

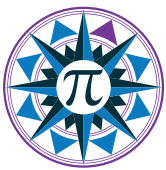
Future Readiness Economic Index

2022

How digital sprinters can quantify, monitor,
and accelerate their transformation



A Portulans Institute Global Report



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Google

Future Readiness Economic Index

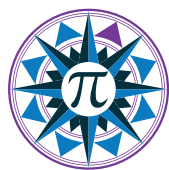
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How digital sprinters can quantify, monitor,
and accelerate their transformation

Bruno Lanvin

Author

A Portulans Institute Global Report



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Section I: Navigating uncharted territories



Executive summary

The pandemic has undoubtedly underscored the importance of being prepared and ready to adapt in the face of uncertainty. Integral to our ability to strengthen future readiness is digital transformation. The past couple of decades have seen technological advances on an unprecedented scale that have brought us closer together and made us more interconnected. This digital revolution has brought with it new possibilities for tackling long-standing challenges and the promise of a more equitable and sustainable world. Still, its potential is yet to be realised and a host of issues need to be addressed.

In this context, Google launched its **Digital Sprinters** initiative in November 2020, where it presented a framework to advance digital transformation in emerging markets. This approach makes the case that countries can achieve digital transformation and inclusive, sustainable growth by focusing their efforts on four policy areas: Physical Capital, Human Capital, Technology, and Competitiveness.

This report builds on the Digital Sprinters framework to provide countries with a benchmarking tool—the **Future Readiness Economic Index (FREI)**—that can be used to assess how well they are placed to achieve faster digital transformation and enhance their future readiness. In this first global version of the FREI report, 124 countries have been assessed and ranked along a combination of 73 indicators, distributed across the four pillars that correspond to the four areas of the Digital Sprinters framework.

Key results and findings from the FREI 2022 report

Overall, **Singapore** is the world's most future-ready country, followed by **Denmark** (2nd) and **Switzerland** (3rd). The top of the rankings is dominated by European countries (especially the Nordics) and the two Northern American neighbours, the United States (6th) and Canada (10th).

The **Physical Capital** pillar measures the performances of countries across three types of infrastructure: Digital Infrastructure, Transport Infrastructure, and Energy Infrastructure. Small

countries tend to do well in this dimension, with Norway being the global leader. It is also notable that three Middle Eastern countries, namely Qatar (2nd), the United Arab Emirates (6th), and Bahrain (9th), are also among the top performers. **The data indicate that investment in physical capital is a prerequisite to digital acceleration, but it is not enough on its own.**

The **Human Capital** pillar is concerned with countries' abilities to Attract, Grow, and Retain talent, and puts a particular emphasis on digital skills. Australia is the top performer in this pillar, while Iceland and Denmark are ranked 2nd and 3rd, respectively. **Available indicators suggest that this human component of digital transformation is the pillar most in need of urgent efforts to allow emerging economies to be more future ready.** Providing due attention to ways in which vibrant ecosystems can be offered to start-ups is a priority in this context.

The **Technology** pillar focuses on the integration of digital technologies—traditional and emerging—in societies and economies along three categories: Digital Usage, Digital Content Creation, and Industry 4.0. These indicators (for which comparable data are available) aim to describe the key technology ingredients of the Digital Sprinters framework, such as innovative uses of data (artificial intelligence/machine learning, or AI/ML; big data; Internet of Things, or IoT), inclusive digital payments, and movement to the cloud. Sweden, Switzerland, and the Netherlands make up the top three countries in this regard. **This is an area in which emerging countries have ample room to improve their scores.** For instance, several countries in the Middle East and North Africa have excellent levels of Digital Usage, but they have not yet been able to fully build on this advantage to achieve equally high levels of digital knowledge creation or adoption and development of emerging technologies. Overall, in the Technology pillar, regional leaders include the United States (4th), Sweden (1st), China (42nd), Chile (47th), and South Africa (70th). It is important to note that, in spite of strong (and sometimes spectacular) performance, most regional readers outside of Europe and Northern America are still not in the first league of future-ready economies. Moving to

such status is clearly one of the objectives of the digital sprinters.

The **Competitiveness** pillar highlights the ecosystem that is necessary to achieve future readiness. In particular, digital policies (including regulatory conditions) are emphasised, along with the innovation capacities of countries, by considering their Digital Policies, Market Environment, Research & Development (R&D), and Innovation capabilities and performance. This is clearly the pillar that remains the most difficult to quantify, especially with regard to the critical area of digital policies. Largely because such policies focus on new considerations and areas, comparable data remain elusive, and the indicators used are proxies at best. It should be noted especially that ‘regulatory environment’ is broader than ‘digital regulatory environment’, although it is only one of the many components of digital policies. With these caveats in mind, the top-ranked countries in this pillar are Switzerland (1st), Singapore (2nd), and Denmark (3rd), followed by the United States (4th).

From data to action: Beyond these results, several key messages and possible recommendations emerge. Specific data and indicators can be found in the discussion on the FREI results and in the country profiles in Section II.

Key messages

One of the overall key messages arising from the report is that **future readiness is highly dependent on the pace and breadth of digital transformation**. Above all, the analyses and data contained in the report highlight the importance of digital transformation for future readiness, emphasising that getting digital policies and actions right is one of the central challenges facing all types of economies. Indeed, the report convincingly demonstrates that digital infrastructure, digital technologies, and digital policies are among the dimensions of future readiness that not only exhibit the highest potential to boost growth and competitiveness but that also display the greatest variation around the world. Addressing the digital divides is crucial. It is also a requirement for a sustainable global post-pandemic recovery.

Another important conclusion stemming from this first global FREI report is that **there is no cookie-**

cutter approach to future readiness. Each national economy should remain responsible for its own ability to design and pursue its own strategies. Such strategies should themselves be based on a careful consideration of local advantages and constraints, and must adequately account for local cultures, history, and aspirations. All this suggests that countries should set themselves a future-readiness challenge and that digital transformation tailored to their specific circumstances should be at the heart of their individual solutions. Aligning such approaches with efforts made to address global challenges (climate change, health resilience, inequalities, for example) will help national economies to garner local and global support around them.

Whatever their respective sizes, individual national economies alone cannot generate the full benefits of being more future ready. **Global cooperation and multi-stakeholder approaches are key to enhancing collective and individual future readiness**. Metrics (such as those contained in this report) have the power to help each economy monitor its own efforts and compare its performance with that of other economies. Altogether, however, a broader approach to the merits of international cooperation (as opposed to protectionist and nationalistic rhetoric) is now urgently required.* At both the international and local levels, multi-stakeholder approaches (involving public and private entities as well as civil society) should be encouraged as a way to create a sustainable momentum of cooperation.

Looking forward

The value of the present report cannot be fully appreciated without due consideration of its companion online benchmarking tool <https://www.portulansinstitutefrei.com/2022>. By allowing users to assess the potential impact of various policies and scenarios, this tool is expected to trigger thought-provoking constructive discussions about what elements of the Digital Sprinters pillars a government could potentially focus its attention on and invest in to make a difference.

* The seven guiding principles for stronger global cooperation, agreed on in the World Economic Forum’s Global Action Group, can be regarded as a valuable basis for action in this regard (World Economic Forum, 2021).

Introduction

When historians look back on the early part of the 21st century, it is likely that one of the distinguishing features they identify will be the rapid wave of digitalisation that swept the planet. Perhaps they will consider the years of the COVID-19 pandemic to mark a turning point, when digital transformation really took off in economies and societies. Or perhaps, in an alternative narrative, they will see it as an opportunity missed and the potential gains of digitalisation for the world at large lost.

Recognising that our current time presents a unique chance to widen and deepen digital transformation throughout the world, Google launched an initiative called *Digital Sprinters* in November 2020. In it, the company proposed a novel framework that can facilitate digital transformation in emerging markets and assist them in becoming digital sprinters.

The present report builds on that initiative to provide countries with a tool for action: the Future Readiness Economic Index (FREI). With the Digital Sprinters framework as its foundation, FREI has

been developed to support countries in assessing the state of their future readiness and their efforts to stimulate greater sustainable, inclusive growth with digital transformation as an integral factor. Countries will be able to use the tool to measure themselves against certain benchmarks or objectives and evaluate their progress towards reaching those goals.

This first global edition of the FREI report covers 124 countries in total and shows that digital transformation is key for better future readiness. It highlights the top performers in the index and provides regional analysis for Europe and Northern America, Asia and Pacific, Latin America and the Caribbean, the Middle East and North Africa, and Sub-Saharan Africa. It also draws particular attention to digital policies and to the reasons why it is critical that countries prioritise regulatory aspects, including aspects of competition, to achieve successful digital transformation. Finally, the report includes a brief profile of each covered country, providing an overview of its state of future readiness as well as of its strengths and weaknesses.

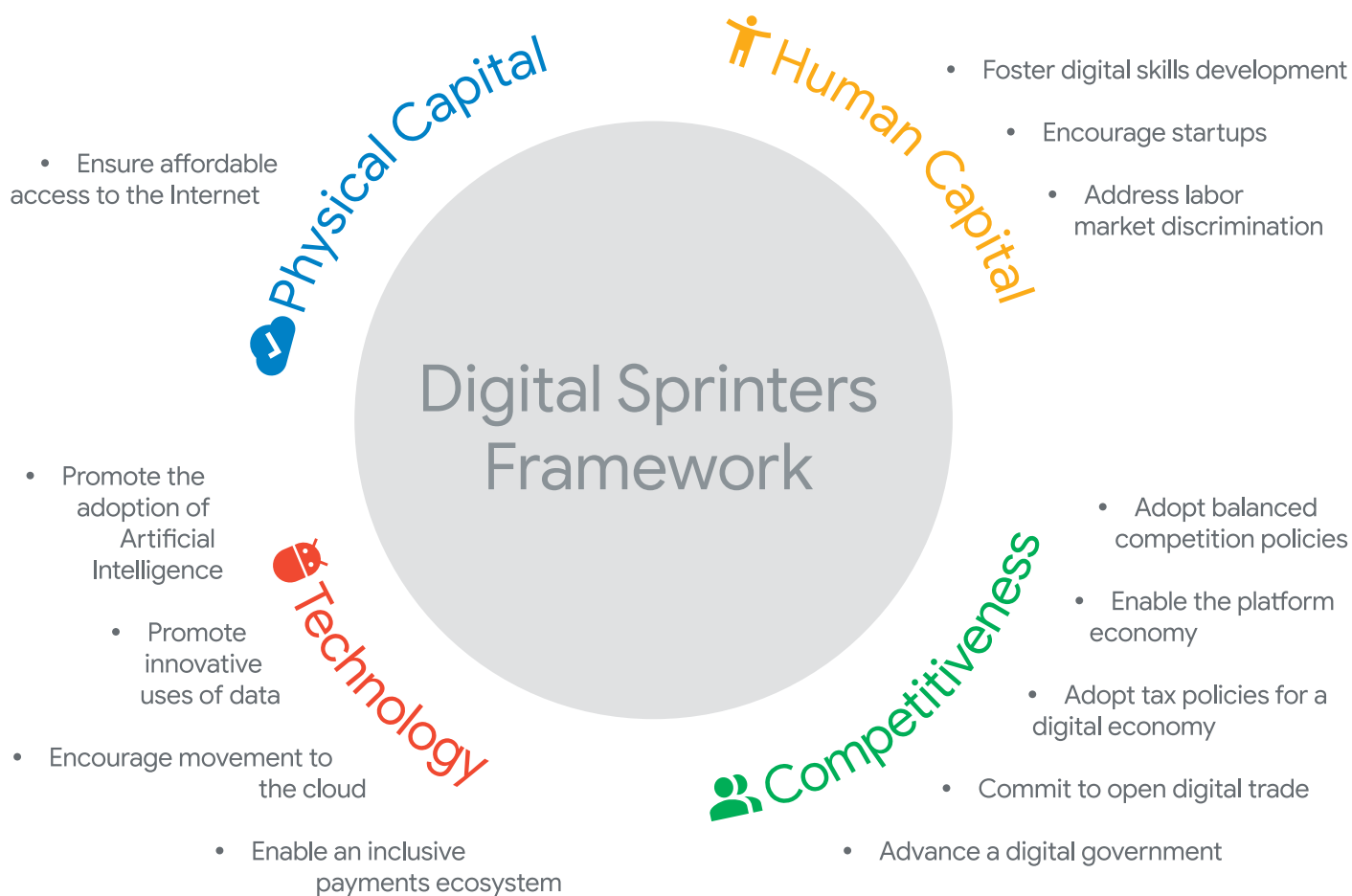


The Digital Sprinters framework

The Digital Sprinters framework presented by Google in 2020 showed how digital policies falling into four categories could facilitate digital transformation and stimulate growth in emerging markets. These four fundamental pillars are Physical Capital, Human Capital, Technology, and Competitiveness (Figure 1), flagging the importance

of ensuring affordable access to the Internet, fostering digital skills development, promoting technological innovation in areas such as AI and cloud computing, and encouraging a regulatory ecosystem that includes competitive markets, open digital trade, and digital governments.

Figure 1: Digital Sprinters framework



Source: Google (2020).

The Future Readiness Economic Index (FREI) described in the present report is first and foremost an attempt to quantify the various components of the Digital Sprinters framework.

It is hence logical that the four-pillar structure of that framework should serve as a basis for the FREI model. For the purposes of quantification and analysis, these pillars have subsequently been divided into separate sub-pillars that measure specific aspects of the overall dimension. The sub-pillars have been identified and built through the

combination of two approaches: on the one hand, the sub-pillars are underpinned by action areas highlighted in the Digital Sprinters report published by Google and, on the other hand, by the data and analysis stemming from three global indices that cover technology, talent, and innovation: the [Network Readiness Index](#), the [Global Talent Competitiveness Index](#), and the [Global Innovation Index](#). In so doing, a model has been developed that consists of 14 sub-pillars grouped under the four pillars mentioned earlier (Figure 2):

- Physical Capital

- *Digital Infrastructure*: measures the access to and affordability of digital technologies
- *Transport Infrastructure*: measures the connectivity of the transport network, including rural access and investments in it
- *Energy Infrastructure*: measures the access to electricity and the extent to which energy is efficiently and sustainably produced and consumed

- Human Capital

- *Attract*: measures the draw towards talent from abroad (external) and from domestic underprivileged groups (internal)
- *Grow*: measures the production of talent through formal education and training, including through reskilling and collaboration
- *Retain*: measures the inclination of workers to stay in a country in view of issues related to sustainability and lifestyle
- *Skills*: measures the degree of high-level skills of the workforce, including advanced digital skills, and the extent of a possible skills gap

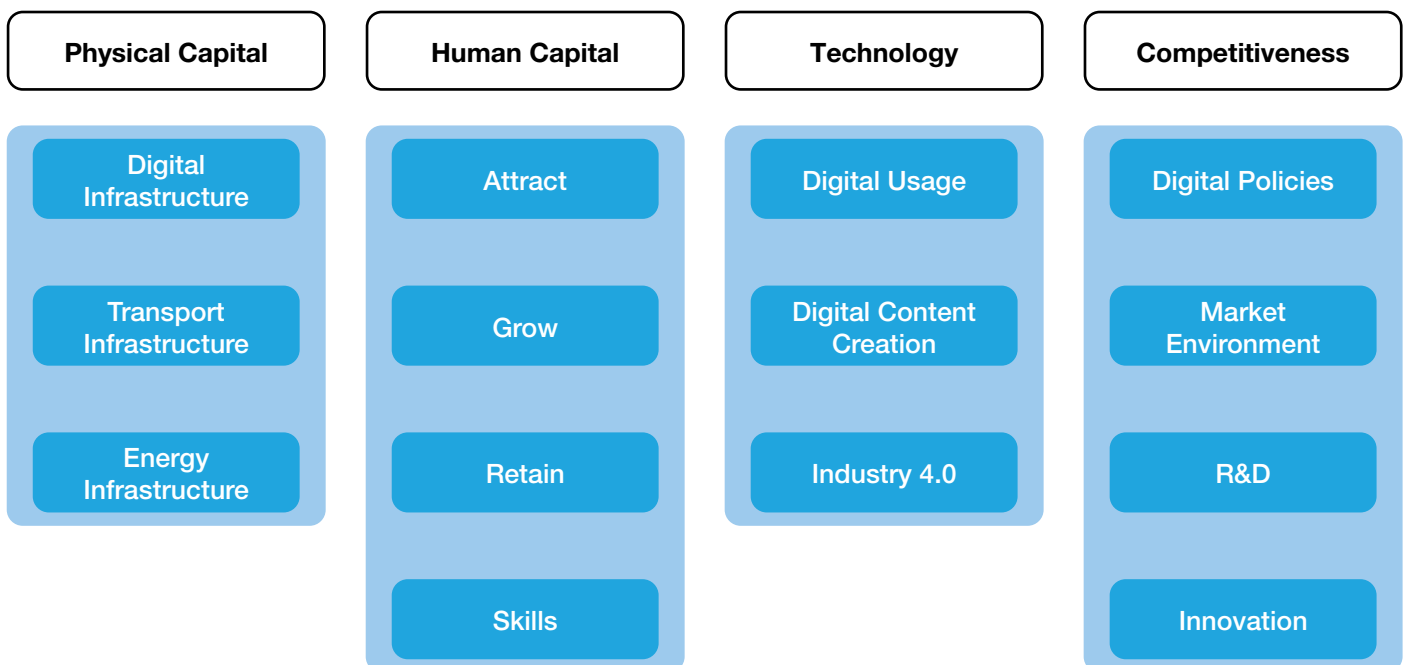
- Technology

- *Digital Usage*: measures the extent to which a country's individuals, businesses, and authorities adopt and use digital technologies
- *Digital Content Creation*: measures different types of knowledge creation produced using digital technologies
- *Industry 4.0*: measures the level of activity in adopting and developing emerging technologies such as robotics, AI/ML, and IoT

- Competitiveness

- *Digital Policies*: measures the enabling conditions of regulations specific to information and communication technologies (ICT) and the general regulatory landscape
- *Market Environment*: measures the extent to which the market is favourable for enabling digital transformation
- *Research and Development (R&D)*: measures the investment in and quality of R&D activities
- *Innovation*: measures the level of innovative activity, including entrepreneurship and inventions

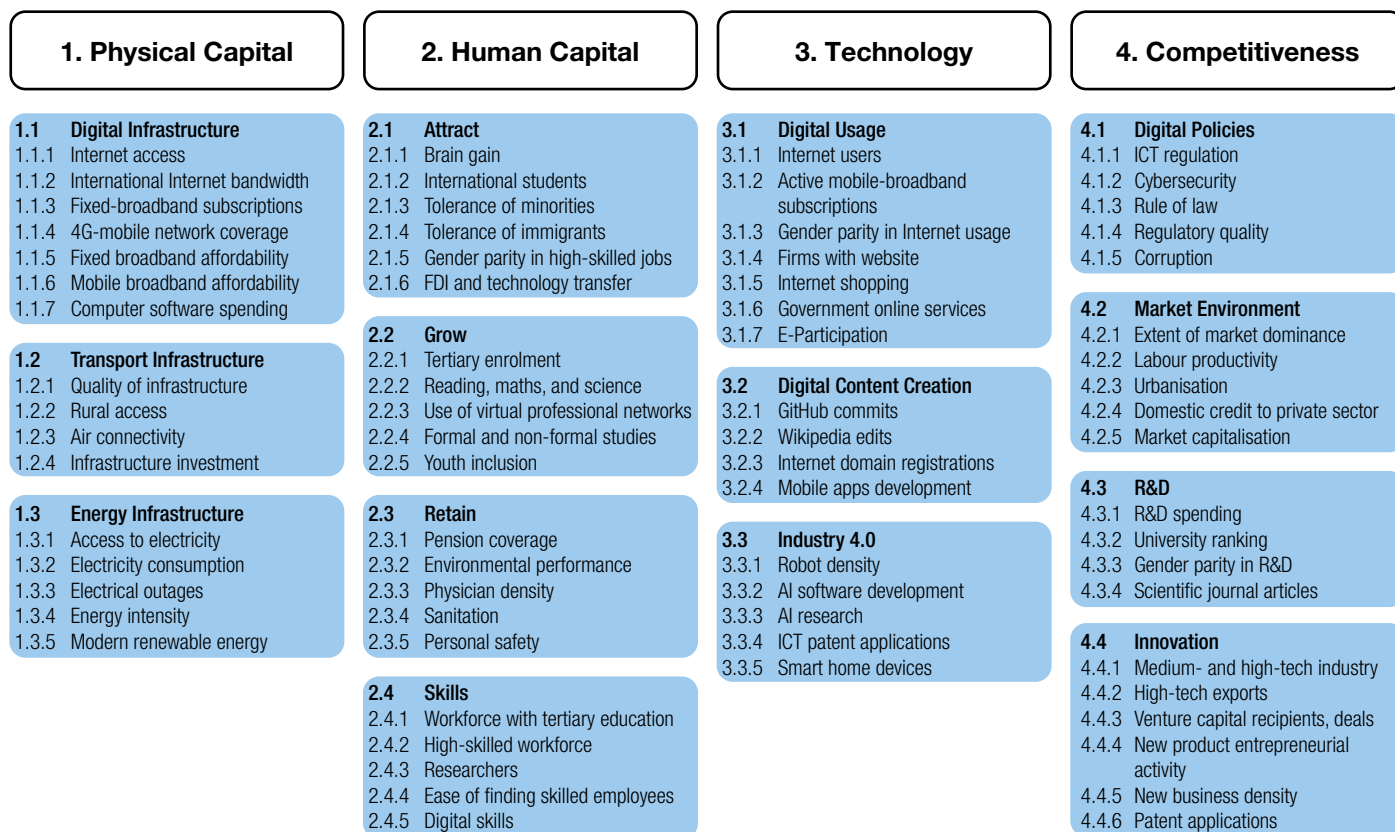
Figure 2: The FREI framework



In total, 73 indicators have been identified to populate the FREI pillars and sub-pillars. Recognising that real digital transformation and future readiness cannot take place if issues of inequality and sustainability are not adequately

addressed, indicators on gender gaps and environmental aspects have been included in the model. Because they are crosscutting by nature, these indicators have been interspersed throughout various sub-pillars (Figure 3).

Figure 3: FREI detailed framework and indicators



Future Readiness Economic Index 2022: Overall results

The Future Readiness Economic Index (FREI) 2022 shows Singapore to be the world's most future-ready country, followed by Denmark (2nd) and Switzerland (3rd)—see Table 1, where the darkest colour blue means the country belongs to the first quartile (best performers); medium colour = second quartile; pale colour = third quartile; palest colour = fourth quartile (worst performers). There is not, however, much separating these countries: they all fall within a single index point of one another. Indeed, much the same can be said regarding the top 8 overall performers in the FREI 2022 report, which includes three other Nordic countries (Sweden, 4th; Norway, 5th; and Finland, 8th), the United States (6th), and the Netherlands (7th). Overall, it is worth noting that the best performers tend to be smaller economies. This underlines that one of the difficulties faced by all economies in terms of innovation, growth, and competitiveness is that of scaling up. In this regard, the fact that larger economies (such as the United States, Canada, and the United Kingdom) are among the top 10 should be regarded as remarkable.

In total, 124 countries are included in the FREI 2022 report: 23 of the countries are situated in Asia and Pacific, 38 are in Europe, 18 are in Latin America and the Caribbean, 18 are in the Middle East and North Africa, 2 are in Northern America, and 25 are in Sub-Saharan Africa. These countries are distributed across four basic income groups: 11 are low-income countries, 33 are lower-middle-income countries, 34 are upper-middle-income countries, and 46 are high-income countries.

In terms of pillar performances, it is interesting to note that few countries perform exceptionally well in all pillars. One manifestation of this is that

the best performers in each of the pillars are all different countries and that only two countries (Singapore and Switzerland) are global leaders in more than one sub-pillar. For instance, **the top 3 countries in the Physical Capital pillar are Norway (5th overall), Qatar (33rd), and Luxembourg (12th); in the Human Capital pillar, they are Australia (11th), Iceland (13th), and Denmark (2nd); in the Technology pillar they are Sweden (4th), Switzerland (3rd), and the Netherlands (7th); and in the Competitiveness pillar they are Switzerland, Singapore (1st), and Denmark.**

That any given country's performances frequently should vary among the pillars and sub-pillars suggests that there is no such thing as perfect future readiness. Rather, it is a continual process where every single country needs to constantly be proactive in building on its strengths and addressing its shortcomings. **Future readiness is (and will remain) a moving target.**

This process is arguably even more critical during a period of digital transformation, which brings with it not only a wealth of opportunities but also potential pitfalls. One such risk is the threat of widening digital (and other) divides. It is perhaps telling that the greatest variances in the index are often seen in the dimensions most directly related to digital technologies. Thus, differences among countries are particularly pronounced in the three sub-pillars related to the Technology pillars. Moreover, it is the Digital Infrastructure sub-pillar that has the greatest variation within the Physical Capital pillar and it is the Digital Policies sub-pillar that has the widest variation within the Competitiveness pillar. The conclusion here is very clear: **digital transformation is key to future readiness.**

Table 1: Future Readiness Economic Index 2022 (overall and by pillar)

Country	Future Readiness Score	Future Readiness Rank	Physical Capital	Human Capital	Technology	Competitiveness
Singapore	76.26	1	4	6	6	2
Denmark	75.89	2	7	3	5	3
Switzerland	75.71	3	10	7	2	1
Sweden	74.72	4	8	4	1	5
Norway	74.07	5	1	5	8	11
United States	73.55	6	15	12	4	4
Netherlands	71.67	7	14	10	3	10
Finland	71.49	8	11	11	7	6
United Kingdom	69.37	9	21	14	9	7
Canada	69.24	10	19	9	10	8
Australia	68.68	11	28	1	12	9
Luxembourg	68.63	12	3	8	18	14
Iceland	67.55	13	5	2	23	13
Germany	66.28	14	20	19	11	15
New Zealand	64.90	15	22	13	14	21
Austria	64.86	16	13	17	15	22
Ireland	64.62	17	16	15	16	23
South Korea	64.14	18	25	22	13	18
Belgium	63.85	19	18	16	22	17
Israel	61.98	20	37	21	20	12
France	61.88	21	27	20	21	20
Japan	61.81	22	30	25	17	16
Estonia	60.14	23	32	28	19	19
Malta	58.56	24	12	24	26	27
Spain	57.95	25	26	23	24	25
Portugal	57.72	26	17	18	32	31
United Arab Emirates	57.22	27	6	26	33	34
Cyprus	55.30	28	31	29	30	28
Italy	55.28	29	23	31	28	32
Slovenia	54.78	30	38	27	25	37
Czech Republic	54.27	31	33	32	27	36

Table 1: Future Readiness Economic Index 2022 (overall and by pillar) (continued)

Country	Future Readiness Score	Future Readiness Rank	Physical Capital	Human Capital	Technology	Competitiveness
Lithuania	53.46	32	34	34	31	29
Qatar	53.45	33	2	57	45	26
Greece	51.57	34	24	33	37	40
Poland	50.97	35	44	37	29	42
Latvia	50.76	36	36	38	36	35
Chile	50.25	37	46	30	47	38
China	50.01	38	41	41	42	33
Hungary	49.48	39	42	39	35	44
Malaysia	49.46	40	39	51	46	24
Slovakia	49.21	41	47	36	34	43
Croatia	48.46	42	35	46	38	41
Bahrain	48.21	43	9	59	39	56
Saudi Arabia	47.25	44	57	42	53	30
Uruguay	46.10	45	51	35	43	63
Bulgaria	45.45	46	53	48	44	50
Turkey	44.21	47	40	69	55	48
Oman	44.18	48	29	72	52	53
Mauritius	44.01	49	43	52	59	62
Romania	44.00	50	48	65	49	47
Serbia	43.81	51	56	54	40	59
Costa Rica	43.77	52	60	44	60	46
Kuwait	43.66	53	54	56	54	51
Russia	42.98	54	65	43	48	72
Armenia	42.48	55	67	58	41	68
Thailand	42.37	56	45	79	62	45
Georgia	42.17	57	55	60	66	49
Argentina	41.70	58	69	53	51	70
Brazil	40.93	59	66	67	56	58
Belarus	40.91	60	63	40	50	99
Ukraine	40.31	61	72	50	58	77
Mexico	40.18	62	70	55	68	66

Table 1: Future Readiness Economic Index 2022 (overall and by pillar) (continued)

Country	Future Readiness Score	Future Readiness Rank	Physical Capital	Human Capital	Technology	Competitiveness
North Macedonia	40.10	63	68	71	57	67
Viet Nam	40.07	64	49	81	67	54
Kazakhstan	39.13	65	84	47	63	71
South Africa	39.01	66	80	86	70	39
Albania	38.51	67	52	61	61	101
Panama	38.15	68	62	74	65	74
Jordan	37.75	69	74	63	88	52
Paraguay	37.57	70	78	45	75	84
Lebanon	37.36	71	61	62	84	78
Trinidad and Tobago	37.08	72	91	49	72	76
Colombia	36.99	73	77	70	64	79
Moldova	36.46	74	58	80	76	82
Egypt	36.34	75	59	89	82	64
Indonesia	36.12	76	50	90	83	73
Azerbaijan	35.97	77	82	66	69	85
Tunisia	35.93	78	79	83	80	60
Ecuador	35.68	79	73	77	71	87
Jamaica	35.50	80	76	64	86	81
Philippines	35.29	81	75	87	89	57
Iran	35.05	82	89	88	78	55
Peru	35.00	83	85	78	74	75
Morocco	34.88	84	71	93	81	69
Bosnia and Herzegovina	34.80	85	81	82	73	80
Botswana	34.34	86	92	73	93	65
Mongolia	33.11	87	95	75	79	83
Dominican Republic	32.68	88	86	84	77	91
India	32.50	89	83	103	90	61
Sri Lanka	32.17	90	64	92	94	94
Kyrgyzstan	31.70	91	90	68	91	102
Bolivia	31.55	92	96	76	85	92
El Salvador	29.86	93	93	97	87	88

Table 1: Future Readiness Economic Index 2022 (overall and by pillar) (continued)

Country	Future Readiness Score	Future Readiness Rank	Physical Capital	Human Capital	Technology	Competitiveness
Algeria	29.28	94	87	85	106	89
Kenya	27.62	95	102	91	96	96
Ghana	26.47	96	103	100	97	86
Cambodia	26.20	97	88	109	92	114
Guatemala	26.12	98	99	111	95	93
Rwanda	25.35	99	94	114	104	97
Honduras	24.93	100	98	105	98	107
Senegal	24.04	101	109	95	105	98
Bangladesh	24.02	102	100	106	100	109
Nepal	23.86	103	106	96	103	108
Pakistan	23.77	104	104	117	102	95
Laos	23.46	105	97	102	114	111
Nigeria	22.58	106	113	101	108	90
Cameroon	21.67	107	110	98	109	110
Côte d'Ivoire	21.29	108	107	113	112	106
Tanzania	20.75	109	115	99	118	105
Zambia	20.33	110	118	94	110	115
Benin	20.20	111	119	104	111	104
Myanmar	20.07	112	101	116	120	123
Uganda	19.86	113	116	115	113	103
Burkina Faso	19.67	114	117	110	117	100
Angola	19.65	115	111	121	101	113
Mali	19.54	116	105	122	107	117
Togo	18.48	117	112	112	115	118
Guinea	18.24	118	108	107	124	121
Zimbabwe	18.11	119	120	119	99	120
Malawi	17.75	120	114	118	119	116
Madagascar	16.83	121	122	108	121	112
Mozambique	15.73	122	121	123	116	119
Ethiopia	13.81	123	123	120	123	122
Niger	10.06	124	124	124	122	124

Top-10 performers

Singapore (1st) is the world's most future-ready country by virtue of its top-10 performances in all key pillars. It does not claim the top spot in any pillar but is the country with the highest number of best performances at the sub-pillar level (five in total). Above all, it stands out in two pillars: Physical Capital (4th) and Competitiveness (2nd). In the case of Physical Capital, Singapore is among the global leaders in Transport Infrastructure (1st) and Digital Infrastructure (4th), whereas a greater share of modern renewables in energy consumption would improve its Energy Infrastructure (70th). As for Competitiveness, the country claims the top spot with respect to Digital Policies and Innovation, but it also benefits from an impressive Market Environment (4th) and strong R&D (8th). The innovative character of Singapore is reflected in its superior performance in Industry 4.0 (1st), especially in robotics and AI, although its Technology (6th) pillar would be even higher with greater Digital Usage (14th) and Digital Content Creation (20th). As for Human Capital (6th), the country is a global leader in growing talent and ranks in the top 3 when it comes to attracting (2nd) talent and its pool of Skills (3rd), but more efforts could be made to increase its ability to Retain (48th) talent.

Denmark (2nd) achieves its highest rank in the Human Capital and Competitiveness pillars (3rd in both). In the latter dimension, it achieves this high rank on the back of strong performances in all sub-pillars: Digital Policies (3rd),* Market Environment (3rd), R&D (4th), and Innovation (4th). In the former pillar, Denmark primarily benefits from an excellent pool of researchers and a high share of people with advanced digital skills, which contribute to a high level of Skills (2nd). The country's level of

* The Digital Policies rank must be understood with the caveat that digital policies are imperfectly measured by the current FREI model. Denmark is one example of a country that does undisputedly well at the overall regulatory level (which the FREI model measures) while facing other specific issues (like most European economies) in the digital regulation area, as well as other aspects of digital policies, which the model does not quantify, largely for lack of international comparability.

Technology (5th) rests on its superior Digital Usage (1st), including its propensity for online shopping, as well as its embrace of Industry 4.0 (6th) and its strong Digital Content Creation (7th). The area with the most room for improvement is Physical Capital (7th), where Denmark could take steps to boost its Digital Infrastructure (9th), including by raising ICT investment.

Switzerland (3rd) displays a stellar FREI performance primarily because of its excellent Competitiveness (1st) and Technology (2nd). When it comes to Competitiveness, it is the global leader in terms of Market Environment and R&D and a top performer in Innovation (5th), which is partly due to its superior patent activity. As for Technology, Switzerland is at the forefront in both Digital Content Creation (2nd) and Industry 4.0 (5th), whereas more could be done to increase Digital Usage (18th) among its population. The country boasts impressive Human Capital (7th), where it has particular strengths in its ability to Attract (5th) and Retain (4th) talent. Switzerland is ranked 10th in the pillar related to Physical Capital, where its excellent Digital Infrastructure (5th) and Transport Infrastructure (8th) are offset by a weaker showing in Energy Infrastructure (22nd).

Sweden (4th) makes it into the top 10 in each of the four pillars, but its standout performance relates to Technology, where it is the global leader. Above all, it benefits from a strong engagement in emerging technologies (2nd in Industry 4.0), but it also displays a high level of Digital Content Creation (5th) and Digital Usage (10th). Sweden ranks 4th and 5th, respectively, in the two pillars related to Human Capital and Competitiveness. In the former case, the country boasts an excellent pool of Skills (7th) and ability to Grow (8th) and Retain (9th) talent; in the latter case, its best showings are in the sub-pillars Market Environment and R&D (ranking 6th in both). As for Physical Capital (8th), an impressive Energy Infrastructure (2nd) is offset by weaker Digital Infrastructure (13th) and Transport Infrastructure (23rd), both of which would benefit from increases in investment.

Norway (5th) claims the top spot in the pillar related to Physical Capital, primarily because of its impressive Energy Infrastructure (1st) and

Transport Infrastructure (4th). An excellent ability to Retain (5th) talent and a strong pool of Skills (4th), including solid digital skills, contribute to the country's high rank in Human Capital (5th). However, there is room to improve its ability to Attract (21st) talent, especially from overseas. Norway also makes it into the top 10 in the Technology (8th) pillar, where it has a particular strength in Digital Content Creation (4th) and solid showings in the sub-pillars related to Industry 4.0 (11th) and Digital Usage (13th). The country is positioned just outside the top 10 when it comes to Competitiveness (11th). It enjoys excellent institutions and Digital Policies (4th) and also benefits from strong R&D (7th) and a favourable Market Environment (9th). However, its level of Innovation (28th), including entrepreneurial activity, could be increased.

The United States (6th) has a strong future readiness that rests on its standing as one of the world's most competitive and technologically advanced countries. In the Competitiveness (4th) pillar, it ranks 2nd in three of the four sub-pillars: Market Environment, R&D, and Innovation. However, the general regulatory landscape hampers Digital Policies (20th). In the Technology (4th) pillar, the United States' pioneering role in emerging technologies means that it ranks 3rd in Industry 4.0, while it also enjoys high levels of Digital Usage (6th) and Digital Content Creation (9th). The country's weakest pillars are Human Capital (12th), where its impressive ability to Grow talent and its high level of Skills (6th in both) stand in contrast to its ability to Retain (32nd) talent; and Physical Capital (15th), where its world-class Digital Infrastructure (1st) is primarily offset by weaker Energy Infrastructure (51st). As underlined earlier, the performance of the United States is all the more remarkable in that the country has to address the needs of a population of some 330 million.

The Netherlands (7th) performs particularly well when it comes to Technology (3rd), which can be attributed chiefly to its world-class Digital Content Creation (1st). In addition, it ranks in the top 10 in the two other sub-pillars: Digital Usage (7th) and Industry 4.0 (10th). The country is among the global leaders when it comes to growing (3rd) talent, which boosts its Human Capital (10th). More could be done to raise its ability to Retain talent and boost Skills (14th in both) however, where expanding tertiary education and strengthening

advanced digital skills should be among its priorities. The Netherlands' Competitiveness (10th) rests on a strong set of institutions that benefit its Digital Policies (5th) and on a favourable Market Environment (10th). Its weakest pillar, meanwhile, is Physical Capital (14th), where there is room to improve its Energy Infrastructure (25th), including by taking steps to make energy consumption more sustainable.

Finland (8th) makes it into the top 10 in two of the four FREI pillars: Competitiveness (6th) and Technology (7th). Its competitive advantage is founded primarily on a strong set of institutions that support its Digital Policies (2nd). The country's technological strength, meanwhile, rests mainly on high Digital Usage (3rd) among its population and a strong involvement in emerging technologies (Industry 4.0, 7th), including AI and IoT. Finland finds itself in 11th position with respect to Human Capital, where a high ability to Grow (12th) and Retain (8th) talent contribute to an excellent level of Skills (8th), but where there is scope to increase its ability to Attract (19th) talent, especially from overseas. Although the Energy Infrastructure (3rd) of Finland is impressive, its performance in the pillar on Physical Capital (11th) would improve by boosting investments in Digital Infrastructure and Transport Infrastructure (24th in both).

The United Kingdom (9th) makes it into the top 10 in two of the four pillars: Competitiveness (7th) and Technology (9th). In the former dimension, it benefits from strong R&D (10th) and Innovation (9th) against a backdrop of solid Digital Policies (12th). As for the latter dimension, its strengths in ICT regulation and cybersecurity may well be contributing factors in the country's high Digital Usage (5th) and Digital Content Creation (6th). The country's best-performing sub-pillars are, however, in the other two pillars. In the Human Capital (14th) pillar, it does particularly well when it comes to retaining (3rd) talent, but a skills gap weighs down its Skills (18th) sub-pillar and fairly weak internal openness hampers its ability to Attract (15th) talent. In the pillar on Physical Capital (21st), the United Kingdom enjoys an impressive Digital Infrastructure (3rd), but it needs to increase investment in its Transport Infrastructure (21st) and boost Energy Infrastructure (74th). The comment made earlier about the United States also applies to the United Kingdom: the digital transformation of a large population (over 65 million) poses significant

challenges, which makes the performance of the country particularly remarkable.

Canada (10th) has its greatest assets for future readiness in Competitiveness (8th) and Human Capital (9th). The strength of its Competitiveness is built on solid showings in all four sub-pillars— Digital Policies (13th), Market Environment (12th), R&D (9th), and Innovation (13th)—where cybersecurity and access to finance for start-ups are among its key strengths. As for Human Capital, Canada has an excellent ability to Attract

(7th) talent, which contributes to its outstanding pool of Skills (5th). There is room to raise its ability to Retain (24th) talent, however, including by improving its environmental performance. The country ranks 10th with respect to Technology, which is boosted by its engagement in Industry 4.0 (8th), including AI and IoT, and by a high level of Digital Content Creation (13th). Canada's lowest-ranked pillar is Physical Capital (19th); this can be primarily attributed to its comparatively weak Energy Infrastructure (41st), where there is particular scope to improve energy efficiency.



Regional results: Europe and Northern America

As the discussion of the top 10 performers shows, the FREI rankings are dominated by countries from Europe and Northern America, notwithstanding some strong performers in Asia and Pacific— notably the global leader Singapore. Among the 38 European countries covered by FREI, 21 are in the top quartile of the ranking. A further 13 countries are positioned in the second quartile, while 4 countries are ranked in the third quartile. Northern America consists of only two countries— Canada and the United States—both of which feature in the top 10 (Figure 4).

There is always room for improvement—even for the most successful countries—but it is striking that the best-ranked countries in Europe and Northern America tend to exhibit a particular strength in Technology and Competitiveness. The United States, for instance, is a top performer in a range of areas, including provision of digital government services, commitment to cybersecurity measures, and activity in emerging technologies such as AI and IoT. Similarly, the United Kingdom is one of the leaders when it comes to digital government and regulations related to digital technologies, among others.

Notable performers

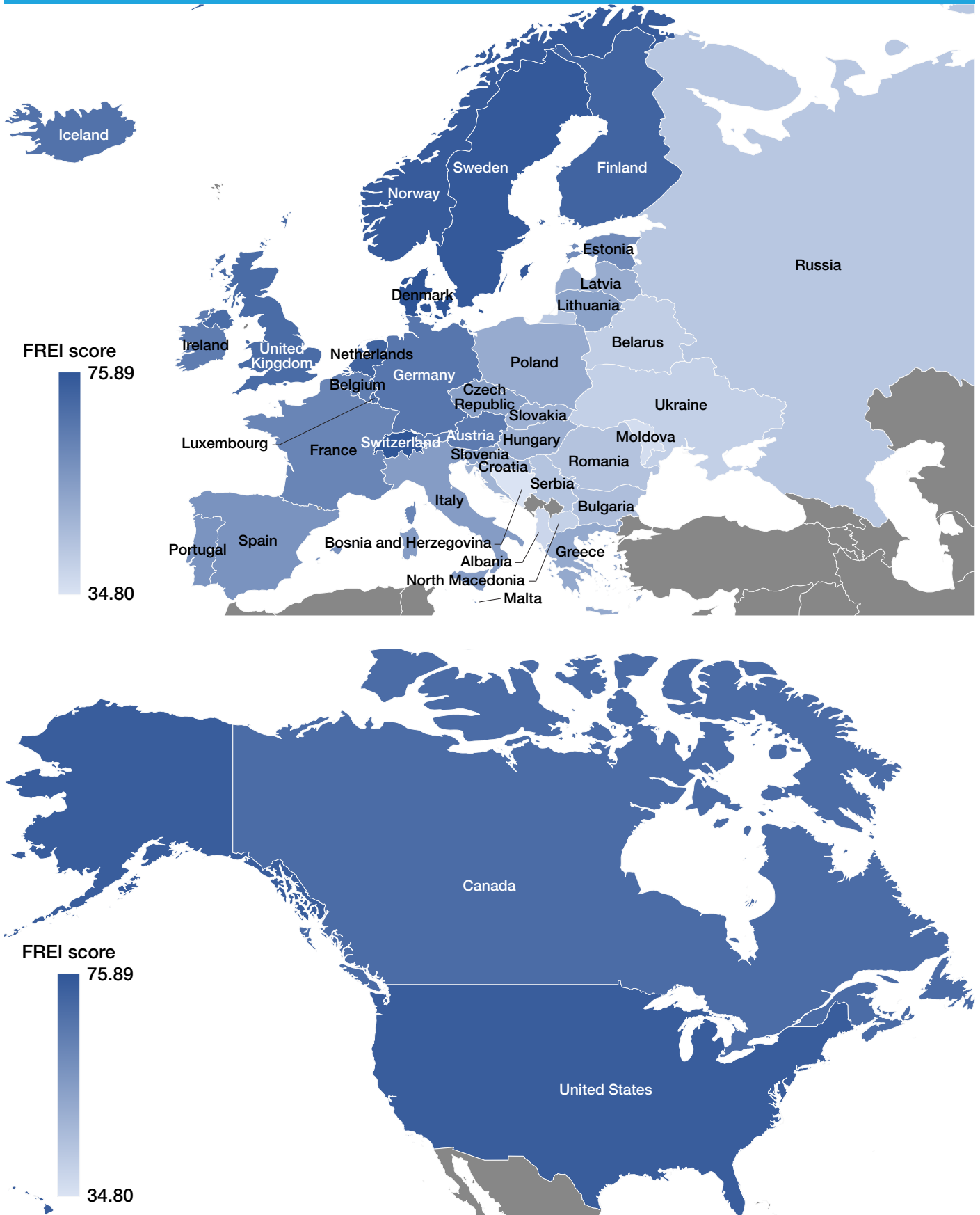
The top performers of Europe and Northern America (both Canada and the United States) feature in the top 10 of the FREI rankings and the interested reader is therefore referred to the 'Top-10 performers' section for in-depth analyses of these countries. This section considers notable performers in addition to those described in the previous section ('Top 10').

Germany (14th) has an advantage in software development and involvement in emerging technologies, which is reflected in high ranks in Industry 4.0 (9th) and Digital Content Creation (11th). Its performance in the related pillar— Technology (11th)—would be particularly

boosted if the country's government increased its Digital Usage (for which the country's rank is a disappointing 25th). Germany makes it into the top 10 with respect to retaining talent (10th), but its Human Capital (19th) would improve with a stronger ability to Attract (22nd) and Grow (25th) talent. Similarly, greater high-level Skills (22nd), especially digital skills, would enhance the country's future readiness. Germany's Competitiveness (15th) primarily rests on an overall regulatory climate that benefits its Digital Policies (11th) and a supportive R&D (14th) environment, but more could be done to strengthen its Market Environment (25th). Germany's weakest sub-pillar relates to Energy Infrastructure (55th) in the Physical Capital (20th) pillar, where there is particular room to increase the share of modern renewables in its energy mix, as the country's reliance on coal remains high.

France (21st) is the global leader when it comes to retaining talent. The country also has a good ability to Grow (17th) talent, but its Human Capital (20th) would rise further with a greater capacity to Attract (33rd) talent and with higher Skills (25th), including by addressing the skills gap and expanding digital skills. France enjoys a solid level of Competitiveness (20th), which is the result of good performances in all the applicable sub-pillars: Innovation (17th), Digital Policies (19th), Market Environment (19th), and R&D (21st). It also has an encouraging level of Technology (21st), which can be partly attributed to its involvement in emerging technologies (Industry 4.0, 19th), including in robotics, and the country's prominent promotion of digital government services (Digital Usage, 24th). France's weakest pillar is Physical Capital (27th), where making its Energy Infrastructure (65th) more sustainable presents the greatest challenge, but where efforts should be made to boost its Digital Infrastructure and Transport Infrastructure (both 26th) as well, including by expanding investments in these two critical areas.

Figure 4: Overall FREI performance in Europe and Northern America



Italy (29th) makes it into the top 10 with respect to the ability to Retain (7th) talent, which benefits from its lifestyle. However, the country's pool of Human Capital (31st) is mainly weakened by its lower ability to Attract (53rd) talent—where challenges include raising the tolerance of minorities and promoting leadership opportunities for women. Italy's strongest pillar is Physical Capital (23rd), where its high energy efficiency contributes to the country's good performance on Energy Infrastructure (17th). However, more could be done to strengthen its Digital Infrastructure (39th), including by increasing Internet access, international Internet bandwidth, and fixed broadband subscriptions. Its involvement in emerging technologies—especially robotics—boosts its rank in the sub-pillar related to Industry 4.0 (22nd) and, by extension, in the Technology (28th) pillar. There is, however, a need to expand the country's Digital Usage (35th) and Digital Content Creation (34th). The Competitiveness (32nd) of Italy benefits from a solid Market Environment (26th), especially a favourable domestic competitive climate, whereas strengthening the start-up ecosystem would boost Innovation (41st).

Russia (54th) features in the upper half of the FREI rankings in two of the model's four pillars: Human Capital (43rd) and Technology (48th). In the former case, the country primarily enjoys a high level of Skills (31st)—although there is a need to strengthen digital skills—but it faces a challenge in improving its ability to Attract (86th) talent, both domestic and foreign. As for the Technology pillar, Russia benefits from solid levels of Digital Usage (41st) and Digital Content Creation (44th), but would also benefit from greater engagement in technologies related to Industry 4.0 (62nd), including AI. The country's Digital Infrastructure (57th) and Transport Infrastructure (64th) contribute to its Physical Capital (65th) pillar being ranked close to the global median, while its Energy Infrastructure (81st) would improve considerably with a higher share of modern renewable energy. Russia's weakest performance relates to Competitiveness (72nd), where the relatively favourable R&D (52nd) climate and Market Environment (58th) are offset by lower levels of Innovation (77th) and Digital Policies (94th), including ICT regulation.

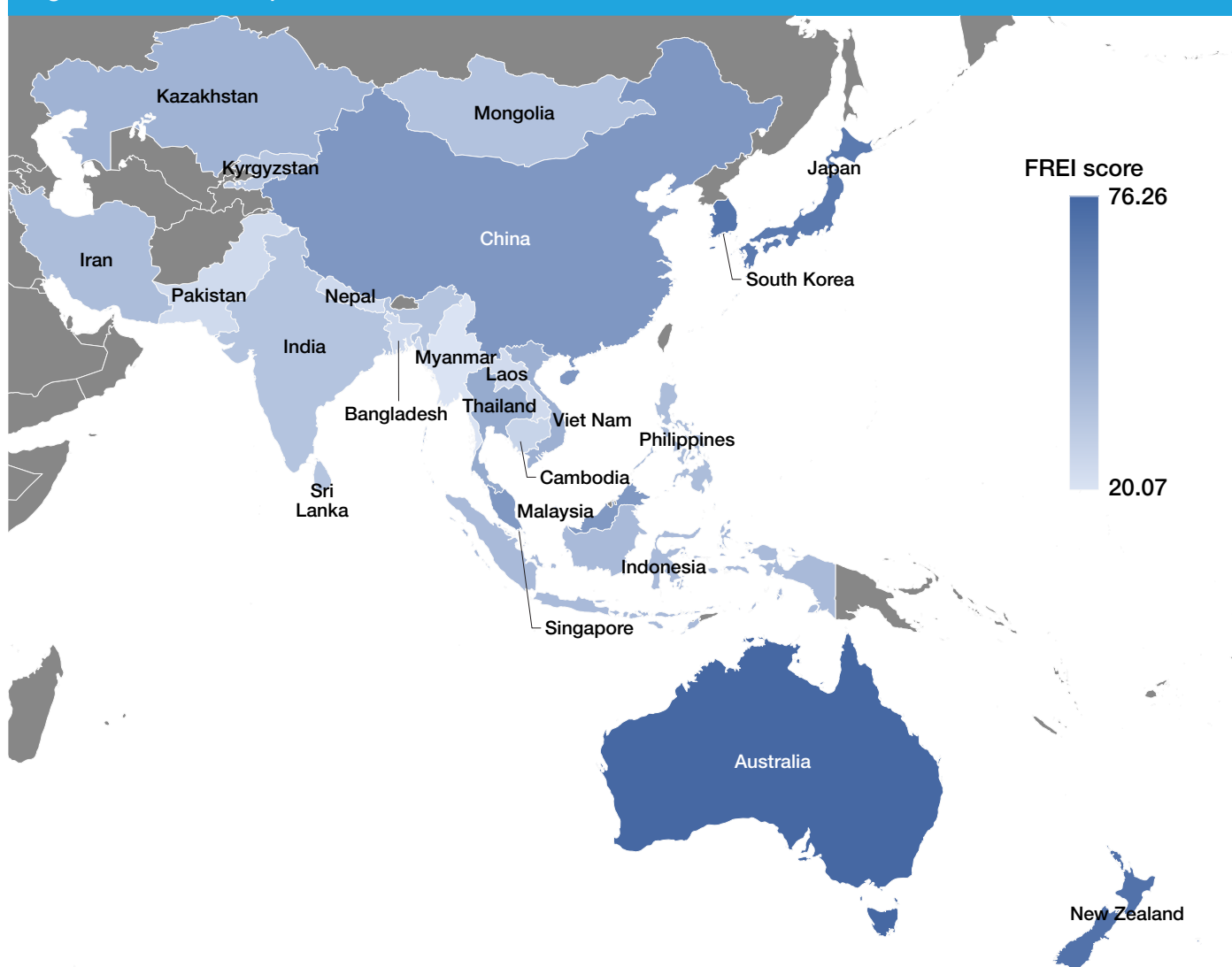


Regional results: Asia and Pacific

Asia and Pacific is the most heterogeneous region in the Future Readiness Economic Index (FREI), with rankings ranging from 1st (Singapore) to 112th (Myanmar). In total, there are 23 countries from the region included in FREI, with performances spreading across all quartiles. Five of them are positioned in the top quartile of FREI, three are in the second quartile, nine are in the third quartile, and six are in the bottom quartile (Figure 5).

In terms of pillar performances, it is noteworthy that the Achilles' heel of many countries in Asia and Pacific is Human Capital. No fewer than seven countries post their lowest ranks in that pillar, and it is also the pillar where Asia and Pacific ranks worst against other regions. As for within-region performances, however, the greatest variation can be seen in the Technology pillar, where differences among the countries appear to be particularly pronounced with respect to Industry 4.0 and Digital Usage.

Figure 5: Overall FREI performance in Asia and Pacific



Notable performers

Australia (11th) is the most future-ready country in the Asia and Pacific apart from Singapore. Its most impressive performance relates to Human Capital (2nd), where it has a particular edge in attracting and growing talent (4th in both). The

country also makes it into the top 10 with respect to Competitiveness (9th), which is primarily a result of its high level of R&D (5th) and excellent Digital Policies (7th), including ICT regulation and general regulatory landscape. Australia performs well in all three sub-pillars associated with the Technology

(12th) pillar (Digital Usage, 12th; Digital Content Creation, 14th; and Industry 4.0, 14th), whereas it could do more to improve its Physical Capital (28th), especially regarding its Digital Infrastructure (50th) and Energy Infrastructure (69th), where there is scope to boost Internet bandwidth and fixed-broadband subscriptions, among others.

New Zealand (15th overall) ranks 3rd regionally in FREI. Its best performance relates to Human Capital (13th), which can primarily be attributed to its ability to Attract (8th) and Grow (5th) talent. It also makes it into the top 15 in the Technology (14th) pillar, where it particularly benefits from high Digital Content Creation (10th) and Digital Usage (11th), including in terms of government online services and e-participation. New Zealand's weakest pillars are Physical Capital (22nd) and Competitiveness (21st). In the former dimension, more could be done to improve its Energy Infrastructure (29th) and Digital Infrastructure (31st). In the latter dimension, efforts should be made to boost its Innovation (31st) ecosystem.

The Republic of Korea (South Korea) (18th) has a clear strength when it comes to Technology (13th), and two of its associated dimensions— Industry 4.0 (4th) and Digital Usage (8th)—are also among the country's best-performing sub-pillars. South Korea also makes it into the top 10 in its Innovation (8th) sub-pillar, but its Competitiveness (18th) pillar is hampered by its relatively weak Digital Policies (29th). In terms of Human Capital (22nd), the country enjoys a high level of Skills (11th), while there is scope to improve its ability to Attract (31st) and Grow (40th) talent. The country's lowest-ranked pillar is Physical Capital (25th), where its Energy Infrastructure (83rd) would improve with greater energy efficiency and a higher share of modern renewables in energy consumption.

Japan (22nd) makes it into the top 20 in two of the four pillars: Competitiveness (16th) and Technology (17th). In the former case, it boasts a favourable Market Environment (5th) and competitive Innovation (18th) climate with high patent activity. In the latter case, it primarily benefits from high Digital Usage (4th), especially among firms, and extensive involvement in Industry 4.0 (13th). Japan's ability to Retain (15th) talent boosts its Human Capital (25th) pillar, but the country could take steps to improve ways in which to Attract (35th) talent, including

by increasing its appeal to international students and addressing gender gaps. As for Physical Capital (30th), the country's strong Transport Infrastructure (14th) is offset by weaker Digital Infrastructure (45th) and Energy Infrastructure (73rd), where challenges include making mobile-broadband usage plans more affordable, boosting IT spending, and increasing the share of modern renewables in energy consumption.

China (38th) is the best-performing non-high-income country in FREI. Above all, China has a particular strength in Competitiveness (33rd), which can be attributed primarily to its strong Innovation (11th) ecosystem and conducive Market Environment (28th), including good access to finance. The country enjoys solid performances in the other three pillars: Physical Capital (41st), Human Capital (41st), and Technology (42nd). With respect to Physical Capital, it is mainly boosted by Transport Infrastructure (32nd) and Digital Infrastructure (38th). As for Human Capital, China has a strong pool of Skills (23rd), but there is considerable scope to strengthen the input dimensions that support the production and acquisition of talent. In particular, there is a need to boost its ability to Attract (64th) and Retain (63rd) talent, including by greater openness towards both foreign and domestic talent. In the case of Technology, the country primarily benefits from its active engagement in Industry 4.0 (27th) and high Digital Usage (30th) among its population.

Indonesia (76th) features in the upper half of the FREI rankings in the pillar related to Physical Capital (50th), where Transport Infrastructure (46th)—supported by solid infrastructure investment—and Digital Infrastructure (59th)—partly due to good affordability of fixed and mobile broadband—are the country's two highest-ranked sub-pillars. Indonesia also performs comparatively well in the R&D (62nd) sub-pillar, but its Competitiveness (73rd) is hampered by weaker Innovation (74th), Digital Policies (75th), and Market Environment (80th), where challenges include boosting the start-up scene and strengthening ICT regulation. Its relative strength in Technology (83rd) is its active participation in Industry 4.0 (63rd)—including in fields related to IoT and AI—whereas it has a lower level of Digital Usage (83rd), especially among firms, and Digital Content Creation (89th). The country's weakest performance relates to Human Capital (90th), where it faces multiple

challenges to increase the ability to Grow and Retain (93rd in both) talent and to boost high-level Skills (93rd), including advanced digital skills.

India (89th) makes it into the upper half of the rankings when it comes to Competitiveness (61st). More than anything else, it performs well with respect to Innovation (29th), including finance for innovation; and Digital Policies (57th), including strong cybersecurity. India is also positioned in the upper half in the sub-pillar related to Industry 4.0 (49th)—in no small part because of its activity in and contribution to AI—but its showing in

Technology (90th) is hampered by weaker Digital Usage (90th) and Digital Content Creation (98th). India ranks slightly higher in the Physical Capital (83rd) pillar, where the quality of its Transport Infrastructure (68th) and its extensive mobile network coverage in Digital Infrastructure (79th) are among the encouraging highlights. The country's weakest performance relates to Human Capital (103rd), where a low level of Skills (107th) and poor ability to Attract (121st) talent could be boosted by addressing gender inequality, tolerance of minorities, and skills gaps, among others.



Regional results: Latin America and the Caribbean

Latin America and the Caribbean is the region (Northern America apart) with the lowest variance in the Future Readiness Economic Index (FREI). In total, there are 18 countries from the region included in FREI and they are represented in all quartiles but for the top, with overall rankings ranging from a high of 37th (Chile) to a low of 100th (Honduras). Six of the countries are positioned in the second quartile, ten are in the third quartile, and two are in the bottom quartile (Figure 6).

In general, the strongest future readiness dimensions in Latin America and the Caribbean are Human Capital and Technology: these are the highest-ranked pillars for eight of the countries in the region. **By contrast, several countries have a relative weakness with respect to Digital Policies and the general regulatory landscape, which has a negative impact on their Competitiveness.**

Notable performers

Chile (37th) is the most future-ready country in Latin America and the Caribbean. Its greatest asset is its Human Capital (30th), where its ability to Attract (27th), Grow (29th), and Retain (41st) talent results in solid Skills (34th), including advanced digital skills. The country does well with respect to Innovation (30th), especially entrepreneurial activity, but its Competitiveness (38th) would benefit from greater R&D (57th). Chile's weakest pillars are Physical Capital (46th) and Technology (47th). Strong Digital Infrastructure (28th)—backed by solid investments—is cancelled out by weaker Energy Infrastructure (66th) in the former dimension, while there is considerable scope to raise performances in all three sub-pillars of the latter dimension (Digital Usage, 40th; Digital Content Creation, 50th; and Industry 4.0, 47th).

Uruguay (45th) is not far from the top quartile when it comes to its strongest pillar: Human Capital (35th). Above all, it has an impressive ability to Attract (11th) talent, which stems from its high degree of internal openness towards minority groups and immigrants. However, its favourable conditions for generating talent do not fully translate to a strong pool of Skills (69th). Uruguay makes it into the top 10 in Energy Infrastructure (10th)—supported by good energy efficiency—but the country's Physical Capital (51st) is hampered by weaker Digital Infrastructure (68th) and Transport Infrastructure (70th), where challenges include boosting investment and improving the quality of its physical infrastructure. In the Technology (43rd) pillar, its key strengths are its levels of Digital Usage (39th), especially among national authorities, and its Digital Content Creation (41st). Uruguay's lowest-ranked pillar is Competitiveness (63rd), where strengthening R&D (111th) is the main concern.

Costa Rica (52nd) makes it into the top 3 in the region of Latin America and the Caribbean. Its best-ranked sub-pillar relates to attracting (28th) talent, which contributes to its key asset in future readiness: Human Capital (44th). More could be done, though, to raise the Skills (58th) of the population, including by expanding tertiary education. The country's level of Competitiveness (46th) benefits from its solid institutions and Digital Policies (47th), including good ICT regulation. The weakest pillars of Costa Rica are Physical Capital and Technology (60th in both). In the former dimension, a solid Energy Infrastructure (35th) is offset by weaker Transport Infrastructure (85th), where there is a need to raise investment. In the latter dimension, the government should raise its Digital Usage (59th) and more efforts should be made to increase the country's activity in emerging technologies (77th in Industry 4.0).

Figure 6: Overall FREI performance in Latin America and the Caribbean



Argentina (58th) makes it into the upper half of rankings in the pillars related to Technology (51st) and Human Capital (53rd). In the former case, it performs well in all three sub-pillars—Digital Usage (45th), Digital Content Creation (52nd), and Industry 4.0 (50th)—where its widespread use of digital government is particularly noteworthy.

In the latter case, it has a particular advantage when it comes to attracting (42nd) and retaining (45th) talent, but more efforts should be put on expanding high-level Skills (72nd). The pillar related to Physical Capital (69th) primarily benefits from solid levels of Digital Infrastructure (63rd) and Energy Infrastructure (54th), but these

are offset by weaker Transport Infrastructure (83rd), which would mainly improve with greater infrastructure investment and air connectivity. As for Competitiveness (70th), Argentina's best performances are in R&D and Innovation (51st for both), whereas its Market Environment (68th) is hampered by low market sophistication and its Digital Policies (96th) are dragged down by weak ICT regulation and cybersecurity, among others.

Brazil (59th) features in the upper half of the FREI rankings in two pillars: Technology (56th) and Competitiveness (58th). In the case of Technology, it benefits above all from its contribution to Industry 4.0 (48th), including AI software development, and its high Digital Usage (51st), especially when it comes to the digitalisation of government services. As for Competitiveness, Brazil primarily enjoys a solid Market Environment (47th) and conducive Digital Policies (56th). Its high share of modern renewables in energy consumption has a positive impact on the country's Energy Infrastructure (40th), but its Digital Infrastructure (69th)—including its relatively low Internet access and international Internet bandwidth—and its Transport Infrastructure (74th) hamper its showing in Physical Capital (66th). In contrast to most other countries

in the region, Brazil's weakest pillar is Human Capital (67th), which can primarily be attributed to its disappointing level of Skills (94th), where its skills gap is of particular concern.

Mexico (62nd) is the last country to find itself in the upper half of the FREI rankings. This is primarily a result of its performance in the Human Capital (55th) pillar, where it does particularly well in the input dimensions that support the production and acquisition of talent (Attract, 43rd; Grow, 58th; and Retain, 46th). Mexico enjoys a solid level of Innovation (40th) that is supported by its Market Environment (64th) and Digital Policies (69th). However, there is a need to lift R&D (82nd), including by raising R&D expenditure, to strengthen the country's Competitiveness (66th). In the Technology (68th) pillar, Mexico's more notable showings include the role of government in Digital Usage (65th) and its level of activity in robotics and IoT in Industry 4.0 (56th). Mexico's lowest-ranked pillar is Physical Capital (70th), where expanding Internet access and international Internet bandwidth would raise Digital Infrastructure (66th) and a more efficient energy consumption would boost the performance in Energy Infrastructure (90th).

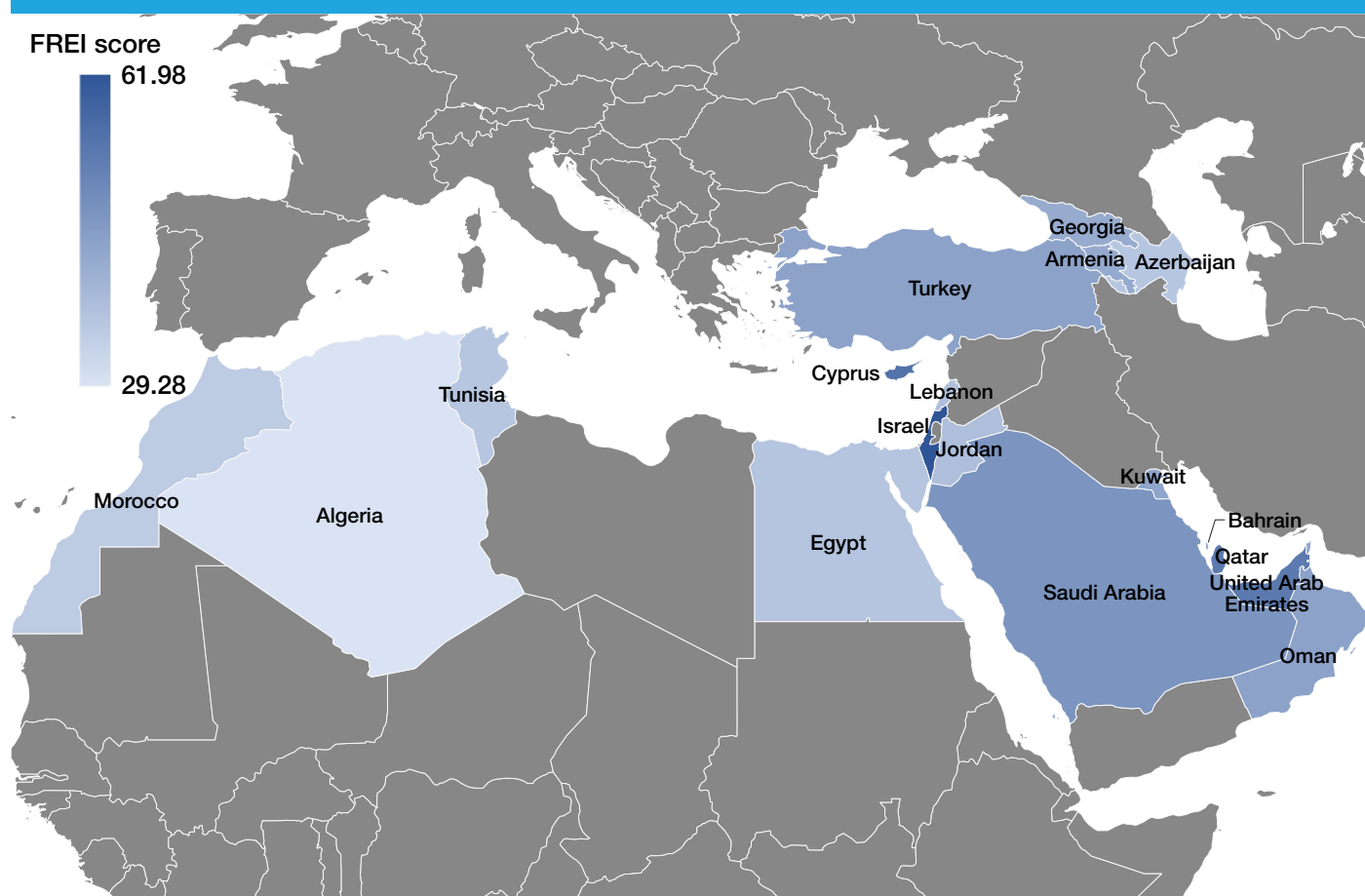


Regional results: The Middle East and North Africa

The Middle East and North Africa is, on average, the region with the third-best future readiness (behind Europe and Northern America). In total, 18 countries from the region are included in the Future Readiness Economic Index (FREI), with at least one country in each of the four quartiles. The highest-ranked country is Israel (20th), while the lowest-ranked is Algeria (94th). Three Middle Eastern countries are in the top quartile and eight are in the second quartile. Six countries from the whole region are positioned in the third quartile, while one is placed in the bottom quartile (Figure 7).

Bearing in mind the considerable variation of future readiness in the Middle East and North Africa, one distinguishing feature of the region as a whole is that there is a tendency to perform better in what could be referred to as the ‘input dimensions’ of digital transformation than in the ‘output dimensions’. That is, several countries have comparative strengths in issues related to the access and use of digital technologies (such as Digital Infrastructure, Digital Usage, and Digital Policies) as opposed to the impact of digital transformation on the generation and production of goods and services (e.g., Digital Content Creation and Industry 4.0).

Figure 7: Overall FREI performance in the Middle East and North Africa



Notable performers

Israel (20th) is the most future-ready country in the Middle East and North Africa. Its key asset is its Competitiveness (12th) and, above all, its world-class R&D and Innovation ecosystem (3rd in both),

which is in line with its reputation as the ‘start-up nation’. The country’s strength in technological innovation is reflected in its high level of activity in Digital Content Creation (23rd) and Industry 4.0 (15th), including in developing ICT patents and in

AI research and software development. However, there is scope to increase Digital Usage (38th)—by expanding government online services, among others—which would boost its Technology (20th) pillar. Israel has an impressive level of Skills (9th), although Human Capital (21st) would be even higher with a better ability to Attract (44th) talent by means of higher tolerance towards minorities and immigrants. The country's greatest challenge relates to building Physical Capital (37th), where higher investments are needed to lift Digital Infrastructure and Transport Infrastructure (40th in both).

The United Arab Emirates (UAE) (27th) makes it into the top 10 in one of the four FREI pillars: Physical Capital (6th). Its most impressive performances relate to Digital Infrastructure (8th) and Transport Infrastructure (2nd), which is partly due to its widespread Internet access and large infrastructure investments. Its excellent digital infrastructure is undoubtedly a factor in the country ranking 2nd in the Digital Usage sub-pillar. However, its associated pillar—Technology (33rd)—would rise with an increase in Digital Content Creation (51st) and Industry 4.0 (38th), by encouraging greater research and innovative activity in emerging digital technologies, among others. The UAE's level of Human Capital (26th) benefits primarily from its excellent ability to Attract (6th) talent and its comparatively strong pool of Skills (15th). The country's Competitiveness (34th) pillar is supported by favourable Digital Policies (24th) and a conducive Market Environment (23rd), but it would strengthen with greater R&D (55th) and higher Innovation (43rd), including an uptick in patent activity.

Cyprus (28th) makes it into the top quartile in all four pillars of FREI, which contributes to it being the third-most future-ready country in the region. Its best-performing pillar is Competitiveness (28th), which is boosted by Innovation (16th), especially entrepreneurial activity, while there is scope to improve its Digital Policies (36th) and strengthen its Market Environment (40th). The country's level of Human Capital (29th) is primarily due to its solid showings in Attract (26th) and Grow (28th). Cyprus ranks 30th with respect to Technology, which benefits from encouraging showings in all three sub-pillars (Digital Usage, 26th; Digital Content Creation, 30th; and Industry 4.0, 29th). Although its two highest-ranked sub-pillars are Digital

Infrastructure (18th) and Energy Infrastructure (23rd), the country's lowest-ranked pillar is Physical Capital (31st) because of its Transport Infrastructure (41st), where improving rural access should be a priority.

Saudi Arabia (44th) has a particular strength in Competitiveness (30th), which is the only pillar where it ranks in the top quartile. Above all, it has an impressive Market Environment (8th), which stands in contrast to the country's weaker Innovation (68th) and start-up ecosystem. It also has strong ICT regulation and cybersecurity, but its Digital Policies (42nd) are hampered by its overall regulatory environment. Saudi Arabia has a relatively high pool of Skills (10th), but its Human Capital (42nd) would be boosted by a stronger ability to Attract (77th) and Retain (81st) talent, especially in areas where gaps remain. In terms of Technology (53rd), it is actively engaged in Industry 4.0 (39th)—where its embrace of IoT stands out—and enjoys high Digital Usage (42nd) among its individuals in particular, whereas there is room to promote greater Digital Content Creation (69th). A low share of modern renewables in energy consumption drags down its Energy Infrastructure (91st), but its Physical Capital (57th) pillar is boosted by an excellent Digital Infrastructure (19th) that is underpinned by strong affordable access to the Internet.

Turkey (47th) has a key asset in its Physical Capital (40th). Above all, it benefits from a strong Digital Infrastructure (29th)—the country's only sub-pillar ranked in the top quartile—where there is good Internet access that is affordable and a high degree of investment. Turkey also performs well in Energy Infrastructure (37th) and Transport Infrastructure (39th), which are its second- and third-best sub-pillars, respectively. Its Market Environment (41st) is driven by the urban, productive workforce, while its Competitiveness (48th) also benefits from strong aspects of the country's R&D (56th), Innovation (55), and Digital Policies (52nd)—especially when it comes to ICT regulation and cybersecurity. As for Technology (55th), the country finds itself in the second quartile in all three sub-pillars: Industry 4.0 (42nd), Digital Usage (54th), and Digital Content Creation (55th). The only pillar where Turkey is in the bottom half of the rankings is Human Capital (69th), where its ability to Grow (44th) talent is offset by weaker performances in the sub-pillars related to Retain (59th), Skills (67th), and, above all,

Attract (123rd), where there is a need to increase the ability to attract both domestic and overseas talent.

Egypt (75th) makes it into the upper half of the rankings in one pillar—Physical Capital (59th)—where it has particularly strong showings in Digital Infrastructure (58th) and Transport Infrastructure (60th). It also performs relatively well in the pillar related to Competitiveness (64th), which can be attributed chiefly to the levels of R&D (47th), Innovation (66th), and Digital Policies (68th) in the country, although there is scope to strengthen its overall regulatory environment. As for its Market

Environment (83rd), there is primarily a need to improve market sophistication through greater access to credit and a better-developed financial market. Egypt's two weakest pillars are Technology (82nd) and Human Capital (89th). In the former case, its engagement in technologies related to Industry 4.0 (65th)—including AI and IoT—are offset by lower levels of Digital Usage (84th) and Digital Content Creation (83rd). As for the latter pillar, Egypt's relative strength in Skills (44th) stands in stark contrast to its ability to Attract (116th), Grow (96th), and Retain (89th) talent, which are the country's three weakest sub-pillars.



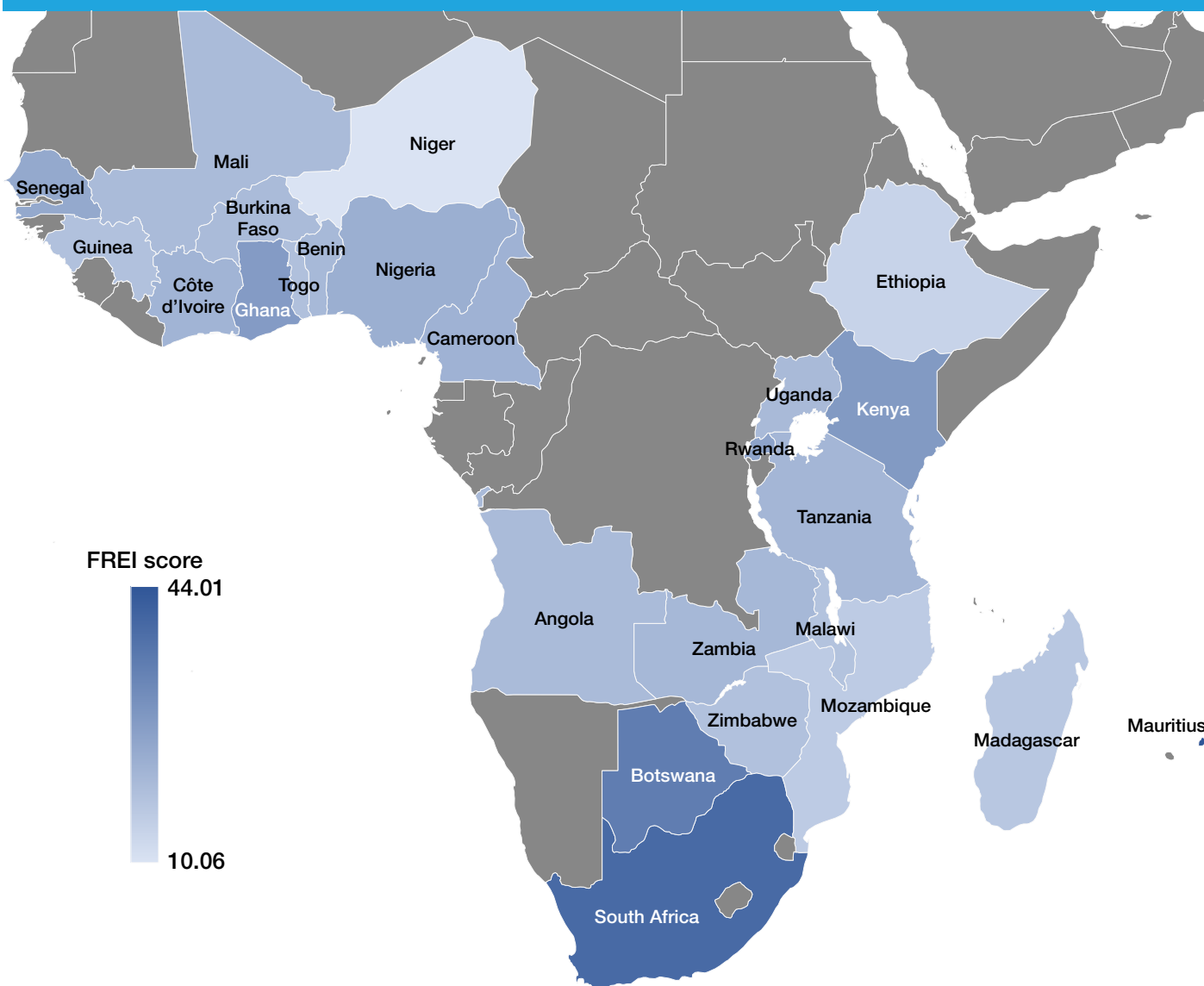
Regional results: Sub-Saharan Africa

Sub-Saharan Africa is, on average, the least future-ready region in the world. In total, there are 25 countries from the region included in the Future Readiness Economic Index (FREI), but only one of them makes it into the upper half of the rankings (Mauritius, 49th). Two Sub-Saharan Africa countries are in the third quartile (South Africa and Botswana), while the remaining 22 are placed in the bottom quartile (Figure 8).

