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Ready for the Future?

Becoming Digital Sprinters: Talent,
Technology and Innovation
as game changers

Commissioned by

Google

ABOUT THE REPORT

Origins and rationale

In 2020, Google developed the 'Digital Sprinters' framework to address how emerging economies can fuel economic development through digital transformation. This report seeks to quantify the main components of the Digital Sprinters framework using data and analyses produced over the last two decades from three existing global indices --the Network Readiness Index (NRI), the Global Innovation Index (GII) and the Global Talent Competitiveness Index (GTCI), now all under the purview of Portulans Institute. It looks at 27 emerging economies.

This report also seeks to assess more broadly the future readiness of those emerging economies based on digital transformation and cross-cutting factors. It is accompanied by a dynamic website featuring all aspects covered in the report, including a number of 'hands-on tools' to allow interested readers and decision makers to assess and compare the future readiness of national economies and to explore various scenarios.

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Disclaimer

The contents of this report and joint website reflect the views of the authors, who are responsible for the facts and accuracy of the information presented herein. They do not represent the views of Google. Portulans Institute bears the full responsibility of country rankings.



***When I start running earlier than the others,
I appear faster.***

Johan Cruyff, Dutch football player,
three-time “best player in the world”
(Ballon d’Or) between 1971 and 1974

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Executive Summary

Executive Summary

The COVID-19 pandemic has made it clear to all countries how vital it is to be future-ready and that digital transformation is at the core of economic development.

Based on the Digital Sprinters framework developed by Google and selected data from three global indices, the present study attempts to measure the future readiness of 27 emerging economies in Asia-Pacific (APAC), Europe, Latin America, and the Middle East and Africa (MEA), thus developing a first edition of a Future Readiness Economic Index (FREI).

Quantifying Digital Sprinters efforts

The Digital Sprinters framework set forth recommendations for governments, the private sector and other stakeholders across **four pillars: (1) Physical Capital, (2) Human Capital, (3) Technology, and (4) Competitiveness**. The first part of this report seeks to assess 27 emerging economies' performance under these pillars, using data accumulated over the last 20 years by three global indices (the Network Readiness Index, NRI; the Global Talent Competitiveness Index, GTCI; and the Global Innovation Index, GII).

Regarding Physical Capital, the top 5 spots are occupied by Singapore and the smaller Gulf Cooperation Council (GCC) countries. However, Internet penetration in some of the 27 countries remains low, suggesting that in the larger, more populated countries, more investments are needed to provide affordable Internet access of good quality to all. The data indicates that investment in physical capital is a prerequisite to digital acceleration, but is not enough on its own.

Regarding Human Capital, it is found that China and India, the two most populous

countries in the world, are in the top 7 regarding 'lifelong learning' and 'skills matching for jobs'. When it comes to entrepreneurship Chile, Viet Nam and South Africa score high, ranking in the top 7 alongside Singapore, China and Israel. As for bridging the gender gap, the smaller GCC countries have made progress and are in the top 7 with Singapore, Argentina, Chile and South Africa. Overall, there is however room for improvement as investment in AI female talent remains limited in the group of 27.

Regarding Technology, and considering in particular the adoption of advanced technologies such as Cloud computing, AI and a platforms approach, it is noteworthy that Ukraine, Viet Nam and Thailand are in the top 7, and that China emerges as the leader in the group of 27. Israel is in second position, and Singapore in third. India is in 7th position, after Thailand. It is also interesting to note that there is a clear correlation between Governance and Future Technologies adoption, as exemplified by Indonesia and Israel.

Regarding Competitiveness, most of the Emerging Markets Group of 27 score relatively low on institutions. It is important to keep in mind that, under that heading, the leaders are Singapore and the UAE, both of which also score well globally. Chile, South Africa and Colombia complete the top 5, immediately followed by Qatar (6th) and India (7th). With respect to digital government, it is found that authorities in many of the emerging economies are active in using and encouraging digital technologies, with Singapore, Israel, and the UAE leading the way, followed by Brazil, Saudi Arabia, Russia, and Mexico.

What does this tell us about countries' state of Future Readiness?

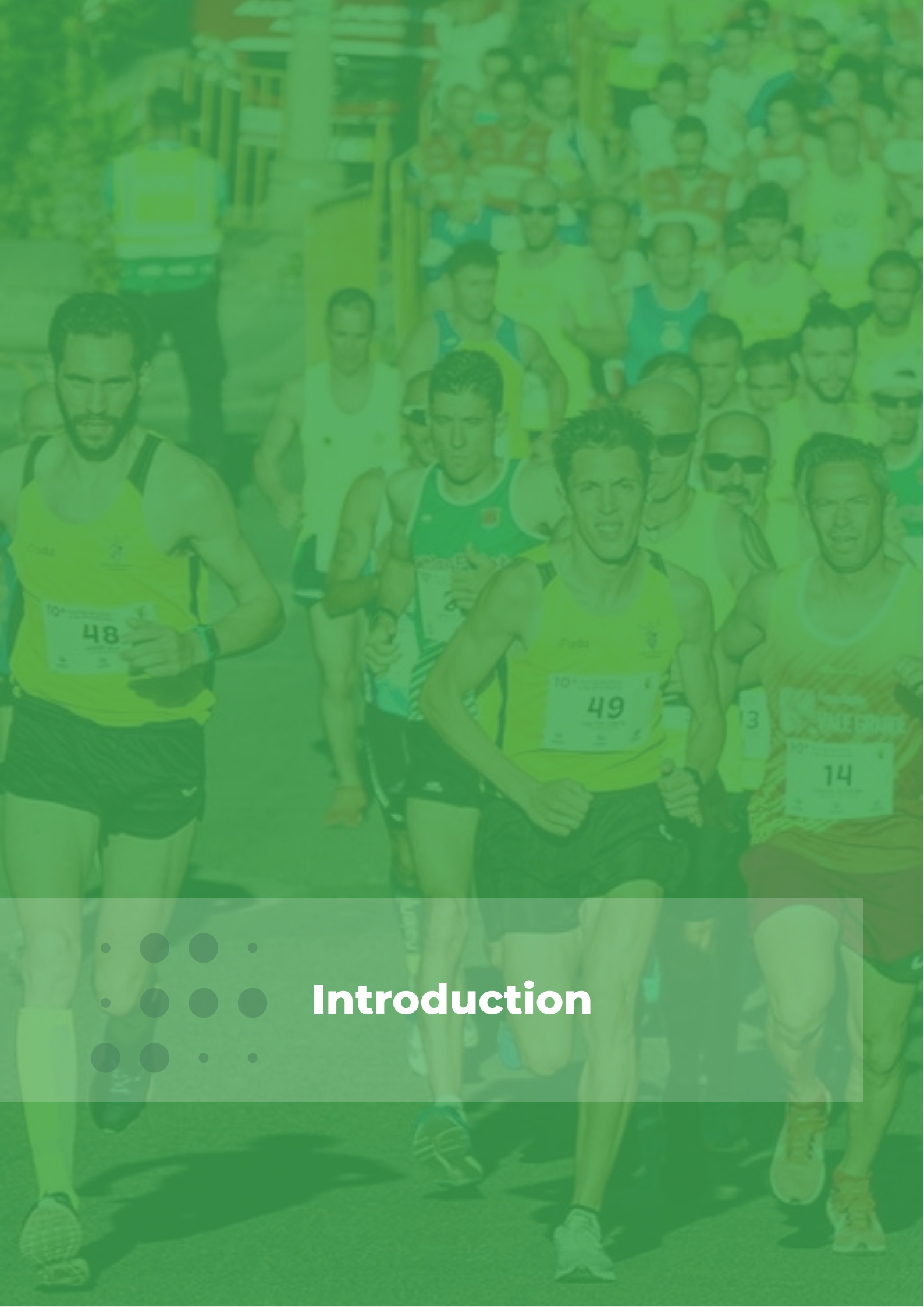
Invoking the data and times series generated by the global indices mentioned above, and applying them to the four pillars of the Digital Sprinters framework, the present research generates a Future Readiness Economic Index (FREI).

The findings emerging from this measurement highlight, inter alia, that future readiness varies considerably around the world. Singapore, China, and the Middle Eastern states of Israel, the UAE, and Qatar are the most future-ready emerging economies. They all have in common solid institutions and infrastructure, and good all-round performances across all FREI pillars. Singapore occupies the pole position globally.

It is also clear, and worth noticing, that countries that are not scoring high in overall future readiness often do so

because of a weakness in a particular pillar. In such situations, a natural question for policy makers would be: what if we focused our investments and efforts on that particular area? This is where the simulation capabilities proposed as part of the FREI report come in.

A novel simulation online tool: What if? To answer this very last challenge posed by the Future Readiness Economic Index, a dedicated interactive online tool has been created. Through a simple and highly intuitive interface, policy makers and analysts can visualise what impact a targeted policy (e.g. focusing on one particular sector of the FREI model) would have on the overall future readiness (and ranking) of their economy. We expect that this tool will be the source of productive thinking and discussions among key decision makers, in all parts of the world. Please visit <http://portulansinstitutefrei.com> to access this online tool.



Introduction



Introduction

That the past year has been one of disruption in more ways than one is an understatement. One of the well-known consequences of the COVID pandemic has been the exponential increase in the use of digital technologies and services. This can be seen as an opportunity to deepen and widen the digital transformation that was already underway before the 2020s. Nowhere is this more valid than in emerging markets, which may have the most to gain from greater digitalisation.

It was against this backdrop that Google released its report [The Digital Sprinters: Driving Growth in Emerging Markets](#) in November 2020. In it, the company proposes a framework that contains 13 recommendations on digital policies that can facilitate digital transformation in emerging markets. Particular attention is paid to 16 countries around the world that showcase examples of digitalisation's beneficial impact on societies and economies, but where there is also scope to step up digital transformation further.

Digital transformation is, however, a means rather than an end in itself. Indeed, the report on the Digital Sprinters refers to digital transformation as “the use of either digital technologies or data to [advance](#) human activities” and how it can encourage inclusive growth and sustainable development. For this reason, the report was also accompanied by a [study](#) that estimated the potential economic impact if the potential of digitalisation were realised.

Beyond measuring the potential impact of the gains of digital transformation, it is important for countries to be able to assess how far they have come in relation to certain benchmarks or objectives. The present study does that by matching the Digital Sprinters framework with three indices—the [Global Innovation Index](#) (GII), the [Global Talent Competitiveness Index](#) (GTCI), and the [Network Readiness Index](#) (NRI)—and analysing how 27¹ emerging economies perform in the most relevant dimensions.

Subsequently, the report presents a novel approach for evaluating the future readiness of countries. In particular, future readiness is seen as the combination technology-talent-innovation that is underpinned by solid institutions and infrastructure. The report analyses how well the emerging economies perform in the Future Readiness Economic Index and discusses how they can leverage the powerful combination of technology-talent-innovation to enhance their ability to prepare for, adapt to, and shape their future.

¹ Argentina, Brazil, Chile, China, Colombia, Egypt, India, Indonesia, Israel, Jordan, Kenya, Kuwait, Lebanon, Mexico, Morocco, Nigeria, Peru, Qatar, Russia, Saudi Arabia, Singapore, South Africa, Thailand, Turkey, Ukraine, United Arab Emirates, and Viet Nam.



Digital Sprinters





Digital Sprinters

Accelerating with traction

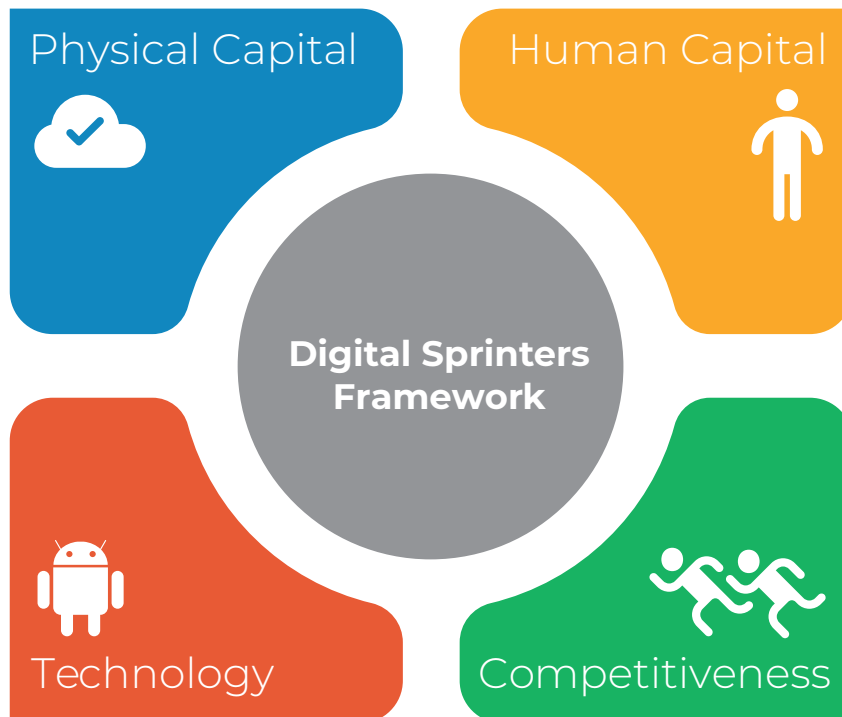
In its 2020 Digital Sprinters Report, Google presented a framework for encouraging digital transformation in emerging economies. This framework is built around four axes: physical capital, human capital, technology, and

competitiveness. Within this framework, the report puts forward 13 specific recommendations on digital policies for sustainable and inclusive growth, covering a range of topics including Internet access, digital skills, gender equality, Artificial Intelligence, the platform economy, and digital government (Figure 1).

Digital Sprinters

by Google

Figure 1: Digital Sprinters Framework





An important part of policy making and analysis is measurement. Policies need to be evaluated by setting benchmarks and objectives against which performances can be gauged and comparisons can be made. A valuable tool in measuring policies and their impact is the [composite indicator](#). Sometimes there are multiple facets to an issue, and a composite indicator that includes several dimensions might be better placed to capture such complexity than any single indicator. Well-known examples are the World Bank's [Doing Business](#) project, the World Economic Forum's [Global Competitiveness Report](#), and the United Nations Development Programme's [Human Development Index](#).

Three composite indicators that are particularly relevant to the Digital Sprinters Framework are the [Global Innovation Index](#) (GII), the [Global Talent Competitiveness Index](#) (GTCI), and the [Network Readiness Index](#) (NRI). Each of them includes pillars and sub-pillars that have a bearing on one or more of the policy recommendations flagged in the report on Digital Sprinters. Drawing on the results and analyses of the most recent GII, GTCI, and NRI reports, this section dives into the four themes of the Digital Sprinters framework to quantitatively assess the performances of the 27 emerging economies in various aspects of digital transformation.

Physical Capital

The pillar related to physical capital includes one critical recommendation: ensure affordable Internet access for all. Although Internet access has grown tremendously over the past decade, it has only reached an estimated [57 percent of the world's households](#), which means that more than one-third of global households are still without Internet access at home. Something similar can be said regarding affordability. Despite more and more people being able to afford digital devices and services, they are still [too expensive for many people](#). For instance, the average prices of mobile voice and mobile data baskets in developing countries were estimated to be, respectively, 5.5 percent and 5.3 percent of GNI per capita in 2019—well above the affordability target of 2 percent set by the

[UN Broadband Commission for Sustainable Development](#).

Variables related to both Internet access and affordability of digital devices and services are included in the NRI's Access sub-pillar. Table 1 presents how the 27 emerging economies performed in this sub-pillar in NRI 2020. It can be seen that Singapore and the Arab states of Qatar, UAE, Saudi Arabia, and Kuwait have the five highest scores in the sample. It is perhaps surprising to see that Israel is not ranked higher given its digitally advanced high-tech sector. This can in part be attributed to a digital infrastructure that predates 2010. This situation is, however, likely to change in view of the country's [National Digital Program for 2017-2022](#) and its recent [legislation](#) approving the deployment of fibre optic infrastructure.

Table 1: Arab countries and Singapore are the best in class in Internet access and affordability (global ranks and scores in the NRI 2020 Access sub-pillar)

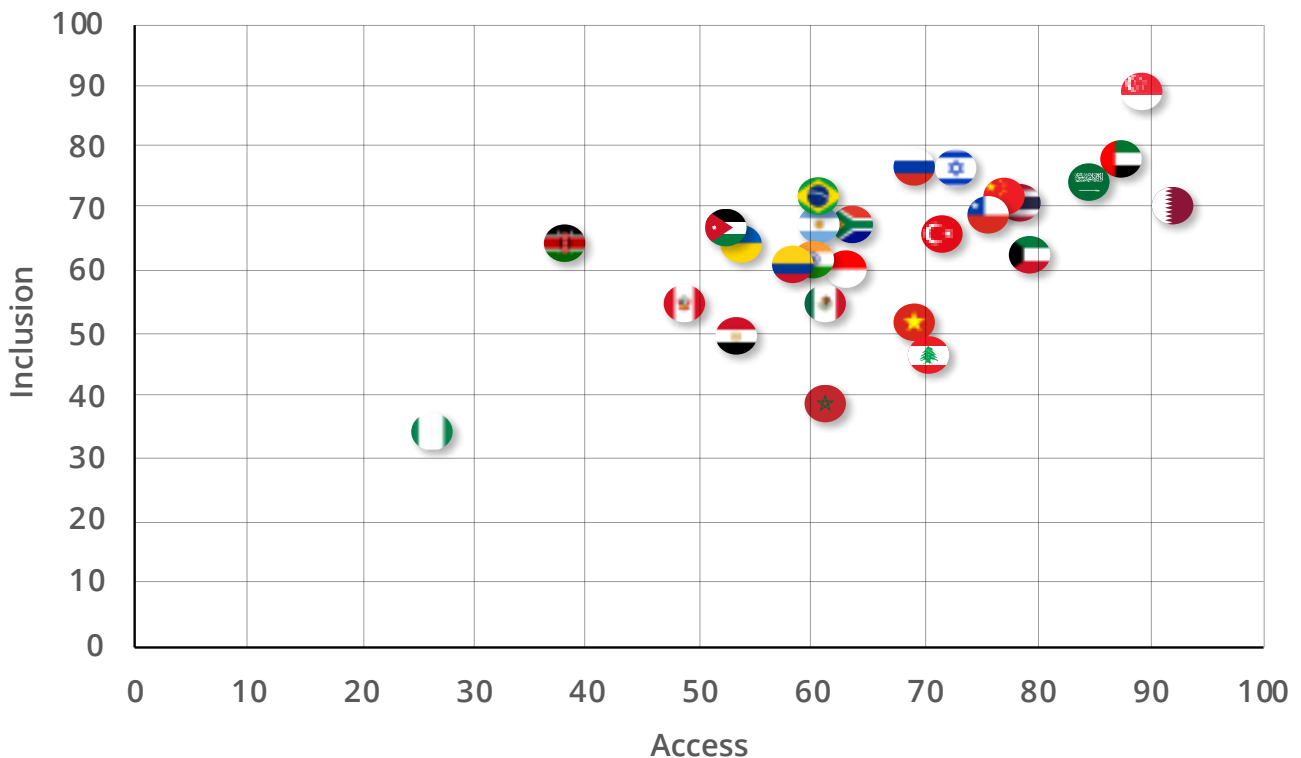
	Country	Access Rank	Access Score
	Qatar	2	92.28
	Singapore	5	89.71
	United Arab Emirates	10	87.79
	Saudi Arabia	19	84.80
	Kuwait	34	79.83
	Thailand	39	78.64
	China	42	77.74
	Chile	43	76.39
	Israel	53	72.11
	Turkey	54	71.81
	Lebanon	57	70.69
	Russia	59	69.68
	Viet Nam	60	69.14
	Indonesia	68	63.24
	South Africa	69	61.79
	Mexico	70	61.70
	Morocco	71	61.67
	Argentina	72	60.87
	Brazil	73	60.50
	India	74	59.96
	Colombia	75	59.74
	Ukraine	79	54.12
	Egypt	80	53.81
	Jordan	81	52.99
	Peru	87	49.29
	Kenya	101	38.61
	Nigeria	119	26.11

Note: Scores fall within the range of 0 (lowest) and 100 (highest).

Ensuring affordable access to the Internet at the country level is of paramount importance (and is recognised as such by its inclusion in the UN's [Sustainable Development Goals](#)). In addition, there is a need to ensure that this access is universal and that digital divides are minimised. This is also pointed out in the report on Digital Sprinters, which stresses the significance of expanding access in rural areas and gives the Alphabet project [Taara](#) in Kenya as one example.

For this reason, the NRI features an Inclusion sub-pillar that considers possible digital divides along the lines of gender, geographic location, and socioeconomic status, among others. To be sure, countries that do well in terms of overall affordable access to digital technologies tend to also be among the countries with the most inclusive digital policies and outcomes. However, Figure 2 illustrates that this is not automatic and that governments must make inclusion, as well as access, a priority in their digital transformation strategies.

Figure 2: Positive correlation, but good digital access does not always extend to everyone (scores in the NRI 2020 Access and Inclusion sub-pillars)



Note: Scores fall within the range of 0 (lowest) to 100 (highest).



It was against such a backdrop of low Internet access and persistent urban-rural digital divides that the [Digital India](#) initiative was launched by the Indian government in 2015. One of the success stories since then is how Jio—a subsidiary of Reliance Industries—has revolutionised the market and contributed to [getting hundreds of millions of Indians online](#). The digital transformation in India is by no means complete, but further government efforts and private sector initiatives like Jio’s partnerships with [Google](#) and [Microsoft](#) are helping the progress [keep apace](#).

Going beyond digital infrastructure

So far, the discussion on physical capital has centred on universal affordable access to digital technologies and services and therefore, by extension, on infrastructure

directly associated with information and communications technologies. There is, however, more to physical capital than digital infrastructure that, moreover, might have a bearing on the digital economy and society. After all, it is hard to imagine affordable access to the Internet without a reliable electricity supply. Or, as a recent article bluntly puts it, [“no power, no digital transformation”](#).

Results for the emerging economies are presented in Table 2. It is similar to Table 1 (Access sub-pillar) in that several of the top performers are the same. Indeed, Qatar, the UAE, Singapore, and Kuwait feature in the top 5 in both tables. The one notable difference is the strong performance of China, which is hardly surprising given the country’s consistently high rates of infrastructure investment.

Table 2: The Middle East and Eastern and Southeastern Asia lead the way among the emerging economies (global ranks and scores in the GII 2020 General Infrastructure sub-pillar)

	Country	General Infrastructure Rank	General Infrastructure Score
	Qatar	2	64.14
	United Arab Emirates	5	50.14
	China	6	48.08
	Singapore	11	45.03
	Kuwait	35	34.20
	Saudi Arabia	39	32.91
	Indonesia	40	32.83
	Israel	43	31.52
	India	46	30.94
	Thailand	50	30.51
	Chile	53	29.60
	Viet Nam	55	29.35
	Turkey	57	28.82
	South Africa	70	26.35
	Russia	72	25.91
	Morocco	73	25.49
	Mexico	78	23.93
	Colombia	88	21.73
	Lebanon	93	21.16
	Ukraine	95	20.25
	Argentina	96	20.22
	Peru	105	19.09
	Brazil	108	18.93
	Jordan	115	17.53
	Egypt	116	17.40
	Kenya	119	15.38
	Nigeria	126	10.06

Note: Scores fall within the range of 0 (lowest) to 100 (highest).



Human Capital

The Digital Sprinters report emphasised three recommendations with respect to human capital:

- Foster digital skills development
- Encourage entrepreneurship and start-ups
- Address the gender gap

Foster digital skills development

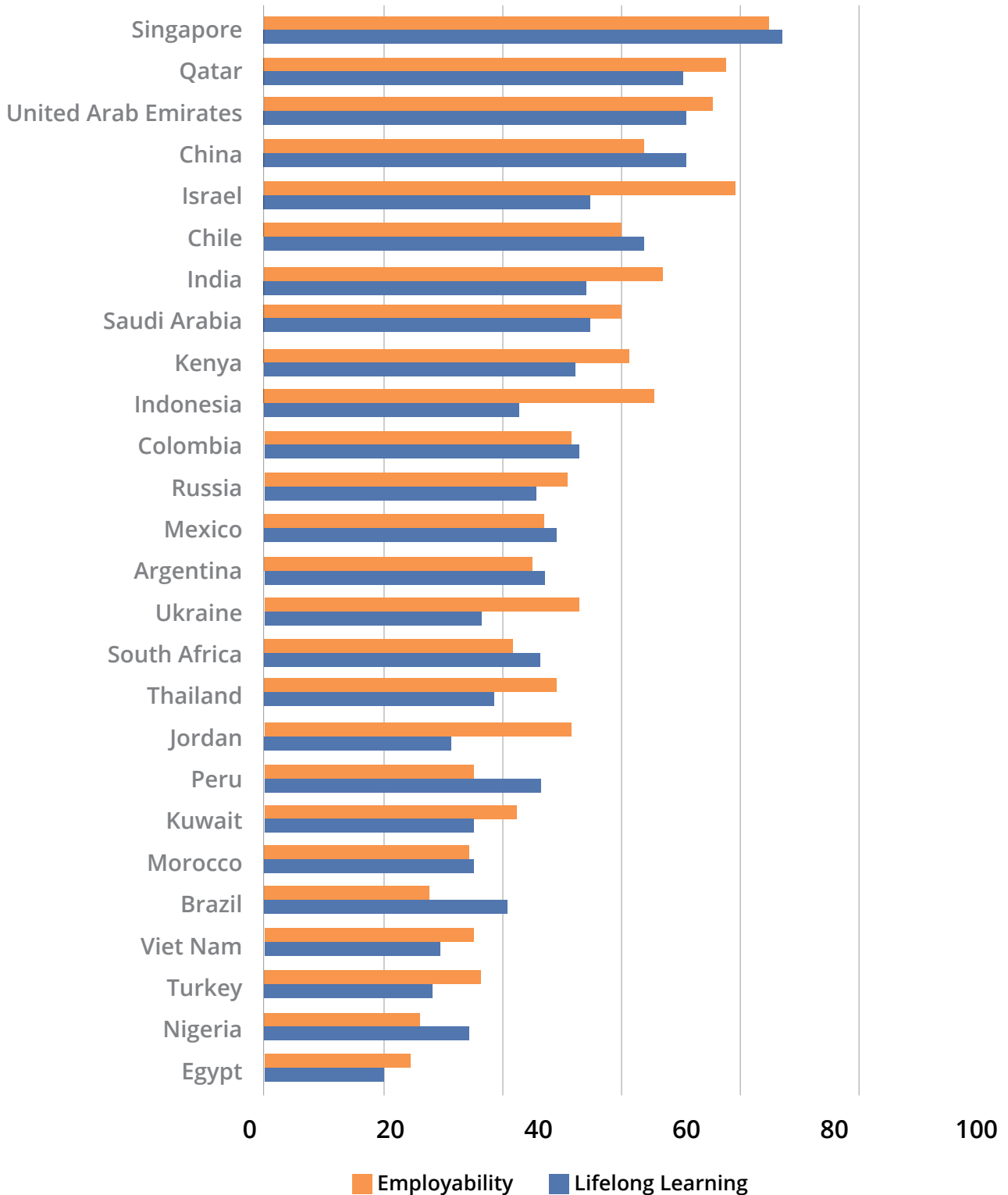
Two important points that are raised in the context of digital skills are the need for continuous learning and education and the value of skills matching. These aspects are captured in the GTCI by the Lifelong Learning sub-pillar and the Employability sub-pillar, respectively. Countries that do well in one dimension are also likely to do well in the other one (Figure 3). There are exceptions, though, such as Israel, Indonesia, and Jordan each having a relative strength in matching labour market demands and workforce supply through lifelong learning. The situation is the opposite in countries like Brazil and Peru, where lifelong learning, especially through training in firms, does not appear to translate into solid employability, which suggests that more attention needs to be paid to the quality of the training.

Singapore is a case in point here, as it is the strongest performer of the 27 emerging economies considered, both for Employability and Lifelong Learning (with global ranks of 4th and 3rd, respectively). The country's government has been proactive in both areas, as illustrated by two successful initiatives: [SkillsFuture](#) and [MyCareersFuture](#). The former benefitted some 540,000 people and 14,000 firms in 2020, whereas the latter supported some 2.77 million job applications in 2019.

Colombia is also worth noting here. Although it is not a top performer in the rankings, Employability and Lifelong Learning are two of the country's strongest sub-pillars in the GTCI 2020. This can in part be attributed to the number of initiatives launched in the country to increase Internet access and boost digital skills, including the 2018-2022 plan for greater digital transformation put in place by the Ministry of Information and Communication Technologies: "[El Futuro Digital es de Todos](#)".

At the multilateral level, the joint ITU-ILO initiative "[Digital skills for youth](#)" jobs deserves mentioning: The two international organisations are partnering with governments, firms, NGOs, universities, and other stakeholders with the aim of providing 5 million young people with job-ready digital skills by 2030.

Figure 3: Performances in skills matching and lifelong learning tend to go together (global scores in the GTCI 2020 Employability and Lifelong Learning sub-pillars)



Note: Scores fall within the range of 0 (lowest) to 100 (highest). Lebanon does not feature in the figure because it was not included in GTCI 2020.



Encourage entrepreneurship and startups

























This important topic forms part of GTCI's sub-pillar on Talent Impact. One notable difference with the performances in this dimension (Table 3) is the absence of Middle Eastern countries among the top performers. In fact, the top 5 emerging economies only include one country from the Middle East—Israel—while the others are from Eastern and Southeastern Asia (Singapore, China, and Viet Nam) or Latin America (Chile).

Given its reputation as a startup nation par excellence, it is only to be expected that Israel does particularly well with respect to Talent Impact. Its status as a [world leader](#) in its rate of engineers, its venture capital availability, and its public-private-academic partnerships are just some of the factors that have contributed

to the country's successful entrepreneurial ecosystem. With one of the highest [AI skills penetration](#) rates around, Israel has the human capital to retain its status going forward.

One of the common denominators of the emerging economies that do relatively well in Talent Impact is government support for access to finance. For instance, the fact that Chile has become one of Latin America's most vibrant entrepreneurial hubs is partly due to the government setting up the start-up accelerator [Start-Up Chile](#) in 2010. Another example of public support in financing innovation and entrepreneurship is the success with which the Indian government—sometimes in partnership with established companies or other organisations—has used two grant instruments: [incubators and challenge grants](#).

Table 3: GTCI's talent impact sub-pillar includes entrepreneurship variables (global ranks and scores in the GTCI 2020 Talent Impact sub-pillar)

	Country	Talent Impact Rank	Talent Impact Score
	Singapore	2	65.17
	China	15	57.69
	Israel	17	51.60
	Chile	30	41.52
	Viet Nam	32	40.04
	India	45	32.18
	South Africa	47	31.58
	Mexico	48	30.98
	Thailand	49	29.73
	Turkey	53	26.02
	Argentina	55	25.49
	United Arab Emirates	61	23.94
	Russia	64	23.16
	Qatar	65	22.85
	Egypt	67	21.88
	Ukraine	73	19.30
	Peru	74	19.29
	Colombia	75	19.03
	Kuwait	76	18.76
	Saudi Arabia	78	17.77
	Jordan	79	17.63
	Morocco	85	15.62
	Brazil	86	15.26
	Indonesia	91	14.24
	Nigeria	98	12.11
	Kenya	102	11.33

Note: Scores fall within the range of 0 (lowest) to 100 (highest). Lebanon does not feature in the table because it was not included in GTCI 2020.



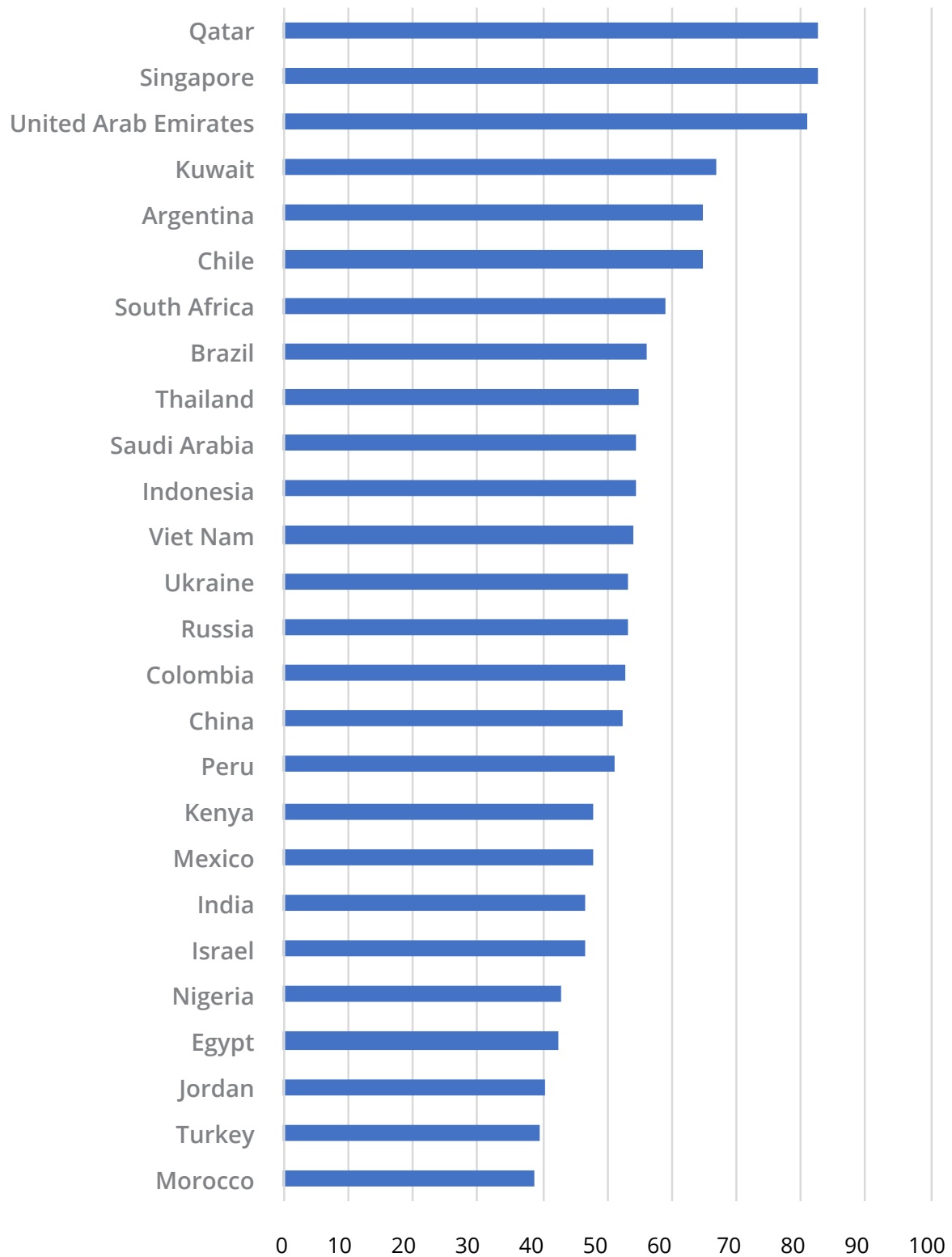
Address the gender gap

The Digital Sprinters report made the point that any type of labour market discrimination needs to be tackled, including on issues related to access to finance, education, and growth opportunities at work. This is also the concern of GTCI's Internal Openness sub-pillar, which covers discrimination against minorities, immigrants, women, and members of lower socio-economic classes (Figure 4). In GTCI 2020, three of the emerging economies were among the best performers in the world: Qatar (6th), Singapore (7th), and the UAE (9th). Indeed, the GTCI 2018 report [Diversity for Competitiveness](#) found that the latter two states are part of a small group of countries that are strongly committed to gender diversity and collaboration among people with different knowledge, experience, and perspectives. Several factors, including

the regulatory framework, explain why these countries have been successful in achieving an environment of openness. One important aspect that is illustrated in the case of Singapore is the value of political will and a commitment to diversity.

There is always room for improvement, though, and countries need to make continuous efforts to address any inequities and inequalities in their labour markets, such as [Qatar's legislations](#) last year to increase migrants' labour mobility and put in place a non-discriminatory minimum wage. And although Singapore and South Africa are two of the countries with the [lowest gender gaps](#) in terms of share of AI professionals, it is nevertheless the case that all countries need to multiply their efforts to increase the pool of female AI talent.

Figure 4: The labour markets of Qatar, Singapore, and the UAE are the least discriminatory among the emerging economies (scores in the GTCI 2020 Internal Openness sub-pillar)



Note: Scores fall within the range of 0 (lowest) to 100 (highest). Lebanon does not feature in the figure because it was not included in GTCI 2020.



Technology

This third pillar of the Digital Sprinters framework is the basis of four concrete recommendations:

- Promote the adoption of Artificial Intelligence
- Promote innovative uses of data
- Encourage movement to the cloud
- Enable an inclusive digital payments ecosystem

Hence, part of the focus here is on issues related to innovation in emerging technologies, such as AI, cloud computing, and big data analytics. Such innovation is covered by the GII's Innovation Outputs sub-index, which consists of two pillars:

Knowledge & Technology Outputs and Creative Outputs. Table 4 presents the performances of the emerging economies with respect to Innovation Outputs and its associated pillars. GII data show that China, Israel, and Singapore are clearly ahead. They are followed by Ukraine and Viet Nam, both of which are effective in translating innovation investments into innovation outputs. [Viet Nam is particularly noteworthy](#) in that its overall GII performance (i.e. innovation inputs as well as innovation outputs) has improved considerably over the years (42nd in 2020, up from 71st in 2014) and that is one of four innovation achievers that have punched above their weights by outperforming expectations based on their levels of development.