In general, Sub-Saharan Africa performs better in the Human Capital pillar than in the other FREI

dimensions, especially when it comes to attracting talent. Indeed, Attract is the highest-ranked sub-pillar in eight countries in the region. By contrast, the results suggest that digital transformation is one of the greatest challenges facing Sub-Saharan Africa. **It lags behind other regions when it comes to technological innovations, including emerging technologies that are part of Industry 4.0, but its most immediate concern is arguably to improve the frequently poor state of its Digital Infrastructure.**

Figure 8: Overall FREI performance in Sub-Saharan Africa



Notable performers

Mauritius (49th) is the most future-ready country in Sub-Saharan Africa and the only one in the

region that makes it into the upper half of the FREI rankings. Its strongest pillar is Physical Capital (43rd), where high investments contribute

to its strong Transport Infrastructure (19th). It is positioned just outside the top quartile in the Attract (32nd) sub-pillar, but further efforts are needed to translate its relative strengths in producing and acquiring Human Capital (52nd) into talent output in the form of Skills (81st). In the Technology (59th) pillar, its development of mobile apps contributes to the country's Digital Content Creation (48th), whereas there is potential to substantially increase the number of Internet users and further develop digital government services, which would improve Digital Usage (66th). Mauritius has a high level of cybersecurity, which has a positive impact on Digital Policies (32nd), although its ICT regulation could be strengthened. Its associated pillar—Competitiveness (62nd)—is, however, primarily hampered by the country's two weakest sub-pillars: Market Environment (87th) and R&D (90th).

South Africa (66th) makes into the upper half of the rankings in one of the FREI pillars: Competitiveness (39th). Above all, the country enjoys a favourable Market Environment (24th)—with impressive market capitalisation—and high levels of R&D (34th) and Innovation (39th). In Technology (70th), it has a relative strength in its engagement in emerging technologies (Industry 4.0, 54th), whereas greater Digital Usage (71st)—with a higher share of Internet users and an expansion of online shopping, among others—and more Digital Content Creation (74th) would boost its showing in this pillar. South Africa's weakest pillars are Physical Capital (80th) and Human Capital (86th). Priorities in the former dimension include expanding access to electricity and improving energy efficiency for a better Energy Infrastructure (104th), as well as making mobile broadband more affordable to strengthen Digital Infrastructure (77th). As for the latter dimension, the country is in the upper half of the rankings with respect to attracting (56th) talent, but this is offset by a lower ability to Retain (84th) talent (where personal safety is a concern) and weak Skills (92nd), which has a negative impact on a wide skills gap.

Botswana (86th) has two key assets in its Human Capital (73rd) and Competitiveness (65th) pillars. In the case of talent, the country has a good ability to Attract (45th) international and domestic human capital, but providing enough education and job opportunities for youth to realise their potential is a

challenge (89th in Grow). As for Competitiveness, it performs particularly well in Innovation (38th), especially in terms of entrepreneurial activity, but there is a need to strengthen its Market Environment (82nd) and R&D (86th) capabilities. In contrast to these two dimensions, Botswana is considerably weaker in the other two pillars: Physical Capital (92nd) and Technology (93rd). In the former pillar, low Internet access and fixed-broadband subscriptions contribute to a deficient Digital Infrastructure (88th), and a lack of access to electricity hampers Energy Infrastructure (107th). In the Technology pillar, there is primarily a need to expand Digital Usage (98th) at all levels of the society: among individuals, among firms, and at the governmental level.

Kenya (95th) finds itself in the third quartile in one pillar—Human Capital (91st)—which can primarily be attributed to its relative strengths in attracting talent and in its pool of high-level Skills (ranking 60th in both). It also has a good ability to Grow (83rd) talent, whereas its main challenge is to Retain (113th) talent. Kenya ranks 96th in the two pillars related to Technology and Competitiveness. The former pillar is boosted by the country's engagement in Industry 4.0 (59th) technologies, especially AI software development, whereas there is particular scope to increase Digital Usage (94th)—notwithstanding the successes of mobile money and digital government initiatives—and Digital Content Creation (105th). The latter pillar primarily benefits from good Digital Policies (76th), especially ICT regulation, while there is a clear need to improve the Market Environment (113th), including though increasing access to finance and boosting productivity. Kenya's lowest-ranked pillar is Physical Capital (102nd), where there is considerable room for improvement in all three sub-pillars: Digital Infrastructure (99th), Transport Infrastructure (92nd), and Energy Infrastructure (106th).

Ghana (96th) is the most future-ready country in the western part of Sub-Saharan Africa. Its greatest asset is its Competitiveness (86th), which is boosted mainly by its Digital Policies (62nd), especially as they relate to ICT regulation and cybersecurity. The country also performs particularly well when it comes to its ability to Attract (52nd) talent, but the development of its Human Capital (100th) is hindered by a weaker capacity to Grow (110th) and Retain (109th)

talent. As for Technology (97th), Ghana's role in AI software development contributes to its involvement in emerging technologies (Industry 4.0, 81st), whereas the country would primarily benefit from increased Digital Usage (96th)—especially in the private sector—and from greater encouragement of Digital Content Creation (109th). The greatest challenge facing Ghana, however, relates to its Physical Capital (103rd), where there is a need to increase access to and investment in Digital Infrastructure (103rd), Transport Infrastructure (99th), and Energy Infrastructure (96th).

Rwanda (99th) finds itself in the bottom quartile in all four pillars but makes it into the upper half of the rankings in two sub-pillars. Its best-performing sub-pillar is Energy Infrastructure (48th), but the associated pillar—Physical Capital (94th)—is weighed down primarily by its weak Digital Infrastructure (105th), where Internet access and affordability are especially poor. The other sub-pillar where Rwanda features in the upper half is Digital Policies (51st), where ICT regulation and cybersecurity legislation are particularly encouraging and have a positive impact on the country's Competitiveness (97th). This regulatory landscape stands in stark contrast to the sub-pillar related to the Market Environment (119th), where challenges include improving access to finance and taking steps to promote an urban, productive workforce. As for Technology (104th), Rwanda demonstrates a strength in digital government services, but there is a need to raise Digital Usage (100th) among individuals and firms, which would likely contribute to greater Digital Content Creation (112th) and engagement in Industry 4.0 (96th) technologies. The country's weakest pillar is Human Capital (114th), where there is marked scope to improve Skills (111th) and raise the ability to Grow (119th) talent.

Senegal (101st) has its best performance in the pillar related to Human Capital (95th). Although the country faces a noticeable challenge to its ability

to Grow (111th) talent, the other three dimensions are among its highest-ranked sub-pillars: Attract (66th), Retain (94th), and Skills (95th). Senegal also has a relative strength with respect to Digital Policies (80th), where it benefits from good ICT regulation and an encouraging regulatory environment. However, the associated pillar—Competitiveness (98th)—would gain from greater R&D (104th) and Innovation (105th). The country's greatest challenges are in the pillars Technology (105th) and Physical Capital (109th). In the former case, the spread of mobile phones presents an opportunity to expand Digital Usage (107th). In the latter pillar, solid energy efficiency boosts its Energy Infrastructure (102nd) and comparatively high software investment contributes to its Digital Infrastructure (104th), but the overall pillar performance is primarily hampered by the poor Transport Infrastructure (114th), Senegal's weakest sub-pillar.

Nigeria (106th) makes it into the third quartile when it comes to Competitiveness (90th). Above all, it has comparatively strong showings in Innovation (78th), R&D (85th), and Digital Policies (88th), which can be partly attributed to the country's entrepreneurial activity and ICT regulation. The pool of high-level Skills (65th) and the ability to Attract (79th) make positive contributions to its Human Capital (101st), but these are offset by a weaker ability to Grow (102nd) and Retain (119th) talent. In terms of Technology (108th), Nigeria has an advantage primarily in its engagement in Industry 4.0 (84th), including AI and IoT, but there is considerable scope to expand Digital Usage (110th) and Digital Content Creation (111th). The country's lowest-ranked pillar is Physical Capital (113th), where the affordability of mobile devices is one of the main positives of the country's otherwise weak Digital Infrastructure (111th) and where two of the main challenges to improving its Energy Infrastructure (121st) are to expand access to electricity and address the frequency of electrical outages.

Conclusions

By quantifying the Digital Sprinters framework, this report is a first attempt to assess the future readiness of national economies around the world. It aims to provide them with actionable insights about how to leverage their strengths and address their weaknesses to position themselves for the future in the best way possible.

One of the key messages arising from the report is that **future readiness is highly dependent on the pace and breadth of digital transformation**. Above all, the analyses and data contained in the report highlight the importance of digital transformation for future readiness, emphasising that getting digital policies and actions right is one of the key challenges facing all types of economies. Indeed, the report convincingly demonstrates that digital infrastructure, digital technologies, and digital policies are among the dimensions of future readiness that not only exhibit the highest potential to help growth and competitiveness but that also display the greatest variation around the world. Addressing the digital divides is crucial, and it is a requirement for a sustainable global post-pandemic recovery.

The dominance of high-income countries in the rankings of the Future Readiness Economic Index (FREI) is one manifestation of the gaps that remain among countries. It is hardly a surprise that the world's three most future-ready countries—Singapore, Denmark, and Switzerland—are all high-income countries, but the dominance of richer economies extends well beyond that: every single country in the top quartile belongs to the group of high-income countries. In fact, the highest-ranked country from another income group—China—is not found until the 38th position. This conclusion alone amply justifies granting priority attention to the ways in which emerging economies (where two-thirds of the world population live) can enhance their future readiness.

The strength of high-income countries notwithstanding, it is an inescapable fact that future readiness is a continual work in progress.

Encouraging signs abound of countries being proactive in building strengths and improving weaknesses, as the current economic recovery is largely digitally driven. Thus, for instance, it is promising that the United States has made great strides towards boosting its physical capital with its recently approved infrastructure bill. Similar trends are now apparent in emerging countries, as exemplified by Digital India. These trends need to be pursued, amplified, and replicated globally. Poorer economies, however, remain handicapped by insufficient levels of talent and education in areas that will be crucial to their future.

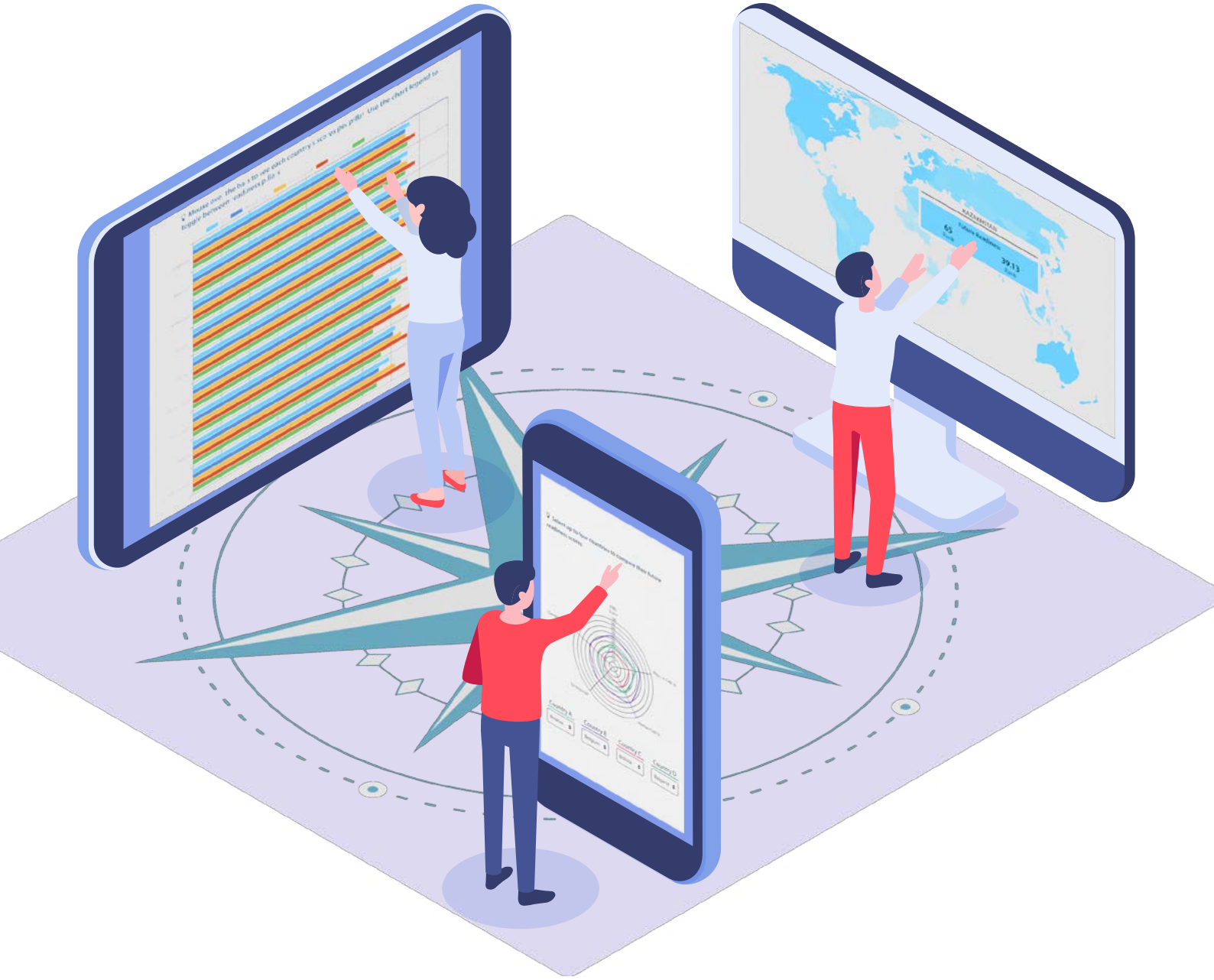
Another important conclusion stemming from this first global FREI report is that **there is no cookie-cutter approach to future readiness**. Each national economy should remain responsible for its own ability to design and pursue its own strategies. Such strategies should themselves be based on a careful consideration of local advantages and constraints, and must adequately account for local cultures, history, and aspirations. All this suggests that countries should set themselves a future readiness challenge and that digital transformation tailored to their specific circumstances should be at the heart of their individual solutions. Aligning such approaches with efforts made to address global challenges (climate change, health resilience, inequalities, for example) will help national economies to garner local and global support around them.

Whatever their respective sizes, individual national economies alone cannot generate the full benefits of being more future ready. **Global cooperation and multi-stakeholder approaches are key to enhancing collective and individual future readiness.** Metrics (such as those contained

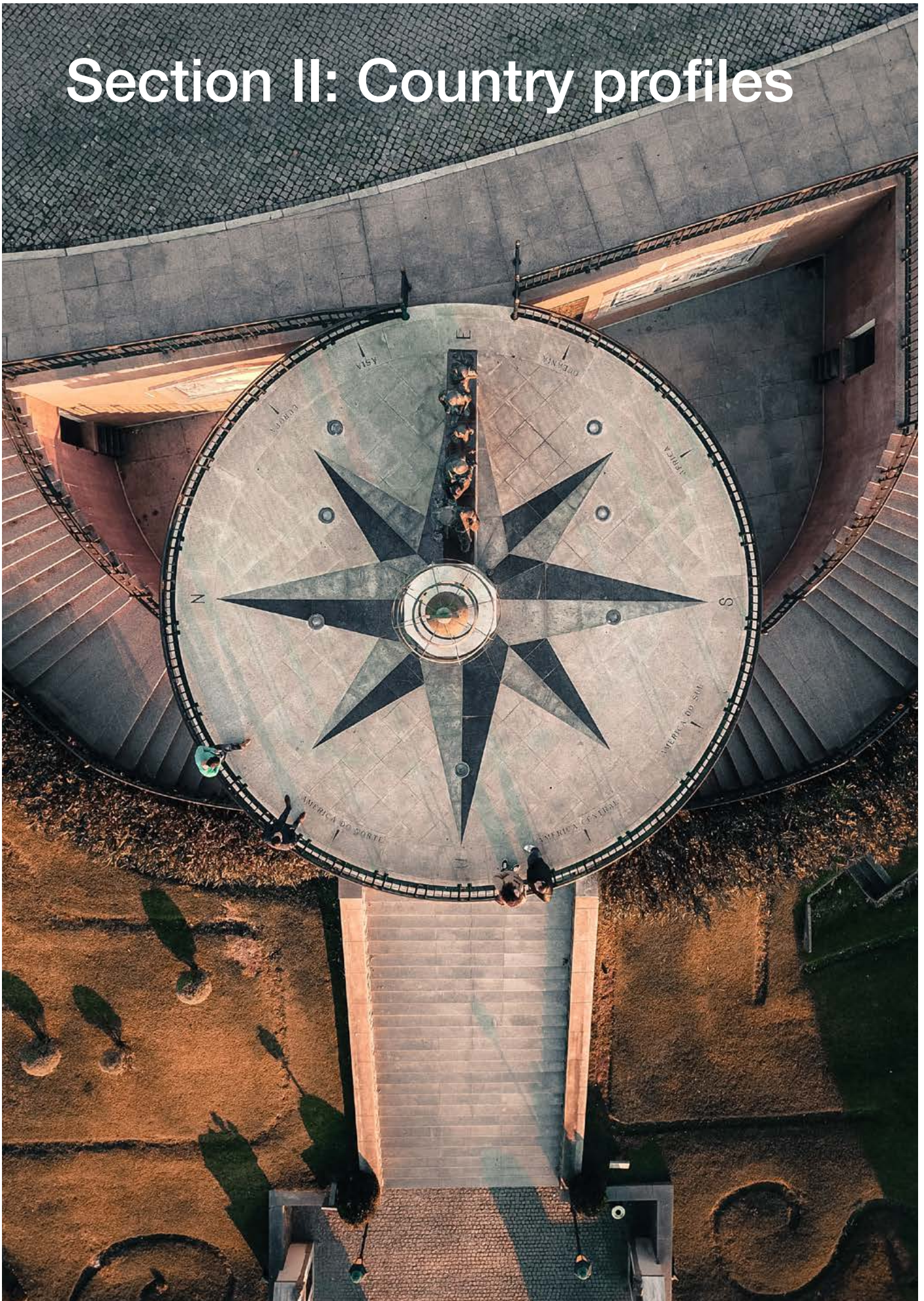
in this report) have the power to help each economy monitor its own efforts and compare its performance to that of other economies. Altogether, however, a broader approach to the merits of international cooperation (as opposed to protectionist and nationalistic rhetoric) is

now urgently required. At both the international and local levels, multi-stakeholder approaches (involving public and private entities as well as civil society) should be encouraged as a way to create a sustainable momentum of cooperation.

Further insights and information can be gathered through the online tool accompanying this report, which can be found at <https://www.portulansinstitutefrei.com/2022>



Section II: Country profiles



How to read the country profiles

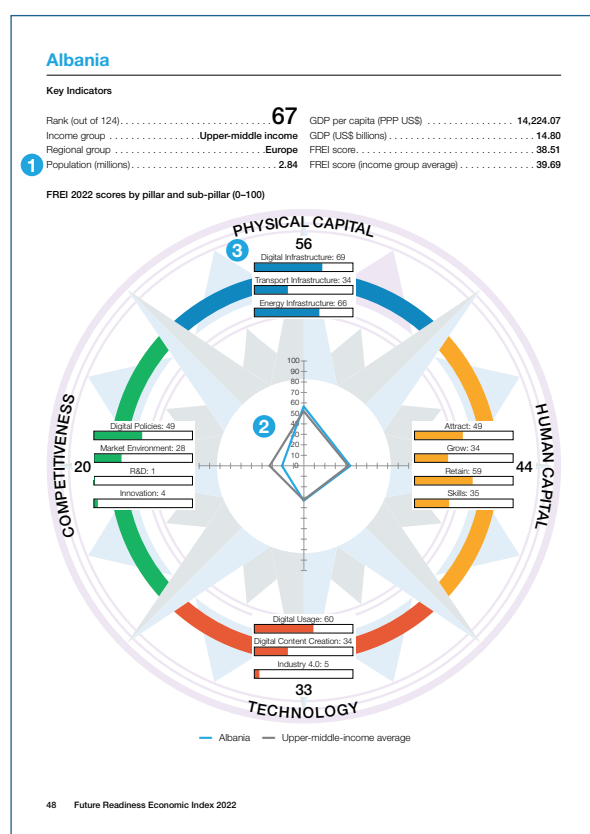
The country profiles provide more granular information on how each of the 124 countries performs in the various dimensions of the Future Readiness Economic Index (FREI).

Each country profile consists of two pages. The first page presents a country's key indicators and a visual overview of its FREI performance in the pillars and sub-pillars. The second page presents granular information on a country's performance across all pillars, sub-pillars, and indicators.

1 Each country profile begins with a summary of key indicators. More specifically, a country's FREI rank (out of 124 countries) and its overall FREI score are highlighted, and basic country statistics such as population, GDP per capita, and GDP (from the World Bank's World Development Indicators) are provided. The key indicators also include information on the country's income group and regional group, and the average FREI score of the associated income group.*

2 The visualisation on the first page has a radar chart in its centre, which depicts the particular country's performance along the four FREI pillars and its position with respect to its income group peers. The blue line plots the country's score on each of the four pillars, while the grey line represents the average scores for its corresponding income group.

3 The outer part of the visualisation on the first page shows a country's score in each of the four pillars and their associated sub-pillars. Pillar names and scores are presented in the outside rim, while sub-pillar names and scores are placed along the inside rim and also depicted with progress bar charts.



The first page of each country profile consists of three parts:

- 1 Key indicators,
- 2 Radar chart, and
- 3 Bar charts.

The results on the second page detail a country's normalised scores and ranks across all pillars, sub-pillars, and variables. The pillars are identified by a bold single digit notation (e.g., **1 PHYSICAL CAPITAL**), the sub-pillars by a two-digit notation (e.g., **1.2 Transport Infrastructure**), and the 73 indicators by a three-digit notation (e.g., **1.2.3 Air connectivity**).

For more information about the method of calculation and variable definitions, please refer to the Methodology of the Future Readiness Economic Index and the Sources and definitions, respectively, in Section III.

* The income group is based on the World Bank's Income Group Classification as of July 2021, whereas the regional affiliation is based on the United Nations' sub-regional groups.

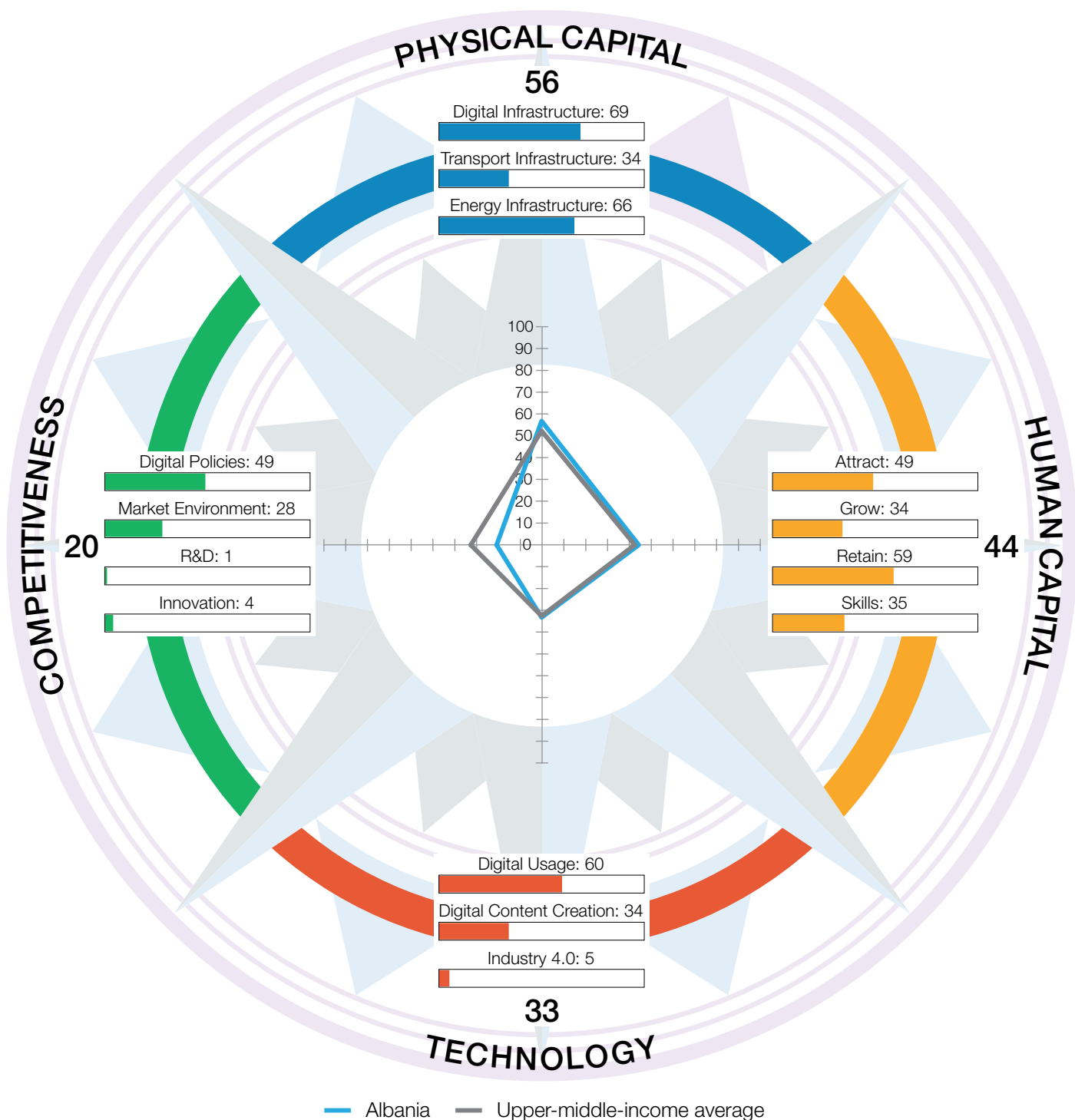
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Key Indicators

Rank (out of 124)	67	GDP per capita (PPP US\$)	14,224.07
Income group	Upper-middle income	GDP (US\$ billions)	14.80
Regional group	Europe	FREI score	38.51
Population (millions)	2.84	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



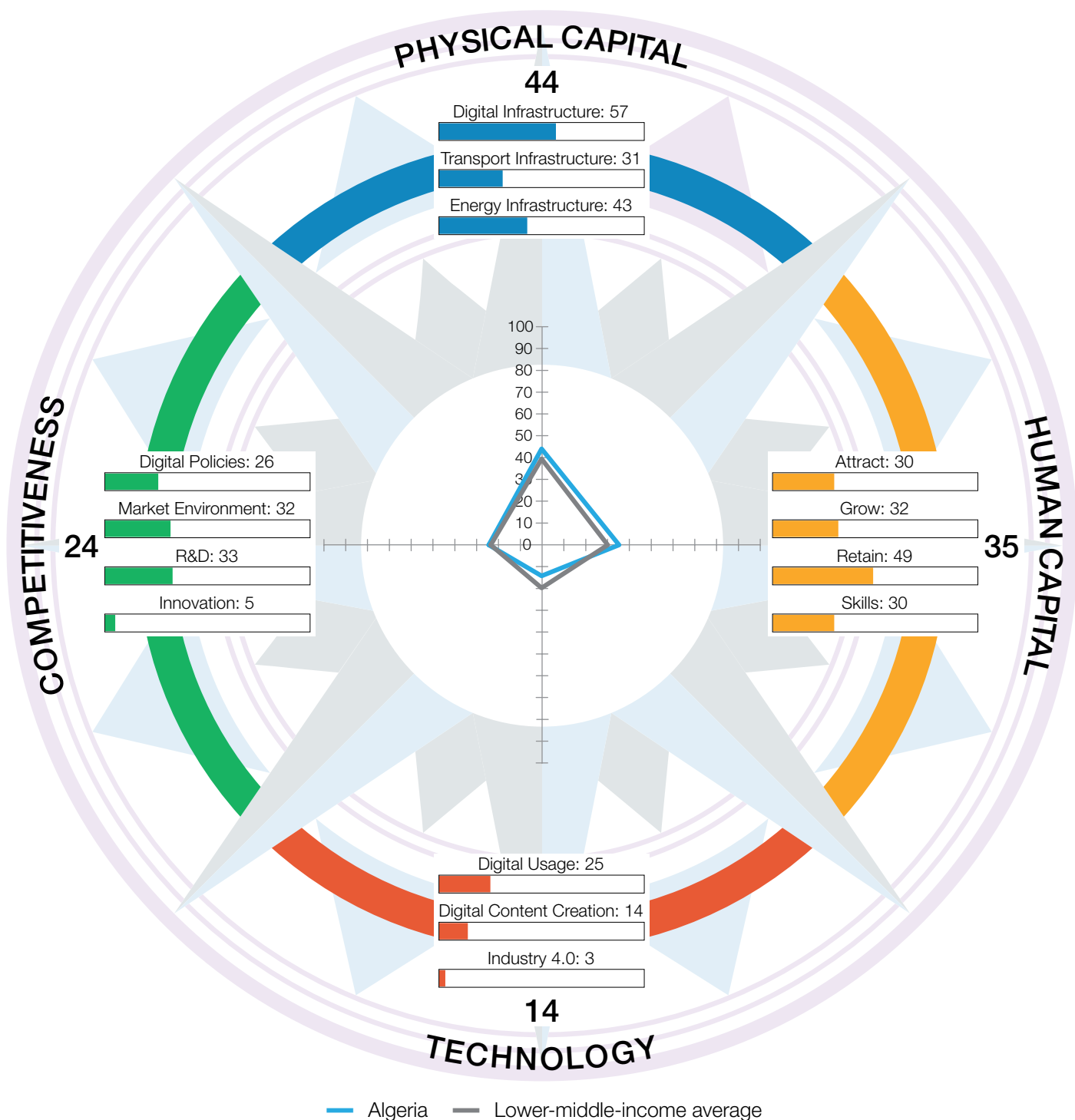
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	56.37	52	3	TECHNOLOGY	33.00	61
1.1	Digital Infrastructure	69.14	61	3.1	Digital Usage	60.25	57
1.1.1	Internet access	83.16	49	3.1.1	Internet users	70.86	69
1.1.2	International Internet bandwidth	47.65	47	3.1.2	Active mobile-broadband subscriptions	29.74	83
1.1.3	Fixed-broadband subscriptions	67.35	72	3.1.3	Gender parity in Internet usage	94.29	46
1.1.4	4G-mobile network coverage	98.38	49	3.1.4	Firms with website	56.33	53
1.1.5	Fixed broadband affordability	97.47	41	3.1.5	Internet shopping	8.51	75
1.1.6	Mobile broadband affordability	81.02	60	3.1.6	Government online services	80.30	31
1.1.7	Computer software spending	8.96	84	3.1.7	E-Participation	81.68	36
1.2	Transport Infrastructure	34.45	59	3.2	Digital Content Creation	33.93	56
1.2.1	Quality of infrastructure	25.98	101	3.2.1	GitHub commits	3.29	66
1.2.2	Rural access	84.73	37	3.2.2	Wikipedia edits	57.44	52
1.2.3	Air connectivity	6.78	64	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	70.57	64
1.3	Energy Infrastructure	65.51	19	3.3	Industry 4.0	4.84	78
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	2.75	96
1.3.3	Electrical outages	78.98	58	3.3.3	AI research	2.18	79
1.3.4	Energy intensity	90.10	15	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	44.23	61	4	COMPETITIVENESS	20.44	101
2.1	Attract	48.78	50	4.1	Digital Policies	48.73	71
2.1.1	Brain gain	38.78	83	4.1.1	ICT regulation	84.13	44
2.1.2	International students	4.53	78	4.1.2	Cybersecurity	63.52	86
2.1.3	Tolerance of minorities	61.70	37	4.1.3	Rule of law	27.33	79
2.1.4	Tolerance of immigrants	40.00	95	4.1.4	Regulatory quality	46.28	58
2.1.5	Gender parity in high-skilled jobs	80.73	48	4.1.5	Corruption	22.39	80
2.1.6	FDI and technology transfer	66.94	28	4.2	Market Environment	27.59	90
2.2	Grow	34.34	71	4.2.1	Extent of market dominance	21.07	112
2.2.1	Tertiary enrolment	38.58	55	4.2.2	Labour productivity	21.50	67
2.2.2	Reading, maths, and science	34.98	53	4.2.3	Urbanisation	52.52	70
2.2.3	Use of virtual professional networks	20.58	51	4.2.4	Domestic credit to private sector	15.25	78
2.2.4	Formal and non-formal studies	12.27	47	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	65.30	78	4.3	R&D	1.23	116
2.3	Retain	58.76	55	4.3.1	R&D spending	n/a	n/a
2.3.1	Pension coverage	76.53	59	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	41.64	58	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	20.20	74	4.3.4	Scientific journal articles	2.47	82
2.3.4	Sanitation	97.54	46	4.4	Innovation	4.19	117
2.3.5	Personal safety	57.91	54	4.4.1	Medium- and high-tech industry	5.76	109
2.4	Skills	35.04	59	4.4.2	High-tech exports	0.07	122
2.4.1	Workforce with tertiary education	48.13	26	4.4.3	Venture capital recipients, deals	8.44	50
2.4.2	High-skilled workforce	25.50	82	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	6.29	61
2.4.4	Ease of finding skilled employees	51.53	68	4.4.6	Patent applications	0.42	84
2.4.5	Digital skills	14.99	58				

Algeria

Key Indicators

Rank (out of 124)	94	GDP per capita (PPP US\$)	11,997.34
Income group	Lower-middle income	GDP (US\$ billions)	145.16
Regional group	Middle East and North Africa	FREI score	29.28
Population (millions)	43.85	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)

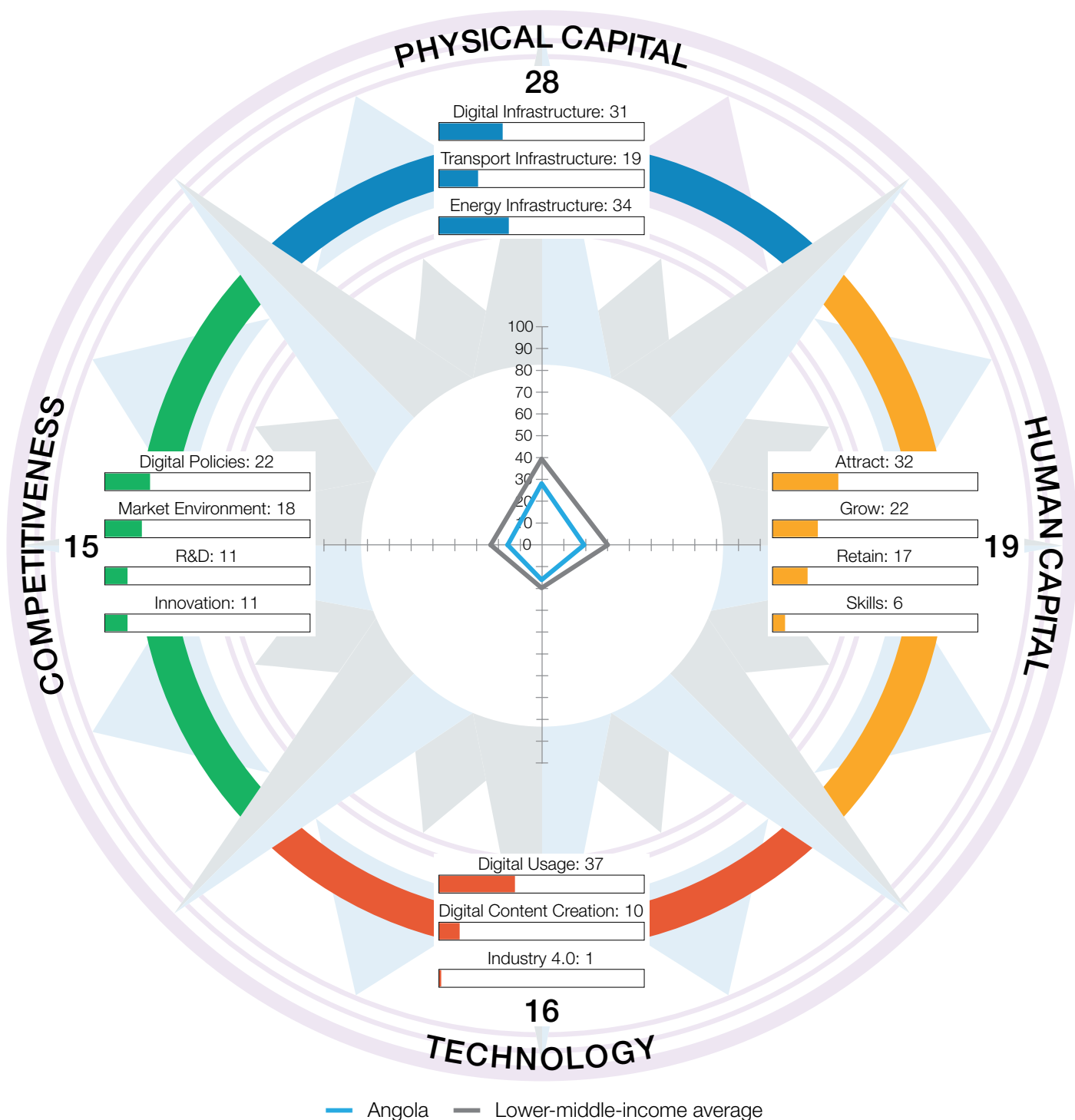


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	43.68	87	3	TECHNOLOGY	14.13	106
1.1	Digital Infrastructure	56.62	84	3.1	Digital Usage	25.49	108
1.1.1	Internet access	74.11	65	3.1.1	Internet users	46.52	90
1.1.2	International Internet bandwidth	37.29	88	3.1.2	Active mobile-broadband subscriptions	39.35	55
1.1.3	Fixed-broadband subscriptions	31.99	93	3.1.3	Gender parity in Internet usage	53.26	92
1.1.4	4G-mobile network coverage	76.18	91	3.1.4	Firms with website	n/a	n/a
1.1.5	Fixed broadband affordability	90.81	83	3.1.5	Internet shopping	3.56	99
1.1.6	Mobile broadband affordability	85.53	44	3.1.6	Government online services	10.22	120
1.1.7	Computer software spending	0.43	118	3.1.7	E-Participation	0.00	124
1.2	Transport Infrastructure	31.17	67	3.2	Digital Content Creation	14.08	108
1.2.1	Quality of infrastructure	30.60	91	3.2.1	GitHub commits	0.33	107
1.2.2	Rural access	69.21	60	3.2.2	Wikipedia edits	27.64	97
1.2.3	Air connectivity	1.92	91	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	28.12	113
1.3	Energy Infrastructure	43.26	99	3.3	Industry 4.0	2.81	95
1.3.1	Access to electricity	99.44	84	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	5.19	84
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	1.60	84
1.3.4	Energy intensity	66.44	88	3.3.4	ICT patent applications	0.04	70
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	35.30	85	4	COMPETITIVENESS	23.99	89
2.1	Attract	30.08	117	4.1	Digital Policies	25.60	110
2.1.1	Brain gain	28.02	98	4.1.1	ICT regulation	53.84	105
2.1.2	International students	1.42	92	4.1.2	Cybersecurity	32.46	104
2.1.3	Tolerance of minorities	28.72	86	4.1.3	Rule of law	14.75	106
2.1.4	Tolerance of immigrants	38.46	96	4.1.4	Regulatory quality	4.57	122
2.1.5	Gender parity in high-skilled jobs	61.22	81	4.1.5	Corruption	22.39	80
2.1.6	FDI and technology transfer	22.66	107	4.2	Market Environment	32.26	70
2.2	Grow	31.94	76	4.2.1	Extent of market dominance	55.97	42
2.2.1	Tertiary enrolment	34.99	60	4.2.2	Labour productivity	27.24	59
2.2.2	Reading, maths, and science	11.28	74	4.2.3	Urbanisation	67.25	48
2.2.3	Use of virtual professional networks	8.74	81	4.2.4	Domestic credit to private sector	10.84	91
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	0.00	79
2.2.5	Youth inclusion	72.74	68	4.3	R&D	33.32	49
2.3	Retain	48.91	76	4.3.1	R&D spending	10.76	58
2.3.1	Pension coverage	n/a	n/a	4.3.2	University ranking	32.00	60
2.3.2	Environmental performance	34.32	72	4.3.3	Gender parity in R&D	85.62	19
2.3.3	Physician density	21.10	73	4.3.4	Scientific journal articles	4.90	75
2.3.4	Sanitation	86.61	77	4.4	Innovation	4.79	115
2.3.5	Personal safety	53.63	63	4.4.1	Medium- and high-tech industry	3.03	117
2.4	Skills	30.28	74	4.4.2	High-tech exports	1.54	110
2.4.1	Workforce with tertiary education	27.41	63	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	24.65	83	4.4.4	New product entrepreneurial activity	17.57	81
2.4.3	Researchers	10.01	52	4.4.5	New business density	1.33	99
2.4.4	Ease of finding skilled employees	49.78	74	4.4.6	Patent applications	0.47	81
2.4.5	Digital skills	39.57	25				

Key Indicators

Rank (out of 124)	115	GDP per capita (PPP US\$)	6,905.65
Income group	Lower-middle income	GDP (US\$ billions)	62.31
Regional group	Sub-Saharan Africa	FREI score	19.65
Population (millions)	32.87	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



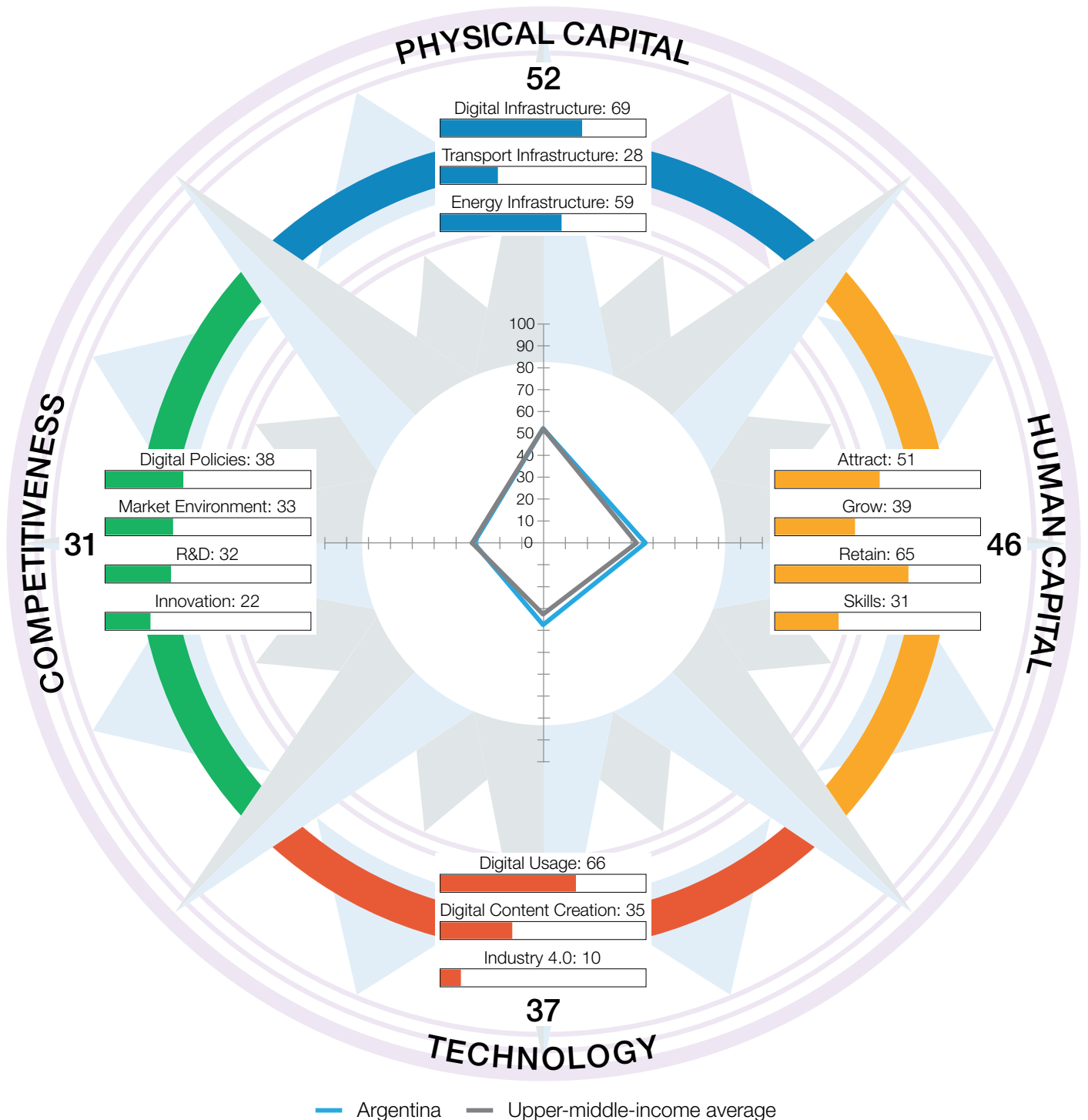
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	27.95	111	3	TECHNOLOGY	15.93	101
1.1	Digital Infrastructure	31.27	108	3.1	Digital Usage	37.43	93
1.1.1	Internet access	5.14	112	3.1.1	Internet users	28.64	100
1.1.2	International Internet bandwidth	16.41	119	3.1.2	Active mobile-broadband subscriptions	7.38	117
1.1.3	Fixed-broadband subscriptions	8.84	108	3.1.3	Gender parity in Internet usage	79.45	79
1.1.4	4G-mobile network coverage	20.73	118	3.1.4	Firms with website	n/a	n/a
1.1.5	Fixed broadband affordability	80.07	97	3.1.5	Internet shopping	n/a	n/a
1.1.6	Mobile broadband affordability	56.45	102	3.1.6	Government online services	36.49	104
1.1.7	Computer software spending	n/a	n/a	3.1.7	E-Participation	35.21	104
1.2	Transport Infrastructure	18.58	104	3.2	Digital Content Creation	9.61	119
1.2.1	Quality of infrastructure	10.68	122	3.2.1	GitHub commits	0.08	116
1.2.2	Rural access	28.47	109	3.2.2	Wikipedia edits	15.25	117
1.2.3	Air connectivity	0.43	109	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	23.11	117
1.3	Energy Infrastructure	34.00	113	3.3	Industry 4.0	0.76	117
1.3.1	Access to electricity	38.82	112	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	0.52	114
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	0.03	120
1.3.4	Energy intensity	85.80	32	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	19.33	121	4	COMPETITIVENESS	15.40	113
2.1	Attract	31.62	115	4.1	Digital Policies	21.84	116
2.1.1	Brain gain	44.54	71	4.1.1	ICT regulation	64.91	87
2.1.2	International students	n/a	n/a	4.1.2	Cybersecurity	11.03	121
2.1.3	Tolerance of minorities	19.15	101	4.1.3	Rule of law	9.29	116
2.1.4	Tolerance of immigrants	46.15	85	4.1.4	Regulatory quality	15.02	118
2.1.5	Gender parity in high-skilled jobs	33.35	107	4.1.5	Corruption	8.96	112
2.1.6	FDI and technology transfer	14.93	116	4.2	Market Environment	17.51	109
2.2	Grow	22.28	104	4.2.1	Extent of market dominance	0.00	121
2.2.1	Tertiary enrolment	5.77	108	4.2.2	Labour productivity	8.87	92
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	58.74	63
2.2.3	Use of virtual professional networks	2.77	110	4.2.4	Domestic credit to private sector	2.45	116
2.2.4	Formal and non-formal studies	18.48	45	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	62.12	83	4.3	R&D	11.00	102
2.3	Retain	16.93	112	4.3.1	R&D spending	0.40	102
2.3.1	Pension coverage	12.76	101	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	8.01	115	4.3.3	Gender parity in R&D	43.61	63
2.3.3	Physician density	2.24	103	4.3.4	Scientific journal articles	0.00	124
2.3.4	Sanitation	45.92	104	4.4	Innovation	11.25	89
2.3.5	Personal safety	15.70	119	4.4.1	Medium- and high-tech industry	3.88	115
2.4	Skills	6.47	122	4.4.2	High-tech exports	9.28	73
2.4.1	Workforce with tertiary education	3.75	113	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	13.10	104	4.4.4	New product entrepreneurial activity	31.86	63
2.4.3	Researchers	0.07	96	4.4.5	New business density	n/a	n/a
2.4.4	Ease of finding skilled employees	8.94	120	4.4.6	Patent applications	0.00	96
2.4.5	Digital skills	n/a	n/a				

Argentina

Key Indicators

Rank (out of 124)	58	GDP per capita (PPP US\$)	22,996.99
Income group	Upper-middle income	GDP (US\$ billions)	383.07
Regional group	Latin America and the Caribbean	FREI score	41.70
Population (millions)	45.38	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)

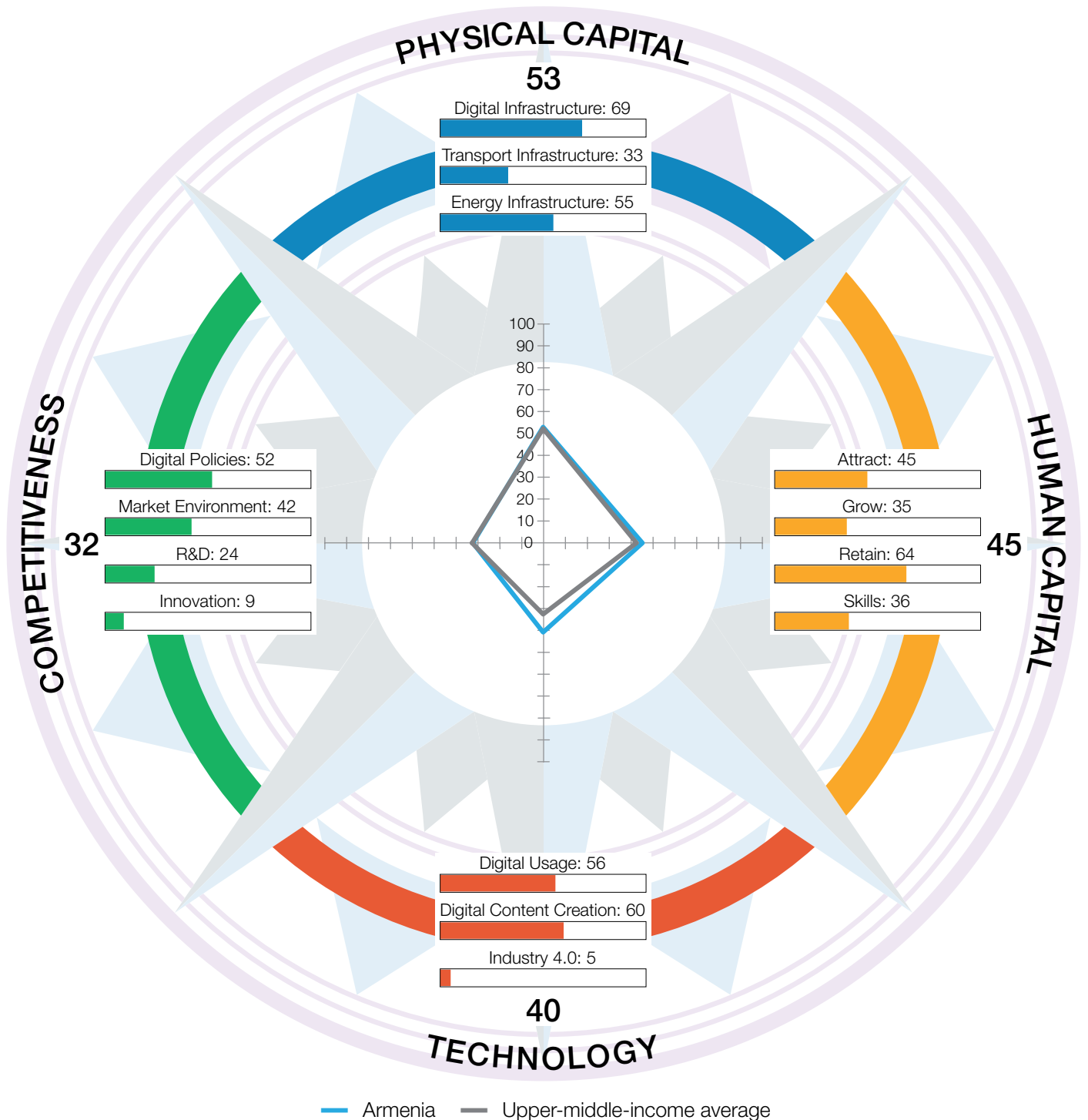


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	51.87	69	3	TECHNOLOGY	37.07	51
1.1	Digital Infrastructure	68.61	63	3.1	Digital Usage	66.48	45
1.1.1	Internet access	90.01	32	3.1.1	Internet users	84.78	38
1.1.2	International Internet bandwidth	39.29	84	3.1.2	Active mobile-broadband subscriptions	34.82	70
1.1.3	Fixed-broadband subscriptions	68.87	71	3.1.3	Gender parity in Internet usage	95.31	42
1.1.4	4G-mobile network coverage	97.68	58	3.1.4	Firms with website	67.82	37
1.1.5	Fixed broadband affordability	84.05	90	3.1.5	Internet shopping	18.52	60
1.1.6	Mobile broadband affordability	80.52	65	3.1.6	Government online services	81.03	30
1.1.7	Computer software spending	19.84	61	3.1.7	E-Participation	83.09	29
1.2	Transport Infrastructure	28.13	83	3.2	Digital Content Creation	35.24	52
1.2.1	Quality of infrastructure	43.06	61	3.2.1	GitHub commits	8.21	50
1.2.2	Rural access	45.88	91	3.2.2	Wikipedia edits	56.30	53
1.2.3	Air connectivity	3.51	85	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	72.83	56
1.3	Energy Infrastructure	58.86	54	3.3	Industry 4.0	9.50	50
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	5.17	40
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	9.91	60
1.3.3	Electrical outages	86.53	43	3.3.3	AI research	4.32	65
1.3.4	Energy intensity	83.22	41	3.3.4	ICT patent applications	0.10	67
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	46.41	53	4	COMPETITIVENESS	31.43	70
2.1	Attract	51.04	42	4.1	Digital Policies	38.09	96
2.1.1	Brain gain	25.59	105	4.1.1	ICT regulation	61.78	94
2.1.2	International students	9.28	59	4.1.2	Cybersecurity	49.00	94
2.1.3	Tolerance of minorities	64.89	33	4.1.3	Rule of law	24.02	87
2.1.4	Tolerance of immigrants	83.08	20	4.1.4	Regulatory quality	24.33	97
2.1.5	Gender parity in high-skilled jobs	95.96	16	4.1.5	Corruption	31.34	60
2.1.6	FDI and technology transfer	27.43	100	4.2	Market Environment	33.46	68
2.2	Grow	39.23	56	4.2.1	Extent of market dominance	39.88	78
2.2.1	Tertiary enrolment	64.06	6	4.2.2	Labour productivity	29.62	54
2.2.2	Reading, maths, and science	24.86	66	4.2.3	Urbanisation	90.27	9
2.2.3	Use of virtual professional networks	27.99	35	4.2.4	Domestic credit to private sector	4.30	108
2.2.4	Formal and non-formal studies	8.59	50	4.2.5	Market capitalisation	3.25	73
2.2.5	Youth inclusion	70.63	71	4.3	R&D	32.41	51
2.3	Retain	64.61	45	4.3.1	R&D spending	9.76	64
2.3.1	Pension coverage	89.59	52	4.3.2	University ranking	20.32	79
2.3.2	Environmental performance	47.21	51	4.3.3	Gender parity in R&D	91.72	10
2.3.3	Physician density	49.57	28	4.3.4	Scientific journal articles	7.85	61
2.3.4	Sanitation	93.81	59	4.4	Innovation	21.74	51
2.3.5	Personal safety	42.88	80	4.4.1	Medium- and high-tech industry	33.87	53
2.4	Skills	30.78	72	4.4.2	High-tech exports	8.37	80
2.4.1	Workforce with tertiary education	28.40	60	4.4.3	Venture capital recipients, deals	1.46	85
2.4.2	High-skilled workforce	25.59	81	4.4.4	New product entrepreneurial activity	64.35	16
2.4.3	Researchers	14.88	47	4.4.5	New business density	0.67	105
2.4.4	Ease of finding skilled employees	54.24	64	4.4.6	Patent applications	n/a	n/a
2.4.5	Digital skills	n/a	n/a				

Key Indicators

Rank (out of 124)	55	GDP per capita (PPP US\$)	14,231.18
Income group	Upper-middle income	GDP (US\$ billions)	12.65
Regional group	Middle East and North Africa	FREI score	42.48
Population (millions)	2.96	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



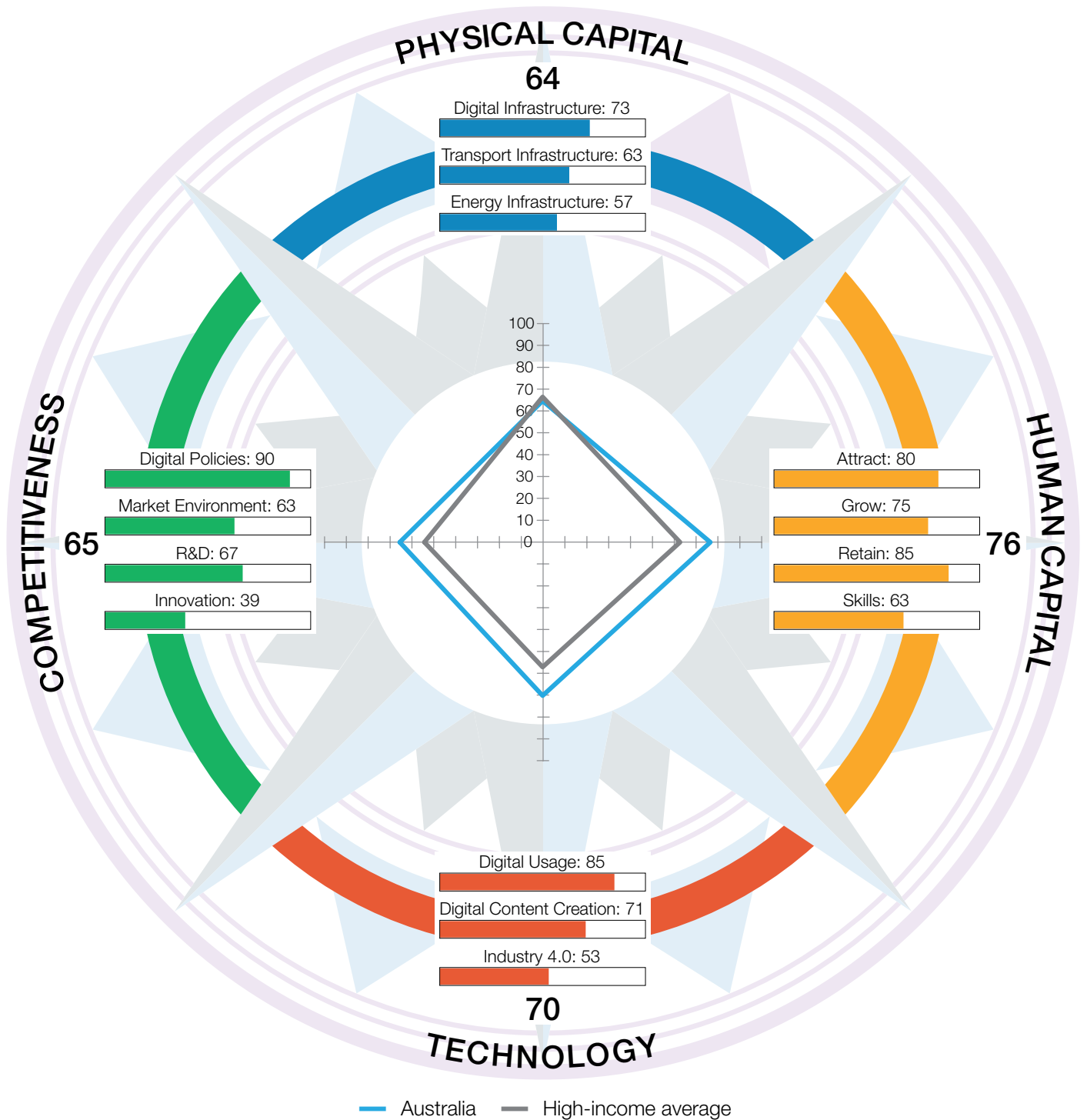
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	52.59	67	3	TECHNOLOGY	40.45	41
1.1	Digital Infrastructure	69.31	60	3.1	Digital Usage	56.31	67
1.1.1	Internet access	76.14	61	3.1.1	Internet users	64.89	79
1.1.2	International Internet bandwidth	61.56	13	3.1.2	Active mobile-broadband subscriptions	36.13	68
1.1.3	Fixed-broadband subscriptions	60.26	76	3.1.3	Gender parity in Internet usage	95.50	40
1.1.4	4G-mobile network coverage	100.00	1	3.1.4	Firms with website	53.55	57
1.1.5	Fixed broadband affordability	93.22	75	3.1.5	Internet shopping	10.88	68
1.1.6	Mobile broadband affordability	82.22	57	3.1.6	Government online services	62.77	68
1.1.7	Computer software spending	11.74	80	3.1.7	E-Participation	70.42	56
1.2	Transport Infrastructure	33.24	63	3.2	Digital Content Creation	59.57	24
1.2.1	Quality of infrastructure	32.74	82	3.2.1	GitHub commits	8.34	49
1.2.2	Rural access	87.05	35	3.2.2	Wikipedia edits	94.22	2
1.2.3	Air connectivity	7.68	61	3.2.3	Internet domain registrations	n/a	n/a
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	76.16	48
1.3	Energy Infrastructure	55.23	78	3.3	Industry 4.0	5.48	71
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	12.85	52
1.3.3	Electrical outages	71.22	65	3.3.3	AI research	2.69	74
1.3.4	Energy intensity	82.10	47	3.3.4	ICT patent applications	0.00	74
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	45.06	58	4	COMPETITIVENESS	31.81	68
2.1	Attract	45.37	62	4.1	Digital Policies	51.63	64
2.1.1	Brain gain	40.03	79	4.1.1	ICT regulation	84.86	38
2.1.2	International students	15.72	42	4.1.2	Cybersecurity	49.36	93
2.1.3	Tolerance of minorities	48.94	55	4.1.3	Rule of law	35.53	61
2.1.4	Tolerance of immigrants	56.92	69	4.1.4	Regulatory quality	46.64	57
2.1.5	Gender parity in high-skilled jobs	70.78	70	4.1.5	Corruption	41.79	47
2.1.6	FDI and technology transfer	39.81	78	4.2	Market Environment	42.20	46
2.2	Grow	35.25	64	4.2.1	Extent of market dominance	59.18	36
2.2.1	Tertiary enrolment	33.85	63	4.2.2	Labour productivity	22.55	66
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	55.91	67
2.2.3	Use of virtual professional networks	10.51	74	4.2.4	Domestic credit to private sector	31.15	46
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	61.39	90	4.3	R&D	24.45	71
2.3	Retain	63.63	47	4.3.1	R&D spending	3.57	84
2.3.1	Pension coverage	64.49	67	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	47.39	50	4.3.3	Gender parity in R&D	87.22	16
2.3.3	Physician density	54.74	19	4.3.4	Scientific journal articles	7.00	64
2.3.4	Sanitation	93.14	61	4.4	Innovation	8.96	101
2.3.5	Personal safety	58.42	50	4.4.1	Medium- and high-tech industry	5.71	110
2.4	Skills	35.98	56	4.4.2	High-tech exports	15.73	51
2.4.1	Workforce with tertiary education	17.25	86	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	44.41	49	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	12.79	44
2.4.4	Ease of finding skilled employees	46.29	81	4.4.6	Patent applications	1.60	63
2.4.5	Digital skills	n/a	n/a				

Australia

Key Indicators

Rank (out of 124)	11	GDP per capita (PPP US\$)	52,203.13
Income group	High income	GDP (US\$ billions)	1,330.90
Regional group	Asia and Pacific	FREI score	68.68
Population (millions)	25.69	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



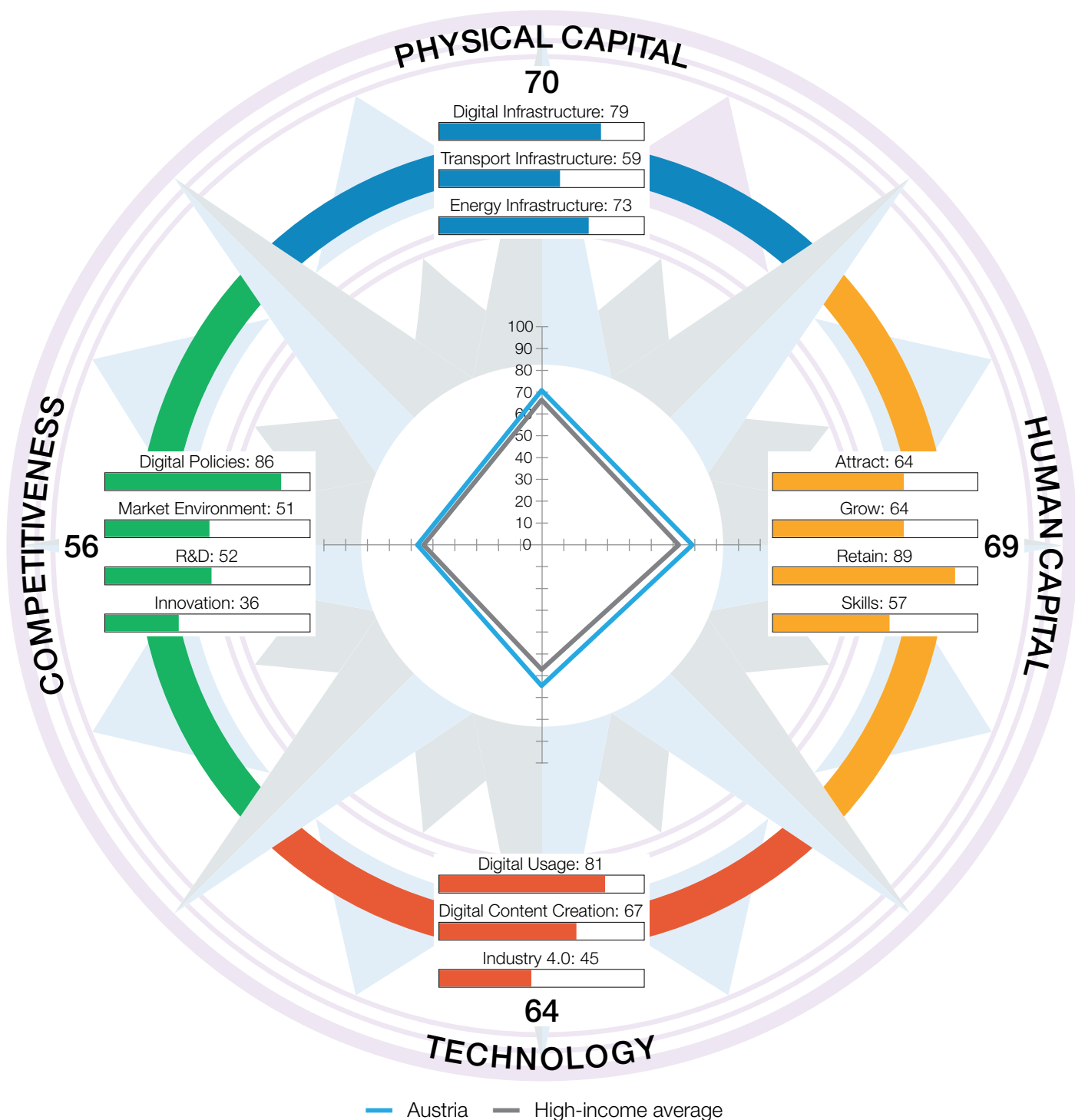
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	64.18	28	3	TECHNOLOGY	69.63	12
1.1	Digital Infrastructure	72.77	50	3.1	Digital Usage	85.22	12
1.1.1	Internet access	86.05	40	3.1.1	Internet users	85.88	36
1.1.2	International Internet bandwidth	44.62	62	3.1.2	Active mobile-broadband subscriptions	55.62	12
1.1.3	Fixed-broadband subscriptions	75.82	67	3.1.3	Gender parity in Internet usage	97.83	23
1.1.4	4G-mobile network coverage	99.40	34	3.1.4	Firms with website	81.20	18
1.1.5	Fixed broadband affordability	98.03	34	3.1.5	Internet shopping	86.81	10
1.1.6	Mobile broadband affordability	84.95	48	3.1.6	Government online services	93.44	7
1.1.7	Computer software spending	20.51	59	3.1.7	E-Participation	95.78	9
1.2	Transport Infrastructure	62.61	12	3.2	Digital Content Creation	71.01	14
1.2.1	Quality of infrastructure	85.77	15	3.2.1	GitHub commits	61.22	13
1.2.2	Rural access	81.00	41	3.2.2	Wikipedia edits	79.36	20
1.2.3	Air connectivity	49.74	14	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	93.84	15
1.3	Energy Infrastructure	57.16	69	3.3	Industry 4.0	52.65	14
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	21.92	23
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	59.15	12
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	81.49	3
1.3.4	Energy intensity	74.44	71	3.3.4	ICT patent applications	22.54	21
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	76.14	1	4	COMPETITIVENESS	64.79	9
2.1	Attract	80.46	4	4.1	Digital Policies	90.23	7
2.1.1	Brain gain	73.58	17	4.1.1	ICT regulation	93.51	11
2.1.2	International students	75.74	4	4.1.2	Cybersecurity	97.41	17
2.1.3	Tolerance of minorities	72.34	22	4.1.3	Rule of law	87.25	13
2.1.4	Tolerance of immigrants	93.85	6	4.1.4	Regulatory quality	89.39	5
2.1.5	Gender parity in high-skilled jobs	94.95	19	4.1.5	Corruption	83.58	11
2.1.6	FDI and technology transfer	72.32	20	4.2	Market Environment	63.18	14
2.2	Grow	75.39	4	4.2.1	Extent of market dominance	56.82	40
2.2.1	Tertiary enrolment	77.94	2	4.2.2	Labour productivity	62.81	20
2.2.2	Reading, maths, and science	67.32	19	4.2.3	Urbanisation	83.26	22
2.2.3	Use of virtual professional networks	66.26	5	4.2.4	Domestic credit to private sector	64.48	11
2.2.4	Formal and non-formal studies	74.32	12	4.2.5	Market capitalisation	48.54	12
2.2.5	Youth inclusion	91.09	18	4.3	R&D	66.84	5
2.3	Retain	85.46	12	4.3.1	R&D spending	37.78	20
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	77.27	8
2.3.2	Environmental performance	86.76	13	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	46.68	32	4.3.4	Scientific journal articles	85.46	4
2.3.4	Sanitation	99.99	11	4.4	Innovation	38.91	22
2.3.5	Personal safety	93.90	6	4.4.1	Medium- and high-tech industry	34.75	50
2.4	Skills	63.25	16	4.4.2	High-tech exports	34.58	18
2.4.1	Workforce with tertiary education	46.44	30	4.4.3	Venture capital recipients, deals	25.34	19
2.4.2	High-skilled workforce	75.66	16	4.4.4	New product entrepreneurial activity	56.07	30
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	61.28	8
2.4.4	Ease of finding skilled employees	67.64	40	4.4.6	Patent applications	21.47	25
2.4.5	Digital skills	n/a	n/a				

Austria

Key Indicators

Rank (out of 124)	16	GDP per capita (PPP US\$)	58,649.67
Income group	High income	GDP (US\$ billions)	430.95
Regional group	Europe	FREI score	64.86
Population (millions)	8.92	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



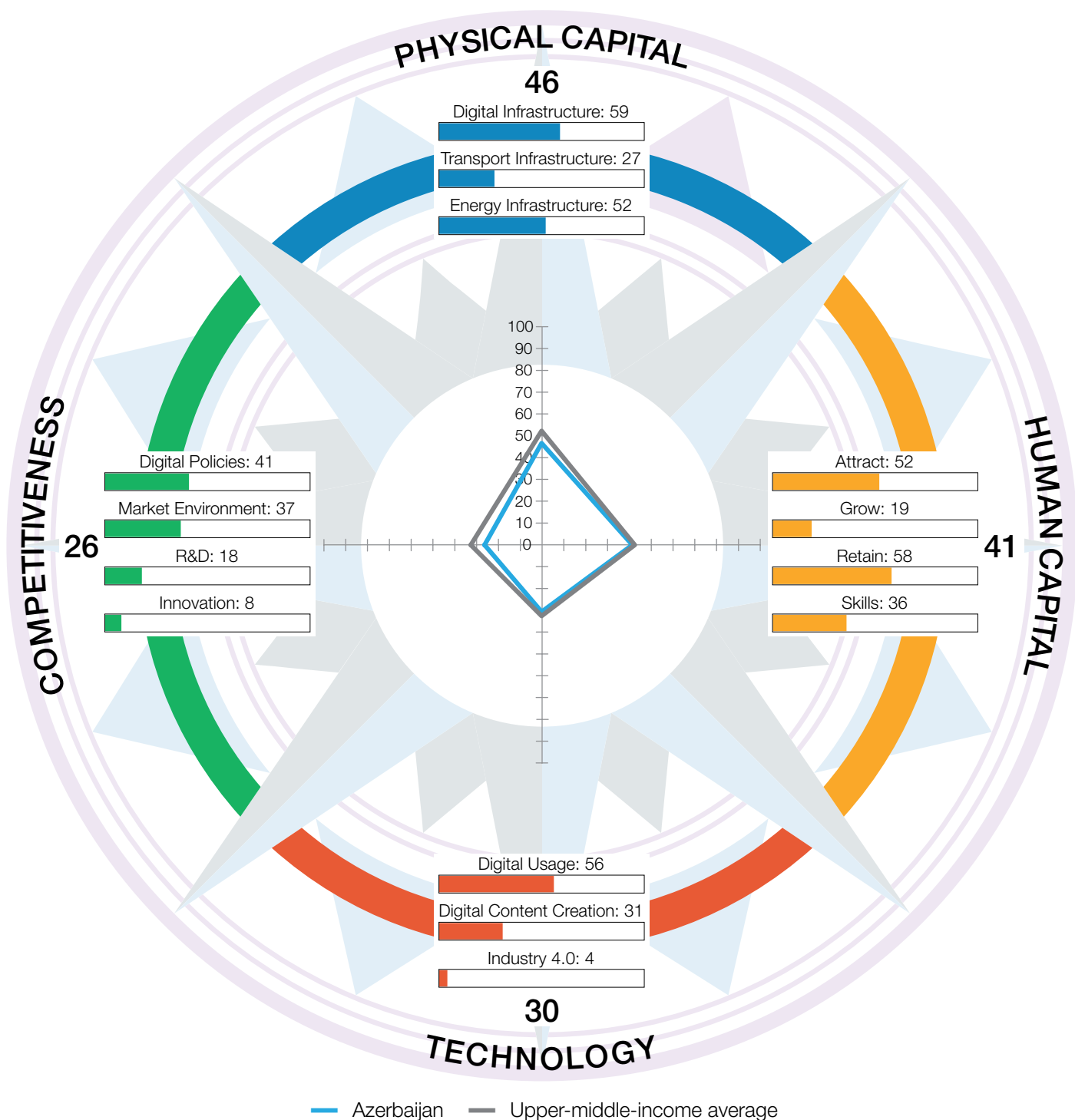
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	70.36	13	3	TECHNOLOGY	64.06	15
1.1	Digital Infrastructure	79.50	27	3.1	Digital Usage	80.92	16
1.1.1	Internet access	90.42	29	3.1.1	Internet users	86.91	31
1.1.2	International Internet bandwidth	41.72	75	3.1.2	Active mobile-broadband subscriptions	46.79	30
1.1.3	Fixed-broadband subscriptions	83.62	54	3.1.3	Gender parity in Internet usage	92.15	55
1.1.4	4G-mobile network coverage	98.00	53	3.1.4	Firms with website	93.36	5
1.1.5	Fixed broadband affordability	99.03	11	3.1.5	Internet shopping	56.59	29
1.1.6	Mobile broadband affordability	97.36	3	3.1.6	Government online services	93.44	7
1.1.7	Computer software spending	46.33	16	3.1.7	E-Participation	97.18	6
1.2	Transport Infrastructure	58.99	16	3.2	Digital Content Creation	66.56	17
1.2.1	Quality of infrastructure	93.24	5	3.2.1	GitHub commits	44.48	21
1.2.2	Rural access	91.27	27	3.2.2	Wikipedia edits	77.05	24
1.2.3	Air connectivity	33.79	21	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	100.00	1
1.3	Energy Infrastructure	72.58	6	3.3	Industry 4.0	44.70	16
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	51.73	11
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	37.17	20
1.3.3	Electrical outages	97.82	4	3.3.3	AI research	50.34	15
1.3.4	Energy intensity	87.69	25	3.3.4	ICT patent applications	29.47	18
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	68.59	17	4	COMPETITIVENESS	56.45	22
2.1	Attract	64.14	24	4.1	Digital Policies	86.44	14
2.1.1	Brain gain	59.33	32	4.1.1	ICT regulation	86.30	36
2.1.2	International students	47.06	10	4.1.2	Cybersecurity	93.75	36
2.1.3	Tolerance of minorities	63.83	34	4.1.3	Rule of law	92.00	7
2.1.4	Tolerance of immigrants	66.15	48	4.1.4	Regulatory quality	78.05	17
2.1.5	Gender parity in high-skilled jobs	90.51	31	4.1.5	Corruption	82.09	14
2.1.6	FDI and technology transfer	57.96	46	4.2	Market Environment	51.31	30
2.2	Grow	63.74	15	4.2.1	Extent of market dominance	84.04	6
2.2.1	Tertiary enrolment	57.99	16	4.2.2	Labour productivity	69.48	11
2.2.2	Reading, maths, and science	64.07	27	4.2.3	Urbanisation	50.10	74
2.2.3	Use of virtual professional networks	22.90	45	4.2.4	Domestic credit to private sector	41.47	31
2.2.4	Formal and non-formal studies	81.13	7	4.2.5	Market capitalisation	11.45	46
2.2.5	Youth inclusion	92.61	15	4.3	R&D	52.37	17
2.3	Retain	89.04	2	4.3.1	R&D spending	64.89	6
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	57.35	18
2.3.2	Environmental performance	94.95	6	4.3.3	Gender parity in R&D	31.55	78
2.3.3	Physician density	64.88	9	4.3.4	Scientific journal articles	55.67	17
2.3.4	Sanitation	99.97	12	4.4	Innovation	35.68	26
2.3.5	Personal safety	85.41	17	4.4.1	Medium- and high-tech industry	56.97	20
2.4	Skills	57.45	21	4.4.2	High-tech exports	18.47	41
2.4.1	Workforce with tertiary education	43.64	34	4.4.3	Venture capital recipients, deals	10.45	40
2.4.2	High-skilled workforce	68.47	25	4.4.4	New product entrepreneurial activity	75.31	10
2.4.3	Researchers	71.03	8	4.4.5	New business density	2.59	85
2.4.4	Ease of finding skilled employees	61.75	52	4.4.6	Patent applications	50.29	11
2.4.5	Digital skills	42.34	23				

Azerbaijan

Key Indicators

Rank (out of 124)	77	GDP per capita (PPP US\$)	15,010.39
Income group	Upper-middle income	GDP (US\$ billions)	42.61
Regional group	Middle East and North Africa	FREI score	35.97
Population (millions)	10.11	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



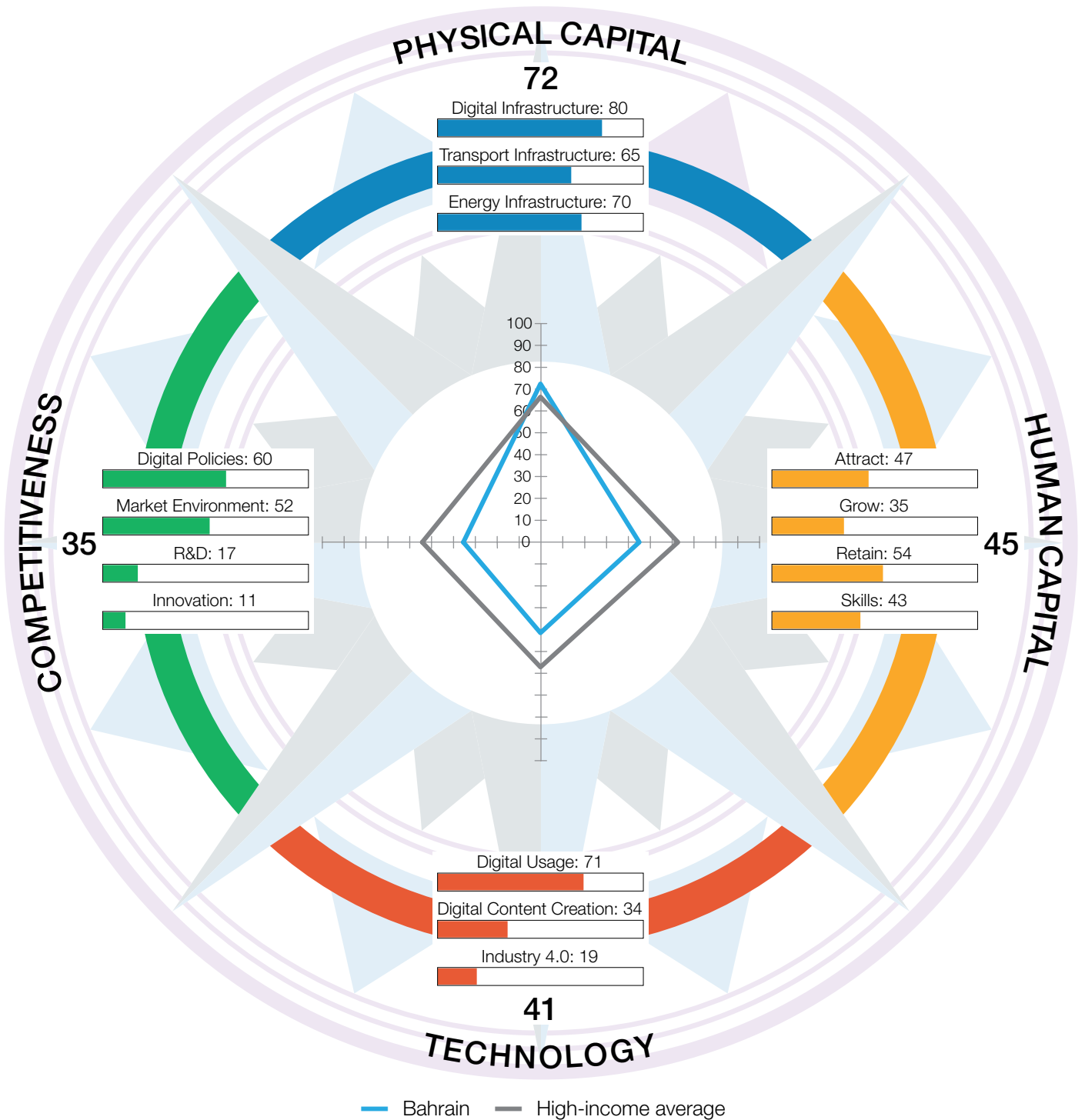
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	46.24	82	3	TECHNOLOGY	30.40	69
1.1	Digital Infrastructure	59.29	82	3.1	Digital Usage	56.13	68
1.1.1	Internet access	78.91	56	3.1.1	Internet users	80.17	50
1.1.2	International Internet bandwidth	46.95	53	3.1.2	Active mobile-broadband subscriptions	31.07	80
1.1.3	Fixed-broadband subscriptions	14.95	104	3.1.3	Gender parity in Internet usage	84.55	74
1.1.4	4G-mobile network coverage	93.00	75	3.1.4	Firms with website	64.07	44
1.1.5	Fixed broadband affordability	97.23	48	3.1.5	Internet shopping	6.15	83
1.1.6	Mobile broadband affordability	77.83	69	3.1.6	Government online services	63.51	64
1.1.7	Computer software spending	6.15	92	3.1.7	E-Participation	63.38	72
1.2	Transport Infrastructure	27.30	86	3.2	Digital Content Creation	31.09	65
1.2.1	Quality of infrastructure	41.08	70	3.2.1	GitHub commits	1.16	94
1.2.2	Rural access	50.88	83	3.2.2	Wikipedia edits	60.54	49
1.2.3	Air connectivity	3.96	81	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	61.57	76
1.3	Energy Infrastructure	52.13	89	3.3	Industry 4.0	3.98	86
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	5.37	83
1.3.3	Electrical outages	74.02	61	3.3.3	AI research	1.41	87
1.3.4	Energy intensity	75.04	69	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	41.33	66	4	COMPETITIVENESS	25.93	85
2.1	Attract	51.94	40	4.1	Digital Policies	40.71	85
2.1.1	Brain gain	76.40	14	4.1.1	ICT regulation	52.40	108
2.1.2	International students	6.23	69	4.1.2	Cybersecurity	89.07	48
2.1.3	Tolerance of minorities	40.43	70	4.1.3	Rule of law	17.41	101
2.1.4	Tolerance of immigrants	53.85	75	4.1.4	Regulatory quality	31.22	88
2.1.5	Gender parity in high-skilled jobs	69.12	71	4.1.5	Corruption	13.43	102
2.1.6	FDI and technology transfer	65.65	30	4.2	Market Environment	36.52	60
2.2	Grow	19.03	112	4.2.1	Extent of market dominance	72.73	18
2.2.1	Tertiary enrolment	23.31	79	4.2.2	Labour productivity	17.23	77
2.2.2	Reading, maths, and science	27.81	62	4.2.3	Urbanisation	46.97	82
2.2.3	Use of virtual professional networks	5.97	93	4.2.4	Domestic credit to private sector	9.14	100
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	n/a	n/a	4.3	R&D	18.07	92
2.3	Retain	58.00	57	4.3.1	R&D spending	3.48	85
2.3.1	Pension coverage	72.24	62	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	37.28	65	4.3.3	Gender parity in R&D	65.78	41
2.3.3	Physician density	42.75	36	4.3.4	Scientific journal articles	3.01	81
2.3.4	Sanitation	91.92	64	4.4	Innovation	8.44	104
2.3.5	Personal safety	45.81	74	4.4.1	Medium- and high-tech industry	19.11	84
2.4	Skills	36.33	53	4.4.2	High-tech exports	6.98	84
2.4.1	Workforce with tertiary education	32.38	53	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	33.63	65	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	6.87	58
2.4.4	Ease of finding skilled employees	75.56	26	4.4.6	Patent applications	0.78	75
2.4.5	Digital skills	3.73	74				

Bahrain

Key Indicators

Rank (out of 124)	43	GDP per capita (PPP US\$)	47,087.54
Income group	High income	GDP (US\$ billions)	38.47
Regional group	Middle East and North Africa	FREI score	48.21
Population (millions)	1.70	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0-100)



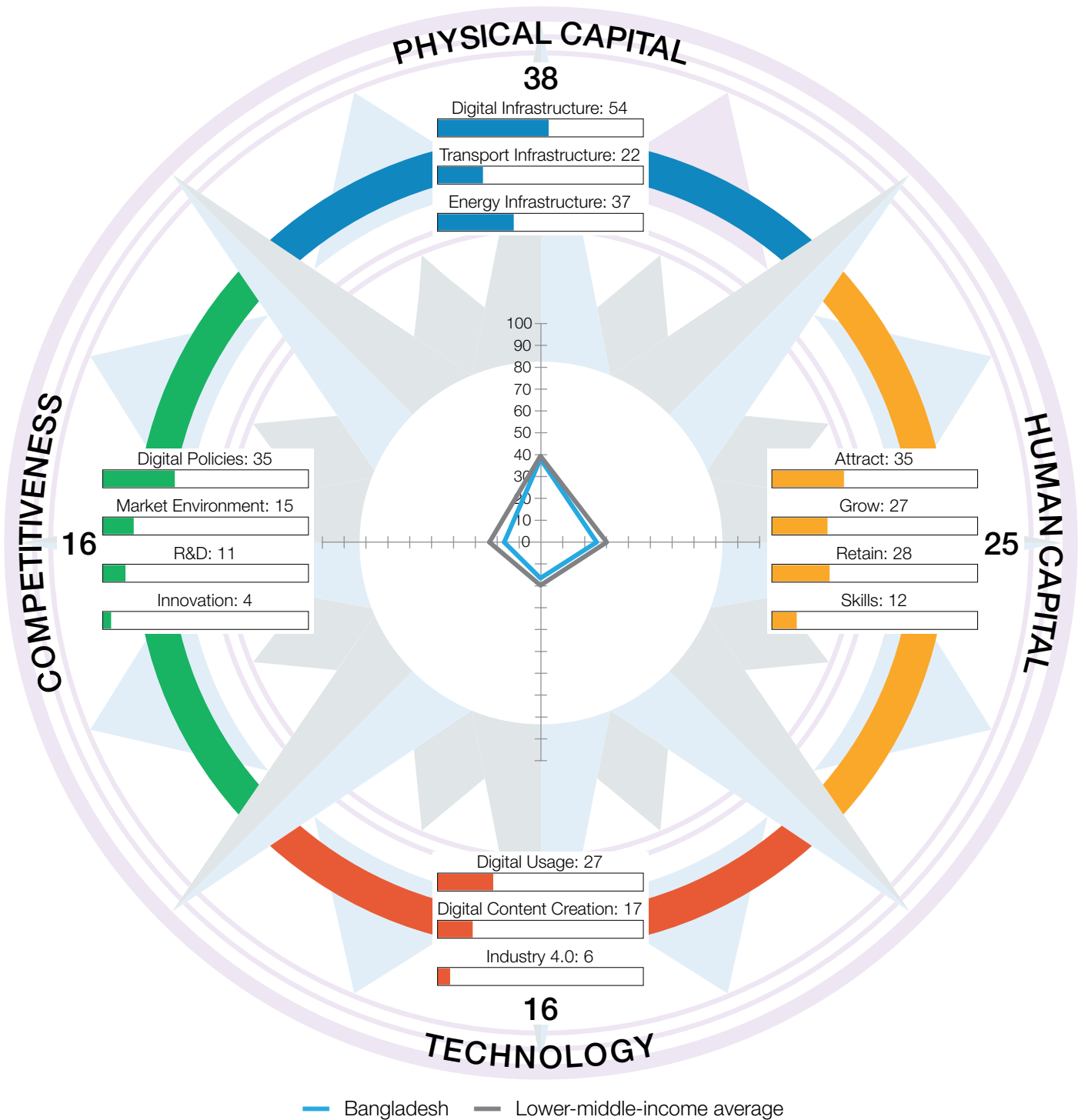
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	71.91	9	3	TECHNOLOGY	41.10	39
1.1	Digital Infrastructure	80.24	21	3.1	Digital Usage	70.93	36
1.1.1	Internet access	99.87	3	3.1.1	Internet users	99.52	3
1.1.2	International Internet bandwidth	66.57	8	3.1.2	Active mobile-broadband subscriptions	47.86	27
1.1.3	Fixed-broadband subscriptions	95.27	31	3.1.3	Gender parity in Internet usage	99.13	8
1.1.4	4G-mobile network coverage	100.00	1	3.1.4	Firms with website	n/a	n/a
1.1.5	Fixed broadband affordability	96.55	54	3.1.5	Internet shopping	32.09	42
1.1.6	Mobile broadband affordability	73.84	77	3.1.6	Government online services	73.72	45
1.1.7	Computer software spending	29.61	28	3.1.7	E-Participation	73.24	50
1.2	Transport Infrastructure	65.02	10	3.2	Digital Content Creation	33.72	57
1.2.1	Quality of infrastructure	41.28	67	3.2.1	GitHub commits	1.44	89
1.2.2	Rural access	97.21	13	3.2.2	Wikipedia edits	55.06	54
1.2.3	Air connectivity	67.86	7	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	76.17	47
1.3	Energy Infrastructure	70.48	11	3.3	Industry 4.0	18.65	32
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	5.89	76
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	38.03	22
1.3.4	Energy intensity	40.96	116	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	44.91	59	4	COMPETITIVENESS	34.93	56
2.1	Attract	47.30	58	4.1	Digital Policies	60.14	48
2.1.1	Brain gain	83.44	8	4.1.1	ICT regulation	82.45	54
2.1.2	International students	34.01	14	4.1.2	Cybersecurity	77.36	68
2.1.3	Tolerance of minorities	3.19	121	4.1.3	Rule of law	52.66	43
2.1.4	Tolerance of immigrants	76.92	28	4.1.4	Regulatory quality	56.89	40
2.1.5	Gender parity in high-skilled jobs	24.10	110	4.1.5	Corruption	31.34	60
2.1.6	FDI and technology transfer	62.16	39	4.2	Market Environment	51.79	29
2.2	Grow	35.18	65	4.2.1	Extent of market dominance	51.93	47
2.2.1	Tertiary enrolment	40.28	50	4.2.2	Labour productivity	61.66	21
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	87.18	14
2.2.3	Use of virtual professional networks	30.09	32	4.2.4	Domestic credit to private sector	31.97	45
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	26.20	25
2.2.5	Youth inclusion	n/a	n/a	4.3	R&D	16.61	95
2.3	Retain	54.28	64	4.3.1	R&D spending	1.79	96
2.3.1	Pension coverage	72.65	61	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	45.12	53	4.3.3	Gender parity in R&D	56.54	52
2.3.3	Physician density	11.16	85	4.3.4	Scientific journal articles	8.12	60
2.3.4	Sanitation	100.00	1	4.4	Innovation	11.16	90
2.3.5	Personal safety	42.48	81	4.4.1	Medium- and high-tech industry	30.39	60
2.4	Skills	42.86	40	4.4.2	High-tech exports	0.72	116
2.4.1	Workforce with tertiary education	11.50	94	4.4.3	Venture capital recipients, deals	11.23	39
2.4.2	High-skilled workforce	31.53	69	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	4.42	69	4.4.5	New business density	13.04	41
2.4.4	Ease of finding skilled employees	80.53	18	4.4.6	Patent applications	0.44	83
2.4.5	Digital skills	86.31	5				

Bangladesh

Key Indicators

Rank (out of 124)	102	GDP per capita (PPP US\$)	4,954.76
Income group	Lower-middle income	GDP (US\$ billions)	324.24
Regional group	Asia and Pacific	FREI score	24.02
Population (millions)	164.69	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



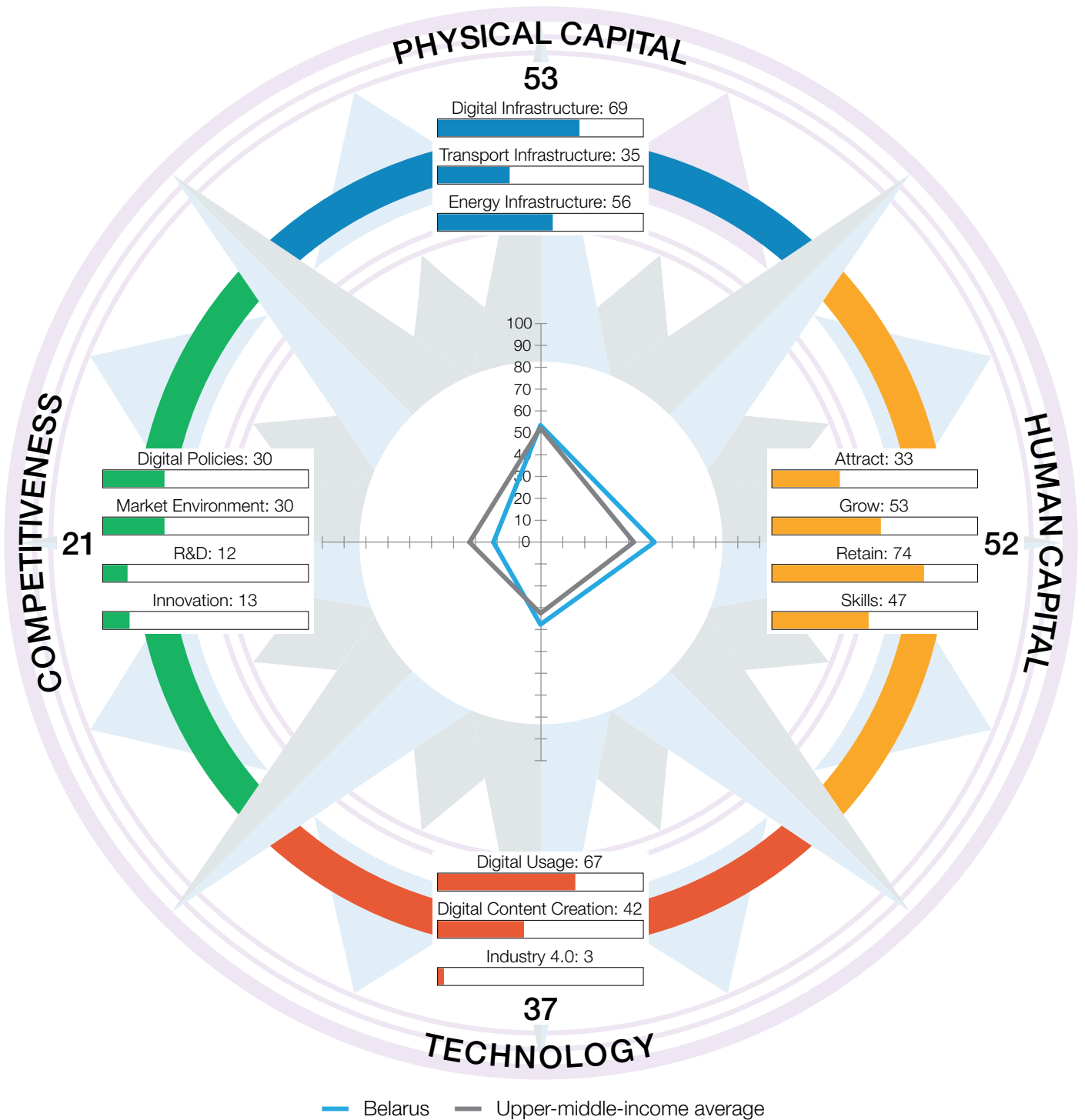
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	37.82	100	3	TECHNOLOGY	16.34	100
1.1	Digital Infrastructure	53.92	89	3.1	Digital Usage	26.59	105
1.1.1	Internet access	36.61	87	3.1.1	Internet users	24.44	102
1.1.2	International Internet bandwidth	34.66	94	3.1.2	Active mobile-broadband subscriptions	22.28	99
1.1.3	Fixed-broadband subscriptions	29.96	95	3.1.3	Gender parity in Internet usage	20.87	96
1.1.4	4G-mobile network coverage	97.40	60	3.1.4	Firms with website	15.84	95
1.1.5	Fixed broadband affordability	94.73	65	3.1.5	Internet shopping	1.59	115
1.1.6	Mobile broadband affordability	69.00	86	3.1.6	Government online services	51.83	84
1.1.7	Computer software spending	15.06	72	3.1.7	E-Participation	49.29	90
1.2	Transport Infrastructure	22.07	93	3.2	Digital Content Creation	16.59	103
1.2.1	Quality of infrastructure	29.54	93	3.2.1	GitHub commits	1.06	95
1.2.2	Rural access	54.30	82	3.2.2	Wikipedia edits	26.57	101
1.2.3	Air connectivity	0.54	106	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	38.56	103
1.3	Energy Infrastructure	37.49	111	3.3	Industry 4.0	5.84	68
1.3.1	Access to electricity	91.22	97	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	12.12	53
1.3.3	Electrical outages	3.50	90	3.3.3	AI research	1.72	82
1.3.4	Energy intensity	90.62	13	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	25.49	106	4	COMPETITIVENESS	16.43	109
2.1	Attract	34.55	105	4.1	Digital Policies	35.42	100
2.1.1	Brain gain	53.32	47	4.1.1	ICT regulation	52.65	107
2.1.2	International students	n/a	n/a	4.1.2	Cybersecurity	80.85	61
2.1.3	Tolerance of minorities	13.83	108	4.1.3	Rule of law	20.92	94
2.1.4	Tolerance of immigrants	56.92	69	4.1.4	Regulatory quality	15.20	117
2.1.5	Gender parity in high-skilled jobs	17.87	113	4.1.5	Corruption	7.46	114
2.1.6	FDI and technology transfer	30.82	94	4.2	Market Environment	15.42	112
2.2	Grow	26.89	90	4.2.1	Extent of market dominance	22.63	107
2.2.1	Tertiary enrolment	14.90	89	4.2.2	Labour productivity	1.69	106
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	24.18	105
2.2.3	Use of virtual professional networks	2.88	108	4.2.4	Domestic credit to private sector	18.28	74
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	10.33	49
2.2.5	Youth inclusion	62.90	82	4.3	R&D	10.93	103
2.3	Retain	28.22	97	4.3.1	R&D spending	n/a	n/a
2.3.1	Pension coverage	37.76	79	4.3.2	University ranking	21.12	77
2.3.2	Environmental performance	6.79	118	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	7.53	94	4.3.4	Scientific journal articles	0.74	100
2.3.4	Sanitation	44.15	105	4.4	Innovation	3.95	118
2.3.5	Personal safety	44.89	75	4.4.1	Medium- and high-tech industry	11.85	97
2.4	Skills	12.28	114	4.4.2	High-tech exports	0.49	119
2.4.1	Workforce with tertiary education	7.33	102	4.4.3	Venture capital recipients, deals	0.46	90
2.4.2	High-skilled workforce	8.41	111	4.4.4	New product entrepreneurial activity	6.94	88
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	0.01	113
2.4.4	Ease of finding skilled employees	32.27	105	4.4.6	Patent applications	n/a	n/a
2.4.5	Digital skills	1.09	79				

Belarus

Key Indicators

Rank (out of 124)	60	GDP per capita (PPP US\$)	19,683.83
Income group	Upper-middle income	GDP (US\$ billions)	60.26
Regional group	Europe	FREI score	40.91
Population (millions)	9.40	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



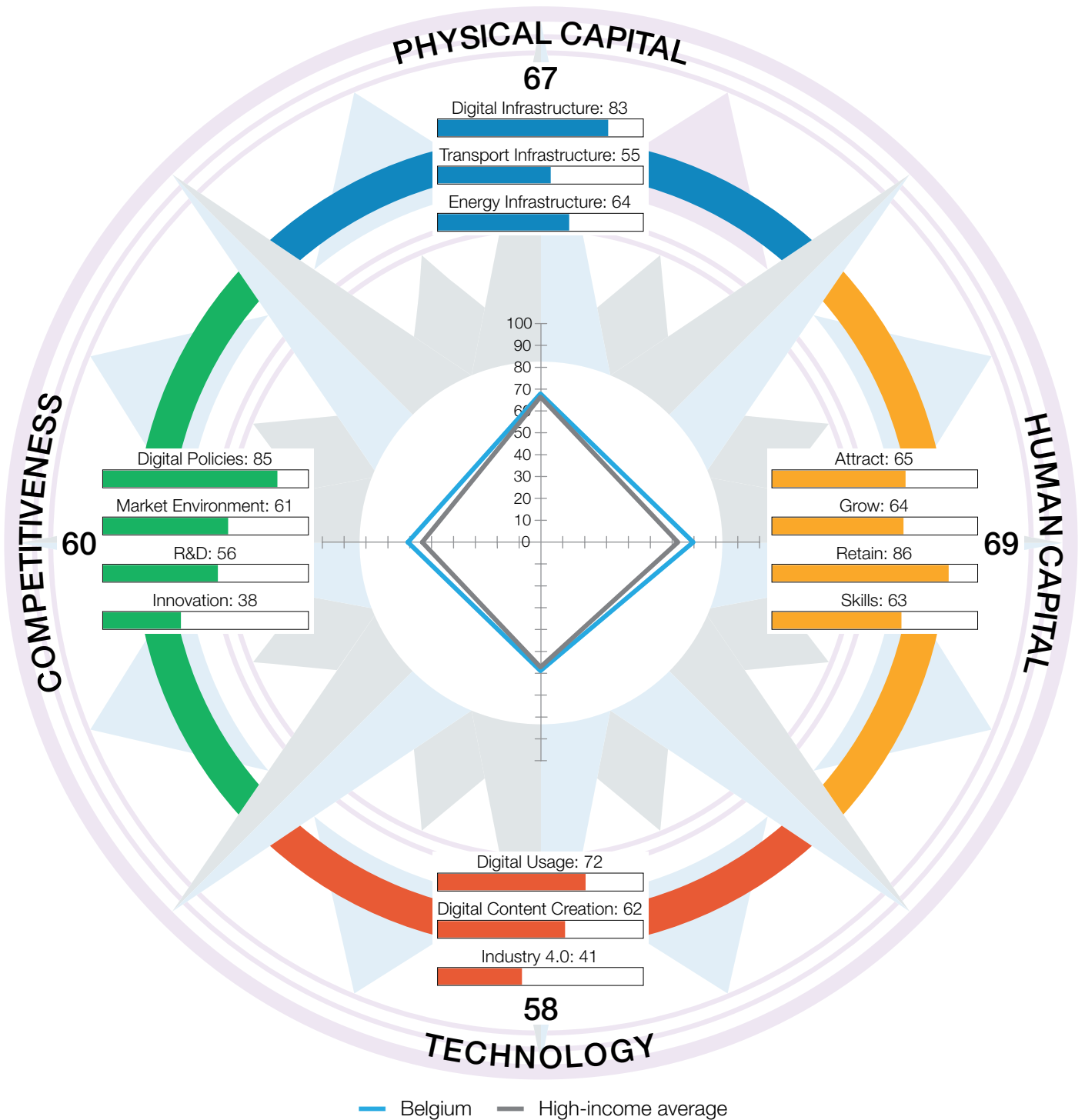
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	53.12	63	3	TECHNOLOGY	37.34	50
1.1	Digital Infrastructure	68.75	62	3.1	Digital Usage	66.54	44
1.1.1	Internet access	76.75	59	3.1.1	Internet users	84.35	39
1.1.2	International Internet bandwidth	59.26	16	3.1.2	Active mobile-broadband subscriptions	39.78	52
1.1.3	Fixed-broadband subscriptions	67.13	73	3.1.3	Gender parity in Internet usage	96.30	35
1.1.4	4G-mobile network coverage	89.50	78	3.1.4	Firms with website	72.90	30
1.1.5	Fixed broadband affordability	98.76	19	3.1.5	Internet shopping	38.49	36
1.1.6	Mobile broadband affordability	86.31	40	3.1.6	Government online services	63.51	64
1.1.7	Computer software spending	3.54	98	3.1.7	E-Participation	70.42	56
1.2	Transport Infrastructure	34.99	57	3.2	Digital Content Creation	42.02	42
1.2.1	Quality of infrastructure	31.32	85	3.2.1	GitHub commits	27.68	31
1.2.2	Rural access	93.82	18	3.2.2	Wikipedia edits	63.00	45
1.2.3	Air connectivity	2.54	87	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	73.84	54
1.3	Energy Infrastructure	55.61	76	3.3	Industry 4.0	3.46	89
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	0.56	57
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	7.81	64
1.3.3	Electrical outages	95.83	13	3.3.3	AI research	2.61	75
1.3.4	Energy intensity	57.49	100	3.3.4	ICT patent applications	0.91	51
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	51.86	40	4	COMPETITIVENESS	21.32	99
2.1	Attract	32.95	112	4.1	Digital Policies	29.74	106
2.1.1	Brain gain	34.05	93	4.1.1	ICT regulation	30.04	121
2.1.2	International students	15.67	43	4.1.2	Cybersecurity	49.46	92
2.1.3	Tolerance of minorities	42.55	65	4.1.3	Rule of law	8.32	117
2.1.4	Tolerance of immigrants	32.31	108	4.1.4	Regulatory quality	22.09	104
2.1.5	Gender parity in high-skilled jobs	40.18	100	4.1.5	Corruption	38.81	50
2.1.6	FDI and technology transfer	n/a	n/a	4.2	Market Environment	30.02	79
2.2	Grow	53.41	34	4.2.1	Extent of market dominance	36.14	84
2.2.1	Tertiary enrolment	58.07	15	4.2.2	Labour productivity	26.20	62
2.2.2	Reading, maths, and science	56.42	35	4.2.3	Urbanisation	74.39	38
2.2.3	Use of virtual professional networks	8.41	82	4.2.4	Domestic credit to private sector	12.49	86
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	0.90	78
2.2.5	Youth inclusion	90.73	20	4.3	R&D	12.22	101
2.3	Retain	74.25	31	4.3.1	R&D spending	12.01	53
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	19.74	80
2.3.2	Environmental performance	48.61	46	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	64.62	10	4.3.4	Scientific journal articles	4.92	74
2.3.4	Sanitation	97.62	45	4.4	Innovation	13.30	85
2.3.5	Personal safety	60.43	46	4.4.1	Medium- and high-tech industry	49.56	32
2.4	Skills	46.83	32	4.4.2	High-tech exports	6.83	85
2.4.1	Workforce with tertiary education	40.53	39	4.4.3	Venture capital recipients, deals	3.33	68
2.4.2	High-skilled workforce	63.96	27	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	5.53	69
2.4.4	Ease of finding skilled employees	71.88	30	4.4.6	Patent applications	1.23	69
2.4.5	Digital skills	10.96	62				

Belgium

Key Indicators

Rank (out of 124)	19	GDP per capita (PPP US\$)	54,693.35
Income group	High income	GDP (US\$ billions)	515.33
Regional group	Europe	FREI score	63.85
Population (millions)	11.56	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)

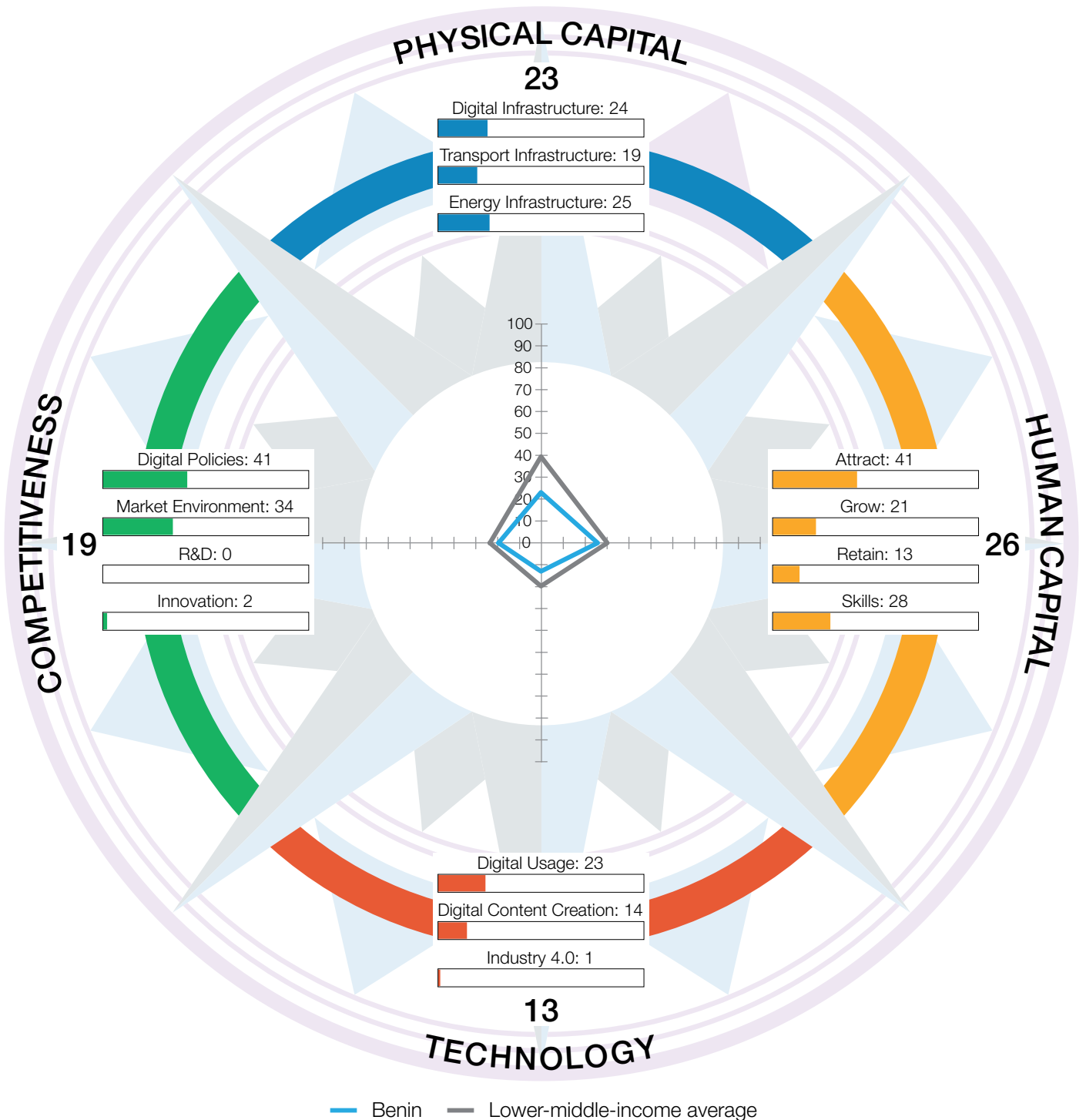


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	67.42	18	3	TECHNOLOGY	58.42	22
1.1	Digital Infrastructure	83.47	6	3.1	Digital Usage	72.41	33
1.1.1	Internet access	90.89	27	3.1.1	Internet users	91.10	21
1.1.2	International Internet bandwidth	52.62	33	3.1.2	Active mobile-broadband subscriptions	38.70	58
1.1.3	Fixed-broadband subscriptions	98.72	14	3.1.3	Gender parity in Internet usage	98.07	18
1.1.4	4G-mobile network coverage	100.00	1	3.1.4	Firms with website	88.76	8
1.1.5	Fixed broadband affordability	99.03	11	3.1.5	Internet shopping	73.44	14
1.1.6	Mobile broadband affordability	92.91	21	3.1.6	Government online services	57.66	75
1.1.7	Computer software spending	50.12	6	3.1.7	E-Participation	59.16	76
1.2	Transport Infrastructure	54.89	28	3.2	Digital Content Creation	61.61	21
1.2.1	Quality of infrastructure	86.12	14	3.2.1	GitHub commits	42.95	22
1.2.2	Rural access	98.86	5	3.2.2	Wikipedia edits	81.91	13
1.2.3	Air connectivity	18.92	41	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	84.79	34
1.3	Energy Infrastructure	63.91	26	3.3	Industry 4.0	41.24	18
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	55.75	9
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	32.24	24
1.3.3	Electrical outages	95.83	13	3.3.3	AI research	48.90	16
1.3.4	Energy intensity	79.00	57	3.3.4	ICT patent applications	21.90	22
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	69.39	16	4	COMPETITIVENESS	60.14	17
2.1	Attract	64.64	23	4.1	Digital Policies	85.02	16
2.1.1	Brain gain	71.81	18	4.1.1	ICT regulation	91.35	24
2.1.2	International students	26.76	25	4.1.2	Cybersecurity	96.17	26
2.1.3	Tolerance of minorities	61.70	37	4.1.3	Rule of law	78.83	19
2.1.4	Tolerance of immigrants	60.00	61	4.1.4	Regulatory quality	76.67	19
2.1.5	Gender parity in high-skilled jobs	96.77	13	4.1.5	Corruption	82.09	14
2.1.6	FDI and technology transfer	70.80	23	4.2	Market Environment	61.07	17
2.2	Grow	64.27	14	4.2.1	Extent of market dominance	75.57	14
2.2.1	Tertiary enrolment	53.70	22	4.2.2	Labour productivity	76.71	7
2.2.2	Reading, maths, and science	67.69	18	4.2.3	Urbanisation	97.61	4
2.2.3	Use of virtual professional networks	48.12	17	4.2.4	Domestic credit to private sector	33.33	42
2.2.4	Formal and non-formal studies	61.16	27	4.2.5	Market capitalisation	22.14	32
2.2.5	Youth inclusion	90.68	21	4.3	R&D	56.12	15
2.3	Retain	85.64	11	4.3.1	R&D spending	55.86	10
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	67.49	14
2.3.2	Environmental performance	83.97	15	4.3.3	Gender parity in R&D	46.45	59
2.3.3	Physician density	74.21	5	4.3.4	Scientific journal articles	54.66	20
2.3.4	Sanitation	99.45	21	4.4	Innovation	38.37	23
2.3.5	Personal safety	70.57	29	4.4.1	Medium- and high-tech industry	61.43	13
2.4	Skills	63.03	17	4.4.2	High-tech exports	15.63	52
2.4.1	Workforce with tertiary education	57.92	11	4.4.3	Venture capital recipients, deals	19.86	26
2.4.2	High-skilled workforce	78.15	12	4.4.4	New product entrepreneurial activity	81.42	7
2.4.3	Researchers	62.22	15	4.4.5	New business density	14.13	37
2.4.4	Ease of finding skilled employees	80.51	19	4.4.6	Patent applications	37.74	17
2.4.5	Digital skills	36.33	31				

Key Indicators

Rank (out of 124)	111	GDP per capita (PPP US\$)	3,426.33
Income group	Lower-middle income	GDP (US\$ billions)	15.65
Regional group	Sub-Saharan Africa	FREI score	20.20
Population (millions)	12.12	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



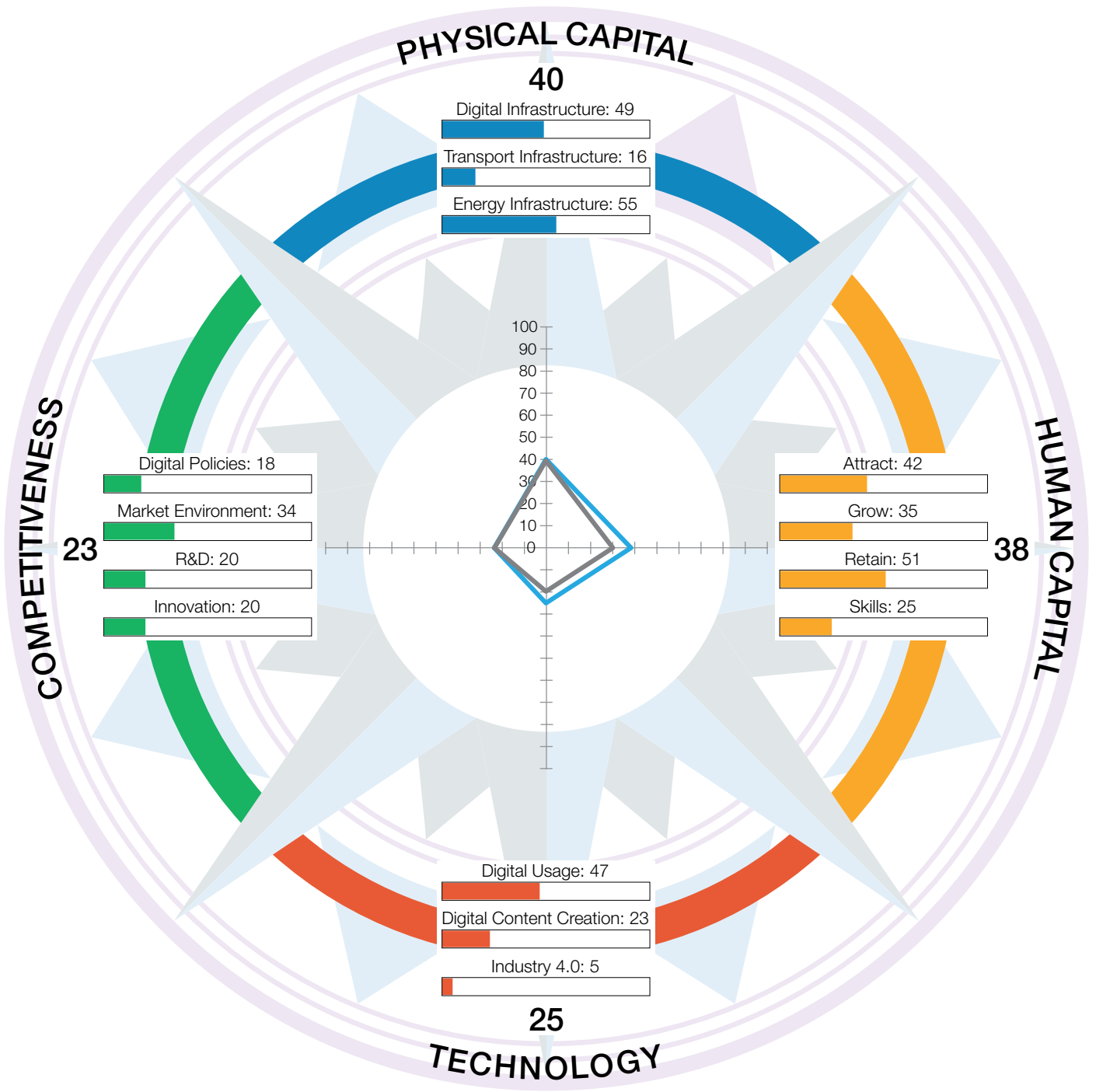
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	22.95	119	3	TECHNOLOGY	12.89	111
1.1	Digital Infrastructure	24.48	115	3.1	Digital Usage	23.19	109
1.1.1	Internet access	2.98	114	3.1.1	Internet users	9.01	118
1.1.2	International Internet bandwidth	30.42	102	3.1.2	Active mobile-broadband subscriptions	10.57	115
1.1.3	Fixed-broadband subscriptions	3.04	114	3.1.3	Gender parity in Internet usage	n/a	n/a
1.1.4	4G-mobile network coverage	42.00	109	3.1.4	Firms with website	30.34	85
1.1.5	Fixed broadband affordability	39.11	116	3.1.5	Internet shopping	3.31	105
1.1.6	Mobile broadband affordability	49.52	109	3.1.6	Government online services	39.42	100
1.1.7	Computer software spending	4.31	94	3.1.7	E-Participation	46.47	93
1.2	Transport Infrastructure	19.46	101	3.2	Digital Content Creation	14.09	107
1.2.1	Quality of infrastructure	33.45	79	3.2.1	GitHub commits	0.57	101
1.2.2	Rural access	43.26	94	3.2.2	Wikipedia edits	28.88	93
1.2.3	Air connectivity	0.04	121	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	26.70	114
1.3	Energy Infrastructure	24.93	123	3.3	Industry 4.0	1.39	110
1.3.1	Access to electricity	32.79	117	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	0.83	111
1.3.3	Electrical outages	22.36	88	3.3.3	AI research	0.64	98
1.3.4	Energy intensity	59.64	98	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	25.72	104	4	COMPETITIVENESS	19.22	104
2.1	Attract	40.67	81	4.1	Digital Policies	41.37	83
2.1.1	Brain gain	50.88	57	4.1.1	ICT regulation	51.44	109
2.1.2	International students	11.96	52	4.1.2	Cybersecurity	79.61	64
2.1.3	Tolerance of minorities	77.66	14	4.1.3	Rule of law	16.31	103
2.1.4	Tolerance of immigrants	87.69	12	4.1.4	Regulatory quality	29.65	90
2.1.5	Gender parity in high-skilled jobs	2.69	119	4.1.5	Corruption	29.85	64
2.1.6	FDI and technology transfer	13.15	118	4.2	Market Environment	33.63	67
2.2	Grow	21.12	109	4.2.1	Extent of market dominance	59.83	35
2.2.1	Tertiary enrolment	7.92	102	4.2.2	Labour productivity	n/a	n/a
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	36.96	94
2.2.3	Use of virtual professional networks	4.31	102	4.2.4	Domestic credit to private sector	4.10	111
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	51.12	103	4.3	R&D	0.38	119
2.3	Retain	13.34	116	4.3.1	R&D spending	n/a	n/a
2.3.1	Pension coverage	9.18	105	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	8.54	114	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	0.36	121	4.3.4	Scientific journal articles	0.75	99
2.3.4	Sanitation	9.86	120	4.4	Innovation	1.50	121
2.3.5	Personal safety	38.77	86	4.4.1	Medium- and high-tech industry	n/a	n/a
2.4	Skills	27.74	80	4.4.2	High-tech exports	2.00	104
2.4.1	Workforce with tertiary education	5.50	107	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	4.57	114	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	2.11	88
2.4.4	Ease of finding skilled employees	73.16	29	4.4.6	Patent applications	0.39	85
2.4.5	Digital skills	n/a	n/a				

Bolivia, Plurinational St.

Key Indicators

Rank (out of 124)	92	GDP per capita (PPP US\$)	9,093.43
Income group	Lower-middle income	GDP (US\$ billions)	36.69
Regional group	Latin America and the Caribbean	FREI score	31.55
Population (millions)	11.67	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



— Bolivia, Plurinational St. — Lower-middle-income average

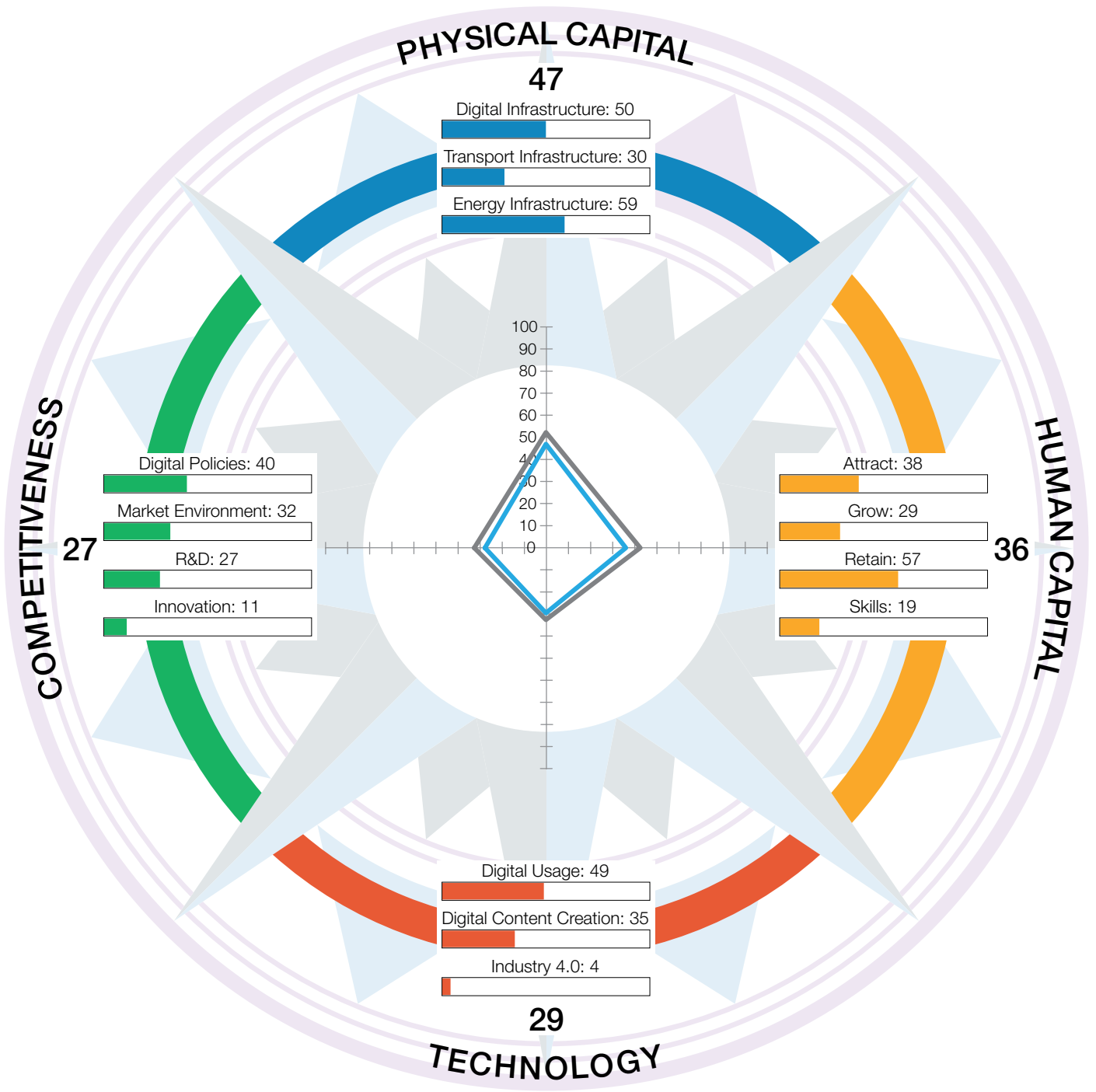
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	39.85	96	3	TECHNOLOGY	24.79	85
1.1	Digital Infrastructure	48.92	97	3.1	Digital Usage	46.96	82
1.1.1	Internet access	54.53	80	3.1.1	Internet users	52.92	87
1.1.2	International Internet bandwidth	36.42	91	3.1.2	Active mobile-broadband subscriptions	36.40	66
1.1.3	Fixed-broadband subscriptions	8.09	109	3.1.3	Gender parity in Internet usage	88.75	66
1.1.4	4G-mobile network coverage	74.48	97	3.1.4	Firms with website	43.76	67
1.1.5	Fixed broadband affordability	82.30	92	3.1.5	Internet shopping	6.61	80
1.1.6	Mobile broadband affordability	62.85	93	3.1.6	Government online services	48.18	88
1.1.7	Computer software spending	23.74	42	3.1.7	E-Participation	52.11	86
1.2	Transport Infrastructure	15.83	112	3.2	Digital Content Creation	22.88	88
1.2.1	Quality of infrastructure	21.00	114	3.2.1	GitHub commits	1.91	79
1.2.2	Rural access	34.42	103	3.2.2	Wikipedia edits	33.05	87
1.2.3	Air connectivity	1.49	98	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	55.72	88
1.3	Energy Infrastructure	54.79	79	3.3	Industry 4.0	4.54	82
1.3.1	Access to electricity	95.84	91	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	7.62	66
1.3.3	Electrical outages	89.24	36	3.3.3	AI research	0.11	114
1.3.4	Energy intensity	77.28	64	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	38.33	76	4	COMPETITIVENESS	23.24	92
2.1	Attract	41.99	78	4.1	Digital Policies	18.42	122
2.1.1	Brain gain	16.93	111	4.1.1	ICT regulation	47.35	113
2.1.2	International students	n/a	n/a	4.1.2	Cybersecurity	14.25	118
2.1.3	Tolerance of minorities	45.74	59	4.1.3	Rule of law	3.67	121
2.1.4	Tolerance of immigrants	58.46	64	4.1.4	Regulatory quality	11.87	121
2.1.5	Gender parity in high-skilled jobs	75.61	59	4.1.5	Corruption	14.93	97
2.1.6	FDI and technology transfer	13.22	117	4.2	Market Environment	34.50	65
2.2	Grow	35.39	63	4.2.1	Extent of market dominance	33.73	92
2.2.1	Tertiary enrolment	n/a	n/a	4.2.2	Labour productivity	10.15	90
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	63.42	53
2.2.3	Use of virtual professional networks	15.27	64	4.2.4	Domestic credit to private sector	30.69	47
2.2.4	Formal and non-formal studies	7.08	54	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	83.82	39	4.3	R&D	20.36	84
2.3	Retain	50.75	73	4.3.1	R&D spending	n/a	n/a
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	33.45	75	4.3.3	Gender parity in R&D	60.76	47
2.3.3	Physician density	12.46	83	4.3.4	Scientific journal articles	0.32	112
2.3.4	Sanitation	57.62	98	4.4	Innovation	19.68	59
2.3.5	Personal safety	50.23	68	4.4.1	Medium- and high-tech industry	11.78	99
2.4	Skills	25.17	85	4.4.2	High-tech exports	10.28	68
2.4.1	Workforce with tertiary education	21.13	75	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	21.03	86	4.4.4	New product entrepreneurial activity	54.65	37
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	2.01	92
2.4.4	Ease of finding skilled employees	33.34	102	4.4.6	Patent applications	n/a	n/a
2.4.5	Digital skills	n/a	n/a				

Bosnia and Herzegovina

Key Indicators

Rank (out of 124)	85	GDP per capita (PPP US\$)	15,817.10
Income group	Upper-middle income	GDP (US\$ billions)	19.79
Regional group	Europe	FREI score	34.80
Population (millions)	3.28	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



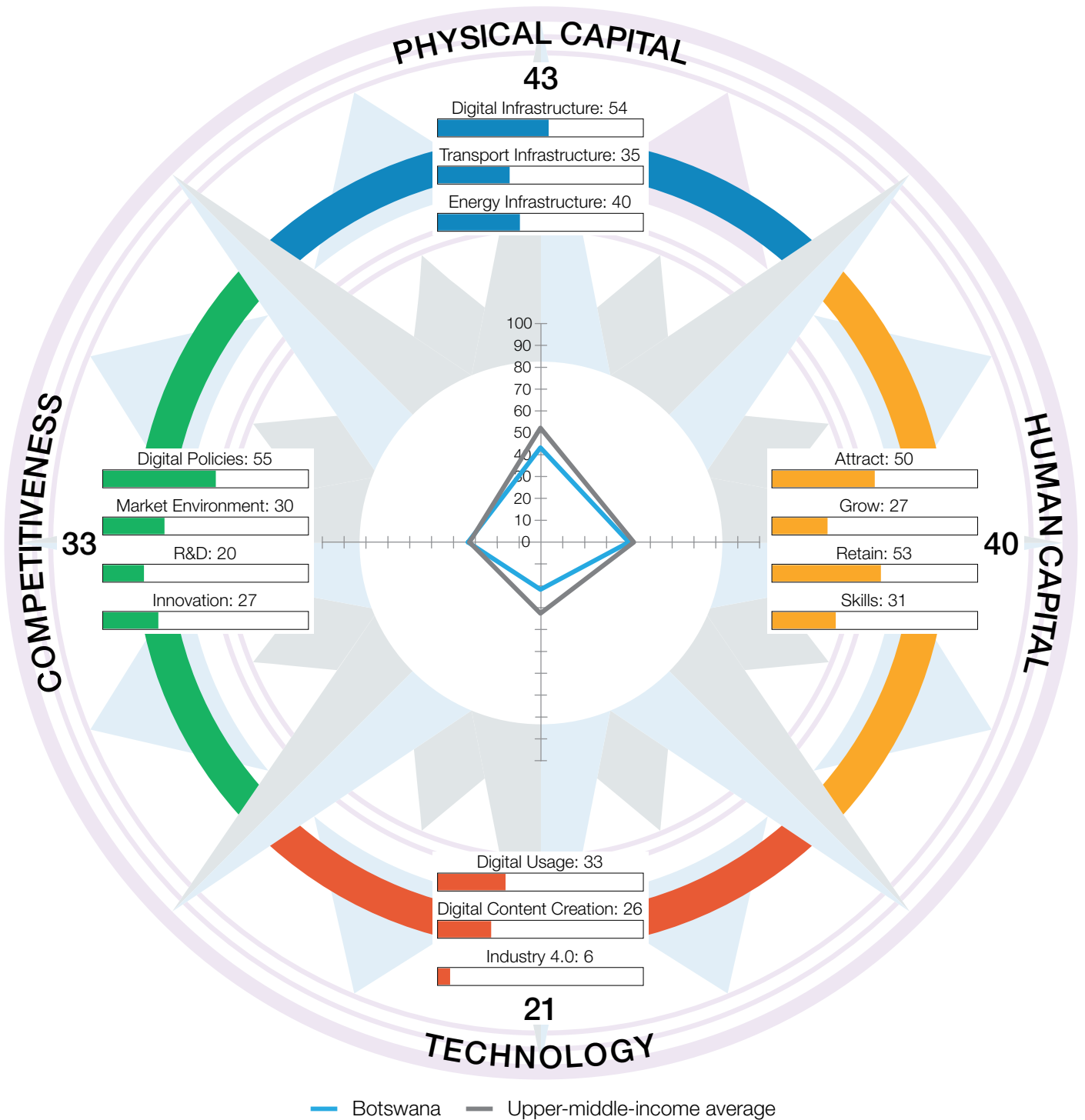
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	46.59	81	3	TECHNOLOGY	29.30	73
1.1	Digital Infrastructure	50.16	96	3.1	Digital Usage	49.41	78
1.1.1	Internet access	72.52	68	3.1.1	Internet users	71.89	67
1.1.2	International Internet bandwidth	45.29	60	3.1.2	Active mobile-broadband subscriptions	19.67	105
1.1.3	Fixed-broadband subscriptions	54.43	80	3.1.3	Gender parity in Internet usage	77.05	81
1.1.4	4G-mobile network coverage	0.00	123	3.1.4	Firms with website	66.37	40
1.1.5	Fixed broadband affordability	95.50	60	3.1.5	Internet shopping	15.07	64
1.1.6	Mobile broadband affordability	76.34	73	3.1.6	Government online services	42.34	94
1.1.7	Computer software spending	7.00	89	3.1.7	E-Participation	53.51	84
1.2	Transport Infrastructure	30.42	73	3.2	Digital Content Creation	34.83	54
1.2.1	Quality of infrastructure	30.60	91	3.2.1	GitHub commits	7.09	54
1.2.2	Rural access	77.56	47	3.2.2	Wikipedia edits	68.74	39
1.2.3	Air connectivity	3.66	82	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	60.94	77
1.3	Energy Infrastructure	59.20	52	3.3	Industry 4.0	3.65	88
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	0.55	58
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	4.04	90
1.3.3	Electrical outages	80.90	55	3.3.3	AI research	9.73	50
1.3.4	Energy intensity	55.59	104	3.3.4	ICT patent applications	0.00	74
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	35.94	82	4	COMPETITIVENESS	27.35	80
2.1	Attract	38.44	91	4.1	Digital Policies	39.62	91
2.1.1	Brain gain	0.00	121	4.1.1	ICT regulation	87.02	35
2.1.2	International students	17.50	40	4.1.2	Cybersecurity	27.85	108
2.1.3	Tolerance of minorities	35.11	79	4.1.3	Rule of law	28.89	75
2.1.4	Tolerance of immigrants	55.38	73	4.1.4	Regulatory quality	33.47	85
2.1.5	Gender parity in high-skilled jobs	99.99	2	4.1.5	Corruption	20.90	86
2.1.6	FDI and technology transfer	22.66	108	4.2	Market Environment	31.72	73
2.2	Grow	29.26	86	4.2.1	Extent of market dominance	27.13	97
2.2.1	Tertiary enrolment	25.12	76	4.2.2	Labour productivity	36.86	44
2.2.2	Reading, maths, and science	27.97	60	4.2.3	Urbanisation	38.07	93
2.2.3	Use of virtual professional networks	10.18	76	4.2.4	Domestic credit to private sector	24.83	59
2.2.4	Formal and non-formal studies	11.59	48	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	71.43	70	4.3	R&D	27.31	65
2.3	Retain	56.70	60	4.3.1	R&D spending	3.70	83
2.3.1	Pension coverage	68.88	65	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	35.37	68	4.3.3	Gender parity in R&D	97.15	5
2.3.3	Physician density	26.65	67	4.3.4	Scientific journal articles	8.40	59
2.3.4	Sanitation	94.99	58	4.4	Innovation	10.74	91
2.3.5	Personal safety	57.63	56	4.4.1	Medium- and high-tech industry	22.11	78
2.4	Skills	19.38	104	4.4.2	High-tech exports	8.46	79
2.4.1	Workforce with tertiary education	20.30	78	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	38.43	55	4.4.4	New product entrepreneurial activity	16.32	82
2.4.3	Researchers	5.69	67	4.4.5	New business density	4.46	77
2.4.4	Ease of finding skilled employees	20.38	114	4.4.6	Patent applications	2.34	57
2.4.5	Digital skills	12.08	61				

Botswana

Key Indicators

Rank (out of 124)	86	GDP per capita (PPP US\$)	18,506.52
Income group	Upper-middle income	GDP (US\$ billions)	15.78
Regional group	Sub-Saharan Africa	FREI score	34.34
Population (millions)	2.35	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



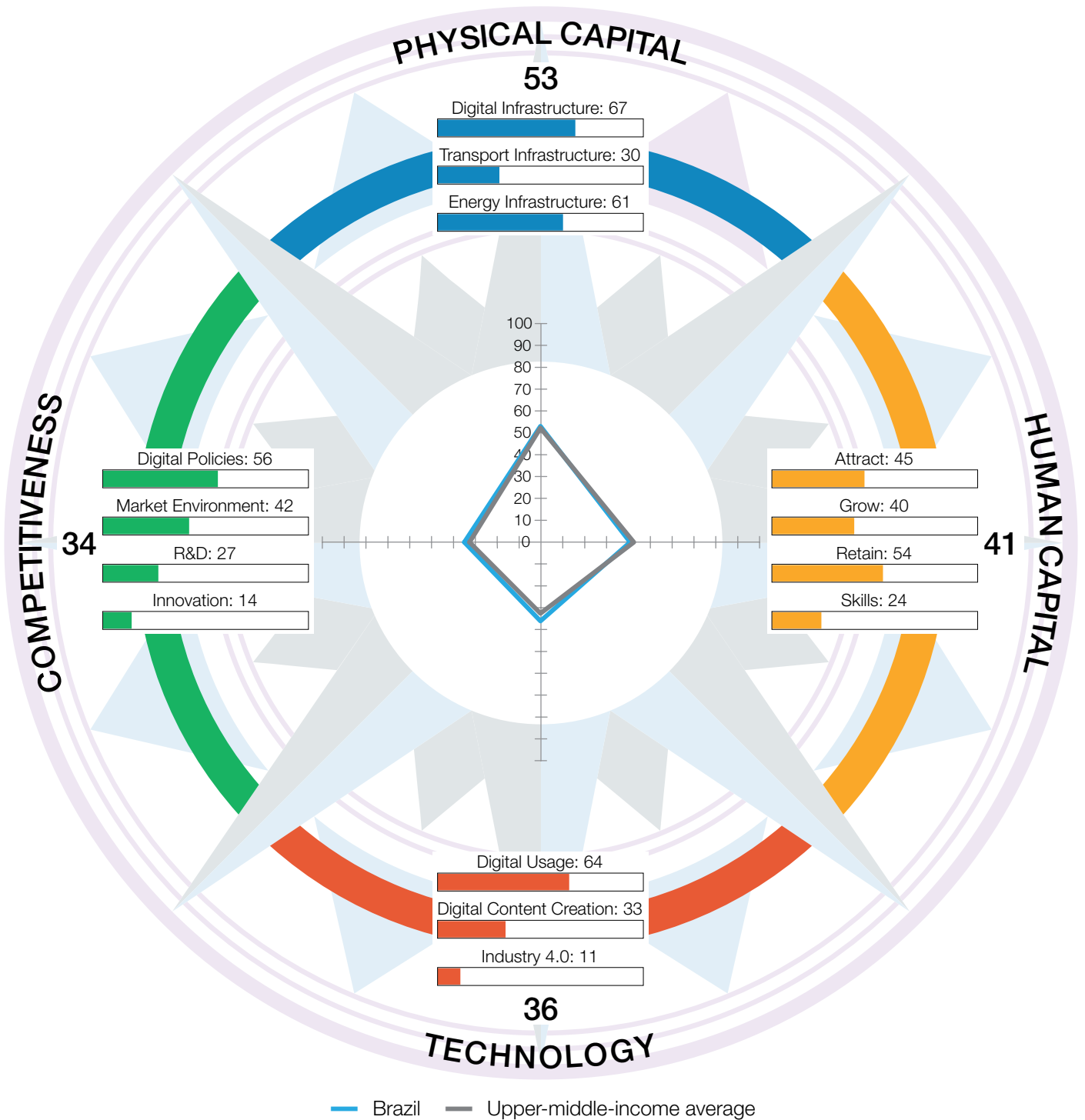
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	42.92	92	3	TECHNOLOGY	21.45	93
1.1	Digital Infrastructure	54.19	88	3.1	Digital Usage	32.52	98
1.1.1	Internet access	62.96	77	3.1.1	Internet users	38.52	93
1.1.2	International Internet bandwidth	40.64	79	3.1.2	Active mobile-broadband subscriptions	40.55	48
1.1.3	Fixed-broadband subscriptions	18.16	100	3.1.3	Gender parity in Internet usage	64.96	88
1.1.4	4G-mobile network coverage	77.00	89	3.1.4	Firms with website	n/a	n/a
1.1.5	Fixed broadband affordability	90.28	84	3.1.5	Internet shopping	4.60	92
1.1.6	Mobile broadband affordability	80.69	64	3.1.6	Government online services	21.17	114
1.1.7	Computer software spending	9.62	83	3.1.7	E-Participation	25.34	111
1.2	Transport Infrastructure	34.85	58	3.2	Digital Content Creation	26.14	77
1.2.1	Quality of infrastructure	49.66	48	3.2.1	GitHub commits	2.16	78
1.2.2	Rural access	39.01	100	3.2.2	Wikipedia edits	53.44	56
1.2.3	Air connectivity	1.53	97	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	48.02	97
1.3	Energy Infrastructure	39.72	107	3.3	Industry 4.0	5.69	70
1.3.1	Access to electricity	66.42	103	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	11.30	56
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	3.32	70
1.3.4	Energy intensity	85.97	30	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	40.18	73	4	COMPETITIVENESS	32.79	65
2.1	Attract	49.86	45	4.1	Digital Policies	54.57	58
2.1.1	Brain gain	57.62	37	4.1.1	ICT regulation	60.33	95
2.1.2	International students	5.81	71	4.1.2	Cybersecurity	52.00	91
2.1.3	Tolerance of minorities	63.83	34	4.1.3	Rule of law	51.15	44
2.1.4	Tolerance of immigrants	64.62	54	4.1.4	Regulatory quality	51.16	51
2.1.5	Gender parity in high-skilled jobs	78.34	54	4.1.5	Corruption	58.21	29
2.1.6	FDI and technology transfer	28.93	98	4.2	Market Environment	29.87	82
2.2	Grow	27.22	89	4.2.1	Extent of market dominance	21.33	111
2.2.1	Tertiary enrolment	17.11	86	4.2.2	Labour productivity	20.03	73
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	63.44	52
2.2.3	Use of virtual professional networks	19.80	53	4.2.4	Domestic credit to private sector	14.67	83
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	44.75	107	4.3	R&D	20.22	86
2.3	Retain	52.64	68	4.3.1	R&D spending	10.64	59
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	18.94	81
2.3.2	Environmental performance	26.66	84	4.3.3	Gender parity in R&D	46.37	60
2.3.3	Physician density	3.18	102	4.3.4	Scientific journal articles	4.92	73
2.3.4	Sanitation	75.47	87	4.4	Innovation	26.51	38
2.3.5	Personal safety	57.91	54	4.4.1	Medium- and high-tech industry	9.35	101
2.4	Skills	30.98	71	4.4.2	High-tech exports	0.61	117
2.4.1	Workforce with tertiary education	39.54	40	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	35.26	63	4.4.4	New product entrepreneurial activity	37.44	59
2.4.3	Researchers	2.14	76	4.4.5	New business density	85.13	2
2.4.4	Ease of finding skilled employees	50.63	70	4.4.6	Patent applications	0.00	96
2.4.5	Digital skills	27.34	43				

Brazil

Key Indicators

Rank (out of 124)	59	GDP per capita (PPP US\$)	15,076.40
Income group	Upper-middle income	GDP (US\$ billions)	1,444.73
Regional group	Latin America and the Caribbean	FREI score	40.93
Population (millions)	212.56	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



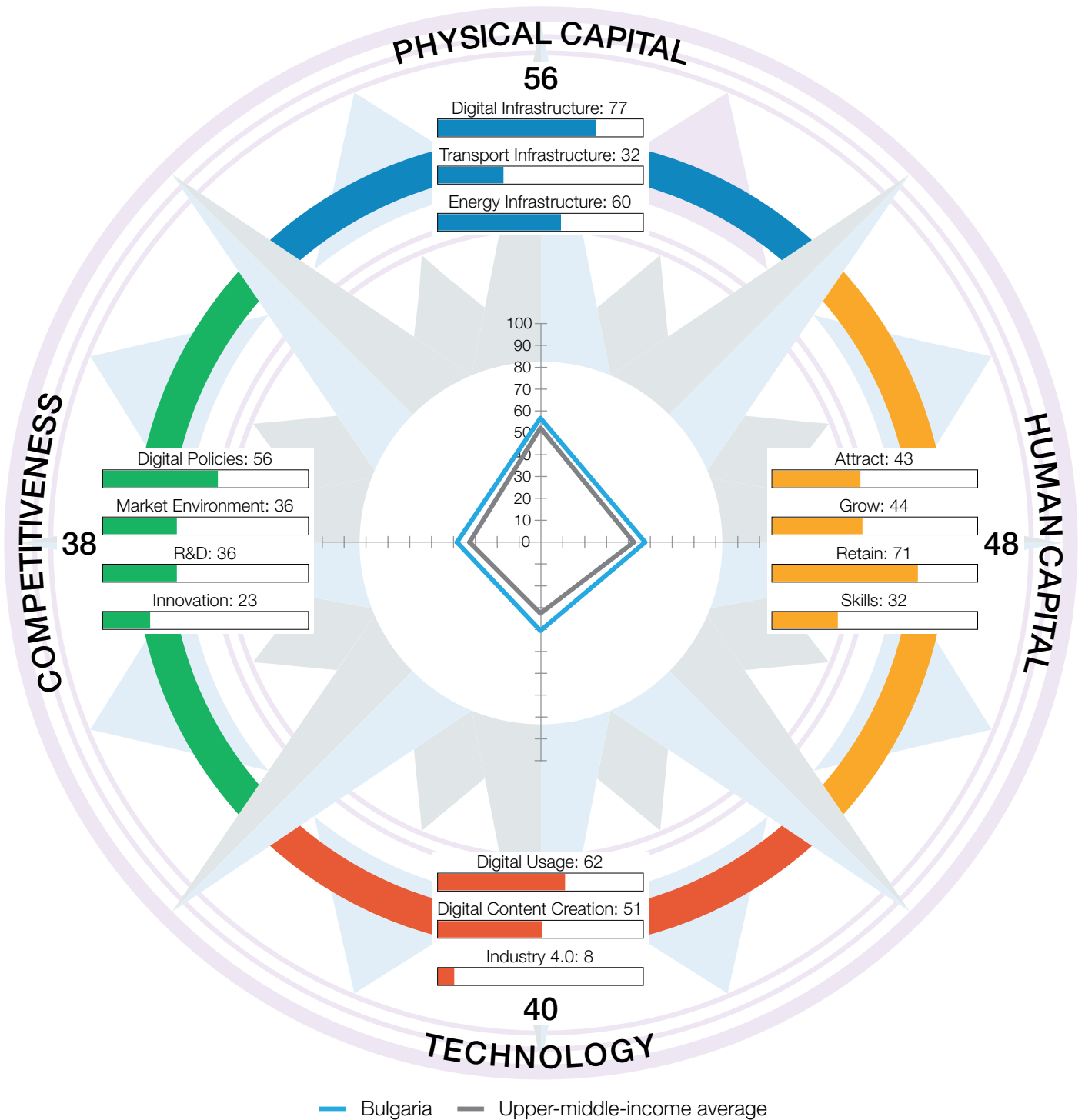
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	52.66	66	3	TECHNOLOGY	35.79	56
1.1	Digital Infrastructure	67.21	69	3.1	Digital Usage	63.98	51
1.1.1	Internet access	71.05	70	3.1.1	Internet users	72.62	66
1.1.2	International Internet bandwidth	35.05	93	3.1.2	Active mobile-broadband subscriptions	38.95	57
1.1.3	Fixed-broadband subscriptions	75.31	68	3.1.3	Gender parity in Internet usage	97.41	27
1.1.4	4G-mobile network coverage	88.23	80	3.1.4	Firms with website	47.99	62
1.1.5	Fixed broadband affordability	94.87	63	3.1.5	Internet shopping	18.19	62
1.1.6	Mobile broadband affordability	74.93	76	3.1.6	Government online services	83.94	20
1.1.7	Computer software spending	31.04	27	3.1.7	E-Participation	88.74	18
1.2	Transport Infrastructure	29.90	74	3.2	Digital Content Creation	32.79	59
1.2.1	Quality of infrastructure	48.75	49	3.2.1	GitHub commits	9.42	47
1.2.2	Rural access	59.33	74	3.2.2	Wikipedia edits	41.81	76
1.2.3	Air connectivity	4.22	79	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	75.39	49
1.3	Energy Infrastructure	60.88	40	3.3	Industry 4.0	10.60	48
1.3.1	Access to electricity	99.77	79	3.3.1	Robot density	4.01	42
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	24.21	30
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	8.71	51
1.3.4	Energy intensity	77.88	62	3.3.4	ICT patent applications	0.85	52
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	40.77	67	4	COMPETITIVENESS	34.47	58
2.1	Attract	44.87	65	4.1	Digital Policies	55.99	56
2.1.1	Brain gain	20.68	109	4.1.1	ICT regulation	89.90	27
2.1.2	International students	0.58	99	4.1.2	Cybersecurity	96.52	25
2.1.3	Tolerance of minorities	23.40	95	4.1.3	Rule of law	32.77	67
2.1.4	Tolerance of immigrants	81.54	23	4.1.4	Regulatory quality	35.40	80
2.1.5	Gender parity in high-skilled jobs	91.47	25	4.1.5	Corruption	25.37	72
2.1.6	FDI and technology transfer	51.57	55	4.2	Market Environment	41.82	47
2.2	Grow	39.96	53	4.2.1	Extent of market dominance	48.63	54
2.2.1	Tertiary enrolment	36.77	57	4.2.2	Labour productivity	20.70	71
2.2.2	Reading, maths, and science	26.91	65	4.2.3	Urbanisation	83.93	19
2.2.3	Use of virtual professional networks	30.20	31	4.2.4	Domestic credit to private sector	30.20	48
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	25.65	27
2.2.5	Youth inclusion	65.96	77	4.3	R&D	26.51	66
2.3	Retain	54.22	65	4.3.1	R&D spending	23.29	33
2.3.1	Pension coverage	91.33	45	4.3.2	University ranking	44.83	33
2.3.2	Environmental performance	45.47	52	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	28.52	63	4.3.4	Scientific journal articles	11.40	51
2.3.4	Sanitation	87.37	75	4.4	Innovation	13.57	83
2.3.5	Personal safety	18.41	114	4.4.1	Medium- and high-tech industry	43.34	42
2.4	Skills	24.05	94	4.4.2	High-tech exports	21.32	35
2.4.1	Workforce with tertiary education	29.22	57	4.4.3	Venture capital recipients, deals	7.74	54
2.4.2	High-skilled workforce	37.11	57	4.4.4	New product entrepreneurial activity	0.00	89
2.4.3	Researchers	10.86	50	4.4.5	New business density	5.33	71
2.4.4	Ease of finding skilled employees	26.94	111	4.4.6	Patent applications	3.70	47
2.4.5	Digital skills	16.11	57				

Bulgaria

Key Indicators

Rank (out of 124)	46	GDP per capita (PPP US\$)	24,579.22
Income group	Upper-middle income	GDP (US\$ billions)	69.11
Regional group	Europe	FREI score	45.45
Population (millions)	6.93	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



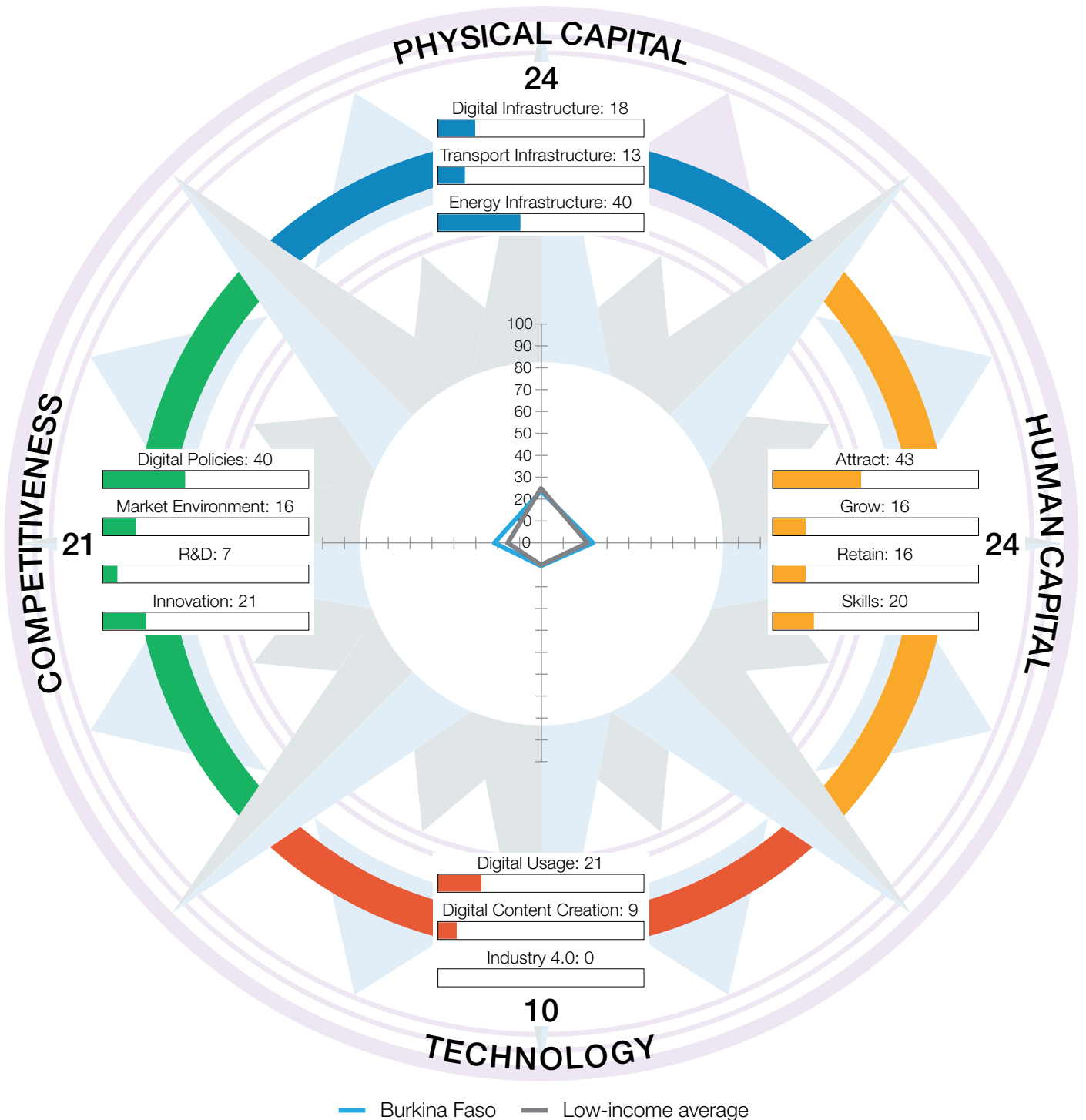
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	56.30	53	3	TECHNOLOGY	40.12	44
1.1	Digital Infrastructure	76.88	34	3.1	Digital Usage	61.83	53
1.1.1	Internet access	78.65	57	3.1.1	Internet users	68.69	74
1.1.2	International Internet bandwidth	68.53	6	3.1.2	Active mobile-broadband subscriptions	46.50	31
1.1.3	Fixed-broadband subscriptions	98.50	16	3.1.3	Gender parity in Internet usage	91.54	61
1.1.4	4G-mobile network coverage	99.85	24	3.1.4	Firms with website	39.29	73
1.1.5	Fixed broadband affordability	96.77	52	3.1.5	Internet shopping	27.91	47
1.1.6	Mobile broadband affordability	77.83	69	3.1.6	Government online services	71.53	46
1.1.7	Computer software spending	18.06	66	3.1.7	E-Participation	87.33	23
1.2	Transport Infrastructure	31.72	66	3.2	Digital Content Creation	50.77	32
1.2.1	Quality of infrastructure	42.70	63	3.2.1	GitHub commits	30.15	27
1.2.2	Rural access	61.44	71	3.2.2	Wikipedia edits	72.21	35
1.2.3	Air connectivity	9.81	51	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	89.43	26
1.3	Energy Infrastructure	60.30	43	3.3	Industry 4.0	7.75	58
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	2.34	44
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	11.79	55
1.3.3	Electrical outages	86.53	43	3.3.3	AI research	14.88	41
1.3.4	Energy intensity	68.93	84	3.3.4	ICT patent applications	0.91	50
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	47.52	48	4	COMPETITIVENESS	37.88	50
2.1	Attract	42.87	72	4.1	Digital Policies	56.34	55
2.1.1	Brain gain	21.98	108	4.1.1	ICT regulation	91.35	24
2.1.2	International students	19.14	33	4.1.2	Cybersecurity	66.65	83
2.1.3	Tolerance of minorities	60.64	40	4.1.3	Rule of law	35.42	62
2.1.4	Tolerance of immigrants	32.31	108	4.1.4	Regulatory quality	53.97	44
2.1.5	Gender parity in high-skilled jobs	74.92	63	4.1.5	Corruption	34.33	53
2.1.6	FDI and technology transfer	48.21	62	4.2	Market Environment	36.19	61
2.2	Grow	43.83	50	4.2.1	Extent of market dominance	51.02	50
2.2.1	Tertiary enrolment	49.12	30	4.2.2	Labour productivity	28.61	57
2.2.2	Reading, maths, and science	37.78	49	4.2.3	Urbanisation	70.10	43
2.2.3	Use of virtual professional networks	16.37	59	4.2.4	Domestic credit to private sector	21.67	66
2.2.4	Formal and non-formal studies	33.18	38	4.2.5	Market capitalisation	9.56	54
2.2.5	Youth inclusion	82.69	43	4.3	R&D	36.02	42
2.3	Retain	71.16	36	4.3.1	R&D spending	15.07	46
2.3.1	Pension coverage	93.88	42	4.3.2	University ranking	18.78	82
2.3.2	Environmental performance	55.57	39	4.3.3	Gender parity in R&D	91.50	13
2.3.3	Physician density	52.29	24	4.3.4	Scientific journal articles	18.74	45
2.3.4	Sanitation	84.90	80	4.4	Innovation	22.95	49
2.3.5	Personal safety	69.15	34	4.4.1	Medium- and high-tech industry	37.48	48
2.4	Skills	32.24	66	4.4.2	High-tech exports	17.43	44
2.4.1	Workforce with tertiary education	38.87	41	4.4.3	Venture capital recipients, deals	9.50	44
2.4.2	High-skilled workforce	49.75	42	4.4.4	New product entrepreneurial activity	25.28	73
2.4.3	Researchers	28.93	33	4.4.5	New business density	42.72	12
2.4.4	Ease of finding skilled employees	37.26	96	4.4.6	Patent applications	5.27	40
2.4.5	Digital skills	6.38	67				