Table 4: China, Israel, and Singapore have an innovative edge among the emerging economies (scores and global ranks, in parentheses, in the GII 2020 Innovation Outputs sub-index)

	Country	Innovation Outputs	Knowledge & Technology Outputs	Creative Outputs
	China	51.04 (6)	55.08 (7)	47.00 (12)
	Israel	45.73 (13)	55.55 (4)	35.90 (26)
	Singapore	43.02 (15)	46.13 (14)	39.91 (18)
	Ukraine	32.49 (37)	35.13 (25)	29.86 (44)
	Viet Nam	32.17 (38)	31.66 (37)	32.67 (38)
	Thailand	27.91 (44)	28.55 (44)	27.26 (52)
	India	27.66 (45)	34.72 (27)	20.61 (64)
	Turkey	25.44 (53)	23.22 (57)	27.66 (50)
	United Arab Emirates	25.28 (55)	16.20 (78)	34.36 (34)
	Mexico	24.80 (57)	23.36 (55)	26.24 (54)
	Russia	24.62 (58)	26.43 (50)	22.81 (60)
	Brazil	20.94 (64)	23.26 (56)	18.61 (77)
	Chile	20.74 (66)	19.86 (64)	21.63 (61)
	South Africa	20.48 (68)	21.18 (62)	19.78 (70)
	Morocco	20.42 (69)	21.87 (60)	18.97 (75)
	Qatar	19.62 (72)	15.38 (85)	23.85 (58)
	Argentina	18.40 (73)	17.22 (75)	19.57 (71)
	Colombia	18.02 (74)	17.87 (72)	18.16 (80)
	Indonesia	17.85 (76)	17.94 (71)	17.76 (83)
	Saudi Arabia	17.40 (77)	14.62 (88)	20.18 (69)
	Kenya	17.22 (78)	18.44 (70)	16.01 (91)
	Kuwait	17.17 (79)	17.80 (73)	16.53 (88)
	Lebanon	17.07 (80)	16.97 (76)	17.16 (85)
	Jordan	16.57 (81)	15.63 (82)	17.51 (84)
	Egypt	16.55 (82)	19.67 (65)	13.43 (101)
	Peru	13.76 (98)	10.90 (112)	16.62 (87)
	Nigeria	10.44 (121)	9.43 (120)	11.46 (110)

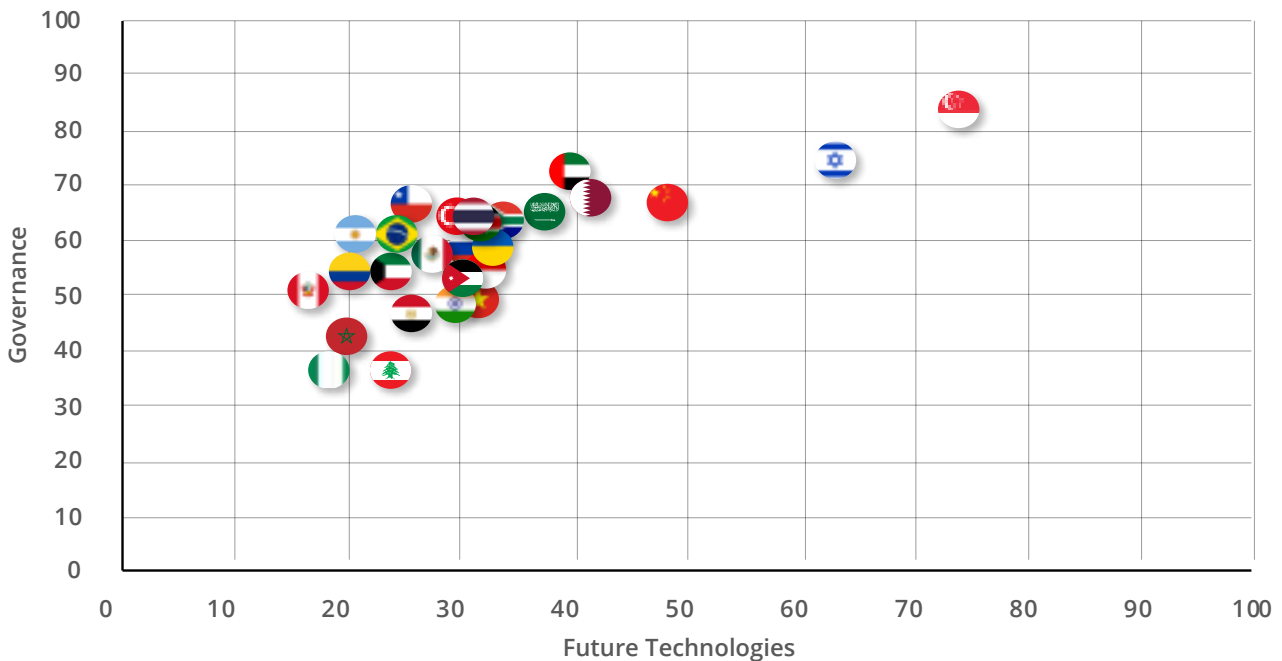
Note: Scores fall within the range of 0 (lowest) to 100 (highest).

The Digital Sprinters report highlighted the role of governments in stimulating technological innovations, be it by supporting AI research, encouraging data sharing, or adopting privacy and data security standards. There are indeed numerous examples of such initiatives among the emerging economies including in AI.

The relevance of governments—and governance, more generally—to technology innovations is also evident in the NRI. In

particular, Figure 5 shows that there is a clear positive correlation between governance and future technologies. It is telling that three of the emerging economies mostly engaged in future technologies—China, Singapore, and the UAE—and with the highest scores in governance were also among the first countries in the world to formulate and adopt [national AI strategies](#). In fact, in October 2017 the UAE became the first country in the world to appoint a [Minister for Artificial Intelligence](#).

Figure 5: Positive correlation between Governance and Future Technologies



Note: Scores fall within the range of 0 (lowest) to 100 (highest).



Another pioneer in AI governance is [Mexico](#), which launched its national AI strategy in 2018. What sets it apart from other early adopters of AI strategies is the emphasis placed on the [social impacts of AI](#), including

on issues of financial inclusion, corruption, and public health. This has since become a common theme in the Latin American region along with an emphasis on public consultations and talent fostering.



Milkha Singh, also known as The Flying Sikh, was a fantastic Indian track and field sprinter. He still is the only athlete to have won gold at 400 metres at the Asian Games as well as the Commonwealth Games. He also won gold medals in the 1958 and 1962 Asian Games. He represented India in the 1956 Summer Olympics in Melbourne, the 1960 Summer Olympics in Rome and the 1964 Summer Olympics in Tokyo. He was awarded the Padma Shri, India's fourth-highest civilian honour, in recognition of his sporting achievements.

Competitiveness

Competitiveness is the broadest of the four pillars that make up the Digital Sprinters. It covers a wide range of issues where stronger competitiveness can have a positive impact on digital transformation. In particular, five recommendations are put forward:

- Adopt balanced competition policies
- Enable the platform economy
- Adopt tax policies for a digital economy
- Commit to open digital trade
- Advance a digital government

None of these five recommendations can be implemented in the absence of effective institutions. Indeed, institutions are a fundamental element in any effort to increase competitiveness and—because of their importance as enablers for innovation, talent, and network readiness, respectively—are included in the GII, GTCI, and NRI models.

The GII even has a pillar dedicated to institutions (Table 5). Comparing the performances in the GII Institutions pillar with the results in other dimensions discussed above makes it clear that the quality of institutions is a weak point in a number of emerging economies. Of the sample, only Singapore and the UAE make it into the top quartile, with Israel and Chile joining them in the top 50.

In the case of South Africa, institutions is described as one of its strengths in the GII, where it is the country's third-best pillar. In the context of digital transformation, the institutional environment has, among other factors, had positive effects on [digital infrastructure](#), as liberalisation and competition have contributed to expanding the broadband network in the first mile, the middle mile, and the last mile. As a result, South Africa is already close to reaching the target of 100 percent mobile broadband coverage.

Table 5: Weak institutions plague several of the emerging economies (global ranks and scores in the GII 2020 Institutions pillar)

	Country	Institutions Rank	Institutions Score
	Singapore	1	94.82
	United Arab Emirates	28	78.82
	Israel	35	75.60
	Chile	38	73.32
	South Africa	55	66.17
	Colombia	57	65.08
	Qatar	58	65.03
	India	61	64.75
	China	62	64.58
	Jordan	63	64.27
	Thailand	65	64.10
	Russia	71	61.54
	Peru	72	61.44
	Mexico	74	61.28
	Morocco	77	60.79
	Kenya	78	59.93
	Brazil	82	58.50
	Viet Nam	83	58.50
	Kuwait	88	56.69
	Ukraine	93	55.59
	Turkey	94	55.38
	Argentina	97	54.30
	Saudi Arabia	102	53.28
	Lebanon	103	52.21
	Nigeria	110	51.08
	Indonesia	111	51.03
	Egypt	115	48.58

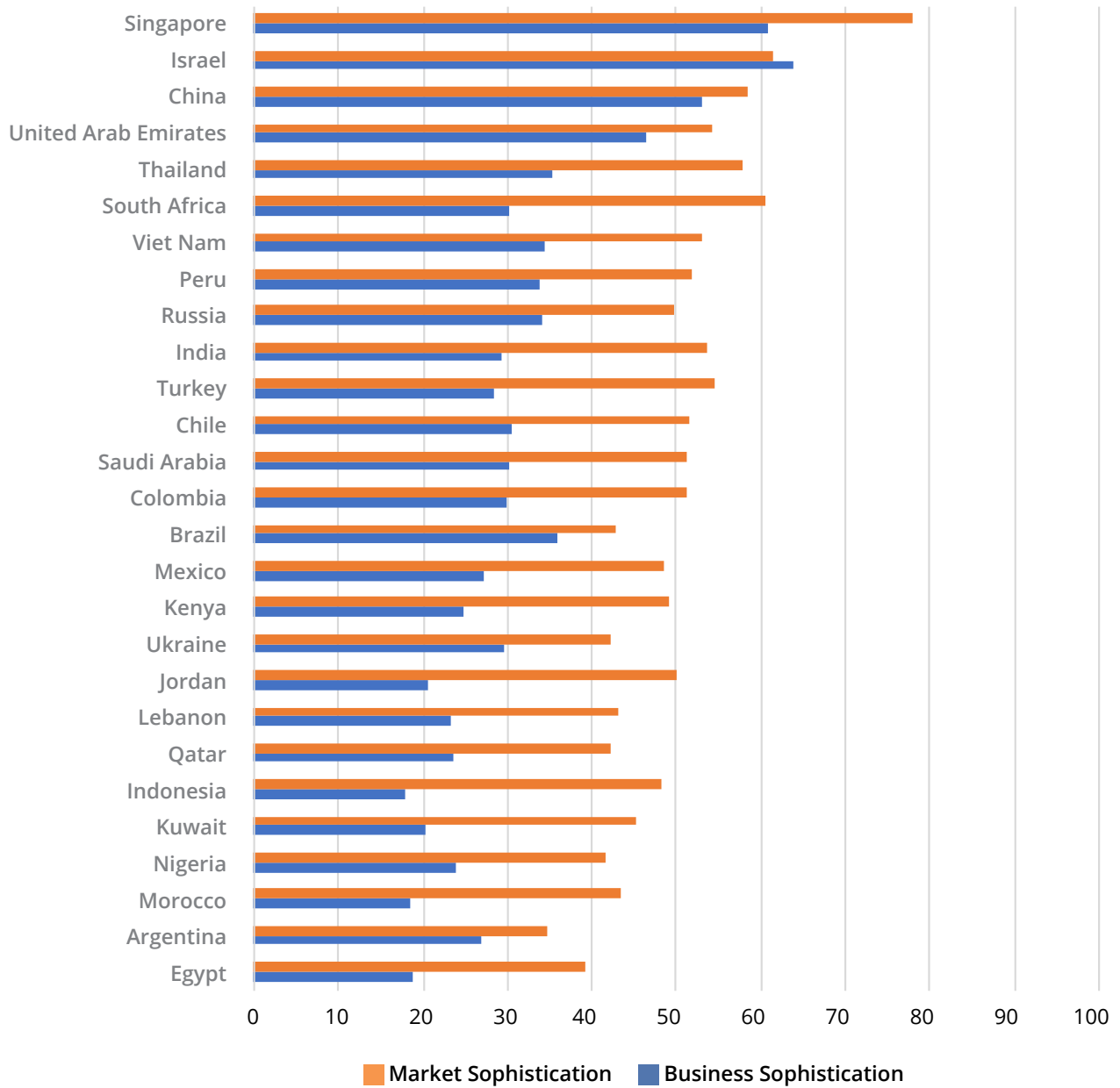
Note: Scores fall within the range of 0 (lowest) to 100 (highest).



The value of competition for innovation is also reflected in the GII's pillars Market Sophistication and, to a lesser extent, Business Sophistication. The former pillar covers such issues as credit, investment, and competition, while the latter pillar focuses more on topics linked to knowledge absorption, partnerships, and clusters, among others. As can be seen in Figure 6, Singapore and Israel are the leaders among the emerging economies in both pillars, although China is not far behind them.

Even though Nigeria performs poorly compared to other countries, it is worth noting that Market Sophistication and Business Sophistication are the country's highest-ranked pillars. An example of how its relative strength in these dimensions has [benefitted the country](#) is how monopolies in the ICT sector have been broken up, leading to increased competition and more affordable access to digital technologies and services.

Figure 6: Singapore and Israel lead the way in Market Sophistication and Business Sophistication (scores in the GII 2020 pillars)



Note: Scores fall within the range of 0 (lowest) to 100 (highest).



Digital Sprinters' final recommendation on digital government is directly linked to the NRI's Governments sub-pillar, which is concerned with the use of digital services by national authorities and their support of investment in emerging technologies, and R&D more generally. Table 6 shows that many of the emerging economies are active in using and encouraging digital technologies. Five of them are in the top quartile of the rankings, and 18 of them are positioned in the upper half. An illustration of this engagement is that four of the eight founding members of the [Open Government Partnership](#) were Brazil, Indonesia, Mexico, and South Africa. In the case of Brazil, the Governments sub-pillar is its highest-ranked dimension in NRI 2020,

and the country has made [digital government a priority](#) in order to make authorities more citizen-centred, open, and efficient.

Although Ukraine's ranking is relatively low among the emerging economies considered, there is reason to believe that this will change because the government is making a strong push to further digitalisation. Most notably, the Ministry of Digital Transformation has launched the [Diia mobile app and portal](#) with the main objective of making 100 percent of public services available online by 2024. This initiative has already led to Ukraine becoming the first country in the world with [digital passports](#), which have proved valuable during the [COVID pandemic](#).

Table 6: Governments are well-positioned to go digital (global ranks and scores in the NRI 2020 Government sub-pillar)

	Country	Government rank	Government score
	Singapore	4	82.17
	Israel	19	64.37
	United Arab Emirates	25	61.34
	Brazil	29	58.03
	Saudi Arabia	32	56.96
	Russia	34	55.36
	Mexico	37	54.76
	Turkey	39	52.44
	Kenya	41	51.30
	China	43	51.10
	India	45	49.21
	Qatar	47	48.23
	Argentina	48	48.14
	Indonesia	53	46.88
	Chile	54	46.75
	Thailand	55	46.74
	Egypt	60	45.35
	South Africa	62	45.30
	Colombia	69	42.77
	Kuwait	70	41.94
	Ukraine	71	41.85
	Morocco	86	36.60
	Viet Nam	87	36.58
	Peru	91	34.52
	Jordan	96	31.01
	Nigeria	99	29.58
	Lebanon	112	24.86

Note: Scores fall within the range of 0 (lowest) to 100 (highest).

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Future Readiness

Future Readiness



The previous section offered an analysis of various aspects of digital transformation by quantitatively exploring how the 27 emerging economies fare in relation to the four pillars of the Digital Sprinters framework. This section builds on and brings together the models underlying the Global Innovation Index (GII), the Global Talent Competitiveness Index (GTCI), and the Network Readiness Index (NRI) in order to construct a Future Readiness Economic Index that evaluates the ability of countries to prepare for, adapt to, and shape the future.

Future Readiness will depend on successful digital transformation as captured in the Digital Sprinters framework together with other foundational factors.

To assess future readiness, we have looked at core existing metrics relating to technology,

talent and innovation from the NRI, GTCI, and GI models. But the future readiness assessment cannot simply be a compilation (or aggregation) of the NRI, GTCI, and GI models, which each have their own philosophy and architecture.

Moreover, the three models have many variables in common, which means there would be redundancies (or biased implicit weighting) if such an approach were taken. For this reason, the future readiness model draws on some of the unique features of the three indices by “deconstructing them”. In the case of the NRI, this relates to dimensions that evaluate the state of digital transformation technologies, the adoption and use of digital technologies, the governance of information and communication technologies (ICTs), and the prevalence of a digital economy. As for the GTCI, it considers the ability to attract,



grow, and retain talent, but does so by selecting the variables that make the most sense when combined with technology and innovation. The GII involves aspects that deal with the R&D environment, the market conditions and business environment for fostering innovation, and the outputs of innovative activities.

Apart from their composite nature (based on the aggregation of separate pillars), the one feature that all three indices have in common is the importance of solid institutions and infrastructure. This makes sense as technology, talent, and innovation do not develop in a vacuum and need, at the very minimum, a strong regulatory and market

environment to thrive. This implies that they do not merely serve as a foundation for technology, talent, and innovation, but that they constitute a crucial ingredient of future readiness in their own right. For instance, they are conducive to political stability and can act as a bulwark against political upheaval and socioeconomic turmoil¹. Institutions and infrastructure are also frequently highlighted in economic literature as one of the drivers of economic growth, which arguably has a positive impact on future readiness².

Ultimately, this yields a model where institutions and infrastructure constitute the foundation for other dimensions (see Appendix III).



Each of the three dimensions of the Technology, Talent, and Innovation framework are themselves made up of four sub-dimensions that are directly drawn from the relevant global indices:

- **Technology:** This pillar recognises that our collective future will require a harmonious integration of people and technology. Technology is mainly defined in this study as digital technologies. The first sub-pillar is therefore concerned with the current state of Digital Transformation Technologies, which encompasses emerging technologies such as AI,

cloud computing, and IoT as well as the access to and affordability of digital technologies, including the Internet. The second sub-pillar, that of People, measures the extent to which a country's individuals, businesses, and authorities adopt and use digital technologies. The third sub-pillar relates to Governance and seeks to capture how conducive the national environment is for a country's participation in the network economy, based on trust, regulation, and inclusion. The fourth sub-pillar is on Digital Economy and deals with the impact of digitalisation on the economy, focusing on the level

of productivity and the use of advanced technologies in the country.¹

• **Talent:** This pillar rests on an input-output framework, where the generation and acquisition of talent represent input and the resulting skills constitute output. Three of the sub-dimensions relate to input. First, there is attracting talent, which is based on how external openness and internal openness act as a magnet for human skills. Second, there is growing talent, which not only covers education but also lifelong learning and opportunities to grow through collaboration. Third, there is retaining talent, which is concerned with the inclination of workers to stay in the country in view of sustainability and lifestyle. The fourth sub-pillar - Skills - focuses on the employability of the workforce and the existing pool of high-level skills.

• **Innovation:** This pillar is similarly based on an input-output framework, where the input side involves elements that enable innovative activities and the output side is concerned with the results of these activities within the economy. Three of the sub-pillars relate to input. First, there is an R&D sub-pillar that measures the level and quality of R&D activities by looking at available skills, expenditure, scientific and research

institutions, among other things. Second, there is a sub-pillar related to Market Sophistication, which assesses the market conditions in which businesses operate and innovation occurs. Third, there is a Business Sophistication sub-pillar, which provides a measure of how conducive firms are to innovation activity based on their R&D spending, patent activity, and imports of ICT services. The fourth sub-pillar - Knowledge, Technology, and Creative Outputs - looks at the knowledge and creative goods and services that are a result of innovative activities.

Institutions and Infrastructure form a pillar that itself consists of three sub-pillars: Regulatory Environment, Market Environment, and General Infrastructure. The first of these focuses on overall governance and evaluates the extent to which the rule of law prevails. The Market Environment revolves around the ability of the government to formulate and implement cohesive policies that promote the development of the private sector. Finally, the sub-pillar on General Infrastructure provides a measure of transport and energy infrastructures that facilitate technology, talent, and innovation.

The following sub-section presents and discusses the future readiness of the emerging economies included in this study. However, a few caveats are in order. First, there is some overlap among the NRI, GTCI, and GII; not only in that institutions and infrastructure feature in all of them, but also that they include some indicators that are present in two or even three of them. There can be no such overlaps between the Technology, Talent, and Innovation pillars of the Future Readiness Economic Index, and care has therefore been taken to position

1 The argument that “good” institutions are conducive to political stability can be traced at least as far back as Aristotle (see his treatise Politics).

2 The literature on the role of institutions and infrastructure on economic development is vast. For institutions, Acemoglu and Robinson (2013) summarises the main arguments. For infrastructure, Calderon and Servén (2014) provide a recent overview.



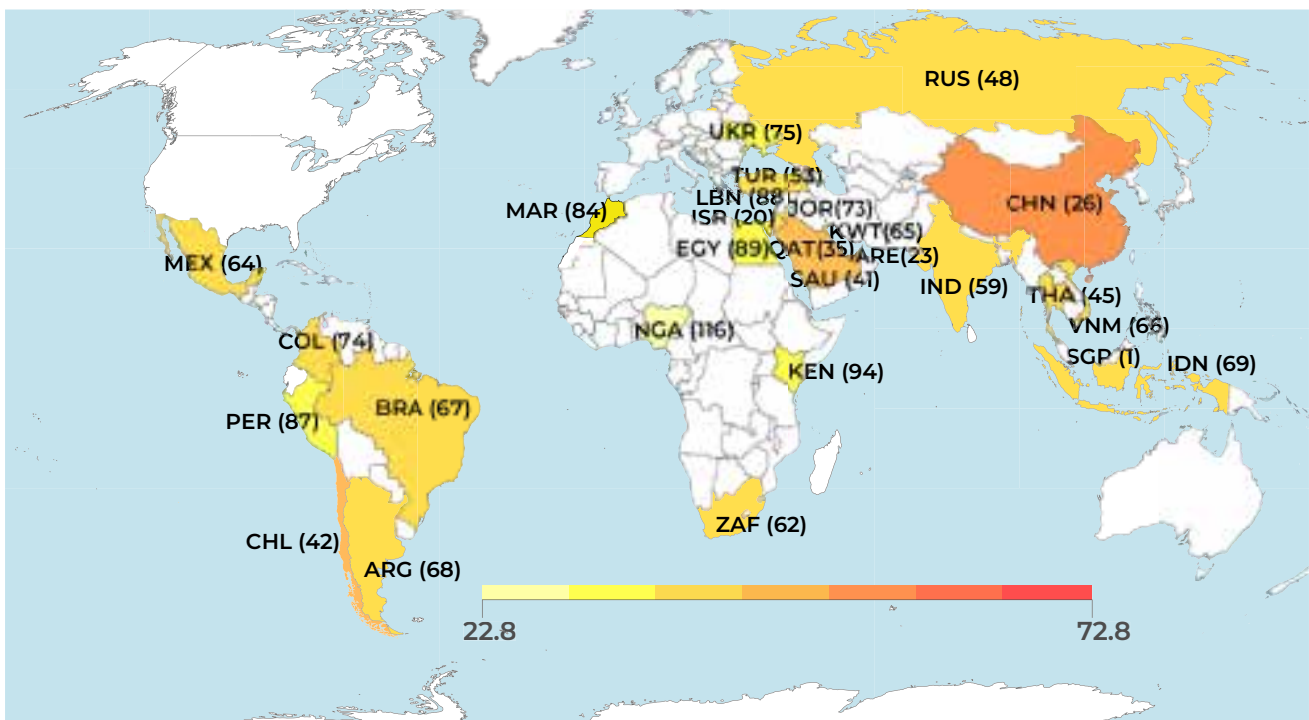
potential overlapping indicators in the most relevant pillar. Second, the three indices have a combined total of more than 200 indicators.

Even though there are some overlapping indicators, and some indicators relate to institutions and infrastructure, it is better to not include all of them. Hence, the calculation of future readiness is based on a subset of the indicators included in the three indices. Third, the three indices differ somewhat in the way they construct composite indicators, e.g. in their usage of

weights and the normalisation of scores. The methodology used here is similar to the approach taken by the GII. The upshot of these three caveats is that the results of future readiness—and, in particular, the Technology, Talent, and Innovation pillars—might in some cases differ somewhat from the results of the NRI, GTCI, and GII studies.




























The selected group of 27 emerging economies is very diverse. Figure 7 hints at some regional tendencies, while Table 7 outlines Future Readiness global ranks (overall and by pillar).

Figure 7: The future readiness of the 27 emerging economies



Note: Global ranks in parentheses. The scale shows scores from the worst-performing emerging economy (Nigeria, 22.8) to the best-performing emerging economy (Singapore, 72.8).

Table 7: Future Readiness global ranks of selected emerging markets (overall and by pillar)

Country	Future Readiness	Institutions and Infrastructure	Technology	Talent	Innovation
 Singapore	1	2	1	1	10
 Israel	20	31	25	25	5
 United Arab Emirates	23	19	26	16	22
 China	26	27	36	42	17
 Qatar	35	26	29	35	64
 Saudi Arabia	41	64	33	50	41
 Chile	42	35	51	43	55
 Thailand	45	49	47	85	33
 Russia	48	79	53	44	45
 Turkey	53	59	55	77	39
 India	59	50	78	86	38
 South Africa	62	60	77	84	34
 Mexico	64	73	61	75	48
 Kuwait	65	67	45	66	82
 Viet Nam	66	68	59	96	44
 Brazil	67	99	62	70	42
 Argentina	68	101	58	51	63
 Indonesia	69	46	71	82	65
 Jordan	73	80	68	58	76
 Colombia	74	70	66	74	61
 Ukraine	75	108	73	56	59
 Morocco	84	55	83	103	74
 Peru	87	90	86	80	87
 Lebanon	88	113	85	79	57
 Egypt	89	106	80	78	97
 Kenya	94	97	93	91	83
 Nigeria	116	121	109	108	119

Note: Note: The darkest blue means the country belongs to the 1st quartile (best performers); medium colour = 2nd quartile; pale colour = 3rd quartile; palest colour = 4th quartile (worst performers).

The remainder of this section summarises the future readiness of each emerging economy in turn, from best performer to worst performer. Further details regarding the future readiness of each country can be found in the Country Briefs.

Top quartile (1st to 31st)

 **Singapore** is the world's most future-ready country. Indeed, it is the highest-ranked country in two of the four dimensions—Technology and Talent—and is second in one dimension (Institutions and Infrastructure). The city-state has a lower rank with respect to Innovation (10th), yet it is still a top 10 country in this pillar. At the sub-pillar level, Singapore is the leading country in five dimensions (Regulatory Environment, Digital Economy, Attract, Grow, and Skills) and is a top 10 performer in four other dimensions. Its two weakest showings relate to retaining talent (35th) and Business Sophistication in Innovation (22nd). In the former case, more could be done to improve a sustainable lifestyle. In the latter case, there is scope to strengthen innovation linkages and increase partnerships among public, private, and academic actors.

 **Israel** is ranked 20th globally in terms of future readiness. This high ranking can primarily be attributed to its impressive performance in Innovation (5th). In particular, the country benefits from world-class Business Sophistication (1st) and Research & Development (3rd), while its position would improve even further with greater Market Sophistication (13th) and innovation Outputs (19th), especially creative outputs. Israel ranks 25th with respect to both Technology and Talent. In the former, it enjoys a strong all-round performance in all four sub-pillars, while the latter is particularly boosted by the country's pool of Skills (7th) and ability to Retain (8th) talent.

The country's weakest pillar, meanwhile, is Institutions and Infrastructure (31st), where a solid Regulatory Environment and Market Environment (both 28th) are offset by a sub-par level of General Infrastructure (52nd).


 The **United Arab Emirates** is placed 23rd in the global future readiness rankings and features in the top quartile in all four pillars. It achieves its highest rank in the Talent (16th) dimension, where an impressive ability to Attract (4th) and Grow (6th) human skills is offset by a weaker capacity to Retain (47th) talent. The country's second-best pillar relates to Institutions and Infrastructure (19th), where the state of the General Infrastructure (6th) is particularly encouraging. High digital usage and skills among individuals contribute to the People (3rd) dimension of the Technology (26th) pillar being the UAE's best-performing sub-pillar. However, the overall result of the pillar is hampered by a low level of digital content creation in the Digital Transformation Technologies (37th) sub-pillar, among others. As for Innovation (22nd), creative goods and services boost the Knowledge, Technology, and Creative Outputs (12th) sub-pillar, but more could be done to strengthen Market Sophistication (38th).

 **China** is the fourth and final of the selected emerging markets to make it into the top quartile in the future readiness rankings (26th). Its main strength relates to Innovation (17th), which is mainly due to an impressive level of Knowledge, Technology, and Creative Outputs (10th) and Research & Development (16th). The country also boasts an excellent General Infrastructure (2nd), but its overall performance in the Institutions and Infrastructure (27th) pillar is weighed down by a less-than-favourable Regulatory Environment (60th). With respect to Technology (36th), China mainly benefits from strong digital usage and investment by the private sector (People, 19th), while



there is particular scope to improve its digital content creation (Digital Transformation Technologies, 59th). Its weakest pillar is Talent (42nd), where the country's pool of Skills (13th) is particularly impressive, but much more can be done to Attract (86th) human capital.

Second quartile (32nd to 62nd)

 **Qatar** finds itself just outside the top quartile when it comes to future readiness (35th). The country's highest rank relates to its Institutions and Infrastructure (26th), which is primarily due to its world-class General Infrastructure (5th). Qatar is also in the top quartile in the Technology (29th) pillar, where high digital usage and skills among its People (12th) and a solid Digital Economy (18th) are offset by a weaker level of Digital Transformation Technologies (50th) as a result of moderate engagement in emerging technologies and a low level of digital content creation. The country's weakest pillar is Innovation (64th). It is positioned in the lower half of the rankings in all four sub-pillars, with the low level of Market Sophistication (95th) particularly discouraging. As for Talent (35th), Qatar is one of the top performers when it comes to attracting human skills (3rd), but there is considerable scope for improvement in the other sub-pillars.

 **Saudi Arabia** is ranked 41st globally in terms of future readiness. Its highest rank relates to Technology (33rd), which can be attributed to solid showings in the digital usage and skills of its People (26th), the level of its Digital Economy (30th), and the state of Governance (32nd). Research & Development (27th) contributes positively to the country's performance in the Innovation (41st) pillar, but more could be done to encourage a greater inflow of high-tech and digital content (Business

Sophistication: 88th). Saudi Arabia also features in the upper half when it comes to Talent (50th), with particular room to improve its ability to Attract (68th) human skills. The greatest challenge for improving its future readiness is to improve its Institutions and Infrastructure (64th), especially on issues pertaining to doing business and resolving insolvency, which hamper the Market Environment (108th).

 **Chile** is the most future-ready Latin American country and is placed 42nd in the global rankings. Its best-performing pillar is Institutions and Infrastructure (35th), where the country's Regulatory Environment (24th) is a particular strength. Chile has a slightly lower ranking in the Talent (43rd) pillar, where a top-quartile position with respect to growing talent (26th) is offset by weaker performances in the Retain (55th) and Skills (58th) sub-pillars. The lowest-ranked pillars are Technology (51st) and Innovation (55th). In the former case, encouraging digital usage and skills among the People (34th) stand in contrast to lower levels of digital Governance (62nd) and Digital Economy (67th). In the latter case, Market Sophistication (30th) is the highest-ranked sub-pillar, whereas there is particular room for improvement in spurring Knowledge, Technology, and Creative Outputs (71st).

 **Thailand** is ranked 45th in the future readiness rankings, which can primarily be attributed to its state of Innovation (33rd). The country does particularly well in supporting credit and investment that result in a high degree of Market Sophistication (16th), and it also enjoys good levels of Business Sophistication (33rd) and Knowledge, Technology, and Creative Outputs (26th). Thailand makes it into the upper half in the rankings in all sub-pillars related to Technology (47th), partly boosted by the country's export-oriented Digital Economy (39th). The country also

finds itself in the upper half in all sub-pillars of the Institutions and Infrastructure (49th) pillar, which can primarily be attributed to its conducive Market Environment (29th). Thailand's weakest pillar, meanwhile, is Talent (85th), which includes the country's four weakest sub-pillars (Attract, 82nd; Grow, 71st; Retain, 86th; and Skills, 84th).



Russia finds itself in 48th place in the future readiness rankings. The country does particularly well in the three pillars of the TTI triangle: Talent (44th), Innovation (45th), and Technology (53rd). In the case of Talent, the Russian workforce boasts excellent Skills (16th), whereas a lack of openness towards foreign investment and ownership, and towards minorities and immigrants, results in a disappointing ability to Attract (115th) talent. As for Innovation, Russia's strength in Research & Development (33rd) is offset by weaker Market Sophistication (74th) and fairly low levels of Knowledge, Technology, and Creative Outputs (61st). When it comes to Technology, the country performs almost equally well in all four sub-pillars, although improving digital-related regulation is a particular concern. The weakest pillar is Institutions and Infrastructure (79th), where improving the Regulatory Environment (95th) is the most pressing challenge facing the country.



Turkey is ranked 53rd in terms of future readiness and makes it into the upper half of the rankings in three of the four pillars. Its best-performing dimension is Innovation (39th), where the levels of Market Sophistication (33rd); Knowledge, Technology, and Creative Outputs (38th); and Research & Development (40th) are encouraging. In the Technology (55th) pillar, Turkey's strengths relate to its digital-related Governance (47th) and its Digital Economy (48th), while the main weakness concerns the state of the country's Digital

Transformation Technologies (67th). The third pillar where Turkey is placed in the upper half is Institutions and Infrastructure (59th), which is primarily boosted by the country's General Infrastructure (54th). Its lowest-ranked pillar, meanwhile, is Talent (77th), where Turkey does well in growing human skills (41st), but poor gender equality, low social inclusion, and weak external openness means that much effort is required to Attract (114th) talent.



India is ranked 59th in the future readiness rankings, and its most encouraging dimension relates to Innovation (38th). More specifically, the pillar includes two of the country's best-performing sub-pillars: Knowledge, Technology, and Creative Outputs (34th) and Research & Development (35th). India also does relatively well with respect to Institutions and Infrastructure (50th), which is due to its General Infrastructure (41st) and Market Environment (46th), whereas its performance in this pillar is mainly hampered by its Regulatory Environment (65th), especially poor regulatory quality and detrimental corruption. The two main dimensions that lower its overall ranking are Technology (78th) and Talent (86th). With respect to the former pillar, India would above all benefit from greater Digital Transformation Technologies (87th) despite the country's engagement in emerging technologies. As for the latter pillar, the most crucial need is to strengthen its ability to Attract (92nd) and Retain (98th) talent.



South Africa is the last of the selected emerging markets to make it into the upper half of the future readiness rankings (62nd). Its best-performing pillar is Innovation (34th), in no small part due to the country's excellent Market Sophistication (9th), including a conducive environment for investment. South Africa's Market (51st) and Regulatory (59th) Environment also has a



positive impact on its global position in the Institutions and Infrastructure (60th) pillar, but there is plenty of scope to improve the country's General Infrastructure (79th). In the case of Technology (77th), the greatest challenge is to boost the digital skills of its People (96th). The adoption of and investment in future technologies, however, is encouraging and benefits the country's state of Digital Transformation Technologies (68th). South Africa's lowest-ranked pillar is Talent (84th), which is primarily dragged down by a weak ability to Retain (109th) human skills that stems from poor sustainability and lifestyle.

Third quartile (63rd to 93rd)



Mexico finds itself just below the median country in the future readiness rankings (64th). Its strength mainly lies in Innovation (48th). Indeed, it makes it into the top quartile in the Knowledge, Technology, and Creative Outputs (24th) sub-pillar—with an impressive output of creative goods—but the levels of Market Sophistication (90th) and Business Sophistication (103rd) leave a lot to be desired. The export-oriented high-tech industry boosts the Digital Economy (35th), which, in turn, has a positive impact on the Technology (61st) pillar. However, more needs to be done to raise access to and engagement in Digital Transformation Technologies (78th). The greatest challenges facing Mexico are to improve Institutions and Infrastructure (73rd) and raise the level of Talent (75th). With regard to the former, a solid Market Environment (36th) is offset by a weak Regulatory Environment (89th) and poor General Infrastructure (80th). As for the latter, improving social inclusion and gender equality would go a long way towards improving the ability to Attract (81st) talent.



Kuwait is positioned close to the median in the future readiness ranking (65th) as well as in two of the four pillars: Institutions and Infrastructure (67th) and Talent (66th). The state of the General Infrastructure (46th) benefits the former, whereas the country's score in this pillar is dragged down by its sub-optimal Market Environment (94th), which would benefit from greater competition and better business conditions. As for Talent, a strong ability to Attract (30th) human skills is primarily offset by a weaker ability to Grow (81st) talent. Kuwait's best-performing pillar, meanwhile, is Technology (45th), which can be attributed to the digital usage among its People (28th). This is in contrast to the country's weakest pillar—Innovation (82nd)—where the most pressing need is to address how the ability of firms to foster their productivity, competitiveness, and innovation potential can be boosted (Business Sophistication: 119th).



Viet Nam is ranked 66th in terms of future readiness. Its key strength is in Innovation (44th), where a top-quartile rank in the sub-pillar related to Knowledge, Technology, and Creative Output (20th) is particularly encouraging. The country also does well in the Digital Economy (33rd) sub-pillar—mainly boosted by its high-tech exports—but there is plenty of scope for improvement in the other dimensions of the Technology (59th) pillar (Digital Transformation Technologies, 76th; People, 68th; Governance, 71st). Viet Nam's weakest pillar is Talent (96th), where one of the greatest challenges is to improve employability and raise the high-level Skills (105th) of the population. As for the pillar related to Institutions and Infrastructure (68th), the state of the General Infrastructure (51st) is better than the median country, whereas more needs to be done to improve the Regulatory (72nd) and Market (88th) Environment.



Brazil is the lowest-ranked member of the BRICS group when it comes to future readiness (67th). The country's main advantage is in Innovation (42nd), which mainly stems from its relatively high levels of Business Sophistication (29th) and Research & Development (34th). By contrast, Brazil lacks a supportive environment for credit and investment, which has an adverse impact on Market Sophistication (92nd). In the pillar related to Technology (62nd), there is an urgent need to address the dearth of digital skills among its People (71st), albeit the expansion of public digital services in recent years has been encouraging. A lack of Skills (83rd) is also a concern with respect to Talent (70th), which is aggravated by a low ability to match job skills to the needs of the economy and to Attract (74th) talent. The greatest challenge facing Brazil, though, is to improve Institutions and Infrastructure (99th), where the state of the General Infrastructure (107th) is particularly disappointing.