Burkina Faso

Key Indicators

Rank (out of 124)	114	GDP per capita (PPP US\$)	2,270.44
Income group	Low income	GDP (US\$ billions)	17.37
Regional group	Sub-Saharan Africa	FREI score	19.67
Population (millions)	20.90	FREI score (income group average)	17.76

FREI 2022 scores by pillar and sub-pillar (0–100)



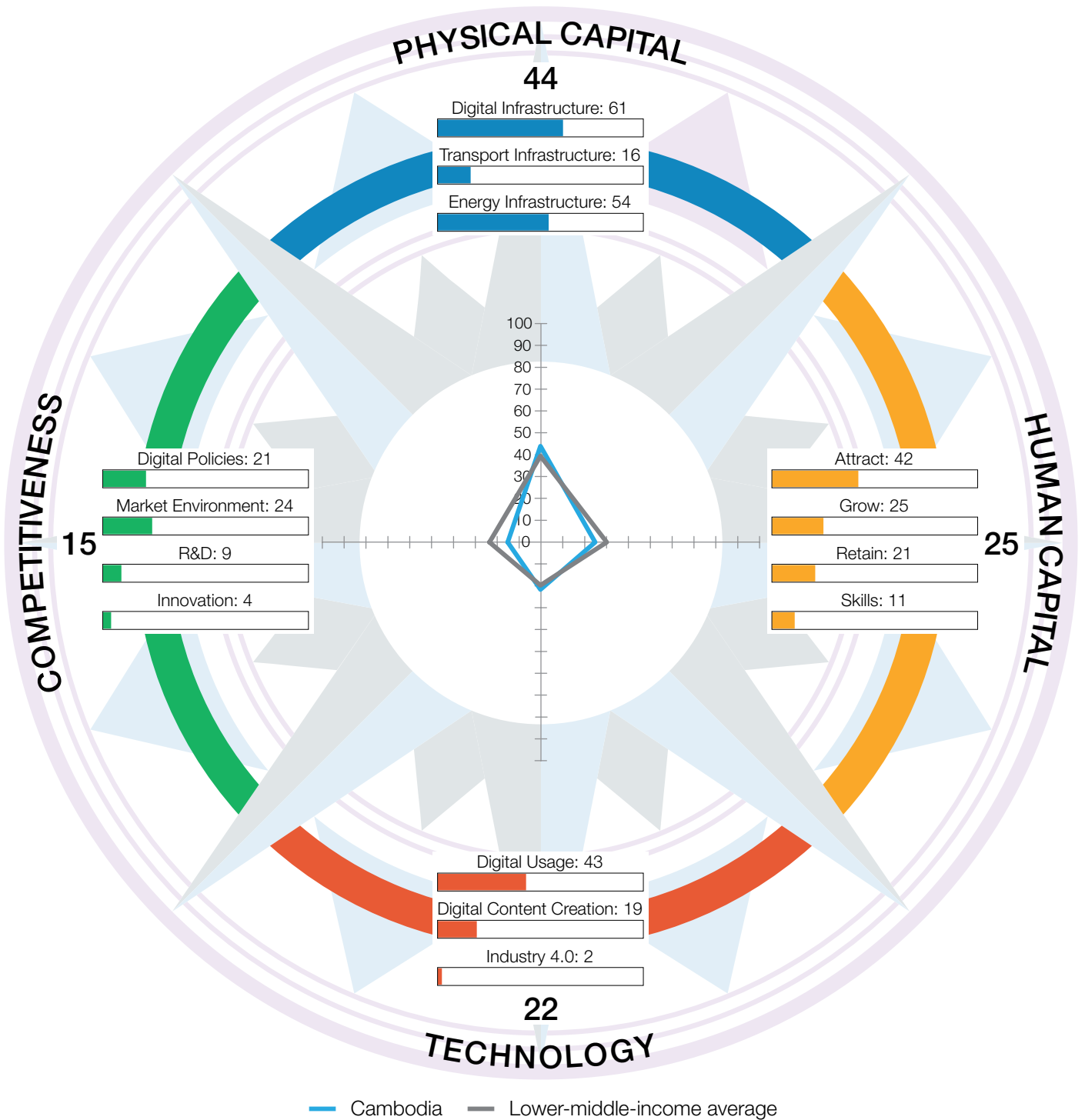
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	23.56	117	3	TECHNOLOGY	10.40	117
1.1	Digital Infrastructure	17.61	120	3.1	Digital Usage	21.47	112
1.1.1	Internet access	n/a	n/a	3.1.1	Internet users	7.65	120
1.1.2	International Internet bandwidth	25.81	109	3.1.2	Active mobile-broadband subscriptions	21.89	101
1.1.3	Fixed-broadband subscriptions	9.27	107	3.1.3	Gender parity in Internet usage	n/a	n/a
1.1.4	4G-mobile network coverage	26.92	116	3.1.4	Firms with website	n/a	n/a
1.1.5	Fixed broadband affordability	18.47	117	3.1.5	Internet shopping	2.00	112
1.1.6	Mobile broadband affordability	23.14	119	3.1.6	Government online services	33.58	106
1.1.7	Computer software spending	2.04	105	3.1.7	E-Participation	42.25	96
1.2	Transport Infrastructure	12.83	116	3.2	Digital Content Creation	9.45	120
1.2.1	Quality of infrastructure	30.96	88	3.2.1	GitHub commits	0.00	124
1.2.2	Rural access	17.26	118	3.2.2	Wikipedia edits	21.14	108
1.2.3	Air connectivity	0.06	119	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	16.65	121
1.3	Energy Infrastructure	40.23	105	3.3	Industry 4.0	0.27	122
1.3.1	Access to electricity	8.08	123	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	0.03	120
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	0.04	119
1.3.4	Energy intensity	72.38	77	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	23.60	110	4	COMPETITIVENESS	21.12	100
2.1	Attract	42.86	73	4.1	Digital Policies	39.86	90
2.1.1	Brain gain	26.26	104	4.1.1	ICT regulation	78.36	66
2.1.2	International students	5.41	73	4.1.2	Cybersecurity	38.63	98
2.1.3	Tolerance of minorities	57.45	44	4.1.3	Rule of law	25.55	86
2.1.4	Tolerance of immigrants	78.46	26	4.1.4	Regulatory quality	28.43	92
2.1.5	Gender parity in high-skilled jobs	63.06	77	4.1.5	Corruption	28.36	65
2.1.6	FDI and technology transfer	26.54	101	4.2	Market Environment	16.10	110
2.2	Grow	16.10	118	4.2.1	Extent of market dominance	36.06	86
2.2.1	Tertiary enrolment	4.76	110	4.2.2	Labour productivity	2.20	105
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	15.47	115
2.2.3	Use of virtual professional networks	1.44	118	4.2.4	Domestic credit to private sector	10.66	92
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	42.11	108	4.3	R&D	7.22	109
2.3	Retain	15.61	114	4.3.1	R&D spending	12.14	52
2.3.1	Pension coverage	0.71	120	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	23.00	89	4.3.3	Gender parity in R&D	16.29	93
2.3.3	Physician density	0.73	113	4.3.4	Scientific journal articles	0.47	105
2.3.4	Sanitation	13.04	117	4.4	Innovation	21.29	54
2.3.5	Personal safety	40.56	85	4.4.1	Medium- and high-tech industry	n/a	n/a
2.4	Skills	19.83	103	4.4.2	High-tech exports	41.45	12
2.4.1	Workforce with tertiary education	2.93	115	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	16.84	96	4.4.4	New product entrepreneurial activity	42.48	51
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	1.23	101
2.4.4	Ease of finding skilled employees	39.71	90	4.4.6	Patent applications	0.00	96
2.4.5	Digital skills	n/a	n/a				

Cambodia

Key Indicators

Rank (out of 124)	97	GDP per capita (PPP US\$)	4,574.40
Income group	Lower-middle income	GDP (US\$ billions)	25.29
Regional group	Asia and Pacific	FREI score	26.20
Population (millions)	16.72	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



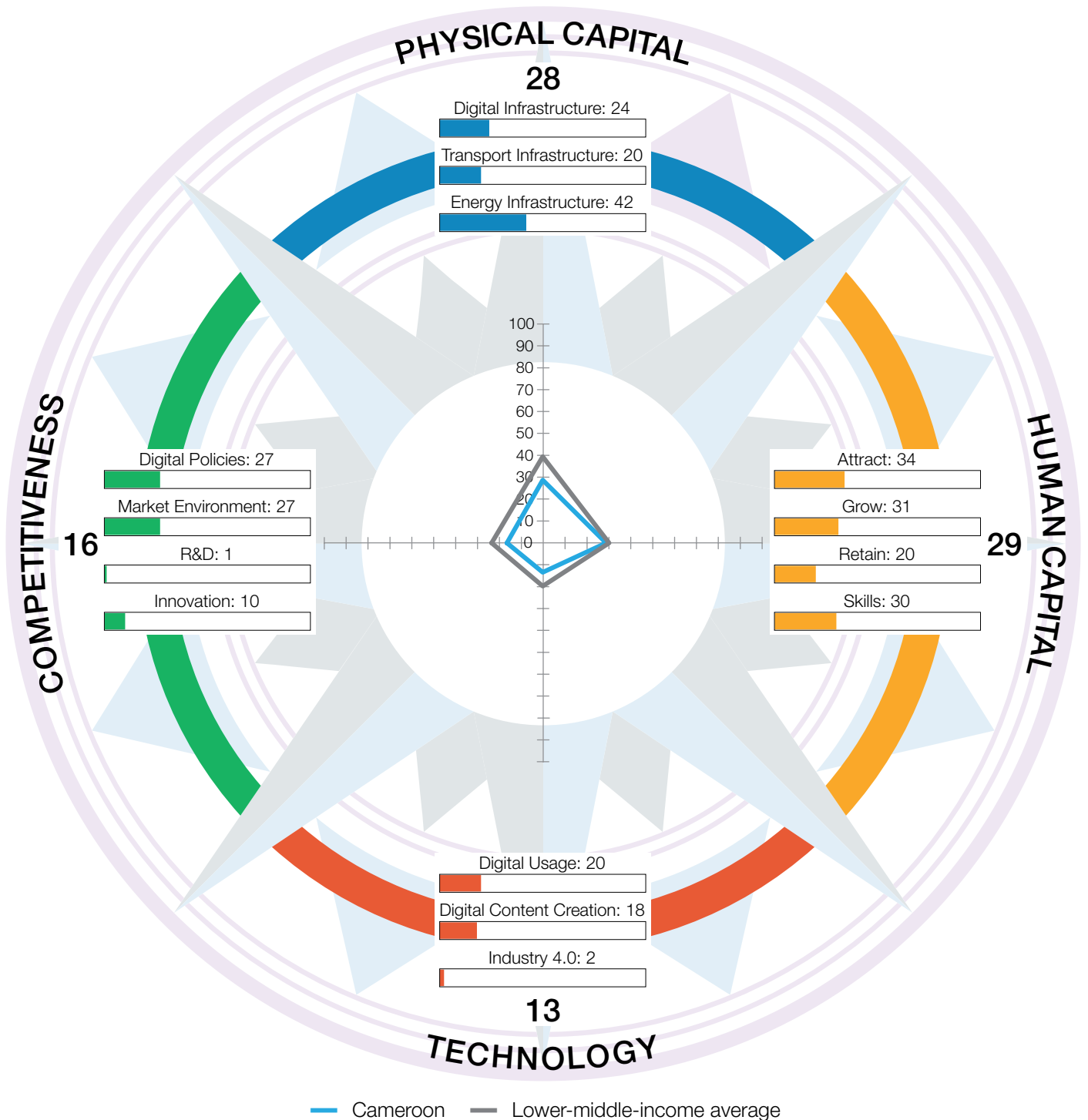
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	43.63	88	3	TECHNOLOGY	21.52	92
1.1	Digital Infrastructure	60.79	80	3.1	Digital Usage	42.86	88
1.1.1	Internet access	73.30	66	3.1.1	Internet users	77.75	52
1.1.2	International Internet bandwidth	35.62	92	3.1.2	Active mobile-broadband subscriptions	41.99	42
1.1.3	Fixed-broadband subscriptions	90.38	46	3.1.3	Gender parity in Internet usage	100.00	2
1.1.4	4G-mobile network coverage	80.30	87	3.1.4	Firms with website	13.30	97
1.1.5	Fixed broadband affordability	71.41	103	3.1.5	Internet shopping	3.88	96
1.1.6	Mobile broadband affordability	72.40	81	3.1.6	Government online services	32.11	108
1.1.7	Computer software spending	2.12	104	3.1.7	E-Participation	30.99	107
1.2	Transport Infrastructure	16.21	111	3.2	Digital Content Creation	19.29	99
1.2.1	Quality of infrastructure	20.64	115	3.2.1	GitHub commits	1.00	96
1.2.2	Rural access	33.02	105	3.2.2	Wikipedia edits	21.46	107
1.2.3	Air connectivity	9.08	55	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	54.36	91
1.3	Energy Infrastructure	53.88	82	3.3	Industry 4.0	2.40	101
1.3.1	Access to electricity	92.12	95	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	0.92	108
1.3.3	Electrical outages	79.92	57	3.3.3	AI research	1.86	81
1.3.4	Energy intensity	67.99	85	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	24.89	109	4	COMPETITIVENESS	14.79	114
2.1	Attract	42.30	75	4.1	Digital Policies	20.88	117
2.1.1	Brain gain	54.69	45	4.1.1	ICT regulation	54.32	101
2.1.2	International students	n/a	n/a	4.1.2	Cybersecurity	17.30	117
2.1.3	Tolerance of minorities	40.43	70	4.1.3	Rule of law	9.81	114
2.1.4	Tolerance of immigrants	9.23	120	4.1.4	Regulatory quality	22.99	100
2.1.5	Gender parity in high-skilled jobs	53.57	91	4.1.5	Corruption	0.00	124
2.1.6	FDI and technology transfer	53.61	53	4.2	Market Environment	24.49	96
2.2	Grow	24.88	94	4.2.1	Extent of market dominance	37.40	82
2.2.1	Tertiary enrolment	9.42	97	4.2.2	Labour productivity	0.99	110
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	8.33	118
2.2.3	Use of virtual professional networks	3.32	106	4.2.4	Domestic credit to private sector	51.22	21
2.2.4	Formal and non-formal studies	1.38	68	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	85.39	36	4.3	R&D	9.39	105
2.3	Retain	21.17	104	4.3.1	R&D spending	2.14	93
2.3.1	Pension coverage	4.69	112	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	14.81	103	4.3.3	Gender parity in R&D	35.09	75
2.3.3	Physician density	1.97	105	4.3.4	Scientific journal articles	0.32	113
2.3.4	Sanitation	56.01	101	4.4	Innovation	4.39	116
2.3.5	Personal safety	28.35	104	4.4.1	Medium- and high-tech industry	0.00	118
2.4	Skills	11.20	117	4.4.2	High-tech exports	1.91	106
2.4.1	Workforce with tertiary education	8.02	100	4.4.3	Venture capital recipients, deals	17.13	32
2.4.2	High-skilled workforce	10.38	108	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	0.22	91	4.4.5	New business density	2.68	84
2.4.4	Ease of finding skilled employees	33.18	103	4.4.6	Patent applications	0.22	92
2.4.5	Digital skills	4.21	72				

Cameroon

Key Indicators

Rank (out of 124)	107	GDP per capita (PPP US\$)	3,796.31
Income group	Lower-middle income	GDP (US\$ billions)	39.80
Regional group	Sub-Saharan Africa	FREI score	21.67
Population (millions)	26.55	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)

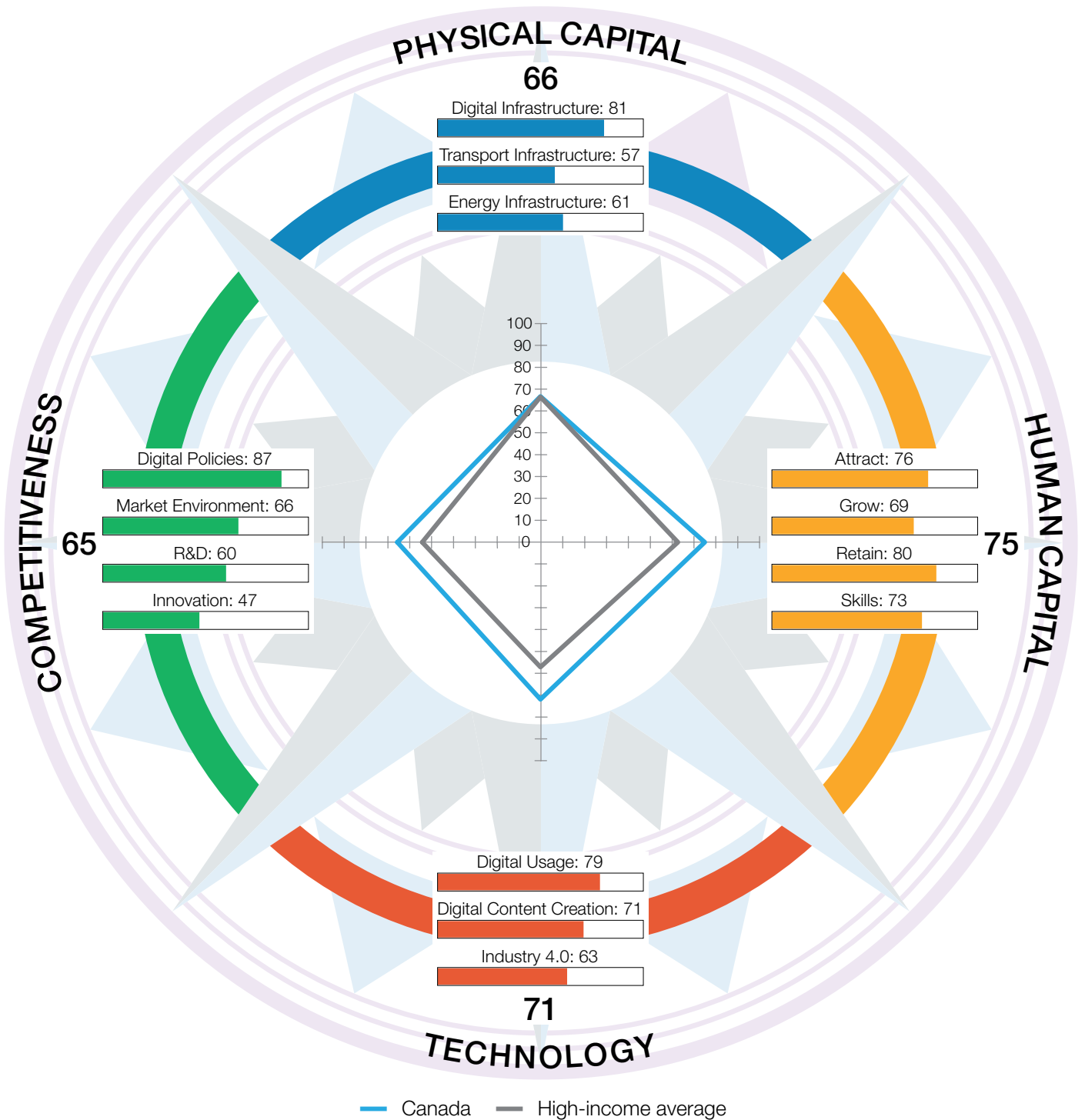


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	28.50	110	3	TECHNOLOGY	13.25	109
1.1	Digital Infrastructure	24.12	116	3.1	Digital Usage	20.28	114
1.1.1	Internet access	20.41	99	3.1.1	Internet users	19.40	107
1.1.2	International Internet bandwidth	10.62	121	3.1.2	Active mobile-broadband subscriptions	5.24	121
1.1.3	Fixed-broadband subscriptions	12.97	106	3.1.3	Gender parity in Internet usage	37.15	93
1.1.4	4G-mobile network coverage	10.76	121	3.1.4	Firms with website	11.36	98
1.1.5	Fixed broadband affordability	50.46	111	3.1.5	Internet shopping	3.51	100
1.1.6	Mobile broadband affordability	51.71	108	3.1.6	Government online services	34.31	105
1.1.7	Computer software spending	11.93	79	3.1.7	E-Participation	30.99	107
1.2	Transport Infrastructure	19.74	100	3.2	Digital Content Creation	17.52	100
1.2.1	Quality of infrastructure	35.94	74	3.2.1	GitHub commits	0.43	104
1.2.2	Rural access	40.75	97	3.2.2	Wikipedia edits	17.17	111
1.2.3	Air connectivity	0.24	115	3.2.3	Internet domain registrations	n/a	n/a
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	34.95	107
1.3	Energy Infrastructure	41.63	100	3.3	Industry 4.0	1.94	102
1.3.1	Access to electricity	58.84	107	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	3.29	94
1.3.3	Electrical outages	50.47	78	3.3.3	AI research	1.06	93
1.3.4	Energy intensity	73.41	74	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	28.76	98	4	COMPETITIVENESS	16.19	110
2.1	Attract	34.31	106	4.1	Digital Policies	26.94	109
2.1.1	Brain gain	44.34	72	4.1.1	ICT regulation	62.97	93
2.1.2	International students	7.44	66	4.1.2	Cybersecurity	44.41	96
2.1.3	Tolerance of minorities	12.77	112	4.1.3	Rule of law	3.83	120
2.1.4	Tolerance of immigrants	61.54	58	4.1.4	Regulatory quality	17.51	114
2.1.5	Gender parity in high-skilled jobs	56.98	87	4.1.5	Corruption	5.97	115
2.1.6	FDI and technology transfer	22.77	106	4.2	Market Environment	27.18	92
2.2	Grow	30.91	80	4.2.1	Extent of market dominance	52.28	46
2.2.1	Tertiary enrolment	9.10	98	4.2.2	Labour productivity	4.71	100
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	47.80	79
2.2.3	Use of virtual professional networks	4.87	98	4.2.4	Domestic credit to private sector	3.93	112
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	78.76	51	4.3	R&D	0.67	118
2.3	Retain	20.01	106	4.3.1	R&D spending	n/a	n/a
2.3.1	Pension coverage	16.63	97	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	14.81	103	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	0.66	115	4.3.4	Scientific journal articles	1.34	91
2.3.4	Sanitation	34.27	108	4.4	Innovation	9.98	96
2.3.5	Personal safety	33.70	96	4.4.1	Medium- and high-tech industry	9.16	104
2.4	Skills	29.80	75	4.4.2	High-tech exports	9.66	72
2.4.1	Workforce with tertiary education	7.10	104	4.4.3	Venture capital recipients, deals	3.19	72
2.4.2	High-skilled workforce	12.75	105	4.4.4	New product entrepreneurial activity	27.56	69
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	n/a	n/a
2.4.4	Ease of finding skilled employees	69.56	35	4.4.6	Patent applications	0.34	88
2.4.5	Digital skills	n/a	n/a				

Key Indicators

Rank (out of 124)	10	GDP per capita (PPP US\$)	50,510.75
Income group	High income	GDP (US\$ billions)	1,644.04
Regional group	Northern America	FREI score	69.24
Population (millions)	38.01	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)

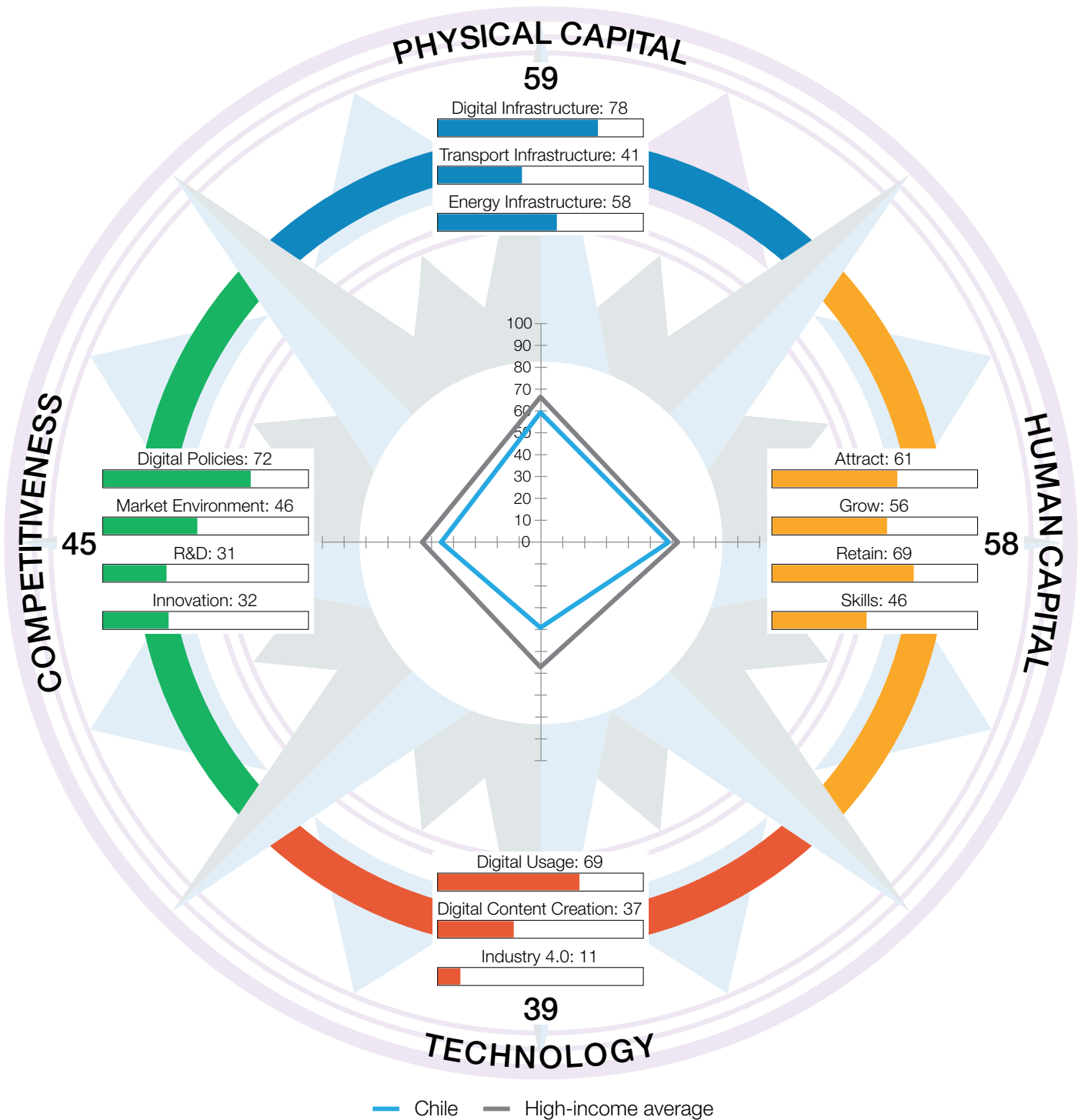


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	66.19	19	3	TECHNOLOGY	71.34	10
1.1	Digital Infrastructure	81.04	16	3.1	Digital Usage	79.15	20
1.1.1	Internet access	91.03	26	3.1.1	Internet users	94.37	13
1.1.2	International Internet bandwidth	45.63	58	3.1.2	Active mobile-broadband subscriptions	36.40	65
1.1.3	Fixed-broadband subscriptions	88.52	49	3.1.3	Gender parity in Internet usage	n/a	n/a
1.1.4	4G-mobile network coverage	99.50	32	3.1.4	Firms with website	82.93	16
1.1.5	Fixed broadband affordability	98.25	32	3.1.5	Internet shopping	87.95	9
1.1.6	Mobile broadband affordability	87.73	34	3.1.6	Government online services	80.30	31
1.1.7	Computer software spending	56.65	5	3.1.7	E-Participation	92.96	16
1.2	Transport Infrastructure	56.76	22	3.2	Digital Content Creation	71.46	13
1.2.1	Quality of infrastructure	77.94	19	3.2.1	GitHub commits	70.30	9
1.2.2	Rural access	74.58	51	3.2.2	Wikipedia edits	76.44	26
1.2.3	Air connectivity	30.87	24	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	92.08	22
1.3	Energy Infrastructure	60.76	41	3.3	Industry 4.0	63.42	8
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	50.86	13
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	100.00	1
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	62.32	9
1.3.4	Energy intensity	52.58	108	3.3.4	ICT patent applications	37.57	13
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	74.56	9	4	COMPETITIVENESS	64.89	8
2.1	Attract	75.98	7	4.1	Digital Policies	87.07	13
2.1.1	Brain gain	79.39	11	4.1.1	ICT regulation	83.41	49
2.1.2	International students	43.27	11	4.1.2	Cybersecurity	97.62	13
2.1.3	Tolerance of minorities	81.91	7	4.1.3	Rule of law	87.36	12
2.1.4	Tolerance of immigrants	98.46	2	4.1.4	Regulatory quality	83.36	10
2.1.5	Gender parity in high-skilled jobs	84.35	40	4.1.5	Corruption	83.58	11
2.1.6	FDI and technology transfer	68.47	26	4.2	Market Environment	65.91	12
2.2	Grow	68.93	11	4.2.1	Extent of market dominance	62.60	28
2.2.1	Tertiary enrolment	50.69	26	4.2.2	Labour productivity	62.94	18
2.2.2	Reading, maths, and science	74.55	6	4.2.3	Urbanisation	77.76	30
2.2.3	Use of virtual professional networks	63.83	9	4.2.4	Domestic credit to private sector	n/a	n/a
2.2.4	Formal and non-formal studies	78.20	9	4.2.5	Market capitalisation	60.35	7
2.2.5	Youth inclusion	77.36	55	4.3	R&D	59.68	9
2.3	Retain	80.11	24	4.3.1	R&D spending	31.04	22
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	83.57	3
2.3.2	Environmental performance	79.97	20	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	30.17	59	4.3.4	Scientific journal articles	64.42	10
2.3.4	Sanitation	99.23	24	4.4	Innovation	46.90	13
2.3.5	Personal safety	91.21	7	4.4.1	Medium- and high-tech industry	45.66	37
2.4	Skills	73.22	5	4.4.2	High-tech exports	26.53	30
2.4.1	Workforce with tertiary education	83.08	2	4.4.3	Venture capital recipients, deals	100.00	1
2.4.2	High-skilled workforce	68.65	24	4.4.4	New product entrepreneurial activity	84.99	6
2.4.3	Researchers	53.55	22	4.4.5	New business density	0.53	107
2.4.4	Ease of finding skilled employees	87.58	11	4.4.6	Patent applications	23.68	23
2.4.5	Digital skills	n/a	n/a				

Key Indicators

Rank (out of 124)	37	GDP per capita (PPP US\$)	26,247.39
Income group	High income	GDP (US\$ billions)	252.94
Regional group	Latin America and the Caribbean	FREI score	50.25
Population (millions)	19.12	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



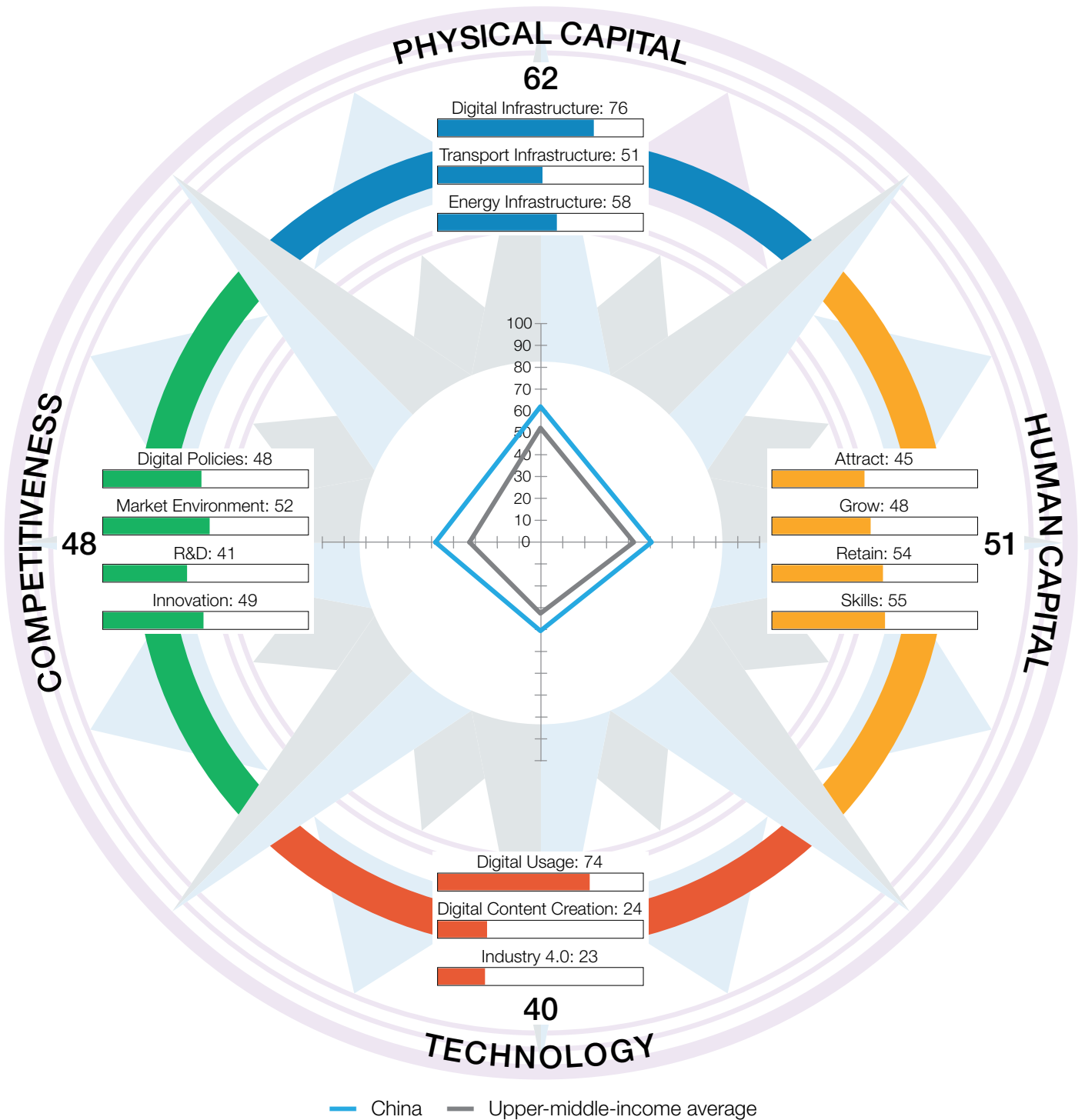
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	58.98	46	3	TECHNOLOGY	38.76	47
1.1	Digital Infrastructure	78.43	28	3.1	Digital Usage	68.60	40
1.1.1	Internet access	87.51	37	3.1.1	Internet users	81.45	47
1.1.2	International Internet bandwidth	54.13	28	3.1.2	Active mobile-broadband subscriptions	44.13	37
1.1.3	Fixed-broadband subscriptions	89.54	47	3.1.3	Gender parity in Internet usage	91.82	57
1.1.4	4G-mobile network coverage	88.00	81	3.1.4	Firms with website	n/a	n/a
1.1.5	Fixed broadband affordability	94.87	63	3.1.5	Internet shopping	29.38	45
1.1.6	Mobile broadband affordability	86.71	38	3.1.6	Government online services	81.75	24
1.1.7	Computer software spending	48.23	7	3.1.7	E-Participation	83.09	29
1.2	Transport Infrastructure	40.98	48	3.2	Digital Content Creation	37.00	50
1.2.1	Quality of infrastructure	58.72	31	3.2.1	GitHub commits	7.28	53
1.2.2	Rural access	74.32	53	3.2.2	Wikipedia edits	61.78	47
1.2.3	Air connectivity	9.32	52	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	71.81	61
1.3	Energy Infrastructure	57.54	66	3.3	Industry 4.0	10.68	47
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	0.70	56
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	15.60	44
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	10.31	48
1.3.4	Energy intensity	80.72	51	3.3.4	ICT patent applications	0.97	49
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	58.22	30	4	COMPETITIVENESS	45.05	38
2.1	Attract	61.37	27	4.1	Digital Policies	71.57	30
2.1.1	Brain gain	55.43	44	4.1.1	ICT regulation	82.69	50
2.1.2	International students	1.45	91	4.1.2	Cybersecurity	68.13	80
2.1.3	Tolerance of minorities	71.28	23	4.1.3	Rule of law	69.85	24
2.1.4	Tolerance of immigrants	67.69	45	4.1.4	Regulatory quality	68.52	30
2.1.5	Gender parity in high-skilled jobs	98.70	7	4.1.5	Corruption	68.66	23
2.1.6	FDI and technology transfer	73.68	18	4.2	Market Environment	45.87	36
2.2	Grow	56.49	29	4.2.1	Extent of market dominance	25.84	102
2.2.1	Tertiary enrolment	62.47	8	4.2.2	Labour productivity	34.93	47
2.2.2	Reading, maths, and science	42.32	45	4.2.3	Urbanisation	85.12	17
2.2.3	Use of virtual professional networks	41.04	21	4.2.4	Domestic credit to private sector	56.13	18
2.2.4	Formal and non-formal studies	63.73	22	4.2.5	Market capitalisation	27.36	22
2.2.5	Youth inclusion	72.86	67	4.3	R&D	30.87	57
2.3	Retain	69.03	41	4.3.1	R&D spending	6.97	70
2.3.1	Pension coverage	70.92	63	4.3.2	University ranking	43.06	35
2.3.2	Environmental performance	52.61	42	4.3.3	Gender parity in R&D	58.34	49
2.3.3	Physician density	64.52	11	4.3.4	Scientific journal articles	15.11	47
2.3.4	Sanitation	100.00	1	4.4	Innovation	31.87	30
2.3.5	Personal safety	57.12	58	4.4.1	Medium- and high-tech industry	22.99	75
2.4	Skills	45.98	34	4.4.2	High-tech exports	12.09	59
2.4.1	Workforce with tertiary education	28.52	59	4.4.3	Venture capital recipients, deals	3.95	66
2.4.2	High-skilled workforce	48.58	43	4.4.4	New product entrepreneurial activity	99.19	2
2.4.3	Researchers	5.97	65	4.4.5	New business density	43.62	10
2.4.4	Ease of finding skilled employees	80.47	20	4.4.6	Patent applications	9.37	33
2.4.5	Digital skills	66.38	8				

China

Key Indicators

Rank (out of 124)	38	GDP per capita (PPP US\$)	16,846.80
Income group	Upper-middle income	GDP (US\$ billions)	14,722.73
Regional group	Asia and Pacific	FREI score	50.01
Population (millions)	1,402.11	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



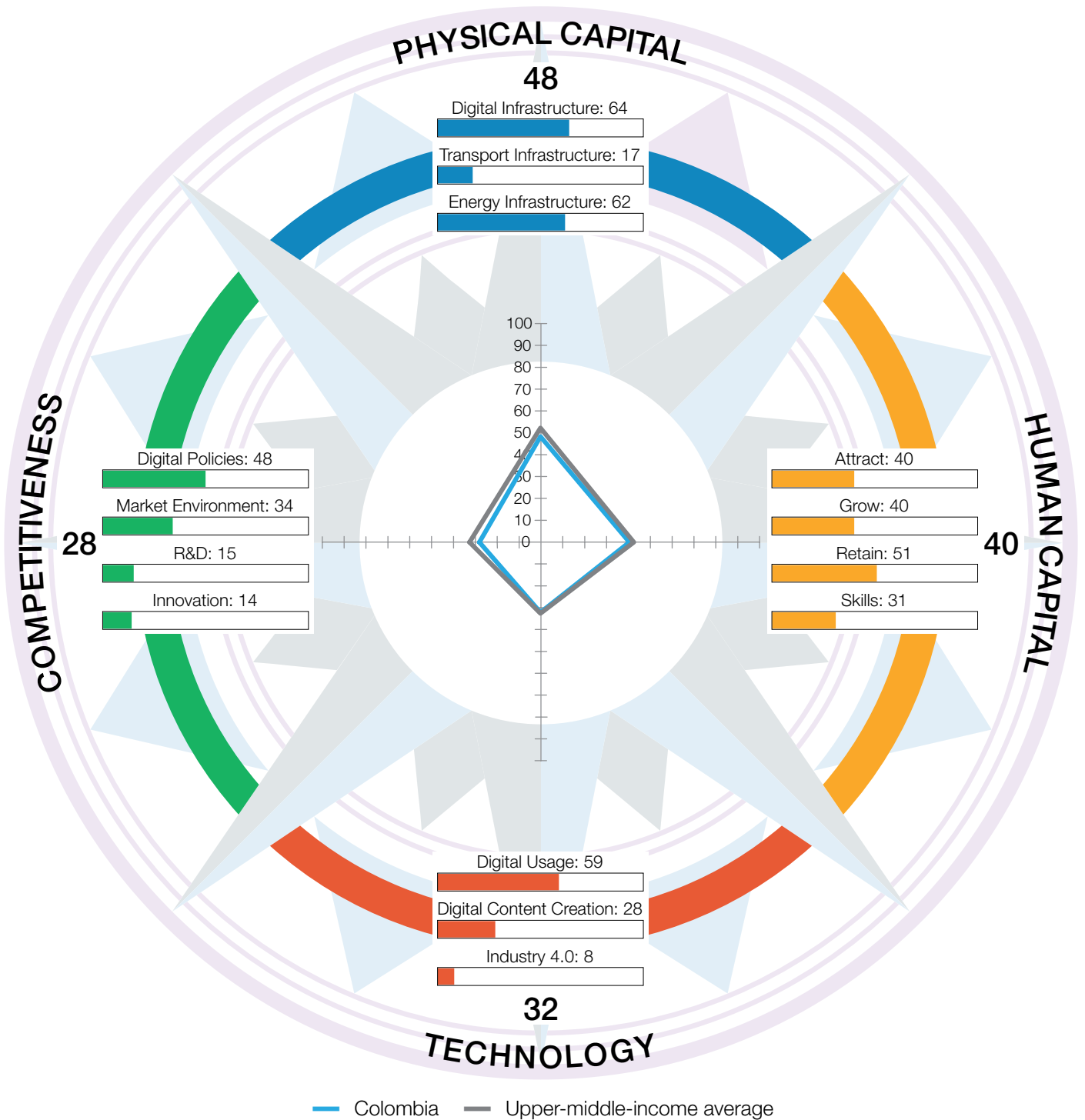
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	61.61	41	3	TECHNOLOGY	40.28	42
1.1	Digital Infrastructure	76.11	38	3.1	Digital Usage	73.61	30
1.1.1	Internet access	n/a	n/a	3.1.1	Internet users	69.19	72
1.1.2	International Internet bandwidth	39.57	83	3.1.2	Active mobile-broadband subscriptions	41.94	43
1.1.3	Fixed-broadband subscriptions	99.33	9	3.1.3	Gender parity in Internet usage	98.03	19
1.1.4	4G-mobile network coverage	99.90	15	3.1.4	Firms with website	63.95	45
1.1.5	Fixed broadband affordability	99.73	2	3.1.5	Internet shopping	58.06	28
1.1.6	Mobile broadband affordability	91.24	26	3.1.6	Government online services	88.32	12
1.1.7	Computer software spending	26.90	37	3.1.7	E-Participation	95.78	9
1.2	Transport Infrastructure	50.93	32	3.2	Digital Content Creation	23.88	85
1.2.1	Quality of infrastructure	77.94	19	3.2.1	GitHub commits	3.38	64
1.2.2	Rural access	71.16	57	3.2.2	Wikipedia edits	n/a	n/a
1.2.3	Air connectivity	8.14	59	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	64.23	70
1.3	Energy Infrastructure	57.78	64	3.3	Industry 4.0	23.34	27
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	39.65	20
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	2.55	98
1.3.3	Electrical outages	97.82	4	3.3.3	AI research	11.32	45
1.3.4	Energy intensity	57.49	100	3.3.4	ICT patent applications	29.78	17
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	50.51	41	4	COMPETITIVENESS	47.63	33
2.1	Attract	44.92	64	4.1	Digital Policies	48.26	73
2.1.1	Brain gain	79.59	10	4.1.1	ICT regulation	43.75	116
2.1.2	International students	1.12	95	4.1.2	Cybersecurity	92.36	40
2.1.3	Tolerance of minorities	29.79	82	4.1.3	Rule of law	36.24	59
2.1.4	Tolerance of immigrants	58.46	64	4.1.4	Regulatory quality	37.61	74
2.1.5	Gender parity in high-skilled jobs	n/a	n/a	4.1.5	Corruption	31.34	60
2.1.6	FDI and technology transfer	55.65	51	4.2	Market Environment	52.49	28
2.2	Grow	47.66	43	4.2.1	Extent of market dominance	82.12	8
2.2.1	Tertiary enrolment	39.00	52	4.2.2	Labour productivity	14.26	84
2.2.2	Reading, maths, and science	100.00	1	4.2.3	Urbanisation	51.12	72
2.2.3	Use of virtual professional networks	3.98	104	4.2.4	Domestic credit to private sector	83.81	3
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	31.12	20
2.2.5	Youth inclusion	n/a	n/a	4.3	R&D	40.85	33
2.3	Retain	54.46	63	4.3.1	R&D spending	43.18	14
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	82.83	4
2.3.2	Environmental performance	21.25	93	4.3.3	Gender parity in R&D	22.33	88
2.3.3	Physician density	24.37	69	4.3.4	Scientific journal articles	15.07	48
2.3.4	Sanitation	83.56	81	4.4	Innovation	48.93	11
2.3.5	Personal safety	43.12	79	4.4.1	Medium- and high-tech industry	51.36	28
2.4	Skills	55.02	23	4.4.2	High-tech exports	49.45	6
2.4.1	Workforce with tertiary education	n/a	n/a	4.4.3	Venture capital recipients, deals	31.02	17
2.4.2	High-skilled workforce	n/a	n/a	4.4.4	New product entrepreneurial activity	66.36	14
2.4.3	Researchers	16.07	45	4.4.5	New business density	n/a	n/a
2.4.4	Ease of finding skilled employees	93.96	4	4.4.6	Patent applications	46.44	13
2.4.5	Digital skills	n/a	n/a				

Colombia

Key Indicators

Rank (out of 124)	73	GDP per capita (PPP US\$)	15,630.08
Income group	Upper-middle income	GDP (US\$ billions)	271.35
Regional group	Latin America and the Caribbean	FREI score	36.99
Population (millions)	50.88	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



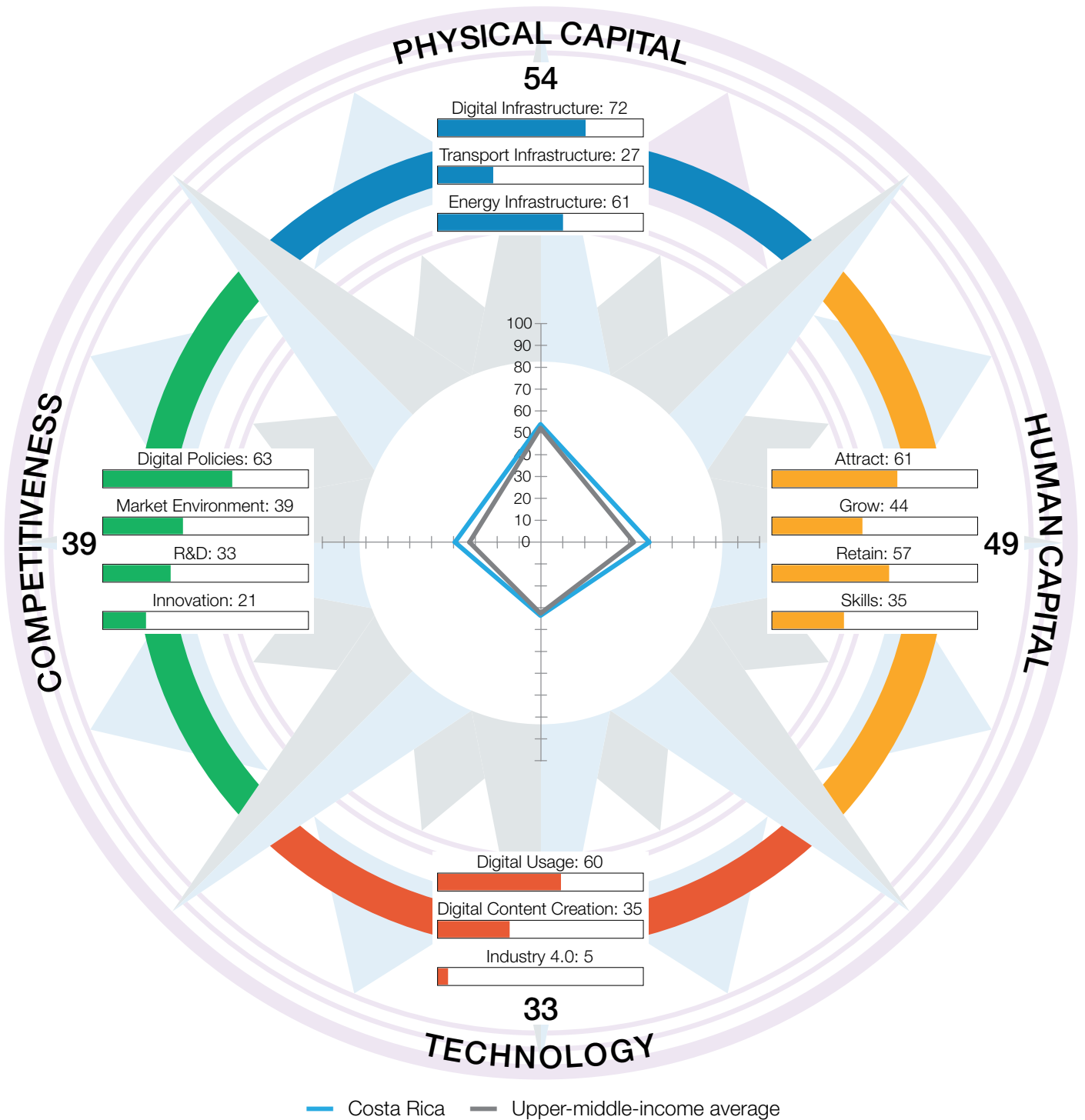
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	47.95	77	3	TECHNOLOGY	31.90	64
1.1	Digital Infrastructure	64.43	74	3.1	Digital Usage	59.41	62
1.1.1	Internet access	51.45	83	3.1.1	Internet users	63.28	81
1.1.2	International Internet bandwidth	57.32	20	3.1.2	Active mobile-broadband subscriptions	26.27	91
1.1.3	Fixed-broadband subscriptions	71.77	69	3.1.3	Gender parity in Internet usage	94.24	48
1.1.4	4G-mobile network coverage	98.00	53	3.1.4	Firms with website	66.02	41
1.1.5	Fixed broadband affordability	90.86	82	3.1.5	Internet shopping	10.78	69
1.1.6	Mobile broadband affordability	64.21	91	3.1.6	Government online services	70.80	48
1.1.7	Computer software spending	17.38	68	3.1.7	E-Participation	84.50	27
1.2	Transport Infrastructure	17.01	110	3.2	Digital Content Creation	28.48	72
1.2.1	Quality of infrastructure	39.50	71	3.2.1	GitHub commits	4.40	57
1.2.2	Rural access	12.42	121	3.2.2	Wikipedia edits	42.16	75
1.2.3	Air connectivity	7.08	62	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	56.70	87
1.3	Energy Infrastructure	62.41	31	3.3	Industry 4.0	7.80	57
1.3.1	Access to electricity	99.74	81	3.3.1	Robot density	0.19	61
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	17.77	38
1.3.3	Electrical outages	86.53	43	3.3.3	AI research	4.37	64
1.3.4	Energy intensity	92.17	10	3.3.4	ICT patent applications	0.44	56
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	40.40	70	4	COMPETITIVENESS	27.73	79
2.1	Attract	40.27	84	4.1	Digital Policies	47.99	74
2.1.1	Brain gain	37.59	85	4.1.1	ICT regulation	78.36	66
2.1.2	International students	0.51	101	4.1.2	Cybersecurity	62.90	87
2.1.3	Tolerance of minorities	25.53	93	4.1.3	Rule of law	23.37	89
2.1.4	Tolerance of immigrants	60.00	61	4.1.4	Regulatory quality	48.47	54
2.1.5	Gender parity in high-skilled jobs	72.29	67	4.1.5	Corruption	26.87	70
2.1.6	FDI and technology transfer	45.72	66	4.2	Market Environment	34.03	66
2.2	Grow	39.94	54	4.2.1	Extent of market dominance	34.54	90
2.2.1	Tertiary enrolment	36.66	58	4.2.2	Labour productivity	21.42	68
2.2.2	Reading, maths, and science	29.15	59	4.2.3	Urbanisation	77.00	32
2.2.3	Use of virtual professional networks	25.77	40	4.2.4	Domestic credit to private sector	22.51	63
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	14.66	41
2.2.5	Youth inclusion	68.16	74	4.3	R&D	14.57	98
2.3	Retain	50.72	74	4.3.1	R&D spending	4.50	80
2.3.1	Pension coverage	49.59	74	4.3.2	University ranking	33.49	54
2.3.2	Environmental performance	48.43	47	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	47.74	31	4.3.4	Scientific journal articles	5.73	67
2.3.4	Sanitation	88.81	72	4.4	Innovation	14.31	79
2.3.5	Personal safety	19.03	112	4.4.1	Medium- and high-tech industry	28.69	65
2.4	Skills	30.65	73	4.4.2	High-tech exports	14.65	53
2.4.1	Workforce with tertiary education	35.12	45	4.4.3	Venture capital recipients, deals	3.20	71
2.4.2	High-skilled workforce	19.20	91	4.4.4	New product entrepreneurial activity	27.94	67
2.4.3	Researchers	0.93	83	4.4.5	New business density	8.40	51
2.4.4	Ease of finding skilled employees	63.43	48	4.4.6	Patent applications	3.00	52
2.4.5	Digital skills	34.56	35				

Costa Rica

Key Indicators

Rank (out of 124)	52	GDP per capita (PPP US\$)	21,059.92
Income group	Upper-middle income	GDP (US\$ billions)	61.52
Regional group	Latin America and the Caribbean	FREI score	43.77
Population (millions)	5.09	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)

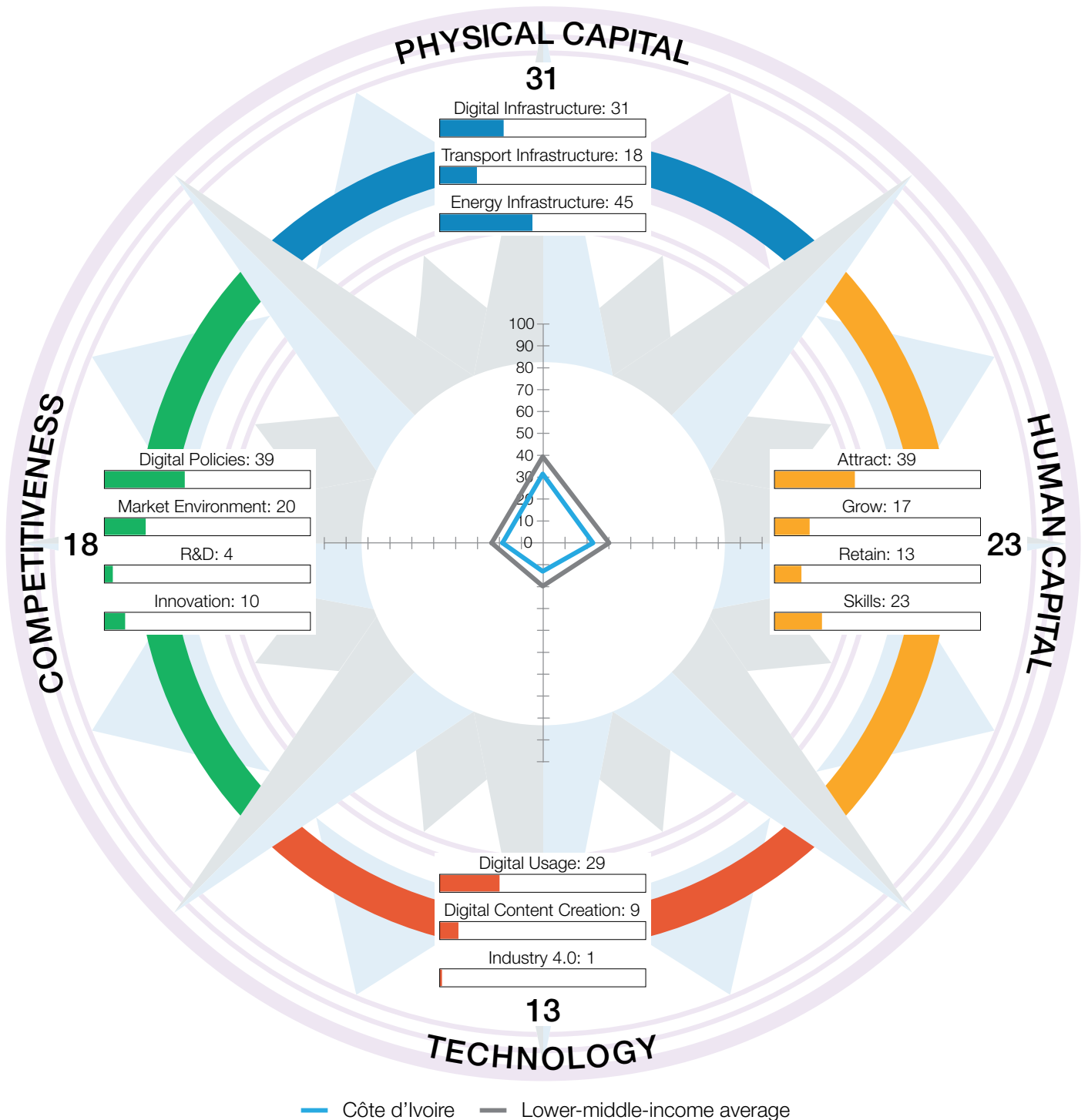


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	53.54	60	3	TECHNOLOGY	33.37	60
1.1	Digital Infrastructure	71.85	55	3.1	Digital Usage	60.01	59
1.1.1	Internet access	84.61	44	3.1.1	Internet users	79.57	51
1.1.2	International Internet bandwidth	58.58	17	3.1.2	Active mobile-broadband subscriptions	39.57	53
1.1.3	Fixed-broadband subscriptions	51.98	83	3.1.3	Gender parity in Internet usage	98.02	20
1.1.4	4G-mobile network coverage	95.00	69	3.1.4	Firms with website	n/a	n/a
1.1.5	Fixed broadband affordability	96.72	53	3.1.5	Internet shopping	23.13	54
1.1.6	Mobile broadband affordability	86.91	36	3.1.6	Government online services	60.59	71
1.1.7	Computer software spending	29.16	29	3.1.7	E-Participation	59.16	76
1.2	Transport Infrastructure	27.35	85	3.2	Digital Content Creation	35.14	53
1.2.1	Quality of infrastructure	33.10	80	3.2.1	GitHub commits	10.05	46
1.2.2	Rural access	54.99	79	3.2.2	Wikipedia edits	51.06	58
1.2.3	Air connectivity	12.20	48	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	74.00	52
1.3	Energy Infrastructure	61.41	35	3.3	Industry 4.0	4.98	77
1.3.1	Access to electricity	99.67	82	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	7.23	73
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	0.28	106
1.3.4	Energy intensity	93.63	7	3.3.4	ICT patent applications	0.11	63
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	49.43	44	4	COMPETITIVENESS	38.72	46
2.1	Attract	60.77	28	4.1	Digital Policies	62.62	47
2.1.1	Brain gain	52.50	50	4.1.1	ICT regulation	85.58	37
2.1.2	International students	3.04	82	4.1.2	Cybersecurity	66.72	82
2.1.3	Tolerance of minorities	73.40	20	4.1.3	Rule of law	55.01	40
2.1.4	Tolerance of immigrants	78.46	26	4.1.4	Regulatory quality	52.09	49
2.1.5	Gender parity in high-skilled jobs	85.01	39	4.1.5	Corruption	53.73	33
2.1.6	FDI and technology transfer	72.21	21	4.2	Market Environment	38.81	55
2.2	Grow	44.04	49	4.2.1	Extent of market dominance	61.10	31
2.2.1	Tertiary enrolment	38.49	56	4.2.2	Labour productivity	30.79	53
2.2.2	Reading, maths, and science	32.95	56	4.2.3	Urbanisation	75.28	36
2.2.3	Use of virtual professional networks	30.75	30	4.2.4	Domestic credit to private sector	25.81	57
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	1.08	77
2.2.5	Youth inclusion	73.95	63	4.3	R&D	32.70	50
2.3	Retain	57.47	58	4.3.1	R&D spending	7.51	68
2.3.1	Pension coverage	55.31	72	4.3.2	University ranking	39.28	44
2.3.2	Environmental performance	47.74	49	4.3.3	Gender parity in R&D	79.99	27
2.3.3	Physician density	35.83	47	4.3.4	Scientific journal articles	4.00	76
2.3.4	Sanitation	97.65	44	4.4	Innovation	20.77	56
2.3.5	Personal safety	50.81	66	4.4.1	Medium- and high-tech industry	19.08	86
2.4	Skills	35.47	58	4.4.2	High-tech exports	28.22	28
2.4.1	Workforce with tertiary education	25.34	67	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	31.58	68	4.4.4	New product entrepreneurial activity	44.02	50
2.4.3	Researchers	4.12	70	4.4.5	New business density	10.87	47
2.4.4	Ease of finding skilled employees	80.81	17	4.4.6	Patent applications	1.65	62
2.4.5	Digital skills	n/a	n/a				

Key Indicators

Rank (out of 124)	108	GDP per capita (PPP US\$)	5,432.99
Income group	Lower-middle income	GDP (US\$ billions)	61.35
Regional group	Sub-Saharan Africa	FREI score	21.29
Population (millions)	26.38	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



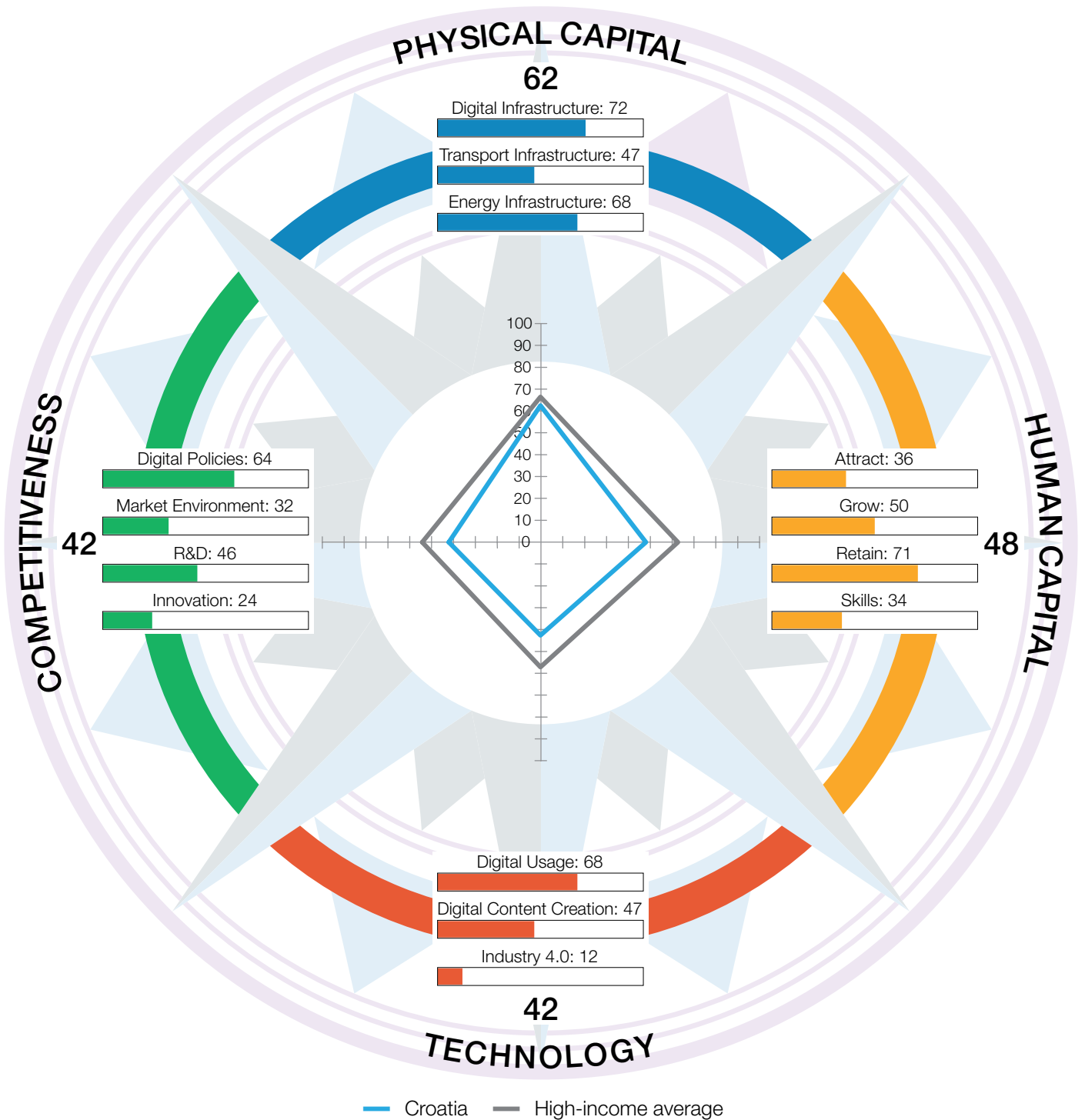
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	31.28	107	3	TECHNOLOGY	12.84	112
1.1	Digital Infrastructure	31.09	109	3.1	Digital Usage	28.65	101
1.1.1	Internet access	15.50	104	3.1.1	Internet users	33.14	98
1.1.2	International Internet bandwidth	22.09	113	3.1.2	Active mobile-broadband subscriptions	32.03	78
1.1.3	Fixed-broadband subscriptions	13.36	105	3.1.3	Gender parity in Internet usage	63.68	89
1.1.4	4G-mobile network coverage	60.00	103	3.1.4	Firms with website	5.92	105
1.1.5	Fixed broadband affordability	58.29	108	3.1.5	Internet shopping	4.12	94
1.1.6	Mobile broadband affordability	47.24	110	3.1.6	Government online services	32.11	108
1.1.7	Computer software spending	1.11	114	3.1.7	E-Participation	29.58	110
1.2	Transport Infrastructure	17.82	108	3.2	Digital Content Creation	8.80	121
1.2.1	Quality of infrastructure	47.33	53	3.2.1	GitHub commits	0.16	113
1.2.2	Rural access	22.01	114	3.2.2	Wikipedia edits	17.13	112
1.2.3	Air connectivity	0.32	112	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	17.72	120
1.3	Energy Infrastructure	44.93	98	3.3	Industry 4.0	1.07	115
1.3.1	Access to electricity	64.58	105	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	1.13	106
1.3.3	Electrical outages	65.43	66	3.3.3	AI research	0.12	113
1.3.4	Energy intensity	82.01	48	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	22.84	113	4	COMPETITIVENESS	18.19	106
2.1	Attract	39.02	89	4.1	Digital Policies	39.25	93
2.1.1	Brain gain	61.46	29	4.1.1	ICT regulation	54.32	101
2.1.2	International students	6.98	68	4.1.2	Cybersecurity	67.10	81
2.1.3	Tolerance of minorities	27.66	88	4.1.3	Rule of law	20.14	95
2.1.4	Tolerance of immigrants	76.92	28	4.1.4	Regulatory quality	32.28	86
2.1.5	Gender parity in high-skilled jobs	18.76	112	4.1.5	Corruption	22.39	80
2.1.6	FDI and technology transfer	42.33	75	4.2	Market Environment	20.38	105
2.2	Grow	16.84	116	4.2.1	Extent of market dominance	39.79	80
2.2.1	Tertiary enrolment	6.18	107	4.2.2	Labour productivity	9.84	91
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	41.10	90
2.2.3	Use of virtual professional networks	5.86	94	4.2.4	Domestic credit to private sector	6.78	106
2.2.4	Formal and non-formal studies	3.78	60	4.2.5	Market capitalisation	4.42	68
2.2.5	Youth inclusion	51.54	102	4.3	R&D	3.61	114
2.3	Retain	12.67	117	4.3.1	R&D spending	1.17	99
2.3.1	Pension coverage	5.82	110	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	1.22	123	4.3.3	Gender parity in R&D	12.93	95
2.3.3	Physician density	1.59	108	4.3.4	Scientific journal articles	0.36	111
2.3.4	Sanitation	26.78	110	4.4	Innovation	9.51	98
2.3.5	Personal safety	27.95	106	4.4.1	Medium- and high-tech industry	18.37	87
2.4	Skills	22.82	98	4.4.2	High-tech exports	18.04	42
2.4.1	Workforce with tertiary education	7.33	103	4.4.3	Venture capital recipients, deals	8.16	52
2.4.2	High-skilled workforce	11.75	107	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	2.97	83
2.4.4	Ease of finding skilled employees	68.60	37	4.4.6	Patent applications	0.00	96
2.4.5	Digital skills	3.59	75				

Croatia

Key Indicators

Rank (out of 124)	42	GDP per capita (PPP US\$)	30,245.98
Income group	High income	GDP (US\$ billions)	55.97
Regional group	Europe	FREI score	48.46
Population (millions)	4.05	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)

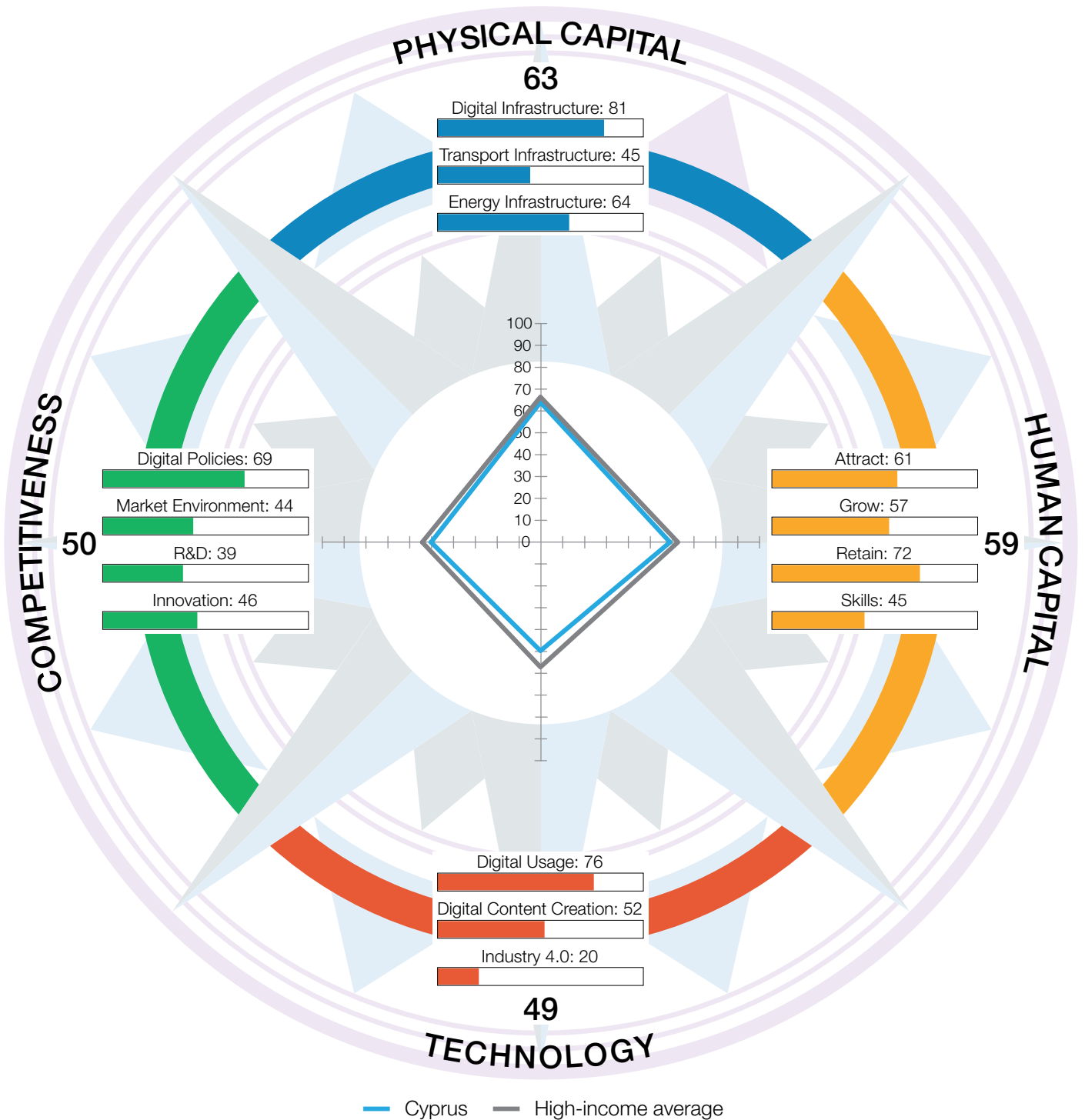


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	62.06	35	3	TECHNOLOGY	42.31	38
1.1	Digital Infrastructure	71.66	56	3.1	Digital Usage	67.86	43
1.1.1	Internet access	84.92	43	3.1.1	Internet users	77.25	55
1.1.2	International Internet bandwidth	58.28	18	3.1.2	Active mobile-broadband subscriptions	46.18	32
1.1.3	Fixed-broadband subscriptions	82.25	57	3.1.3	Gender parity in Internet usage	82.34	77
1.1.4	4G-mobile network coverage	99.53	31	3.1.4	Firms with website	74.59	29
1.1.5	Fixed broadband affordability	99.51	4	3.1.5	Internet shopping	37.96	37
1.1.6	Mobile broadband affordability	72.65	80	3.1.6	Government online services	69.34	51
1.1.7	Computer software spending	4.48	93	3.1.7	E-Participation	87.33	23
1.2	Transport Infrastructure	46.67	36	3.2	Digital Content Creation	46.93	36
1.2.1	Quality of infrastructure	51.60	44	3.2.1	GitHub commits	21.72	34
1.2.2	Rural access	93.04	21	3.2.2	Wikipedia edits	73.29	31
1.2.3	Air connectivity	21.61	36	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	81.47	38
1.3	Energy Infrastructure	67.84	14	3.3	Industry 4.0	12.15	44
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	2.01	45
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	17.52	41
1.3.3	Electrical outages	95.83	13	3.3.3	AI research	25.76	30
1.3.4	Energy intensity	84.51	35	3.3.4	ICT patent applications	0.98	48
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	47.87	46	4	COMPETITIVENESS	41.61	41
2.1	Attract	36.00	101	4.1	Digital Policies	64.48	45
2.1.1	Brain gain	9.60	118	4.1.1	ICT regulation	92.79	14
2.1.2	International students	9.26	61	4.1.2	Cybersecurity	92.36	40
2.1.3	Tolerance of minorities	53.19	49	4.1.3	Rule of law	46.78	48
2.1.4	Tolerance of immigrants	23.08	116	4.1.4	Regulatory quality	51.65	50
2.1.5	Gender parity in high-skilled jobs	96.69	14	4.1.5	Corruption	38.81	50
2.1.6	FDI and technology transfer	24.21	104	4.2	Market Environment	31.53	74
2.2	Grow	50.38	38	4.2.1	Extent of market dominance	25.64	103
2.2.1	Tertiary enrolment	45.29	40	4.2.2	Labour productivity	42.81	42
2.2.2	Reading, maths, and science	56.24	36	4.2.3	Urbanisation	48.49	78
2.2.3	Use of virtual professional networks	21.35	49	4.2.4	Domestic credit to private sector	25.86	56
2.2.4	Formal and non-formal studies	42.96	34	4.2.5	Market capitalisation	14.86	40
2.2.5	Youth inclusion	86.05	33	4.3	R&D	46.04	24
2.3	Retain	70.62	37	4.3.1	R&D spending	19.46	38
2.3.1	Pension coverage	89.59	52	4.3.2	University ranking	26.87	65
2.3.2	Environmental performance	66.20	34	4.3.3	Gender parity in R&D	96.19	8
2.3.3	Physician density	37.15	44	4.3.4	Scientific journal articles	41.65	28
2.3.4	Sanitation	96.27	53	4.4	Innovation	24.40	45
2.3.5	Personal safety	63.90	41	4.4.1	Medium- and high-tech industry	33.68	54
2.4	Skills	34.48	61	4.4.2	High-tech exports	13.34	54
2.4.1	Workforce with tertiary education	35.16	44	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	58.88	32	4.4.4	New product entrepreneurial activity	47.21	44
2.4.3	Researchers	23.70	38	4.4.5	New business density	24.71	26
2.4.4	Ease of finding skilled employees	15.49	118	4.4.6	Patent applications	3.06	51
2.4.5	Digital skills	39.19	26				

Key Indicators

Rank (out of 124)	28	GDP per capita (PPP US\$)	38,458.19
Income group	High income	GDP (US\$ billions)	23.80
Regional group	Middle East and North Africa	FREI score	55.30
Population (millions)	1.21	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