Argentina is placed 68th in the global rankings. Argentina's future readiness is primarily weighed down by its Institutions and Infrastructure (101st). In particular, there is a need to improve business conditions that have a negative impact on the Market Environment (110th) and to increase investment in General Infrastructure (99th). Argentina's highest-ranked pillar is Talent (51st), where the most encouraging aspects are the ability to Grow (39th) and Retain (45th) human capital. The country also does relatively well in the dimensions related to Technology (58th) and Innovation (63rd), boosted by encouraging digital usage and skills among its People (43rd) in the former pillar and a relatively high level of Research & Development (39th) in the latter. Addressing the dismal Market Sophistication (117th)—especially when it comes to facilitating credit and investment—is a vital priority, though.



Indonesia finds itself in 69th position in the future readiness rankings. It primarily benefits from a good showing in the dimension related to Institutions and Infrastructure (46th)—the only pillar where the country is in the upper half of the rankings. Indonesia produces a moderate level of Knowledge, Technology, and Creative Outputs (50th) and Research & Development (59th), which contribute to its 65th rank in the Innovation pillar. However, innovation activity would rise even further if Business Sophistication (99th)—including greater innovative linkages involving firms—were to gain traction. Closely related to the innovation potential of firms is the level of Talent (82nd) in the country. Attracting (70th) and growing (69th) talent and raising the level of Skills (69th)—especially in view of the shortage of knowledge-intensive workers—are certainly issues that Indonesia need to address, but the weakest sub-pillar is that of retaining (97th) talent. As for Technology (71st), there is particular scope to increase the digital usage of individuals, firms, and national authorities (People: 80th).



Jordan is ranked 73rd in terms of future readiness, which is primarily driven by the country's Talent (58th). Its most impressive sub-pillar relates to Skills (33rd), and Jordan also does relatively well in retaining (48th) talent. Greater lifelong learning and higher levels of internal openness—through greater social inclusion and gender equality—would improve its ability to, respectively, Attract (76th) and Grow (79th) talent. Jordan enjoys relatively high digital usage and skills among its People (62nd), but its overall performance in the Technology (68th) pillar is hampered by weak digital-related Governance (87th), where a lack of trust is of particular concern. The country's weakest pillars, however, are Infrastructure and Institutions (80th) and Innovation (76th). In the former dimension, a



decent Regulatory (55th) and Market (67th) Environment is offset by a poor state of General Infrastructure (104th). In the latter dimension, the greatest challenge is to raise the level of Business Sophistication (94th).



Colombia is one of the more consistent performers in the future readiness rankings in that it is positioned within a narrow range in all four pillars. Overall, Colombia is ranked 74th in future readiness, with its highest-ranked pillar being Innovation (61st) and its lowest-ranked pillar being Talent (74th). One of the challenges facing Colombia with respect to Innovation is to ensure that the innovation inputs translate into greater Knowledge, Technology, and Creative Outputs (76th). As for Talent, the country does relatively well in growing (57th) human skills, but more needs to be done to Attract (97th) talent—from within the country as well as from abroad. In the Technology (66th) pillar, greater Internet access and adoption of emerging technologies would boost Digital Transformation Technologies (72nd). With respect to Institutions and Infrastructure (70th), Colombia enjoys a solid Market Environment (39th), and it should put most of its effort into improving the Regulatory Environment (80th) and General Infrastructure (87th).



Ukraine finds itself ranked 75th in terms of future readiness. It makes it into the upper half of the rankings in two pillars: Talent (56th) and Innovation (59th). That Talent is the highest-ranked pillar is in no small part due to the country's level of Skills (18th), especially its highly educated workforce. By contrast, there is a need to improve its ability to Attract (95th) talent, in particular foreign business. As for Innovation, Ukraine's performances in the sub-pillars related to Research & Development (44th) and Business Sophistication (58th) are offset by, above all, poor Market Sophistication

(99th). With respect to Technology (73rd), more could be done to improve access to and affordability of Digital Transformation Technologies (84th), although the level of digital content creation and adoption of emerging technologies is encouraging. The greatest challenge facing Ukraine is to address the dismal Institutions and Infrastructure (108th), where the country is in the bottom quartile in all sub-pillars (Regulatory Environment, 99th; Market Environment, 102nd; General Infrastructure, 94th).



Morocco is ranked 84th globally, with the country's Institutions and Infrastructure (55th) having the most positive impact on its future readiness. Most impressive is the state of the General Infrastructure (49th), which is one of two sub-pillars where Morocco makes it into the upper half of the rankings. The other sub-pillar with an upper-half rank is Market Sophistication (61st) in support of Innovation (74th). Although Internet access is relatively good, poor affordability hampers the uptake of Digital Transformation Technologies (73rd). That said, the Technology (83rd) pillar would primarily be boosted if digital-related Governance (93rd) were to improve. Morocco's weakest pillar is Talent (103rd), where the bottom-quartile showings with respect to Attract (101st) and Skills (114th) are particularly disappointing.



Peru is ranked 87th in terms of future readiness. Its pillar performances cover a narrow range from its highest-ranked: Talent (80th) to its lowest-ranked: Infrastructure and Institutions (90th). In the former pillar, Peru has a relatively good ability to Attract (55th) talent—especially foreign business—whereas its showings are quite similar in the other three sub-pillars (Grow, 82nd; Retain, 84th; Skills, 85th). As for the latter pillar, the country's Market

Environment (73rd) is primarily offset by poor General Infrastructure (93rd). When it comes to Technology (86th), Peru is boosted by digital usage among its People (61st), but more needs to be done to increase access to Digital Transformation Technologies (92nd)—despite encouraging affordability—and improve trust in digital-related Governance (90th), among other things. As for the Innovation (87th) pillar, one key concern is how to translate innovation investments into more and high-quality Knowledge, Technology, and Creative Outputs (91st).



Lebanon finds itself ranked 88th in terms of future readiness, but when it comes to Innovation (57th), it is in the upper half in the global rankings. This stems from solid performances in all four sub-pillars, including creative goods and services boosting Knowledge, Technology, and Creative Outputs (54th) and strong innovation linkages supporting Business Sophistication (63rd). This is in stark contrast to Lebanon's Institutions and Infrastructure (113th), where there need to be concerted efforts to strengthen all sub-pillars (Regulatory Environment, 111th; Market Environment, 92nd; and General Infrastructure, 113th). The performances in three of the sub-pillars related to Talent (79th) are similarly underwhelming, but that pillar is boosted by a relatively high level of Skills (41st), which is partly due to how well the country matches labour market demand and workforce supply. In the pillar related to Technology (85th), encouraging Internet access to Digital Transformation Technologies (58th) is offset by dismal Governance, including poor digital regulation (120th).



Egypt is the final of the selected emerging markets to make into the third quartile in the future readiness rankings (89th). It does relatively better in two pillars: Talent (78th) and Technology (80th). In the former dimension, a low ability

to Attract (103rd) and Grow (92nd) talent is compensated by the country's level of Skills (43rd), although more needs to be done to address mismatches in the labour market. As for the latter pillar, the country's engagement in emerging technologies has a positive impact on the state of its Digital Transformation Technologies (77th), but a lack of Internet access has a negative effect on digital usage among its People (78th), which is aggravated by a digital divide across generations. In the Innovation (97th) pillar, Egypt is boosted by its level of Research & Development (60th) and production of Knowledge, Technology, and Creative Outputs (65th). However, to foster more innovative activity, it is imperative to raise its level of Market Sophistication (115th) and Business Sophistication (110th). As for Institutions and Infrastructure (106th), Egypt must tackle its weak Regulatory Environment (98th) and poor General Infrastructure (108th).


Bottom quartile (94th and beyond)



Kenya is ranked 94th in terms of future readiness. It finds itself in the second quartile with respect to Innovation (83rd), where the innovation linkages among public, private, and academic actors have a positive impact on the country's Business Sophistication (61st). Kenya also ranks in the second quartile when it comes to Talent (91st). A good ability to match labour market demand and workforce supply contributes to the level of Skills (50th) in the country, but there is plenty of scope to improve how it can Attract (108th), Grow (90th), and Retain (99th) more talent. In the Technology (93rd) pillar, one of the key challenges facing Kenya is expanding Internet access, which not only has a negative impact on the uptake of Digital Transformation Technologies (109th), but also on digital usage among its People



(89th). As for Institutions and Infrastructure (97th), favourable business conditions benefit the Market Environment (40th), whereas Kenya needs to address its weak Regulatory Environment (97th) and dismal General Infrastructure (114th).

 **Nigeria** is ranked 116th and, as such, has the weakest future readiness of the selected emerging countries. Above all, it needs to focus attention on building solid foundations by way of better Institutions and Infrastructure (121st), where the Regulatory Environment and General Infrastructure (both 120th) are its weakest sub-pillars. Nigeria also faces numerous challenges when it comes to raising its level

of Innovation (119th), not least of which is its capacity to engage in research activities (Research & Development: 117th). Intimately linked to doing research is the country's Talent (108th) competitiveness, where efforts need to be made across the board (Attract, 107th; Grow, 102nd; Retain, 107th; and Skills, 106th), although the level of openness towards foreign business and talent is encouraging. As for Technology (109th), Nigeria enjoys an expanding e-commerce market and has a relative strength in its Digital Economy (79th), but improving access to Digital Transformation Technologies (116th) is one of the key bottlenecks for improved future readiness.



Conclusion



Conclusion

Honing in on 27 emerging economies around the world, the purpose of the study has been twofold. First, to highlight the Digital Sprinters framework that has been proposed by Google that can be useful to encourage digital transformation in emerging markets. The framework includes four pillars (Physical Capital, Human Capital, Technology, and Competitiveness) and 13 recommendations that the present study has sought to match with the relevant dimensions of three indices—the Global Innovation Index, the Global Talent Competitiveness Index, and the Network Readiness Index—and explore the countries' performances in them.

Second, to present and discuss a novel approach to measuring future readiness that focuses on the nexus of three crucial elements: technology, talent, and innovation. Each of them represents a component of a triangle, technology-talent-innovation, that can yield important insights into how countries can strengthen their preparation and adaptability in a world where uncertainty is a constant. This triangle becomes a powerful force for improved future readiness and long-term stability and progress when the components are successfully developed, combined, and founded on solid institutions and infrastructure.

It has been found that the future readiness of the emerging economies varies considerably and that they are represented in each quartile of the global rankings. It has also been seen that the top 3 performers (Singapore, Israel, and the UAE) do relatively well in all four key dimensions of the Future Readiness Economic Index, but that countries positioned further down the rankings often have a clear weakness in at least one of the main pillars.

Notwithstanding the diversity of the emerging economies included in this study, several key messages are applicable to each country individually or to all of them collectively. One of the clear messages coming out of the analysis (which is also highlighted in the report on Digital Sprinters) is the importance of **strengthening partnerships**. Again and again, it has been seen that collaboration and linkages among various stakeholders (governments, academia, civil society, the private sector) is crucial for the advancement of technology, talent, and innovation. Not only that: partnerships have positive effects in other dimensions such as fostering trust and encouraging greater openness.

Another key message that is pertinent for several emerging economies is that there is



room to **strengthen their institutions and infrastructure**.

A third key message is to **enhance social inclusion**. Social inequalities and injustices against women, minorities, and immigrants are sadly prevalent all over the world, and the emerging economies cannot afford to relax, even when progress has been made. Addressing discrimination of all forms will have benefits for future readiness well beyond direct effects such as greater attraction of talent.

Coincidentally, these three key messages on partnerships, institutions and infrastructure, and social inclusion are included among the seven guiding principles for **stronger global cooperation** that has been agreed on in the World Economic Forum's Global Action Group. Policy makers and other stakeholders in the emerging economies would also do well to follow these principles in their efforts to strengthen future readiness.

It is welcome to see the increasing number of countries that are taking issues of future

readiness seriously and making sustained efforts to improve them. This is, for instance, reflected in how more and more countries are adopting digital transformation strategies—not only at the country level, but also (like in [Africa](#)) at the regional level. Indeed, a case can be made that policy makers and other stakeholders should be bold and set themselves future readiness challenges that would go beyond the goals and targets of the SDGs.

This report is a first step towards the establishment of a global Future Readiness Economic Index, and of the relevant policy and assessment tools. We look forward to feedback from its readership in order to continue improving the relevance and accuracy of such tools.

As mentioned in the Johan Cruyff quote used as an opener to this report, speed is not the only factor to consider in accelerating digital transformation: getting a head start is part of being future-ready. We hope that this work can help emerging countries (and others) in that direction.



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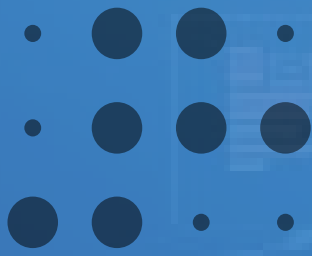
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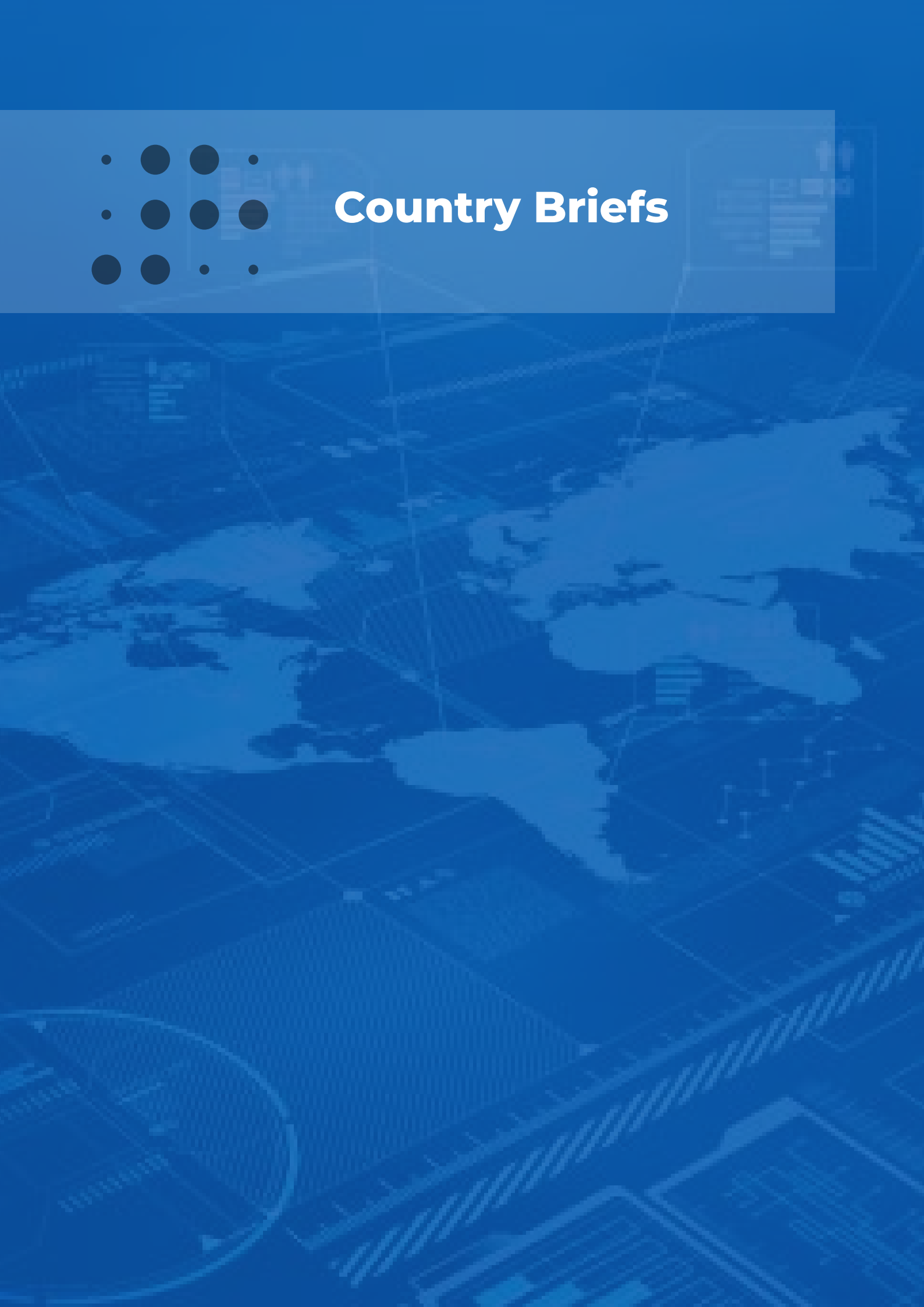
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Country Briefs





Country Briefs

The following country briefs provide summaries of the future readiness positions of the 27 emerging markets included in the present study. Each country brief includes data on key indicators, future readiness ranking, break-

down of performances in the TTI triangle components, and comparative performances in future readiness and its key dimensions against the global average. The country briefs are presented alphabetically.



Note on how to read the TTI graphs used in country briefs.

For each country, a 'TTI graph is used' (see above). The head of each pillar—Technology, Talent, and Innovation, respectively—includes the relevant global rank of the country considered in that dimension. Sub-pillars also include the relevant global rank and are by default coloured in yellow. Sub-pillars in which the country is delivering its best performance (as compared to its overall future readiness performance) are in green, whereas those where additional efforts can be expected are in red.



Future Readiness of Argentina

Key Indicators



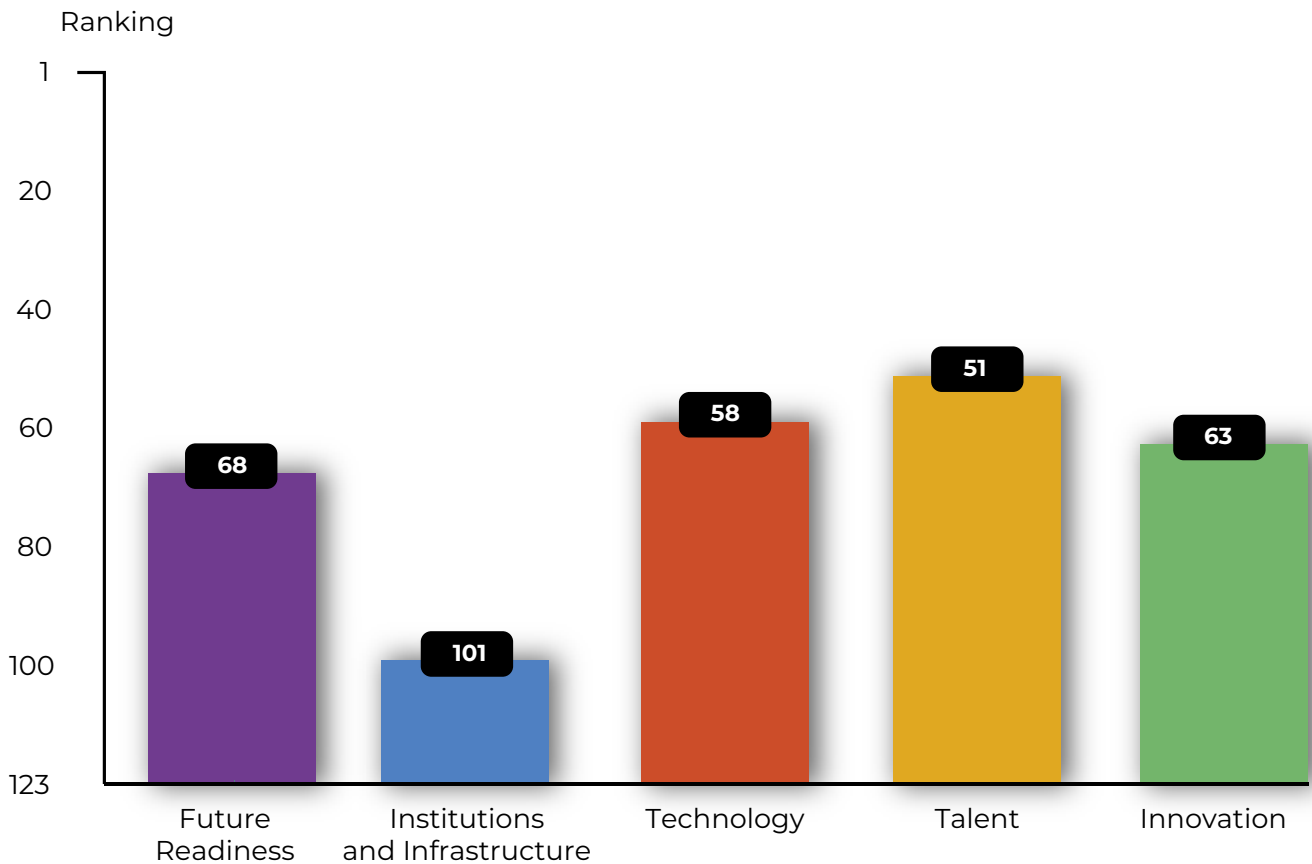
Total population:	45,376,763
GDP:	US\$ 383.07 bn
GDP (PPP) per capita:	US\$ 20,768
Income group:	Upper-middle income
Future readiness ranking:	68

Overall Future Readiness of Argentina

Argentina is ranked 68th in terms of future readiness out of a sample of 123 economies (Figure 1). It has a clear strength in the TTI components, ranking 51st in Talent, 58th in Technology, and 63rd in Innovation. The coun-

try's main weakness relates to Institutions and Infrastructure (101st), where a challenging Market Environment (110th) and General Infrastructure (99th) is partially offset by Argentina's Regulatory Environment (75th).

Figure 1: Future Readiness of Argentina (global ranking)





Future Readiness of Argentina

Key Indicators



Performance in the TTI triangle

Argentina’s best performance in the TTI triangle relates to Talent, which also includes one of the country’s top sub-pillars: Grow (39th). Argentina performs equally well in the sub-pillar related to Research & Development (39), but Innovation is nonetheless the country’s lowest ranked component, as it is

primarily weighed down by a disappointing Market Sophistication (117th). As for Technology, Argentina benefits from a solid use of digital technologies among its People (43rd), while there is particular scope for improvement with respect to its technology-related Governance (70th).

Table 1: Argentina’s ranks in the TTI components

Technology: 58	Talent: 51	Innovation: 63
Digital Transformation Technologies: 57	Attract: 60	Research & Development: 39
People: 43	Grow: 39	Market Sophistication: 117
Governance: 70	Retain: 45	Business Sophistication: 70
Digital Economy: 65	Skills: 70	Knowledge, Tech and Creative Outputs: 73



Future Readiness of Argentina

Key Indicators

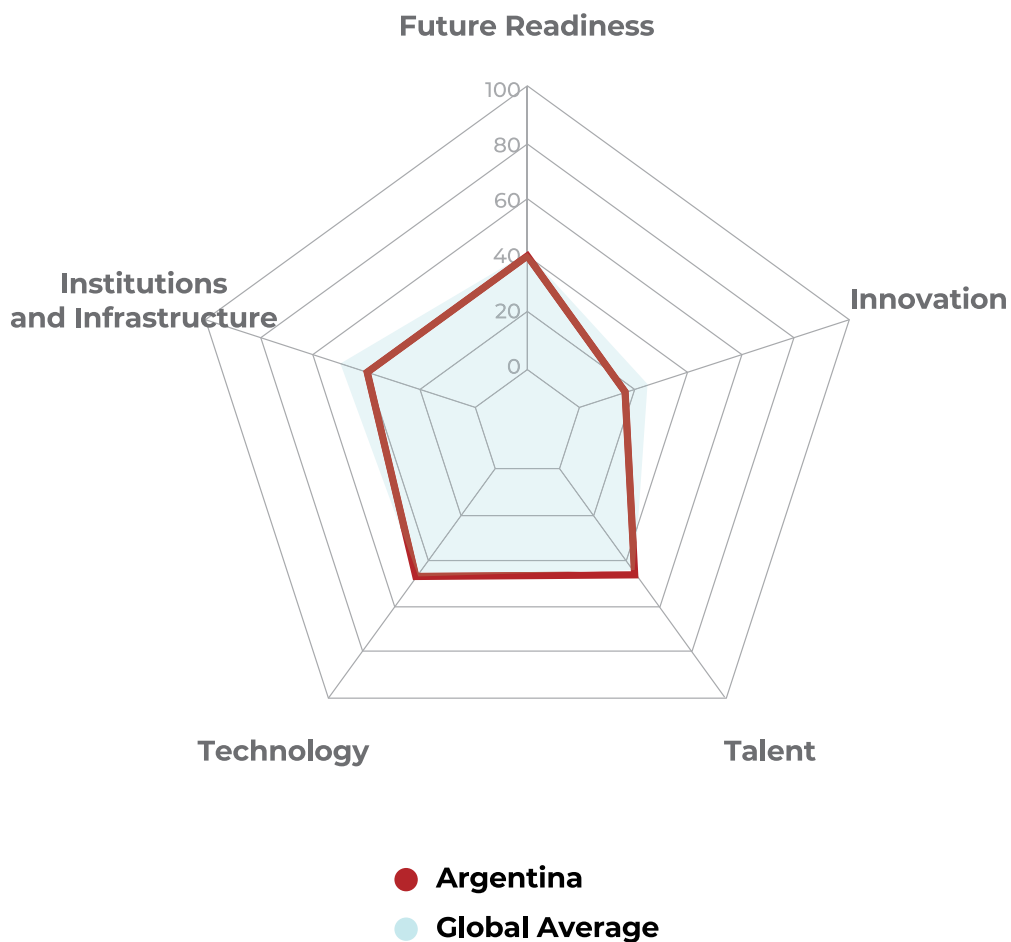


Performance against the global average

Overall, Argentina has a future readiness score below the global average (Figure 2). It clearly lags behind in terms of Institutions and Infrastructure and with respect to In-

novation. On the other hand, Argentina outperforms the global average slightly in both Technology and Talent.

Figure 2: Argentina's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Brazil

Key Indicators



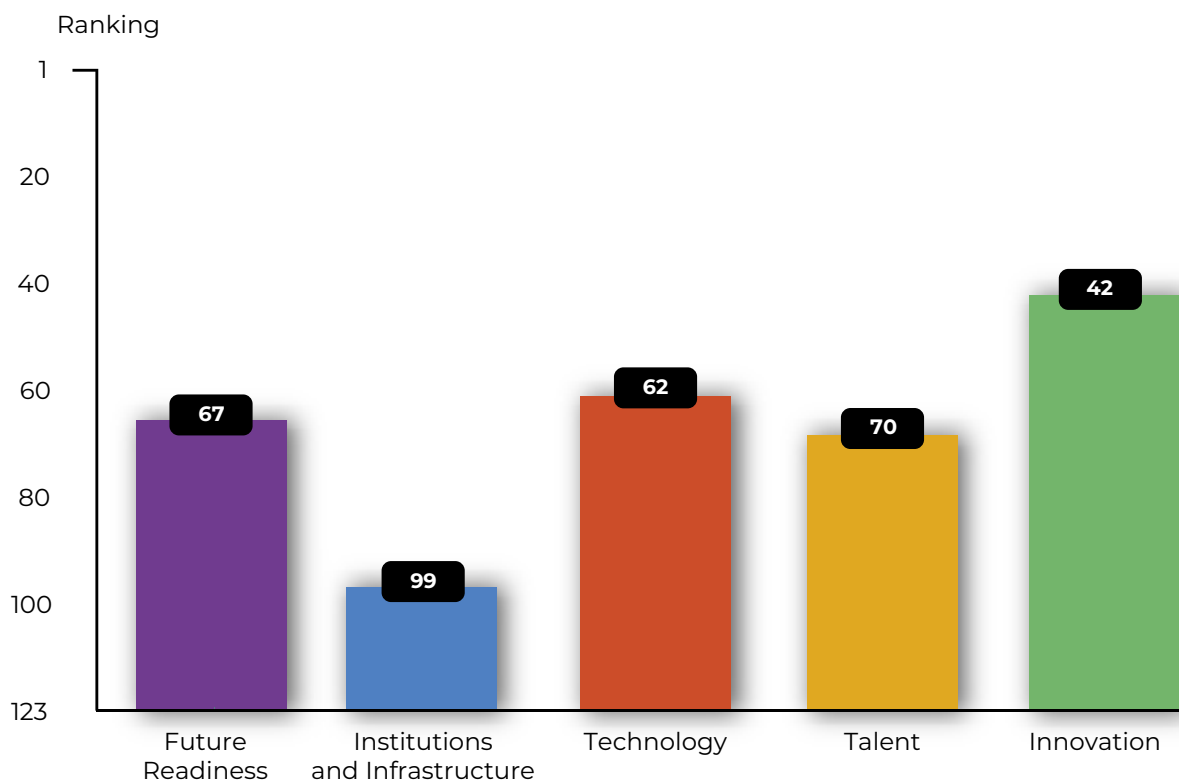
Total population:	212,559,409
GDP:	US\$ 1,444.73 bn
GDP (PPP) per capita:	US\$ 14,836
Income group:	Upper-middle income
Future readiness ranking:	67

Overall Future Readiness of Brazil

Brazil is ranked 67th in terms of future readiness out of a sample of 123 economies (Figure 1). The country's best performance relates to Innovation (42nd), the only pillar where it is positioned in the third quartile. It finds itself in the second quartile with respect to the other

two TTI components—Technology (62nd) and Talent (70th). Brazil's weakest dimension is Institutions and Infrastructure (99th), where improving the General Infrastructure presents a particular challenge.

Figure 1: Future Readiness of Brazil (global ranking)





Future Readiness of Brazil

Key Indicators



Performance in the TTI triangle

Brazil's relative strength in Innovation is reflected by the fact that two of its top-3 sub-pillars are in that component: Business Sophistication (29th) and Research & Development (34th) (Table 1). The third top-3 sub-pillar concerns technology-related Governance (51st),

but the Technology component is hampered by the state of Digital Transformation Technologies (69th) and the relatively low use of digital technologies among its People (71st). As for Talent, there is primarily a need to increase the level of Skills (70th) in Brazil.

Table 1: Brazil's ranks in the TTI components

Technology: 62	Talent: 70	Innovation: 42
Digital Transformation Technologies: 69	Attract: 74	Research & Development: 34
People: 71	Grow: 62	Market Sophistication: 92
Governance: 51	Retain: 63	Business Sophistication: 29
Digital Economy: 60	Skills: 83	Knowledge, Tech and Creative Outputs: 68



Future Readiness of Brazil

Key Indicators

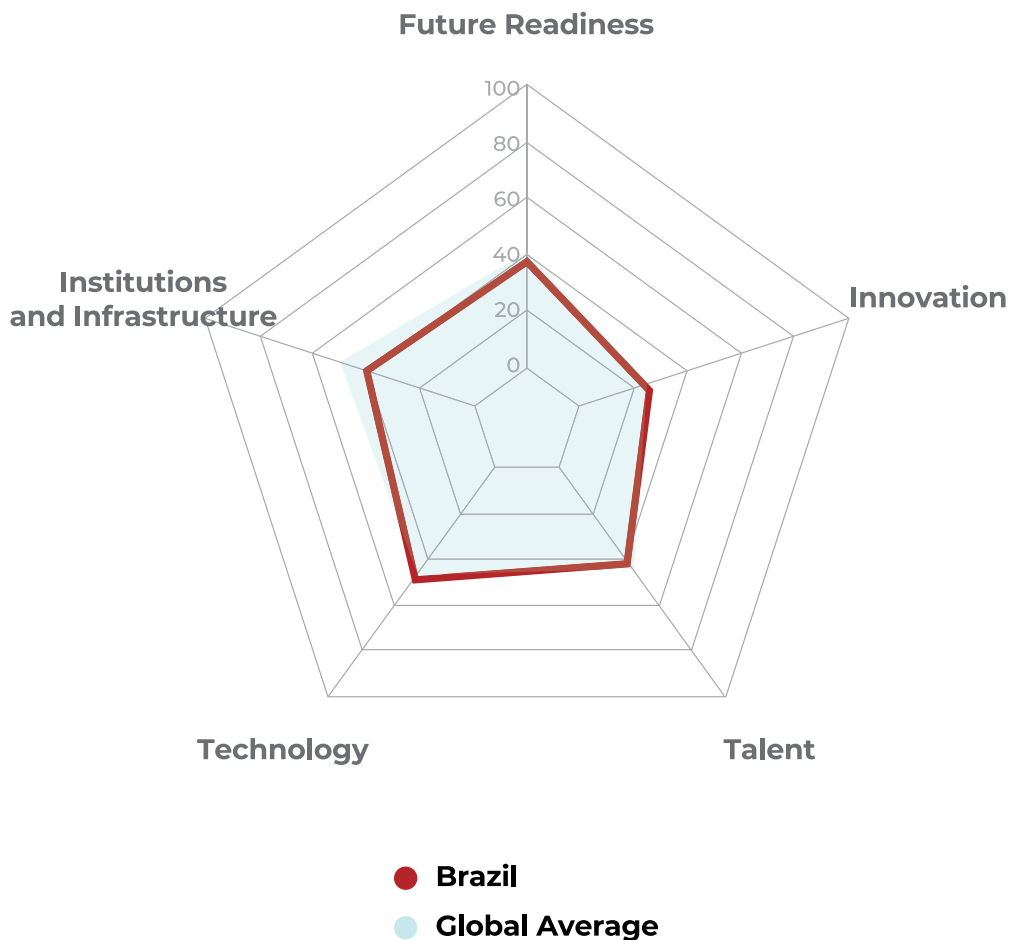


Performance against the global average

Brazil has a future readiness score below the global average (Figure 2). As would be expected, it is well below the average with

respect to Institutions and Infrastructure. The only pillar where it outperforms the global average is Innovation.

Figure 2: Brazil's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Chile

Key Indicators



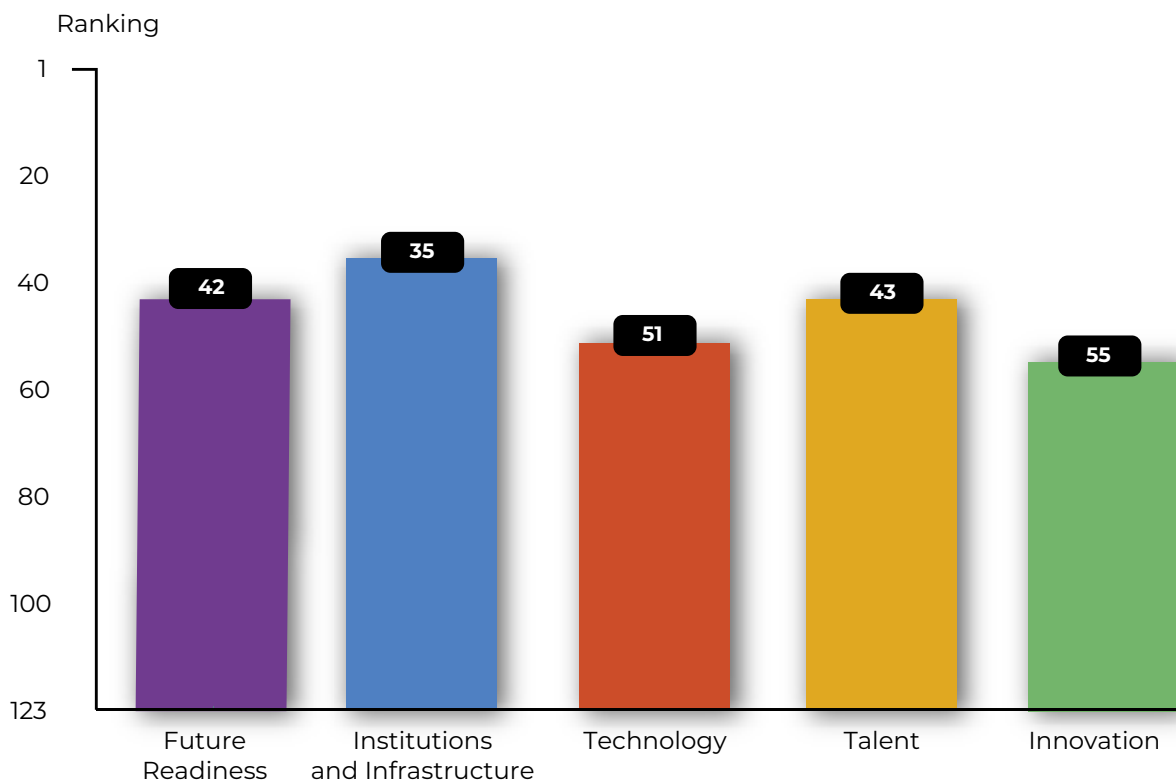
Total population:	19,116,209
GDP:	US\$ 252.94 bn
GDP (PPP) per capita:	US\$ 25,068
Income group:	High income
Future readiness ranking:	42

Overall Future Readiness of Chile

Chile is ranked 42nd in terms of future readiness out of a sample of 123 economies (Figure 1). It ranks in the third quartile in all four pillars, with its best showing relating to Institutions and Infrastructure (35th), which is driven by a solid Regulatory Environment (24th). The

country's ability to Grow (26th) human skills contribute to Talent (43rd) being its best TTI component. Innovation (55th) is Chile's lowest-ranked pillar—slightly below that of Technology (51st)—where there is primarily scope to boost innovative outputs (71st).

Figure 1: Future Readiness of Chile (global ranking)





Future Readiness of Chile

Key Indicators



Performance in the TTI triangle

Overall, Chile performs quite evenly across the various TTI components, although its performances in some sub-pillars are clearly better than others (Table 1). The country ranks in the top quartile with respect to two sub-pillars—growing talent and Market So-

phistication (30th) for Innovation— and the use of technology by individuals, firms, and governments (People, 34th). There are two sub-pillars in each TTI component that have particular scope for improvement.

Table 1: Chile's ranks in the TTI components

Technology: 51	Talent: 43	Innovation: 55
Digital Transformation Technologies: 45	Attract: 40	Research & Development: 53
People: 34	Grow: 26	Market Sophistication: 30
Governance: 62	Retain: 55	Business Sophistication: 67
Digital Economy: 67	Skills: 58	Knowledge, Tech and Creative Outputs: 71



Future Readiness of Chile

Key Indicators

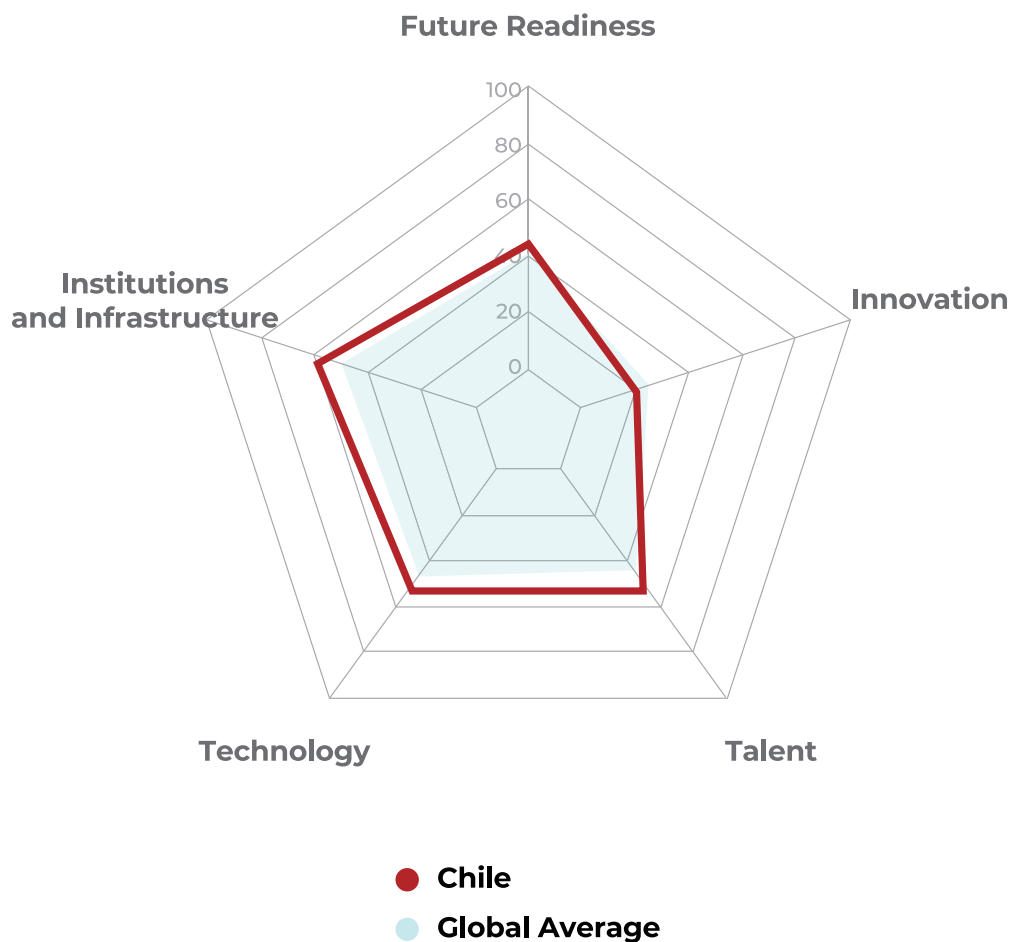


Performance against the global average

Chile is clearly ahead of the global average when it comes to Institutions and Infrastructure (Figure 2). It scores slightly above

the global average with respect to Technology and Talent but is slightly below average in the case of Innovation.

Figure 2: Chile's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of China

Key Indicators



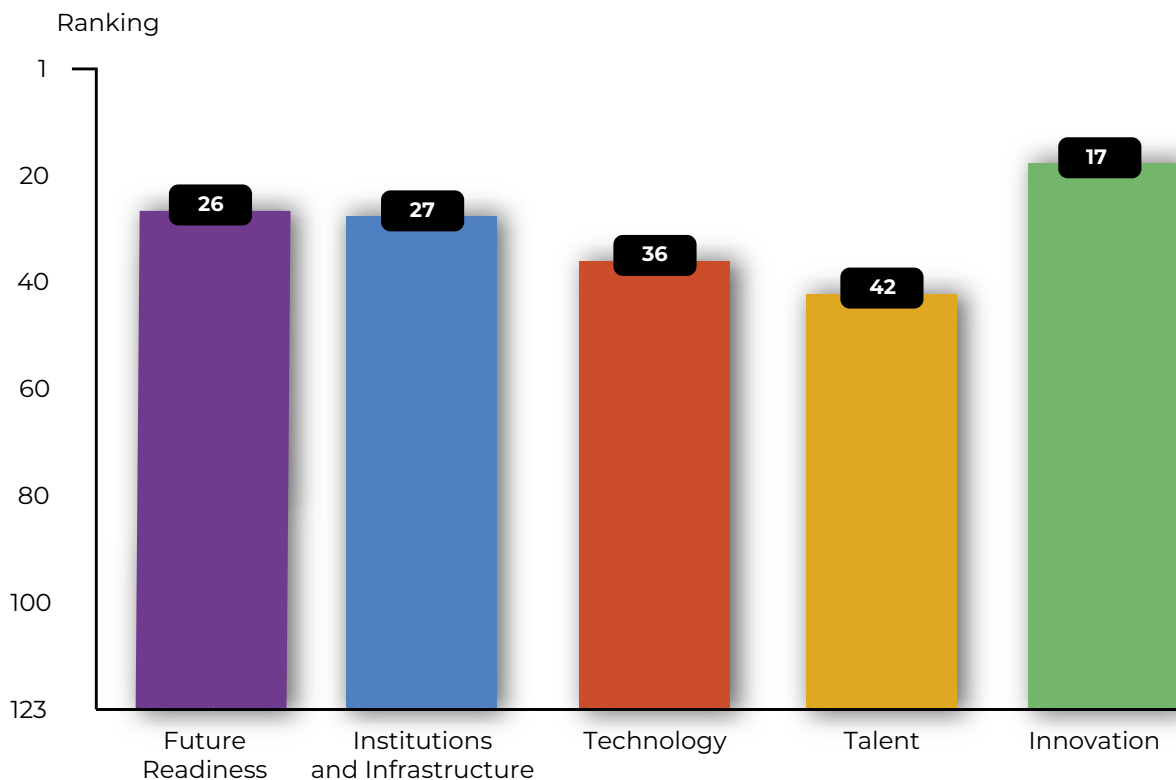
Total population:	1,402,112,000
GDP:	US\$ 14,722.73 bn
GDP (PPP) per capita:	US\$ 17,312
Income group:	Upper-middle income
Future readiness ranking:	26

Overall Future Readiness of China

China is ranked 26th in terms of future readiness out of a sample of 123 economies (Figure 1). It ranks in the top quartile in the pillars related to Innovation (17th) and to Institutions and Infrastructure (27th), although the latter

dimension would benefit from an improved Regulatory Environment (60th). As for the other two TTI components—Technology and Talent—China is positioned 36th and 42nd, respectively.

Figure 1: Future Readiness of China (global ranking)





Future Readiness of China

Key Indicators



Performance in the TTI triangle

China’s strongest TTI component—Innovation—includes two of its best-performing sub-pillars: Knowledge, Tech, and Creative Outputs (10th) and Research & Development

(16th). A third strength is the country’s pool of Skills (13th), but the Talent component is weighed down by a weak capacity to Attract (86th) and Retain (54th) human skills.

Table 1: China’s ranks in the TTI components

Technology: 36	Talent: 42	Innovation: 17
Digital Transformation Technologies: 59	Attract: 86	Research & Development: 16
People: 19	Grow: 38	Market Sophistication: 26
Governance: 30	Retain: 54	Business Sophistication: 25
Digital Economy: 32	Skills: 13	Knowledge, Tech and Creative Outputs: 10



Future Readiness of China

Key Indicators

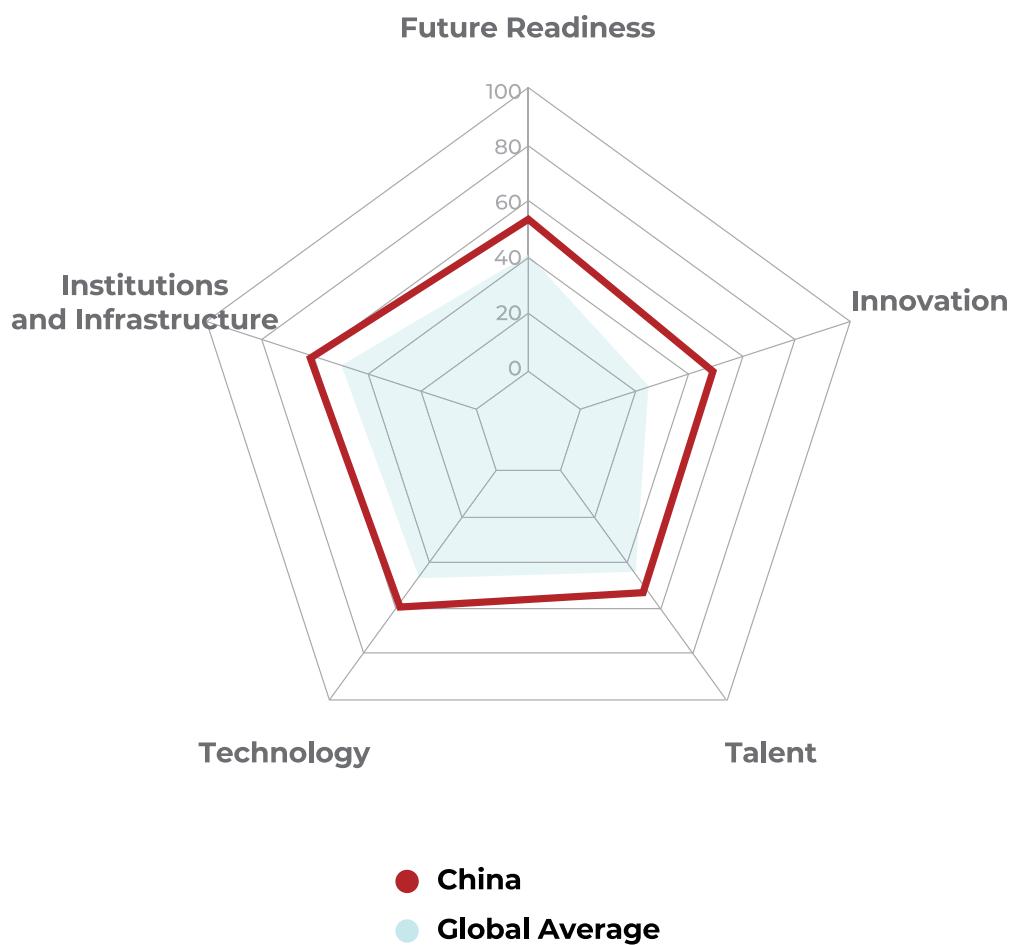


Performance against the global average

China outperforms the global average in all four key pillars (Figure 2). As would be expected, it has a particular advantage in the

dimension related to Innovation, whereas the country is considerably closer to the global average when it comes to Talent.

Figure 2: China's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Colombia

Key Indicators



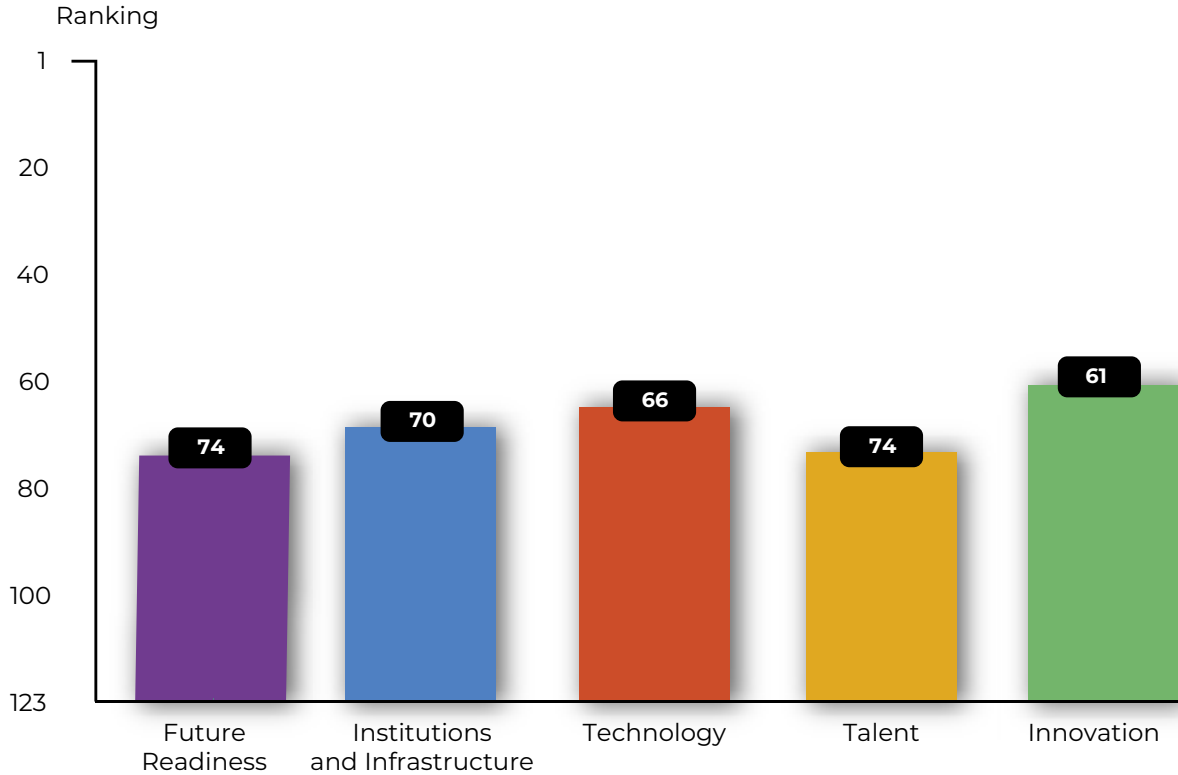
Total population:	50,882,884
GDP:	US\$ 271.35 bn
GDP (PPP) per capita:	US\$ 14,565
Income group:	Upper-middle income
Future readiness ranking:	74

Overall Future Readiness of Colombia

Colombia is ranked 74th in terms of future readiness out of a sample of 123 economies (Figure 1). The country performs consistently across all four pillars, with rankings ranging from 61 to 74. Above all, Colombia does well with respect to Innovation (61st), the only pillar where it is positioned in the upper half of

the global rankings. In the other two TTI components—Technology and Talent—it is ranked 66th and 74th, respectively. As for Institutions and Infrastructure (70th), a conducive Market Environment (39th) is offset by a relatively weak Regulatory Environment (80th) and General Infrastructure (87th).

Figure 1: Future Readiness of Colombia (global ranking)





Future Readiness of Colombia

Key Indicators



Performance in the TTI triangle

Each TTI component includes a top-3 sub-pillar: People (52nd) in the case of Technology, Grow (57th) with respect to Talent, and Business Sophistication (53rd) in Innovation. The greatest challenge facing Colombia is boosting its ability to Attract (97th) talent. In

the sphere of Innovation, there is primarily a need to increase Market Sophistication (69th) and Knowledge, Tech, and Creative Outputs (76th). As for Technology, Colombia's weakest sub-pillars relate to Digital Transformation Technologies and Digital Economy (both 72nd).

Table 1: Colombia's ranks in the TTI components

Technology: 66	Talent: 74	Innovation: 61
Digital Transformation Technologies: 72	Attract: 97	Research & Development: 61
People: 52	Grow: 57	Market Sophistication: 69
Governance: 67	Retain: 71	Business Sophistication: 53
Digital Economy: 72	Skills: 72	Knowledge, Tech and Creative Outputs: 76



Future Readiness of Colombia

Key Indicators

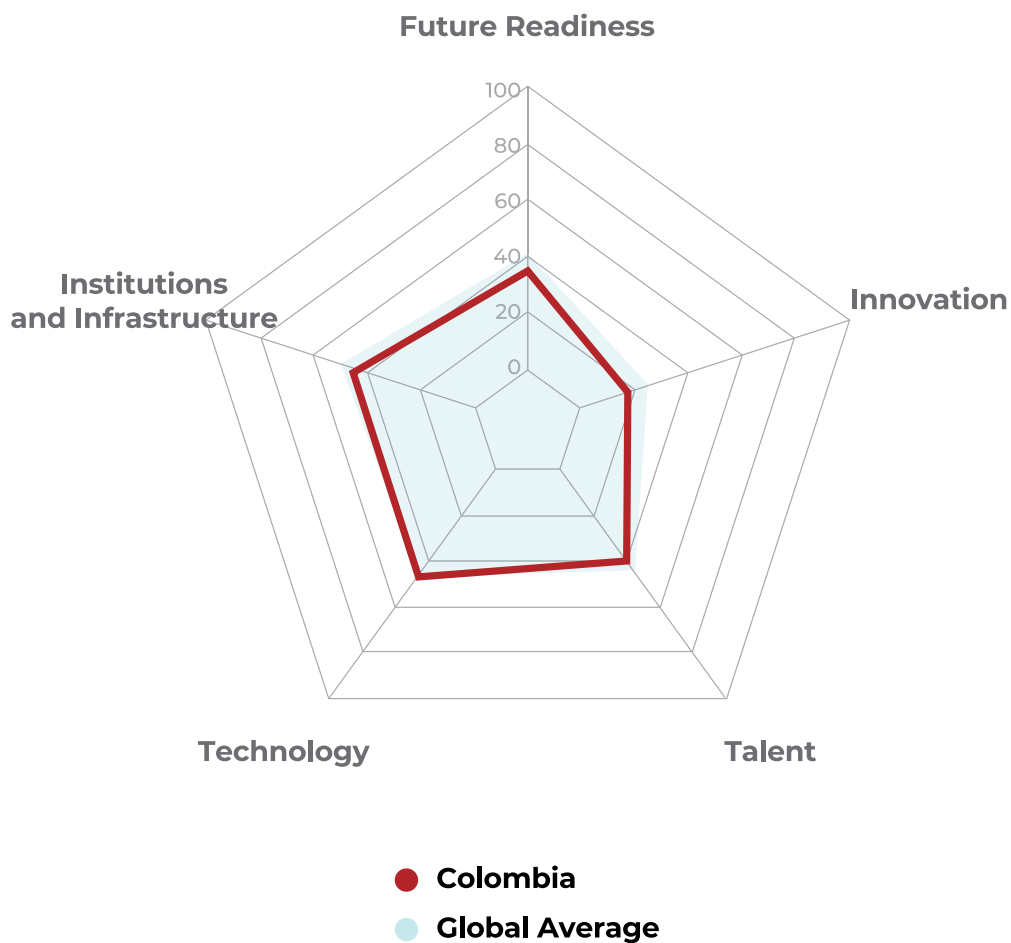


Performance against the global average

As can be seen in Figure 2, Colombia posts scores below the global average in overall future readiness and in all four key pillars. The country is closest to the global average

when it comes Technology, while the greatest distance from it is with respect to Innovation, despite the latter being Colombia's highest-ranked pillar.

Figure 2: Colombia's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Egypt

Key Indicators



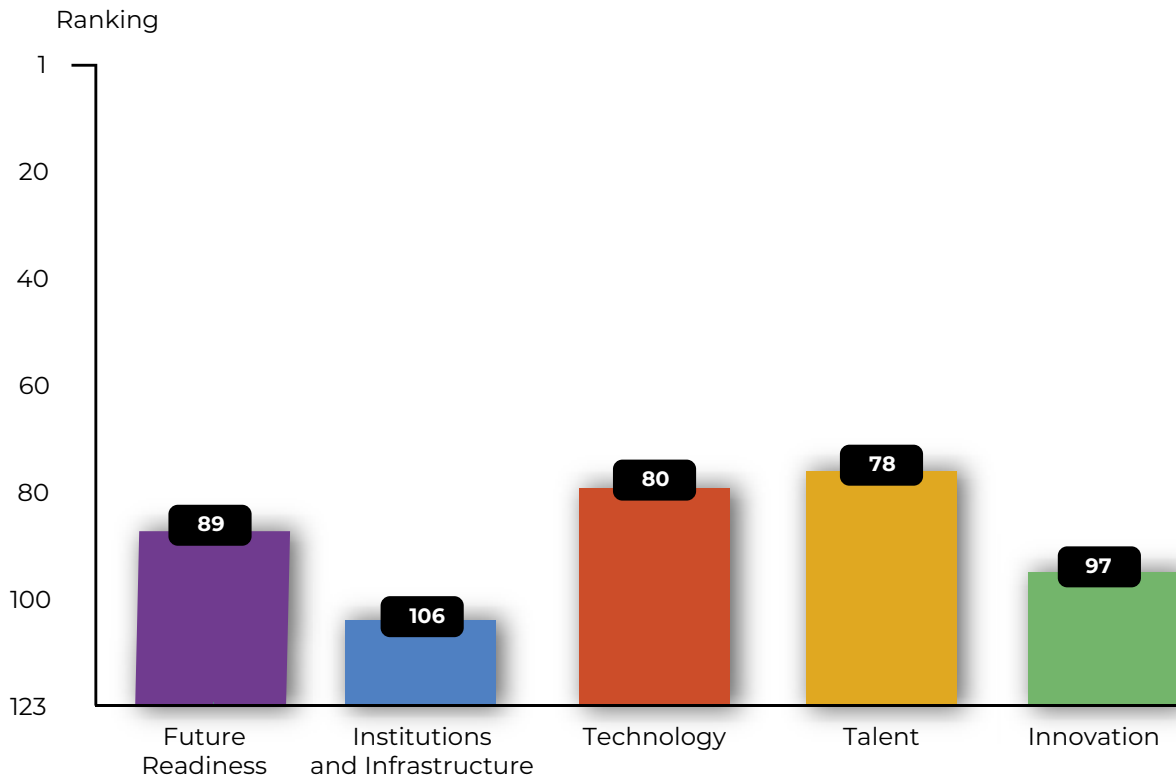
Total population:	100,388,073
GDP:	US\$ 303.18 bn
GDP (PPP) per capita:	US\$ 12,251
Income group:	Lower-middle income
Future readiness ranking:	89

Overall Future Readiness of Egypt

Egypt is ranked 89th in terms of future readiness out of a sample of 123 economies (Figure 1) and, as such, is the laggard in the MENA region. Its strongest performances are in the Talent (78th) and Technology (80th) pillars. However, the country finds itself in the bottom quartile

with respect to the third TTI component—Innovation (97th)—and when it comes to Institutions and Infrastructure (106th), where a weak Regulatory Environment and poor General Infrastructure present particular challenges.

Figure 1: Future Readiness of Egypt (global ranking)





Future Readiness of Egypt

Key Indicators



Performance in the TTI triangle

The highest-ranked component in the case of Egypt is Talent and another talent-related dimension is its best-performing sub-pillar: Skills (Table 1). The country makes it into the upper half of the global ranking in only

two sub-pillars (R&D and Skills), while it is positioned in the bottom quartile in three sub-pillars (Attract, Market Sophistication, and Business Sophistication).

Table 1: Egypt's ranks in the TTI components

Technology: 80	Talent: 78	Innovation: 97
Digital Transformation Technologies: 77	Attract: 103	Research & Development: 60
People: 78	Grow: 92	Market Sophistication: 115
Governance: 83	Retain: 78	Business Sophistication: 110
Digital Economy: 82	Skills: 43	Knowledge, Tech and Creative Outputs: 65



Future Readiness of Egypt

Key Indicators



Performance against the global average

As can be seen in Figure 2, Egypt lags behind the global average in all key dimensions of future readiness. Its score differ-

tial is particularly wide with respect to the Innovation component and the Institutions and Infrastructure dimension.

Figure 2: Egypt's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of India

Key Indicators



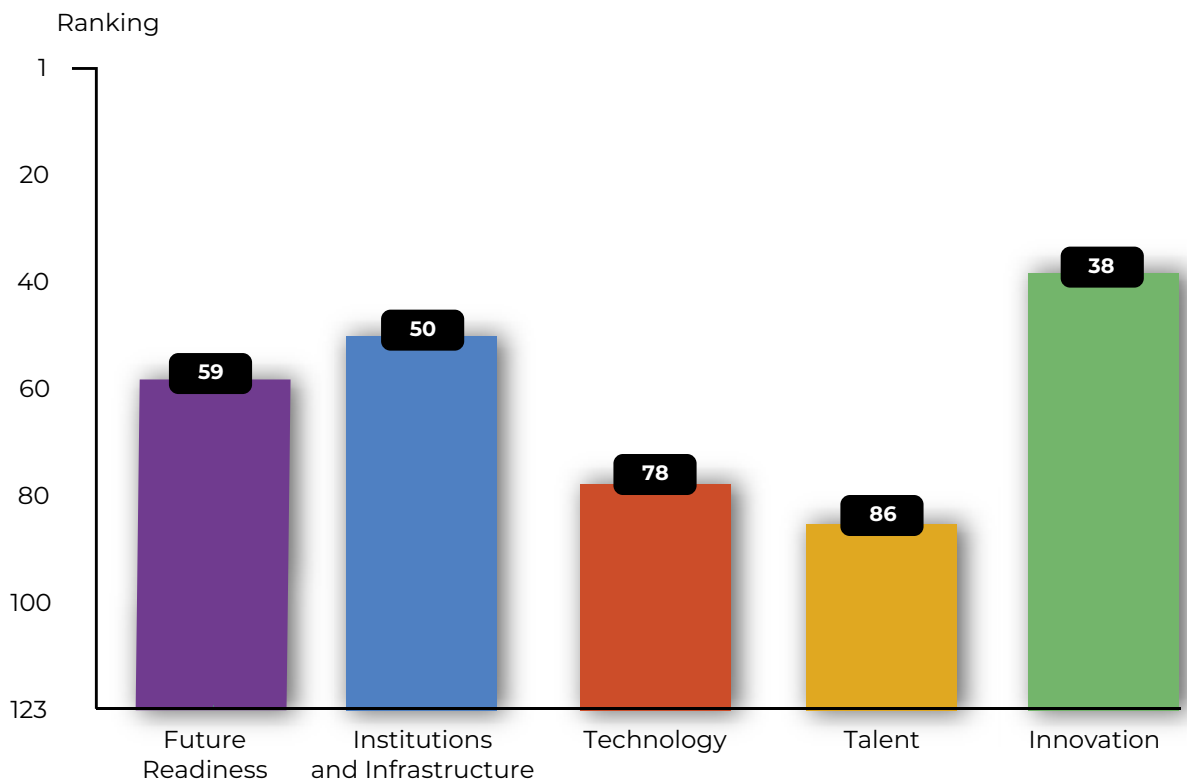
Total population:	1,380,004,385
GDP:	US\$ 2,622.98 bn
GDP (PPP) per capita:	US\$ 6,454
Income group:	Lower-middle income
Future readiness ranking:	59

Overall Future Readiness of India

India is ranked 59th in terms of future readiness out of a sample of 123 economies (Figure 1). The country finds itself in the upper half of the global rankings in two pillars—Innovation (38th) and Institutions and Infrastructure (50th)—

where the latter primarily benefits from the General Infrastructure (41st) and the Market Environment (46th). India ranks in the lower half of the rankings with respect to Technology (78th) and Talent (86th).

Figure 1: Future Readiness of India (global ranking)





Future Readiness of India

Key Indicators



Performance in the TTI triangle

India's best performance in the TTI components is, by far, in Innovation (Table 1). In fact, the four innovation-related sub-pillars are also the nation's best sub-pillars out of the three components. The Technology component is boosted by the country's Digital Econ-

omy (63rd), while there is primarily a need to increase the level of Digital Transformation Technologies (87th). As for Talent, India does relatively well in the sub-pillars Grow and Skills (both 66th) but needs to make further efforts to strengthen its ability to Attract (92nd) and Retain (98th) talent.

Table 1: India's ranks in the TTI components

Technology: 78	Talent: 86	Innovation: 38
Digital Transformation Technologies: 87	Attract: 92	Research & Development: 35
People: 79	Grow: 66	Market Sophistication: 52
Governance: 73	Retain: 98	Business Sophistication: 51
Digital Economy: 63	Skills: 66	Knowledge, Tech and Creative Outputs: 34



Future Readiness of India

Key Indicators

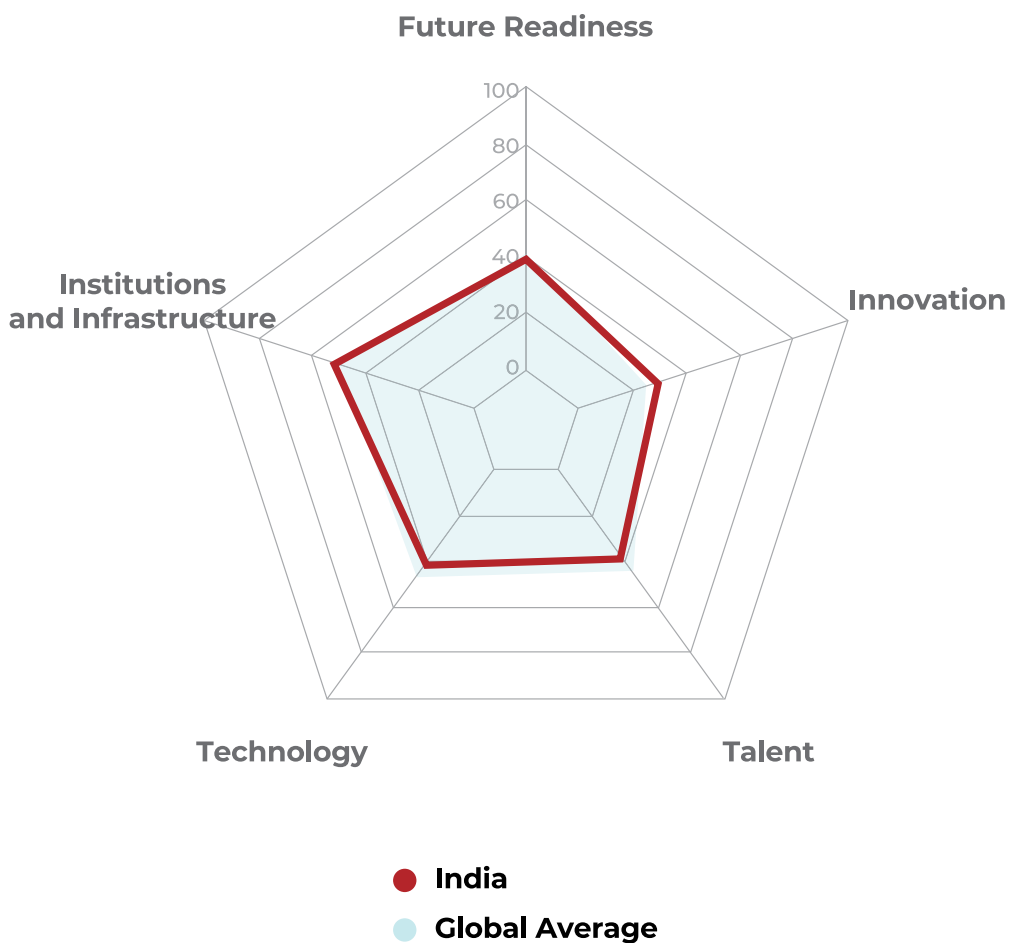


Performance against the global average

It can be clearly seen in Figure 2 that India outperforms the global average with respect to Innovation. It also has a score higher than average when it comes to Institutions

and Infrastructure. By contrast, it lags in the Technology and Talent components, which results in future readiness scores slightly below the global average.

Figure 2: India's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Indonesia

Key Indicators



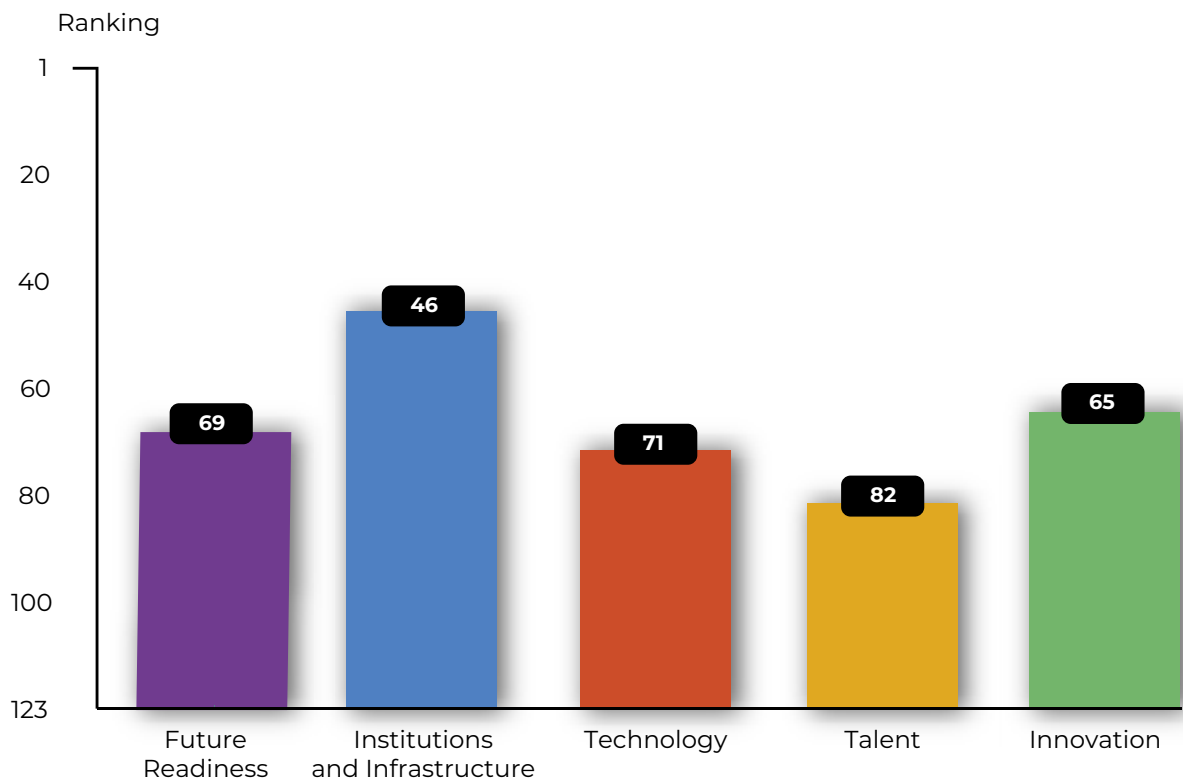
Total population:	273,523,621
GDP:	US\$ 1,058.42 bn
GDP (PPP) per capita:	US\$ 12,073
Income group:	Lower-middle income
Future readiness ranking:	69

Overall Future Readiness of Indonesia

Indonesia is ranked 69th in terms of future readiness out of a sample of 123 economies (Figure 1). The country's best performance relates to Institutions and Infrastructure (46th), which is the only pillar where Indonesia is positioned in the upper half of the global rankings.

This can be attributed to the country's Market Environment and General Infrastructure (both 34th), whereas there is a clear need to strengthen the Regulatory Environment (71st). As for the three TTI components, Indonesia ranks in the second quartile in each of them.

Figure 1: Future Readiness of Indonesia (global ranking)





Future Readiness of Indonesia

Key Indicators



Performance in the TTI triangle

As can be seen in Table 1, Indonesia's two highest-ranked sub-pillars are both in the Innovation component (Knowledge, Tech, and Creative Outputs, 50th, and Research & Development, 59th). At the same time, the pillar also includes the worst-performing sub-pillar of the TTI triangle: Business Sophistication

(99th). The third-best sub-pillar, meanwhile, is Digital Economy (64th), which is offset by the relatively low use of digital technologies among Indonesia's People (80th). As for Talent, the greatest challenge is to improve the ability to Retain (97th) human skills.

Table 1: Indonesia's ranks in the TTI components

Technology: 71	Talent: 82	Innovation: 65
Digital Transformation Technologies: 71	Attract: 70	Research & Development: 59
People: 80	Grow: 69	Market Sophistication: 73
Governance: 68	Retain: 97	Business Sophistication: 99
Digital Economy: 64	Skills: 69	Knowledge, Tech and Creative Outputs: 50



Future Readiness of Indonesia

Key Indicators

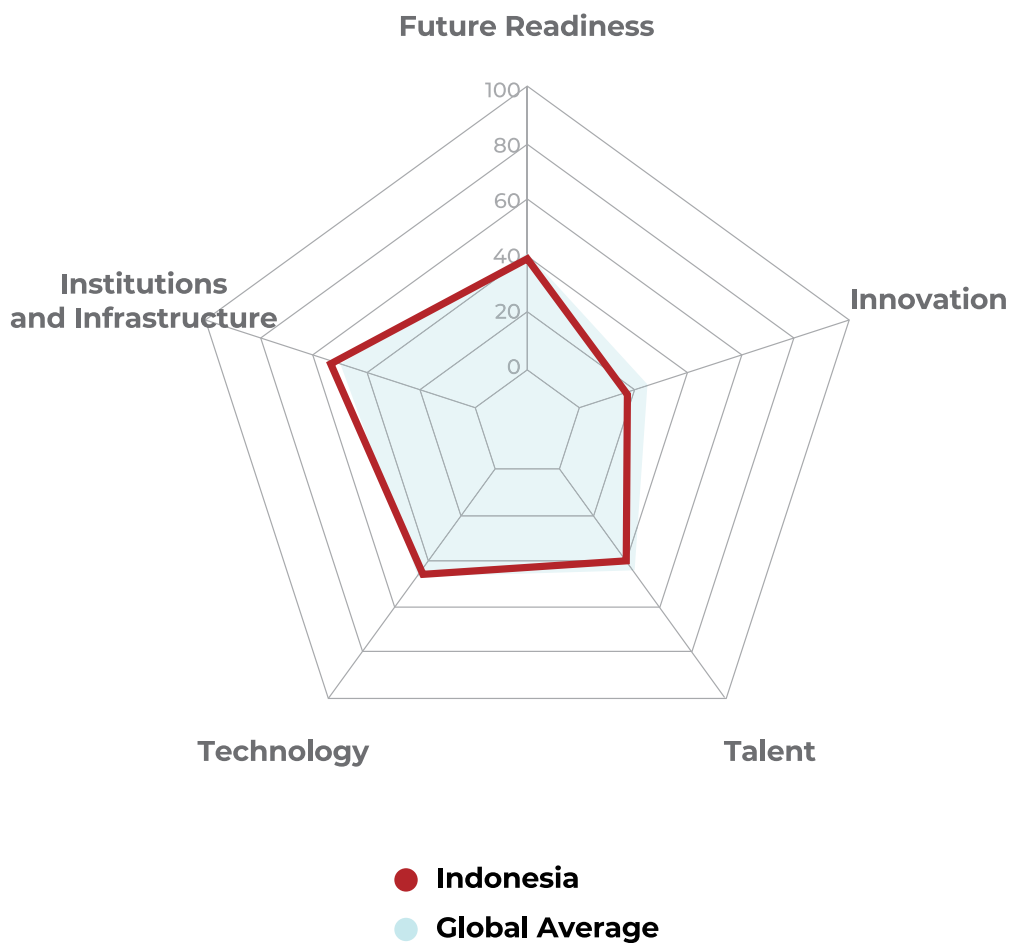


Performance against the global average

Indonesia’s best-performing pillar—Institutions and Infrastructure—is the only dimension where the country has a score above

the global average. In all three TTI components, Indonesia performs below the global average.