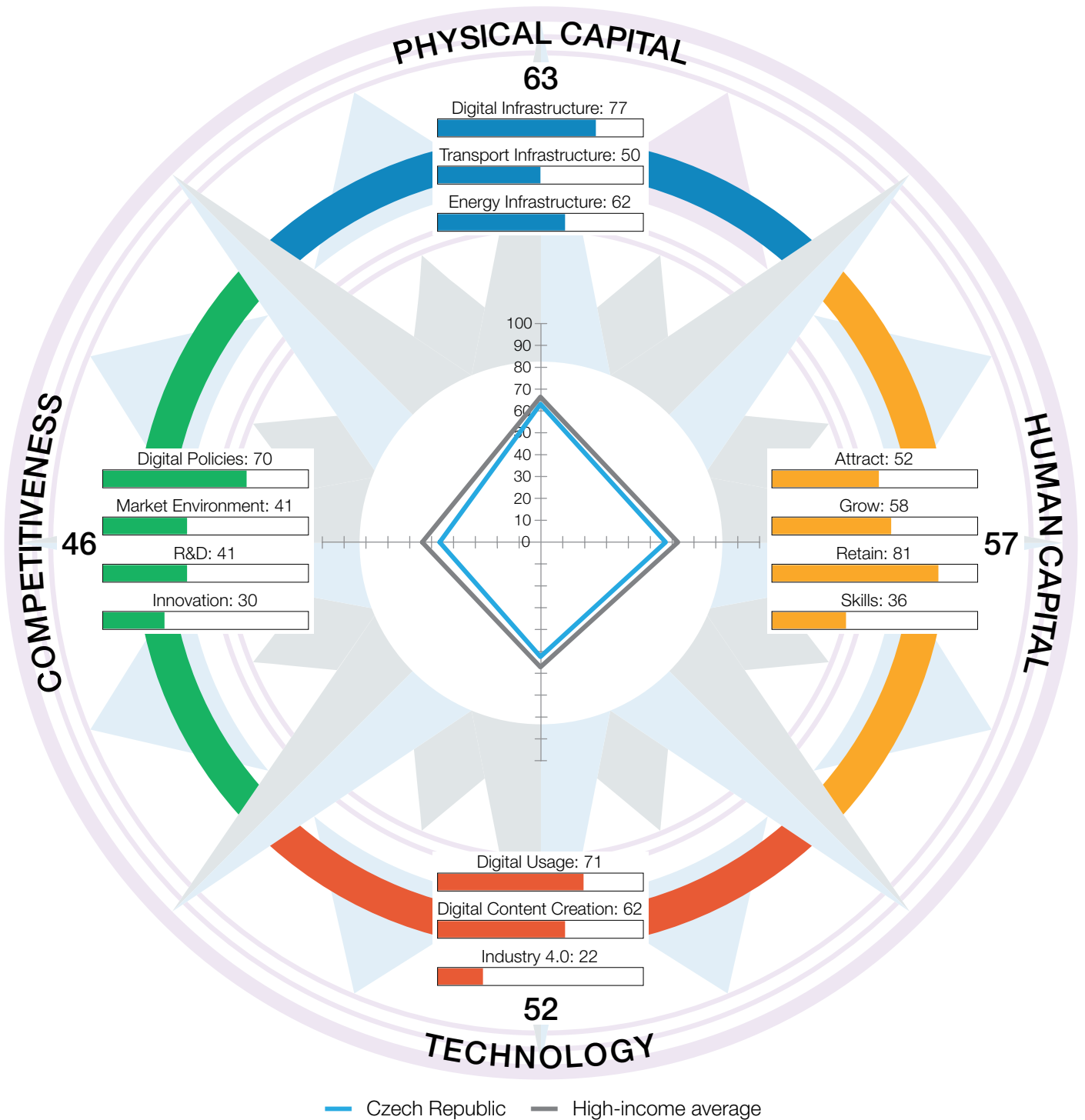
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	63.48	31	3	TECHNOLOGY	49.30	30
1.1	Digital Infrastructure	80.90	18	3.1	Digital Usage	75.88	26
1.1.1	Internet access	92.84	18	3.1.1	Internet users	90.35	23
1.1.2	International Internet bandwidth	79.67	2	3.1.2	Active mobile-broadband subscriptions	51.88	19
1.1.3	Fixed-broadband subscriptions	97.46	18	3.1.3	Gender parity in Internet usage	98.71	12
1.1.4	4G-mobile network coverage	99.93	14	3.1.4	Firms with website	70.48	34
1.1.5	Fixed broadband affordability	98.78	18	3.1.5	Internet shopping	41.45	35
1.1.6	Mobile broadband affordability	83.28	53	3.1.6	Government online services	83.94	20
1.1.7	Computer software spending	14.34	73	3.1.7	E-Participation	94.37	14
1.2	Transport Infrastructure	45.23	41	3.2	Digital Content Creation	51.70	30
1.2.1	Quality of infrastructure	47.33	53	3.2.1	GitHub commits	14.03	38
1.2.2	Rural access	23.26	113	3.2.2	Wikipedia edits	62.31	46
1.2.3	Air connectivity	97.44	5	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	96.15	11
1.3	Energy Infrastructure	64.30	23	3.3	Industry 4.0	20.32	29
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	32.66	23
1.3.3	Electrical outages	95.83	13	3.3.3	AI research	39.83	21
1.3.4	Energy intensity	87.78	24	3.3.4	ICT patent applications	2.40	40
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	58.82	29	4	COMPETITIVENESS	49.62	28
2.1	Attract	61.50	26	4.1	Digital Policies	69.40	36
2.1.1	Brain gain	51.63	53	4.1.1	ICT regulation	82.22	55
2.1.2	International students	69.56	5	4.1.2	Cybersecurity	88.57	49
2.1.3	Tolerance of minorities	51.06	52	4.1.3	Rule of law	55.33	39
2.1.4	Tolerance of immigrants	50.77	77	4.1.4	Regulatory quality	67.17	32
2.1.5	Gender parity in high-skilled jobs	99.49	5	4.1.5	Corruption	53.73	33
2.1.6	FDI and technology transfer	46.48	63	4.2	Market Environment	44.35	40
2.2	Grow	56.84	28	4.2.1	Extent of market dominance	51.51	48
2.2.1	Tertiary enrolment	59.35	12	4.2.2	Labour productivity	51.33	29
2.2.2	Reading, maths, and science	42.42	44	4.2.3	Urbanisation	60.29	61
2.2.3	Use of virtual professional networks	34.51	26	4.2.4	Domestic credit to private sector	51.29	20
2.2.4	Formal and non-formal studies	65.10	19	4.2.5	Market capitalisation	7.34	61
2.2.5	Youth inclusion	82.81	42	4.3	R&D	39.07	37
2.3	Retain	72.10	34	4.3.1	R&D spending	10.86	57
2.3.1	Pension coverage	97.76	37	4.3.2	University ranking	39.69	42
2.3.2	Environmental performance	69.16	31	4.3.3	Gender parity in R&D	64.05	43
2.3.3	Physician density	24.01	70	4.3.4	Scientific journal articles	41.68	27
2.3.4	Sanitation	99.09	26	4.4	Innovation	45.65	16
2.3.5	Personal safety	70.48	31	4.4.1	Medium- and high-tech industry	32.78	57
2.4	Skills	44.82	36	4.4.2	High-tech exports	31.93	23
2.4.1	Workforce with tertiary education	57.17	12	4.4.3	Venture capital recipients, deals	35.96	14
2.4.2	High-skilled workforce	55.60	37	4.4.4	New product entrepreneurial activity	78.95	9
2.4.3	Researchers	15.43	46	4.4.5	New business density	74.45	4
2.4.4	Ease of finding skilled employees	77.99	22	4.4.6	Patent applications	19.81	26
2.4.5	Digital skills	17.93	53				

Czech Republic

Key Indicators

Rank (out of 124)	31	GDP per capita (PPP US\$)	43,004.53
Income group	High income	GDP (US\$ billions)	245.35
Regional group	Europe	FREI score	54.27
Population (millions)	10.70	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



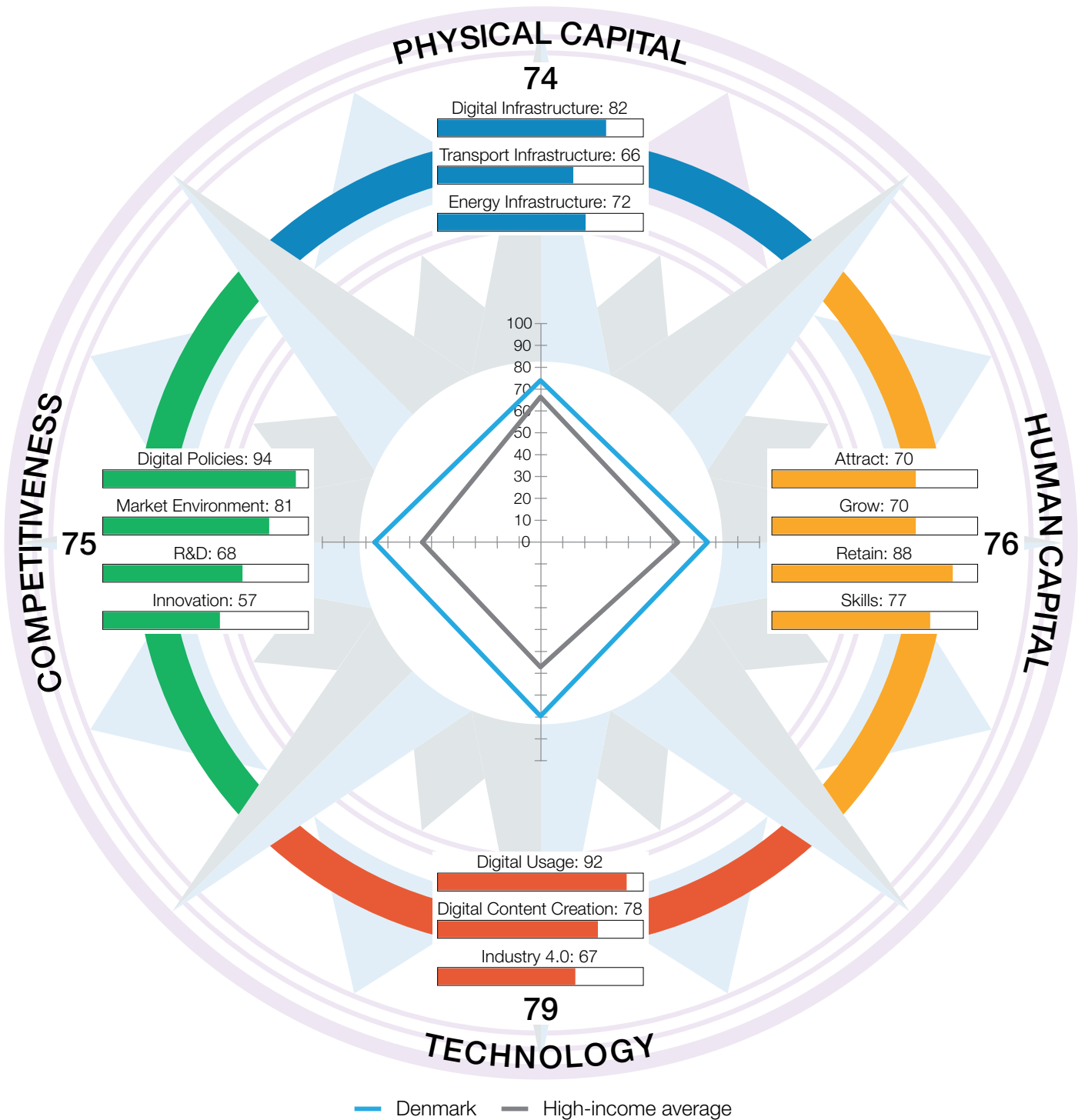
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	62.69	33	3	TECHNOLOGY	51.95	27
1.1	Digital Infrastructure	76.57	36	3.1	Digital Usage	71.49	34
1.1.1	Internet access	81.53	51	3.1.1	Internet users	80.42	49
1.1.2	International Internet bandwidth	43.16	67	3.1.2	Active mobile-broadband subscriptions	41.06	45
1.1.3	Fixed-broadband subscriptions	93.95	35	3.1.3	Gender parity in Internet usage	91.57	59
1.1.4	4G-mobile network coverage	99.80	26	3.1.4	Firms with website	84.76	12
1.1.5	Fixed broadband affordability	98.66	24	3.1.5	Internet shopping	69.31	19
1.1.6	Mobile broadband affordability	96.53	5	3.1.6	Government online services	65.69	60
1.1.7	Computer software spending	22.38	52	3.1.7	E-Participation	67.61	64
1.2	Transport Infrastructure	49.63	34	3.2	Digital Content Creation	62.42	19
1.2.1	Quality of infrastructure	67.62	24	3.2.1	GitHub commits	49.05	18
1.2.2	Rural access	99.54	3	3.2.2	Wikipedia edits	79.99	17
1.2.3	Air connectivity	13.93	44	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	88.77	27
1.3	Energy Infrastructure	61.86	32	3.3	Industry 4.0	21.94	28
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	40.05	19
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	21.76	35
1.3.3	Electrical outages	89.24	36	3.3.3	AI research	27.61	28
1.3.4	Energy intensity	74.53	70	3.3.4	ICT patent applications	2.35	41
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	56.79	32	4	COMPETITIVENESS	45.66	36
2.1	Attract	51.73	41	4.1	Digital Policies	70.10	33
2.1.1	Brain gain	37.10	86	4.1.1	ICT regulation	84.13	44
2.1.2	International students	38.31	13	4.1.2	Cybersecurity	73.79	76
2.1.3	Tolerance of minorities	56.38	45	4.1.3	Rule of law	69.62	26
2.1.4	Tolerance of immigrants	35.38	101	4.1.4	Regulatory quality	73.68	22
2.1.5	Gender parity in high-skilled jobs	80.32	50	4.1.5	Corruption	49.25	38
2.1.6	FDI and technology transfer	62.91	38	4.2	Market Environment	41.13	51
2.2	Grow	57.76	27	4.2.1	Extent of market dominance	60.01	34
2.2.1	Tertiary enrolment	43.85	44	4.2.2	Labour productivity	50.93	30
2.2.2	Reading, maths, and science	65.89	22	4.2.3	Urbanisation	68.64	47
2.2.3	Use of virtual professional networks	22.01	48	4.2.4	Domestic credit to private sector	22.09	65
2.2.4	Formal and non-formal studies	62.38	23	4.2.5	Market capitalisation	4.00	70
2.2.5	Youth inclusion	94.65	10	4.3	R&D	41.17	32
2.3	Retain	81.42	20	4.3.1	R&D spending	38.91	18
2.3.1	Pension coverage	91.12	46	4.3.2	University ranking	36.48	48
2.3.2	Environmental performance	79.97	20	4.3.3	Gender parity in R&D	30.95	79
2.3.3	Physician density	51.14	26	4.3.4	Scientific journal articles	58.34	15
2.3.4	Sanitation	99.07	28	4.4	Innovation	30.23	32
2.3.5	Personal safety	85.78	14	4.4.1	Medium- and high-tech industry	65.54	9
2.4	Skills	36.27	54	4.4.2	High-tech exports	33.42	19
2.4.1	Workforce with tertiary education	30.07	56	4.4.3	Venture capital recipients, deals	1.83	81
2.4.2	High-skilled workforce	60.15	31	4.4.4	New product entrepreneurial activity	53.81	40
2.4.3	Researchers	47.81	23	4.4.5	New business density	18.48	32
2.4.4	Ease of finding skilled employees	18.69	115	4.4.6	Patent applications	8.30	35
2.4.5	Digital skills	24.61	47				

Denmark

Key Indicators

Rank (out of 124)	2	GDP per capita (PPP US\$)	60,334.81
Income group	High income	GDP (US\$ billions)	356.08
Regional group	Europe	FREI score	75.89
Population (millions)	5.83	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0-100)



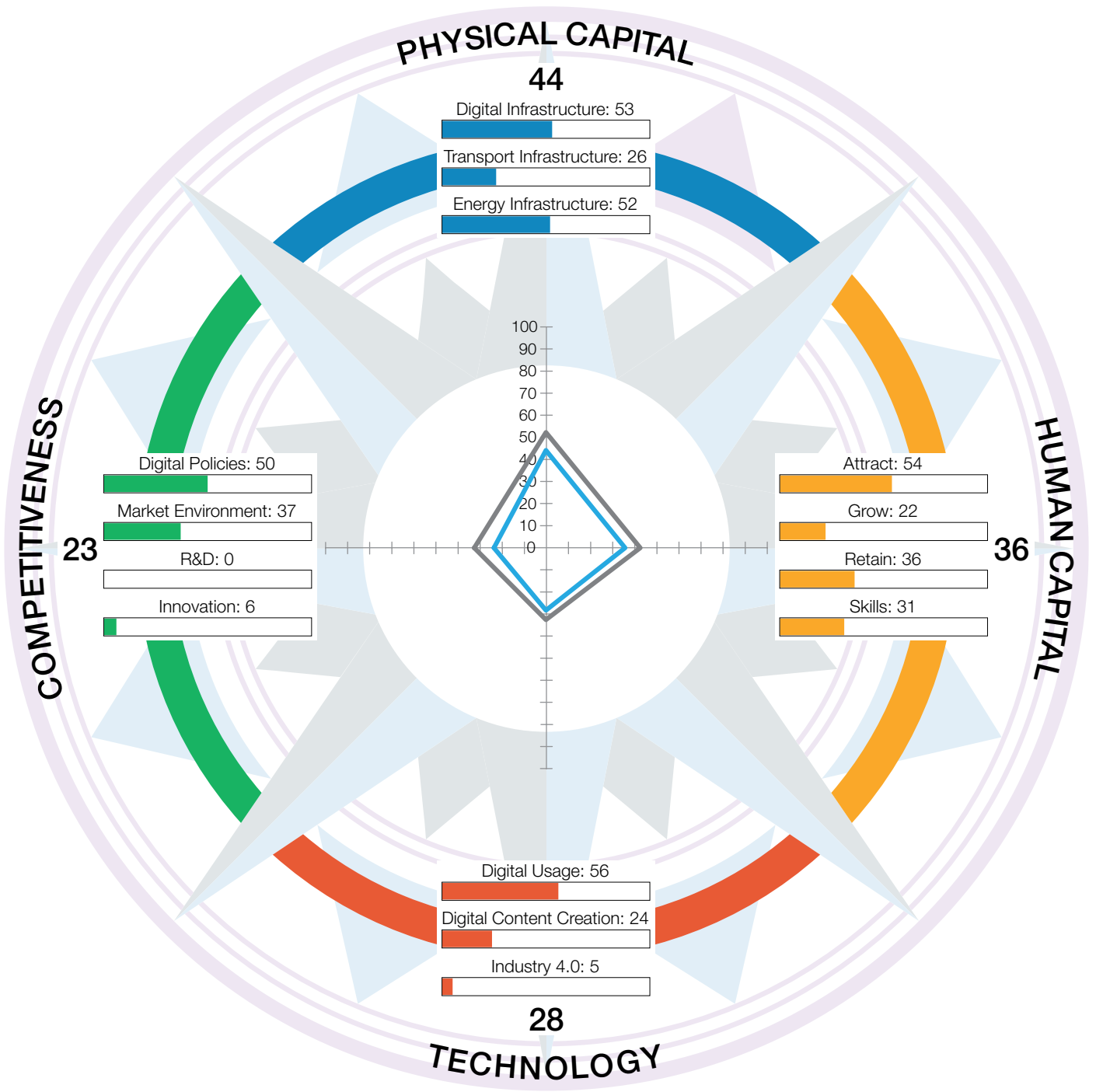
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	73.51	7	3	TECHNOLOGY	78.90	5
1.1	Digital Infrastructure	82.33	9	3.1	Digital Usage	91.63	1
1.1.1	Internet access	92.60	19	3.1.1	Internet users	96.38	9
1.1.2	International Internet bandwidth	47.60	48	3.1.2	Active mobile-broadband subscriptions	60.31	9
1.1.3	Fixed-broadband subscriptions	95.20	32	3.1.3	Gender parity in Internet usage	96.39	34
1.1.4	4G-mobile network coverage	100.00	1	3.1.4	Firms with website	96.19	2
1.1.5	Fixed broadband affordability	98.98	14	3.1.5	Internet shopping	100.00	1
1.1.6	Mobile broadband affordability	95.19	10	3.1.6	Government online services	96.35	3
1.1.7	Computer software spending	46.77	13	3.1.7	E-Participation	95.78	9
1.2	Transport Infrastructure	65.76	9	3.2	Digital Content Creation	77.82	7
1.2.1	Quality of infrastructure	85.41	16	3.2.1	GitHub commits	71.75	7
1.2.2	Rural access	97.07	14	3.2.2	Wikipedia edits	75.08	29
1.2.3	Air connectivity	50.77	13	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	99.89	6
1.3	Energy Infrastructure	72.43	8	3.3	Industry 4.0	67.26	6
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	70.85	6
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	74.39	7
1.3.3	Electrical outages	100.00	1	3.3.3	AI research	75.41	4
1.3.4	Energy intensity	92.86	9	3.3.4	ICT patent applications	38.02	12
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	75.98	3	4	COMPETITIVENESS	75.17	3
2.1	Attract	70.09	13	4.1	Digital Policies	94.05	3
2.1.1	Brain gain	65.52	23	4.1.1	ICT regulation	95.67	6
2.1.2	International students	27.96	22	4.1.2	Cybersecurity	92.43	39
2.1.3	Tolerance of minorities	65.96	32	4.1.3	Rule of law	93.44	5
2.1.4	Tolerance of immigrants	84.62	15	4.1.4	Regulatory quality	88.68	6
2.1.5	Gender parity in high-skilled jobs	97.84	9	4.1.5	Corruption	100.00	1
2.1.6	FDI and technology transfer	78.67	13	4.2	Market Environment	80.77	3
2.2	Grow	69.58	9	4.2.1	Extent of market dominance	90.64	3
2.2.1	Tertiary enrolment	54.85	20	4.2.2	Labour productivity	72.26	10
2.2.2	Reading, maths, and science	68.16	16	4.2.3	Urbanisation	85.49	16
2.2.3	Use of virtual professional networks	63.27	11	4.2.4	Domestic credit to private sector	74.71	7
2.2.4	Formal and non-formal studies	68.22	18	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	93.38	13	4.3	R&D	68.37	4
2.3	Retain	87.51	6	4.3.1	R&D spending	61.29	8
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	63.37	15
2.3.2	Environmental performance	100.00	1	4.3.3	Gender parity in R&D	52.75	53
2.3.3	Physician density	52.51	23	4.3.4	Scientific journal articles	96.09	2
2.3.4	Sanitation	99.57	19	4.4	Innovation	57.50	4
2.3.5	Personal safety	85.47	15	4.4.1	Medium- and high-tech industry	68.68	7
2.4	Skills	76.75	2	4.4.2	High-tech exports	21.31	36
2.4.1	Workforce with tertiary education	46.83	29	4.4.3	Venture capital recipients, deals	40.88	11
2.4.2	High-skilled workforce	78.29	11	4.4.4	New product entrepreneurial activity	96.38	4
2.4.3	Researchers	100.00	1	4.4.5	New business density	42.33	14
2.4.4	Ease of finding skilled employees	77.45	23	4.4.6	Patent applications	75.42	7
2.4.5	Digital skills	81.16	6				

Dominican Republic

Key Indicators

Rank (out of 124)	88	GDP per capita (PPP US\$)	19,191.58
Income group	Upper-middle income	GDP (US\$ billions)	78.84
Regional group	Latin America and the Caribbean	FREI score	32.68
Population (millions)	10.85	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



— Dominican Republic — Upper-middle-income average

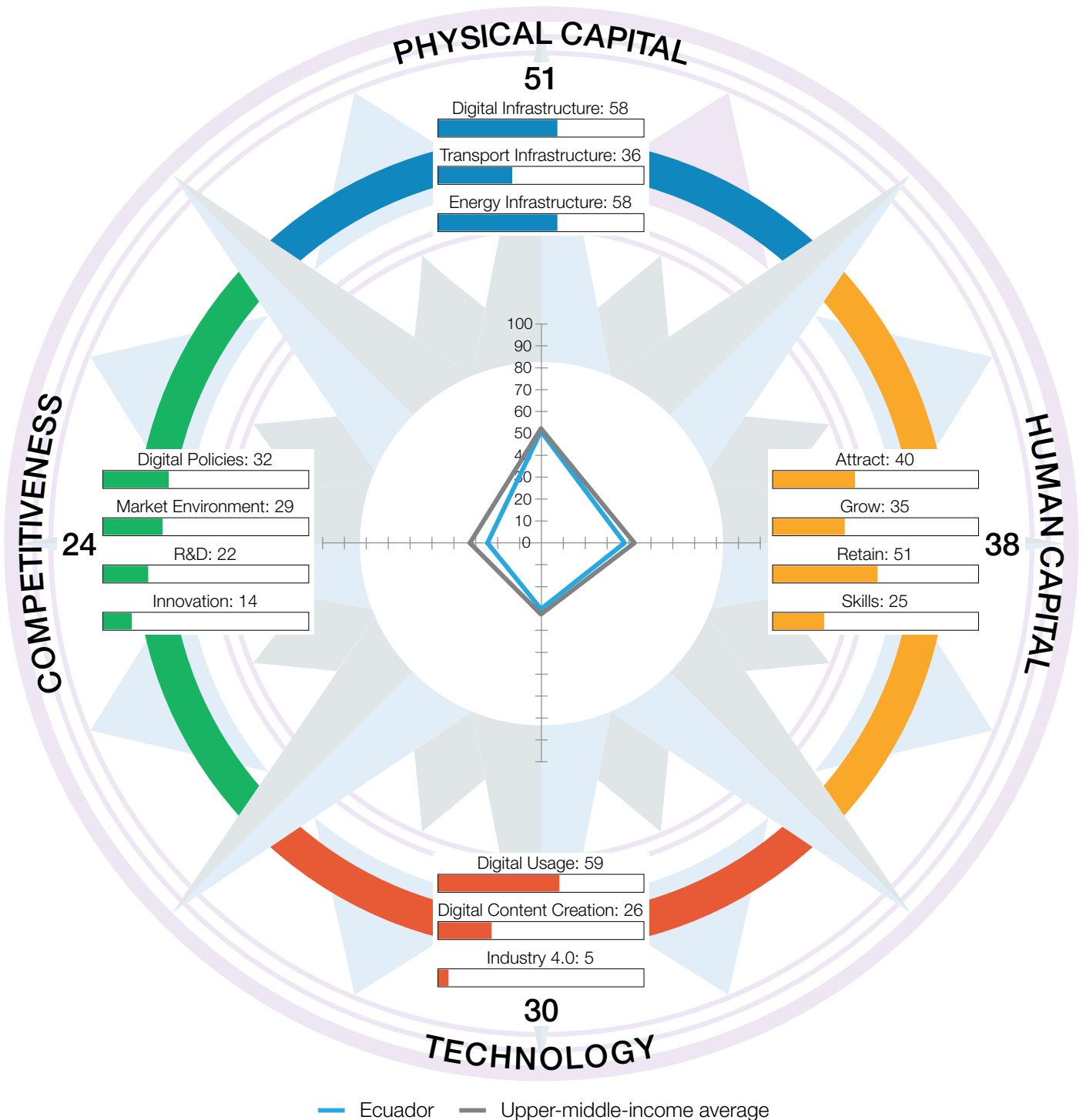
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	43.83	86	3	TECHNOLOGY	28.03	77
1.1	Digital Infrastructure	53.43	90	3.1	Digital Usage	55.87	69
1.1.1	Internet access	32.63	92	3.1.1	Internet users	73.58	63
1.1.2	International Internet bandwidth	45.56	59	3.1.2	Active mobile-broadband subscriptions	30.39	82
1.1.3	Fixed-broadband subscriptions	46.02	85	3.1.3	Gender parity in Internet usage	98.79	10
1.1.4	4G-mobile network coverage	96.64	64	3.1.4	Firms with website	34.82	81
1.1.5	Fixed broadband affordability	93.95	71	3.1.5	Internet shopping	9.51	71
1.1.6	Mobile broadband affordability	57.71	101	3.1.6	Government online services	70.80	48
1.1.7	Computer software spending	1.51	111	3.1.7	E-Participation	73.24	50
1.2	Transport Infrastructure	25.78	87	3.2	Digital Content Creation	23.54	87
1.2.1	Quality of infrastructure	28.47	97	3.2.1	GitHub commits	2.93	69
1.2.2	Rural access	54.69	80	3.2.2	Wikipedia edits	31.51	89
1.2.3	Air connectivity	13.39	45	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	58.21	82
1.3	Energy Infrastructure	52.28	88	3.3	Industry 4.0	4.67	79
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	3.95	92
1.3.3	Electrical outages	51.01	77	3.3.3	AI research	0.23	109
1.3.4	Energy intensity	94.06	6	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	35.56	84	4	COMPETITIVENESS	23.32	91
2.1	Attract	53.52	38	4.1	Digital Policies	50.18	66
2.1.1	Brain gain	55.78	42	4.1.1	ICT regulation	96.39	5
2.1.2	International students	4.54	77	4.1.2	Cybersecurity	74.49	74
2.1.3	Tolerance of minorities	56.38	45	4.1.3	Rule of law	30.14	72
2.1.4	Tolerance of immigrants	67.69	45	4.1.4	Regulatory quality	39.44	72
2.1.5	Gender parity in high-skilled jobs	75.61	60	4.1.5	Corruption	10.45	108
2.1.6	FDI and technology transfer	61.12	40	4.2	Market Environment	36.97	59
2.2	Grow	22.23	105	4.2.1	Extent of market dominance	34.90	89
2.2.1	Tertiary enrolment	40.01	51	4.2.2	Labour productivity	24.43	64
2.2.2	Reading, maths, and science	0.00	76	4.2.3	Urbanisation	77.35	31
2.2.3	Use of virtual professional networks	15.71	63	4.2.4	Domestic credit to private sector	11.20	89
2.2.4	Formal and non-formal studies	8.30	51	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	47.14	106	4.3	R&D	0.07	123
2.3	Retain	35.50	92	4.3.1	R&D spending	n/a	n/a
2.3.1	Pension coverage	9.49	103	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	36.93	67	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	17.75	78	4.3.4	Scientific journal articles	0.15	120
2.3.4	Sanitation	82.62	83	4.4	Innovation	6.06	110
2.3.5	Personal safety	30.73	100	4.4.1	Medium- and high-tech industry	n/a	n/a
2.4	Skills	30.98	70	4.4.2	High-tech exports	11.24	64
2.4.1	Workforce with tertiary education	16.16	89	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	20.76	87	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	6.11	64
2.4.4	Ease of finding skilled employees	48.35	77	4.4.6	Patent applications	0.83	74
2.4.5	Digital skills	38.65	27				

Ecuador

Key Indicators

Rank (out of 124)	79	GDP per capita (PPP US\$)	11,777.76
Income group	Upper-middle income	GDP (US\$ billions)	98.81
Regional group	Latin America and the Caribbean	FREI score	35.68
Population (millions)	17.64	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)

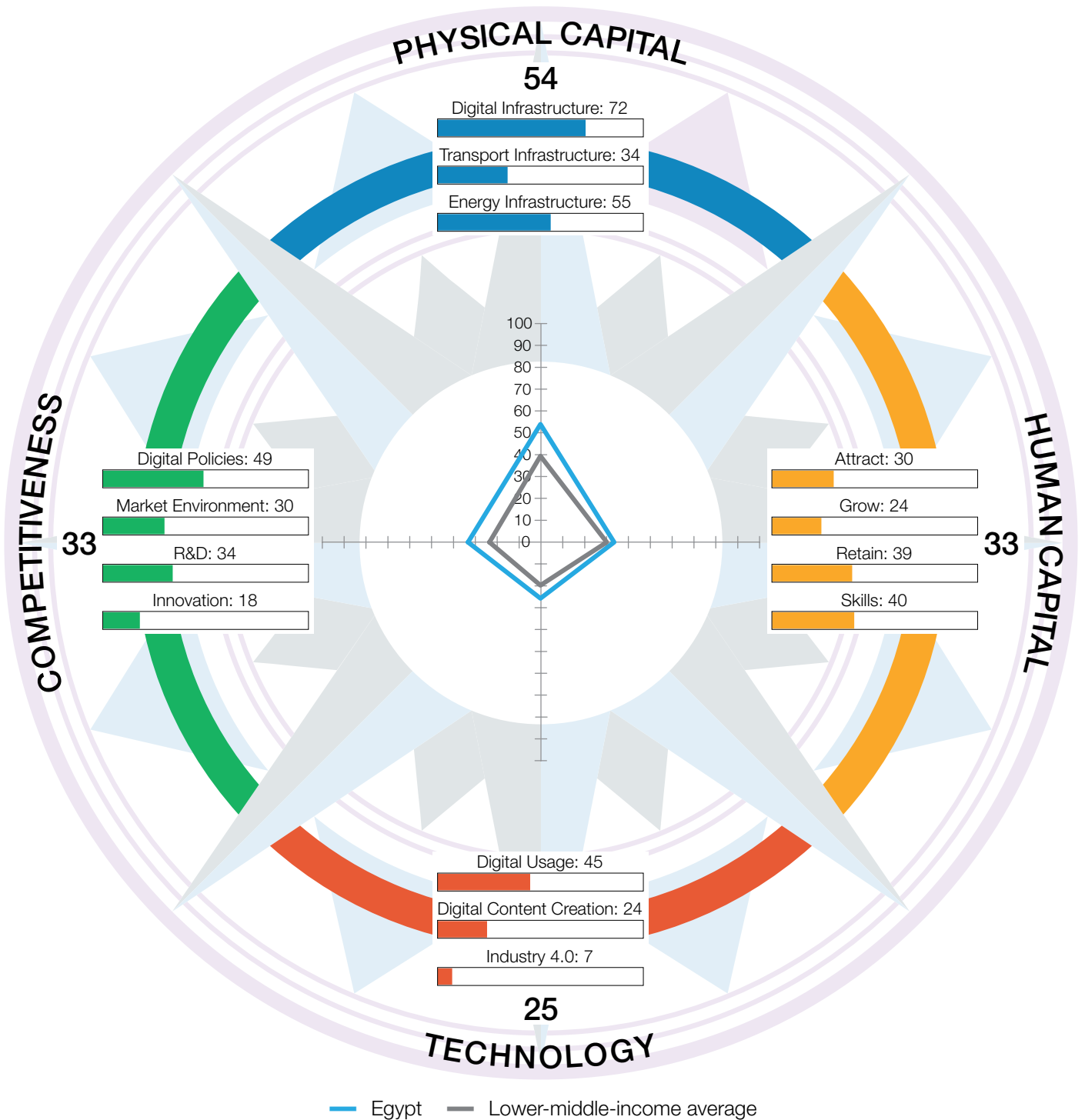


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	50.62	73	3	TECHNOLOGY	29.95	71
1.1	Digital Infrastructure	57.59	83	3.1	Digital Usage	58.88	63
1.1.1	Internet access	52.52	81	3.1.1	Internet users	53.61	86
1.1.2	International Internet bandwidth	23.66	112	3.1.2	Active mobile-broadband subscriptions	23.54	97
1.1.3	Fixed-broadband subscriptions	60.80	75	3.1.3	Gender parity in Internet usage	95.91	37
1.1.4	4G-mobile network coverage	90.98	76	3.1.4	Firms with website	78.70	23
1.1.5	Fixed broadband affordability	89.74	86	3.1.5	Internet shopping	7.70	77
1.1.6	Mobile broadband affordability	65.62	89	3.1.6	Government online services	76.65	40
1.1.7	Computer software spending	19.77	62	3.1.7	E-Participation	76.05	48
1.2	Transport Infrastructure	35.90	54	3.2	Digital Content Creation	25.99	79
1.2.1	Quality of infrastructure	41.28	67	3.2.1	GitHub commits	2.45	73
1.2.2	Rural access	54.34	81	3.2.2	Wikipedia edits	39.66	77
1.2.3	Air connectivity	2.56	86	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	60.57	78
1.3	Energy Infrastructure	58.38	56	3.3	Industry 4.0	4.98	76
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	6.81	74
1.3.3	Electrical outages	81.92	52	3.3.3	AI research	6.97	56
1.3.4	Energy intensity	85.03	33	3.3.4	ICT patent applications	0.00	74
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	37.92	77	4	COMPETITIVENESS	24.24	87
2.1	Attract	40.37	83	4.1	Digital Policies	31.99	103
2.1.1	Brain gain	31.23	94	4.1.1	ICT regulation	71.15	74
2.1.2	International students	2.03	87	4.1.2	Cybersecurity	24.64	110
2.1.3	Tolerance of minorities	40.43	70	4.1.3	Rule of law	21.67	91
2.1.4	Tolerance of immigrants	58.46	64	4.1.4	Regulatory quality	15.63	116
2.1.5	Gender parity in high-skilled jobs	89.29	33	4.1.5	Corruption	26.87	70
2.1.6	FDI and technology transfer	20.78	111	4.2	Market Environment	29.29	85
2.2	Grow	35.02	66	4.2.1	Extent of market dominance	26.35	100
2.2.1	Tertiary enrolment	31.90	65	4.2.2	Labour productivity	14.68	83
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	56.71	65
2.2.3	Use of virtual professional networks	25.88	39	4.2.4	Domestic credit to private sector	19.41	71
2.2.4	Formal and non-formal studies	4.29	58	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	77.98	53	4.3	R&D	21.70	76
2.3	Retain	51.43	70	4.3.1	R&D spending	8.72	66
2.3.1	Pension coverage	59.80	70	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	45.12	53	4.3.3	Gender parity in R&D	73.11	35
2.3.3	Physician density	27.38	65	4.3.4	Scientific journal articles	4.96	72
2.3.4	Sanitation	87.04	76	4.4	Innovation	13.97	82
2.3.5	Personal safety	37.80	89	4.4.1	Medium- and high-tech industry	17.63	89
2.4	Skills	24.88	88	4.4.2	High-tech exports	8.88	78
2.4.1	Workforce with tertiary education	18.46	82	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	17.93	93	4.4.4	New product entrepreneurial activity	29.01	66
2.4.3	Researchers	4.80	68	4.4.5	New business density	n/a	n/a
2.4.4	Ease of finding skilled employees	54.06	65	4.4.6	Patent applications	0.35	87
2.4.5	Digital skills	29.13	39				

Key Indicators

Rank (out of 124)	75	GDP per capita (PPP US\$)	12,261.18
Income group	Lower-middle income	GDP (US\$ billions)	363.07
Regional group	Middle East and North Africa	FREI score	36.34
Population (millions)	102.33	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



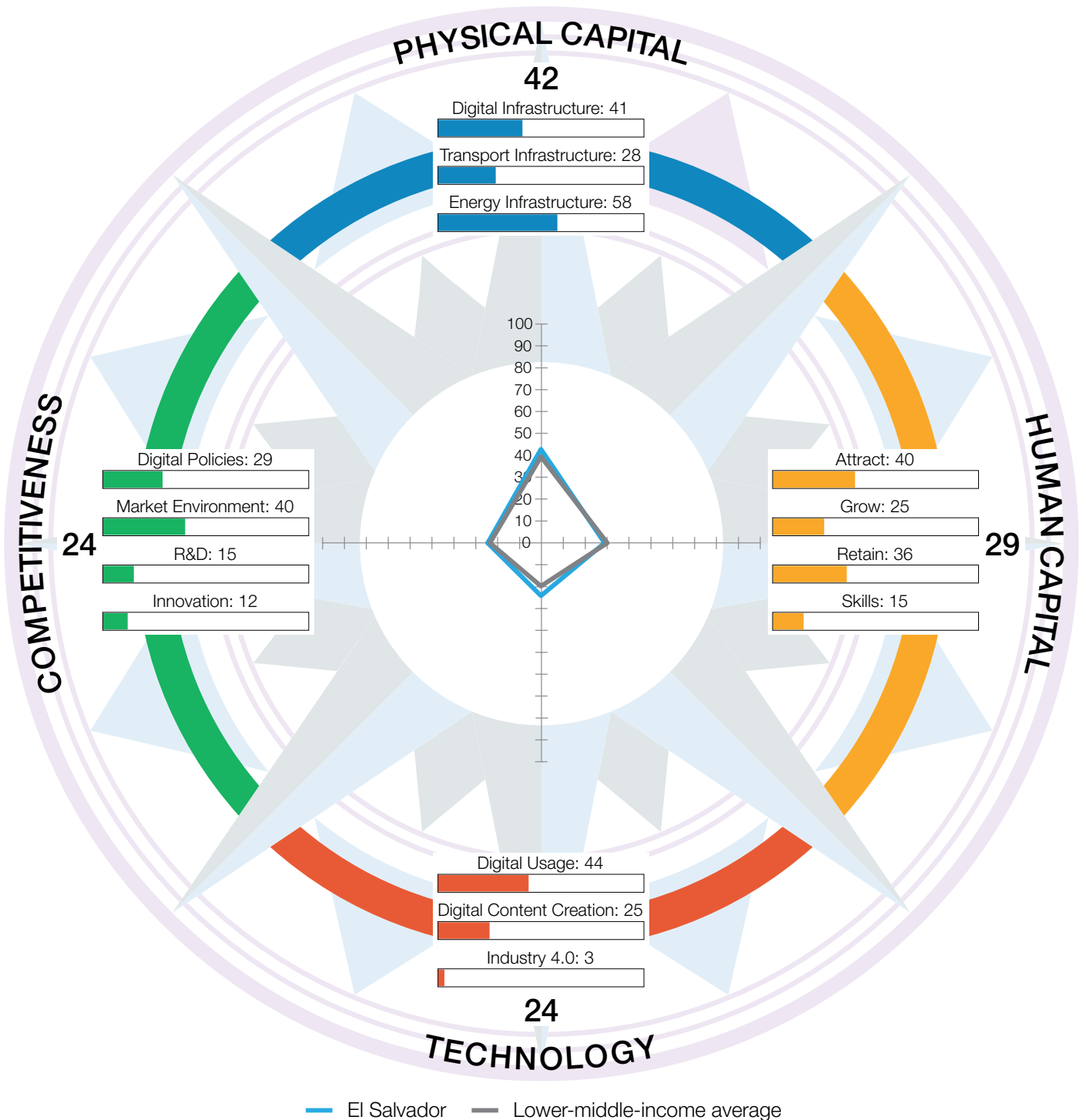
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	53.57	59	3	TECHNOLOGY	25.49	82
1.1	Digital Infrastructure	71.54	58	3.1	Digital Usage	45.40	84
1.1.1	Internet access	72.70	67	3.1.1	Internet users	70.52	71
1.1.2	International Internet bandwidth	40.96	77	3.1.2	Active mobile-broadband subscriptions	27.61	88
1.1.3	Fixed-broadband subscriptions	100.00	2	3.1.3	Gender parity in Internet usage	92.32	54
1.1.4	4G-mobile network coverage	96.00	67	3.1.4	Firms with website	35.30	79
1.1.5	Fixed broadband affordability	93.15	76	3.1.5	Internet shopping	3.09	108
1.1.6	Mobile broadband affordability	81.36	58	3.1.6	Government online services	46.72	92
1.1.7	Computer software spending	16.61	70	3.1.7	E-Participation	42.25	96
1.2	Transport Infrastructure	33.84	60	3.2	Digital Content Creation	24.30	83
1.2.1	Quality of infrastructure	44.84	57	3.2.1	GitHub commits	1.23	92
1.2.2	Rural access	81.37	40	3.2.2	Wikipedia edits	44.43	71
1.2.3	Air connectivity	2.09	90	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	51.09	94
1.3	Energy Infrastructure	55.32	77	3.3	Industry 4.0	6.78	65
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	0.22	60
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	14.13	46
1.3.3	Electrical outages	86.53	43	3.3.3	AI research	4.47	63
1.3.4	Energy intensity	80.90	50	3.3.4	ICT patent applications	0.10	64
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	33.45	89	4	COMPETITIVENESS	32.85	64
2.1	Attract	30.15	116	4.1	Digital Policies	49.29	68
2.1.1	Brain gain	52.90	48	4.1.1	ICT regulation	84.86	38
2.1.2	International students	4.83	76	4.1.2	Cybersecurity	95.38	30
2.1.3	Tolerance of minorities	17.02	105	4.1.3	Rule of law	27.28	81
2.1.4	Tolerance of immigrants	43.08	88	4.1.4	Regulatory quality	21.02	106
2.1.5	Gender parity in high-skilled jobs	16.61	115	4.1.5	Corruption	17.91	92
2.1.6	FDI and technology transfer	46.46	64	4.2	Market Environment	29.64	83
2.2	Grow	24.23	96	4.2.1	Extent of market dominance	68.88	21
2.2.1	Tertiary enrolment	25.78	75	4.2.2	Labour productivity	33.98	48
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	31.44	98
2.2.3	Use of virtual professional networks	8.41	82	4.2.4	Domestic credit to private sector	9.70	97
2.2.4	Formal and non-formal studies	0.67	74	4.2.5	Market capitalisation	4.20	69
2.2.5	Youth inclusion	62.05	84	4.3	R&D	34.42	47
2.3	Retain	39.36	89	4.3.1	R&D spending	14.43	47
2.3.1	Pension coverage	36.73	80	4.3.2	University ranking	42.35	37
2.3.2	Environmental performance	31.71	78	4.3.3	Gender parity in R&D	75.55	32
2.3.3	Physician density	8.91	91	4.3.4	Scientific journal articles	5.36	69
2.3.4	Sanitation	93.73	60	4.4	Innovation	18.03	66
2.3.5	Personal safety	25.70	109	4.4.1	Medium- and high-tech industry	25.79	69
2.4	Skills	40.05	44	4.4.2	High-tech exports	3.76	95
2.4.1	Workforce with tertiary education	25.02	69	4.4.3	Venture capital recipients, deals	6.20	59
2.4.2	High-skilled workforce	44.65	48	4.4.4	New product entrepreneurial activity	53.83	39
2.4.3	Researchers	8.37	57	4.4.5	New business density	n/a	n/a
2.4.4	Ease of finding skilled employees	69.88	33	4.4.6	Patent applications	0.58	76
2.4.5	Digital skills	52.32	13				

El Salvador

Key Indicators

Rank (out of 124)	93	GDP per capita (PPP US\$)	9,210.99
Income group	Lower-middle income	GDP (US\$ billions)	24.64
Regional group	Latin America and the Caribbean	FREI score	29.86
Population (millions)	6.49	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



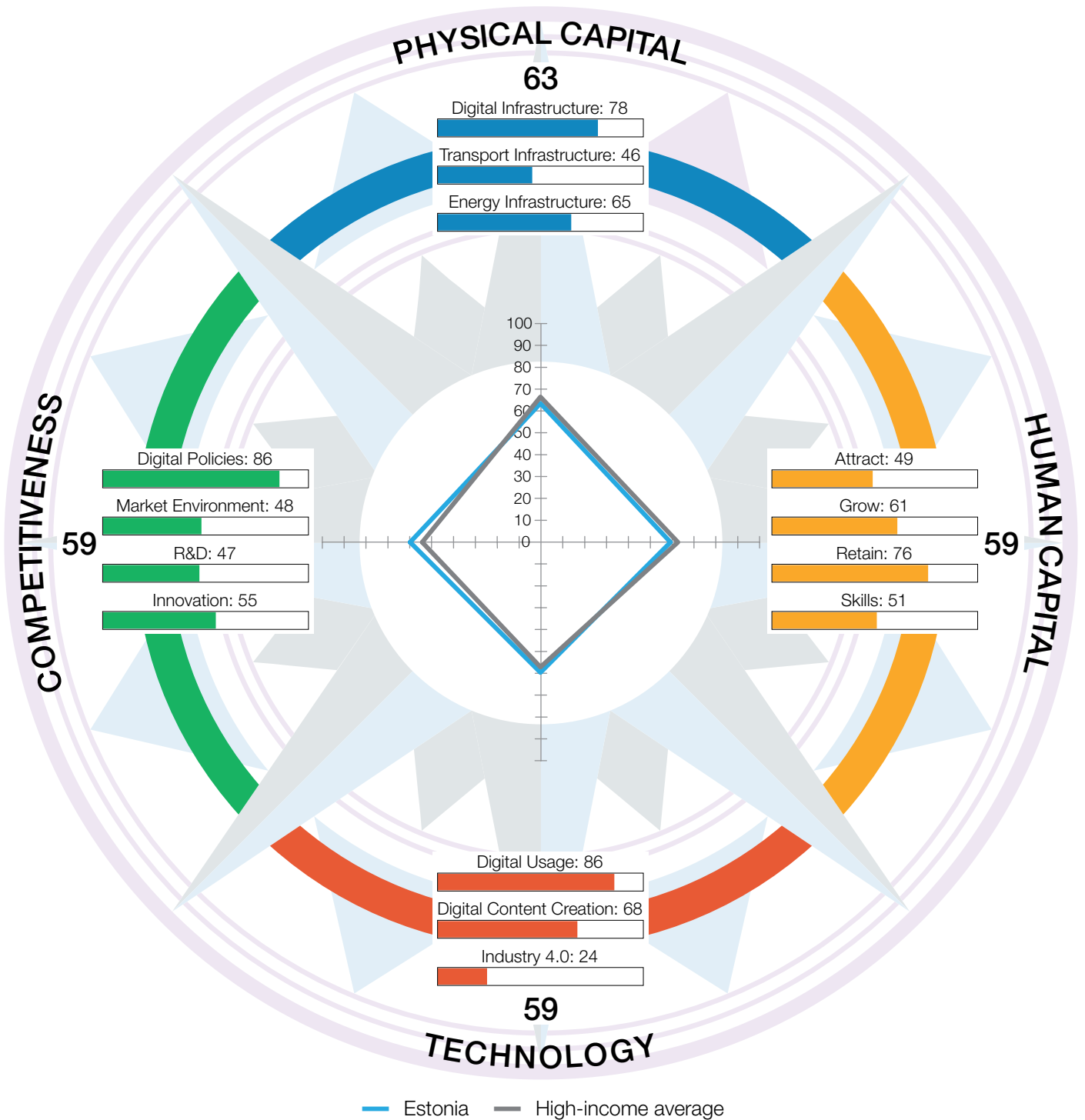
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	42.49	93	3	TECHNOLOGY	23.89	87
1.1	Digital Infrastructure	41.08	100	3.1	Digital Usage	44.07	87
1.1.1	Internet access	22.25	96	3.1.1	Internet users	48.04	89
1.1.2	International Internet bandwidth	46.59	55	3.1.2	Active mobile-broadband subscriptions	25.73	93
1.1.3	Fixed-broadband subscriptions	7.84	111	3.1.3	Gender parity in Internet usage	85.93	70
1.1.4	4G-mobile network coverage	68.00	100	3.1.4	Firms with website	35.42	78
1.1.5	Fixed broadband affordability	80.55	96	3.1.5	Internet shopping	3.91	95
1.1.6	Mobile broadband affordability	58.36	100	3.1.6	Government online services	47.45	91
1.1.7	Computer software spending	3.98	95	3.1.7	E-Participation	61.97	74
1.2	Transport Infrastructure	28.41	80	3.2	Digital Content Creation	24.91	81
1.2.1	Quality of infrastructure	24.56	103	3.2.1	GitHub commits	2.16	77
1.2.2	Rural access	76.78	48	3.2.2	Wikipedia edits	36.50	81
1.2.3	Air connectivity	6.48	68	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	59.77	79
1.3	Energy Infrastructure	57.99	60	3.3	Industry 4.0	2.69	98
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	5.37	82
1.3.3	Electrical outages	81.92	52	3.3.3	AI research	0.22	110
1.3.4	Energy intensity	83.56	40	3.3.4	ICT patent applications	0.00	74
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	28.88	97	4	COMPETITIVENESS	24.17	88
2.1	Attract	39.54	87	4.1	Digital Policies	29.16	107
2.1.1	Brain gain	26.31	103	4.1.1	ICT regulation	57.45	99
2.1.2	International students	1.30	93	4.1.2	Cybersecurity	11.35	119
2.1.3	Tolerance of minorities	46.81	58	4.1.3	Rule of law	15.33	105
2.1.4	Tolerance of immigrants	66.15	48	4.1.4	Regulatory quality	39.29	73
2.1.5	Gender parity in high-skilled jobs	75.45	62	4.1.5	Corruption	22.39	80
2.1.6	FDI and technology transfer	21.24	110	4.2	Market Environment	39.99	53
2.2	Grow	24.84	95	4.2.1	Extent of market dominance	27.11	98
2.2.1	Tertiary enrolment	19.33	83	4.2.2	Labour productivity	n/a	n/a
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	66.52	49
2.2.3	Use of virtual professional networks	13.61	70	4.2.4	Domestic credit to private sector	26.35	55
2.2.4	Formal and non-formal studies	2.53	64	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	63.90	81	4.3	R&D	15.18	97
2.3	Retain	36.19	91	4.3.1	R&D spending	3.08	86
2.3.1	Pension coverage	18.47	92	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	31.36	79	4.3.3	Gender parity in R&D	57.41	51
2.3.3	Physician density	35.53	49	4.3.4	Scientific journal articles	0.24	114
2.3.4	Sanitation	86.44	78	4.4	Innovation	12.32	87
2.3.5	Personal safety	9.14	122	4.4.1	Medium- and high-tech industry	23.53	73
2.4	Skills	14.95	112	4.4.2	High-tech exports	10.26	69
2.4.1	Workforce with tertiary education	9.07	99	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	15.32	100	4.4.4	New product entrepreneurial activity	25.30	72
2.4.3	Researchers	0.72	84	4.4.5	New business density	2.23	87
2.4.4	Ease of finding skilled employees	34.67	99	4.4.6	Patent applications	0.30	89
2.4.5	Digital skills	n/a	n/a				

Estonia

Key Indicators

Rank (out of 124)	23	GDP per capita (PPP US\$)	38,819.34
Income group	High income	GDP (US\$ billions)	30.65
Regional group	Europe	FREI score	60.14
Population (millions)	1.33	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



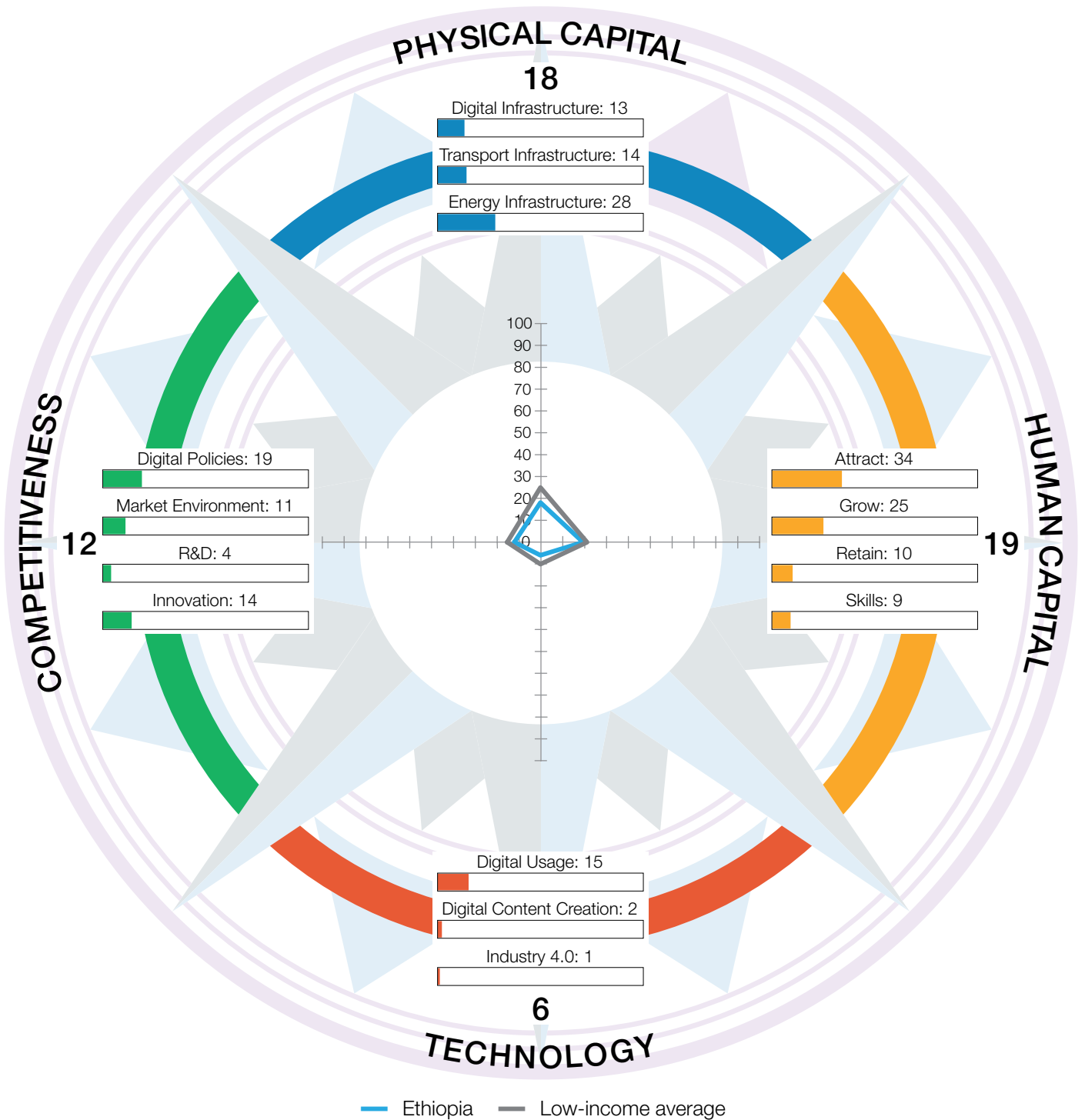
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	63.11	32	3	TECHNOLOGY	59.20	19
1.1	Digital Infrastructure	77.92	30	3.1	Digital Usage	85.52	9
1.1.1	Internet access	90.01	32	3.1.1	Internet users	88.52	28
1.1.2	International Internet bandwidth	51.48	35	3.1.2	Active mobile-broadband subscriptions	73.14	4
1.1.3	Fixed-broadband subscriptions	99.24	10	3.1.3	Gender parity in Internet usage	97.38	28
1.1.4	4G-mobile network coverage	99.00	39	3.1.4	Firms with website	80.50	19
1.1.5	Fixed broadband affordability	98.71	22	3.1.5	Internet shopping	59.87	24
1.1.6	Mobile broadband affordability	94.41	16	3.1.6	Government online services	99.27	2
1.1.7	Computer software spending	12.56	76	3.1.7	E-Participation	100.00	1
1.2	Transport Infrastructure	46.21	37	3.2	Digital Content Creation	68.22	16
1.2.1	Quality of infrastructure	54.80	42	3.2.1	GitHub commits	63.17	11
1.2.2	Rural access	97.24	12	3.2.2	Wikipedia edits	94.03	3
1.2.3	Air connectivity	17.26	42	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	92.51	17
1.3	Energy Infrastructure	65.20	20	3.3	Industry 4.0	23.86	26
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	5.63	39
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	45.94	17
1.3.3	Electrical outages	97.82	4	3.3.3	AI research	42.59	20
1.3.4	Energy intensity	63.34	95	3.3.4	ICT patent applications	14.33	23
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	59.11	28	4	COMPETITIVENESS	59.13	19
2.1	Attract	48.73	51	4.1	Digital Policies	86.04	15
2.1.1	Brain gain	62.15	28	4.1.1	ICT regulation	89.18	28
2.1.2	International students	29.55	19	4.1.2	Cybersecurity	99.47	4
2.1.3	Tolerance of minorities	26.60	92	4.1.3	Rule of law	79.23	18
2.1.4	Tolerance of immigrants	35.38	101	4.1.4	Regulatory quality	81.71	13
2.1.5	Gender parity in high-skilled jobs	79.02	52	4.1.5	Corruption	80.60	16
2.1.6	FDI and technology transfer	59.69	42	4.2	Market Environment	48.33	34
2.2	Grow	60.72	22	4.2.1	Extent of market dominance	53.52	45
2.2.1	Tertiary enrolment	49.70	28	4.2.2	Labour productivity	49.38	34
2.2.2	Reading, maths, and science	78.15	3	4.2.3	Urbanisation	62.76	56
2.2.3	Use of virtual professional networks	25.00	42	4.2.4	Domestic credit to private sector	27.65	54
2.2.4	Formal and non-formal studies	59.53	28	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	91.21	17	4.3	R&D	46.99	22
2.3	Retain	76.44	29	4.3.1	R&D spending	28.24	24
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	34.72	51
2.3.2	Environmental performance	70.03	30	4.3.3	Gender parity in R&D	82.40	22
2.3.3	Physician density	42.96	35	4.3.4	Scientific journal articles	42.60	26
2.3.4	Sanitation	99.08	27	4.4	Innovation	55.17	6
2.3.5	Personal safety	70.13	32	4.4.1	Medium- and high-tech industry	34.19	51
2.4	Skills	50.55	28	4.4.2	High-tech exports	28.82	27
2.4.1	Workforce with tertiary education	51.24	21	4.4.3	Venture capital recipients, deals	89.82	5
2.4.2	High-skilled workforce	76.02	14	4.4.4	New product entrepreneurial activity	59.89	23
2.4.3	Researchers	46.47	24	4.4.5	New business density	100.00	1
2.4.4	Ease of finding skilled employees	38.36	93	4.4.6	Patent applications	18.29	27
2.4.5	Digital skills	40.68	24				

Ethiopia

Key Indicators

Rank (out of 124)	123	GDP per capita (PPP US\$)	2,315.35
Income group	Low income	GDP (US\$ billions)	107.65
Regional group	Sub-Saharan Africa	FREI score	13.81
Population (millions)	114.96	FREI score (income group average)	17.76

FREI 2022 scores by pillar and sub-pillar (0–100)



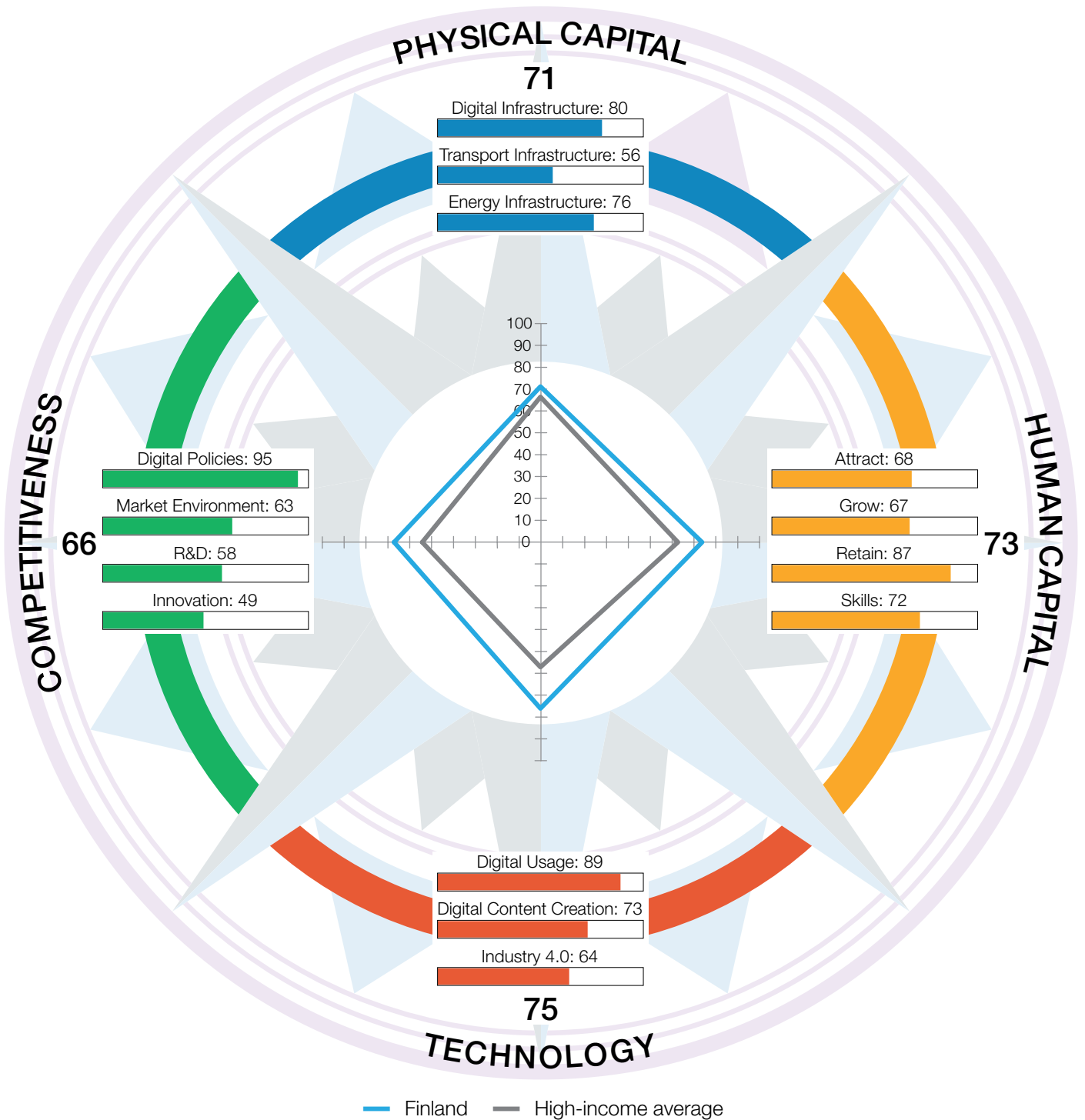
	Score	Rank		Score	Rank
1	18.04	123	3	5.95	123
1.1	13.02	122	3.1	14.59	120
1.1.1	13.96	105	3.1.1	14.59	112
1.1.2	0.00	123	3.1.2	4.52	123
1.1.3	3.03	115	3.1.3	n/a	n/a
1.1.4	7.00	122	3.1.4	26.11	87
1.1.5	40.18	115	3.1.5	0.00	119
1.1.6	26.99	118	3.1.6	21.17	114
1.1.7	0.00	120	3.1.7	21.12	114
1.2	13.55	115	3.2	2.48	124
1.2.1	19.85	116	3.2.1	0.06	119
1.2.2	25.95	111	3.2.2	0.00	123
1.2.3	0.90	103	3.2.3	—	—
1.2.4	—	—	3.2.4	9.85	122
1.3	27.56	119	3.3	0.79	116
1.3.1	41.75	110	3.3.1	n/a	n/a
1.3.2	—	—	3.3.2	0.58	113
1.3.3	48.91	80	3.3.3	1.30	88
1.3.4	43.80	114	3.3.4	n/a	n/a
1.3.5	—	—	3.3.5	—	—
2	19.43	120	4	11.82	122
2.1	33.78	108	4.1	19.23	120
2.1.1	35.74	90	4.1.1	4.80	123
2.1.2	n/a	n/a	4.1.2	26.11	109
2.1.3	4.26	120	4.1.3	26.15	83
2.1.4	72.31	38	4.1.4	13.69	119
2.1.5	32.53	108	4.1.5	25.37	72
2.1.6	24.06	105	4.2	10.80	120
2.2	25.02	92	4.2.1	25.87	101
2.2.1	6.50	104	4.2.2	1.35	108
2.2.2	n/a	n/a	4.2.3	5.19	119
2.2.3	0.22	122	4.2.4	n/a	n/a
2.2.4	4.63	56	4.2.5	n/a	n/a
2.2.5	88.74	25	4.3	3.71	113
2.3	10.18	122	4.3.1	5.31	76
2.3.1	1.94	118	4.3.2	0.00	84
2.3.2	16.20	100	4.3.3	8.85	97
2.3.3	0.52	120	4.3.4	0.69	101
2.3.4	0.00	124	4.4	13.53	84
2.3.5	32.24	98	4.4.1	19.71	82
2.4	8.74	119	4.4.2	21.92	34
2.4.1	0.81	119	4.4.3	1.40	86
2.4.2	1.92	117	4.4.4	22.63	78
2.4.3	0.96	81	4.4.5	2.01	91
2.4.4	31.25	107	4.4.6	n/a	n/a
2.4.5	n/a	n/a			

Finland

Key Indicators

Rank (out of 124)	8	GDP per capita (PPP US\$)	51,619.83
Income group	High income	GDP (US\$ billions)	269.75
Regional group	Europe	FREI score	71.49
Population (millions)	5.53	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



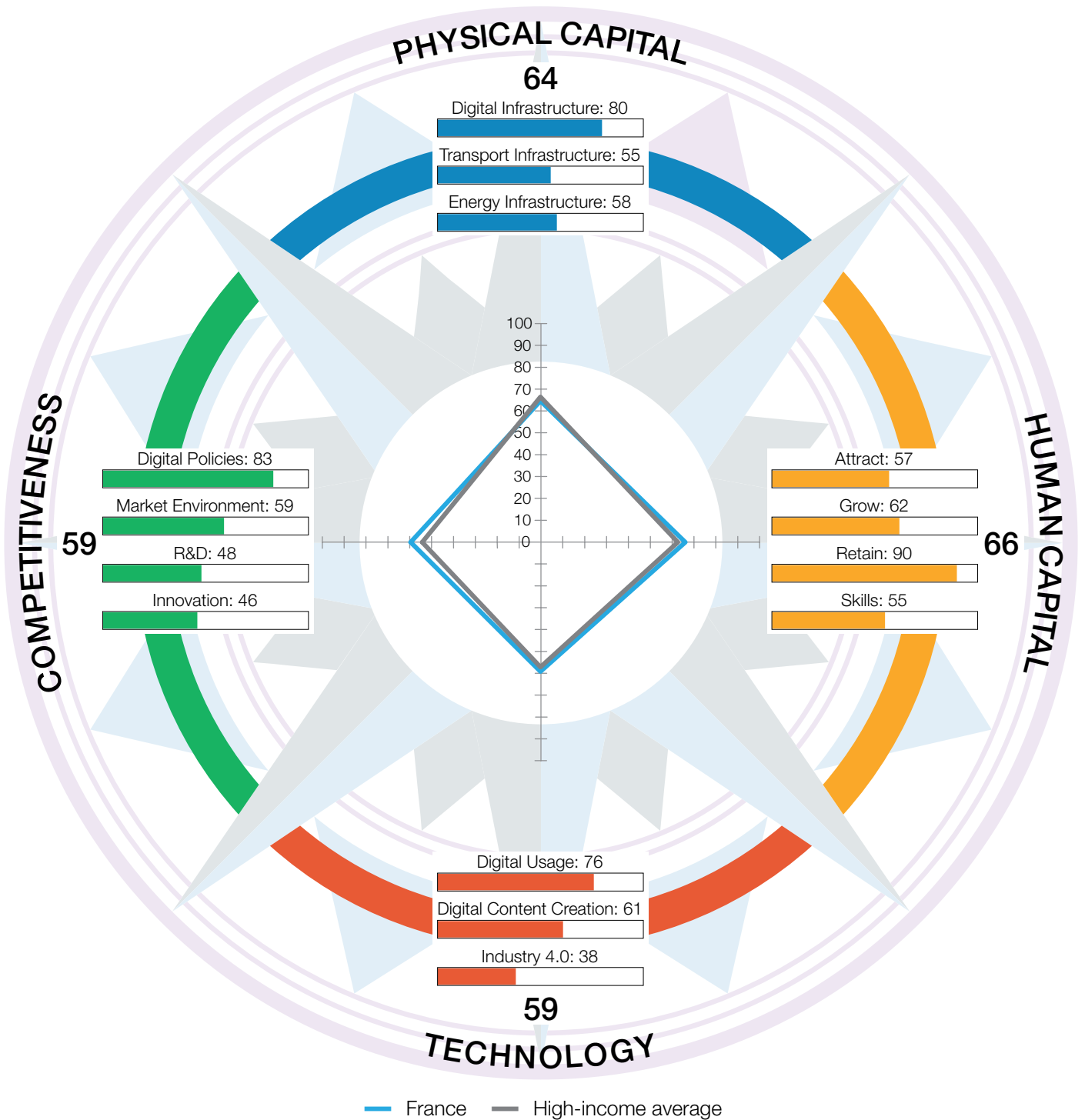
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	70.71	11	3	TECHNOLOGY	75.48	7
1.1	Digital Infrastructure	79.97	24	3.1	Digital Usage	89.40	3
1.1.1	Internet access	91.11	25	3.1.1	Internet users	91.78	18
1.1.2	International Internet bandwidth	47.18	50	3.1.2	Active mobile-broadband subscriptions	68.91	5
1.1.3	Fixed-broadband subscriptions	96.86	24	3.1.3	Gender parity in Internet usage	96.48	32
1.1.4	4G-mobile network coverage	99.90	15	3.1.4	Firms with website	100.00	1
1.1.5	Fixed broadband affordability	98.76	19	3.1.5	Internet shopping	77.92	12
1.1.6	Mobile broadband affordability	85.72	43	3.1.6	Government online services	96.35	3
1.1.7	Computer software spending	40.26	21	3.1.7	E-Participation	94.37	14
1.2	Transport Infrastructure	55.98	24	3.2	Digital Content Creation	73.25	12
1.2.1	Quality of infrastructure	86.83	11	3.2.1	GitHub commits	83.27	4
1.2.2	Rural access	81.39	39	3.2.2	Wikipedia edits	88.44	6
1.2.3	Air connectivity	37.06	18	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	92.26	21
1.3	Energy Infrastructure	76.19	3	3.3	Industry 4.0	63.80	7
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	41.52	18
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	72.38	9
1.3.3	Electrical outages	95.83	13	3.3.3	AI research	68.72	6
1.3.4	Energy intensity	65.66	90	3.3.4	ICT patent applications	100.00	1
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	73.35	11	4	COMPETITIVENESS	66.43	6
2.1	Attract	67.83	19	4.1	Digital Policies	95.46	2
2.1.1	Brain gain	47.65	64	4.1.1	ICT regulation	95.67	6
2.1.2	International students	21.45	32	4.1.2	Cybersecurity	95.69	29
2.1.3	Tolerance of minorities	98.94	3	4.1.3	Rule of law	100.00	1
2.1.4	Tolerance of immigrants	76.92	28	4.1.4	Regulatory quality	90.43	3
2.1.5	Gender parity in high-skilled jobs	96.84	12	4.1.5	Corruption	95.52	3
2.1.6	FDI and technology transfer	65.15	32	4.2	Market Environment	63.45	13
2.2	Grow	66.86	12	4.2.1	Extent of market dominance	61.26	30
2.2.1	Tertiary enrolment	62.38	9	4.2.2	Labour productivity	65.11	16
2.2.2	Reading, maths, and science	74.44	7	4.2.3	Urbanisation	82.51	23
2.2.3	Use of virtual professional networks	33.63	28	4.2.4	Domestic credit to private sector	44.91	26
2.2.4	Formal and non-formal studies	73.25	13	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	90.62	23	4.3	R&D	57.93	11
2.3	Retain	86.76	8	4.3.1	R&D spending	55.66	11
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	57.07	19
2.3.2	Environmental performance	93.73	7	4.3.3	Gender parity in R&D	42.48	66
2.3.3	Physician density	57.72	16	4.3.4	Scientific journal articles	76.52	8
2.3.4	Sanitation	99.40	22	4.4	Innovation	48.87	12
2.3.5	Personal safety	82.93	20	4.4.1	Medium- and high-tech industry	57.07	18
2.4	Skills	71.97	8	4.4.2	High-tech exports	16.06	49
2.4.1	Workforce with tertiary education	55.92	13	4.4.3	Venture capital recipients, deals	43.97	10
2.4.2	High-skilled workforce	81.50	8	4.4.4	New product entrepreneurial activity	58.08	28
2.4.3	Researchers	85.04	4	4.4.5	New business density	18.03	33
2.4.4	Ease of finding skilled employees	83.51	13	4.4.6	Patent applications	100.00	1
2.4.5	Digital skills	53.89	12				

France

Key Indicators

Rank (out of 124)	21	GDP per capita (PPP US\$)	49,377.13
Income group	High income	GDP (US\$ billions)	2,630.32
Regional group	Europe	FREI score	61.88
Population (millions)	67.39	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)