Figure 2: Indonesia’s future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Israel

Key Indicators



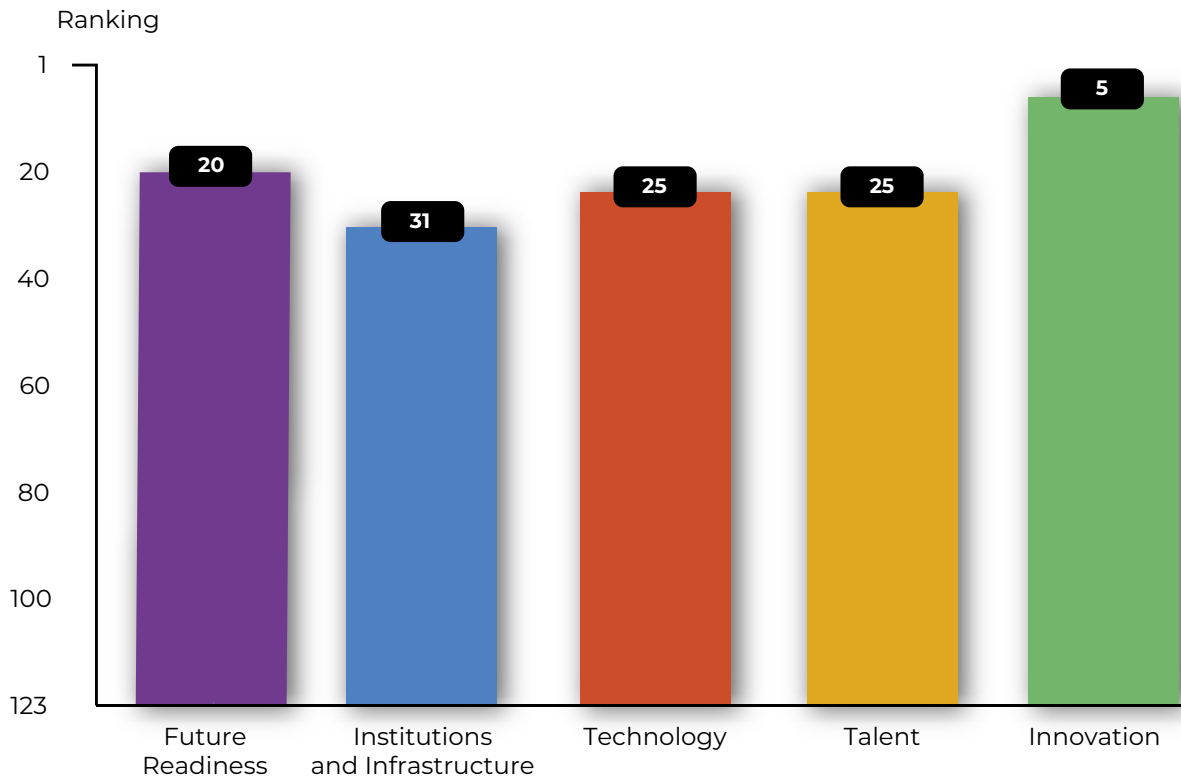
Total population:	9,216,900
GDP:	US\$ 401.94 bn
GDP (PPP) per capita:	US\$ 41,855
Income group:	High income
Future readiness ranking:	20

Overall Future Readiness of Israel

Israel is ranked 20th in terms of future readiness out of a sample of 123 economies (Figure 1). It is a top-10 country when it comes to Innovation (5th), where it is the global leader in terms of Business Sophistication and also has an impressive R&D environment (3rd). Is-

rael ranks 25th with respect to the two other TTI components (Technology and Talent). As for Institutions and Infrastructure, the country finds itself just outside the top quartile, where the General Infrastructure (52nd) presents the most scope for improvement.

Figure 1: Future Readiness of Israel (global ranking)





Future Readiness of Israel

Key Indicators



Performance in the TTI triangle

Israel's best performance in the TTI components relates to Innovation (Table 1), which includes its two highest-ranked sub-pillars (Business Sophistication and Research & De-

velopment). The country finds itself in the top quartile in all but two of the sub-pillars: technology-related Governance (33rd) and the ability to Attract (66th) talent.

Table 1: Israel's ranks in the TTI components

Technology: 25	Talent: 25	Innovation: 5
Digital Transformation Technologies: 23	Attract: 66	Research & Development: 3
People: 25	Grow: 28	Market Sophistication: 13
Governance: 33	Retain: 8	Business Sophistication: 1
Digital Economy: 23	Skills: 7	Knowledge, Tech and Creative Outputs: 19



Future Readiness of Israel

Key Indicators

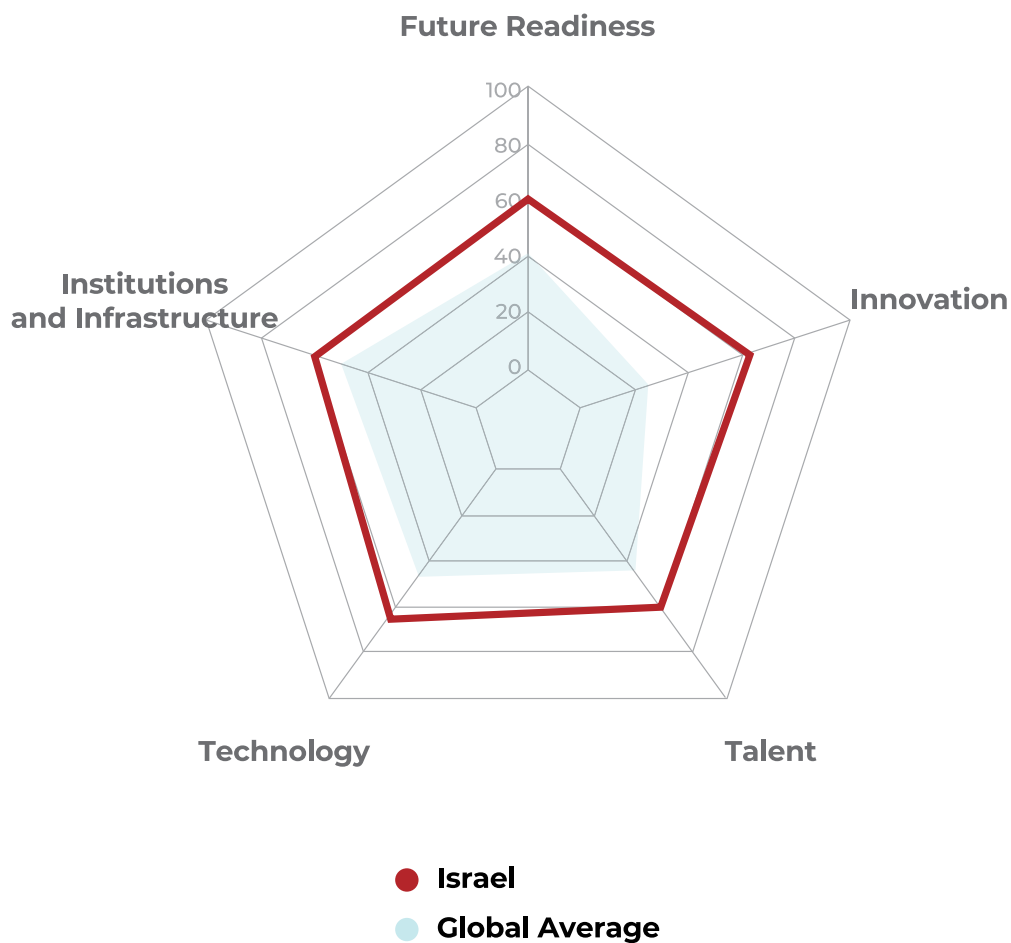


Performance against the global average

The performance of Israel is higher than the global average in all four pillars (Figure 2). Its greatest showing, comparatively

speaking, is in Innovation. The country has a clear advantage in the other TTI components as well.

Figure 2: Israel's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Jordan

Key Indicators



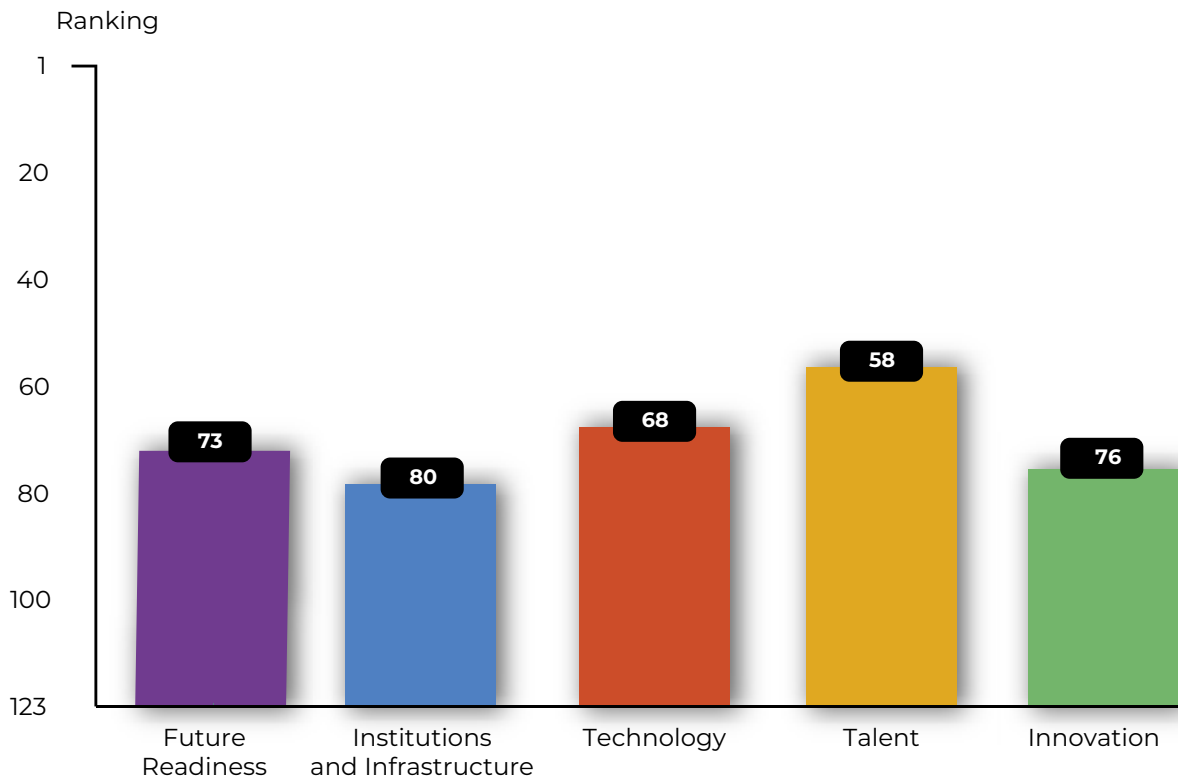
Total population:	10,101,694
GDP:	US\$ 43.74 bn
GDP (PPP) per capita:	US\$ 10,317
Income group:	Upper-middle income
Future readiness ranking:	73

Overall Future Readiness of Jordan

Jordan is ranked 73rd in terms of future readiness out of a sample of 123 economies (Figure 1). The country's future readiness is driven by its human skills; indeed, the only dimension where it finds itself positioned in the upper

half of the global rankings is Talent (58th). Its greatest challenge, meanwhile, is to improve its Institutions and Infrastructure (80th), especially its state of general infrastructure.

Figure 1: Future Readiness of Jordan (global ranking)





Future Readiness of Jordan

Key Indicators



Performance in the TTI triangle

As can be seen in Table 1, the highest-ranked component in the case of Jordan is Talent, and two talent-related dimensions are also its best-performing sub-pillars: Skills (33rd) and Retain (48th). The country features in

the upper half of the global ranking in six of the 12 sub-pillars and is only positioned in the bottom quartile in one sub-pillar (Business Sophistication, 118th).

Table 1: Jordan's ranks in the TTI components

Technology: 68	Talent: 58	Innovation: 76
Digital Transformation Technologies: 61	Attract: 76	Research & Development: 62
People: 62	Grow: 79	Market Sophistication: 60
Governance: 87	Retain: 48	Business Sophistication: 118
Digital Economy: 70	Skills: 33	Knowledge, Tech and Creative Outputs: 70

Note: Green = top 3 sub-pillar, red = sub-pillar where additional efforts are required



Future Readiness of Jordan

Key Indicators

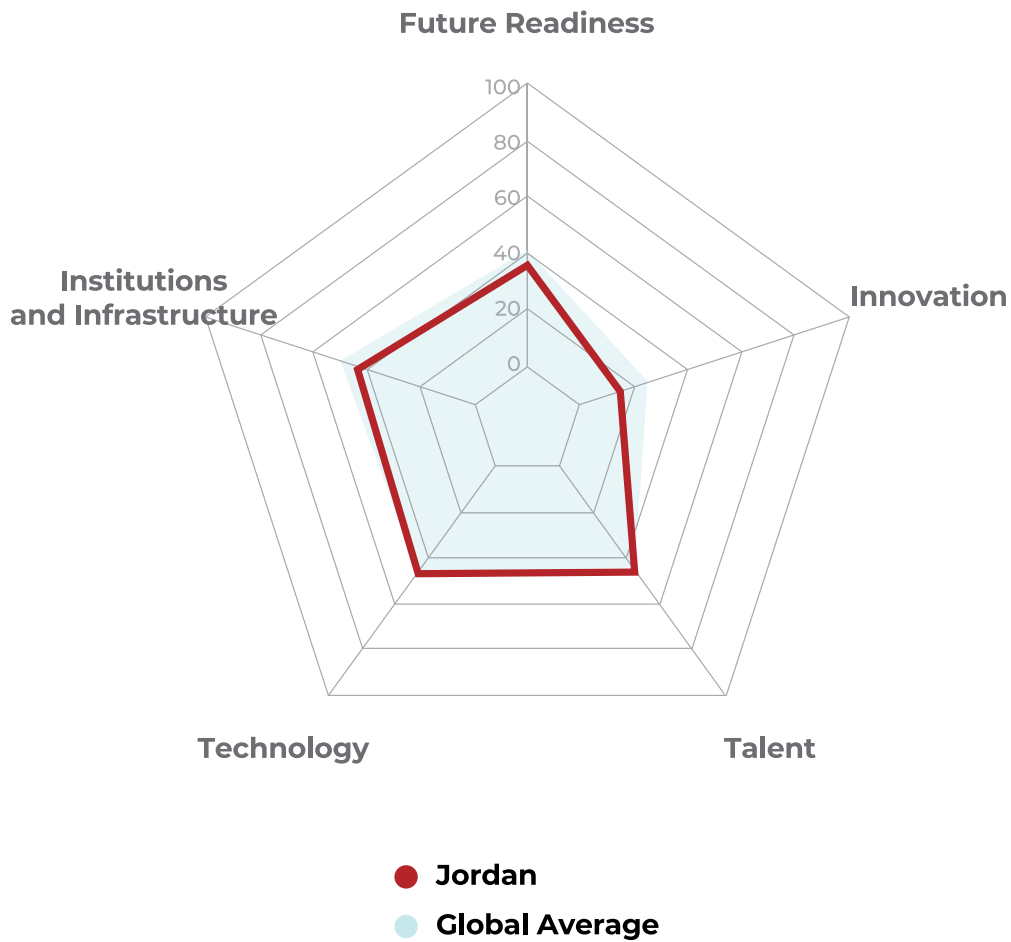


Performance against the global average

As can be seen in Figure 2, Jordan outscores the global average in only one dimension: Talent (albeit only just). It is slightly below

the global average when it comes to Technology. By contrast, Jordan is well behind the global average in the Innovation dimension.

Figure 2: Jordan's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Kenya

Key Indicators



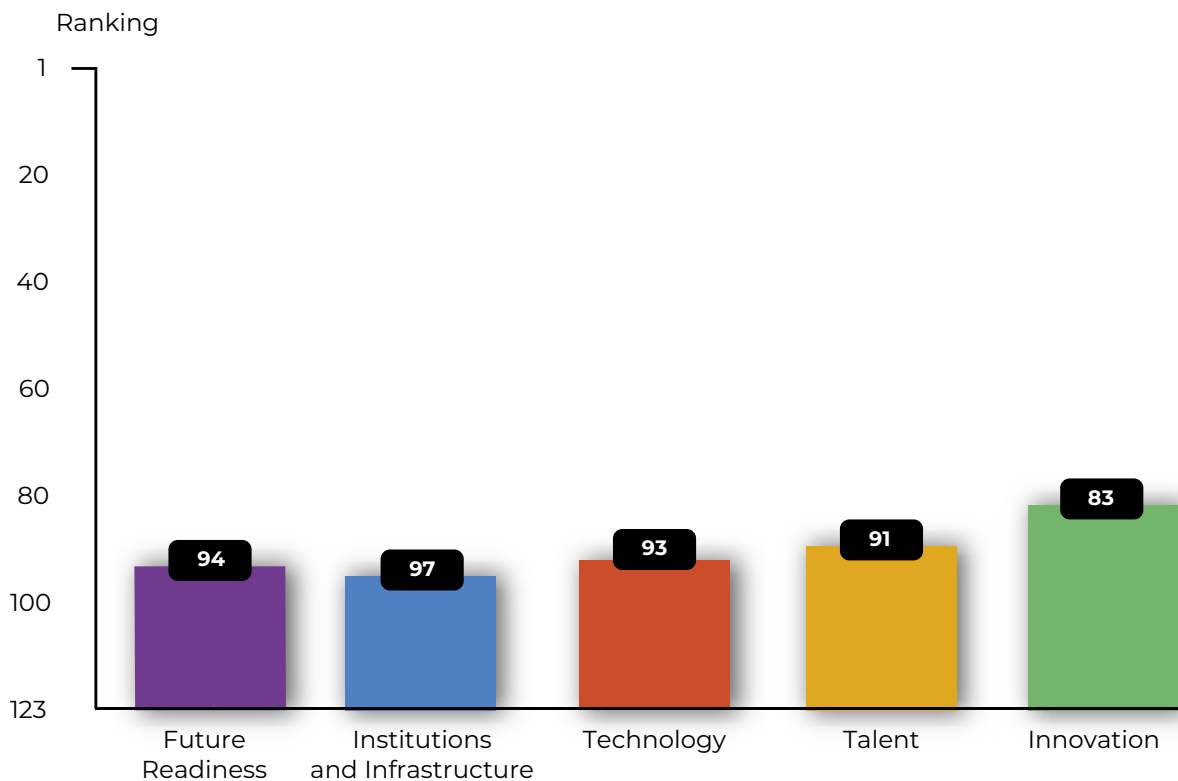
Total population:	53,771,300
GDP:	US\$ 98.84 bn
GDP (PPP) per capita:	US\$ 4,452
Income group:	Lower-middle income
Future readiness ranking:	94

Overall Future Readiness of Kenya

Kenya is ranked 94th in terms of future readiness out of a sample of 123 economies (Figure 1). There is a low degree of variability among the four pillars, where Innovation (83rd) is the highest-ranked dimension. Institutions and Infrastructure (97th) is the lowest-ranked pillar,

where a conducive Market Environment (40th) is offset by a weak Regulatory Environment (97th) and General Infrastructure (114th). As for the other two TTI components—Technology (93rd) and Talent (91st)—Kenya finds itself placed towards the bottom of the second quartile.

Figure 1: Future Readiness of Kenya (global ranking)





Future Readiness of Kenya

Key Indicators



Performance in the TTI triangle

Kenya's strongest sub-pillar is Skills (50th), but the pool of talent in the country is offset by a weak ability to Attract (108th), Grow (90th), and Retain (99th) human capital. The strongest component is Innovation, which can primarily be attributed to the country's Business Sophistication (61st). As for Tech-

nology, Governance (69th) related to digital technologies is one of Kenya's positive assets, but there is considerable scope for improvement with respect to Digital Transformation Technologies and the Digital Economy (102nd).

Table 1: Kenya's ranks in the TTI components

Technology: 93	Talent: 91	Innovation: 83
Digital Transformation Technologies: 109	Attract: 108	Research & Development: 81
People: 89	Grow: 90	Market Sophistication: 85
Governance: 69	Retain: 99	Business Sophistication: 61
Digital Economy: 102	Skills: 50	Knowledge, Tech and Creative Outputs: 86



Future Readiness of Kenya

Key Indicators

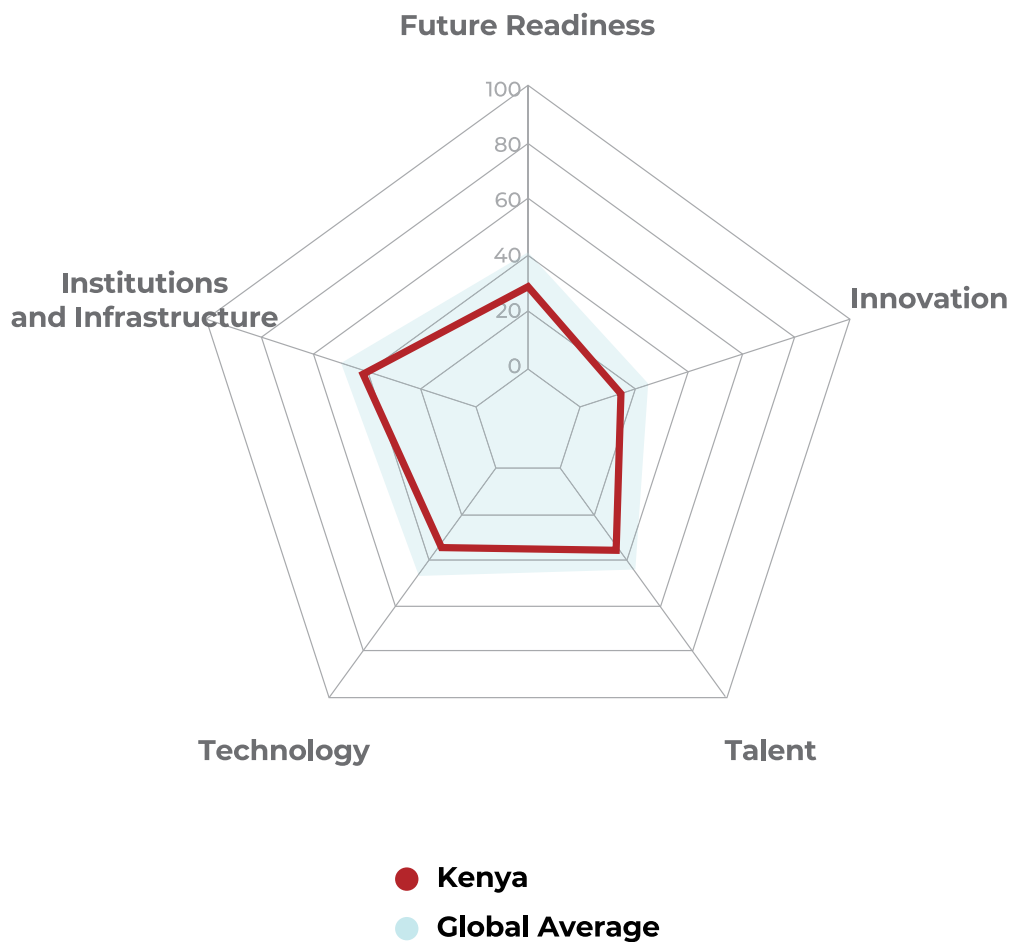


Performance against the global average

As can be seen in Figure 2, Kenya is well below the global average in all four pillars. In three pillars—Institutions and Infrastructure, Talent, and Innovation—the gap is

slightly less than 10 points, whereas it is almost 15 points with respect to the Technology dimension.

Figure 2: Kenya’s future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Kuwait

Key Indicators



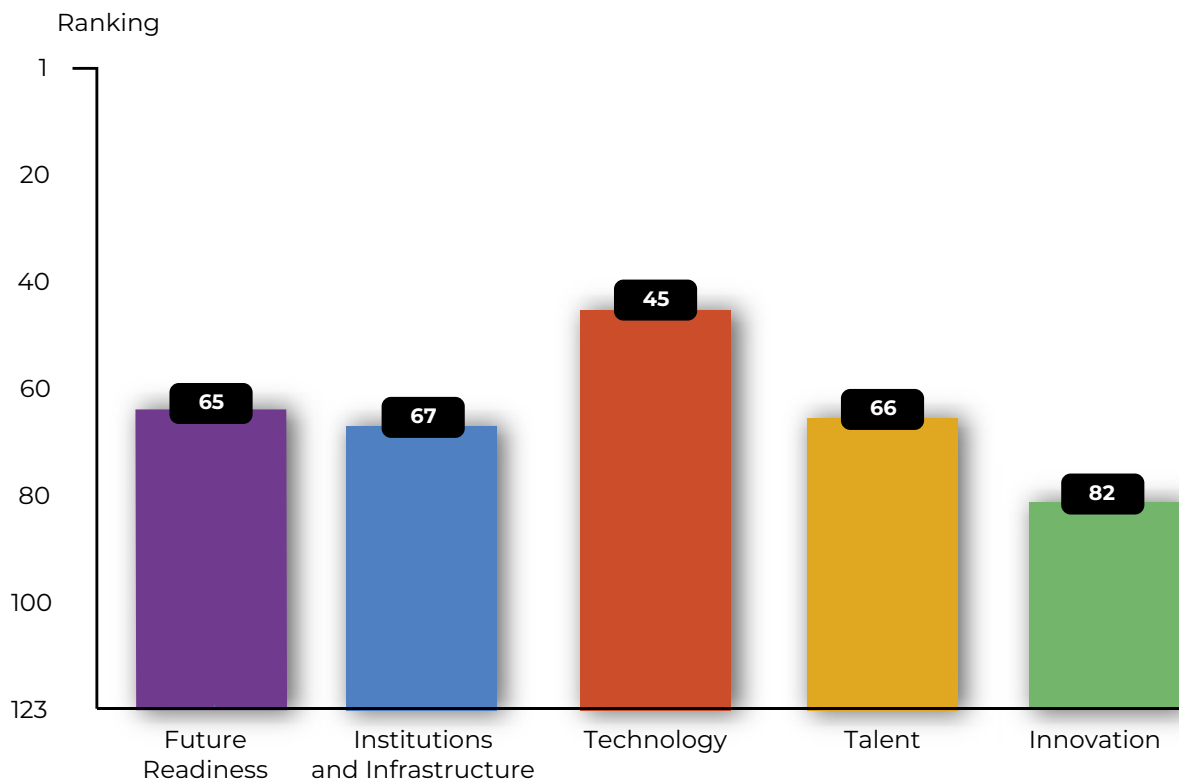
Total population:	4,207,083
GDP:	US\$ 135.00 bn
GDP (PPP) per capita:	US\$ 51,912
Income group:	High income
Future readiness ranking:	65

Overall Future Readiness of Kuwait

Kuwait is ranked 65th in terms of future readiness out of a sample of 123 economies (Figure 1). The country is placed fourth regionally in the overall scores and in the TTI component related to Technology (45th), which is its key strength. Kuwait is only slightly below the me-

dian when it comes to Talent (66th, regional rank: 5th) and Institutions and Infrastructure (67th, regional rank: 5th). Its weakest dimension is Innovation (82nd), where it ranks second-to-last regionally.

Figure 1: Future Readiness of Kuwait (global ranking)





Future Readiness of Kuwait

Key Indicators



Performance in the TTI triangle

Kuwait features in the top quartile in two sub-pillars: People (28th) in the case of Technology and Attract (30th) with respect to Talent (Table 1). Its ability to attract talent, however, is offset by lower levels of growing and retaining talent (81st and 74th, respec-

tively). Overall, Kuwait finds itself in the upper half of the global rankings in five of the 12 sub-pillars and is only positioned in the bottom quartile in one sub-pillar (Business Sophistication, 119th).

Table 1: Kuwait's ranks in the TTI components

Technology: 45	Talent: 66	Innovation: 82
Digital Transformation Technologies: 51	Attract: 30	Research & Development: 80
People: 28	Grow: 81	Market Sophistication: 47
Governance: 65	Retain: 74	Business Sophistication: 119
Digital Economy: 45	Skills: 74	Knowledge, Tech and Creative Outputs: 75



Future Readiness of Kuwait

Key Indicators

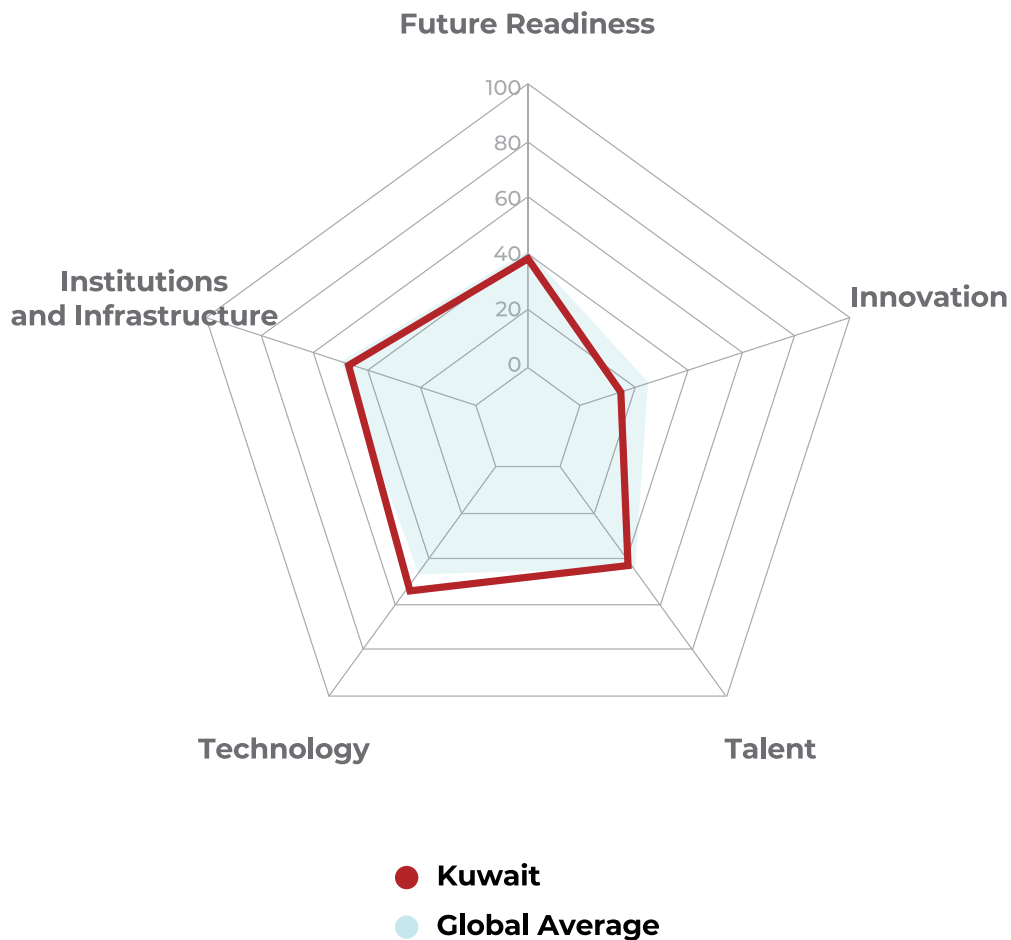


Performance against the global average

Kuwait outscores the global average in only one dimension—Technology—and is slightly below the global average when it comes to Talent and Institutions and Infrastructure

(Figure 2). By contrast, Kuwait is well behind the global average in the pillar related to Innovation.

Figure 2: Kuwait's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Lebanon

Key Indicators



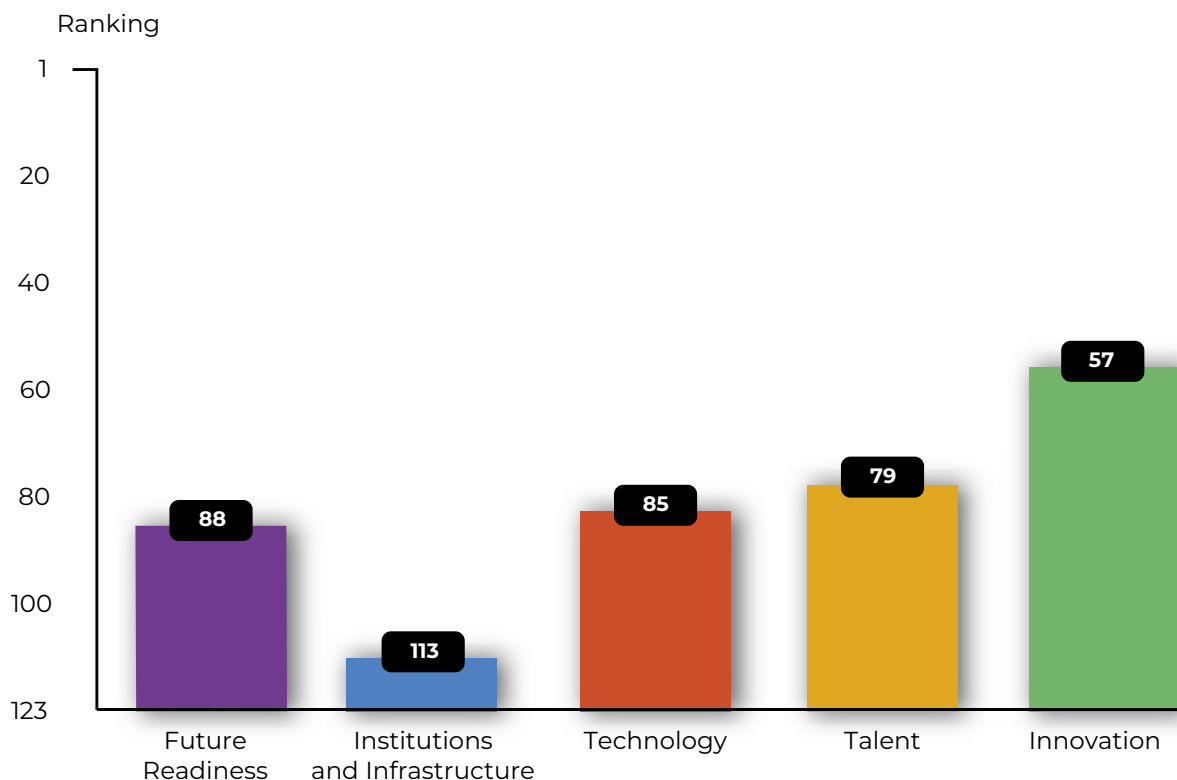
Total population:	6,855,713
GDP:	US\$ 53.37 bn
GDP (PPP) per capita:	US\$ 15,327
Income group:	Upper-middle income
Future readiness ranking:	88

Overall Future Readiness of Lebanon

Lebanon is ranked 88th in terms of future readiness out of a sample of 123 economies (Figure 1). The country's performances in the four main dimensions are strikingly diverse. Its main strength relates to Innovation (57th), where it makes it into the upper half in the global rankings. This is in stark contrast to

the country's position with respect to Institutions and Infrastructure (113th), where there is room for improvement in all three sub-pillars (Regulatory Environment, 111th; Market Environment, 92nd; General Infrastructure, 113th).

Figure 1: Future Readiness of Lebanon (global ranking)





Future Readiness of Lebanon

Key Indicators



Performance in the TTI triangle

The highest-ranked component in the case of Lebanon is Innovation, which includes two of the country's top-3 sub-pillars: Knowledge, Tech, and Creative Outputs (54th) and Research & Development (55th) (Table 1). The country's best performance with respect to sub-pillars relates to Skills (41st), but the Tal-

ent pillar is hampered by a weak ability to Attract (88th), Grow (93rd), and Retain (92nd) human capital. Overall, Lebanon makes it into the upper half of the global rankings in four of the 12 sub-pillars and is one of the world's worst-performing countries when it comes to Governance (120th).

Table 1: Lebanon's ranks in the TTI components

Technology: 85	Talent: 79	Innovation: 57
Digital Transformation Technologies: 58	Attract: 88	Research & Development: 55
People: 73	Grow: 93	Market Sophistication: 66
Governance: 120	Retain: 92	Business Sophistication: 63
Digital Economy: 77	Skills: 41	Knowledge, Tech and Creative Outputs: 54



Future Readiness of Lebanon

Key Indicators

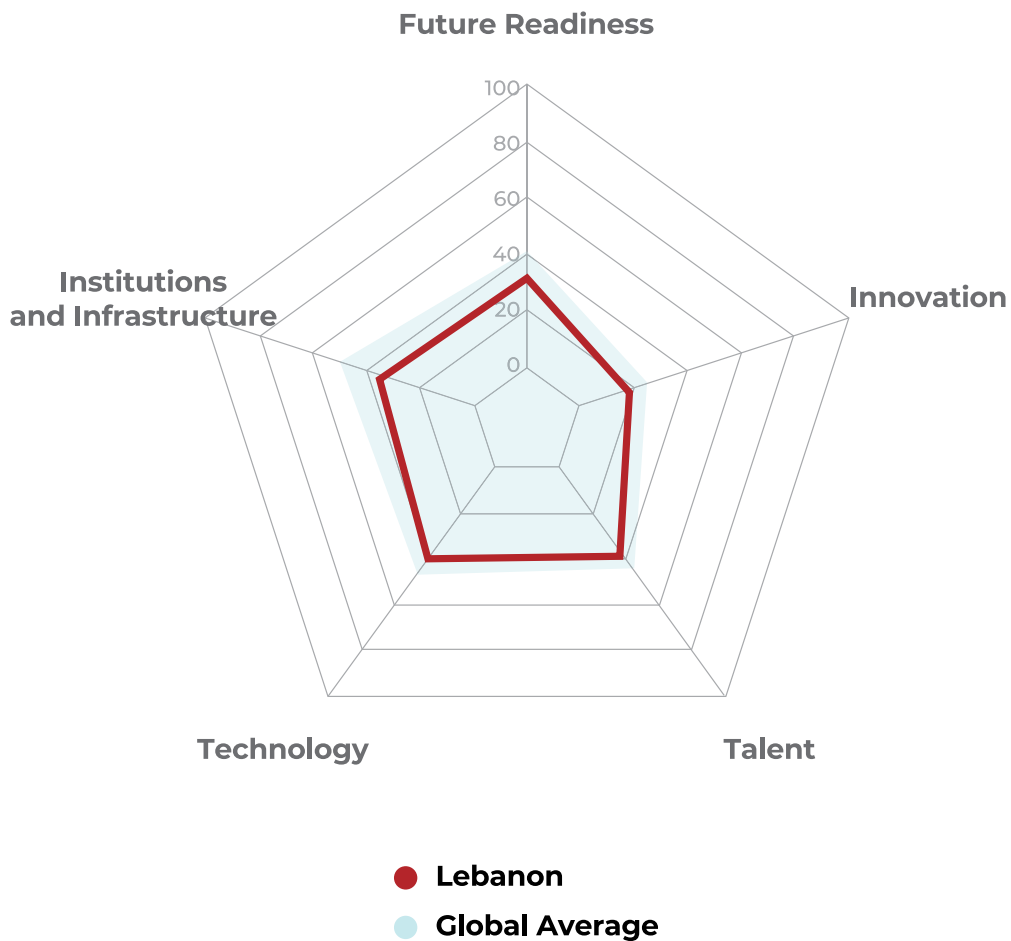


Performance against the global average

As can be seen in Figure 2, Lebanon lags behind the global average in all key dimensions of future readiness. Its score differential is particularly wide with respect to the

Institutions and Infrastructure dimension and, to a lesser extent, the Technology component.