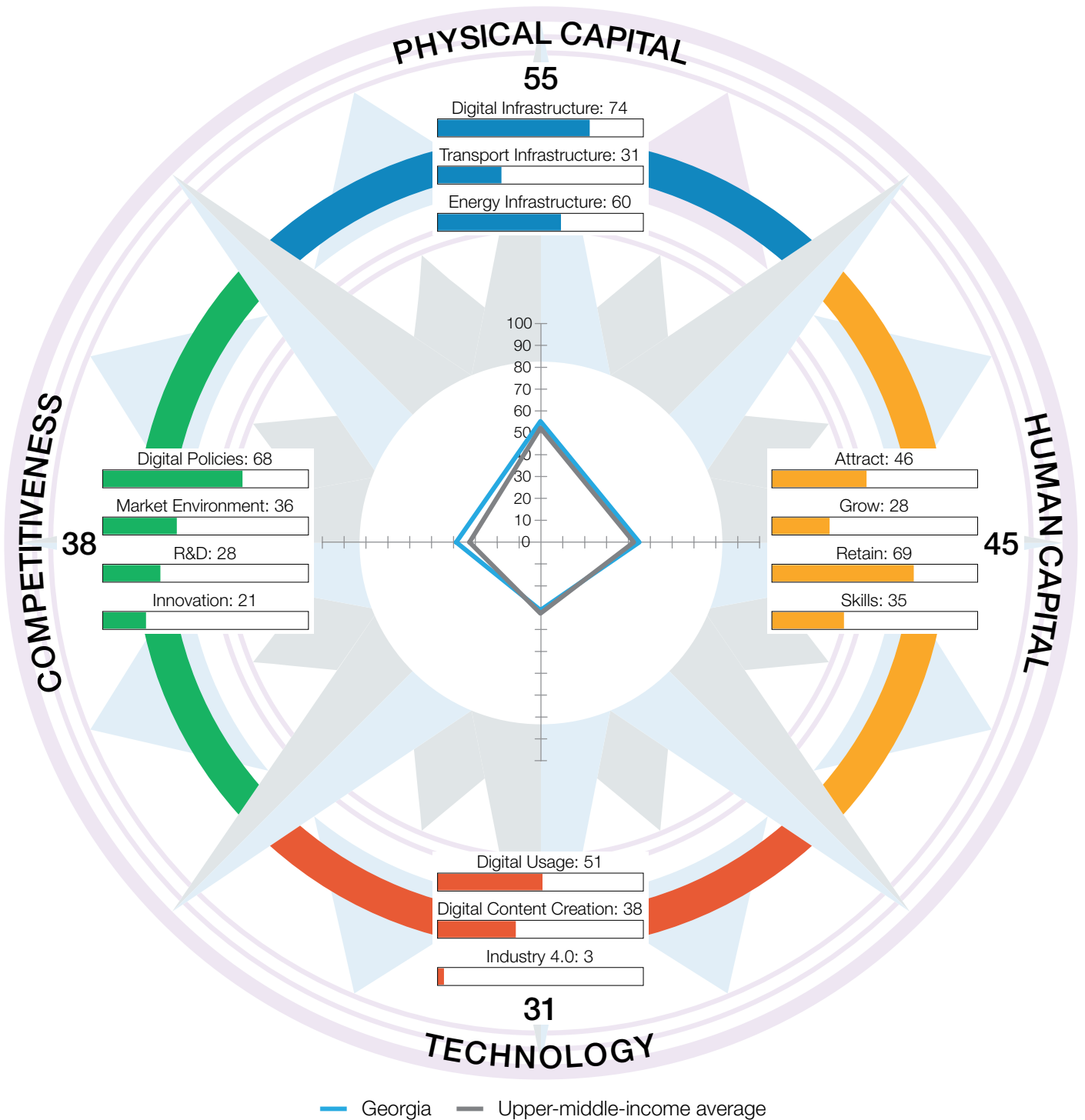


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	64.21	27	3	TECHNOLOGY	58.66	21
1.1	Digital Infrastructure	79.76	26	3.1	Digital Usage	76.30	24
1.1.1	Internet access	83.91	47	3.1.1	Internet users	82.52	45
1.1.2	International Internet bandwidth	42.23	72	3.1.2	Active mobile-broadband subscriptions	43.27	39
1.1.3	Fixed-broadband subscriptions	95.49	30	3.1.3	Gender parity in Internet usage	93.91	50
1.1.4	4G-mobile network coverage	99.00	39	3.1.4	Firms with website	69.09	36
1.1.5	Fixed broadband affordability	98.06	33	3.1.5	Internet shopping	71.18	16
1.1.6	Mobile broadband affordability	91.71	25	3.1.6	Government online services	85.41	18
1.1.7	Computer software spending	47.91	9	3.1.7	E-Participation	88.74	18
1.2	Transport Infrastructure	55.22	26	3.2	Digital Content Creation	61.39	22
1.2.1	Quality of infrastructure	86.83	11	3.2.1	GitHub commits	48.40	19
1.2.2	Rural access	98.88	4	3.2.2	Wikipedia edits	82.80	11
1.2.3	Air connectivity	19.22	40	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	88.71	28
1.3	Energy Infrastructure	57.66	65	3.3	Industry 4.0	38.29	19
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	45.52	16
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	45.28	18
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	29.10	27
1.3.4	Energy intensity	82.62	44	3.3.4	ICT patent applications	31.98	16
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	65.81	20	4	COMPETITIVENESS	58.85	20
2.1	Attract	56.54	33	4.1	Digital Policies	82.84	19
2.1.1	Brain gain	55.77	43	4.1.1	ICT regulation	94.95	8
2.1.2	International students	24.44	28	4.1.2	Cybersecurity	97.55	14
2.1.3	Tolerance of minorities	37.23	76	4.1.3	Rule of law	77.59	21
2.1.4	Tolerance of immigrants	61.54	58	4.1.4	Regulatory quality	72.45	24
2.1.5	Gender parity in high-skilled jobs	95.57	17	4.1.5	Corruption	71.64	22
2.1.6	FDI and technology transfer	64.68	33	4.2	Market Environment	59.45	19
2.2	Grow	62.39	17	4.2.1	Extent of market dominance	65.29	26
2.2.1	Tertiary enrolment	45.72	37	4.2.2	Labour productivity	68.37	13
2.2.2	Reading, maths, and science	65.14	24	4.2.3	Urbanisation	76.60	33
2.2.3	Use of virtual professional networks	44.25	19	4.2.4	Domestic credit to private sector	55.16	19
2.2.4	Formal and non-formal studies	69.45	17	4.2.5	Market capitalisation	31.82	18
2.2.5	Youth inclusion	87.36	30	4.3	R&D	47.53	21
2.3	Retain	89.63	1	4.3.1	R&D spending	44.24	12
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	70.51	10
2.3.2	Environmental performance	95.64	5	4.3.3	Gender parity in R&D	35.99	74
2.3.3	Physician density	81.46	3	4.3.4	Scientific journal articles	39.36	30
2.3.4	Sanitation	98.54	37	4.4	Innovation	45.58	17
2.3.5	Personal safety	72.47	27	4.4.1	Medium- and high-tech industry	61.36	14
2.4	Skills	54.71	25	4.4.2	High-tech exports	43.36	11
2.4.1	Workforce with tertiary education	52.57	17	4.4.3	Venture capital recipients, deals	49.59	9
2.4.2	High-skilled workforce	75.67	15	4.4.4	New product entrepreneurial activity	55.08	36
2.4.3	Researchers	58.39	18	4.4.5	New business density	20.38	29
2.4.4	Ease of finding skilled employees	58.84	55	4.4.6	Patent applications	43.69	14
2.4.5	Digital skills	28.06	42				

Key Indicators

Rank (out of 124)	57	GDP per capita (PPP US\$)	15,623.15
Income group	Upper-middle income	GDP (US\$ billions)	15.89
Regional group	Middle East and North Africa	FREI score	42.17
Population (millions)	3.71	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



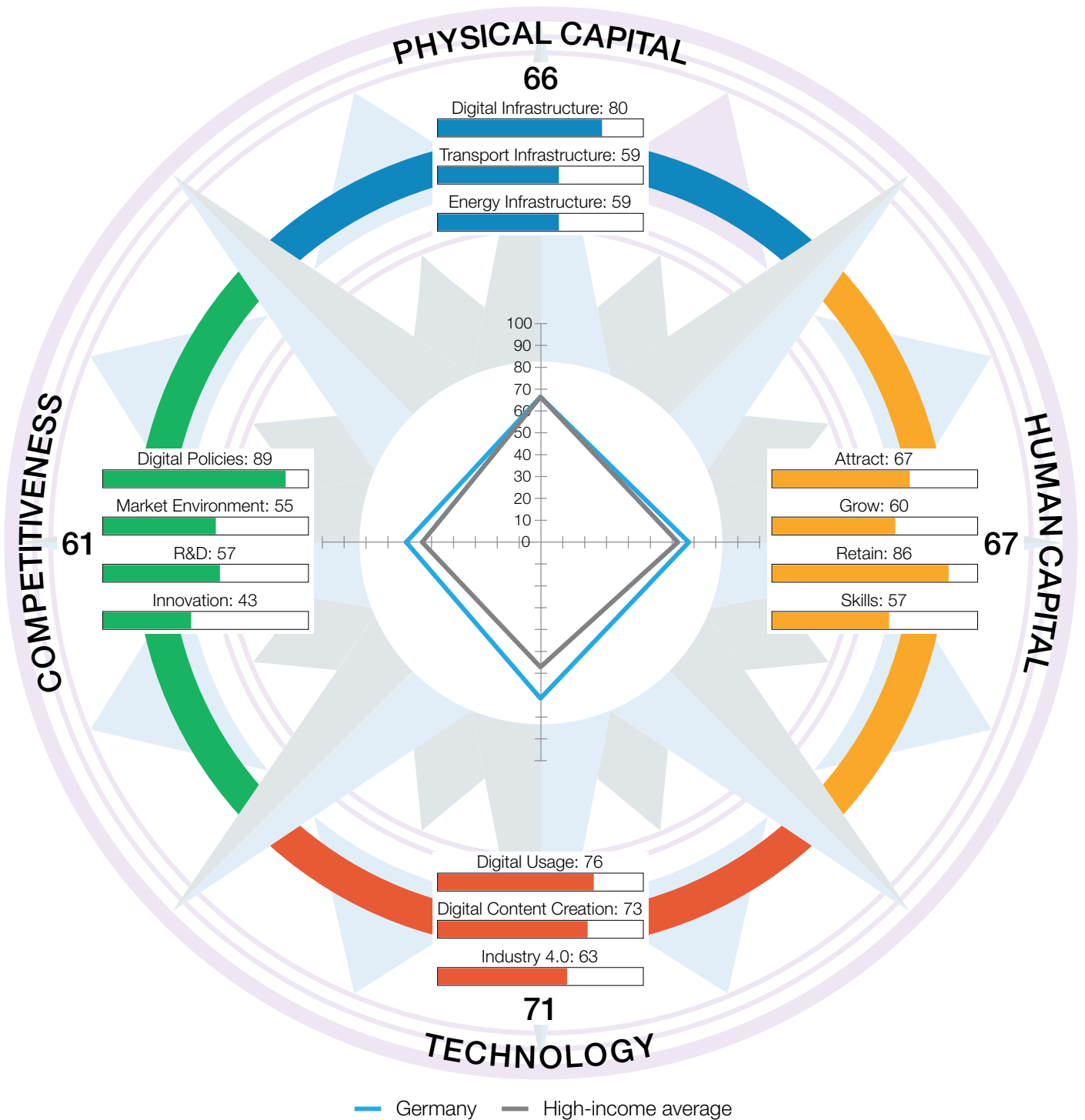
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	54.85	55	3	TECHNOLOGY	30.83	66
1.1	Digital Infrastructure	73.82	48	3.1	Digital Usage	51.49	74
1.1.1	Internet access	83.74	48	3.1.1	Internet users	71.17	68
1.1.2	International Internet bandwidth	55.91	23	3.1.2	Active mobile-broadband subscriptions	35.25	69
1.1.3	Fixed-broadband subscriptions	85.79	52	3.1.3	Gender parity in Internet usage	95.85	38
1.1.4	4G-mobile network coverage	99.72	28	3.1.4	Firms with website	45.94	65
1.1.5	Fixed broadband affordability	94.19	69	3.1.5	Internet shopping	5.54	86
1.1.6	Mobile broadband affordability	90.10	31	3.1.6	Government online services	48.90	86
1.1.7	Computer software spending	7.28	87	3.1.7	E-Participation	57.75	79
1.2	Transport Infrastructure	30.51	72	3.2	Digital Content Creation	38.09	49
1.2.1	Quality of infrastructure	29.18	94	3.2.1	GitHub commits	1.47	88
1.2.2	Rural access	75.13	50	3.2.2	Wikipedia edits	76.32	27
1.2.3	Air connectivity	9.26	53	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	71.94	59
1.3	Energy Infrastructure	60.21	44	3.3	Industry 4.0	2.93	94
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	5.43	81
1.3.3	Electrical outages	73.29	62	3.3.3	AI research	2.34	78
1.3.4	Energy intensity	78.74	58	3.3.4	ICT patent applications	0.00	74
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	44.83	60	4	COMPETITIVENESS	38.17	49
2.1	Attract	45.94	61	4.1	Digital Policies	68.02	38
2.1.1	Brain gain	45.32	67	4.1.1	ICT regulation	90.62	26
2.1.2	International students	23.23	30	4.1.2	Cybersecurity	80.63	63
2.1.3	Tolerance of minorities	27.66	88	4.1.3	Rule of law	46.54	49
2.1.4	Tolerance of immigrants	72.31	38	4.1.4	Regulatory quality	70.07	27
2.1.5	Gender parity in high-skilled jobs	71.17	69	4.1.5	Corruption	52.24	36
2.1.6	FDI and technology transfer	35.97	84	4.2	Market Environment	36.12	62
2.2	Grow	28.49	88	4.2.1	Extent of market dominance	45.37	61
2.2.1	Tertiary enrolment	44.59	41	4.2.2	Labour productivity	19.61	76
2.2.2	Reading, maths, and science	21.46	67	4.2.3	Urbanisation	50.50	73
2.2.3	Use of virtual professional networks	13.27	71	4.2.4	Domestic credit to private sector	28.99	50
2.2.4	Formal and non-formal studies	1.97	67	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	61.16	91	4.3	R&D	27.91	64
2.3	Retain	69.41	40	4.3.1	R&D spending	5.43	75
2.3.1	Pension coverage	90.71	48	4.3.2	University ranking	13.93	83
2.3.2	Environmental performance	28.22	83	4.3.3	Gender parity in R&D	86.45	17
2.3.3	Physician density	88.28	2	4.3.4	Scientific journal articles	5.85	66
2.3.4	Sanitation	89.24	70	4.4	Innovation	20.63	57
2.3.5	Personal safety	50.58	67	4.4.1	Medium- and high-tech industry	16.42	90
2.4	Skills	35.50	57	4.4.2	High-tech exports	4.12	93
2.4.1	Workforce with tertiary education	48.50	25	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	51.45	41	4.4.4	New product entrepreneurial activity	37.06	60
2.4.3	Researchers	18.02	42	4.4.5	New business density	43.79	9
2.4.4	Ease of finding skilled employees	55.08	63	4.4.6	Patent applications	1.75	61
2.4.5	Digital skills	4.43	71				

Germany

Key Indicators

Rank (out of 124)	14	GDP per capita (PPP US\$)	55,891.20
Income group	High income	GDP (US\$ billions)	3,846.41
Regional group	Europe	FREI score	66.28
Population (millions)	83.24	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



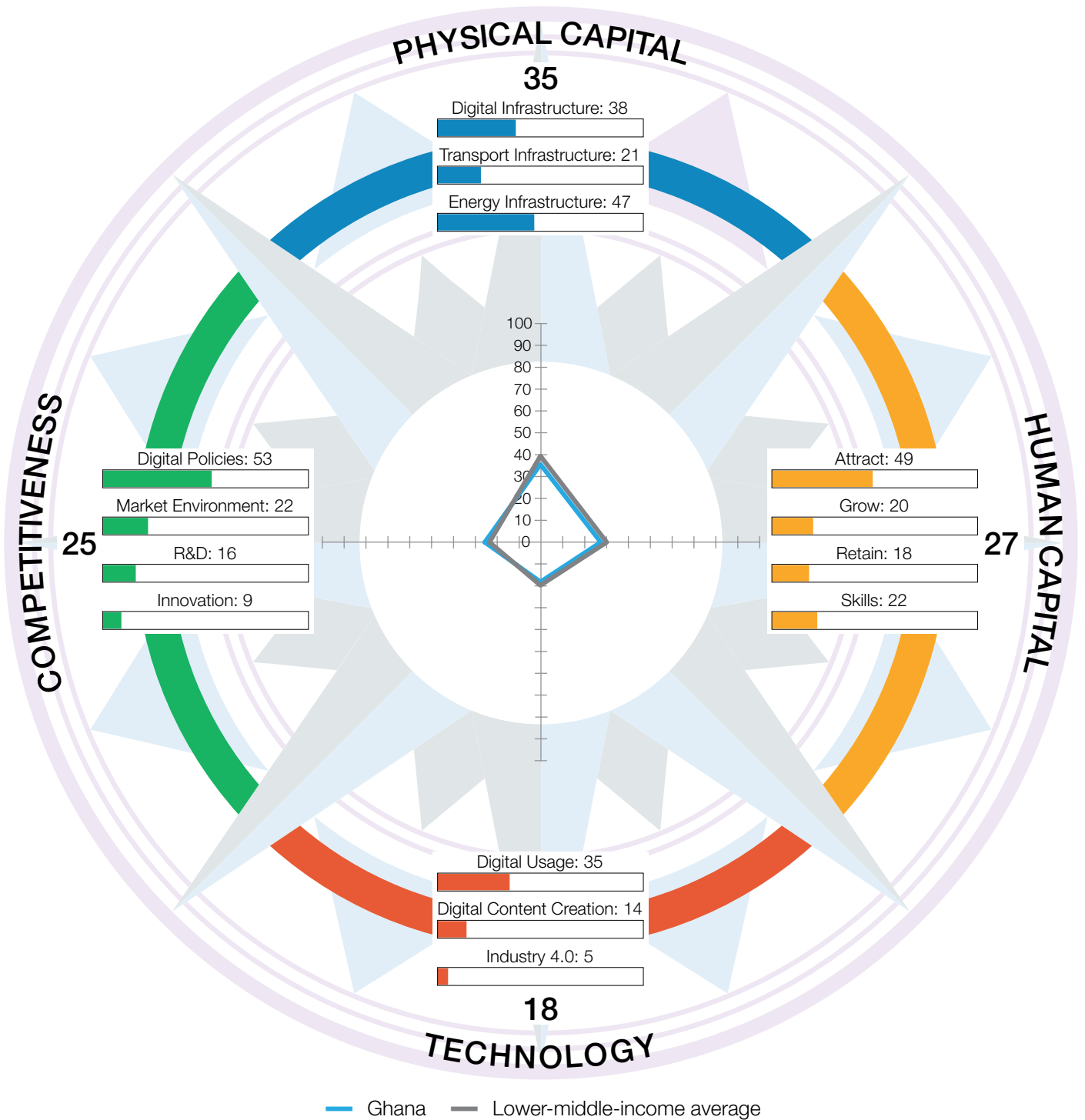
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	65.96	20	3	TECHNOLOGY	70.84	11
1.1	Digital Infrastructure	80.24	22	3.1	Digital Usage	75.89	25
1.1.1	Internet access	92.13	21	3.1.1	Internet users	89.31	25
1.1.2	International Internet bandwidth	42.05	73	3.1.2	Active mobile-broadband subscriptions	39.38	54
1.1.3	Fixed-broadband subscriptions	93.49	37	3.1.3	Gender parity in Internet usage	88.42	67
1.1.4	4G-mobile network coverage	99.60	29	3.1.4	Firms with website	90.85	7
1.1.5	Fixed broadband affordability	98.57	26	3.1.5	Internet shopping	85.73	11
1.1.6	Mobile broadband affordability	93.40	20	3.1.6	Government online services	67.15	58
1.1.7	Computer software spending	42.45	19	3.1.7	E-Participation	70.42	56
1.2	Transport Infrastructure	58.99	17	3.2	Digital Content Creation	73.32	11
1.2.1	Quality of infrastructure	100.00	1	3.2.1	GitHub commits	58.66	15
1.2.2	Rural access	98.41	8	3.2.2	Wikipedia edits	81.29	14
1.2.3	Air connectivity	23.89	32	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	92.50	18
1.3	Energy Infrastructure	58.66	55	3.3	Industry 4.0	63.31	9
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	100.00	1
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	50.98	13
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	43.10	19
1.3.4	Energy intensity	87.26	26	3.3.4	ICT patent applications	59.33	9
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	67.38	19	4	COMPETITIVENESS	60.94	15
2.1	Attract	67.15	22	4.1	Digital Policies	88.99	11
2.1.1	Brain gain	67.10	21	4.1.1	ICT regulation	92.07	19
2.1.2	International students	26.94	24	4.1.2	Cybersecurity	97.35	18
2.1.3	Tolerance of minorities	62.77	36	4.1.3	Rule of law	84.47	14
2.1.4	Tolerance of immigrants	75.38	33	4.1.4	Regulatory quality	83.00	12
2.1.5	Gender parity in high-skilled jobs	91.25	26	4.1.5	Corruption	88.06	9
2.1.6	FDI and technology transfer	79.44	11	4.2	Market Environment	54.66	25
2.2	Grow	59.81	25	4.2.1	Extent of market dominance	77.75	12
2.2.1	Tertiary enrolment	49.22	29	4.2.2	Labour productivity	62.82	19
2.2.2	Reading, maths, and science	67.91	17	4.2.3	Urbanisation	72.85	40
2.2.3	Use of virtual professional networks	18.14	57	4.2.4	Domestic credit to private sector	37.62	36
2.2.4	Formal and non-formal studies	70.40	16	4.2.5	Market capitalisation	22.26	30
2.2.5	Youth inclusion	93.40	12	4.3	R&D	57.02	14
2.3	Retain	85.77	10	4.3.1	R&D spending	63.31	7
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	79.98	7
2.3.2	Environmental performance	90.77	10	4.3.3	Gender parity in R&D	34.68	77
2.3.3	Physician density	53.45	22	4.3.4	Scientific journal articles	50.13	23
2.3.4	Sanitation	99.16	25	4.4	Innovation	43.09	20
2.3.5	Personal safety	85.47	15	4.4.1	Medium- and high-tech industry	76.61	4
2.4	Skills	56.77	22	4.4.2	High-tech exports	24.90	31
2.4.1	Workforce with tertiary education	46.21	31	4.4.3	Venture capital recipients, deals	22.49	24
2.4.2	High-skilled workforce	73.06	17	4.4.4	New product entrepreneurial activity	60.64	22
2.4.3	Researchers	64.56	14	4.4.5	New business density	5.58	68
2.4.4	Ease of finding skilled employees	70.12	32	4.4.6	Patent applications	68.34	9
2.4.5	Digital skills	29.92	37				

Ghana

Key Indicators

Rank (out of 124)	96	GDP per capita (PPP US\$)	5,604.13
Income group	Lower-middle income	GDP (US\$ billions)	72.35
Regional group	Sub-Saharan Africa	FREI score	26.47
Population (millions)	31.07	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)

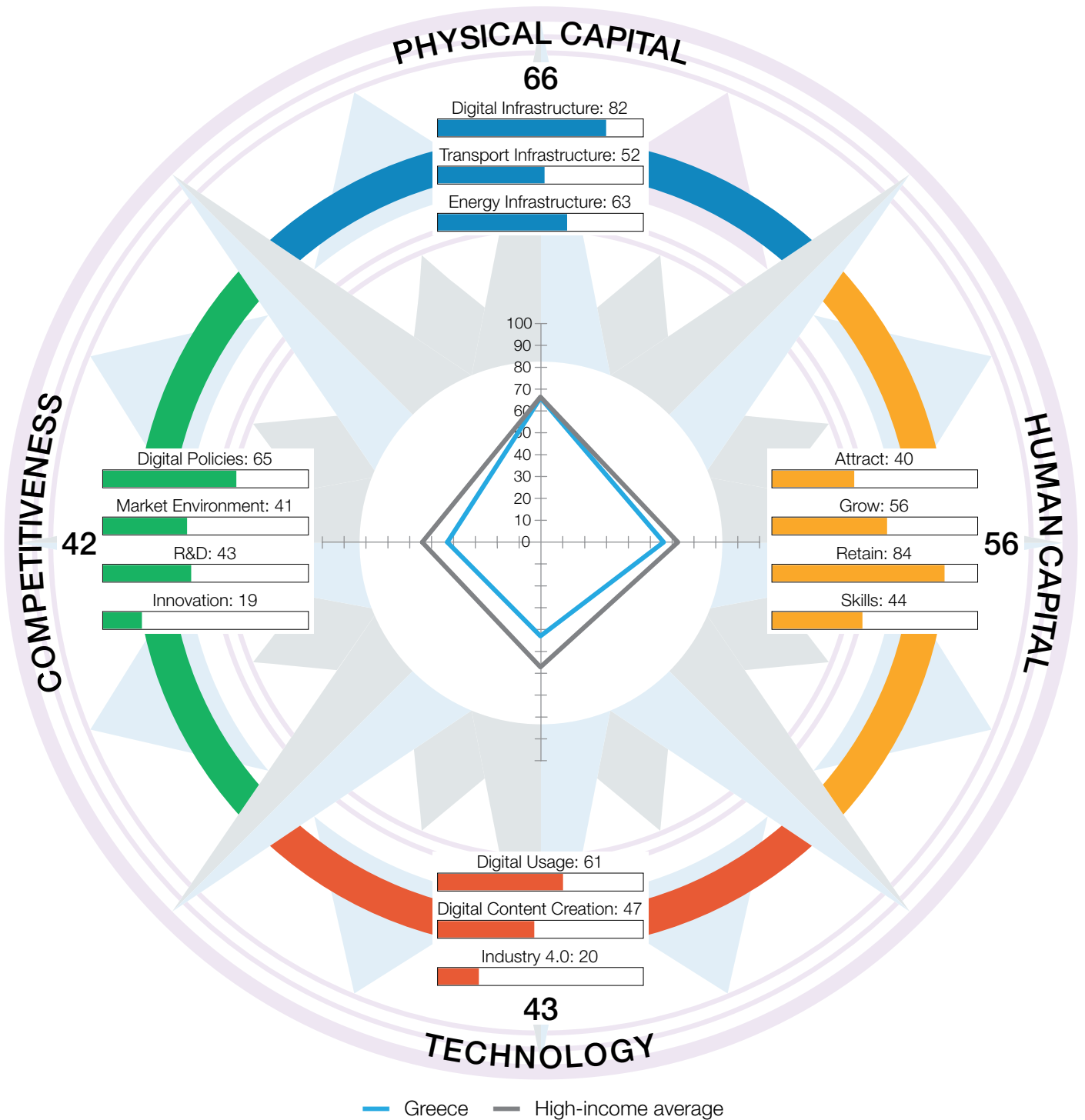


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	35.29	103	3	TECHNOLOGY	17.99	97
1.1	Digital Infrastructure	38.01	103	3.1	Digital Usage	35.40	96
1.1.1	Internet access	21.11	98	3.1.1	Internet users	34.81	97
1.1.2	International Internet bandwidth	39.25	85	3.1.2	Active mobile-broadband subscriptions	36.94	63
1.1.3	Fixed-broadband subscriptions	0.00	119	3.1.3	Gender parity in Internet usage	n/a	n/a
1.1.4	4G-mobile network coverage	67.65	101	3.1.4	Firms with website	24.18	89
1.1.5	Fixed broadband affordability	69.83	105	3.1.5	Internet shopping	5.41	88
1.1.6	Mobile broadband affordability	67.54	88	3.1.6	Government online services	54.75	79
1.1.7	Computer software spending	0.68	117	3.1.7	E-Participation	56.34	81
1.2	Transport Infrastructure	20.83	99	3.2	Digital Content Creation	13.95	109
1.2.1	Quality of infrastructure	31.32	85	3.2.1	GitHub commits	0.75	99
1.2.2	Rural access	49.27	87	3.2.2	Wikipedia edits	16.64	113
1.2.3	Air connectivity	0.67	105	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	38.20	104
1.3	Energy Infrastructure	47.02	96	3.3	Industry 4.0	4.60	81
1.3.1	Access to electricity	81.42	100	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	8.93	62
1.3.3	Electrical outages	48.41	81	3.3.3	AI research	2.91	72
1.3.4	Energy intensity	88.73	21	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	27.42	100	4	COMPETITIVENESS	25.18	86
2.1	Attract	48.68	52	4.1	Digital Policies	53.41	62
2.1.1	Brain gain	56.78	38	4.1.1	ICT regulation	71.15	74
2.1.2	International students	2.72	83	4.1.2	Cybersecurity	86.39	51
2.1.3	Tolerance of minorities	71.28	23	4.1.3	Rule of law	36.86	57
2.1.4	Tolerance of immigrants	72.31	38	4.1.4	Regulatory quality	39.82	70
2.1.5	Gender parity in high-skilled jobs	46.27	96	4.1.5	Corruption	32.84	59
2.1.6	FDI and technology transfer	42.72	74	4.2	Market Environment	22.23	101
2.2	Grow	20.40	110	4.2.1	Extent of market dominance	51.04	49
2.2.1	Tertiary enrolment	12.10	94	4.2.2	Labour productivity	6.10	96
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	47.42	81
2.2.3	Use of virtual professional networks	9.07	78	4.2.4	Domestic credit to private sector	1.88	118
2.2.4	Formal and non-formal studies	2.21	65	4.2.5	Market capitalisation	4.73	67
2.2.5	Youth inclusion	58.21	96	4.3	R&D	16.30	96
2.3	Retain	18.16	109	4.3.1	R&D spending	n/a	n/a
2.3.1	Pension coverage	17.35	94	4.3.2	University ranking	25.13	68
2.3.2	Environmental performance	4.36	119	4.3.3	Gender parity in R&D	22.10	89
2.3.3	Physician density	0.89	112	4.3.4	Scientific journal articles	1.67	89
2.3.4	Sanitation	12.04	119	4.4	Innovation	8.76	102
2.3.5	Personal safety	56.17	60	4.4.1	Medium- and high-tech industry	13.19	96
2.4	Skills	22.43	99	4.4.2	High-tech exports	1.82	108
2.4.1	Workforce with tertiary education	9.59	98	4.4.3	Venture capital recipients, deals	9.12	47
2.4.2	High-skilled workforce	14.94	101	4.4.4	New product entrepreneurial activity	24.92	75
2.4.3	Researchers	0.95	82	4.4.5	New business density	3.52	79
2.4.4	Ease of finding skilled employees	64.25	47	4.4.6	Patent applications	0.00	96
2.4.5	Digital skills	n/a	n/a				

Key Indicators

Rank (out of 124)	34	GDP per capita (PPP US\$)	30,869.15
Income group	High income	GDP (US\$ billions)	189.41
Regional group	Europe	FREI score	51.57
Population (millions)	10.72	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



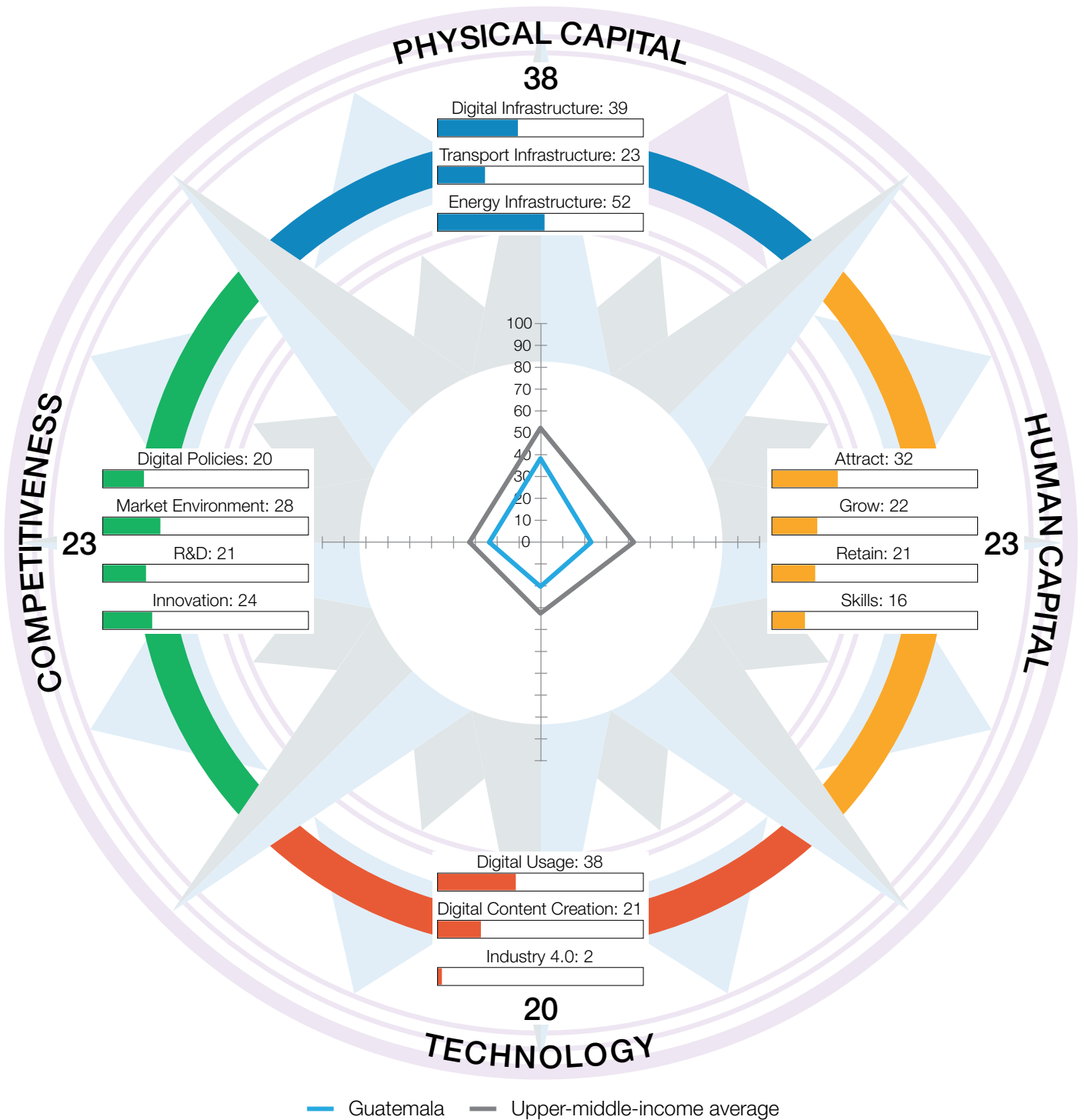
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	65.54	24	3	TECHNOLOGY	42.55	37
1.1	Digital Infrastructure	81.89	14	3.1	Digital Usage	60.69	56
1.1.1	Internet access	80.21	53	3.1.1	Internet users	77.03	58
1.1.2	International Internet bandwidth	57.46	19	3.1.2	Active mobile-broadband subscriptions	38.42	60
1.1.3	Fixed-broadband subscriptions	99.76	5	3.1.3	Gender parity in Internet usage	86.11	69
1.1.4	4G-mobile network coverage	98.80	47	3.1.4	Firms with website	56.70	52
1.1.5	Fixed broadband affordability	97.45	42	3.1.5	Internet shopping	28.40	46
1.1.6	Mobile broadband affordability	92.18	22	3.1.6	Government online services	63.51	64
1.1.7	Computer software spending	47.37	10	3.1.7	E-Participation	74.65	49
1.2	Transport Infrastructure	51.79	31	3.2	Digital Content Creation	47.19	35
1.2.1	Quality of infrastructure	57.30	36	3.2.1	GitHub commits	18.23	35
1.2.2	Rural access	91.40	26	3.2.2	Wikipedia edits	73.31	30
1.2.3	Air connectivity	32.63	22	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	83.64	36
1.3	Energy Infrastructure	62.93	28	3.3	Industry 4.0	19.78	30
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	6.74	36
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	35.33	22
1.3.3	Electrical outages	85.29	48	3.3.3	AI research	37.00	23
1.3.4	Energy intensity	86.23	28	3.3.4	ICT patent applications	2.90	37
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	55.98	33	4	COMPETITIVENESS	42.20	40
2.1	Attract	40.48	82	4.1	Digital Policies	65.40	43
2.1.1	Brain gain	16.48	112	4.1.1	ICT regulation	87.49	34
2.1.2	International students	9.28	60	4.1.2	Cybersecurity	93.84	35
2.1.3	Tolerance of minorities	60.64	40	4.1.3	Rule of law	47.56	47
2.1.4	Tolerance of immigrants	32.31	108	4.1.4	Regulatory quality	54.82	42
2.1.5	Gender parity in high-skilled jobs	99.15	6	4.1.5	Corruption	43.28	46
2.1.6	FDI and technology transfer	25.01	102	4.2	Market Environment	41.22	50
2.2	Grow	55.58	31	4.2.1	Extent of market dominance	43.58	68
2.2.1	Tertiary enrolment	100.00	1	4.2.2	Labour productivity	41.64	43
2.2.2	Reading, maths, and science	48.73	42	4.2.3	Urbanisation	74.94	37
2.2.3	Use of virtual professional networks	22.12	47	4.2.4	Domestic credit to private sector	35.89	40
2.2.4	Formal and non-formal studies	22.46	44	4.2.5	Market capitalisation	10.05	51
2.2.5	Youth inclusion	84.57	38	4.3	R&D	43.10	28
2.3	Retain	84.06	13	4.3.1	R&D spending	23.63	32
2.3.1	Pension coverage	95.71	40	4.3.2	University ranking	42.12	39
2.3.2	Environmental performance	76.66	25	4.3.3	Gender parity in R&D	66.19	40
2.3.3	Physician density	77.60	4	4.3.4	Scientific journal articles	40.45	29
2.3.4	Sanitation	98.90	32	4.4	Innovation	19.10	61
2.3.5	Personal safety	71.45	28	4.4.1	Medium- and high-tech industry	24.18	72
2.4	Skills	43.79	39	4.4.2	High-tech exports	21.29	37
2.4.1	Workforce with tertiary education	43.43	35	4.4.3	Venture capital recipients, deals	1.94	80
2.4.2	High-skilled workforce	48.33	44	4.4.4	New product entrepreneurial activity	55.91	32
2.4.3	Researchers	43.09	25	4.4.5	New business density	5.86	66
2.4.4	Ease of finding skilled employees	48.27	78	4.4.6	Patent applications	5.41	39
2.4.5	Digital skills	35.85	32				

Guatemala

Key Indicators

Rank (out of 124)	98	GDP per capita (PPP US\$)	8,982.99
Income group	Upper-middle income	GDP (US\$ billions)	77.60
Regional group	Latin America and the Caribbean	FREI score	26.12
Population (millions)	16.86	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)

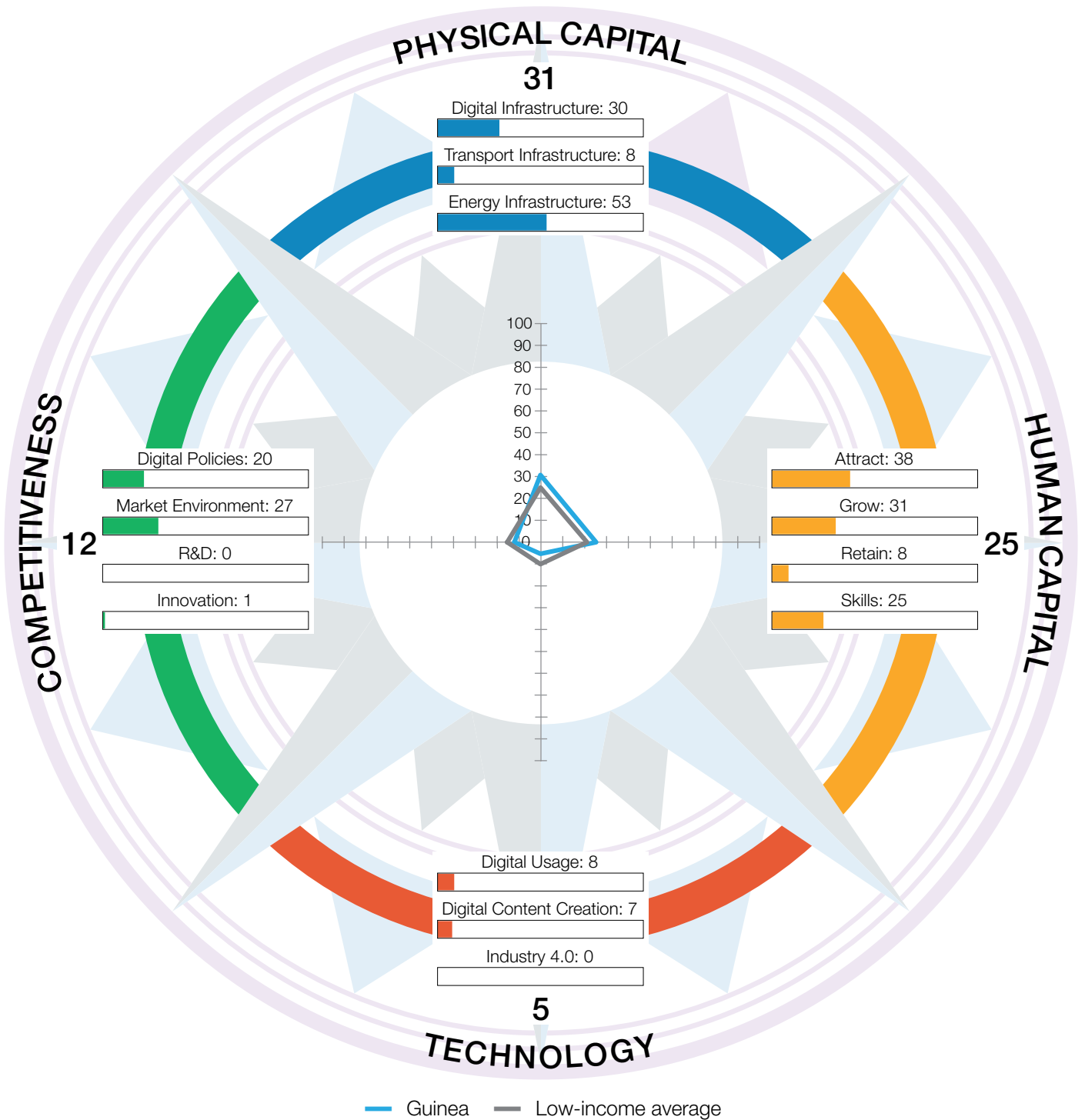


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	38.07	99	3	TECHNOLOGY	20.18	95
1.1	Digital Infrastructure	38.72	102	3.1	Digital Usage	37.73	92
1.1.1	Internet access	21.46	97	3.1.1	Internet users	41.65	92
1.1.2	International Internet bandwidth	31.52	101	3.1.2	Active mobile-broadband subscriptions	5.68	119
1.1.3	Fixed-broadband subscriptions	n/a	n/a	3.1.3	Gender parity in Internet usage	75.86	82
1.1.4	4G-mobile network coverage	40.35	111	3.1.4	Firms with website	54.16	56
1.1.5	Fixed broadband affordability	82.69	91	3.1.5	Internet shopping	6.47	82
1.1.6	Mobile broadband affordability	55.23	104	3.1.6	Government online services	39.42	100
1.1.7	Computer software spending	1.07	115	3.1.7	E-Participation	40.84	100
1.2	Transport Infrastructure	23.11	88	3.2	Digital Content Creation	20.88	95
1.2.1	Quality of infrastructure	22.78	108	3.2.1	GitHub commits	1.35	91
1.2.2	Rural access	44.91	92	3.2.2	Wikipedia edits	27.80	96
1.2.3	Air connectivity	1.64	95	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	52.59	93
1.3	Energy Infrastructure	52.37	87	3.3	Industry 4.0	1.93	103
1.3.1	Access to electricity	95.19	93	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	2.74	97
1.3.3	Electrical outages	80.90	55	3.3.3	AI research	0.08	115
1.3.4	Energy intensity	75.13	68	3.3.4	ICT patent applications	0.00	74
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	23.04	111	4	COMPETITIVENESS	23.20	93
2.1	Attract	32.35	114	4.1	Digital Policies	20.12	118
2.1.1	Brain gain	38.05	84	4.1.1	ICT regulation	41.83	118
2.1.2	International students	0.54	100	4.1.2	Cybersecurity	11.18	120
2.1.3	Tolerance of minorities	5.32	118	4.1.3	Rule of law	6.61	119
2.1.4	Tolerance of immigrants	13.85	119	4.1.4	Regulatory quality	35.04	81
2.1.5	Gender parity in high-skilled jobs	90.95	27	4.1.5	Corruption	5.97	115
2.1.6	FDI and technology transfer	45.40	67	4.2	Market Environment	28.09	88
2.2	Grow	22.18	106	4.2.1	Extent of market dominance	44.70	63
2.2.1	Tertiary enrolment	14.44	90	4.2.2	Labour productivity	12.39	86
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	41.43	89
2.2.3	Use of virtual professional networks	9.29	77	4.2.4	Domestic credit to private sector	13.83	84
2.2.4	Formal and non-formal studies	3.31	61	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	61.68	86	4.3	R&D	20.63	83
2.3	Retain	21.25	103	4.3.1	R&D spending	0.34	104
2.3.1	Pension coverage	15.00	98	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	11.67	109	4.3.3	Gender parity in R&D	81.97	23
2.3.3	Physician density	4.00	100	4.3.4	Scientific journal articles	0.20	115
2.3.4	Sanitation	62.31	95	4.4	Innovation	23.96	46
2.3.5	Personal safety	13.25	120	4.4.1	Medium- and high-tech industry	27.61	66
2.4	Skills	16.39	110	4.4.2	High-tech exports	9.74	70
2.4.1	Workforce with tertiary education	5.45	108	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	10.12	109	4.4.4	New product entrepreneurial activity	80.15	8
2.4.3	Researchers	0.00	98	4.4.5	New business density	2.07	90
2.4.4	Ease of finding skilled employees	50.00	73	4.4.6	Patent applications	0.22	91
2.4.5	Digital skills	n/a	n/a				

Key Indicators

Rank (out of 124)	118	GDP per capita (PPP US\$)	2,434.61
Income group	Low income	GDP (US\$ billions)	15.68
Regional group	Sub-Saharan Africa	FREI score	18.24
Population (millions)	13.13	FREI score (income group average)	17.76

FREI 2022 scores by pillar and sub-pillar (0–100)



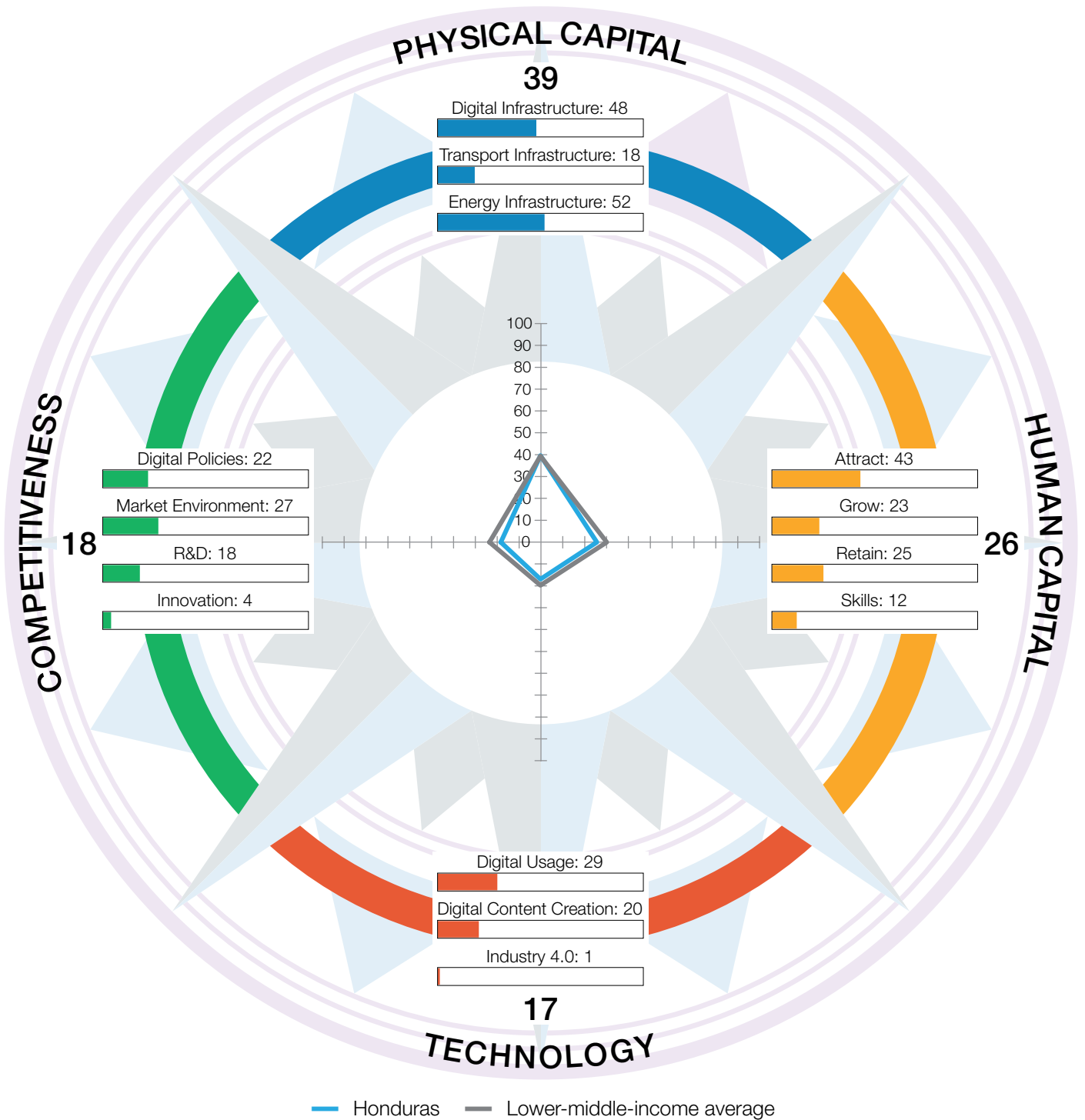
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	30.50	108	3	TECHNOLOGY	5.23	124
1.1	Digital Infrastructure	29.81	112	3.1	Digital Usage	8.34	124
1.1.1	Internet access	11.55	107	3.1.1	Internet users	17.96	109
1.1.2	International Internet bandwidth	26.83	108	3.1.2	Active mobile-broadband subscriptions	8.73	116
1.1.3	Fixed-broadband subscriptions	n/a	n/a	3.1.3	Gender parity in Internet usage	0.00	100
1.1.4	4G-mobile network coverage	29.00	115	3.1.4	Firms with website	7.01	103
1.1.5	Fixed broadband affordability	70.59	104	3.1.5	Internet shopping	3.47	101
1.1.6	Mobile broadband affordability	37.85	112	3.1.6	Government online services	2.92	123
1.1.7	Computer software spending	3.07	101	3.1.7	E-Participation	18.30	118
1.2	Transport Infrastructure	8.31	122	3.2	Digital Content Creation	6.97	123
1.2.1	Quality of infrastructure	0.00	124	3.2.1	GitHub commits	0.02	122
1.2.2	Rural access	32.73	106	3.2.2	Wikipedia edits	27.85	95
1.2.3	Air connectivity	0.04	121	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	0.00	124
1.3	Energy Infrastructure	53.38	85	3.3	Industry 4.0	0.38	121
1.3.1	Access to electricity	35.16	114	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	0.90	109
1.3.3	Electrical outages	60.79	70	3.3.3	AI research	0.00	121
1.3.4	Energy intensity	64.20	93	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	25.35	107	4	COMPETITIVENESS	11.86	121
2.1	Attract	37.55	93	4.1	Digital Policies	19.60	119
2.1.1	Brain gain	66.16	22	4.1.1	ICT regulation	51.44	109
2.1.2	International students	2.38	84	4.1.2	Cybersecurity	18.74	115
2.1.3	Tolerance of minorities	6.38	116	4.1.3	Rule of law	0.33	123
2.1.4	Tolerance of immigrants	75.38	33	4.1.4	Regulatory quality	17.06	115
2.1.5	Gender parity in high-skilled jobs	24.46	109	4.1.5	Corruption	10.45	108
2.1.6	FDI and technology transfer	50.51	56	4.2	Market Environment	26.83	95
2.2	Grow	31.39	77	4.2.1	Extent of market dominance	55.89	43
2.2.1	Tertiary enrolment	4.20	113	4.2.2	Labour productivity	n/a	n/a
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	23.59	107
2.2.3	Use of virtual professional networks	1.66	116	4.2.4	Domestic credit to private sector	1.01	120
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	88.31	28	4.3	R&D	0.02	124
2.3	Retain	7.60	124	4.3.1	R&D spending	n/a	n/a
2.3.1	Pension coverage	0.00	122	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	2.26	122	4.3.3	Gender parity in R&D	0.00	100
2.3.3	Physician density	0.59	118	4.3.4	Scientific journal articles	0.05	123
2.3.4	Sanitation	16.62	116	4.4	Innovation	0.99	123
2.3.5	Personal safety	18.52	113	4.4.1	Medium- and high-tech industry	n/a	n/a
2.4	Skills	24.85	89	4.4.2	High-tech exports	1.44	113
2.4.1	Workforce with tertiary education	11.81	93	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	6.86	112	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	1.52	96
2.4.4	Ease of finding skilled employees	55.89	60	4.4.6	Patent applications	0.00	96
2.4.5	Digital skills	n/a	n/a				

Honduras

Key Indicators

Rank (out of 124)	100	GDP per capita (PPP US\$)	5,980.06
Income group	Lower-middle income	GDP (US\$ billions)	23.83
Regional group	Latin America and the Caribbean	FREI score	24.93
Population (millions)	9.90	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



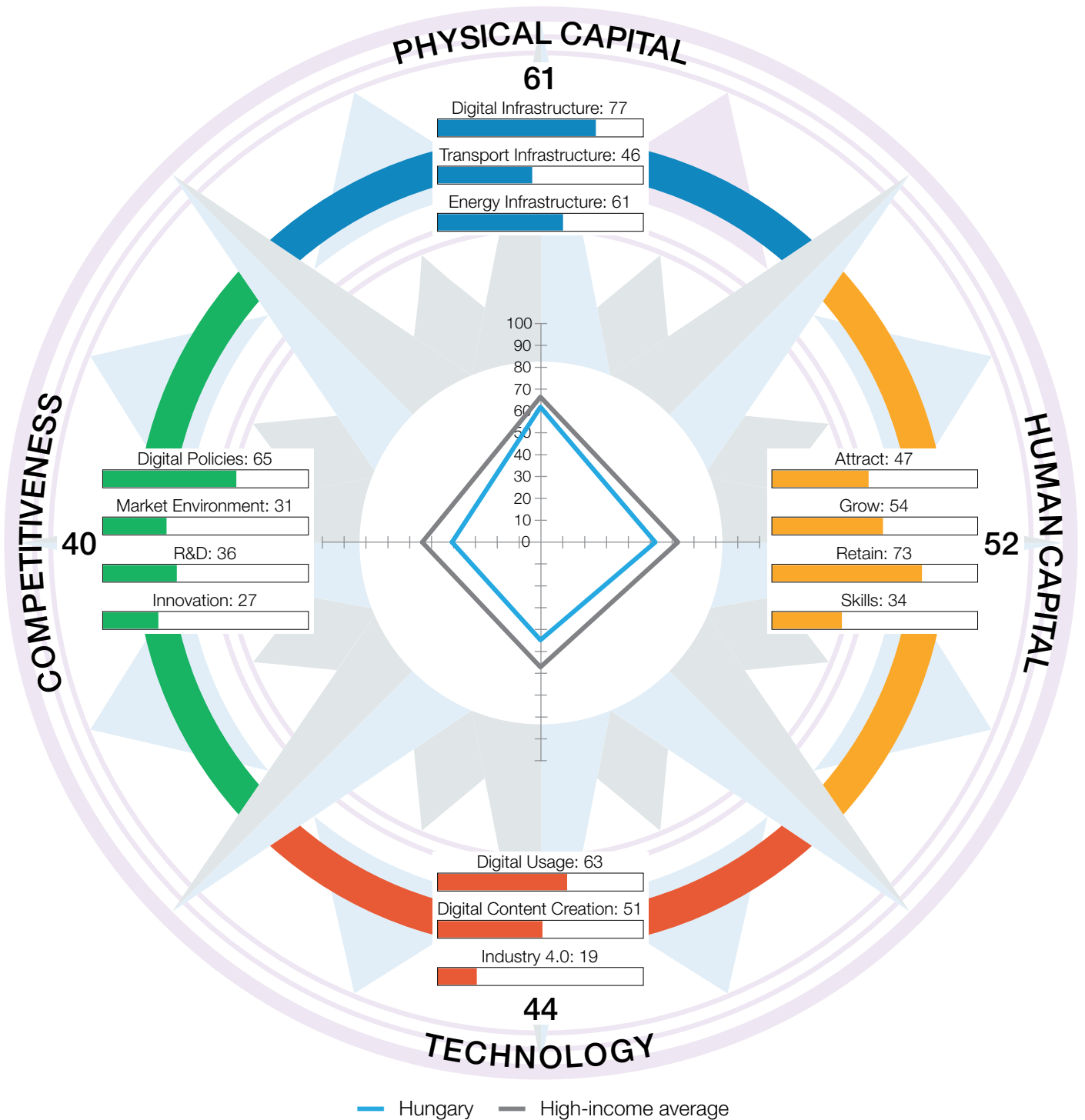
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	39.40	98	3	TECHNOLOGY	16.76	98
1.1	Digital Infrastructure	48.27	98	3.1	Digital Usage	28.63	102
1.1.1	Internet access	n/a	n/a	3.1.1	Internet users	36.39	95
1.1.2	International Internet bandwidth	50.79	39	3.1.2	Active mobile-broadband subscriptions	21.24	102
1.1.3	Fixed-broadband subscriptions	42.50	86	3.1.3	Gender parity in Internet usage	n/a	n/a
1.1.4	4G-mobile network coverage	75.24	93	3.1.4	Firms with website	36.63	76
1.1.5	Fixed broadband affordability	66.80	106	3.1.5	Internet shopping	4.53	93
1.1.6	Mobile broadband affordability	31.20	116	3.1.6	Government online services	33.58	106
1.1.7	Computer software spending	23.08	45	3.1.7	E-Participation	39.43	101
1.2	Transport Infrastructure	18.39	106	3.2	Digital Content Creation	20.24	97
1.2.1	Quality of infrastructure	32.38	83	3.2.1	GitHub commits	1.18	93
1.2.2	Rural access	33.94	104	3.2.2	Wikipedia edits	29.43	91
1.2.3	Air connectivity	1.72	94	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	49.99	95
1.3	Energy Infrastructure	51.56	94	3.3	Industry 4.0	1.40	109
1.3.1	Access to electricity	91.87	96	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	0.93	107
1.3.3	Electrical outages	71.89	63	3.3.3	AI research	0.07	116
1.3.4	Energy intensity	72.20	78	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	25.63	105	4	COMPETITIVENESS	17.93	107
2.1	Attract	43.03	71	4.1	Digital Policies	22.27	114
2.1.1	Brain gain	26.43	102	4.1.1	ICT regulation	71.15	74
2.1.2	International students	2.13	86	4.1.2	Cybersecurity	0.00	124
2.1.3	Tolerance of minorities	52.13	51	4.1.3	Rule of law	9.44	115
2.1.4	Tolerance of immigrants	38.46	96	4.1.4	Regulatory quality	26.29	96
2.1.5	Gender parity in high-skilled jobs	83.13	44	4.1.5	Corruption	4.48	122
2.1.6	FDI and technology transfer	55.92	49	4.2	Market Environment	27.24	91
2.2	Grow	22.65	103	4.2.1	Extent of market dominance	3.07	120
2.2.1	Tertiary enrolment	16.68	87	4.2.2	Labour productivity	n/a	n/a
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	48.66	77
2.2.3	Use of virtual professional networks	7.85	87	4.2.4	Domestic credit to private sector	30.00	49
2.2.4	Formal and non-formal studies	4.27	59	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	61.80	85	4.3	R&D	18.27	91
2.3	Retain	25.19	99	4.3.1	R&D spending	0.55	101
2.3.1	Pension coverage	8.88	107	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	22.13	91	4.3.3	Gender parity in R&D	72.39	36
2.3.3	Physician density	3.42	101	4.3.4	Scientific journal articles	0.15	119
2.3.4	Sanitation	79.77	86	4.4	Innovation	3.92	119
2.3.5	Personal safety	11.73	121	4.4.1	Medium- and high-tech industry	8.60	105
2.4	Skills	11.65	116	4.4.2	High-tech exports	3.16	98
2.4.1	Workforce with tertiary education	7.71	101	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	15.46	99	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	0.27	88	4.4.5	New business density	n/a	n/a
2.4.4	Ease of finding skilled employees	23.16	113	4.4.6	Patent applications	0.00	96
2.4.5	Digital skills	n/a	n/a				

Hungary

Key Indicators

Rank (out of 124)	39	GDP per capita (PPP US\$)	33,949.63
Income group	High income	GDP (US\$ billions)	155.01
Regional group	Europe	FREI score	49.48
Population (millions)	9.75	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



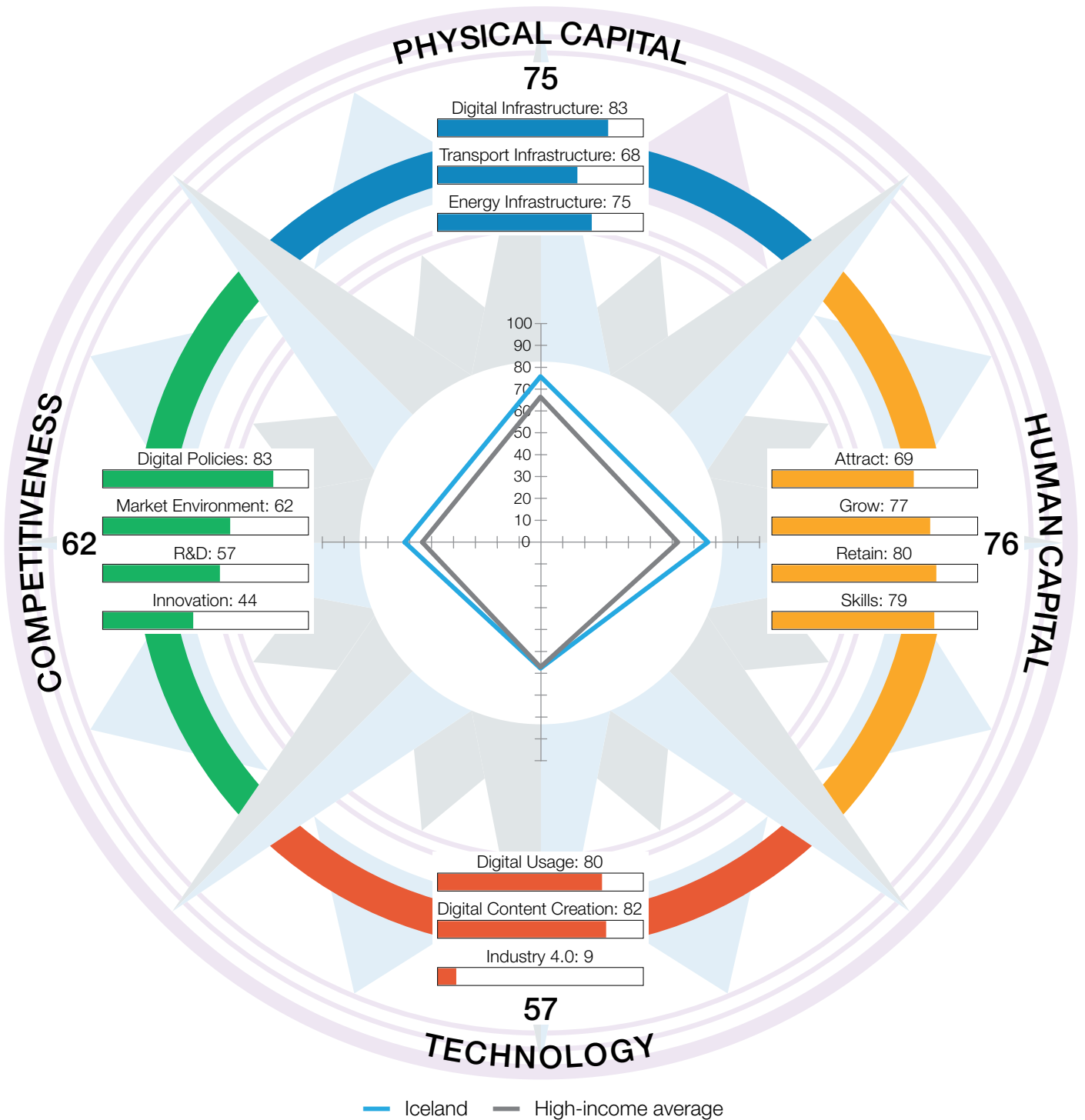
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	61.39	42	3	TECHNOLOGY	44.35	35
1.1	Digital Infrastructure	77.24	33	3.1	Digital Usage	63.10	52
1.1.1	Internet access	87.60	36	3.1.1	Internet users	84.02	41
1.1.2	International Internet bandwidth	43.49	66	3.1.2	Active mobile-broadband subscriptions	31.70	79
1.1.3	Fixed-broadband subscriptions	95.16	33	3.1.3	Gender parity in Internet usage	98.01	21
1.1.4	4G-mobile network coverage	99.20	37	3.1.4	Firms with website	60.48	49
1.1.5	Fixed broadband affordability	97.37	44	3.1.5	Internet shopping	36.86	38
1.1.6	Mobile broadband affordability	95.45	9	3.1.6	Government online services	68.62	54
1.1.7	Computer software spending	22.41	51	3.1.7	E-Participation	61.97	74
1.2	Transport Infrastructure	45.93	38	3.2	Digital Content Creation	51.43	31
1.2.1	Quality of infrastructure	60.85	28	3.2.1	GitHub commits	23.88	32
1.2.2	Rural access	88.83	33	3.2.2	Wikipedia edits	79.65	18
1.2.3	Air connectivity	12.42	47	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	82.20	37
1.3	Energy Infrastructure	61.00	38	3.3	Industry 4.0	18.52	33
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	24.95	22
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	13.84	47
1.3.3	Electrical outages	89.24	36	3.3.3	AI research	21.98	33
1.3.4	Energy intensity	79.95	55	3.3.4	ICT patent applications	13.38	24
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	52.13	39	4	COMPETITIVENESS	40.05	44
2.1	Attract	47.08	59	4.1	Digital Policies	64.89	44
2.1.1	Brain gain	28.40	95	4.1.1	ICT regulation	92.79	14
2.1.2	International students	33.61	15	4.1.2	Cybersecurity	91.08	43
2.1.3	Tolerance of minorities	67.02	29	4.1.3	Rule of law	53.31	42
2.1.4	Tolerance of immigrants	0.00	123	4.1.4	Regulatory quality	52.96	47
2.1.5	Gender parity in high-skilled jobs	88.26	36	4.1.5	Corruption	34.33	53
2.1.6	FDI and technology transfer	65.21	31	4.2	Market Environment	31.39	75
2.2	Grow	54.18	33	4.2.1	Extent of market dominance	25.31	105
2.2.1	Tertiary enrolment	34.95	61	4.2.2	Labour productivity	44.15	39
2.2.2	Reading, maths, and science	59.29	32	4.2.3	Urbanisation	65.72	50
2.2.3	Use of virtual professional networks	14.38	66	4.2.4	Domestic credit to private sector	15.06	81
2.2.4	Formal and non-formal studies	75.42	11	4.2.5	Market capitalisation	6.71	62
2.2.5	Youth inclusion	86.86	31	4.3	R&D	36.46	40
2.3	Retain	73.21	33	4.3.1	R&D spending	30.86	23
2.3.1	Pension coverage	90.31	50	4.3.2	University ranking	37.32	46
2.3.2	Environmental performance	67.25	33	4.3.3	Gender parity in R&D	50.41	54
2.3.3	Physician density	42.27	38	4.3.4	Scientific journal articles	27.27	38
2.3.4	Sanitation	97.83	41	4.4	Innovation	27.45	36
2.3.5	Personal safety	68.38	35	4.4.1	Medium- and high-tech industry	71.28	5
2.4	Skills	34.04	64	4.4.2	High-tech exports	28.04	29
2.4.1	Workforce with tertiary education	34.23	46	4.4.3	Venture capital recipients, deals	4.79	64
2.4.2	High-skilled workforce	57.53	34	4.4.4	New product entrepreneurial activity	37.73	58
2.4.3	Researchers	40.05	26	4.4.5	New business density	15.70	35
2.4.4	Ease of finding skilled employees	16.33	117	4.4.6	Patent applications	7.17	36
2.4.5	Digital skills	22.06	50				

Iceland

Key Indicators

Rank (out of 124)	13	GDP per capita (PPP US\$)	58,512.65
Income group	High income	GDP (US\$ billions)	21.72
Regional group	Europe	FREI score	67.55
Population (millions)	0.37	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



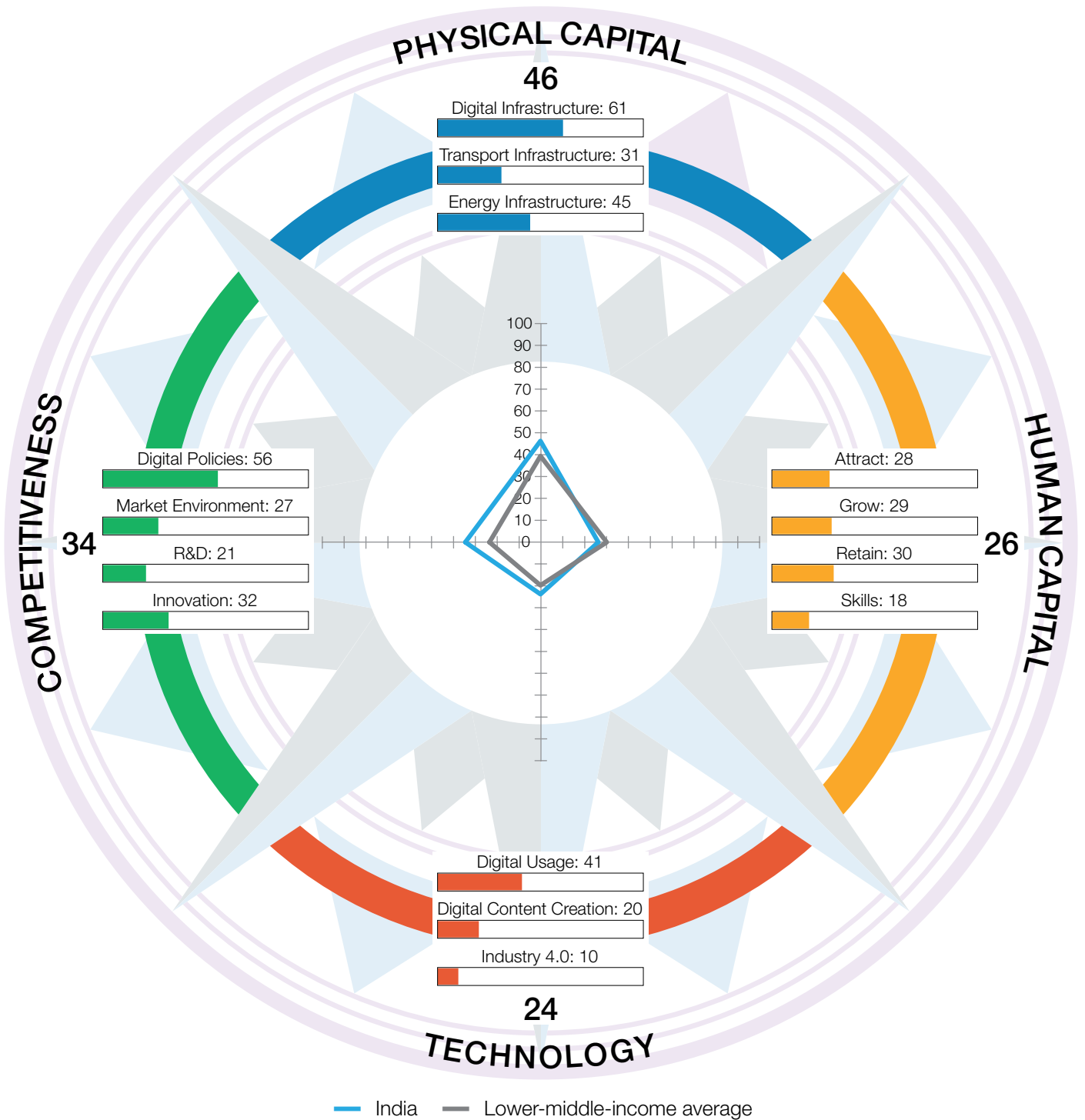
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	75.23	5	3	TECHNOLOGY	57.27	23
1.1	Digital Infrastructure	82.78	7	3.1	Digital Usage	80.48	17
1.1.1	Internet access	96.55	8	3.1.1	Internet users	98.96	4
1.1.2	International Internet bandwidth	67.48	7	3.1.2	Active mobile-broadband subscriptions	53.98	15
1.1.3	Fixed-broadband subscriptions	99.85	3	3.1.3	Gender parity in Internet usage	98.36	14
1.1.4	4G-mobile network coverage	99.98	12	3.1.4	Firms with website	83.86	15
1.1.5	Fixed broadband affordability	98.01	35	3.1.5	Internet shopping	n/a	n/a
1.1.6	Mobile broadband affordability	94.67	13	3.1.6	Government online services	74.45	42
1.1.7	Computer software spending	22.94	46	3.1.7	E-Participation	73.24	50
1.2	Transport Infrastructure	67.90	6	3.2	Digital Content Creation	81.87	3
1.2.1	Quality of infrastructure	58.01	34	3.2.1	GitHub commits	62.66	12
1.2.2	Rural access	66.55	62	3.2.2	Wikipedia edits	90.39	4
1.2.3	Air connectivity	100.00	1	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	97.58	9
1.3	Energy Infrastructure	75.00	5	3.3	Industry 4.0	9.47	51
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	6.06	38
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	n/a	n/a
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	n/a	n/a
1.3.4	Energy intensity	0.00	123	3.3.4	ICT patent applications	0.00	74
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	76.06	2	4	COMPETITIVENESS	61.62	13
2.1	Attract	68.61	17	4.1	Digital Policies	83.01	18
2.1.1	Brain gain	60.33	30	4.1.1	ICT regulation	84.13	44
2.1.2	International students	22.50	31	4.1.2	Cybersecurity	79.36	66
2.1.3	Tolerance of minorities	100.00	1	4.1.3	Rule of law	91.66	9
2.1.4	Tolerance of immigrants	83.08	20	4.1.4	Regulatory quality	79.33	16
2.1.5	Gender parity in high-skilled jobs	100.00	1	4.1.5	Corruption	80.60	16
2.1.6	FDI and technology transfer	45.74	65	4.2	Market Environment	62.39	15
2.2	Grow	76.91	2	4.2.1	Extent of market dominance	44.93	62
2.2.1	Tertiary enrolment	51.97	24	4.2.2	Labour productivity	67.65	14
2.2.2	Reading, maths, and science	60.14	29	4.2.3	Urbanisation	92.60	7
2.2.3	Use of virtual professional networks	100.00	1	4.2.4	Domestic credit to private sector	44.37	29
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	95.54	6	4.3	R&D	57.46	12
2.3	Retain	80.00	25	4.3.1	R&D spending	41.16	16
2.3.1	Pension coverage	70.82	64	4.3.2	University ranking	47.48	29
2.3.2	Environmental performance	82.23	17	4.3.3	Gender parity in R&D	64.31	42
2.3.3	Physician density	51.47	25	4.3.4	Scientific journal articles	76.87	7
2.3.4	Sanitation	98.69	34	4.4	Innovation	43.62	19
2.3.5	Personal safety	96.82	3	4.4.1	Medium- and high-tech industry	13.78	93
2.4	Skills	78.73	1	4.4.2	High-tech exports	45.56	9
2.4.1	Workforce with tertiary education	48.55	23	4.4.3	Venture capital recipients, deals	74.98	6
2.4.2	High-skilled workforce	82.82	4	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	75.97	7	4.4.5	New business density	41.77	15
2.4.4	Ease of finding skilled employees	100.00	1	4.4.6	Patent applications	42.01	15
2.4.5	Digital skills	86.31	4				

India

Key Indicators

Rank (out of 124)	89	GDP per capita (PPP US\$)	6,994.03
Income group	Lower-middle income	GDP (US\$ billions)	2,622.98
Regional group	Asia and Pacific	FREI score	32.50
Population (millions)	1,380.00	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



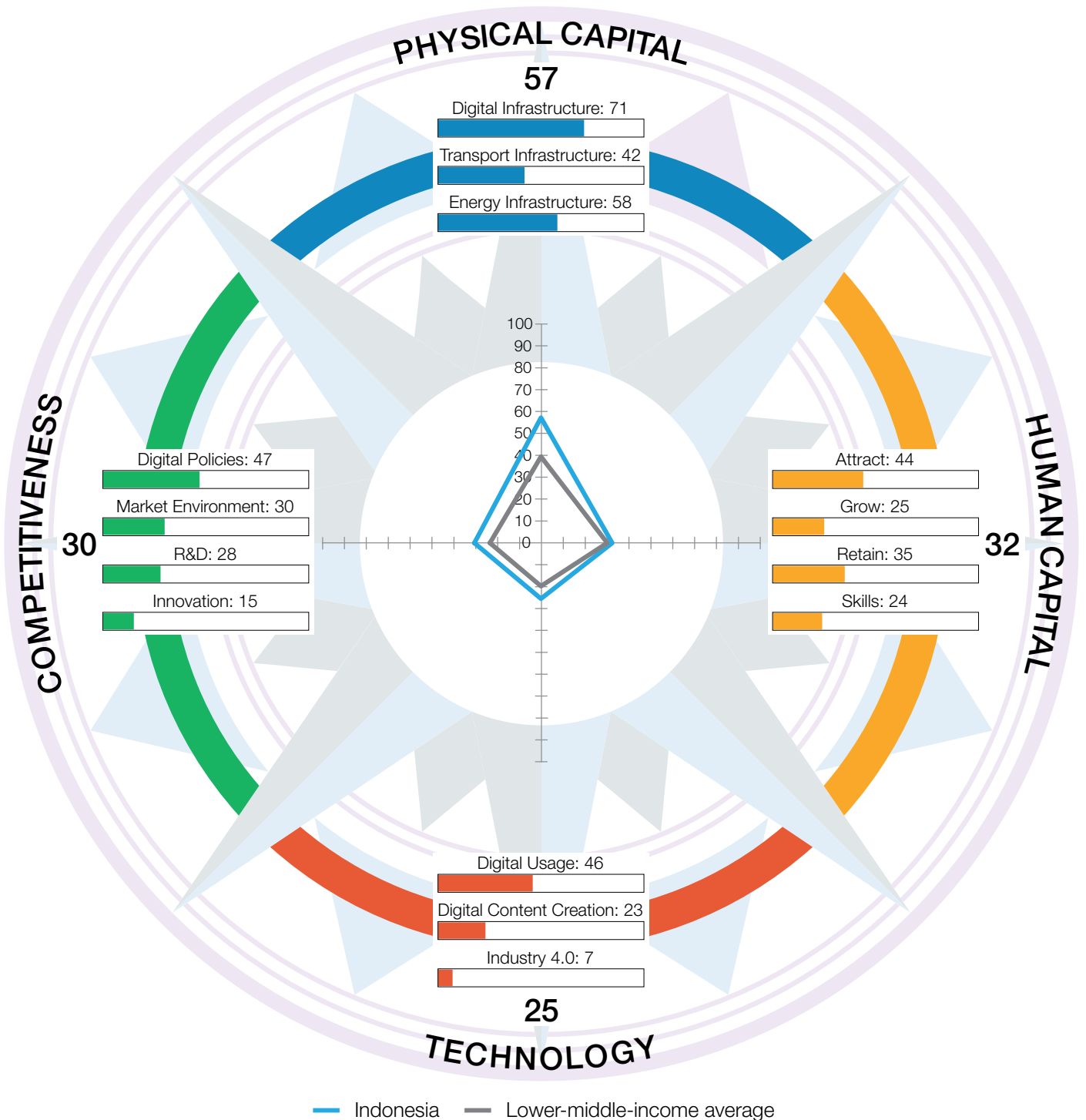
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	46.01	83	3	TECHNOLOGY	23.60	90
1.1	Digital Infrastructure	61.40	79	3.1	Digital Usage	40.99	90
1.1.1	Internet access	22.55	95	3.1.1	Internet users	38.08	94
1.1.2	International Internet bandwidth	41.77	74	3.1.2	Active mobile-broadband subscriptions	22.07	100
1.1.3	Fixed-broadband subscriptions	79.15	64	3.1.3	Gender parity in Internet usage	15.16	98
1.1.4	4G-mobile network coverage	97.92	57	3.1.4	Firms with website	43.16	68
1.1.5	Fixed broadband affordability	93.27	74	3.1.5	Internet shopping	3.63	97
1.1.6	Mobile broadband affordability	72.40	81	3.1.6	Government online services	81.75	24
1.1.7	Computer software spending	22.76	49	3.1.7	E-Participation	83.09	29
1.2	Transport Infrastructure	31.16	68	3.2	Digital Content Creation	20.08	98
1.2.1	Quality of infrastructure	48.04	50	3.2.1	GitHub commits	1.88	81
1.2.2	Rural access	65.26	65	3.2.2	Wikipedia edits	19.66	110
1.2.3	Air connectivity	1.87	92	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	58.11	84
1.3	Energy Infrastructure	45.46	97	3.3	Industry 4.0	9.72	49
1.3.1	Access to electricity	97.54	90	3.3.1	Robot density	1.09	51
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	29.37	27
1.3.3	Electrical outages	37.92	86	3.3.3	AI research	3.61	69
1.3.4	Energy intensity	74.01	72	3.3.4	ICT patent applications	1.26	46
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	26.34	103	4	COMPETITIVENESS	34.07	61
2.1	Attract	27.98	121	4.1	Digital Policies	55.83	57
2.1.1	Brain gain	28.19	97	4.1.1	ICT regulation	79.81	63
2.1.2	International students	0.29	102	4.1.2	Cybersecurity	97.44	15
2.1.3	Tolerance of minorities	18.09	104	4.1.3	Rule of law	37.48	56
2.1.4	Tolerance of immigrants	50.77	77	4.1.4	Regulatory quality	36.05	77
2.1.5	Gender parity in high-skilled jobs	15.62	116	4.1.5	Corruption	28.36	65
2.1.6	FDI and technology transfer	54.92	52	4.2	Market Environment	26.96	94
2.2	Grow	29.47	85	4.2.1	Extent of market dominance	43.02	71
2.2.1	Tertiary enrolment	19.38	82	4.2.2	Labour productivity	10.53	89
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	21.06	111
2.2.3	Use of virtual professional networks	7.41	91	4.2.4	Domestic credit to private sector	23.07	61
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	37.14	16
2.2.5	Youth inclusion	61.62	87	4.3	R&D	21.31	77
2.3	Retain	30.39	95	4.3.1	R&D spending	12.99	49
2.3.1	Pension coverage	41.33	76	4.3.2	University ranking	46.99	30
2.3.2	Environmental performance	4.36	119	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	11.19	84	4.3.4	Scientific journal articles	3.96	78
2.3.4	Sanitation	56.35	100	4.4	Innovation	32.16	29
2.3.5	Personal safety	38.71	87	4.4.1	Medium- and high-tech industry	51.38	27
2.4	Skills	17.52	107	4.4.2	High-tech exports	16.54	46
2.4.1	Workforce with tertiary education	16.79	87	4.4.3	Venture capital recipients, deals	23.42	22
2.4.2	High-skilled workforce	23.11	85	4.4.4	New product entrepreneurial activity	97.60	3
2.4.3	Researchers	2.98	74	4.4.5	New business density	0.41	108
2.4.4	Ease of finding skilled employees	27.18	109	4.4.6	Patent applications	3.60	48
2.4.5	Digital skills	n/a	n/a				

Indonesia

Key Indicators

Rank (out of 124)	76	GDP per capita (PPP US\$)	12,312.60
Income group	Lower-middle income	GDP (US\$ billions)	1,058.42
Regional group	Asia and Pacific	FREI score	36.12
Population (millions)	273.52	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



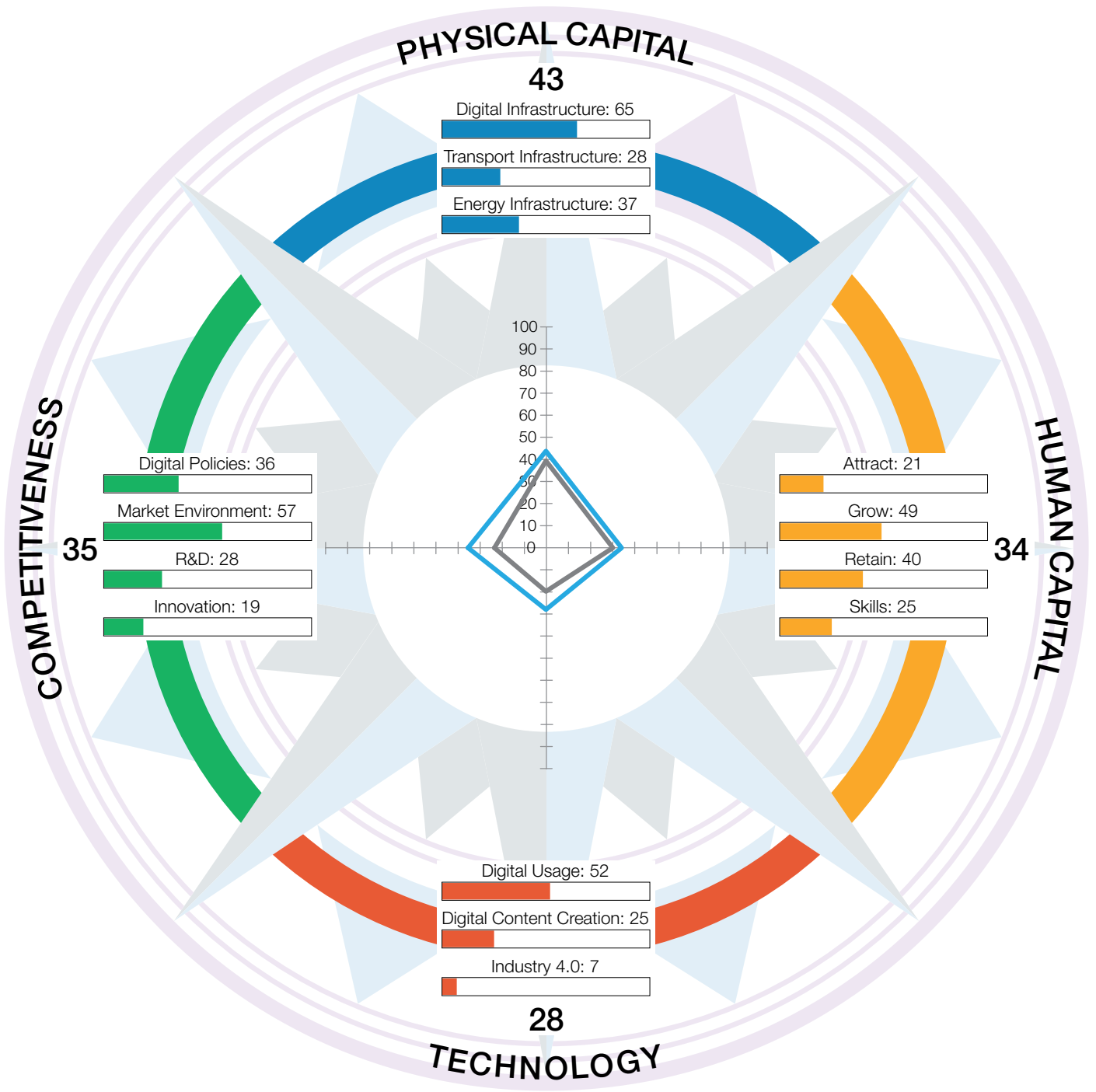
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	56.82	50	3	TECHNOLOGY	25.26	83
1.1	Digital Infrastructure	70.95	59	3.1	Digital Usage	45.83	83
1.1.1	Internet access	77.96	58	3.1.1	Internet users	51.44	88
1.1.2	International Internet bandwidth	51.28	36	3.1.2	Active mobile-broadband subscriptions	38.64	59
1.1.3	Fixed-broadband subscriptions	89.23	48	3.1.3	Gender parity in Internet usage	78.23	80
1.1.4	4G-mobile network coverage	95.60	68	3.1.4	Firms with website	8.82	101
1.1.5	Fixed broadband affordability	74.40	99	3.1.5	Internet shopping	12.64	65
1.1.6	Mobile broadband affordability	76.34	73	3.1.6	Government online services	60.59	71
1.1.7	Computer software spending	31.83	26	3.1.7	E-Participation	70.42	56
1.2	Transport Infrastructure	41.71	46	3.2	Digital Content Creation	22.79	89
1.2.1	Quality of infrastructure	47.33	53	3.2.1	GitHub commits	1.68	84
1.2.2	Rural access	61.57	70	3.2.2	Wikipedia edits	30.51	90
1.2.3	Air connectivity	6.65	66	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	58.13	83
1.3	Energy Infrastructure	57.80	63	3.3	Industry 4.0	7.16	63
1.3.1	Access to electricity	98.70	88	3.3.1	Robot density	1.56	46
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	5.87	77
1.3.3	Electrical outages	90.72	30	3.3.3	AI research	5.74	61
1.3.4	Energy intensity	84.34	37	3.3.4	ICT patent applications	0.01	72
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	32.31	90	4	COMPETITIVENESS	30.10	73
2.1	Attract	44.49	67	4.1	Digital Policies	47.02	75
2.1.1	Brain gain	65.13	24	4.1.1	ICT regulation	46.63	115
2.1.2	International students	0.18	103	4.1.2	Cybersecurity	94.76	31
2.1.3	Tolerance of minorities	29.79	82	4.1.3	Rule of law	27.91	77
2.1.4	Tolerance of immigrants	30.77	111	4.1.4	Regulatory quality	41.93	66
2.1.5	Gender parity in high-skilled jobs	82.59	46	4.1.5	Corruption	23.88	79
2.1.6	FDI and technology transfer	58.47	44	4.2	Market Environment	29.92	80
2.2	Grow	24.96	93	4.2.1	Extent of market dominance	64.40	27
2.2.1	Tertiary enrolment	24.03	77	4.2.2	Labour productivity	5.92	97
2.2.2	Reading, maths, and science	19.51	69	4.2.3	Urbanisation	46.54	84
2.2.3	Use of virtual professional networks	8.96	80	4.2.4	Domestic credit to private sector	15.16	79
2.2.4	Formal and non-formal studies	0.81	72	4.2.5	Market capitalisation	17.55	36
2.2.5	Youth inclusion	71.50	69	4.3	R&D	28.32	62
2.3	Retain	35.42	93	4.3.1	R&D spending	4.33	81
2.3.1	Pension coverage	13.06	100	4.3.2	University ranking	24.17	74
2.3.2	Environmental performance	22.13	91	4.3.3	Gender parity in R&D	80.80	26
2.3.3	Physician density	5.38	96	4.3.4	Scientific journal articles	3.97	77
2.3.4	Sanitation	71.01	93	4.4	Innovation	15.14	74
2.3.5	Personal safety	65.55	38	4.4.1	Medium- and high-tech industry	43.75	41
2.4	Skills	24.36	93	4.4.2	High-tech exports	13.01	56
2.4.1	Workforce with tertiary education	15.06	91	4.4.3	Venture capital recipients, deals	6.39	58
2.4.2	High-skilled workforce	13.46	103	4.4.4	New product entrepreneurial activity	26.34	71
2.4.3	Researchers	2.52	75	4.4.5	New business density	1.24	100
2.4.4	Ease of finding skilled employees	70.61	31	4.4.6	Patent applications	0.08	94
2.4.5	Digital skills	20.15	52				

Iran, Islamic Rep.

Key Indicators

Rank (out of 124)	82	GDP per capita (PPP US\$)	12,913.16
Income group	Lower-middle income	GDP (US\$ billions)	191.72
Regional group	Asia and Pacific	FREI score	35.05
Population (millions)	83.99	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



— Iran, Islamic Rep. — Lower-middle-income average

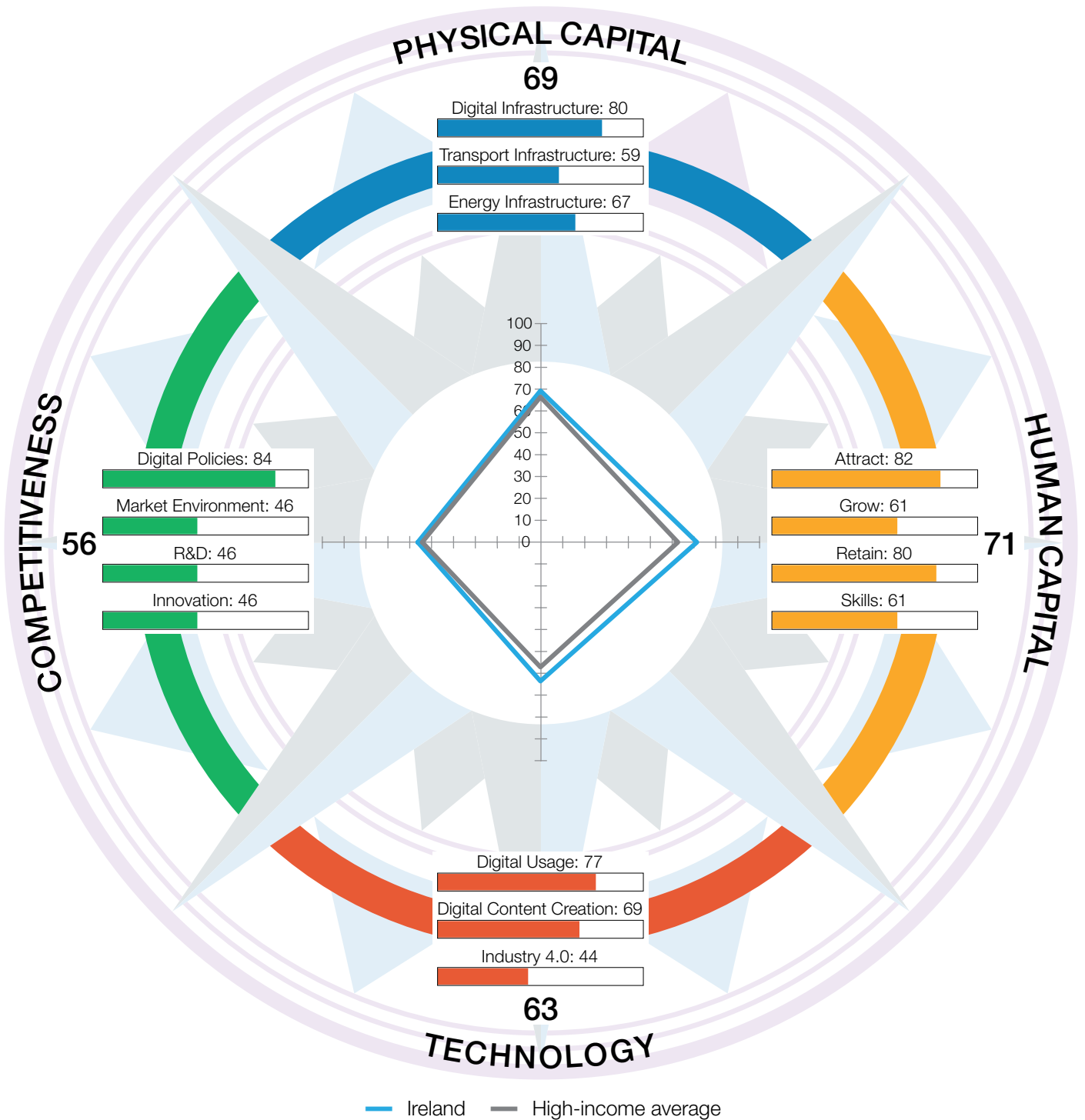
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	43.49	89	3	TECHNOLOGY	27.72	78
1.1	Digital Infrastructure	64.93	72	3.1	Digital Usage	51.69	73
1.1.1	Internet access	93.38	17	3.1.1	Internet users	83.32	43
1.1.2	International Internet bandwidth	40.20	80	3.1.2	Active mobile-broadband subscriptions	40.21	50
1.1.3	Fixed-broadband subscriptions	30.19	94	3.1.3	Gender parity in Internet usage	68.11	86
1.1.4	4G-mobile network coverage	81.00	86	3.1.4	Firms with website	n/a	n/a
1.1.5	Fixed broadband affordability	98.88	16	3.1.5	Internet shopping	32.95	40
1.1.6	Mobile broadband affordability	83.65	51	3.1.6	Government online services	48.90	86
1.1.7	Computer software spending	27.23	36	3.1.7	E-Participation	36.62	103
1.2	Transport Infrastructure	28.35	81	3.2	Digital Content Creation	24.56	82
1.2.1	Quality of infrastructure	43.06	61	3.2.1	GitHub commits	1.48	87
1.2.2	Rural access	47.90	90	3.2.2	Wikipedia edits	50.77	59
1.2.3	Air connectivity	1.49	98	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	42.45	102
1.3	Energy Infrastructure	37.20	112	3.3	Industry 4.0	6.92	64
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	0.12	64
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	7.27	71
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	21.97	34
1.3.4	Energy intensity	33.56	118	3.3.4	ICT patent applications	0.35	57
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	34.02	88	4	COMPETITIVENESS	34.96	55
2.1	Attract	21.22	124	4.1	Digital Policies	36.00	98
2.1.1	Brain gain	9.30	119	4.1.1	ICT regulation	81.25	57
2.1.2	International students	1.97	88	4.1.2	Cybersecurity	80.64	62
2.1.3	Tolerance of minorities	6.38	116	4.1.3	Rule of law	12.16	109
2.1.4	Tolerance of immigrants	41.54	91	4.1.4	Regulatory quality	0.00	124
2.1.5	Gender parity in high-skilled jobs	33.86	106	4.1.5	Corruption	5.97	115
2.1.6	FDI and technology transfer	34.28	89	4.2	Market Environment	56.74	22
2.2	Grow	49.35	41	4.2.1	Extent of market dominance	60.06	33
2.2.1	Tertiary enrolment	38.86	53	4.2.2	Labour productivity	25.45	63
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	69.96	44
2.2.3	Use of virtual professional networks	n/a	n/a	4.2.4	Domestic credit to private sector	28.23	52
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	100.00	1
2.2.5	Youth inclusion	59.83	92	4.3	R&D	28.37	61
2.3	Retain	40.16	88	4.3.1	R&D spending	16.59	44
2.3.1	Pension coverage	19.69	90	4.3.2	University ranking	46.38	31
2.3.2	Environmental performance	39.90	60	4.3.3	Gender parity in R&D	27.03	82
2.3.3	Physician density	19.41	76	4.3.4	Scientific journal articles	23.49	40
2.3.4	Sanitation	87.51	74	4.4	Innovation	18.70	63
2.3.5	Personal safety	34.29	95	4.4.1	Medium- and high-tech industry	55.42	21
2.4	Skills	25.36	84	4.4.2	High-tech exports	1.33	114
2.4.1	Workforce with tertiary education	34.18	47	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	27.80	77	4.4.4	New product entrepreneurial activity	30.57	65
2.4.3	Researchers	18.16	41	4.4.5	New business density	1.60	95
2.4.4	Ease of finding skilled employees	39.47	91	4.4.6	Patent applications	4.59	44
2.4.5	Digital skills	7.18	64				

Ireland

Key Indicators

Rank (out of 124)	17	GDP per capita (PPP US\$)	87,212.05
Income group	High income	GDP (US\$ billions)	425.89
Regional group	Europe	FREI score	64.62
Population (millions)	4.99	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



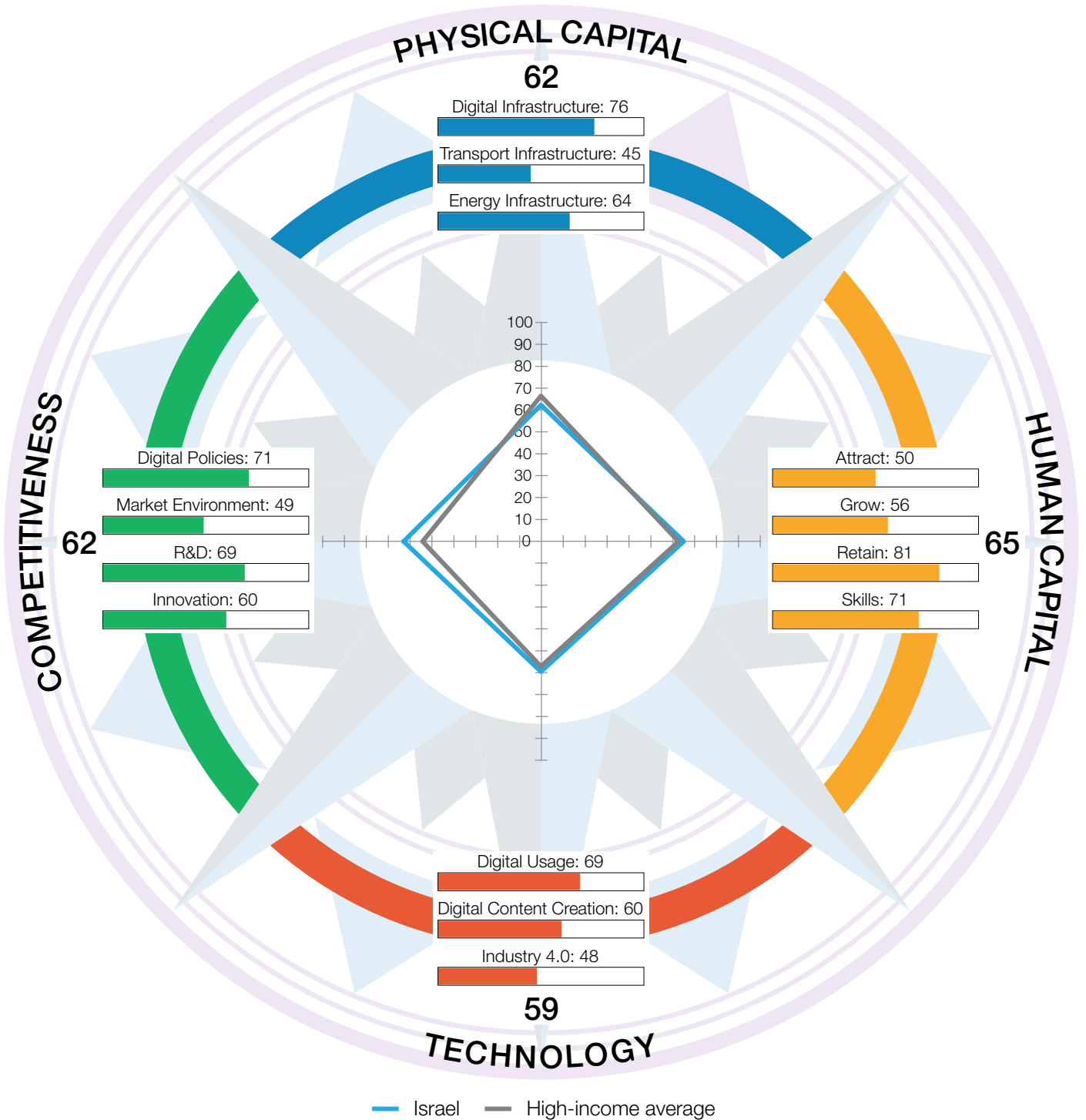
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	68.72	16	3	TECHNOLOGY	63.11	16
1.1	Digital Infrastructure	80.12	23	3.1	Digital Usage	76.90	22
1.1.1	Internet access	92.05	22	3.1.1	Internet users	91.60	20
1.1.2	International Internet bandwidth	46.44	56	3.1.2	Active mobile-broadband subscriptions	45.34	34
1.1.3	Fixed-broadband subscriptions	92.27	43	3.1.3	Gender parity in Internet usage	95.45	41
1.1.4	4G-mobile network coverage	90.00	77	3.1.4	Firms with website	75.03	28
1.1.5	Fixed broadband affordability	97.42	43	3.1.5	Internet shopping	76.29	13
1.1.6	Mobile broadband affordability	85.53	44	3.1.6	Government online services	71.53	46
1.1.7	Computer software spending	57.14	3	3.1.7	E-Participation	83.09	29
1.2	Transport Infrastructure	58.74	18	3.2	Digital Content Creation	68.72	15
1.2.1	Quality of infrastructure	61.57	27	3.2.1	GitHub commits	60.57	14
1.2.2	Rural access	92.39	23	3.2.2	Wikipedia edits	79.43	19
1.2.3	Air connectivity	59.92	11	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	100.00	1
1.3	Energy Infrastructure	67.30	16	3.3	Industry 4.0	43.72	17
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	12.16	31
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	100.00	1
1.3.3	Electrical outages	97.82	4	3.3.3	AI research	55.68	13
1.3.4	Energy intensity	99.57	3	3.3.4	ICT patent applications	28.89	19
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	71.04	15	4	COMPETITIVENESS	55.62	23
2.1	Attract	81.54	3	4.1	Digital Policies	84.30	17
2.1.1	Brain gain	74.03	16	4.1.1	ICT regulation	97.12	4
2.1.2	International students	28.56	21	4.1.2	Cybersecurity	85.54	54
2.1.3	Tolerance of minorities	100.00	1	4.1.3	Rule of law	82.71	16
2.1.4	Tolerance of immigrants	93.85	6	4.1.4	Regulatory quality	80.03	15
2.1.5	Gender parity in high-skilled jobs	92.81	22	4.1.5	Corruption	76.12	19
2.1.6	FDI and technology transfer	100.00	1	4.2	Market Environment	45.77	37
2.2	Grow	61.28	21	4.2.1	Extent of market dominance	60.84	32
2.2.1	Tertiary enrolment	50.34	27	4.2.2	Labour productivity	89.21	3
2.2.2	Reading, maths, and science	69.61	9	4.2.3	Urbanisation	55.93	66
2.2.3	Use of virtual professional networks	67.15	4	4.2.4	Domestic credit to private sector	12.18	88
2.2.4	Formal and non-formal studies	32.91	39	4.2.5	Market capitalisation	10.69	48
2.2.5	Youth inclusion	86.39	32	4.3	R&D	46.28	23
2.3	Retain	80.34	23	4.3.1	R&D spending	23.01	34
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	56.77	20
2.3.2	Environmental performance	83.10	16	4.3.3	Gender parity in R&D	46.67	58
2.3.3	Physician density	41.57	39	4.3.4	Scientific journal articles	58.69	13
2.3.4	Sanitation	90.55	66	4.4	Innovation	46.15	15
2.3.5	Personal safety	86.47	11	4.4.1	Medium- and high-tech industry	67.64	8
2.4	Skills	61.00	19	4.4.2	High-tech exports	41.33	13
2.4.1	Workforce with tertiary education	60.89	9	4.4.3	Venture capital recipients, deals	36.46	13
2.4.2	High-skilled workforce	72.30	20	4.4.4	New product entrepreneurial activity	72.44	11
2.4.3	Researchers	64.95	13	4.4.5	New business density	30.10	21
2.4.4	Ease of finding skilled employees	68.98	36	4.4.6	Patent applications	28.92	21
2.4.5	Digital skills	37.88	29				

Israel

Key Indicators

Rank (out of 124)	20	GDP per capita (PPP US\$)	41,947.59
Income group	High income	GDP (US\$ billions)	401.95
Regional group	Middle East and North Africa	FREI score	61.98
Population (millions)	9.22	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)

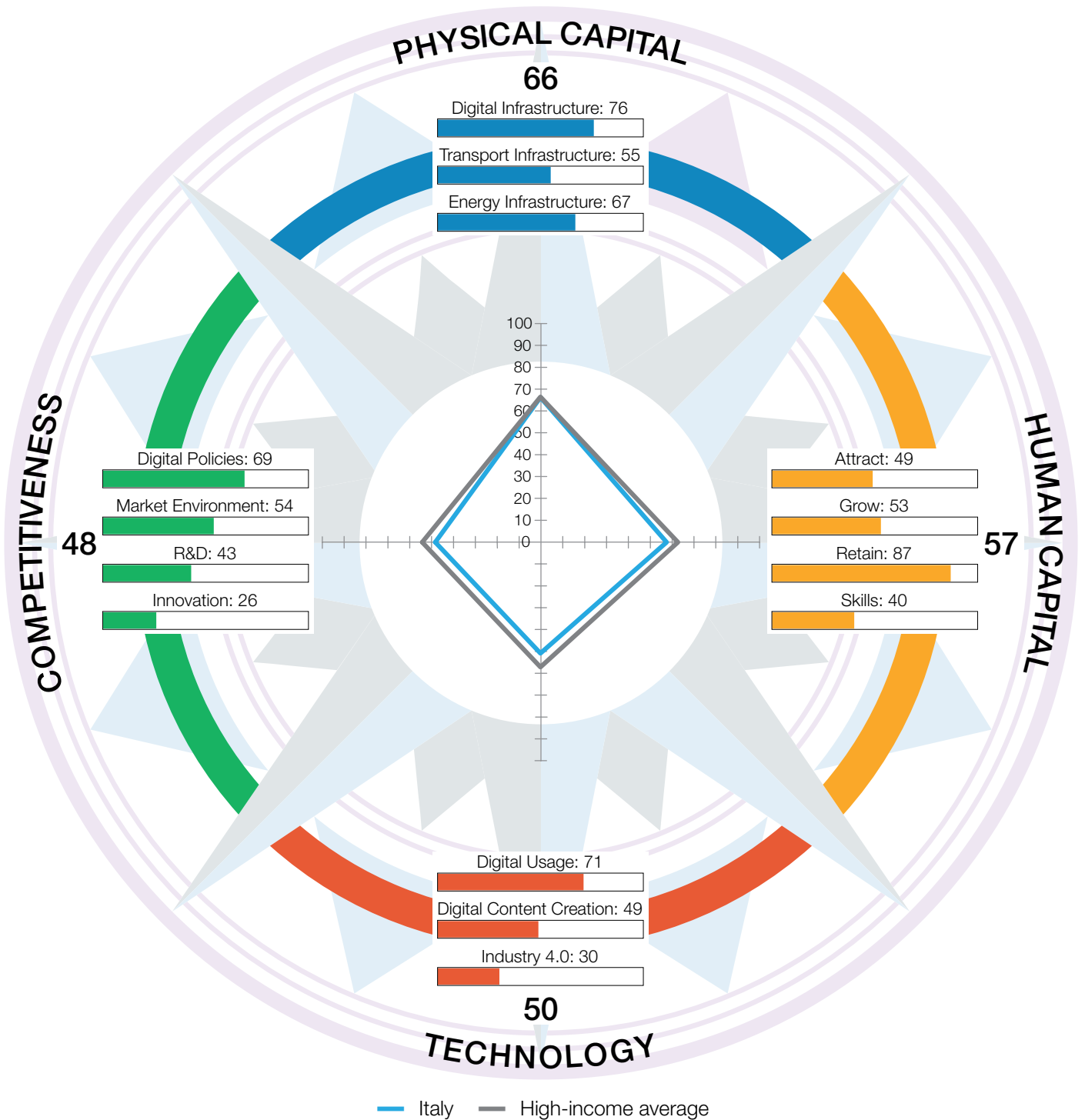


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	61.84	37	3	TECHNOLOGY	59.09	20
1.1	Digital Infrastructure	75.90	40	3.1	Digital Usage	69.27	38
1.1.1	Internet access	75.68	63	3.1.1	Internet users	86.13	34
1.1.2	International Internet bandwidth	42.77	69	3.1.2	Active mobile-broadband subscriptions	50.66	23
1.1.3	Fixed-broadband subscriptions	98.50	15	3.1.3	Gender parity in Internet usage	96.46	33
1.1.4	4G-mobile network coverage	97.00	61	3.1.4	Firms with website	65.28	42
1.1.5	Fixed broadband affordability	99.12	9	3.1.5	Internet shopping	51.57	32
1.1.6	Mobile broadband affordability	96.26	6	3.1.6	Government online services	68.62	54
1.1.7	Computer software spending	21.93	54	3.1.7	E-Participation	66.20	65
1.2	Transport Infrastructure	45.48	40	3.2	Digital Content Creation	60.22	23
1.2.1	Quality of infrastructure	62.99	26	3.2.1	GitHub commits	29.60	29
1.2.2	Rural access	80.85	42	3.2.2	Wikipedia edits	100.00	1
1.2.3	Air connectivity	22.00	34	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	98.22	8
1.3	Energy Infrastructure	64.14	24	3.3	Industry 4.0	47.76	15
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	13.65	29
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	48.43	15
1.3.3	Electrical outages	97.82	4	3.3.3	AI research	50.44	14
1.3.4	Energy intensity	88.81	20	3.3.4	ICT patent applications	100.00	1
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	64.74	21	4	COMPETITIVENESS	62.26	12
2.1	Attract	50.47	44	4.1	Digital Policies	71.01	31
2.1.1	Brain gain	55.96	40	4.1.1	ICT regulation	64.66	88
2.1.2	International students	7.35	67	4.1.2	Cybersecurity	90.73	44
2.1.3	Tolerance of minorities	34.04	80	4.1.3	Rule of law	67.75	28
2.1.4	Tolerance of immigrants	27.69	114	4.1.4	Regulatory quality	73.69	21
2.1.5	Gender parity in high-skilled jobs	91.83	24	4.1.5	Corruption	58.21	29
2.1.6	FDI and technology transfer	85.93	5	4.2	Market Environment	48.73	33
2.2	Grow	55.64	30	4.2.1	Extent of market dominance	43.79	66
2.2.1	Tertiary enrolment	40.29	49	4.2.2	Labour productivity	56.55	26
2.2.2	Reading, maths, and science	53.53	38	4.2.3	Urbanisation	90.93	8
2.2.3	Use of virtual professional networks	34.85	25	4.2.4	Domestic credit to private sector	27.93	53
2.2.4	Formal and non-formal studies	71.14	14	4.2.5	Market capitalisation	24.44	28
2.2.5	Youth inclusion	78.38	52	4.3	R&D	69.08	3
2.3	Retain	81.40	21	4.3.1	R&D spending	100.00	1
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	52.41	26
2.3.2	Environmental performance	70.91	29	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	68.08	7	4.3.4	Scientific journal articles	54.84	19
2.3.4	Sanitation	100.00	1	4.4	Innovation	60.21	3
2.3.5	Personal safety	67.99	36	4.4.1	Medium- and high-tech industry	48.68	35
2.4	Skills	71.46	9	4.4.2	High-tech exports	44.74	10
2.4.1	Workforce with tertiary education	42.74	36	4.4.3	Venture capital recipients, deals	100.00	1
2.4.2	High-skilled workforce	76.56	13	4.4.4	New product entrepreneurial activity	66.00	15
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	13.71	39
2.4.4	Ease of finding skilled employees	95.08	3	4.4.6	Patent applications	88.11	6
2.4.5	Digital skills	n/a	n/a				

Key Indicators

Rank (out of 124)	29	GDP per capita (PPP US\$)	44,821.01
Income group	High income	GDP (US\$ billions)	1,886.45
Regional group	Europe	FREI score	55.28
Population (millions)	59.55	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0-100)



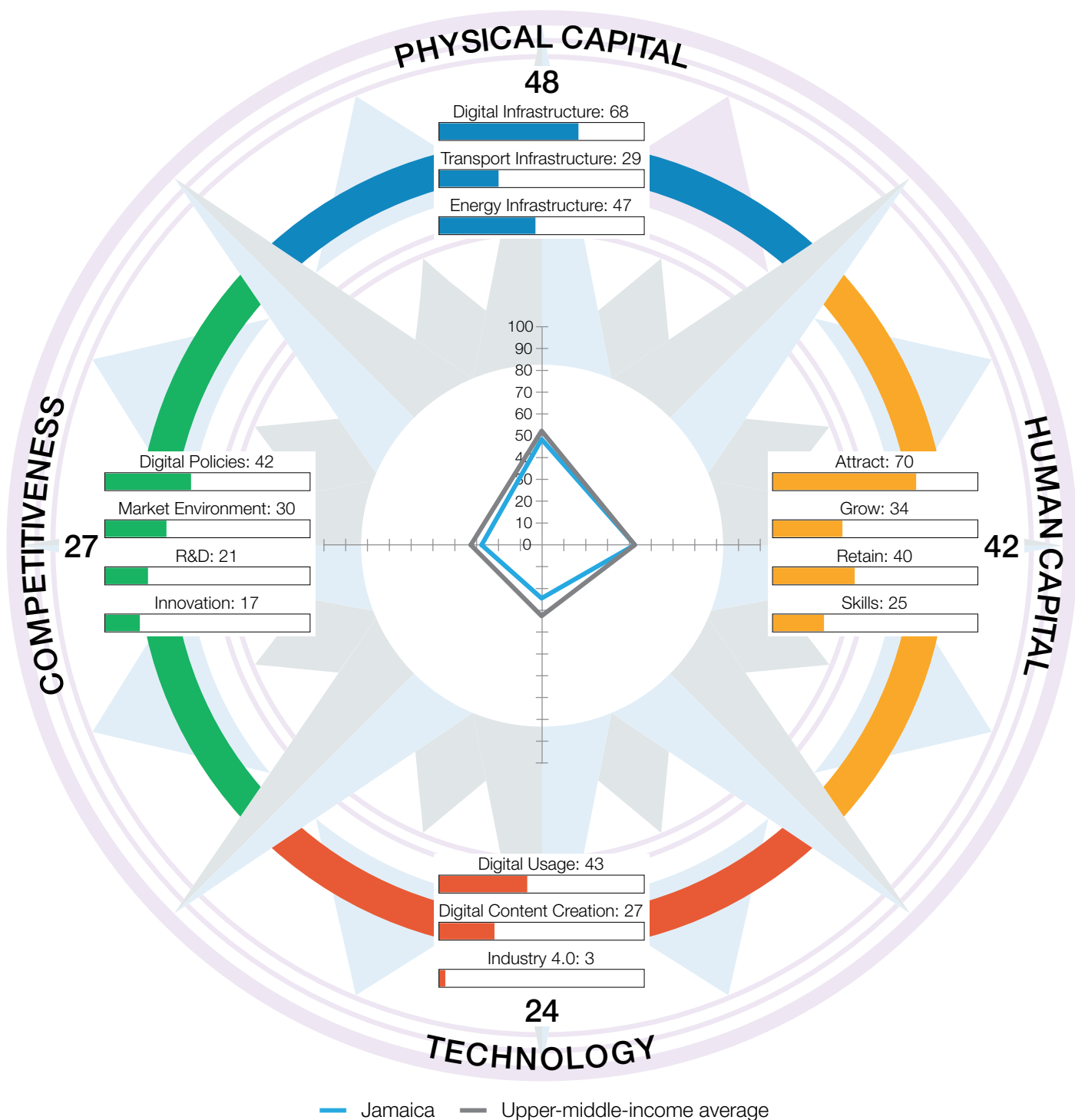
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	65.77	23	3	TECHNOLOGY	50.41	28
1.1	Digital Infrastructure	75.92	39	3.1	Digital Usage	71.46	35
1.1.1	Internet access	75.90	62	3.1.1	Internet users	73.12	65
1.1.2	International Internet bandwidth	36.78	90	3.1.2	Active mobile-broadband subscriptions	40.92	47
1.1.3	Fixed-broadband subscriptions	80.41	61	3.1.3	Gender parity in Internet usage	85.59	71
1.1.4	4G-mobile network coverage	100.00	1	3.1.4	Firms with website	72.43	31
1.1.5	Fixed broadband affordability	97.57	40	3.1.5	Internet shopping	70.45	17
1.1.6	Mobile broadband affordability	93.90	17	3.1.6	Government online services	78.83	36
1.1.7	Computer software spending	46.90	12	3.1.7	E-Participation	78.87	41
1.2	Transport Infrastructure	54.79	29	3.2	Digital Content Creation	49.28	34
1.2.1	Quality of infrastructure	81.49	17	3.2.1	GitHub commits	12.38	45
1.2.2	Rural access	98.84	6	3.2.2	Wikipedia edits	77.97	22
1.2.3	Air connectivity	21.57	37	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	86.83	29
1.3	Energy Infrastructure	66.60	17	3.3	Industry 4.0	30.50	22
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	59.11	8
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	24.27	29
1.3.3	Electrical outages	100.00	1	3.3.3	AI research	36.95	24
1.3.4	Energy intensity	90.45	14	3.3.4	ICT patent applications	8.57	26
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	57.25	31	4	COMPETITIVENESS	47.69	32
2.1	Attract	48.64	53	4.1	Digital Policies	68.51	37
2.1.1	Brain gain	34.29	91	4.1.1	ICT regulation	100.00	1
2.1.2	International students	7.49	65	4.1.2	Cybersecurity	96.04	27
2.1.3	Tolerance of minorities	59.57	42	4.1.3	Rule of law	45.20	50
2.1.4	Tolerance of immigrants	73.85	36	4.1.4	Regulatory quality	53.54	46
2.1.5	Gender parity in high-skilled jobs	76.09	58	4.1.5	Corruption	47.76	41
2.1.6	FDI and technology transfer	40.54	76	4.2	Market Environment	53.75	26
2.2	Grow	53.24	35	4.2.1	Extent of market dominance	94.20	2
2.2.1	Tertiary enrolment	44.16	42	4.2.2	Labour productivity	63.16	17
2.2.2	Reading, maths, and science	58.33	33	4.2.3	Urbanisation	64.63	51
2.2.3	Use of virtual professional networks	31.75	29	4.2.4	Domestic credit to private sector	36.60	38
2.2.4	Formal and non-formal studies	56.14	31	4.2.5	Market capitalisation	10.15	50
2.2.5	Youth inclusion	75.83	60	4.3	R&D	42.52	30
2.3	Retain	87.39	7	4.3.1	R&D spending	27.98	25
2.3.1	Pension coverage	94.29	41	4.3.2	University ranking	59.08	16
2.3.2	Environmental performance	79.97	20	4.3.3	Gender parity in R&D	36.08	73
2.3.3	Physician density	100.00	1	4.3.4	Scientific journal articles	46.94	24
2.3.4	Sanitation	98.68	35	4.4	Innovation	25.97	41
2.3.5	Personal safety	64.05	39	4.4.1	Medium- and high-tech industry	54.21	24
2.4	Skills	39.73	45	4.4.2	High-tech exports	12.58	57
2.4.1	Workforce with tertiary education	27.95	62	4.4.3	Venture capital recipients, deals	7.13	55
2.4.2	High-skilled workforce	57.22	35	4.4.4	New product entrepreneurial activity	46.48	45
2.4.3	Researchers	28.48	34	4.4.5	New business density	12.40	46
2.4.4	Ease of finding skilled employees	50.34	72	4.4.6	Patent applications	22.99	24
2.4.5	Digital skills	34.63	34				

Jamaica

Key Indicators

Rank (out of 124)	80	GDP per capita (PPP US\$)	10,594.28
Income group	Upper-middle income	GDP (US\$ billions)	13.81
Regional group	Latin America and the Caribbean	FREI score	35.50
Population (millions)	2.96	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



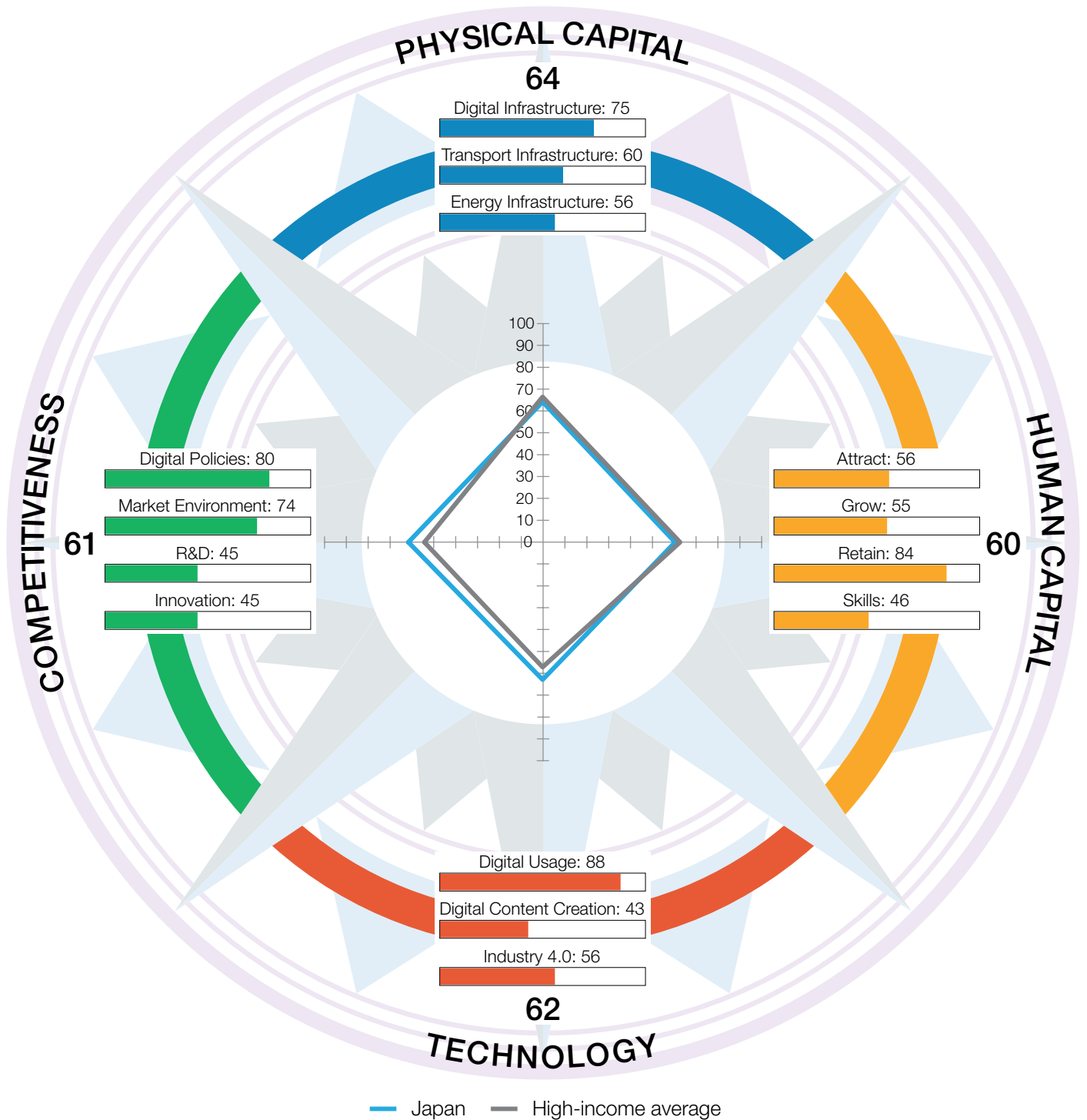
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	48.05	76	3	TECHNOLOGY	24.24	86
1.1	Digital Infrastructure	68.12	64	3.1	Digital Usage	42.71	89
1.1.1	Internet access	63.93	76	3.1.1	Internet users	66.64	76
1.1.2	International Internet bandwidth	44.48	63	3.1.2	Active mobile-broadband subscriptions	24.92	94
1.1.3	Fixed-broadband subscriptions	91.14	44	3.1.3	Gender parity in Internet usage	72.55	83
1.1.4	4G-mobile network coverage	97.00	61	3.1.4	Firms with website	n/a	n/a
1.1.5	Fixed broadband affordability	87.14	89	3.1.5	Internet shopping	n/a	n/a
1.1.6	Mobile broadband affordability	59.62	98	3.1.6	Government online services	24.08	113
1.1.7	Computer software spending	33.54	23	3.1.7	E-Participation	25.34	111
1.2	Transport Infrastructure	28.75	78	3.2	Digital Content Creation	26.83	75
1.2.1	Quality of infrastructure	27.05	98	3.2.1	GitHub commits	2.85	70
1.2.2	Rural access	60.23	73	3.2.2	Wikipedia edits	47.95	64
1.2.3	Air connectivity	24.02	31	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	55.35	90
1.3	Energy Infrastructure	47.28	95	3.3	Industry 4.0	3.18	91
1.3.1	Access to electricity	99.31	86	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	4.11	89
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	3.95	67
1.3.4	Energy intensity	76.16	65	3.3.4	ICT patent applications	0.00	74
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	42.42	64	4	COMPETITIVENESS	27.30	81
2.1	Attract	69.81	14	4.1	Digital Policies	41.50	82
2.1.1	Brain gain	51.39	55	4.1.1	ICT regulation	68.99	82
2.1.2	International students	n/a	n/a	4.1.2	Cybersecurity	31.01	106
2.1.3	Tolerance of minorities	81.91	7	4.1.3	Rule of law	30.93	70
2.1.4	Tolerance of immigrants	84.62	15	4.1.4	Regulatory quality	42.25	65
2.1.5	Gender parity in high-skilled jobs	67.63	72	4.1.5	Corruption	34.33	53
2.1.6	FDI and technology transfer	63.51	37	4.2	Market Environment	29.91	81
2.2	Grow	34.46	69	4.2.1	Extent of market dominance	42.92	72
2.2.1	Tertiary enrolment	17.81	85	4.2.2	Labour productivity	10.70	88
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	46.96	83
2.2.3	Use of virtual professional networks	26.00	38	4.2.4	Domestic credit to private sector	17.18	77
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	31.78	19
2.2.5	Youth inclusion	59.57	93	4.3	R&D	21.03	81
2.3	Retain	40.25	87	4.3.1	R&D spending	n/a	n/a
2.3.1	Pension coverage	39.08	78	4.3.2	University ranking	39.88	41
2.3.2	Environmental performance	40.24	59	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	5.25	97	4.3.4	Scientific journal articles	2.19	85
2.3.4	Sanitation	86.31	79	4.4	Innovation	16.74	69
2.3.5	Personal safety	30.36	101	4.4.1	Medium- and high-tech industry	23.08	74
2.4	Skills	25.16	86	4.4.2	High-tech exports	4.92	88
2.4.1	Workforce with tertiary education	7.08	105	4.4.3	Venture capital recipients, deals	12.01	37
2.4.2	High-skilled workforce	31.09	71	4.4.4	New product entrepreneurial activity	37.06	60
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	6.61	59
2.4.4	Ease of finding skilled employees	56.76	58	4.4.6	Patent applications	n/a	n/a
2.4.5	Digital skills	5.72	68				

Japan

Key Indicators

Rank (out of 124)	22	GDP per capita (PPP US\$)	42,338.03
Income group	High income	GDP (US\$ billions)	4,975.42
Regional group	Asia and Pacific	FREI score	61.81
Population (millions)	125.84	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)

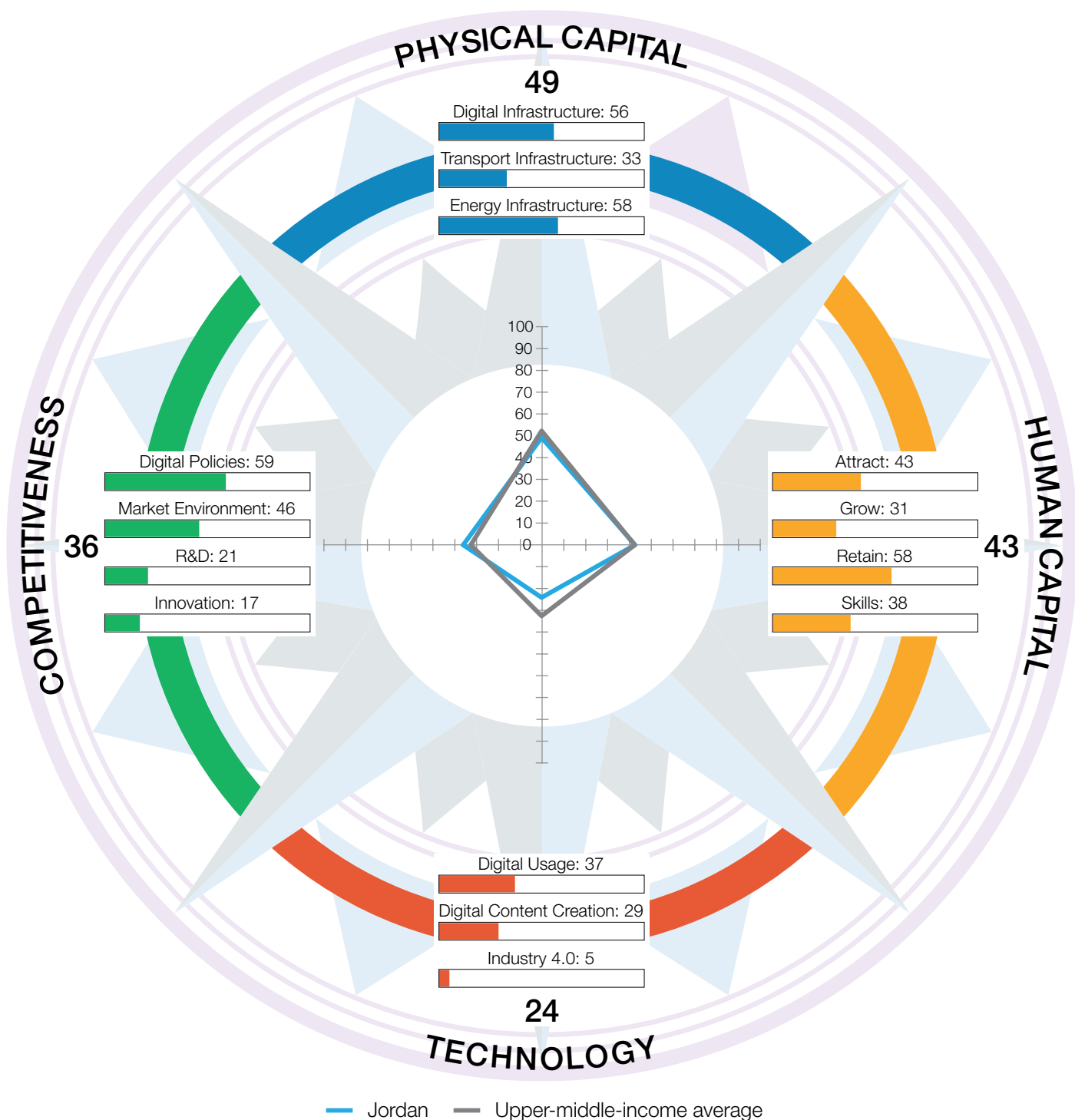


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	63.78	30	3	TECHNOLOGY	62.40	17
1.1	Digital Infrastructure	74.77	45	3.1	Digital Usage	88.07	4
1.1.1	Internet access	97.00	7	3.1.1	Internet users	92.37	17
1.1.2	International Internet bandwidth	33.16	99	3.1.2	Active mobile-broadband subscriptions	91.91	2
1.1.3	Fixed-broadband subscriptions	92.58	41	3.1.3	Gender parity in Internet usage	91.81	58
1.1.4	4G-mobile network coverage	99.90	15	3.1.4	Firms with website	94.66	4
1.1.5	Fixed broadband affordability	98.42	29	3.1.5	Internet shopping	58.85	26
1.1.6	Mobile broadband affordability	78.91	67	3.1.6	Government online services	88.32	12
1.1.7	Computer software spending	23.46	44	3.1.7	E-Participation	98.59	4
1.2	Transport Infrastructure	60.25	14	3.2	Digital Content Creation	43.39	39
1.2.1	Quality of infrastructure	95.73	2	3.2.1	GitHub commits	14.00	39
1.2.2	Rural access	92.95	22	3.2.2	Wikipedia edits	65.32	42
1.2.3	Air connectivity	27.55	29	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	86.00	31
1.3	Energy Infrastructure	56.32	73	3.3	Industry 4.0	55.72	13
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	96.78	4
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	17.97	37
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	22.57	31
1.3.4	Energy intensity	82.19	46	3.3.4	ICT patent applications	100.00	1
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	60.19	25	4	COMPETITIVENESS	60.85	16
2.1	Attract	55.56	35	4.1	Digital Policies	80.07	21
2.1.1	Brain gain	50.15	59	4.1.1	ICT regulation	63.22	92
2.1.2	International students	13.92	47	4.1.2	Cybersecurity	97.77	12
2.1.3	Tolerance of minorities	78.72	13	4.1.3	Rule of law	83.49	15
2.1.4	Tolerance of immigrants	56.92	69	4.1.4	Regulatory quality	76.76	18
2.1.5	Gender parity in high-skilled jobs	55.23	88	4.1.5	Corruption	79.10	18
2.1.6	FDI and technology transfer	78.39	14	4.2	Market Environment	73.59	5
2.2	Grow	55.44	32	4.2.1	Extent of market dominance	89.85	4
2.2.1	Tertiary enrolment	42.84	46	4.2.2	Labour productivity	47.81	37
2.2.2	Reading, maths, and science	75.89	4	4.2.3	Urbanisation	89.97	10
2.2.3	Use of virtual professional networks	1.99	113	4.2.4	Domestic credit to private sector	89.61	2
2.2.4	Formal and non-formal studies	56.48	30	4.2.5	Market capitalisation	50.71	8
2.2.5	Youth inclusion	100.00	1	4.3	R&D	44.84	26
2.3	Retain	83.53	15	4.3.1	R&D spending	66.20	5
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	70.12	11
2.3.2	Environmental performance	87.11	12	4.3.3	Gender parity in R&D	11.96	96
2.3.3	Physician density	30.63	58	4.3.4	Scientific journal articles	31.07	35
2.3.4	Sanitation	99.89	16	4.4	Innovation	44.92	18
2.3.5	Personal safety	100.00	1	4.4.1	Medium- and high-tech industry	70.21	6
2.4	Skills	46.23	33	4.4.2	High-tech exports	29.97	26
2.4.1	Workforce with tertiary education	62.29	7	4.4.3	Venture capital recipients, deals	13.56	35
2.4.2	High-skilled workforce	38.37	56	4.4.4	New product entrepreneurial activity	54.33	38
2.4.3	Researchers	66.04	12	4.4.5	New business density	1.47	97
2.4.4	Ease of finding skilled employees	51.87	67	4.4.6	Patent applications	100.00	1
2.4.5	Digital skills	12.56	60				

Key Indicators

Rank (out of 124)	69	GDP per capita (PPP US\$)	10,497.30
Income group	Upper-middle income	GDP (US\$ billions)	43.70
Regional group	Middle East and North Africa	FREI score	37.75
Population (millions)	10.20	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



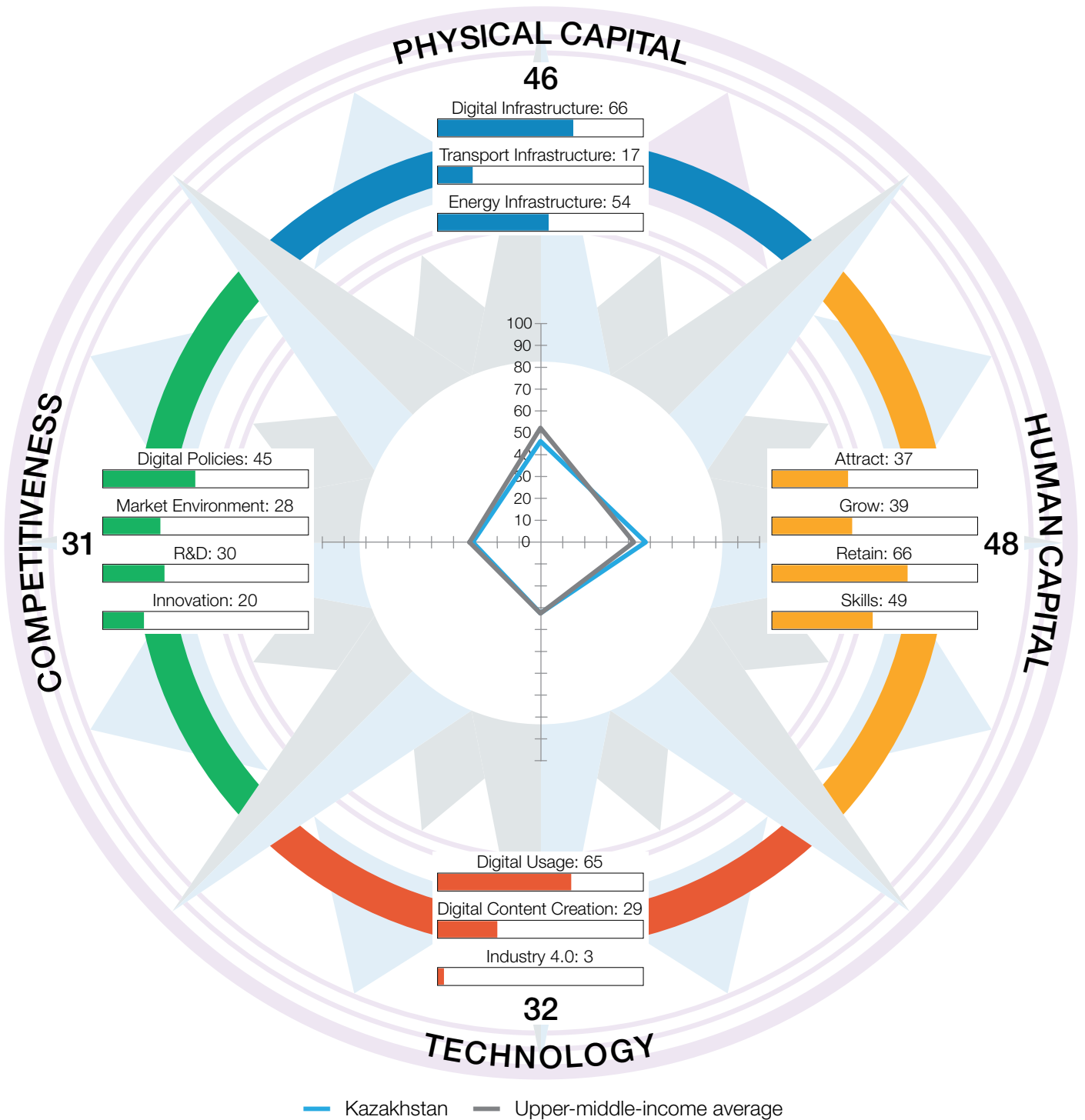
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	48.91	74	3	TECHNOLOGY	23.88	88
1.1	Digital Infrastructure	55.66	86	3.1	Digital Usage	37.05	95
1.1.1	Internet access	36.45	88	3.1.1	Internet users	65.15	77
1.1.2	International Internet bandwidth	47.86	45	3.1.2	Active mobile-broadband subscriptions	29.30	84
1.1.3	Fixed-broadband subscriptions	56.17	77	3.1.3	Gender parity in Internet usage	n/a	n/a
1.1.4	4G-mobile network coverage	99.00	39	3.1.4	Firms with website	77.25	25
1.1.5	Fixed broadband affordability	71.61	102	3.1.5	Internet shopping	9.08	73
1.1.6	Mobile broadband affordability	54.21	106	3.1.6	Government online services	20.44	116
1.1.7	Computer software spending	24.33	40	3.1.7	E-Participation	21.12	114
1.2	Transport Infrastructure	33.19	65	3.2	Digital Content Creation	29.12	70
1.2.1	Quality of infrastructure	41.28	67	3.2.1	GitHub commits	1.51	86
1.2.2	Rural access	80.70	43	3.2.2	Wikipedia edits	44.90	69
1.2.3	Air connectivity	8.89	56	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	68.16	65
1.3	Energy Infrastructure	57.89	62	3.3	Industry 4.0	5.47	72
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	5.60	79
1.3.3	Electrical outages	95.83	13	3.3.3	AI research	11.14	46
1.3.4	Energy intensity	78.23	61	3.3.4	ICT patent applications	0.48	55
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	42.55	63	4	COMPETITIVENESS	35.67	52
2.1	Attract	42.70	74	4.1	Digital Policies	59.04	50
2.1.1	Brain gain	49.48	61	4.1.1	ICT regulation	92.79	14
2.1.2	International students	32.62	17	4.1.2	Cybersecurity	70.31	77
2.1.3	Tolerance of minorities	13.83	108	4.1.3	Rule of law	44.35	52
2.1.4	Tolerance of immigrants	56.92	69	4.1.4	Regulatory quality	45.97	59
2.1.5	Gender parity in high-skilled jobs	53.04	93	4.1.5	Corruption	41.79	47
2.1.6	FDI and technology transfer	50.31	58	4.2	Market Environment	45.89	35
2.2	Grow	30.96	79	4.2.1	Extent of market dominance	58.84	37
2.2.1	Tertiary enrolment	22.16	80	4.2.2	Labour productivity	29.40	55
2.2.2	Reading, maths, and science	33.44	55	4.2.3	Urbanisation	89.21	13
2.2.3	Use of virtual professional networks	18.47	56	4.2.4	Domestic credit to private sector	36.39	39
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	15.59	39
2.2.5	Youth inclusion	49.75	105	4.3	R&D	21.07	79
2.3	Retain	58.40	56	4.3.1	R&D spending	14.10	48
2.3.1	Pension coverage	56.43	71	4.3.2	University ranking	36.58	47
2.3.2	Environmental performance	49.30	45	4.3.3	Gender parity in R&D	23.14	87
2.3.3	Physician density	28.68	62	4.3.4	Scientific journal articles	10.47	52
2.3.4	Sanitation	97.13	50	4.4	Innovation	16.70	70
2.3.5	Personal safety	60.46	45	4.4.1	Medium- and high-tech industry	29.18	63
2.4	Skills	38.12	48	4.4.2	High-tech exports	2.19	101
2.4.1	Workforce with tertiary education	27.40	64	4.4.3	Venture capital recipients, deals	17.88	30
2.4.2	High-skilled workforce	30.59	73	4.4.4	New product entrepreneurial activity	45.65	46
2.4.3	Researchers	7.24	59	4.4.5	New business density	2.10	89
2.4.4	Ease of finding skilled employees	87.27	12	4.4.6	Patent applications	3.20	49
2.4.5	Digital skills	n/a	n/a				

Kazakhstan

Key Indicators

Rank (out of 124)	65	GDP per capita (PPP US\$)	27,466.22
Income group	Upper-middle income	GDP (US\$ billions)	169.84
Regional group	Asia and Pacific	FREI score	39.13
Population (millions)	18.75	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



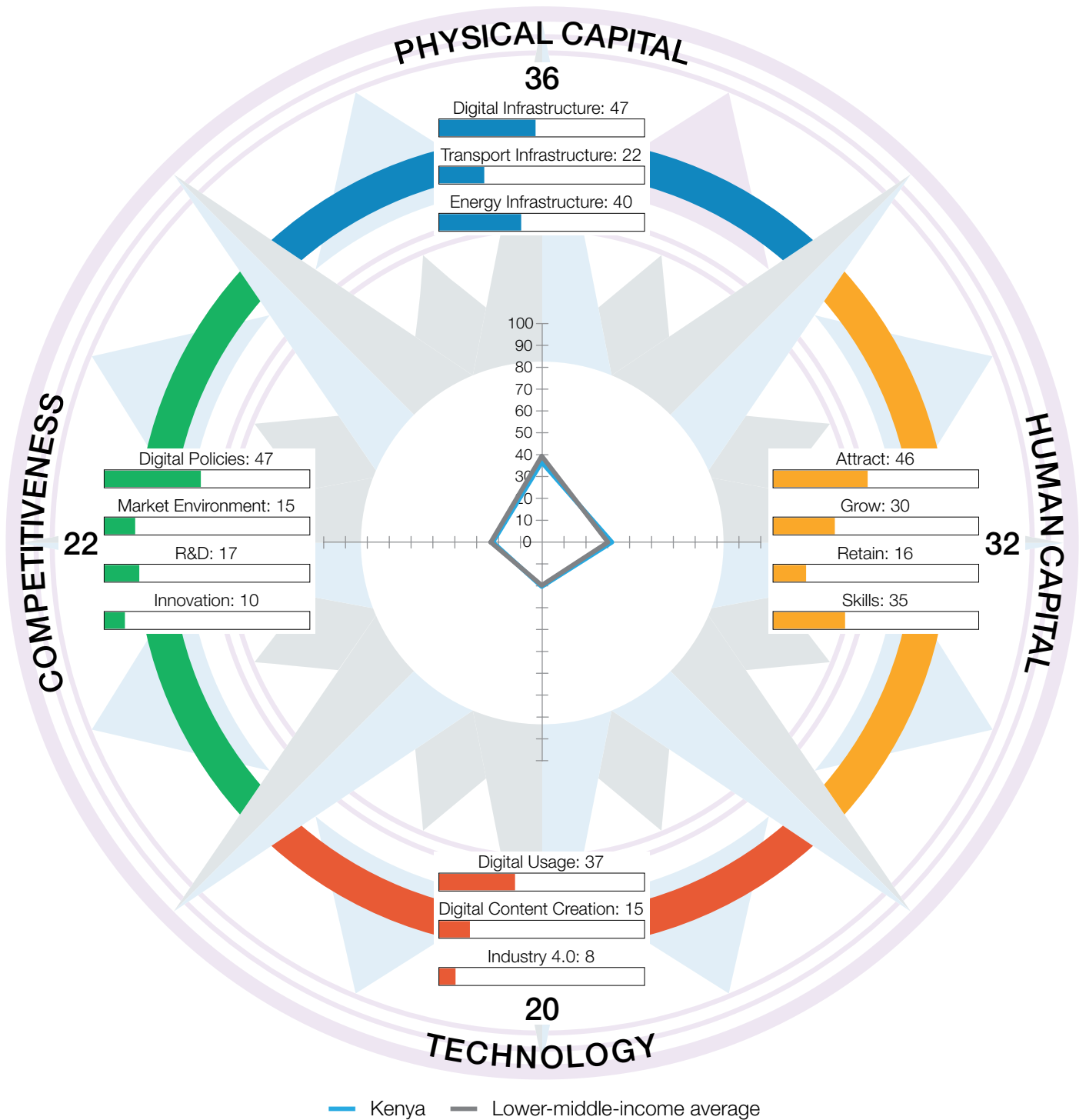
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	45.81	84	3	TECHNOLOGY	32.17	63
1.1	Digital Infrastructure	66.27	71	3.1	Digital Usage	65.20	48
1.1.1	Internet access	92.45	20	3.1.1	Internet users	85.25	37
1.1.2	International Internet bandwidth	47.07	51	3.1.2	Active mobile-broadband subscriptions	36.19	67
1.1.3	Fixed-broadband subscriptions	53.69	81	3.1.3	Gender parity in Internet usage	94.80	45
1.1.4	4G-mobile network coverage	75.70	92	3.1.4	Firms with website	44.97	66
1.1.5	Fixed broadband affordability	98.91	15	3.1.5	Internet shopping	18.79	59
1.1.6	Mobile broadband affordability	94.93	12	3.1.6	Government online services	90.51	11
1.1.7	Computer software spending	1.16	113	3.1.7	E-Participation	85.92	26
1.2	Transport Infrastructure	17.47	109	3.2	Digital Content Creation	28.52	71
1.2.1	Quality of infrastructure	35.23	76	3.2.1	GitHub commits	4.04	60
1.2.2	Rural access	19.32	117	3.2.2	Wikipedia edits	44.09	72
1.2.3	Air connectivity	3.62	84	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	64.18	72
1.3	Energy Infrastructure	53.68	84	3.3	Industry 4.0	2.80	97
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	3.97	91
1.3.3	Electrical outages	90.72	30	3.3.3	AI research	2.46	77
1.3.4	Energy intensity	53.27	106	3.3.4	ICT patent applications	0.09	68
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	47.78	47	4	COMPETITIVENESS	30.75	71
2.1	Attract	37.48	94	4.1	Digital Policies	44.95	78
2.1.1	Brain gain	50.97	56	4.1.1	ICT regulation	36.54	120
2.1.2	International students	14.64	45	4.1.2	Cybersecurity	93.00	38
2.1.3	Tolerance of minorities	20.21	98	4.1.3	Rule of law	26.20	82
2.1.4	Tolerance of immigrants	43.08	88	4.1.4	Regulatory quality	43.62	63
2.1.5	Gender parity in high-skilled jobs	63.56	76	4.1.5	Corruption	25.37	72
2.1.6	FDI and technology transfer	32.39	92	4.2	Market Environment	28.02	89
2.2	Grow	39.21	57	4.2.1	Extent of market dominance	38.53	81
2.2.1	Tertiary enrolment	47.29	33	4.2.2	Labour productivity	33.58	49
2.2.2	Reading, maths, and science	27.87	61	4.2.3	Urbanisation	49.06	76
2.2.3	Use of virtual professional networks	7.85	87	4.2.4	Domestic credit to private sector	9.02	102
2.2.4	Formal and non-formal studies	22.79	43	4.2.5	Market capitalisation	9.93	52
2.2.5	Youth inclusion	90.25	24	4.3	R&D	30.09	59
2.3	Retain	65.70	44	4.3.1	R&D spending	2.11	94
2.3.1	Pension coverage	99.59	35	4.3.2	University ranking	21.59	76
2.3.2	Environmental performance	34.15	73	4.3.3	Gender parity in R&D	91.54	12
2.3.3	Physician density	49.44	29	4.3.4	Scientific journal articles	5.12	70
2.3.4	Sanitation	97.71	43	4.4	Innovation	19.96	58
2.3.5	Personal safety	47.61	72	4.4.1	Medium- and high-tech industry	17.77	88
2.4	Skills	48.75	30	4.4.2	High-tech exports	47.83	8
2.4.1	Workforce with tertiary education	100.00	1	4.4.3	Venture capital recipients, deals	0.00	93
2.4.2	High-skilled workforce	57.07	36	4.4.4	New product entrepreneurial activity	44.83	48
2.4.3	Researchers	8.12	58	4.4.5	New business density	8.33	52
2.4.4	Ease of finding skilled employees	44.59	85	4.4.6	Patent applications	0.98	72
2.4.5	Digital skills	33.96	36				

Kenya

Key Indicators

Rank (out of 124)	95	GDP per capita (PPP US\$)	4,512.98
Income group	Lower-middle income	GDP (US\$ billions)	98.84
Regional group	Sub-Saharan Africa	FREI score	27.62
Population (millions)	53.77	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



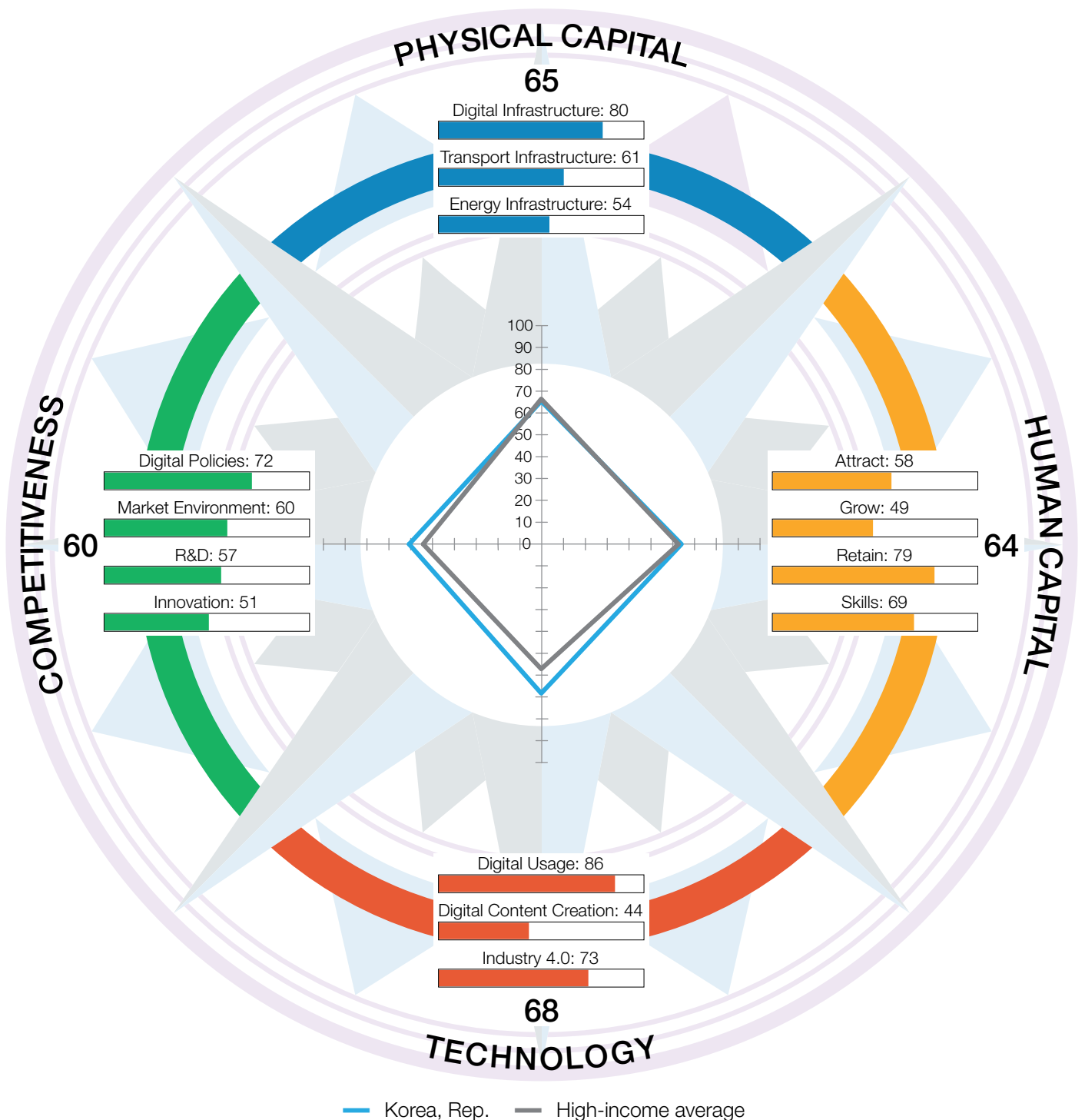
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	36.31	102	3	TECHNOLOGY	20.07	96
1.1	Digital Infrastructure	46.69	99	3.1	Digital Usage	37.40	94
1.1.1	Internet access	16.59	101	3.1.1	Internet users	18.73	108
1.1.2	International Internet bandwidth	62.80	12	3.1.2	Active mobile-broadband subscriptions	19.44	108
1.1.3	Fixed-broadband subscriptions	39.88	88	3.1.3	Gender parity in Internet usage	58.57	90
1.1.4	4G-mobile network coverage	77.00	89	3.1.4	Firms with website	41.22	71
1.1.5	Fixed broadband affordability	61.52	107	3.1.5	Internet shopping	11.83	66
1.1.6	Mobile broadband affordability	55.91	103	3.1.6	Government online services	59.86	74
1.1.7	Computer software spending	13.16	75	3.1.7	E-Participation	52.11	86
1.2	Transport Infrastructure	22.13	92	3.2	Digital Content Creation	15.10	105
1.2.1	Quality of infrastructure	35.23	76	3.2.1	GitHub commits	2.57	72
1.2.2	Rural access	48.11	89	3.2.2	Wikipedia edits	7.29	121
1.2.3	Air connectivity	1.18	100	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	49.86	96
1.3	Energy Infrastructure	40.11	106	3.3	Industry 4.0	7.70	59
1.3.1	Access to electricity	65.88	104	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	17.66	39
1.3.3	Electrical outages	63.94	67	3.3.3	AI research	1.24	90
1.3.4	Energy intensity	65.58	91	3.3.4	ICT patent applications	0.10	66
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	31.86	91	4	COMPETITIVENESS	22.25	96
2.1	Attract	46.39	60	4.1	Digital Policies	46.62	76
2.1.1	Brain gain	58.49	34	4.1.1	ICT regulation	87.74	32
2.1.2	International students	3.38	81	4.1.2	Cybersecurity	81.29	59
2.1.3	Tolerance of minorities	20.21	98	4.1.3	Rule of law	21.38	93
2.1.4	Tolerance of immigrants	67.69	45	4.1.4	Regulatory quality	27.75	95
2.1.5	Gender parity in high-skilled jobs	72.75	66	4.1.5	Corruption	14.93	97
2.1.6	FDI and technology transfer	55.80	50	4.2	Market Environment	14.96	113
2.2	Grow	29.78	83	4.2.1	Extent of market dominance	35.99	87
2.2.1	Tertiary enrolment	6.24	106	4.2.2	Labour productivity	5.75	98
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	12.69	116
2.2.3	Use of virtual professional networks	8.41	82	4.2.4	Domestic credit to private sector	12.32	87
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	8.06	58
2.2.5	Youth inclusion	74.70	61	4.3	R&D	17.06	94
2.3	Retain	16.33	113	4.3.1	R&D spending	n/a	n/a
2.3.1	Pension coverage	11.43	102	4.3.2	University ranking	33.20	56
2.3.2	Environmental performance	16.72	98	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	1.51	109	4.3.4	Scientific journal articles	0.93	96
2.3.4	Sanitation	23.45	113	4.4	Innovation	10.36	93
2.3.5	Personal safety	28.55	103	4.4.1	Medium- and high-tech industry	15.12	91
2.4	Skills	34.95	60	4.4.2	High-tech exports	7.37	83
2.4.1	Workforce with tertiary education	4.79	111	4.4.3	Venture capital recipients, deals	22.66	23
2.4.2	High-skilled workforce	17.74	95	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	6.15	63
2.4.4	Ease of finding skilled employees	82.32	15	4.4.6	Patent applications	0.47	80
2.4.5	Digital skills	n/a	n/a				

Korea, Rep.