Figure 2: Lebanon's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Mexico

Key Indicators



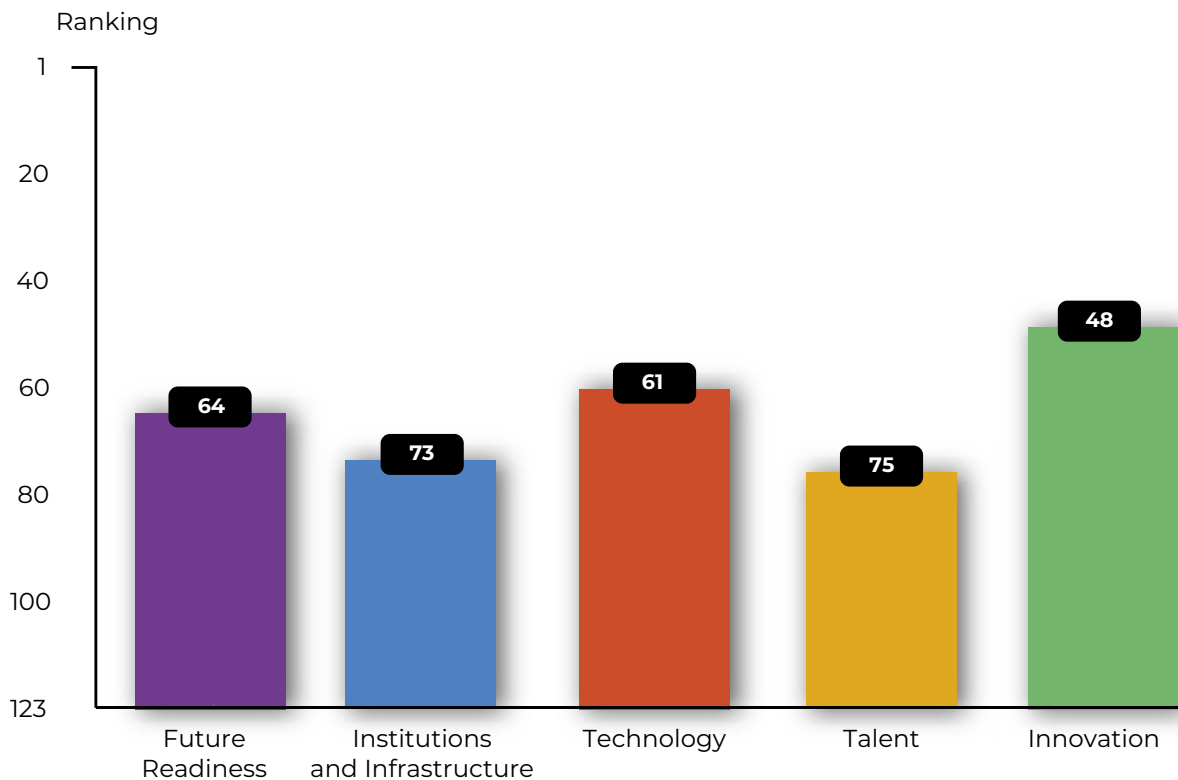
Total population:	128,932,753
GDP:	US\$ 1,076.16 bn
GDP (PPP) per capita:	US\$ 18,833
Income group:	Upper-middle income
Future readiness ranking:	64

Overall Future Readiness of Mexico

Mexico is ranked 64th in terms of future readiness out of a sample of 123 economies, which means that it is positioned just outside the upper half of the global rankings (Figure 1). The country’s main strength is in Innovation (48th), and it also finds itself in the upper half of the rankings with respect to Technology (61st). In

the third TTI component—Talent (75th)—Mexico is ranked slightly lower than in the pillar related to Institutions and Infrastructure (73rd), where it enjoys a conducive Market Environment (36th) that is offset by a weak Regulatory Environment (89th) and General Infrastructure (80th).

Figure 1: Future Readiness of Mexico (global ranking)





Future Readiness of Mexico

Key Indicators



Performance in the TTI triangle

Mexico’s strongest TTI component—Innovation—contains highly varied performances. On one hand, the country finds itself in the top quartile with respect to Knowledge, Tech, and Creative Outputs (24th) and in the third quartile in Research & Development (41st). On the other hand, the pillar includes Mexico’s two weakest sub-pillars: Market

Sophistication (90th) and Business Sophistication (103rd). In the sphere of Technology, a favourable Digital Economy (35th) stands in contrast to a relatively low use of digital technologies among its People (70th) and a weak level of Digital Transformation Technologies (78th).

Table 1: Mexico’s ranks in the TTI components

Technology: 61	Talent: 75	Innovation: 48
Digital Transformation Technologies: 78	Attract: 81	Research & Development: 41
People: 70	Grow: 73	Market Sophistication: 90
Governance: 58	Retain: 72	Business Sophistication: 103
Digital Economy: 35	Skills: 76	Knowledge, Tech and Creative Outputs: 24



Future Readiness of Mexico

Key Indicators



Performance against the global average

In general, Mexico performs just below the global average (Figure 2). The only pillar where it outscores the average (albeit slightly) is in Technology. The country is close to

the average when it comes to Innovation and is further behind in the two remaining pillars.

Figure 2: Mexico's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Morocco

Key Indicators



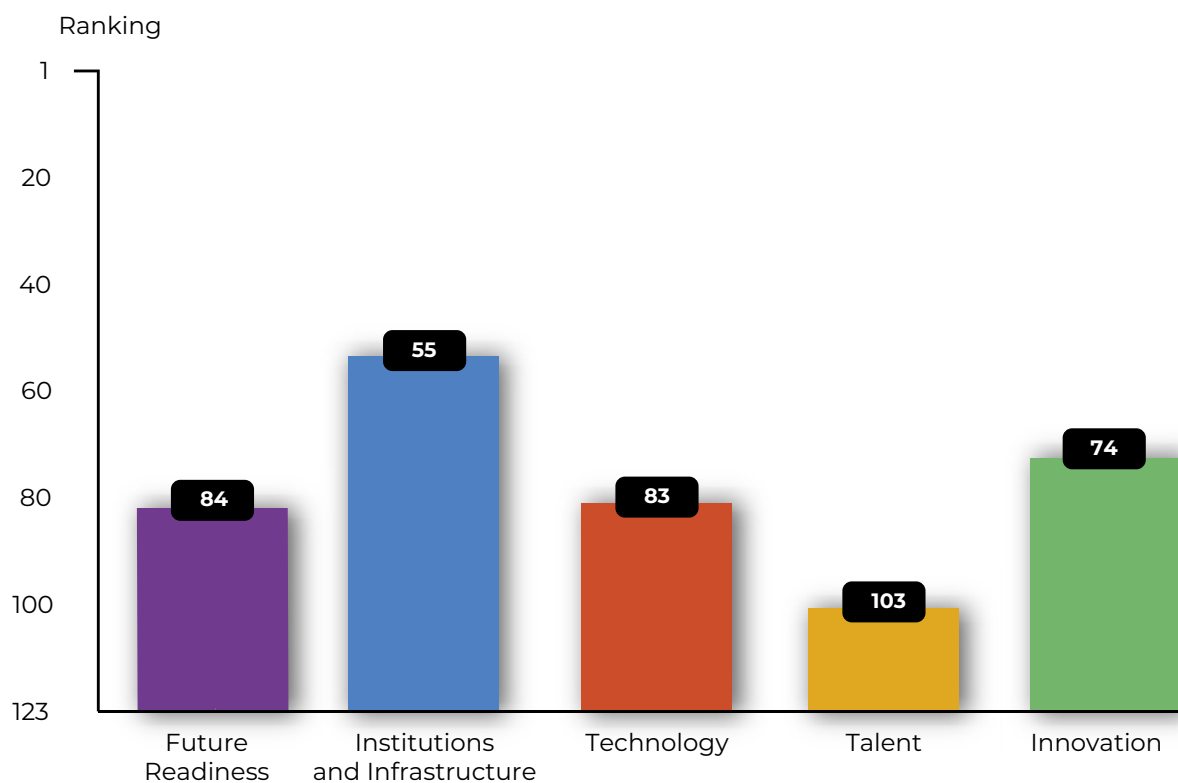
Total population:	36,471,769
GDP:	US\$ 119.00 bn
GDP (PPP) per capita:	US\$ 7,826
Income group:	Lower-middle income
Future readiness ranking:	84

Overall Future Readiness of Morocco

Morocco is ranked 84th in terms of future readiness out of a sample of 123 economies (Figure 1). It is an inconsistent performer in terms of how it ranks across the four main dimensions. Morocco's strength resides in its Institutions and Infrastructure (55th), especially in the state of its General Infrastructure

(49th). These relatively solid institutions and infrastructure do not, however, translate into strong performances in the three TTI components. Morocco's best showing relates to Innovation (74th) and Technology (83rd), while it finds itself in the bottom quartile when it comes to Talent (103rd).

Figure 1: Future Readiness of Morocco (global ranking)





Future Readiness of Morocco

Key Indicators



Performance in the TTI triangle

As can be seen in Table 1, Morocco’s strongest TTI component—Innovation—includes three of the country’s top performances at the sub-pillar level (Market Sophistication, 61st; Research & Development, 71st; Business Sophistication 73rd). Digital Transformation Technologies is also one of its top-3 sub-pillars

in the TTI triangle, but the Technology component is weighed down by poor Governance (93rd) in digital technologies. The greatest challenge for Morocco relates to Talent, where Attract (101st) and Skills (114th) are the areas that need to be addressed most urgently.

Table 1: Morocco’s ranks in the TTI components

Technology: 83	Talent: 103	Innovation: 74
Digital Transformation Technologies: 73	Attract: 101	Research & Development: 71
People: 84	Grow: 88	Market Sophistication: 61
Governance: 93	Retain: 87	Business Sophistication: 73
Digital Economy: 78	Skills: 114	Knowledge, Tech and Creative Outputs: 87



Future Readiness of Morocco

Key Indicators

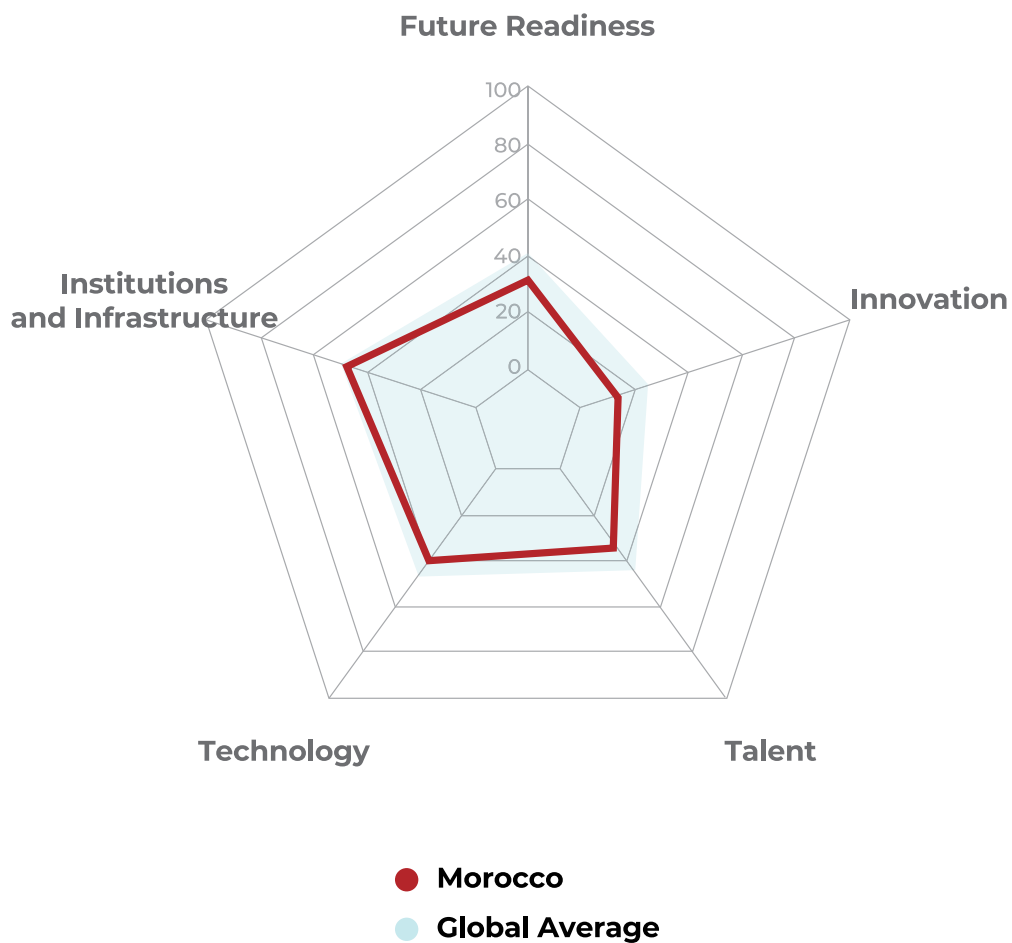


Performance against the global average

As can be seen in Figure 2, Morocco lags behind the global average in all key dimensions of future readiness. It is close to the global average with respect to Institutions

and Infrastructure, but it is well behind it in all three TTI triangle components, especially Talent.

Figure 2: Morocco's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Nigeria

Key Indicators



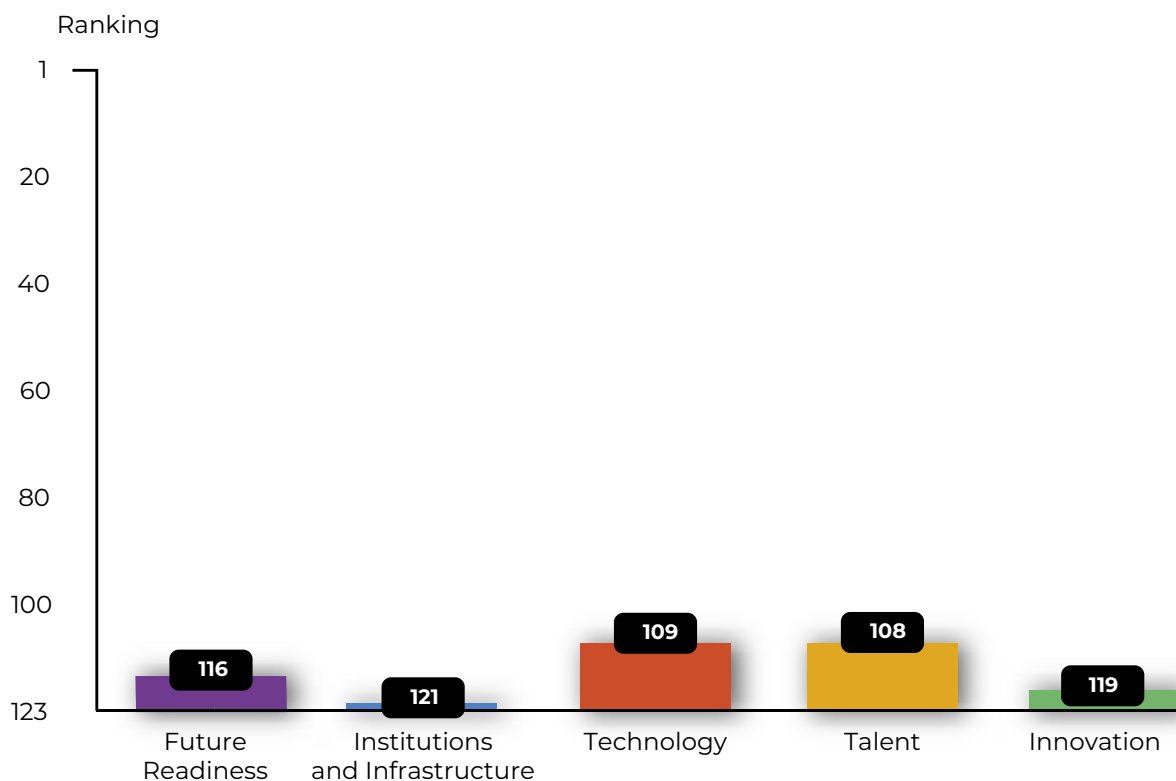
Total population:	206,139,587
GDP:	US\$ 432.29 bn
GDP (PPP) per capita:	US\$ 5,187
Income group:	Lower-middle income
Future readiness ranking:	116

Overall Future Readiness of Nigeria

Nigeria is ranked 116th in terms of future readiness out of a sample of 123 economies (Figure 1). It is positioned in the bottom quartile in all four key dimensions. The lowest-ranked pillar—Institutions and Infrastructure (121st)—is primarily dragged down by a dismal Regula-

tory Environment and General Infrastructure (both 120th), even though the Market Environment (109th) is also challenging. Its weakest TTI component is Innovation (119th), while it is ranked a few places higher in Technology (109th) and Talent (108th).

Figure 1: Future Readiness of Nigeria (global ranking)





Future Readiness of Nigeria

Key Indicators



Performance in the TTI triangle

Nigeria features in the bottom quartile in all but two of the sub-pillars in the TTI triangle (Table 1). The exceptions are technology-related Governance (96th) and Digital Economy (79th), where the country is ranked in the second quartile. Within the same pillar, Nigeria primarily needs to address its level of Dig-

ital Transformation Technologies (116th) and the low use of digital technologies among its People (118th). The country's third-best sub-pillar relates to growing talent (102nd), even though it is admittedly only a few ranks higher than the other sub-pillars in the Talent component.

Table 1: Nigeria's ranks in the TTI components

Technology: 109	Talent: 108	Innovation: 119
Digital Transformation Technologies: 116	Attract: 107	Research & Development: 117
People: 118	Grow: 102	Market Sophistication: 116
Governance: 96	Retain: 107	Business Sophistication: 108
Digital Economy: 79	Skills: 106	Knowledge, Tech and Creative Outputs: 112



Future Readiness of Nigeria

Key Indicators

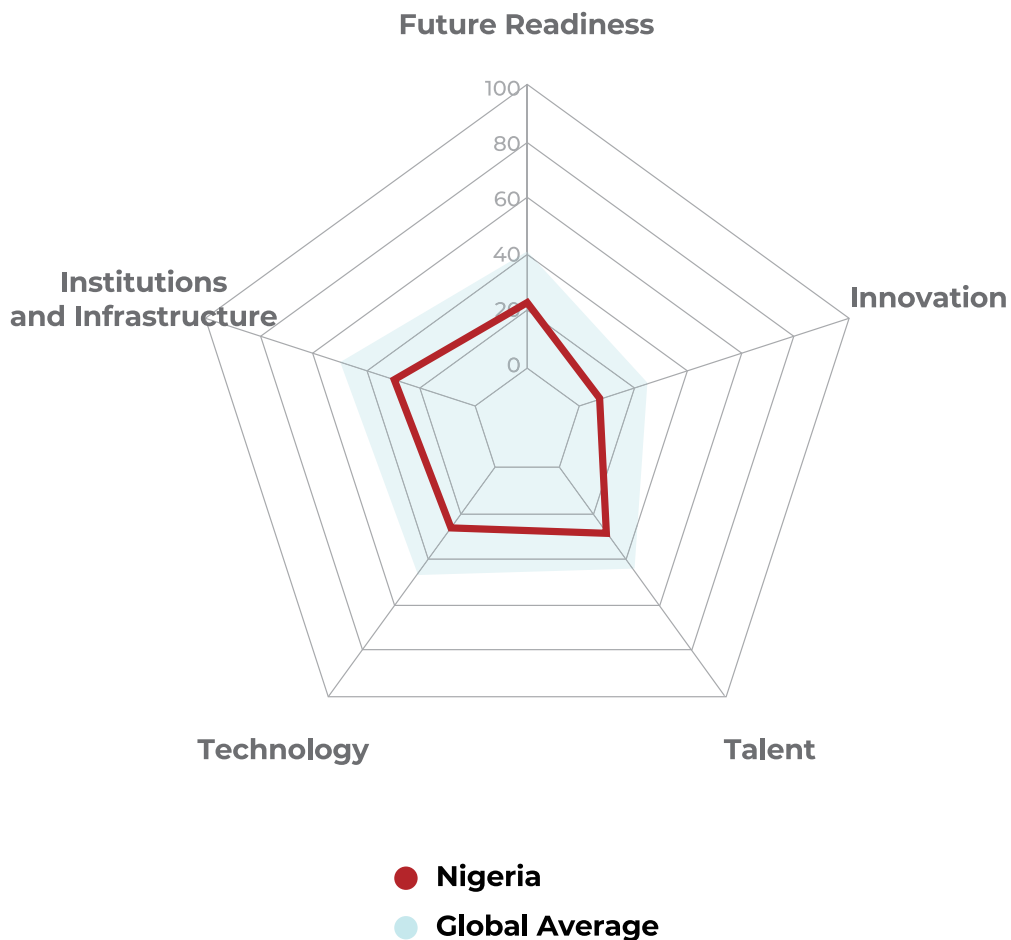


Performance against the global average

As would be expected, Nigeria is well below the global average in overall future readiness and in all of its key dimensions (Figure 2). The country's best pillar, comparatively

speaking, is Talent, but even in this dimension, it is more than 15 points below the global average.

Figure 2: Nigeria's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Peru

Key Indicators



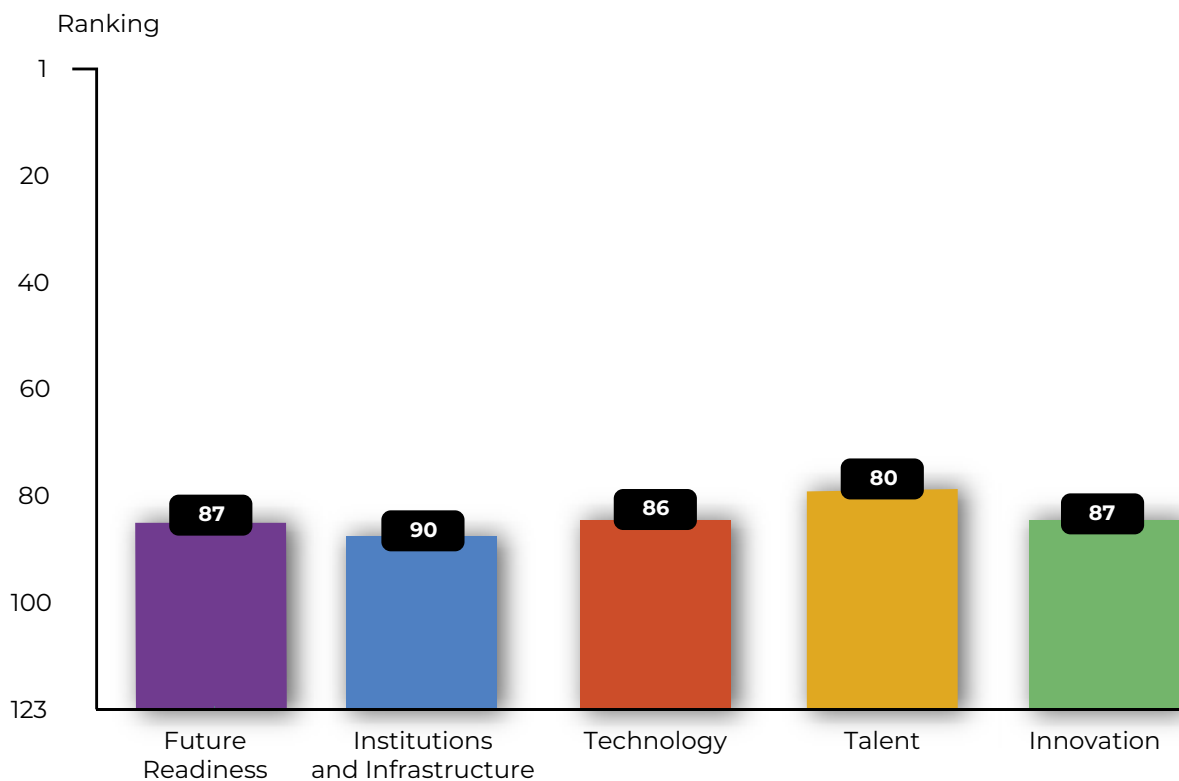
Total population:	32,971,846
GDP:	US\$ 202.01 bn
GDP (PPP) per capita:	US\$ 11,879
Income group:	Upper-middle income
Future readiness ranking:	87

Overall Future Readiness of Peru

Peru is ranked 87th in terms of future readiness out of a sample of 123 economies (Figure 1). The country is one of the more consistent performers in that its rankings in the four dimensions are all between 80 and 90. Its highest rank relates to Talent (80th), which is followed by the

other two TTI components: Technology (86th) and Innovation (87th). Its lowest rank concerns its Institutions and Infrastructure (90th), as a result of weak performances in all three sub-pillars (Regulatory Environment, 83rd; Market Environment, 73rd; General Infrastructure, 93rd).

Figure 1: Future Readiness of Peru (global ranking)





Future Readiness of Peru

Key Indicators



Performance in the TTI triangle

Peru’s consistency at the pillar-level is also evident at the sub-pillar level (Table 1). The country’s two best performances—Attract (55th) and People (61st)—are in the third quartile, whereas it is placed in the second quartile in the remaining 10 sub-pillars. Its

third-best sub-pillar concerns Market Sophistication (72nd) in the Innovation component, where the main challenge is to translate the innovation-related inputs to Knowledge, Tech, and Creative Outputs (91st).

Table 1: Peru’s ranks in the TTI components

Technology: 86	Talent: 80	Innovation: 87
Digital Transformation Technologies: 92	Attract: 55	Research & Development: 74
People: 61	Grow: 82	Market Sophistication: 72
Governance: 90	Retain: 84	Business Sophistication: 82
Digital Economy: 90	Skills: 85	Knowledge, Tech and Creative Outputs: 91



Future Readiness of Peru

Key Indicators

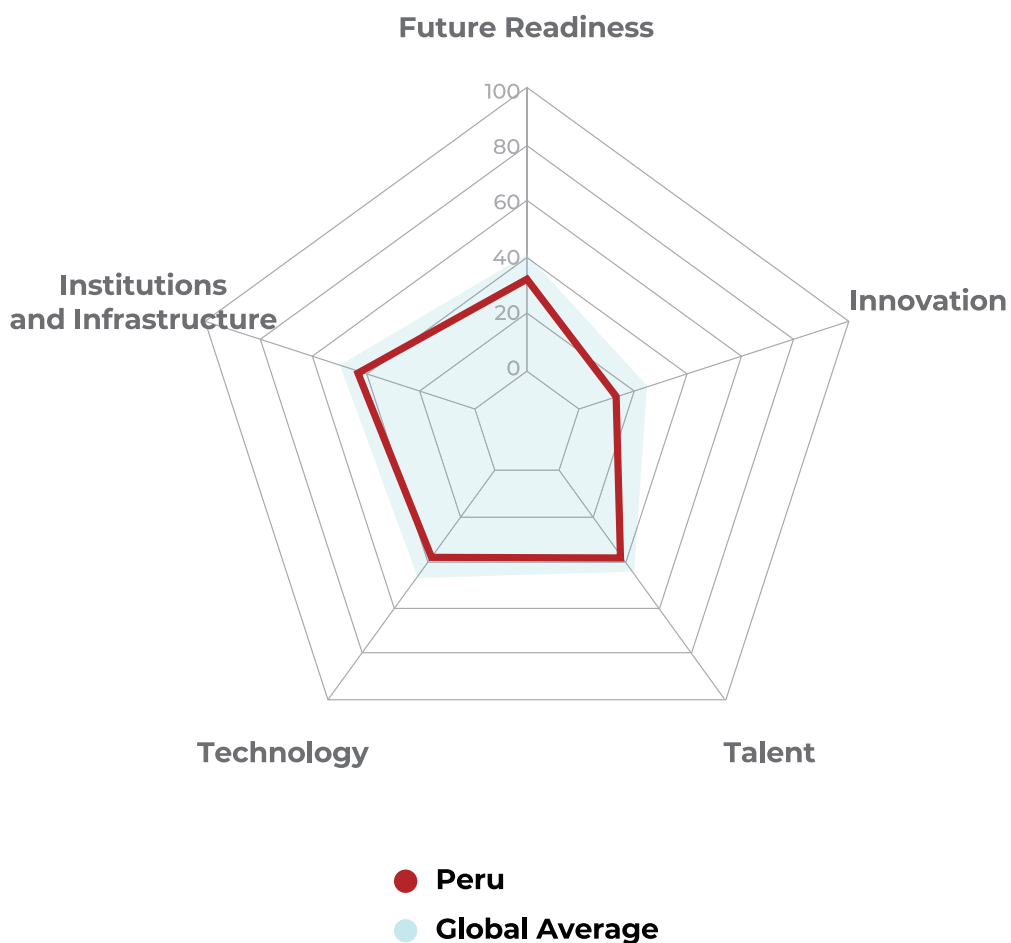


Performance against the global average

As can be seen in Figure 2, Peru's future readiness score is clearly below the global average. In fact, the country trails the global

average in all four key dimensions, especially in its two weakest pillars: Technology and Innovation.

Figure 2: Peru's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Qatar

Key Indicators



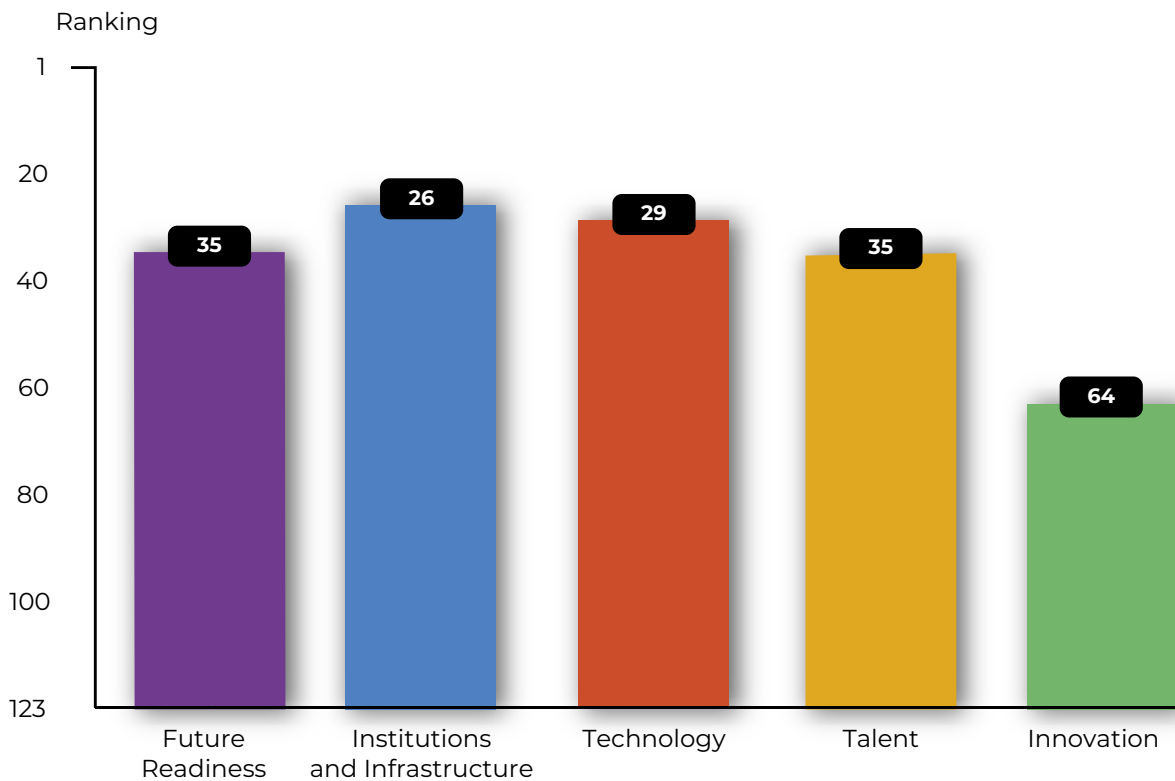
Total population:	2,832,067
GDP:	US\$ 183.00 bn
GDP (PPP) per capita:	US\$ 96,491
Income group:	High income
Future readiness ranking:	35

Overall Future Readiness of Qatar

Qatar is ranked 35th in terms of future readiness out of a sample of 123 economies (Figure 1) and, as such, the second most future-ready country in the MENA region. The country's highest rank relates to its Institutions and Infrastructure (26th) and it is also in the top

quartile with respect to Technology (29th). Qatar also performs well in the Talent (35th) component. Its weakest dimension, meanwhile, relates to Innovation (64th), where it is positioned just outside the upper half of the global ranking and ranks fourth among the eight MENA countries.

Figure 1: Future Readiness of Qatar (global ranking)





Future Readiness of Qatar

Key Indicators



Performance in the TTI triangle

Although Qatar's highest-ranked component is Technology, the country's best performance with respect to sub-pillars relates to attracting talent, where it is one of the world's top-ranked countries (Table 1). This stands in contrast to Qatar's performance in the other three talent-related sub-pillars (Grow, 61st; Retain,

44th; Skills, 57th). Its most impressive component, meanwhile, is Technology, where Qatar features in the top quartile in three sub-pillars: People (12th), Digital Economy (18th), and Governance (28th). As for the country's weakest component—Innovation—the greatest challenge is to improve its Market Sophistication

Table 1: Qatar's ranks in the TTI components

Technology: 29	Talent: 35	Innovation: 64
Digital Transformation Technologies: 50	Attract: 3	Research & Development: 54
People: 12	Grow: 61	Market Sophistication: 95
Governance: 28	Retain: 44	Business Sophistication: 68
Digital Economy: 18	Skills: 57	Knowledge, Tech and Creative Outputs: 60



Future Readiness of Qatar

Key Indicators

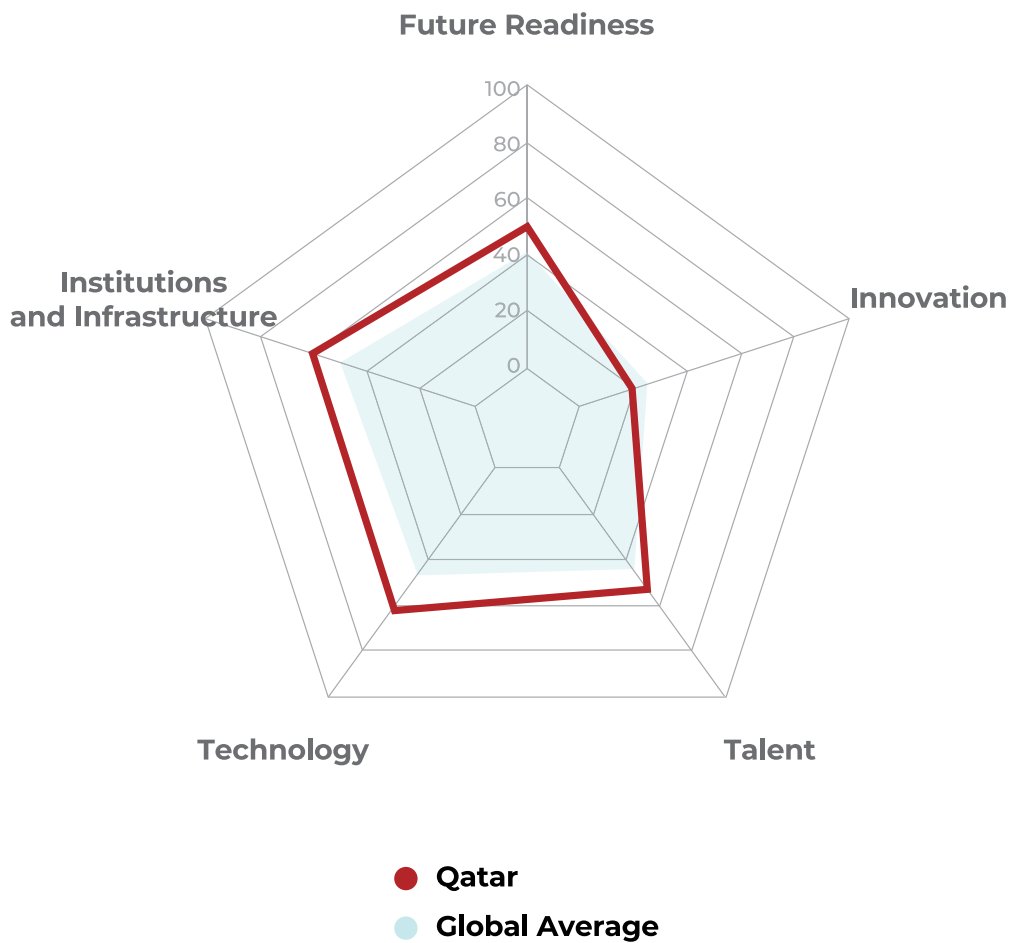


Performance against the global average

As can be seen in Figure 2, Qatar is well above the global average in three of the four key dimensions of future readiness, espe-

cially Technology. The exception is Innovation, the country's weakest dimension.

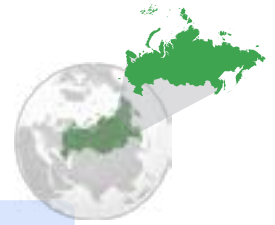
Figure 2: Qatar's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Russia

Key Indicators



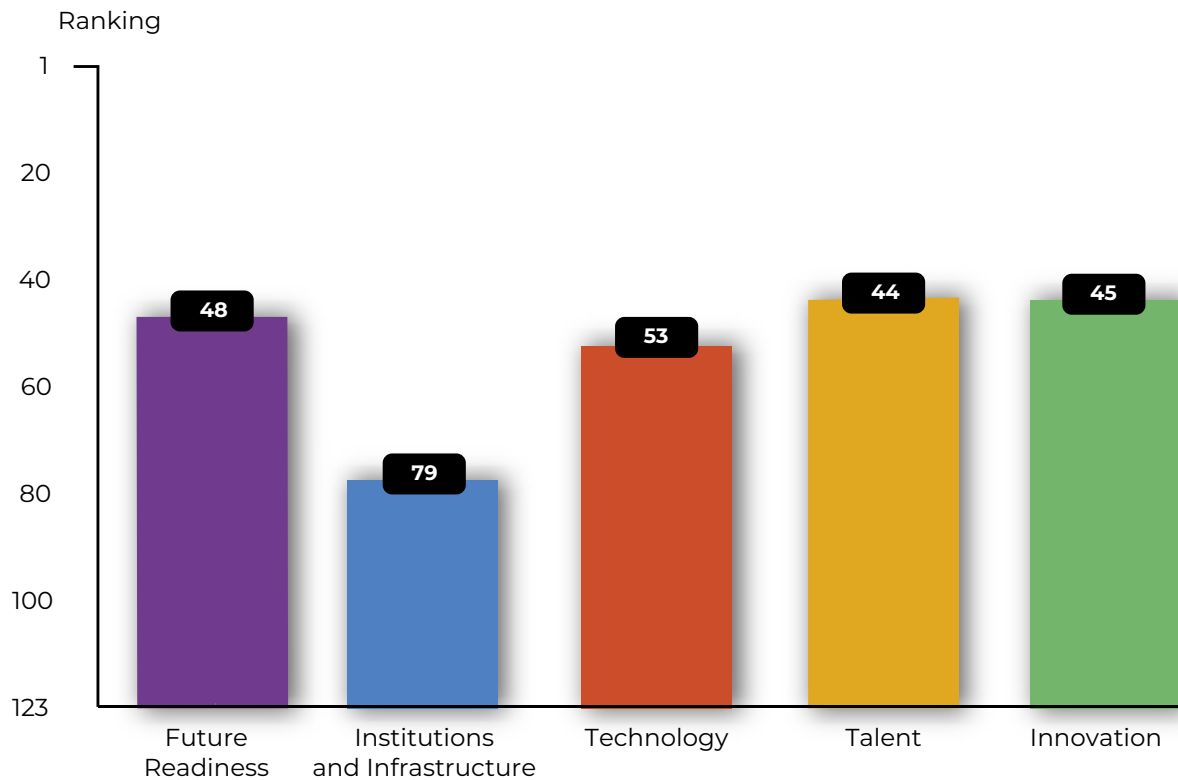
Total population:	144,104,080
GDP:	US\$ 1,483.50 bn
GDP (PPP) per capita:	US\$ 28,213
Income group:	Upper-middle income
Future readiness ranking:	48

Overall Future Readiness of Russia

Russia is ranked 48th in terms of future readiness out of a sample of 123 economies (Figure 1). The country has similar performances in the three TTI components (Technology, 53rd; Talent, 44th; Innovation (45th).

Strengthening its Institutions and Infrastructure (79th), meanwhile, presents Russia's greatest challenge, especially when it comes to fostering a more conducive Regulatory Environment (95th).

Figure 1: Future Readiness of Russia (global ranking)





Future Readiness of Russia

Key Indicators



Performance in the TTI triangle

The performance of Russia with respect to Technology is quite even across all four sub-pillars (Table 1). In the other two (slightly higher-ranked) TTI components, its performances are more varied. With respect to Talent, a strong pool of Skills (16th) and a solid ability to Retain (36th) and Grow (37th) tal-

ent is offset by the country's disappointingly low rank in Attract (115th). As for Innovation, Russia's strength lies in Research & Development (33rd), whereas there is considerable scope for improvement in the other three sub-pillars.

Table 1: Russia's ranks in the TTI components

Technology: 53	Talent: 44	Innovation: 45
Digital Transformation Technologies: 55	Attract: 115	Research & Development: 33
People: 50	Grow: 37	Market Sophistication: 74
Governance: 54	Retain: 36	Business Sophistication: 56
Digital Economy: 52	Skills: 16	Knowledge, Tech and Creative Outputs: 61



Future Readiness of Russia

Key Indicators



Performance against the global average

Russia's performance is close to the global average in both future readiness overall and its key pillars (Figure 2). More specifically, Russia's future readiness score is slightly above the global average, as is its score

in Technology and Talent. By contrast, the country lags behind the global average slightly in Innovation and by a greater margin in Institutions and Infrastructure.

Figure 2: Russia's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Saudi Arabia

Key Indicators



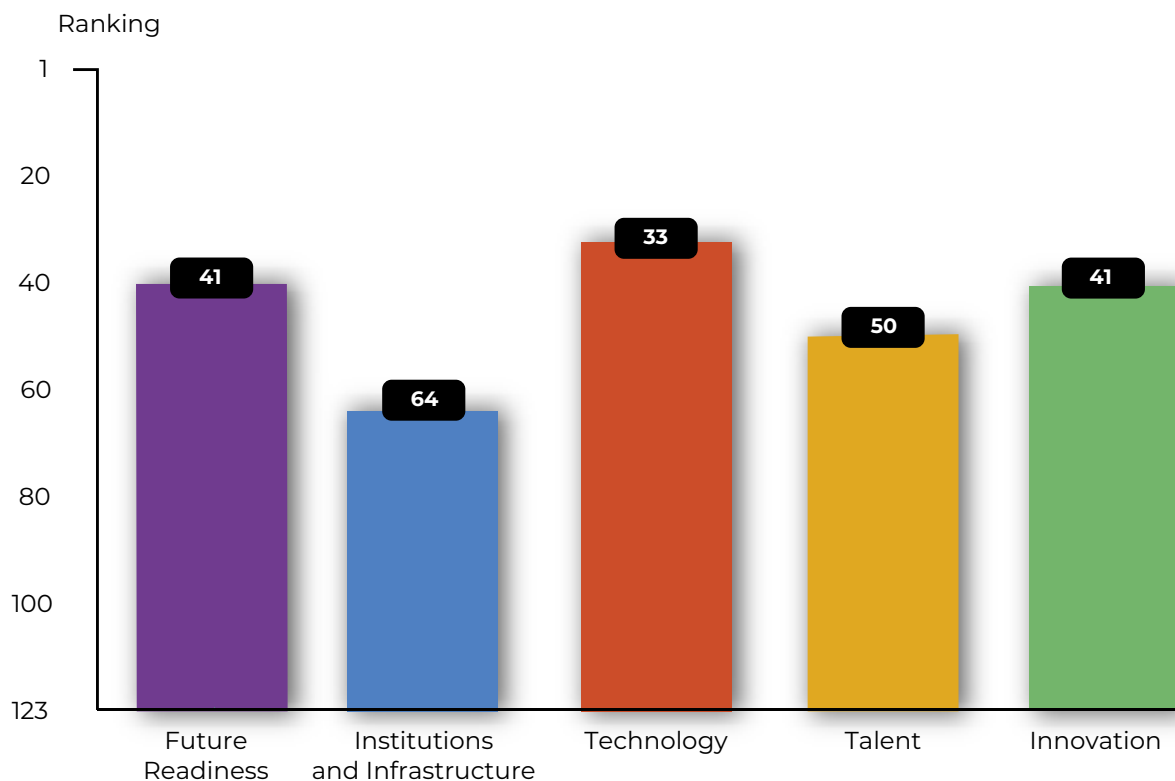
Total population:	34,268,528
GDP:	US\$ 793.00 bn
GDP (PPP) per capita:	US\$ 48,908
Income group:	High income
Future readiness ranking:	41

Future Readiness of Saudi Arabia

Saudi Arabia is ranked 41st in terms of future readiness out of a sample of 123 economies (Figure 1). The country's highest global rank relates to its state of Technology (33rd), whereas it is also positioned in the upper half of the global rankings when it comes to In-

novation (41st) and Talent (50th). Saudi Arabia's greatest challenge for raising its future readiness is to improve its Institutions and Infrastructure (64th), particularly with respect to fostering a more conducive Market Environment (105th).

Figure 1: Future Readiness of Saudi Arabia (global ranking)





Future Readiness of Saudi Arabia

Key Indicators



Performance in the TTI triangle

As can be seen in Table 1, Saudi Arabia's best-performing component, Technology, includes two sub-pillars where the country features in the top quartile: People (26th) and Digital Economy (30th). Saudi Arabia also makes it into the top quartile with re-

spect to Research & Development (27th), but the Innovation component is primarily hampered by a weak level of Business Sophistication (88th). As for Talent, the country's greatest scope for improvement relates to its ability to Attract (68th) human skills.

Table 1: Saudi Arabia's ranks in the TTI components

Technology: 33	Talent: 50	Innovation: 41
Digital Transformation Technologies: 47	Attract: 68	Research & Development: 27
People: 26	Grow: 42	Market Sophistication: 53
Governance: 32	Retain: 49	Business Sophistication: 88
Digital Economy: 30	Skills: 49	Knowledge, Tech and Creative Outputs: 49



Future Readiness of Saudi Arabia

Key Indicators

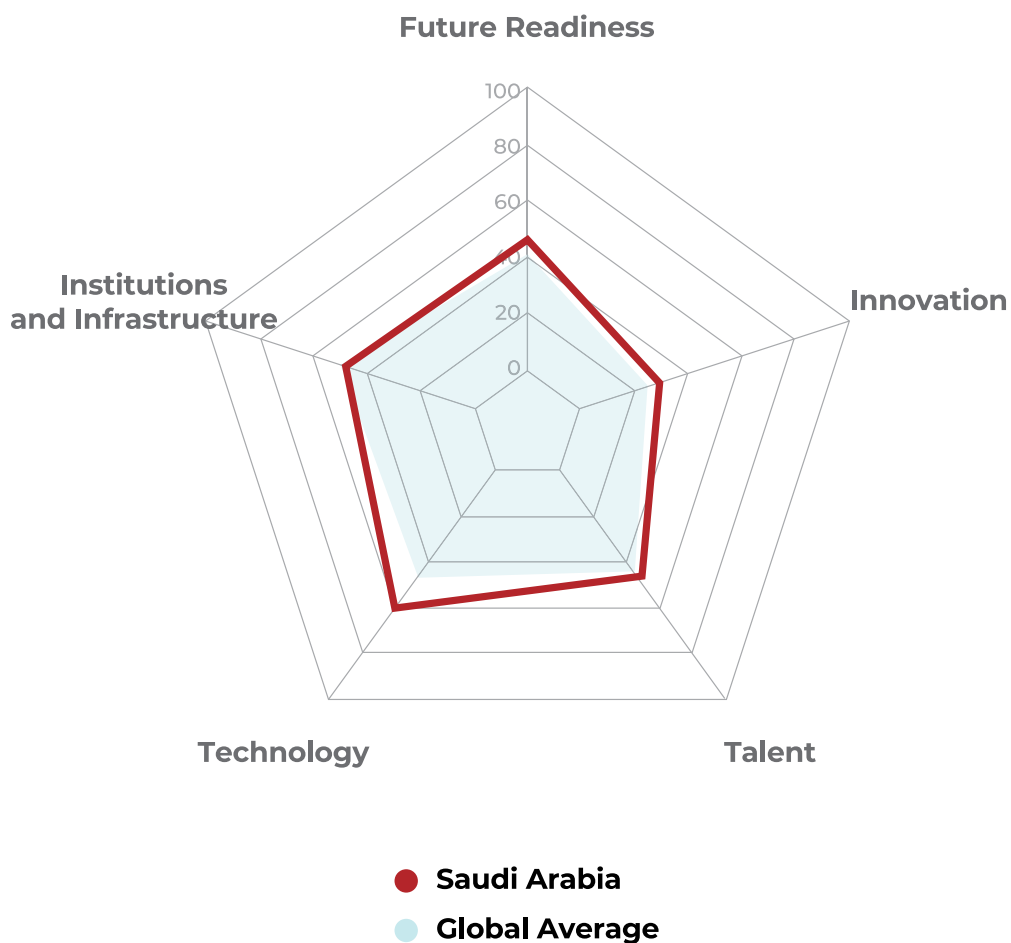


Performance against the global average

Saudi Arabia is above the global average in three of the four key dimensions of future readiness (Figure 2). The country has a particular advantage in its strongest dimension

(Technology), whereas it is slightly behind in its weakest dimension (Institutions and Infrastructure).

Figure 2: Saudi Arabia's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Singapore

Key Indicators



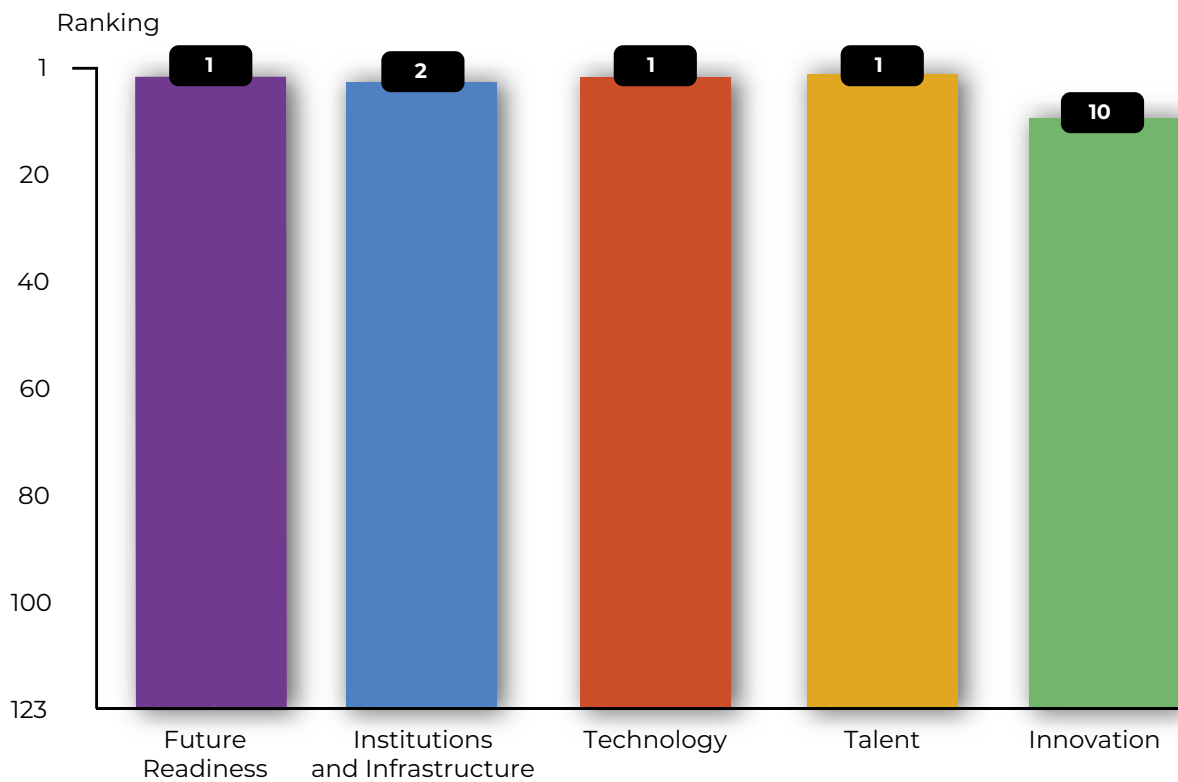
Total population:	5,685,807
GDP:	US\$ 340.00 bn
GDP (PPP) per capita:	US\$ 98,526
Income group:	High income
Future readiness ranking:	1

Overall Future Readiness of Singapore

Singapore is the world's most future-ready country and is ranked in the top 10 in all four core pillars. The city-state is the global leader in both Technology and Talent. It is also one of the world's best-performing countries

when it comes to Institutions and Infrastructure (2nd), not least because of its conducive Regulatory Environment. As for Innovation (10th), Singapore benefits primarily from its high Market Sophistication (2nd).

Figure 1: Future Readiness of Singapore (global ranking)





Future Readiness of Singapore

Key Indicators



Performance in the TTI triangle

Singapore is the world's top performer in two of three TTI components: Technology and Talent (Table 1). Not only that, but it is the global leader in four of the 12 sub-pillars (Digital Economy, Attract, Grow, and Skills) and is the second-best performer in two sub-pillars (People and Market Sophistica-

tion). The only sub-pillar where Singapore does not find itself in the top quartile is Retain (35th), and there is also scope for improvement in Business Sophistication (22nd) for Innovation and Governance (13th) and Digital Transformation Technologies (14th) in the Technology dimension.

Table 1: Singapore's ranks in the TTI components

Technology: 1	Talent: 1	Innovation: 10
Digital Transformation Technologies: 14	Attract: 1	Research & Development: 13
People: 2	Grow: 1	Market Sophistication: 2
Governance: 13	Retain: 35	Business Sophistication: 22
Digital Economy: 1	Skills: 1	Knowledge, Tech and Creative Outputs: 9



Future Readiness of Singapore

Key Indicators

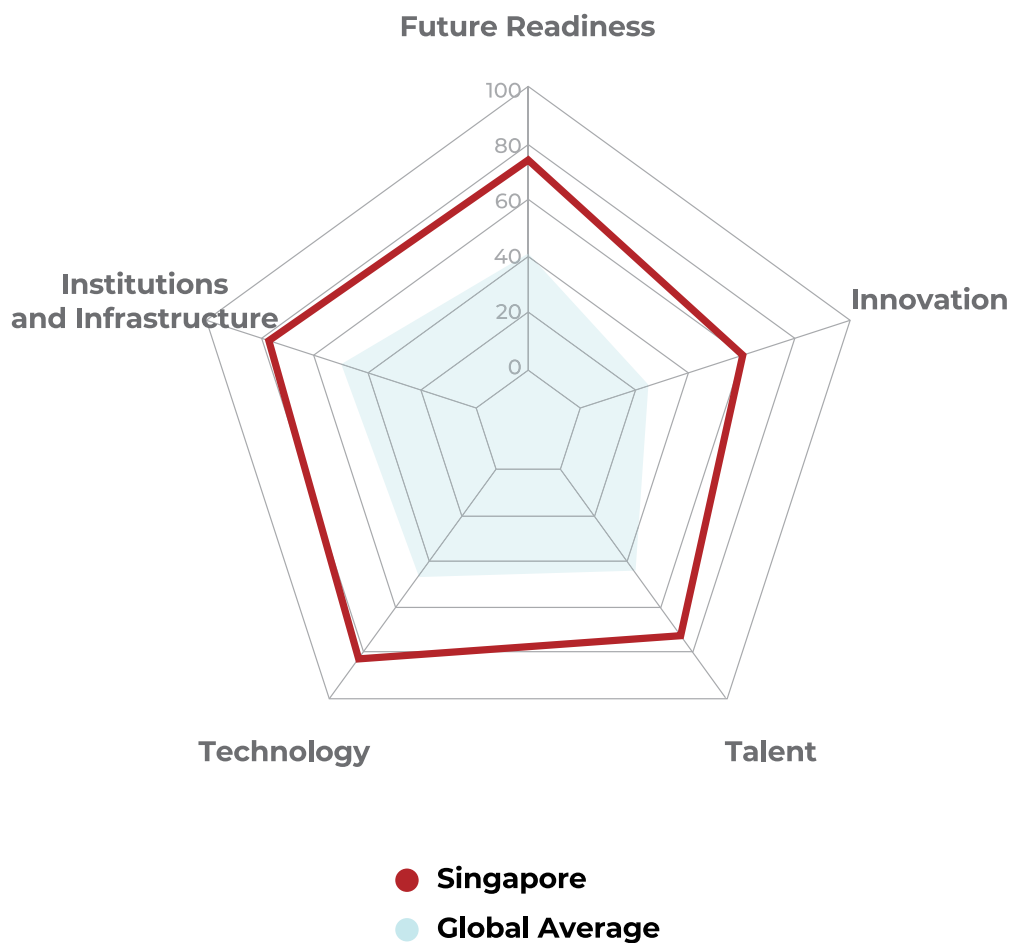


Performance against the global average

As would be expected, Singapore performs well above the global average in all four key dimensions of future readiness (Figure 2).

The difference is particularly wide with respect to the Technology and Innovation dimensions.

Figure 2: Singapore's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of South Africa

Key Indicators



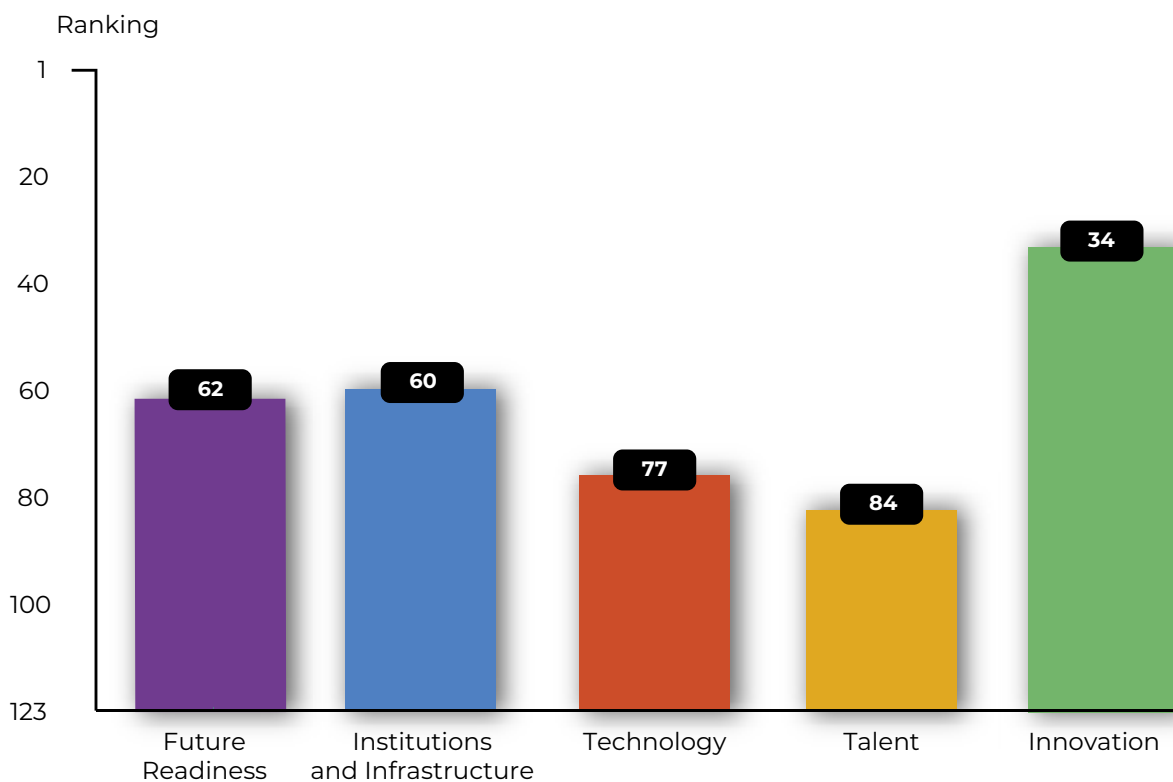
Total population:	59,308,690
GDP:	US\$ 301.92 bn
GDP (PPP) per capita:	US\$ 12,096
Income group:	Upper-middle income
Future readiness ranking:	62

Overall Future Readiness of South Africa

South Africa is ranked 62nd in terms of future readiness out of a sample of 123 economies (Figure 1). The country's best dimension is, by far, Innovation (34th), where it is just a shy of a position in the top quartile. Institutions and Infrastructure (60th) is the other pillar where

South Africa finds itself in the upper half of the global rankings. This can mainly be attributed to the Regulatory Environment (59th) and the Market Environment (51st). As for the other two TTI components, it is ranked 77th and 84th, respectively, in Technology and Talent.

Figure 1: Future Readiness of South Africa (global ranking)





Future Readiness of South Africa

Key Indicators



Performance in the TTI triangle

As can be seen in Table 1, the strong performance of South Africa in Innovation is reflected in the showings of all its sub-pillars. In fact, the Innovation-related dimensions are the highest-ranked sub-pillars in the TTI triangle, with Market Sophistication (9th) being particularly impressive. The other two components are characterised by one sub-pillar

being considerably worse than the others. In the case of Technology, the main challenge is to increase the use of digital technologies among individuals, firms, and governmental authorities (People, 96th). As for Talent, the most urgent need is to boost the ability to Retain (109th) human skills.

Table 1: South Africa's ranks in the TTI components

Technology: 77	Talent: 84	Innovation: 34
Digital Transformation Technologies: 68	Attract: 64	Research & Development: 42
People: 96	Grow: 64	Market Sophistication: 9
Governance: 77	Retain: 109	Business Sophistication: 47
Digital Economy: 68	Skills: 68	Knowledge, Tech and Creative Outputs: 46



Future Readiness of South Africa

Key Indicators

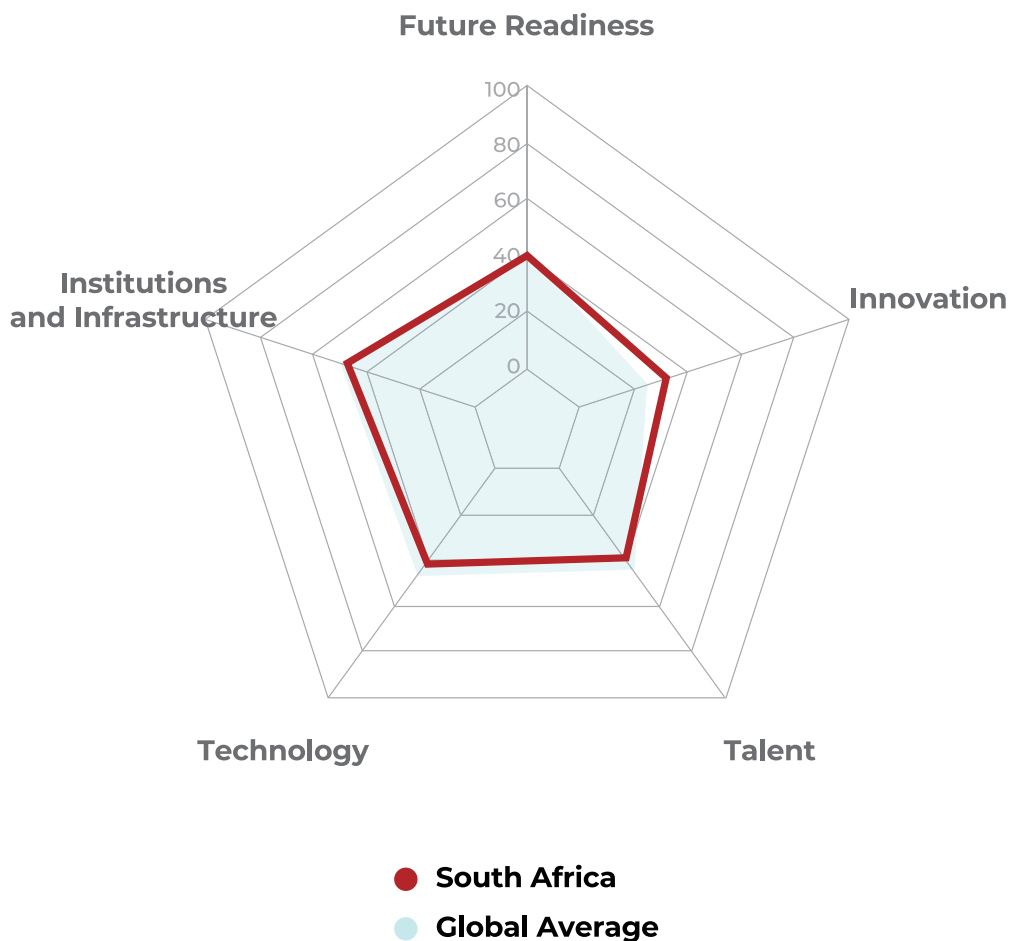


Performance against the global average

South Africa outperforms the global average in its strongest pillar: Innovation (Figure 2). It is a couple of points shy of the average in overall future readiness and in the pillar

related to Institutions and Infrastructure, while the greatest gaps are in the Technology and Talent components.

Figure 2: South Africa's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Thailand

Key Indicators



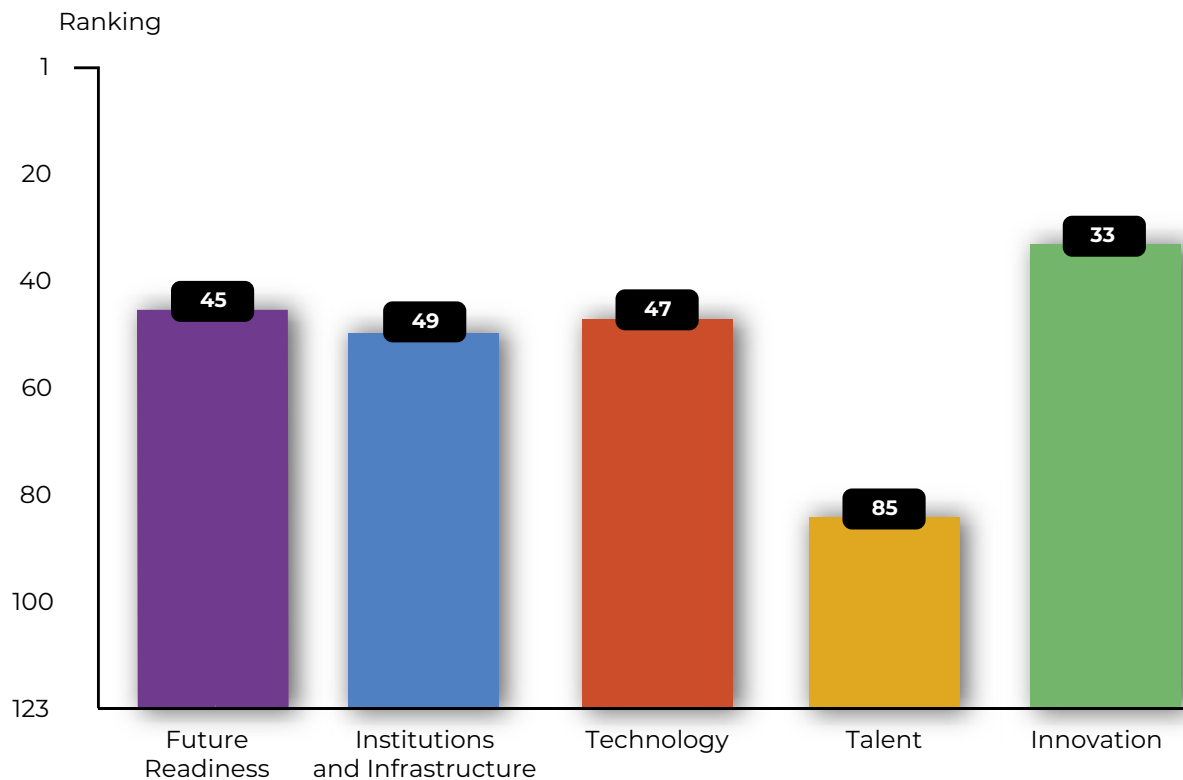
Total population:	69,799,978
GDP:	US\$ 501.79 bn
GDP (PPP) per capita:	US\$ 18,236
Income group:	Upper-middle income
Future readiness ranking:	45

Overall Future Readiness of Thailand

Thailand is ranked 45th in terms of future readiness out of a sample of 123 economies (Figure 1), which means that it is positioned in the third quartile in the ranking. At the pillar level, the country finds itself in the same quartile in two of the three TTI components: Innovation (33rd)

and Technology (47th). Thailand also ranks in the third quartile with respect to Institutions and Infrastructure (49th), which is primarily due to a conducive Market Environment (29th). Its weakest pillar relates to Talent, with relatively poor performances in all four sub-pillars.

Figure 1: Future Readiness of Thailand (global ranking)





Future Readiness of Thailand

Key Indicators



Performance in the TTI triangle

Thailand's strength in the TTI triangle clearly relates to Innovation, and it is also in this pillar that the country has its best sub-pillar performances (Market Sophistication, 16th; Knowledge, Tech, and Creative Outputs, 26th; Business Sophistication, 33rd). Al-

though more could be done to strengthen Digital Transformation Technologies (62nd) and Research & Development (47th), Thailand's greatest challenge is to boost the talent dimension by addressing shortcomings in all sub-pillars.

Table 1: Thailand's ranks in the TTI components

Technology: 47	Talent: 85	Innovation: 33
Digital Transformation Technologies: 62	Attract: 82	Research & Development: 47
People: 46	Grow: 71	Market Sophistication: 16
Governance: 48	Retain: 86	Business Sophistication: 33
Digital Economy: 39	Skills: 84	Knowledge, Tech and Creative Outputs: 26



Future Readiness of Thailand

Key Indicators

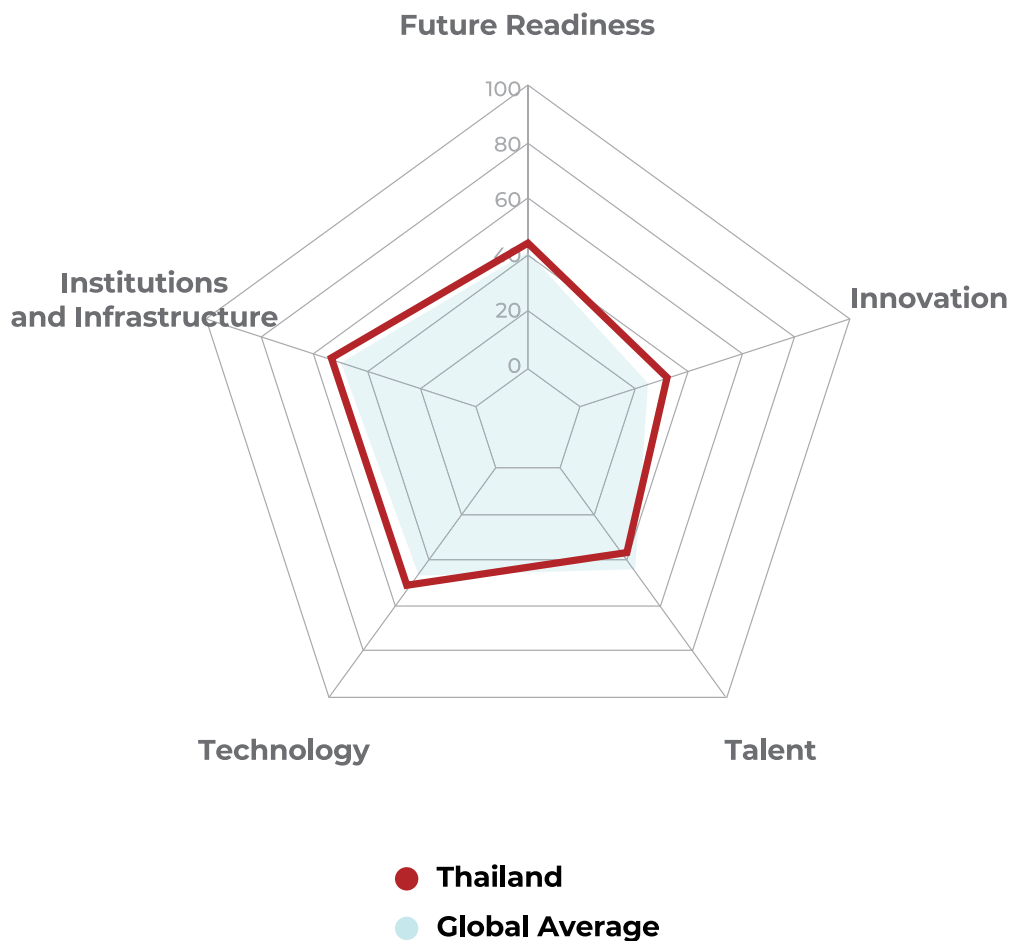


Performance against the global average

Thailand's future readiness score is slightly above the global average (Figure 2). This is primarily due to the country's strength in Innovation, although it also outperforms the

global average with respect to Technology and Institutions and Infrastructure. As for Talent, Thailand lags behind the global average by more than 7 points.

Figure 2: Thailand's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Turkey

Key Indicators



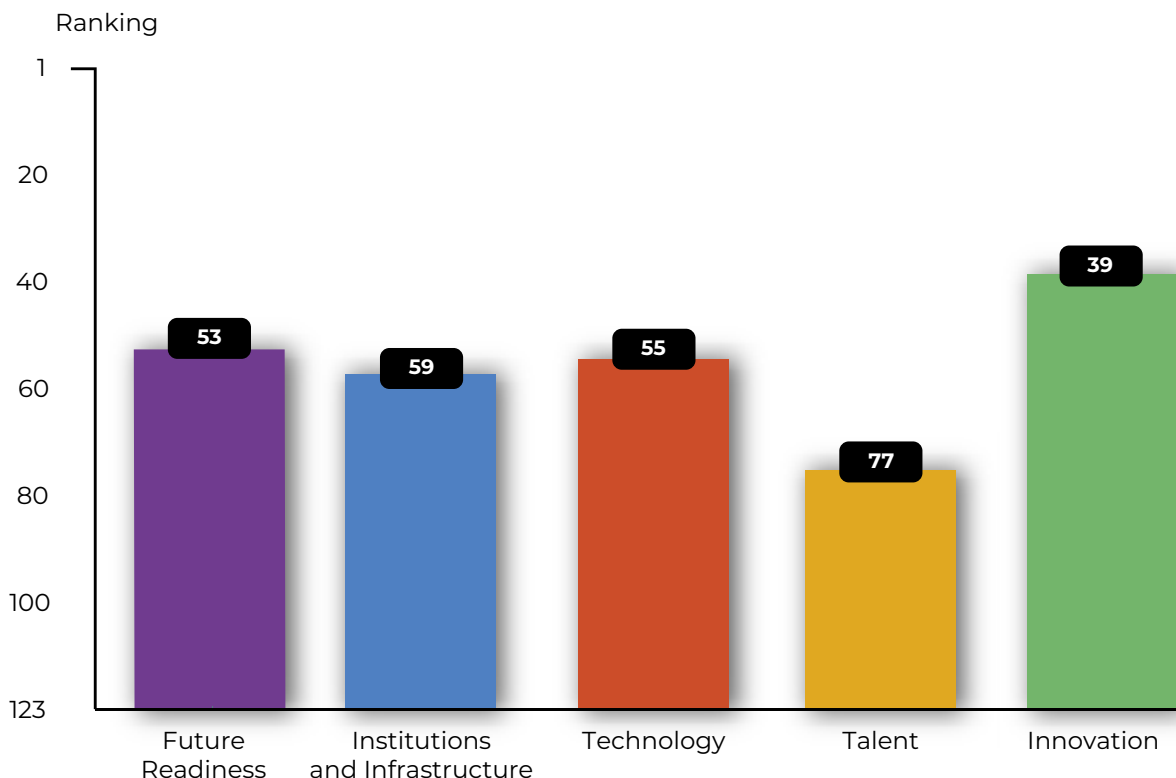
Total population:	84,339,067
GDP:	US\$ 720.10 bn
GDP (PPP) per capita:	US\$ 28,119
Income group:	Upper-middle income
Future readiness ranking:	53

Overall Future Readiness of Turkey

Turkey is ranked 53rd in terms of future readiness out of a sample of 123 economies (Figure 1). The country does particularly well with respect to Innovation (39th). It also finds itself in the third quartile in Technology (55th) and Institutions and Infrastructure (59th). In the

latter category, Turkey has a particular asset in General Infrastructure (54th) while more could be done to improve the Regulatory Environment (74th). Turkey's weakest dimension is Talent (77th), especially as it relates to attracting (114th) human skills.

Figure 1: Future Readiness of Turkey (global ranking)





Future Readiness of Turkey

Key Indicators



Performance in the TTI triangle

Innovation is clearly Turkey's strongest TTI component (Table 1). Not only is it the pillar with the highest ranking, but it also includes all top-3 sub-pillars (Market Sophistication, 33rd; Knowledge, Tech, and Creative Outputs, 38th; Research & Development, 40th).

The Technology component is weighed down by the state of Digital Transformation Technologies (67th) in the country, but the most pressing need for Turkey is to increase its ability to attract talent.

Table 1: Turkey's ranks in the TTI components

Technology: 55	Talent: 77	Innovation: 39
Digital Transformation Technologies: 67	Attract: 114	Research & Development: 40
People: 60	Grow: 41	Market Sophistication: 33
Governance: 47	Retain: 75	Business Sophistication: 55
Digital Economy: 48	Skills: 75	Knowledge, Tech and Creative Outputs: 38



Future Readiness of Turkey

Key Indicators

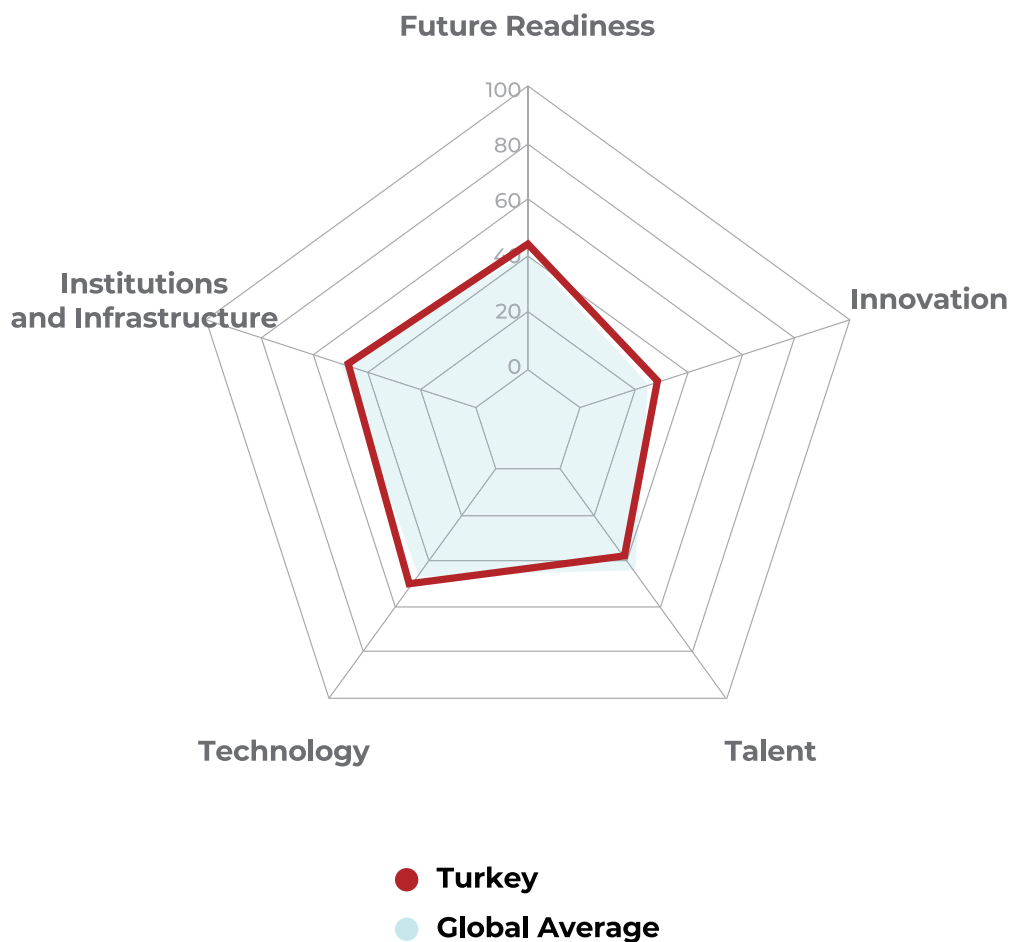


Performance against the global average

Turkey's performance is close to the global average in both future readiness overall and its key pillars (Figure 2). Overall, the country has a score slightly below the global average. At the pillar level, it is ahead of the glob-

al average when it comes to Innovation and Technology, whereas it lags behind it with respect to Institutions and Infrastructure and, in particular, Talent.

Figure 2: Turkey's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Ukraine

Key Indicators



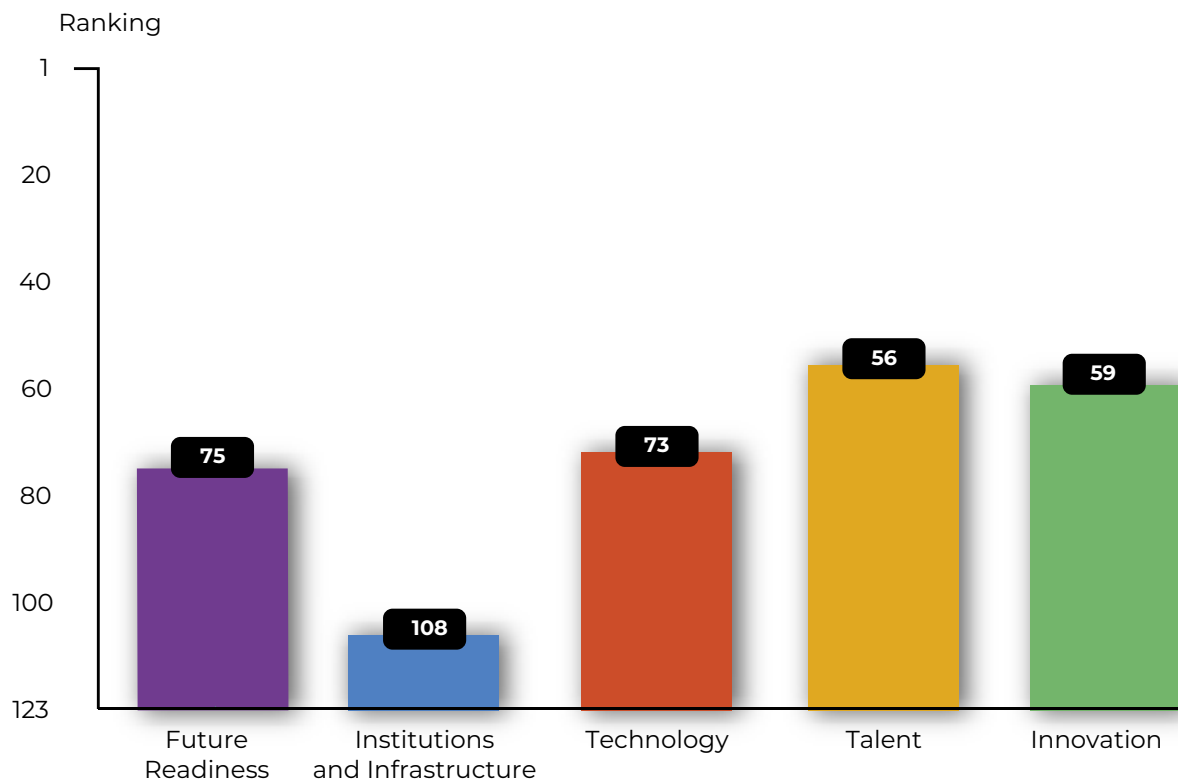
Total population:	44,134,693
GDP:	US\$ 155.58 bn
GDP (PPP) per capita:	US\$ 13,057
Income group:	Lower-middle income
Future readiness ranking:	75

Overall Future Readiness of Ukraine

Ukraine is ranked 75th in terms of future readiness out of a sample of 123 economies (Figure 1), which means that it is positioned in the second quartile in the ranking. The country finds itself in the upper half of the rankings in two of the three TTI components: Talent (56th) and Innovation (59th). As for the third TTI component—

Technology—it ranks 73rd. Ukraine's weakest dimension, however, is Institutions and Infrastructure (108th), where there is scope for considerable improvement in all three sub-pillars (Regulatory Environment, 99th; Market Environment, 102nd; General Infrastructure, 94th).

Figure 1: Future Readiness of Ukraine (global ranking)





Future Readiness of Ukraine

Key Indicators



Performance in the TTI triangle

Ukraine makes it into the top quartile in one of the sub-pillars of the TTI triangle: Skills (18th) in the Talent component (Table 1). Growing talent (52nd) also counts among the country's strengths, whereas retaining and, above all, attracting talent (68th and 95th, respectively) are the main challenges facing Ukraine in human skills. The Innovation component in-

cludes two stronger sub-pillars (Research & Development, 44th, and Business Sophistication, 58th) and two weaker sub-pillars (Knowledge, Tech, and Creative Outputs, 82nd, and Market Sophistication, 99th). As for Technology, Ukraine primarily needs to address the level of Digital Transformation Technologies (84th) in the country.

Table 1: Ukraine's ranks in the TTI components

Technology: 73	Talent: 56	Innovation: 59
Digital Transformation Technologies: 84	Attract: 95	Research & Development: 44
People: 64	Grow: 52	Market Sophistication: 99
Governance: 55	Retain: 68	Business Sophistication: 58
Digital Economy: 69	Skills: 18	Knowledge, Tech and Creative Outputs: 82



Future Readiness of Ukraine

Key Indicators

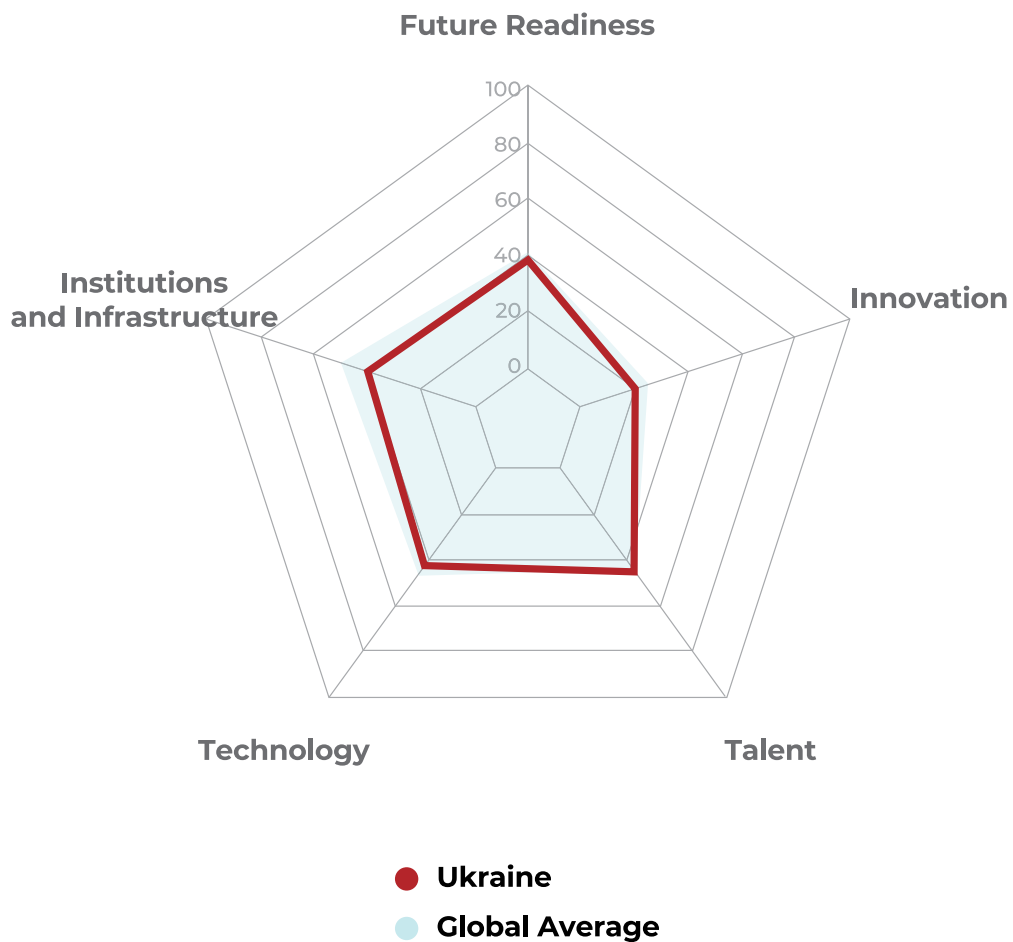


Performance against the global average

Ukraine trails the global average in three of the four future readiness dimensions (Figure 2). The exception is Talent, where the country has a score slightly above the

average. As would be expected, Ukraine is mainly lagging behind with respect to Institutions and Infrastructure.

Figure 2: Ukraine's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of United Arab Emirates Key Indicators



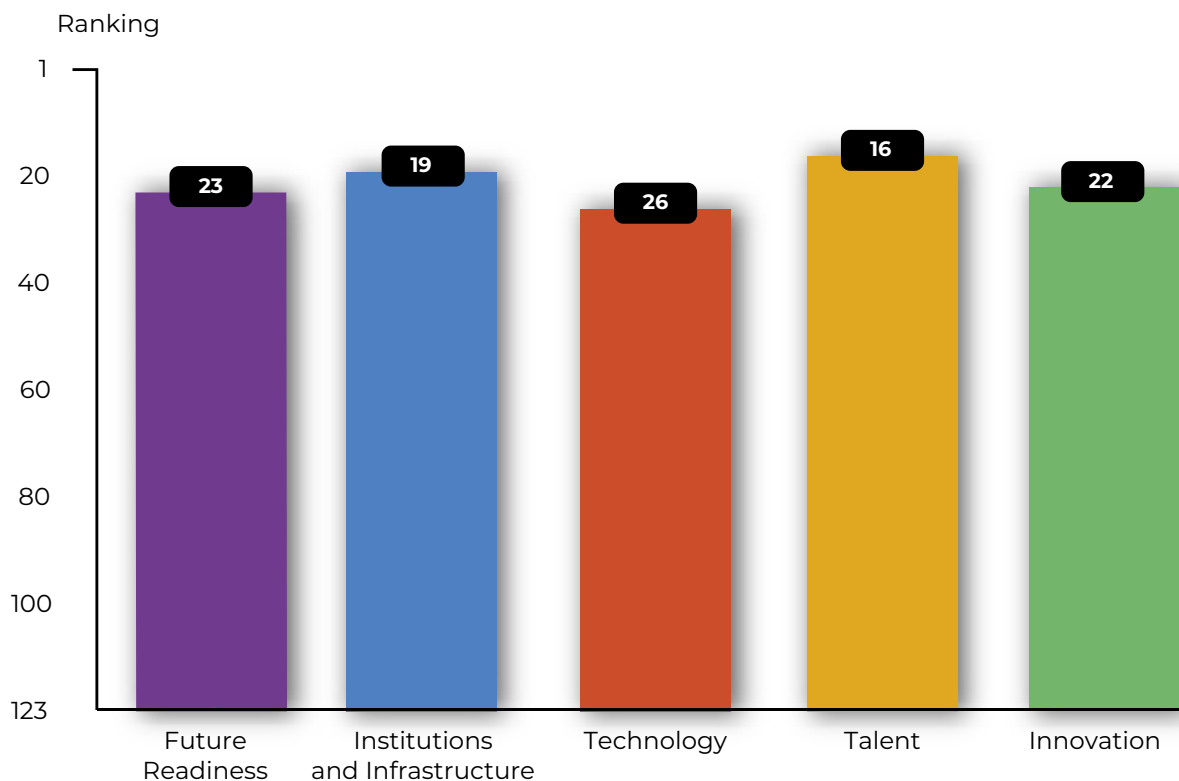
Total population:	9,770,529
GDP:	US\$ 421.00 bn
GDP (PPP) per capita:	US\$ 69,901
Income group:	High income
Future readiness ranking:	23

Overall Future Readiness of United Arab Emirates

United Arab Emirates is ranked 23rd in terms of future readiness out of a sample of 123 economies (Figure 1). In fact, the UAE features in the top quartile in all four dimensions, achieving its highest rank in Talent (16th). The country's

second-best dimension in terms of global rank is Institutions and Infrastructure (19th), where it primarily benefits from world-class General Infrastructure (6th).

Figure 1: Future Readiness of United Arab Emirates (global ranking)





Future Readiness of United Arab Emirates Key Indicators



Performance in the TTI triangle

As can be seen in Table 1, the UAE makes it into the top 10 in two of the sub-pillars related to Talent: Attract (4th) and Grow (6th). However, the country achieves its highest rank in the Technology component, more precisely in the sub-pillar concerned with

the use of digital technologies among its People (3rd). Overall, the UAE features in the top quartile in eight of the 12 sub-pillars of the TTI triangle and in the third quartile in the remaining four.

Table 1: UAE’s ranks in the TTI components and their sub-pillars

Technology: 26	Talent: 16	Innovation: 22
Digital Transformation Technologies: 37	Attract: 4	Research & Development: 28
People: 3	Grow: 6	Market Sophistication: 38
Governance: 22	Retain: 47	Business Sophistication: 26
Digital Economy: 38	Skills: 22	Knowledge, Tech and Creative Outputs: 12



Future Readiness of United Arab Emirates

Key Indicators

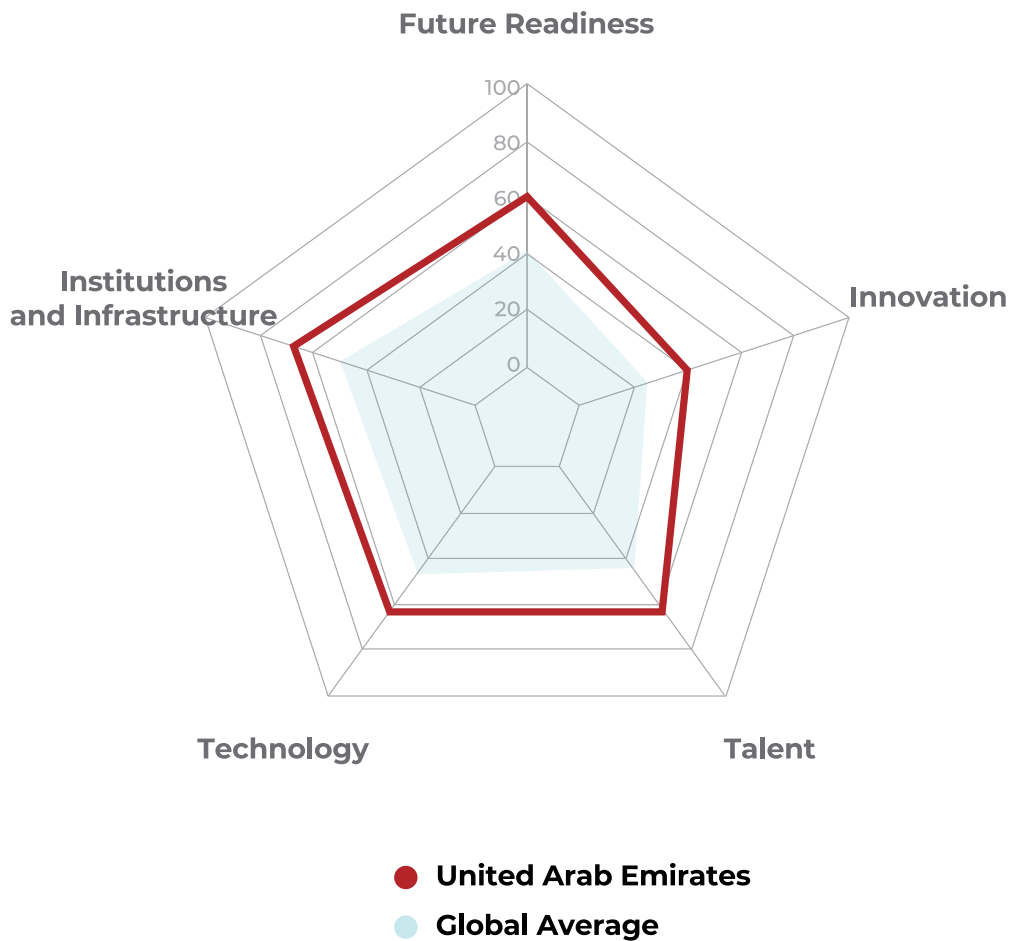


Performance against the global average

As can be seen in Figure 2, the UAE is well above the global average in all dimensions of future readiness, with an advantage in

excess of 15 points in each pillar. More specifically, its lead ranges from 16.1 points in Innovation to 19.3 points in Talent.

Figure 2: UAE's future readiness vs. the global average, overall and by pillar (scores, 0-100)





Future Readiness of Viet Nam

Key Indicators



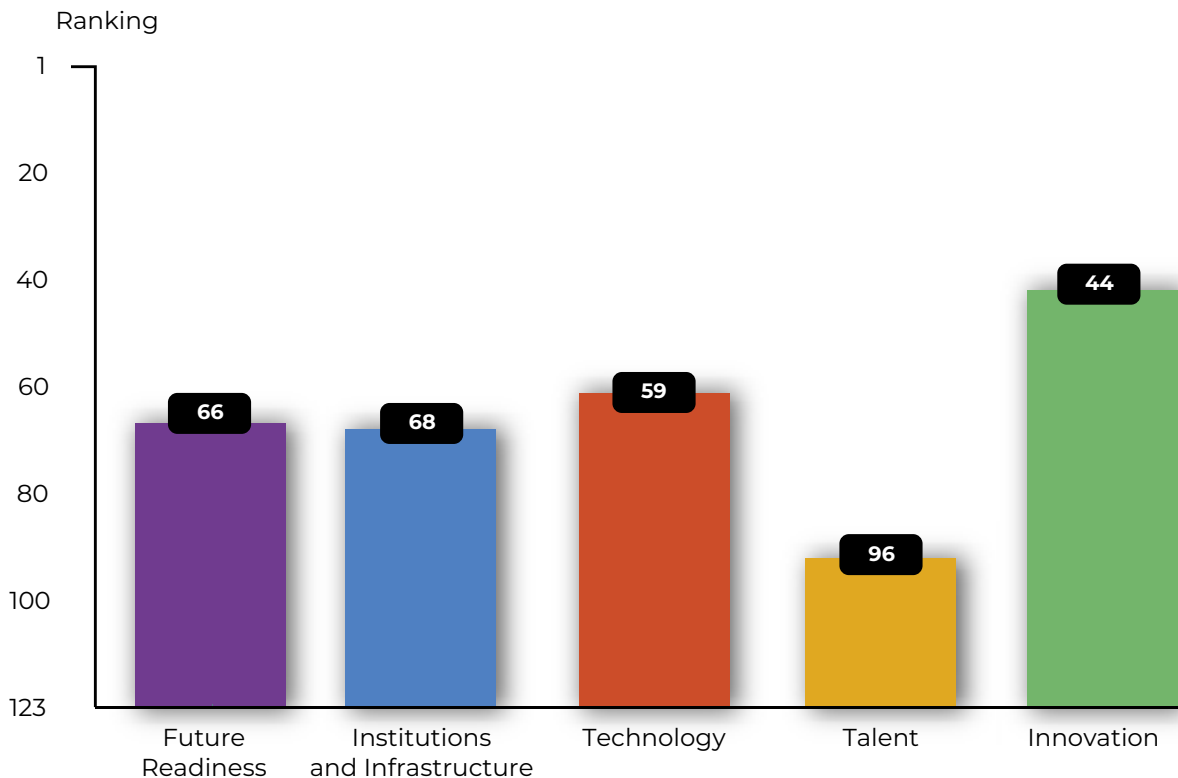
Total population:	97,338,583
GDP:	US\$ 271.16 bn
GDP (PPP) per capita:	US\$ 8,651
Income group:	Lower-middle income
Future readiness ranking:	66

Overall Future Readiness of Viet Nam

Viet Nam is ranked 66th in terms of future readiness out of a sample of 123 economies (Figure 1). The country’s main strength relates to Innovation (44th), and it also finds itself in the upper half in the rankings with respect to Technology (59th). The most disappointing TTI

component is Talent (96th), where Viet Nam is close to the bottom quartile. As for Institutions and Infrastructure (68th), the country enjoys solid General Infrastructure (51st), but is hampered by a weak Regulatory Environment (72nd) and Market Environment (88th).

Figure 1: Future Readiness of Viet Nam (global ranking)



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Future Readiness of Viet Nam

Key Indicators



Performance in the TTI triangle

Viet Nam finds itself in the top quartile in one sub-pillar of the TTI triangle: Knowledge, Tech, and Creative Outputs (20th) in the Innovation component (Table 1). It also performs well in terms of Business Sophistication (46th) but should take steps to improve Research & Development (68th) and Market Sophistication

(62nd). Viet Nam has a fairly developed Digital Economy (33rd) but needs to raise its level of Digital Transformation Technologies (76th), among others. The greatest challenges facing the country relate to Talent, however. Above all, there is a lack of Skills (105th) and a weak ability to Attract (90th) and Retain (95th) tal-

Table 1: Viet Nam's ranks in the TTI components

Technology: 59	Talent: 96	Innovation: 44
Digital Transformation Technologies: 76	Attract: 90	Research & Development: 68
People: 68	Grow: 65	Market Sophistication: 62
Governance: 71	Retain: 95	Business Sophistication: 46
Digital Economy: 33	Skills: 105	Knowledge, Tech and Creative Outputs: 20



Future Readiness of Viet Nam

Key Indicators

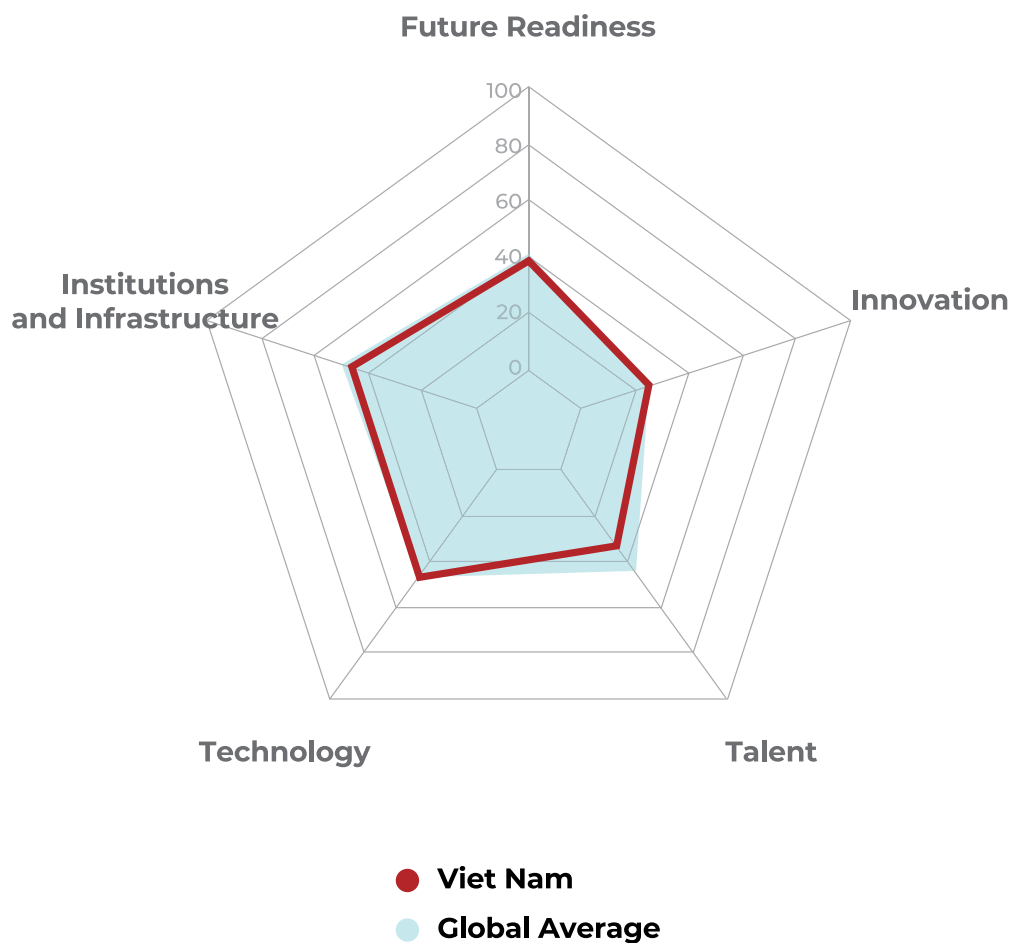


Performance against the global average

Viet Nam has a future readiness score below that of the global average (Figure 2). It outperforms the global average slightly when

it comes to Technology and Talent, while it lags behind it in the pillars related to Institutions and Infrastructure and, especially,

Figure 2: Viet Nam's future readiness vs. the global average, overall and by pillar (scores, 0-100)





























Appendix I:

- ● ● • **The 27 Emerging**
- ● ● ● **Economies in the GII**
- ● • • **2020, GTCI 2020, and**
- NRI 2020**

Appendix I: The 27 Emerging Economies in the GII 2020, GTCI 2020, and NRI 2020

Country	Global Innovation Index	Global Talent Competitiveness Index	Network Readiness Index
 Argentina	80	56	60
 Brazil	62	80	59
 Chile	54	34	50
 China	14	42	40
 Colombia	68	74	72
 Egypt	96	97	84
 India	48	72	88
 Indonesia	85	65	73
 Israel	13	20	24
 Jordan	81	61	69
 Kenya	86	88	82
 Kuwait	78	63	53
 Lebanon	87	n/a	90
 Mexico	55	69	63
 Morocco	75	100	93
 Nigeria	117	112	117
 Peru	76	77	80
 Qatar	70	29	38
 Russia	47	48	48
 Saudi Arabia	66	40	41
 Singapore	8	3	3
 South Africa	60	70	76
 Thailand	44	67	51
 Turkey	51	78	57
 Ukraine	45	66	64
 United Arab Emirates	34	22	30
 Viet Nam	42	96	62

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Appendix II: Methodology of the Future Readiness Economic Index

Appendix II: Methodology of the Future Readiness Economic Index

Structure of the future readiness framework

The future readiness framework builds on four pillars: (i) Institutions and Infrastructure, (ii) Technology, (iii) Talent, and (iv) Innovation. The first pillar consists of three sub-pillars, whereas the other three contain four sub-pillars each. Every sub-pillar is composed of three to six variables. In total, the framework is populated by 69 indicators. Of these indicators, 41 are hard/quantitative data, 15 are index/composite indicator data, and 13 are survey/qualitative data.

Thus, any given indicator belongs to a pillar and a sub-pillar. For that reason, each indicator is identified by three digits, where the first digit refers to the pillar, the second digit concerns the sub-pillar, and the third digit denotes the indicator. For instance, indicator 1.2.3 refers to the third indicator (Ease of resolving insolvency) that is placed in the second sub-pillar (Market Environment), which, in turn, belongs to the first pillar (Institutions and Infrastructure).

Computation of future readiness

The computation of future readiness is based on successive aggregations of scores, from the indicator level (i.e., the most disaggregated level) to the overall future readiness score. In general, the unweighted arithmetic mean has been used to aggregate (i) individual indicators within each sub-pillar, (ii) sub-pillars within each pillar, and (iii) the pillars comprising the overall index.

The notion of weights as important coefficients has been taken into account to ensure a greater statistical coherence of the model. The approach follows the one adopted by the Global Innovation Index, whereby weights of 0.5 or 1 are assigned to each component in a composite index to ensure the highest correlations between them (i.e., indicator/sub-pillar, sub-pillar/pillar, etc.).

Country and data coverage

The inclusion of countries and indicators is based on the double threshold approach. In terms of country coverage, this means that only countries with data available for at least 70% of all indicators are included in the Future Readiness Economic Index. In addition, countries need a sub-pillar level data availability of at least 40%. In terms of indicator coverage, only indicators with data available for at least 50% of all countries are included in the computation. Missing values are denoted as “n/a” and are not taken into account in the computation of scores.

Treatment of series with outliers

The presence of outliers in an indicator can potentially bias rankings. Therefore, outliers should be detected and removed before the normalisation of scores. To do so, a rule of thumb is applied whereby an absolute value of skewness greater than 2 and kurtosis greater than 3.5 indicates the presence of out-

liers.* The treatment of outliers is carried out in one of two ways. First, indicators that have no more than four outliers are winsorised, whereby the value affecting the distribution is assigned the next highest/lowest value method. The winsorisation process continues until the reported skewness and/or kurtosis fall within the ranges specified above.

Second, indicators with at least five outliers are transformed by natural logarithms according to the following formula:

$$\ln \left[(\max \times \text{factor} - 1) \times \frac{(\text{value} - \min)}{(\max - \min)} + 1 \right]$$

Normalisation

The indicators need to be normalised in order to make them comparable for data aggregation. The Future Readiness Economic Index applies the min-max normalisation method so that all values fall into the [0, 100] range, with higher scores representing better outcomes. An exception is made for index and survey data, for which the original series range of values was kept as min and

* Adopted from Groeneveld & Meeden (1984).

max values (for example, [1, 7] for the World Economic Forum Executive Opinion Survey questions; [0, 100] for World Bank's World Governance Indicators). Most indicators are "goods" in that higher values indicate higher outcomes. For these indicators, the following normalisation formula is applied:

$$100 \times \frac{(\text{value} - \min)}{(\max - \min)}$$

For indicators where higher values imply worse outcomes (i.e. "bads"), the following reverse normalization formula is applied:

$$100 \times \frac{(\max - \text{value})}{(\max - \min)}$$

Methodological references

Groeneveld, R. A. & Meeden, G. (1984). Measuring skewness and kurtosis. *Journal of the Royal Statistical Society, Series D (The Statistician)*, 33, 391-399.

OECD & EC JRC (2008). *Handbook on constructing composite indicators: Methodology and user guide*. Paris: OECD, available at <http://www.oecd.org/std/42495745.pdf>



Appendix III:

- ● ● • **List of Indicators**
- ● ● ● **in the Future**
- ● • • **Readiness Economic**
- Index**

Appendix III: List of Indicators in the Future Readiness Economic Index

PILLAR	SUB-PILLAR	INDICATOR
Institutions and Infrastructure	Regulatory Environment	Government effectiveness
		Rule of law
		Political & operational stability
		Regulatory quality
		Corruption
	Market Environment	Competition intensity
		Ease of doing business
		Ease of resolving insolvency
		Cluster development
	General Infrastructure	Electricity output, GWh/mn pop
		Logistics performance
Gross capital formation, % GDP		
Technology	Digital Transformation Technologies	Internet access
		4G mobile network coverage
		GitHub commits
		Wikipedia edits
		Adoption of emerging technologies
	People	Use of virtual social networks
		Digital skills
		Firms with website
		Government online services
		Government promotion of investment in emerging technologies
	Governance	Cybersecurity
		Internet shopping
		ICT regulatory environment
		Legal framework's adaptability to emerging tech
		E-Participation
	Digital Economy	Gender gap in Internet use
		Medium- and high-tech industry
		High-tech exports
		Labour productivity per employee



PILLAR	SUB-PILLAR	INDICATOR
Talent	Attract	FDI and technology transfer
		International students
		Tolerance of minorities
		Social mobility
		Female graduates
	Grow	Tertiary enrolment
		Employee development
		Delegation of authority
		Use of virtual professional networks
		Reading, maths, and science
	Retain	Pension system
		Brain retention
		Environmental performance
		Physician density
	Skills	Ease of finding skilled employees
		Workforce with tertiary education
Professionals		
Senior officials and managers		
Availability of scientists and engineers		
Innovation	R&D	Researchers
		Gross expenditure on R&D (GERD)
		Global R&D companies, average expenditure top 3
		University ranking
	Market Sophistication	Domestic credit to private sector
		Market capitalization
		Protecting minority investors
		Applied tariff rate, weighted mean
		Venture capital deals
	Business Sophistication	GERD performed by business enterprise
		GERD financed by business
		GERD financed by abroad
		Patent families filed in at least two offices
		ICT services imports
	Knowledge, Technology, and Creative Outputs	PCT international applications by origin
		Cultural and creative services exports (% of total trade)
Creative goods exports (% of total trade)		
Intellectual property receipts		
Global brand value, top 5,000 / bn PPP\$ GDP		

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