Key Indicators

Rank (out of 124)	18	GDP per capita (PPP US\$)	42,727.95
Income group	High income	GDP (US\$ billions)	1,630.53
Regional group	Asia and Pacific	FREI score	64.14
Population (millions)	51.78	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)

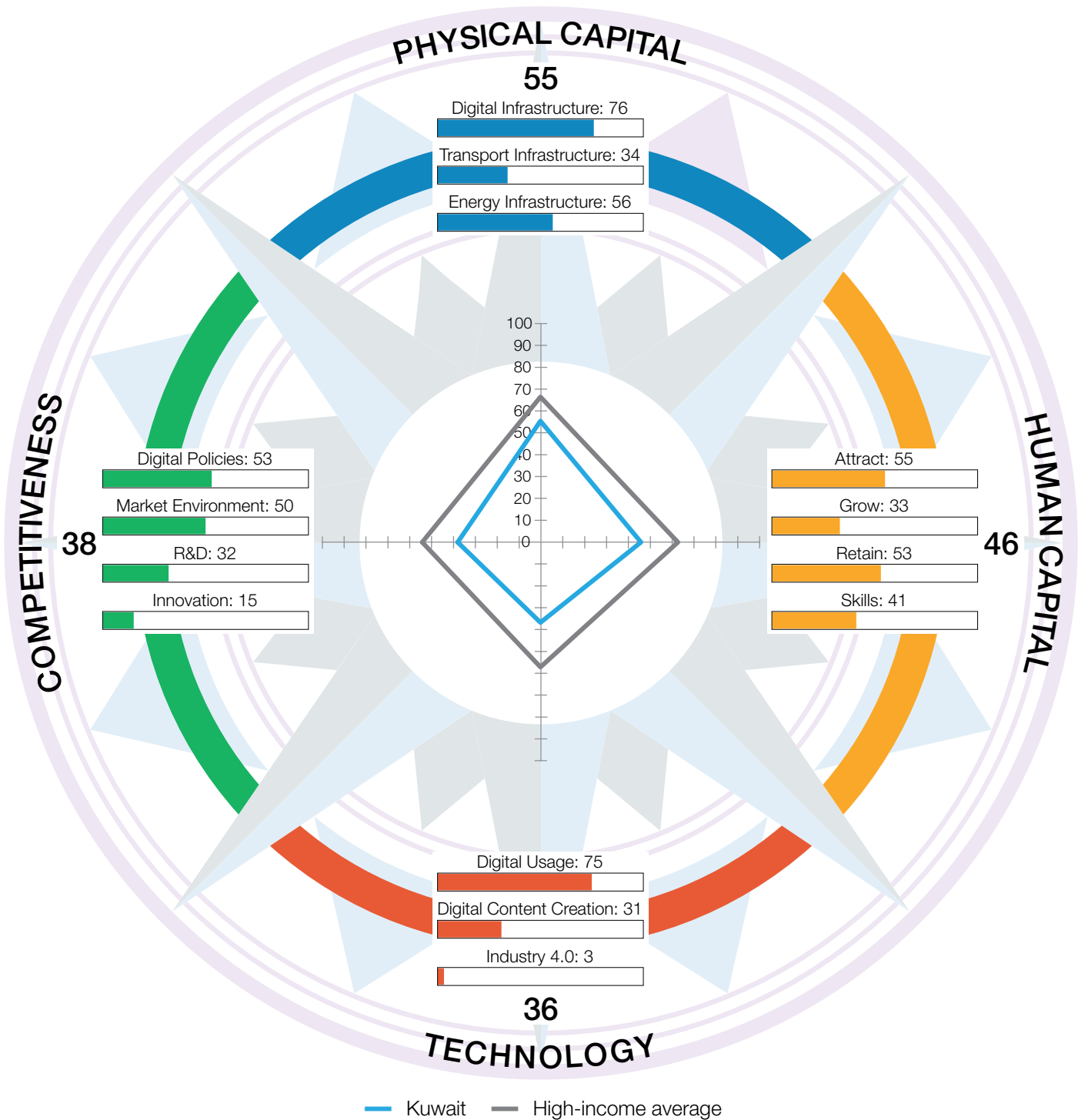


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	65.00	25	3	TECHNOLOGY	67.73	13
1.1	Digital Infrastructure	79.78	25	3.1	Digital Usage	86.05	8
1.1.1	Internet access	99.95	2	3.1.1	Internet users	96.33	10
1.1.2	International Internet bandwidth	47.75	46	3.1.2	Active mobile-broadband subscriptions	51.28	22
1.1.3	Fixed-broadband subscriptions	100.00	1	3.1.3	Gender parity in Internet usage	96.65	31
1.1.4	4G-mobile network coverage	99.90	15	3.1.4	Firms with website	65.15	43
1.1.5	Fixed broadband affordability	98.27	31	3.1.5	Internet shopping	92.94	5
1.1.6	Mobile broadband affordability	93.90	17	3.1.6	Government online services	100.00	1
1.1.7	Computer software spending	18.65	64	3.1.7	E-Participation	100.00	1
1.2	Transport Infrastructure	61.41	13	3.2	Digital Content Creation	43.77	38
1.2.1	Quality of infrastructure	77.22	21	3.2.1	GitHub commits	13.49	42
1.2.2	Rural access	95.71	16	3.2.2	Wikipedia edits	63.38	44
1.2.3	Air connectivity	20.68	38	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	90.38	24
1.3	Energy Infrastructure	53.82	83	3.3	Industry 4.0	73.36	4
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	100.00	1
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	49.01	14
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	29.59	26
1.3.4	Energy intensity	64.63	92	3.3.4	ICT patent applications	100.00	1
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	63.77	22	4	COMPETITIVENESS	60.05	18
2.1	Attract	57.69	31	4.1	Digital Policies	71.73	29
2.1.1	Brain gain	50.79	58	4.1.1	ICT regulation	59.14	96
2.1.2	International students	8.63	63	4.1.2	Cybersecurity	98.49	5
2.1.3	Tolerance of minorities	80.85	10	4.1.3	Rule of law	73.29	23
2.1.4	Tolerance of immigrants	58.46	64	4.1.4	Regulatory quality	68.01	31
2.1.5	Gender parity in high-skilled jobs	90.78	30	4.1.5	Corruption	59.70	27
2.1.6	FDI and technology transfer	56.65	48	4.2	Market Environment	60.20	18
2.2	Grow	49.46	40	4.2.1	Extent of market dominance	43.73	67
2.2.1	Tertiary enrolment	66.09	5	4.2.2	Labour productivity	53.63	28
2.2.2	Reading, maths, and science	75.76	5	4.2.3	Urbanisation	77.82	29
2.2.3	Use of virtual professional networks	6.53	92	4.2.4	Domestic credit to private sector	75.73	6
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	50.12	9
2.2.5	Youth inclusion	n/a	n/a	4.3	R&D	57.19	13
2.3	Retain	79.27	26	4.3.1	R&D spending	91.61	2
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	68.19	13
2.3.2	Environmental performance	72.13	28	4.3.3	Gender parity in R&D	17.74	92
2.3.3	Physician density	29.74	60	4.3.4	Scientific journal articles	51.21	22
2.3.4	Sanitation	100.00	1	4.4	Innovation	51.08	8
2.3.5	Personal safety	94.46	5	4.4.1	Medium- and high-tech industry	79.26	3
2.4	Skills	68.67	11	4.4.2	High-tech exports	52.06	5
2.4.1	Workforce with tertiary education	65.15	5	4.4.3	Venture capital recipients, deals	5.15	62
2.4.2	High-skilled workforce	60.79	29	4.4.4	New product entrepreneurial activity	59.30	25
2.4.3	Researchers	98.94	2	4.4.5	New business density	10.72	48
2.4.4	Ease of finding skilled employees	83.13	14	4.4.6	Patent applications	100.00	1
2.4.5	Digital skills	35.34	33				

Key Indicators

Rank (out of 124)	53	GDP per capita (PPP US\$)	51,363.74
Income group	High income	GDP (US\$ billions)	136.20
Regional group	Middle East and North Africa	FREI score	43.66
Population (millions)	4.27	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



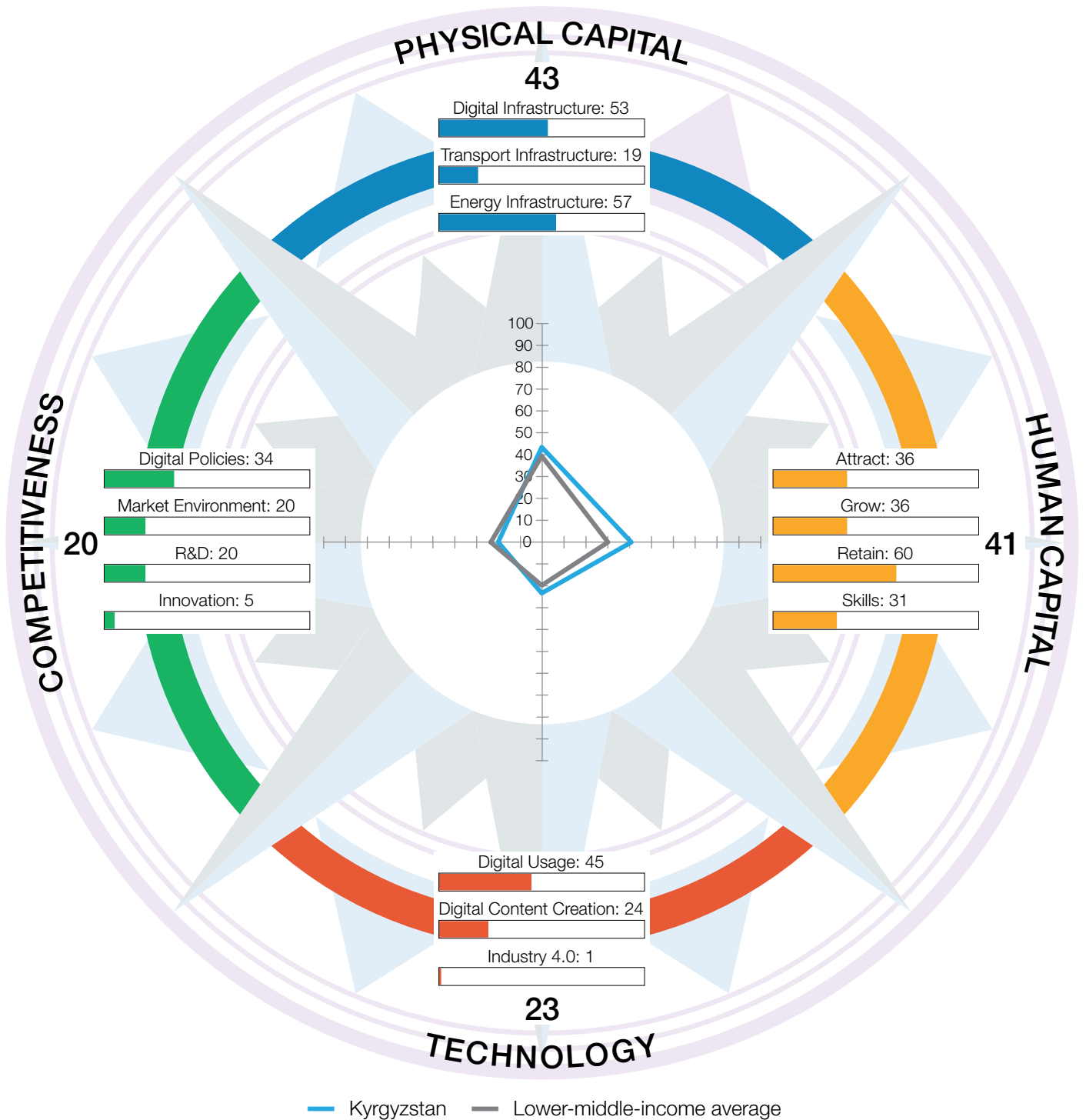
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	55.02	54	3	TECHNOLOGY	36.46	54
1.1	Digital Infrastructure	75.84	41	3.1	Digital Usage	74.85	29
1.1.1	Internet access	99.59	5	3.1.1	Internet users	98.53	6
1.1.2	International Internet bandwidth	55.12	27	3.1.2	Active mobile-broadband subscriptions	56.06	11
1.1.3	Fixed-broadband subscriptions	52.79	82	3.1.3	Gender parity in Internet usage	99.57	5
1.1.4	4G-mobile network coverage	100.00	1	3.1.4	Firms with website	n/a	n/a
1.1.5	Fixed broadband affordability	100.00	1	3.1.5	Internet shopping	25.89	50
1.1.6	Mobile broadband affordability	91.24	26	3.1.6	Government online services	80.30	31
1.1.7	Computer software spending	32.11	25	3.1.7	E-Participation	88.74	18
1.2	Transport Infrastructure	33.50	62	3.2	Digital Content Creation	31.14	63
1.2.1	Quality of infrastructure	51.96	43	3.2.1	GitHub commits	1.53	85
1.2.2	Rural access	38.85	102	3.2.2	Wikipedia edits	45.71	67
1.2.3	Air connectivity	35.75	20	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	73.73	55
1.3	Energy Infrastructure	55.71	75	3.3	Industry 4.0	3.38	90
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	0.04	67
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	1.37	103
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	7.38	54
1.3.4	Energy intensity	53.01	107	3.3.4	ICT patent applications	0.52	54
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	45.64	56	4	COMPETITIVENESS	37.54	51
2.1	Attract	55.12	36	4.1	Digital Policies	53.36	63
2.1.1	Brain gain	52.61	49	4.1.1	ICT regulation	65.38	86
2.1.2	International students	n/a	n/a	4.1.2	Cybersecurity	74.51	73
2.1.3	Tolerance of minorities	61.70	37	4.1.3	Rule of law	47.90	46
2.1.4	Tolerance of immigrants	69.23	44	4.1.4	Regulatory quality	47.67	55
2.1.5	Gender parity in high-skilled jobs	62.14	79	4.1.5	Corruption	31.34	60
2.1.6	FDI and technology transfer	29.89	96	4.2	Market Environment	49.88	31
2.2	Grow	32.97	73	4.2.1	Extent of market dominance	44.09	65
2.2.1	Tertiary enrolment	40.83	48	4.2.2	Labour productivity	32.65	50
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	100.00	1
2.2.3	Use of virtual professional networks	25.11	41	4.2.4	Domestic credit to private sector	40.10	32
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	32.55	17
2.2.5	Youth inclusion	n/a	n/a	4.3	R&D	31.55	54
2.3	Retain	53.07	67	4.3.1	R&D spending	1.01	100
2.3.1	Pension coverage	24.90	87	4.3.2	University ranking	25.93	67
2.3.2	Environmental performance	49.65	44	4.3.3	Gender parity in R&D	89.62	14
2.3.3	Physician density	32.72	51	4.3.4	Scientific journal articles	9.63	55
2.3.4	Sanitation	100.00	1	4.4	Innovation	15.36	72
2.3.5	Personal safety	58.05	53	4.4.1	Medium- and high-tech industry	47.73	36
2.4	Skills	41.39	43	4.4.2	High-tech exports	1.45	112
2.4.1	Workforce with tertiary education	22.95	71	4.4.3	Venture capital recipients, deals	1.67	83
2.4.2	High-skilled workforce	32.80	67	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	6.22	64	4.4.5	New business density	24.89	25
2.4.4	Ease of finding skilled employees	64.32	46	4.4.6	Patent applications	1.04	71
2.4.5	Digital skills	80.67	7				

Kyrgyzstan

Key Indicators

Rank (out of 124)	91	GDP per capita (PPP US\$)	5,223.48
Income group	Lower-middle income	GDP (US\$ billions)	7.74
Regional group	Asia and Pacific	FREI score	31.70
Population (millions)	6.59	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)

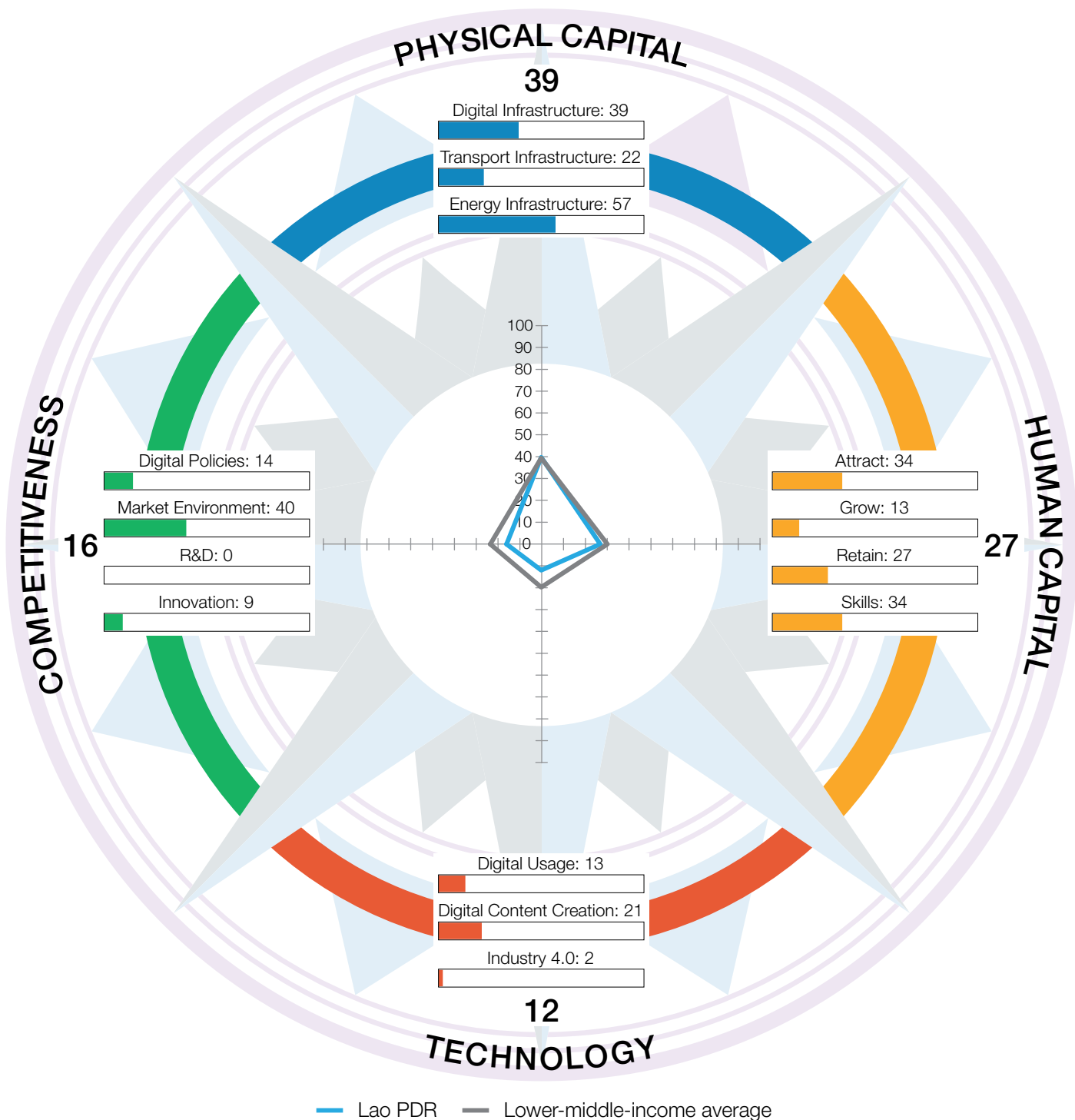


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	43.17	90	3	TECHNOLOGY	23.16	91
1.1	Digital Infrastructure	53.37	91	3.1	Digital Usage	44.73	86
1.1.1	Internet access	69.69	72	3.1.1	Internet users	35.14	96
1.1.2	International Internet bandwidth	43.71	65	3.1.2	Active mobile-broadband subscriptions	54.01	14
1.1.3	Fixed-broadband subscriptions	27.29	97	3.1.3	Gender parity in Internet usage	n/a	n/a
1.1.4	4G-mobile network coverage	85.00	83	3.1.4	Firms with website	53.19	58
1.1.5	Fixed broadband affordability	81.04	94	3.1.5	Internet shopping	3.62	98
1.1.6	Mobile broadband affordability	59.79	97	3.1.6	Government online services	56.21	78
1.1.7	Computer software spending	7.05	88	3.1.7	E-Participation	66.20	65
1.2	Transport Infrastructure	19.32	102	3.2	Digital Content Creation	23.68	86
1.2.1	Quality of infrastructure	29.18	94	3.2.1	GitHub commits	2.38	74
1.2.2	Rural access	38.95	101	3.2.2	Wikipedia edits	36.41	82
1.2.3	Air connectivity	2.41	88	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	55.50	89
1.3	Energy Infrastructure	56.82	72	3.3	Industry 4.0	1.08	114
1.3.1	Access to electricity	99.87	78	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	0.16	116
1.3.3	Electrical outages	85.29	48	3.3.3	AI research	0.36	103
1.3.4	Energy intensity	61.10	97	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	40.73	68	4	COMPETITIVENESS	19.73	102
2.1	Attract	35.66	103	4.1	Digital Policies	34.32	102
2.1.1	Brain gain	37.07	87	4.1.1	ICT regulation	68.99	82
2.1.2	International students	41.45	12	4.1.2	Cybersecurity	48.51	95
2.1.3	Tolerance of minorities	19.15	101	4.1.3	Rule of law	10.38	113
2.1.4	Tolerance of immigrants	66.15	48	4.1.4	Regulatory quality	28.77	91
2.1.5	Gender parity in high-skilled jobs	48.67	94	4.1.5	Corruption	14.93	97
2.1.6	FDI and technology transfer	1.45	119	4.2	Market Environment	19.58	108
2.2	Grow	35.71	62	4.2.1	Extent of market dominance	36.85	83
2.2.1	Tertiary enrolment	30.89	67	4.2.2	Labour productivity	7.34	93
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	23.84	106
2.2.3	Use of virtual professional networks	2.88	108	4.2.4	Domestic credit to private sector	10.27	95
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	73.37	65	4.3	R&D	19.69	88
2.3	Retain	60.32	54	4.3.1	R&D spending	1.79	97
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	25.61	85	4.3.3	Gender parity in R&D	76.14	31
2.3.3	Physician density	27.29	66	4.3.4	Scientific journal articles	0.82	97
2.3.4	Sanitation	96.23	54	4.4	Innovation	5.34	112
2.3.5	Personal safety	52.48	64	4.4.1	Medium- and high-tech industry	3.17	116
2.4	Skills	31.23	68	4.4.2	High-tech exports	10.87	67
2.4.1	Workforce with tertiary education	21.82	73	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	26.29	78	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	5.24	72
2.4.4	Ease of finding skilled employees	45.59	84	4.4.6	Patent applications	2.08	60
2.4.5	Digital skills	n/a	n/a				

Key Indicators

Rank (out of 124)	105	GDP per capita (PPP US\$)	8,187.70
Income group	Lower-middle income	GDP (US\$ billions)	19.14
Regional group	Asia and Pacific	FREI score	23.46
Population (millions)	7.28	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)

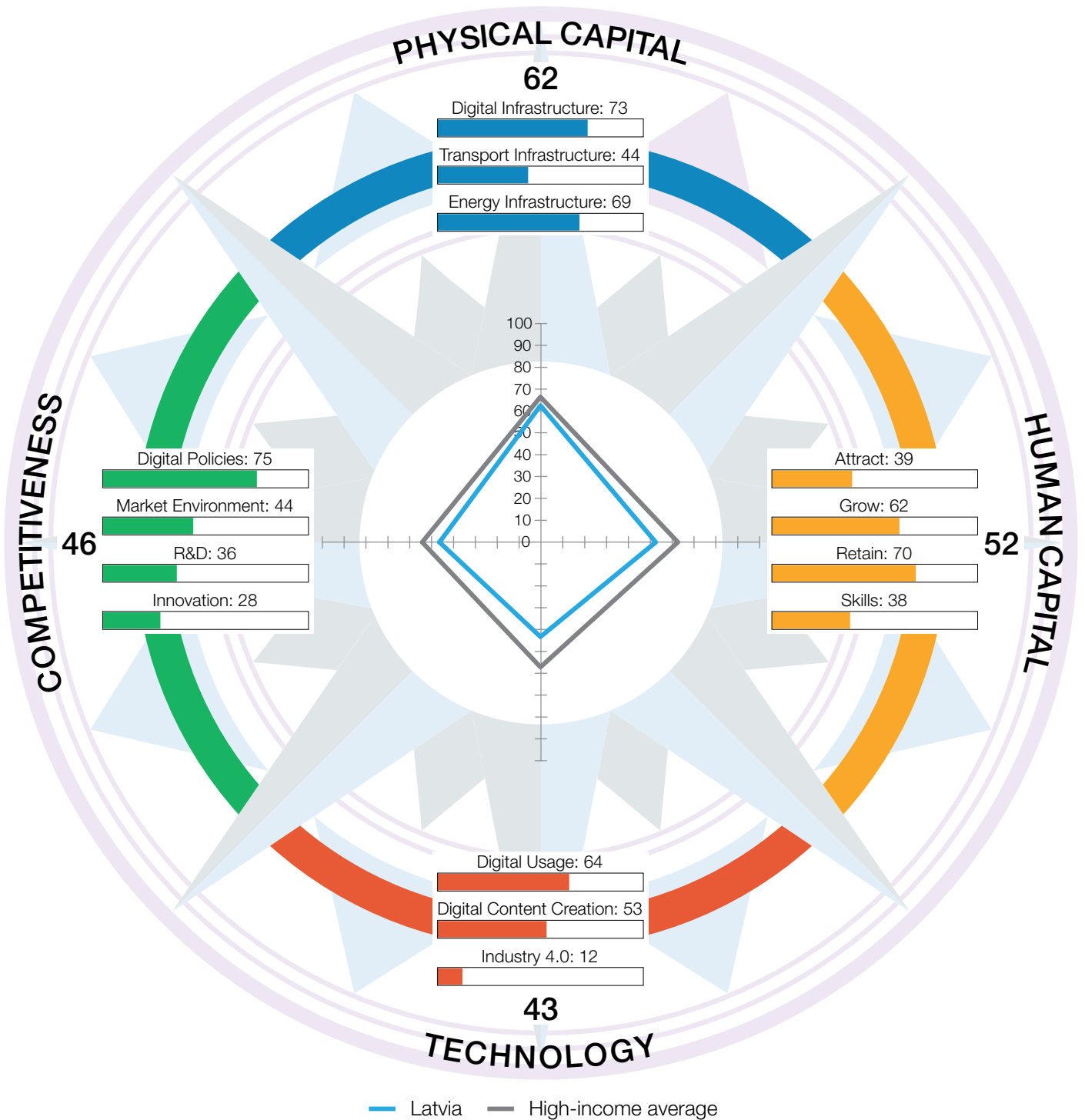


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	39.43	97	3	TECHNOLOGY	11.82	114
1.1	Digital Infrastructure	39.00	101	3.1	Digital Usage	12.94	121
1.1.1	Internet access	0.00	117	3.1.1	Internet users	21.83	104
1.1.2	International Internet bandwidth	42.29	71	3.1.2	Active mobile-broadband subscriptions	20.27	103
1.1.3	Fixed-broadband subscriptions	3.94	112	3.1.3	Gender parity in Internet usage	n/a	n/a
1.1.4	4G-mobile network coverage	43.00	108	3.1.4	Firms with website	21.40	92
1.1.5	Fixed broadband affordability	80.77	95	3.1.5	Internet shopping	7.11	78
1.1.6	Mobile broadband affordability	64.01	92	3.1.6	Government online services	0.00	124
1.1.7	Computer software spending	n/a	n/a	3.1.7	E-Participation	7.04	123
1.2	Transport Infrastructure	22.42	90	3.2	Digital Content Creation	20.80	96
1.2.1	Quality of infrastructure	31.32	85	3.2.1	GitHub commits	0.06	120
1.2.2	Rural access	42.01	96	3.2.2	Wikipedia edits	34.46	85
1.2.3	Air connectivity	5.06	74	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	46.83	98
1.3	Energy Infrastructure	56.86	71	3.3	Industry 4.0	1.70	105
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	0.07	119
1.3.3	Electrical outages	95.83	13	3.3.3	AI research	0.12	112
1.3.4	Energy intensity	62.13	96	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	26.84	102	4	COMPETITIVENESS	15.77	111
2.1	Attract	33.84	107	4.1	Digital Policies	13.96	123
2.1.1	Brain gain	47.24	65	4.1.1	ICT regulation	8.65	122
2.1.2	International students	1.47	90	4.1.2	Cybersecurity	18.55	116
2.1.3	Tolerance of minorities	28.72	86	4.1.3	Rule of law	12.68	108
2.1.4	Tolerance of immigrants	7.69	122	4.1.4	Regulatory quality	17.95	113
2.1.5	Gender parity in high-skilled jobs	78.69	53	4.1.5	Corruption	11.94	106
2.1.6	FDI and technology transfer	39.21	79	4.2	Market Environment	39.51	54
2.2	Grow	12.94	121	4.2.1	Extent of market dominance	56.80	41
2.2.1	Tertiary enrolment	8.57	100	4.2.2	Labour productivity	n/a	n/a
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	22.23	110
2.2.3	Use of virtual professional networks	1.99	113	4.2.4	Domestic credit to private sector	n/a	n/a
2.2.4	Formal and non-formal studies	0.72	73	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	40.46	109	4.3	R&D	0.23	121
2.3	Retain	26.56	98	4.3.1	R&D spending	n/a	n/a
2.3.1	Pension coverage	4.39	113	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	16.90	97	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	4.22	99	4.3.4	Scientific journal articles	0.45	107
2.3.4	Sanitation	72.44	91	4.4	Innovation	9.37	100
2.3.5	Personal safety	34.86	94	4.4.1	Medium- and high-tech industry	4.38	113
2.4	Skills	34.05	63	4.4.2	High-tech exports	33.11	21
2.4.1	Workforce with tertiary education	15.19	90	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	30.45	74	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	0.00	114
2.4.4	Ease of finding skilled employees	56.49	59	4.4.6	Patent applications	0.00	96
2.4.5	Digital skills	n/a	n/a				

Key Indicators

Rank (out of 124)	36	GDP per capita (PPP US\$)	32,047.35
Income group	High income	GDP (US\$ billions)	33.51
Regional group	Europe	FREI score	50.76
Population (millions)	1.90	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



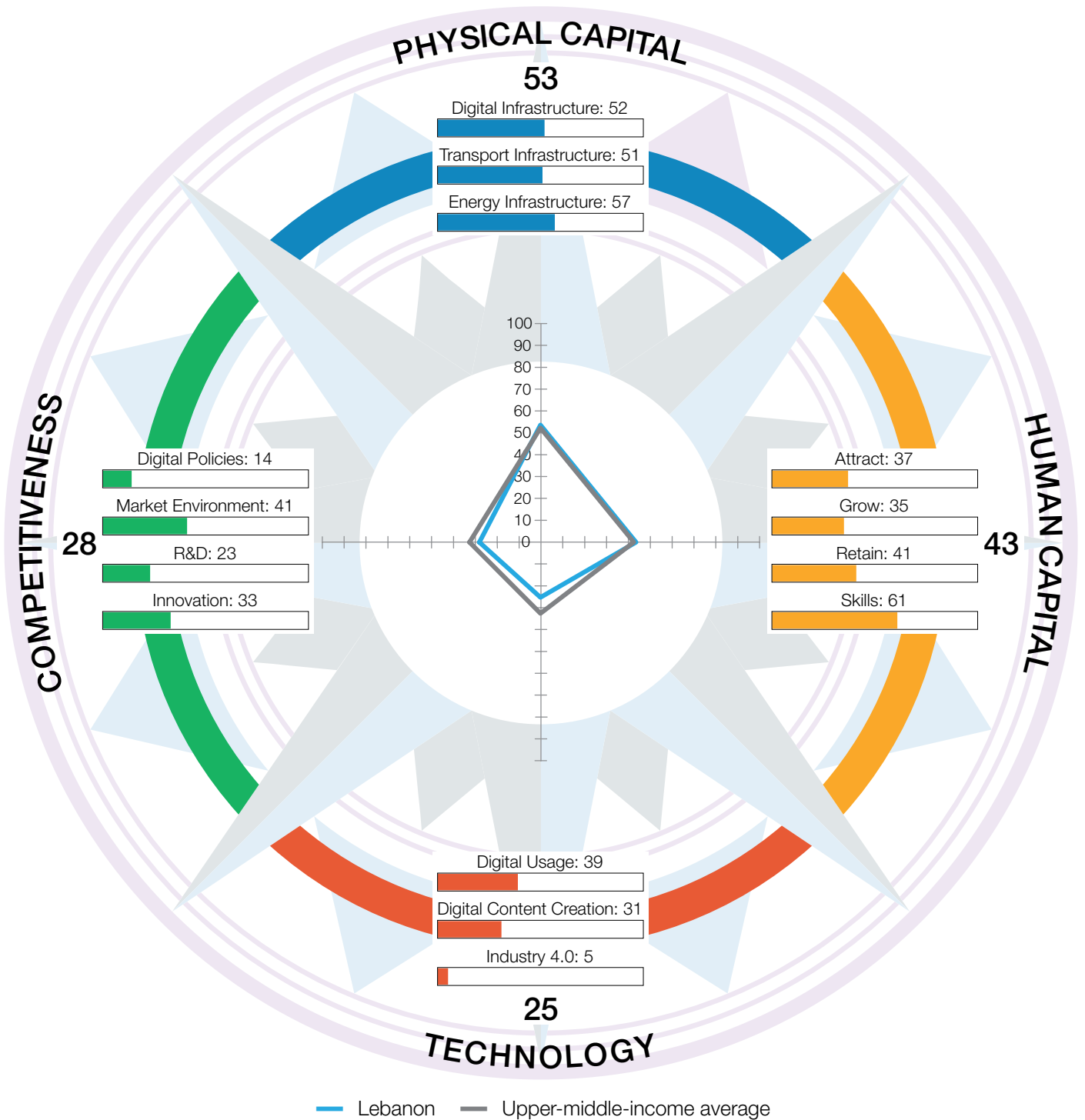
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	62.05	36	3	TECHNOLOGY	42.90	36
1.1	Digital Infrastructure	73.19	49	3.1	Digital Usage	64.32	50
1.1.1	Internet access	89.74	35	3.1.1	Internet users	88.35	29
1.1.2	International Internet bandwidth	52.58	34	3.1.2	Active mobile-broadband subscriptions	62.34	8
1.1.3	Fixed-broadband subscriptions	83.54	55	3.1.3	Gender parity in Internet usage	96.68	30
1.1.4	4G-mobile network coverage	95.00	69	3.1.4	Firms with website	59.74	50
1.1.5	Fixed broadband affordability	97.35	46	3.1.5	Internet shopping	44.25	33
1.1.6	Mobile broadband affordability	84.38	49	3.1.6	Government online services	48.18	88
1.1.7	Computer software spending	9.76	82	3.1.7	E-Participation	50.70	88
1.2	Transport Infrastructure	43.64	42	3.2	Digital Content Creation	52.51	29
1.2.1	Quality of infrastructure	50.53	47	3.2.1	GitHub commits	30.61	25
1.2.2	Rural access	89.13	32	3.2.2	Wikipedia edits	77.27	23
1.2.3	Air connectivity	25.46	30	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	85.16	32
1.3	Energy Infrastructure	69.30	12	3.3	Industry 4.0	11.87	45
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	1.45	47
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	13.37	50
1.3.3	Electrical outages	95.83	13	3.3.3	AI research	26.44	29
1.3.4	Energy intensity	82.79	42	3.3.4	ICT patent applications	3.60	32
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	52.31	38	4	COMPETITIVENESS	45.78	35
2.1	Attract	38.57	90	4.1	Digital Policies	74.77	25
2.1.1	Brain gain	41.57	77	4.1.1	ICT regulation	84.13	44
2.1.2	International students	27.79	23	4.1.2	Cybersecurity	97.22	21
2.1.3	Tolerance of minorities	17.02	105	4.1.3	Rule of law	66.54	30
2.1.4	Tolerance of immigrants	30.77	111	4.1.4	Regulatory quality	72.23	25
2.1.5	Gender parity in high-skilled jobs	61.53	80	4.1.5	Corruption	53.73	33
2.1.6	FDI and technology transfer	52.74	54	4.2	Market Environment	43.90	42
2.2	Grow	62.14	18	4.2.1	Extent of market dominance	56.85	39
2.2.1	Tertiary enrolment	63.67	7	4.2.2	Labour productivity	43.70	41
2.2.2	Reading, maths, and science	62.57	28	4.2.3	Urbanisation	61.88	58
2.2.3	Use of virtual professional networks	26.22	37	4.2.4	Domestic credit to private sector	13.19	85
2.2.4	Formal and non-formal studies	64.29	21	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	93.96	11	4.3	R&D	36.12	41
2.3	Retain	70.12	39	4.3.1	R&D spending	12.75	51
2.3.1	Pension coverage	91.84	44	4.3.2	University ranking	24.63	71
2.3.2	Environmental performance	63.59	36	4.3.3	Gender parity in R&D	77.84	30
2.3.3	Physician density	40.94	40	4.3.4	Scientific journal articles	29.27	37
2.3.4	Sanitation	91.53	65	4.4	Innovation	28.32	33
2.3.5	Personal safety	62.69	44	4.4.1	Medium- and high-tech industry	28.89	64
2.4	Skills	38.41	47	4.4.2	High-tech exports	33.11	20
2.4.1	Workforce with tertiary education	47.39	28	4.4.3	Venture capital recipients, deals	9.91	42
2.4.2	High-skilled workforce	68.82	23	4.4.4	New product entrepreneurial activity	55.84	33
2.4.3	Researchers	22.09	39	4.4.5	New business density	33.82	18
2.4.4	Ease of finding skilled employees	40.89	88	4.4.6	Patent applications	8.36	34
2.4.5	Digital skills	12.86	59				

Lebanon

Key Indicators

Rank (out of 124)	71	GDP per capita (PPP US\$)	15,166.98
Income group	Upper-middle income	GDP (US\$ billions)	33.38
Regional group	Middle East and North Africa	FREI score	37.36
Population (millions)	6.83	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



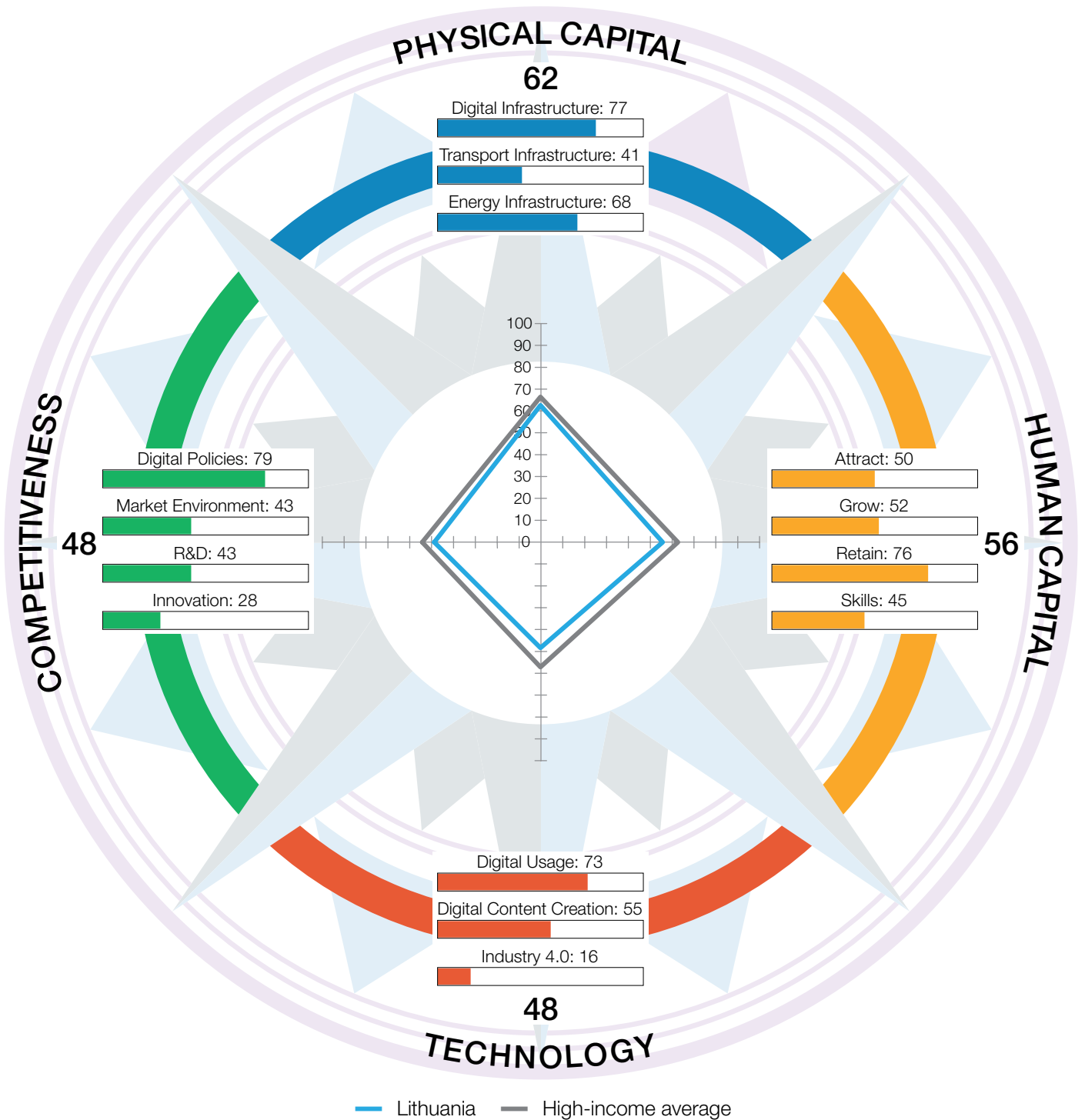
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	53.24	61	3	TECHNOLOGY	25.00	84
1.1	Digital Infrastructure	51.72	93	3.1	Digital Usage	38.59	91
1.1.1	Internet access	n/a	n/a	3.1.1	Internet users	77.10	57
1.1.2	International Internet bandwidth	42.47	70	3.1.2	Active mobile-broadband subscriptions	27.13	90
1.1.3	Fixed-broadband subscriptions	17.09	101	3.1.3	Gender parity in Internet usage	n/a	n/a
1.1.4	4G-mobile network coverage	99.20	37	3.1.4	Firms with website	60.81	47
1.1.5	Fixed broadband affordability	94.39	67	3.1.5	Internet shopping	17.64	63
1.1.6	Mobile broadband affordability	54.79	105	3.1.6	Government online services	27.73	111
1.1.7	Computer software spending	2.40	103	3.1.7	E-Participation	21.12	114
1.2	Transport Infrastructure	50.61	33	3.2	Digital Content Creation	31.12	64
1.2.1	Quality of infrastructure	38.43	72	3.2.1	GitHub commits	3.82	61
1.2.2	Rural access	97.61	10	3.2.2	Wikipedia edits	43.59	73
1.2.3	Air connectivity	15.78	43	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	74.56	51
1.3	Energy Infrastructure	57.40	68	3.3	Industry 4.0	5.30	73
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	5.10	85
1.3.3	Electrical outages	89.24	36	3.3.3	AI research	8.38	53
1.3.4	Energy intensity	82.79	42	3.3.4	ICT patent applications	3.29	34
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	43.45	62	4	COMPETITIVENESS	27.74	78
2.1	Attract	37.22	96	4.1	Digital Policies	13.70	124
2.1.1	Brain gain	27.25	100	4.1.1	ICT regulation	0.00	124
2.1.2	International students	25.54	27	4.1.2	Cybersecurity	28.88	107
2.1.3	Tolerance of minorities	21.28	97	4.1.3	Rule of law	11.05	111
2.1.4	Tolerance of immigrants	47.69	82	4.1.4	Regulatory quality	22.59	102
2.1.5	Gender parity in high-skilled jobs	81.19	47	4.1.5	Corruption	5.97	115
2.1.6	FDI and technology transfer	20.37	113	4.2	Market Environment	40.99	52
2.2	Grow	35.01	67	4.2.1	Extent of market dominance	43.32	70
2.2.1	Tertiary enrolment	n/a	n/a	4.2.2	Labour productivity	20.34	72
2.2.2	Reading, maths, and science	17.44	70	4.2.3	Urbanisation	86.35	15
2.2.3	Use of virtual professional networks	18.81	55	4.2.4	Domestic credit to private sector	47.47	24
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	7.47	59
2.2.5	Youth inclusion	68.79	73	4.3	R&D	23.35	73
2.3	Retain	41.00	85	4.3.1	R&D spending	n/a	n/a
2.3.1	Pension coverage	7.96	108	4.3.2	University ranking	36.43	49
2.3.2	Environmental performance	35.37	68	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	25.92	68	4.3.4	Scientific journal articles	10.28	53
2.3.4	Sanitation	98.36	39	4.4	Innovation	32.90	27
2.3.5	Personal safety	37.40	90	4.4.1	Medium- and high-tech industry	19.09	85
2.4	Skills	60.58	20	4.4.2	High-tech exports	3.78	94
2.4.1	Workforce with tertiary education	40.63	38	4.4.3	Venture capital recipients, deals	22.41	25
2.4.2	High-skilled workforce	41.27	53	4.4.4	New product entrepreneurial activity	86.32	5
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	n/a	n/a
2.4.4	Ease of finding skilled employees	99.84	2	4.4.6	Patent applications	n/a	n/a
2.4.5	Digital skills	n/a	n/a				

Lithuania

Key Indicators

Rank (out of 124)	32	GDP per capita (PPP US\$)	38,756.11
Income group	High income	GDP (US\$ billions)	55.89
Regional group	Europe	FREI score	53.46
Population (millions)	2.79	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)

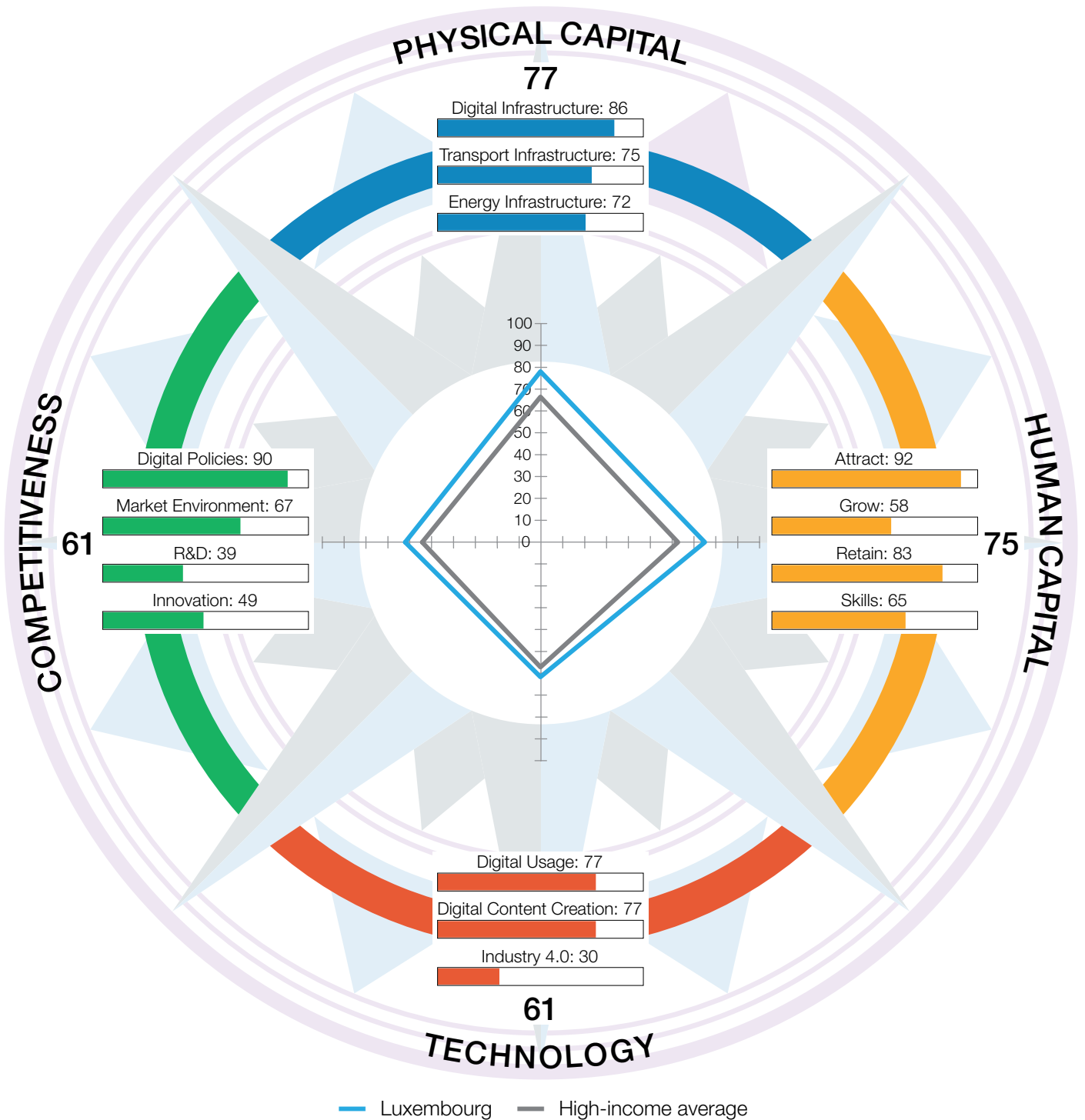


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	62.19	34	3	TECHNOLOGY	47.99	31
1.1	Digital Infrastructure	77.48	32	3.1	Digital Usage	72.94	32
1.1.1	Internet access	81.99	50	3.1.1	Internet users	82.22	46
1.1.2	International Internet bandwidth	71.75	4	3.1.2	Active mobile-broadband subscriptions	51.41	21
1.1.3	Fixed-broadband subscriptions	96.33	27	3.1.3	Gender parity in Internet usage	94.85	44
1.1.4	4G-mobile network coverage	99.99	11	3.1.4	Firms with website	78.49	24
1.1.5	Fixed broadband affordability	98.74	21	3.1.5	Internet shopping	52.88	31
1.1.6	Mobile broadband affordability	86.91	36	3.1.6	Government online services	81.75	24
1.1.7	Computer software spending	6.69	90	3.1.7	E-Participation	69.01	63
1.2	Transport Infrastructure	41.11	47	3.2	Digital Content Creation	55.29	26
1.2.1	Quality of infrastructure	41.64	65	3.2.1	GitHub commits	32.39	24
1.2.2	Rural access	90.49	29	3.2.2	Wikipedia edits	76.92	25
1.2.3	Air connectivity	11.58	50	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	91.96	23
1.3	Energy Infrastructure	67.98	13	3.3	Industry 4.0	15.74	37
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	3.88	43
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	23.28	32
1.3.3	Electrical outages	94.00	26	3.3.3	AI research	22.29	32
1.3.4	Energy intensity	84.08	38	3.3.4	ICT patent applications	1.71	44
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	55.54	34	4	COMPETITIVENESS	48.11	29
2.1	Attract	49.69	46	4.1	Digital Policies	78.51	22
2.1.1	Brain gain	44.59	70	4.1.1	ICT regulation	99.28	2
2.1.2	International students	15.94	41	4.1.2	Cybersecurity	97.88	11
2.1.3	Tolerance of minorities	70.21	25	4.1.3	Rule of law	67.65	29
2.1.4	Tolerance of immigrants	33.85	106	4.1.4	Regulatory quality	69.51	28
2.1.5	Gender parity in high-skilled jobs	64.71	75	4.1.5	Corruption	58.21	29
2.1.6	FDI and technology transfer	68.85	24	4.2	Market Environment	42.59	44
2.2	Grow	51.55	37	4.2.1	Extent of market dominance	44.65	64
2.2.1	Tertiary enrolment	48.20	31	4.2.2	Labour productivity	49.52	32
2.2.2	Reading, maths, and science	59.45	31	4.2.3	Urbanisation	61.33	60
2.2.3	Use of virtual professional networks	24.12	43	4.2.4	Domestic credit to private sector	14.87	82
2.2.4	Formal and non-formal studies	37.67	36	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	88.31	28	4.3	R&D	43.38	27
2.3	Retain	76.24	30	4.3.1	R&D spending	18.85	40
2.3.1	Pension coverage	97.04	38	4.3.2	University ranking	24.27	73
2.3.2	Environmental performance	65.85	35	4.3.3	Gender parity in R&D	98.20	2
2.3.3	Physician density	62.73	12	4.3.4	Scientific journal articles	32.21	34
2.3.4	Sanitation	92.83	63	4.4	Innovation	27.96	35
2.3.5	Personal safety	62.75	43	4.4.1	Medium- and high-tech industry	33.30	55
2.4	Skills	44.70	37	4.4.2	High-tech exports	19.33	40
2.4.1	Workforce with tertiary education	55.82	14	4.4.3	Venture capital recipients, deals	36.46	12
2.4.2	High-skilled workforce	68.91	22	4.4.4	New product entrepreneurial activity	58.42	27
2.4.3	Researchers	39.46	27	4.4.5	New business density	13.96	38
2.4.4	Ease of finding skilled employees	33.07	104	4.4.6	Patent applications	6.26	37
2.4.5	Digital skills	26.22	45				

Key Indicators

Rank (out of 124)	12	GDP per capita (PPP US\$)	120,962.19
Income group	High income	GDP (US\$ billions)	73.26
Regional group	Europe	FREI score	68.63
Population (millions)	0.63	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



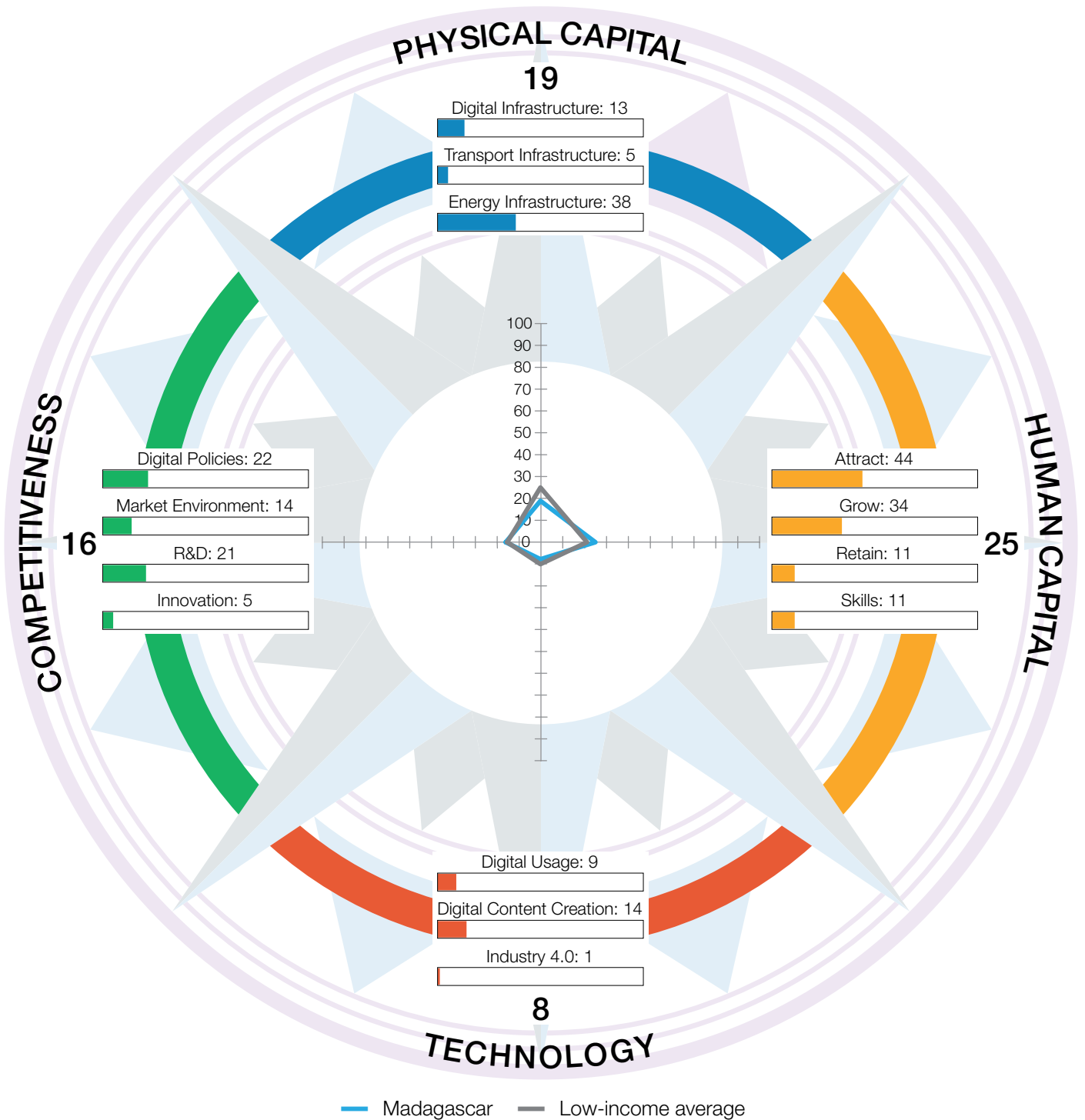
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	77.43	3	3	TECHNOLOGY	61.18	18
1.1	Digital Infrastructure	85.51	2	3.1	Digital Usage	76.71	23
1.1.1	Internet access	93.68	16	3.1.1	Internet users	98.76	5
1.1.2	International Internet bandwidth	100.00	1	3.1.2	Active mobile-broadband subscriptions	51.69	20
1.1.3	Fixed-broadband subscriptions	92.60	40	3.1.3	Gender parity in Internet usage	99.83	4
1.1.4	4G-mobile network coverage	98.00	53	3.1.4	Firms with website	85.57	10
1.1.5	Fixed broadband affordability	99.15	8	3.1.5	Internet shopping	65.55	20
1.1.6	Mobile broadband affordability	100.00	1	3.1.6	Government online services	70.80	48
1.1.7	Computer software spending	15.16	71	3.1.7	E-Participation	64.79	69
1.2	Transport Infrastructure	74.57	5	3.2	Digital Content Creation	76.80	8
1.2.1	Quality of infrastructure	73.67	23	3.2.1	GitHub commits	57.99	16
1.2.2	Rural access	99.98	2	3.2.2	Wikipedia edits	82.78	12
1.2.3	Air connectivity	67.20	8	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	97.00	10
1.3	Energy Infrastructure	72.21	9	3.3	Industry 4.0	30.01	23
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	n/a	n/a
1.3.3	Electrical outages	97.82	4	3.3.3	AI research	n/a	n/a
1.3.4	Energy intensity	91.48	11	3.3.4	ICT patent applications	42.09	11
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	74.61	8	4	COMPETITIVENESS	61.31	14
2.1	Attract	91.89	1	4.1	Digital Policies	89.94	10
2.1.1	Brain gain	93.04	3	4.1.1	ICT regulation	82.69	50
2.1.2	International students	100.00	1	4.1.2	Cybersecurity	97.35	18
2.1.3	Tolerance of minorities	82.98	6	4.1.3	Rule of law	91.52	10
2.1.4	Tolerance of immigrants	95.38	3	4.1.4	Regulatory quality	90.08	4
2.1.5	Gender parity in high-skilled jobs	90.78	29	4.1.5	Corruption	88.06	9
2.1.6	FDI and technology transfer	89.19	4	4.2	Market Environment	66.85	11
2.2	Grow	58.34	26	4.2.1	Extent of market dominance	71.38	20
2.2.1	Tertiary enrolment	11.92	95	4.2.2	Labour productivity	100.00	1
2.2.2	Reading, maths, and science	58.23	34	4.2.3	Urbanisation	89.21	12
2.2.3	Use of virtual professional networks	61.73	12	4.2.4	Domestic credit to private sector	47.26	25
2.2.4	Formal and non-formal studies	65.10	19	4.2.5	Market capitalisation	26.39	24
2.2.5	Youth inclusion	94.74	9	4.3	R&D	39.26	36
2.3	Retain	83.16	17	4.3.1	R&D spending	24.32	30
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	54.65	25
2.3.2	Environmental performance	99.65	2	4.3.3	Gender parity in R&D	21.15	90
2.3.3	Physician density	37.25	43	4.3.4	Scientific journal articles	56.92	16
2.3.4	Sanitation	97.41	48	4.4	Innovation	49.19	10
2.3.5	Personal safety	81.47	21	4.4.1	Medium- and high-tech industry	24.45	71
2.4	Skills	65.05	13	4.4.2	High-tech exports	9.03	76
2.4.1	Workforce with tertiary education	59.26	10	4.4.3	Venture capital recipients, deals	15.33	34
2.4.2	High-skilled workforce	100.00	1	4.4.4	New product entrepreneurial activity	100.00	1
2.4.3	Researchers	61.20	16	4.4.5	New business density	72.84	6
2.4.4	Ease of finding skilled employees	50.46	71	4.4.6	Patent applications	73.48	8
2.4.5	Digital skills	54.32	11				

Madagascar

Key Indicators

Rank (out of 124)	121	GDP per capita (PPP US\$)	1,677.79
Income group	Low income	GDP (US\$ billions)	13.72
Regional group	Sub-Saharan Africa	FREI score	16.83
Population (millions)	27.69	FREI score (income group average)	17.76

FREI 2022 scores by pillar and sub-pillar (0–100)

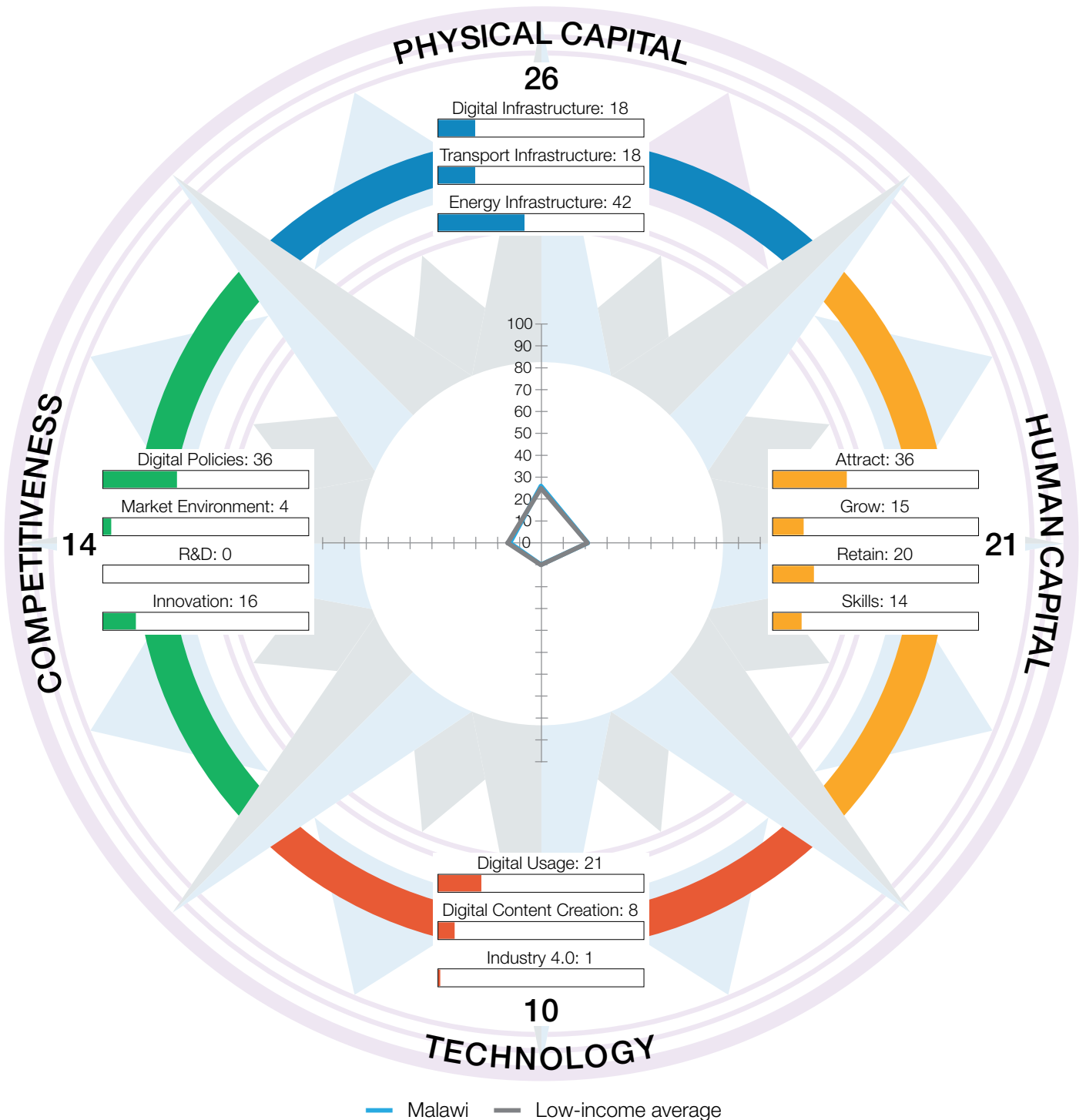


	Score	Rank		Score	Rank
1	18.83	122	3	7.75	121
1.1	12.69	123	3.1	9.13	122
1.1.1	11.83	106	3.1.1	0.00	123
1.1.2	11.50	120	3.1.2	5.30	120
1.1.3	27.83	96	3.1.3	n/a	n/a
1.1.4	25.00	117	3.1.4	19.71	94
1.1.5	0.00	120	3.1.5	1.24	116
1.1.6	10.85	122	3.1.6	11.68	119
1.1.7	1.84	107	3.1.7	16.90	120
1.2	5.42	124	3.2	13.50	110
1.2.1	21.35	113	3.2.1	0.14	114
1.2.2	0.00	124	3.2.2	16.14	114
1.2.3	0.11	118	3.2.3	—	—
1.2.4	—	—	3.2.4	37.67	105
1.3	38.37	109	3.3	0.60	120
1.3.1	17.69	121	3.3.1	n/a	n/a
1.3.2	—	—	3.3.2	0.77	112
1.3.3	53.02	75	3.3.3	0.07	117
1.3.4	44.41	113	3.3.4	n/a	n/a
1.3.5	—	—	3.3.5	—	—
2	24.96	108	4	15.77	112
2.1	44.03	69	4.1	22.38	113
2.1.1	45.20	68	4.1.1	53.12	106
2.1.2	5.04	75	4.1.2	21.61	113
2.1.3	70.21	25	4.1.3	11.69	110
2.1.4	35.38	101	4.1.4	19.53	112
2.1.5	74.57	64	4.1.5	5.97	115
2.1.6	33.80	90	4.2	13.98	114
2.2	34.31	72	4.2.1	26.93	99
2.2.1	3.19	115	4.2.2	0.00	115
2.2.2	n/a	n/a	4.2.3	24.85	103
2.2.3	0.77	121	4.2.4	4.14	110
2.2.4	n/a	n/a	4.2.5	n/a	n/a
2.2.5	98.96	2	4.3	21.31	78
2.3	10.50	120	4.3.1	0.00	105
2.3.1	2.65	117	4.3.2	0.00	84
2.3.2	2.44	121	4.3.3	85.10	20
2.3.3	1.82	106	4.3.4	0.15	116
2.3.4	3.44	123	4.4	5.39	111
2.3.5	42.15	82	4.4.1	4.11	114
2.4	11.00	118	4.4.2	0.58	118
2.4.1	5.28	109	4.4.3	n/a	n/a
2.4.2	0.49	121	4.4.4	21.86	79
2.4.3	0.26	89	4.4.5	0.37	109
2.4.4	37.95	94	4.4.6	0.00	96
2.4.5	n/a	n/a			

Key Indicators

Rank (out of 124)	120	GDP per capita (PPP US\$)	1,114.83
Income group	Low income	GDP (US\$ billions)	11.96
Regional group	Sub-Saharan Africa	FREI score	17.75
Population (millions)	19.13	FREI score (income group average)	17.76

FREI 2022 scores by pillar and sub-pillar (0–100)



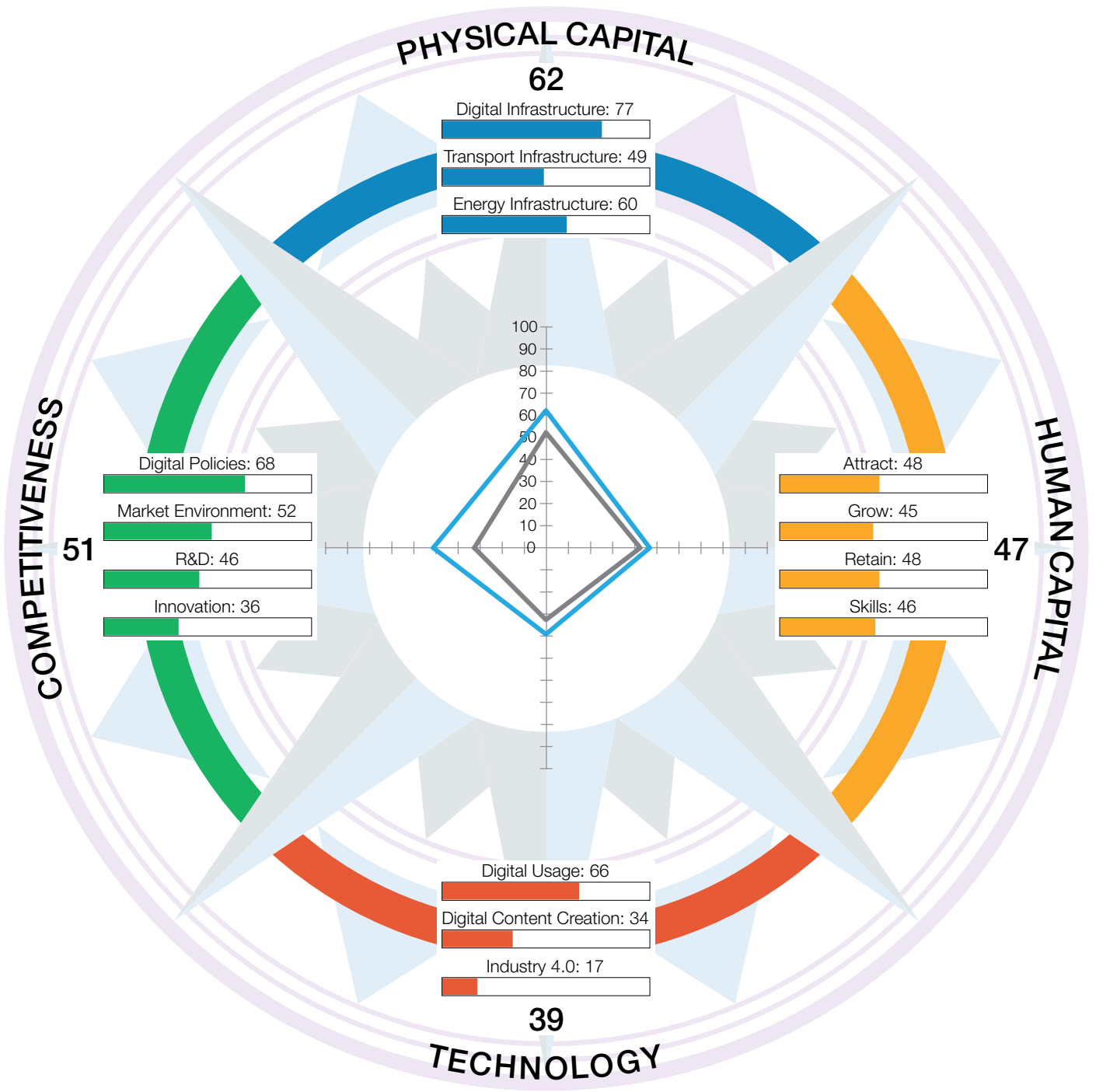
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	25.86	114	3	TECHNOLOGY	9.80	119
1.1	Digital Infrastructure	17.92	119	3.1	Digital Usage	20.77	113
1.1.1	Internet access	8.97	108	3.1.1	Internet users	9.52	117
1.1.2	International Internet bandwidth	21.07	114	3.1.2	Active mobile-broadband subscriptions	14.40	113
1.1.3	Fixed-broadband subscriptions	3.50	113	3.1.3	Gender parity in Internet usage	n/a	n/a
1.1.4	4G-mobile network coverage	84.50	84	3.1.4	Firms with website	38.32	75
1.1.5	Fixed broadband affordability	0.00	120	3.1.5	Internet shopping	2.93	109
1.1.6	Mobile broadband affordability	4.83	123	3.1.6	Government online services	28.47	110
1.1.7	Computer software spending	2.54	102	3.1.7	E-Participation	30.99	107
1.2	Transport Infrastructure	18.15	107	3.2	Digital Content Creation	7.99	122
1.2.1	Quality of infrastructure	22.06	112	3.2.1	GitHub commits	0.08	117
1.2.2	Rural access	50.54	84	3.2.2	Wikipedia edits	22.14	106
1.2.3	Air connectivity	0.00	124	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	9.69	123
1.3	Energy Infrastructure	41.51	101	3.3	Industry 4.0	0.64	118
1.3.1	Access to electricity	0.00	124	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	1.15	105
1.3.3	Electrical outages	53.02	75	3.3.3	AI research	0.27	107
1.3.4	Energy intensity	71.51	81	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	21.32	118	4	COMPETITIVENESS	14.04	116
2.1	Attract	36.22	100	4.1	Digital Policies	35.76	99
2.1.1	Brain gain	49.80	60	4.1.1	ICT regulation	79.81	63
2.1.2	International students	n/a	n/a	4.1.2	Cybersecurity	35.41	99
2.1.3	Tolerance of minorities	55.32	48	4.1.3	Rule of law	30.05	73
2.1.4	Tolerance of immigrants	26.15	115	4.1.4	Regulatory quality	20.12	110
2.1.5	Gender parity in high-skilled jobs	34.32	105	4.1.5	Corruption	13.43	102
2.1.6	FDI and technology transfer	15.50	115	4.2	Market Environment	3.68	123
2.2	Grow	15.41	120	4.2.1	Extent of market dominance	12.18	118
2.2.1	Tertiary enrolment	0.00	120	4.2.2	Labour productivity	0.25	112
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	0.61	123
2.2.3	Use of virtual professional networks	1.22	119	4.2.4	Domestic credit to private sector	1.68	119
2.2.4	Formal and non-formal studies	0.88	70	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	59.54	94	4.3	R&D	0.23	120
2.3	Retain	19.68	107	4.3.1	R&D spending	n/a	n/a
2.3.1	Pension coverage	0.31	121	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	23.00	89	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	0.00	124	4.3.4	Scientific journal articles	0.47	106
2.3.4	Sanitation	20.40	115	4.4	Innovation	16.46	71
2.3.5	Personal safety	54.67	62	4.4.1	Medium- and high-tech industry	13.82	92
2.4	Skills	13.96	113	4.4.2	High-tech exports	11.65	61
2.4.1	Workforce with tertiary education	2.09	117	4.4.3	Venture capital recipients, deals	17.72	31
2.4.2	High-skilled workforce	0.63	120	4.4.4	New product entrepreneurial activity	55.39	35
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	0.20	112
2.4.4	Ease of finding skilled employees	39.14	92	4.4.6	Patent applications	0.00	96
2.4.5	Digital skills	n/a	n/a				

Malaysia

Key Indicators

Rank (out of 124)	40	GDP per capita (PPP US\$)	29,564.01
Income group	Upper-middle income	GDP (US\$ billions)	336.66
Regional group	Asia and Pacific	FREI score	49.46
Population (millions)	32.37	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



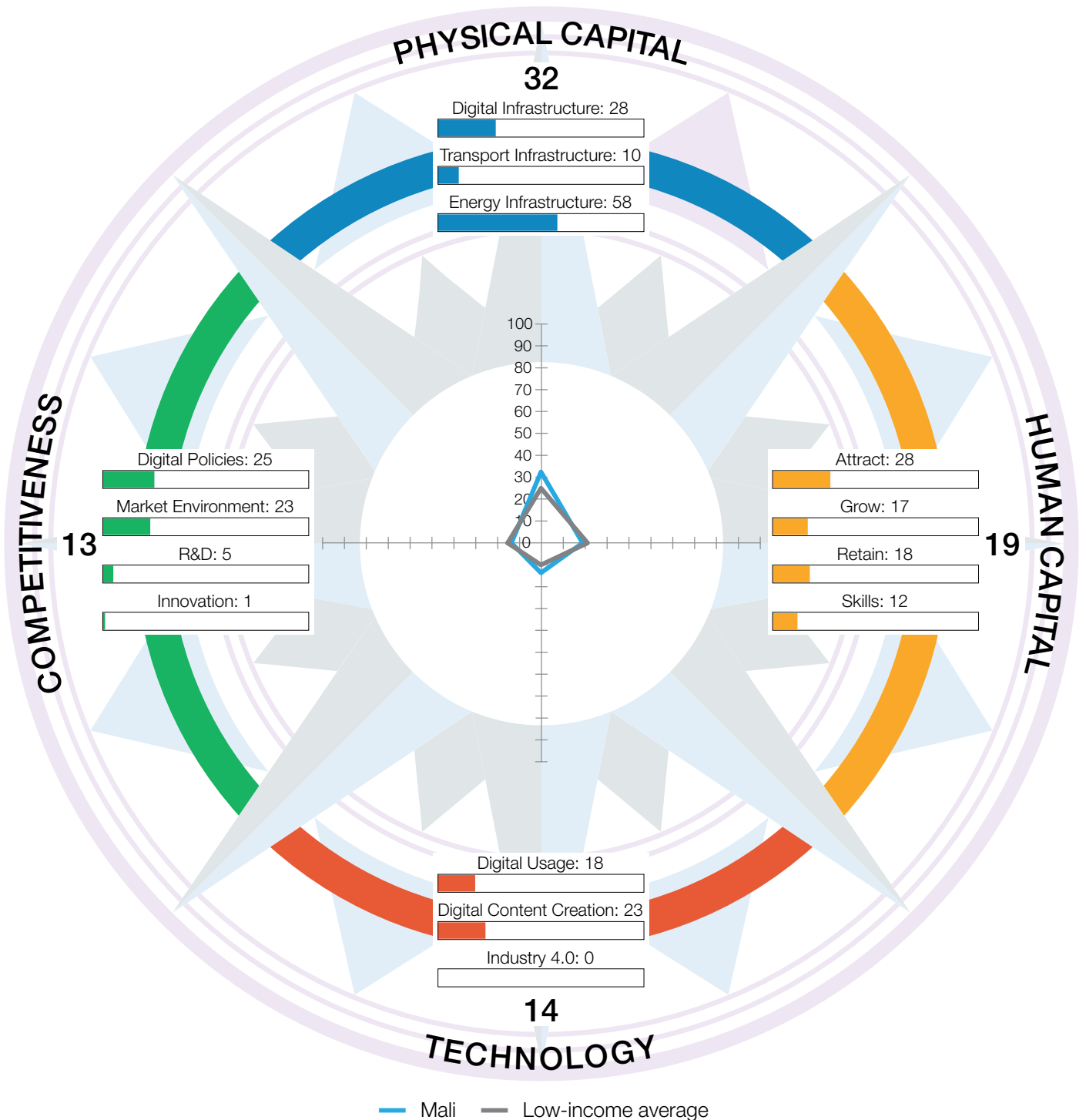
— Malaysia — Upper-middle-income average

	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	61.69	39	3	TECHNOLOGY	38.81	46
1.1	Digital Infrastructure	76.65	35	3.1	Digital Usage	66.28	46
1.1.1	Internet access	91.75	23	3.1.1	Internet users	89.04	26
1.1.2	International Internet bandwidth	60.74	15	3.1.2	Active mobile-broadband subscriptions	52.68	17
1.1.3	Fixed-broadband subscriptions	83.98	53	3.1.3	Gender parity in Internet usage	91.82	56
1.1.4	4G-mobile network coverage	93.50	73	3.1.4	Firms with website	22.12	91
1.1.5	Fixed broadband affordability	95.65	59	3.1.5	Internet shopping	43.46	34
1.1.6	Mobile broadband affordability	83.10	54	3.1.6	Government online services	81.75	24
1.1.7	Computer software spending	27.85	34	3.1.7	E-Participation	83.09	29
1.2	Transport Infrastructure	48.61	35	3.2	Digital Content Creation	33.59	58
1.2.1	Quality of infrastructure	56.58	38	3.2.1	GitHub commits	3.37	65
1.2.2	Rural access	62.97	68	3.2.2	Wikipedia edits	49.64	60
1.2.3	Air connectivity	28.15	28	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	76.77	44
1.3	Energy Infrastructure	59.81	49	3.3	Industry 4.0	16.57	35
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	15.32	26
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	14.24	45
1.3.3	Electrical outages	97.82	4	3.3.3	AI research	20.98	36
1.3.4	Energy intensity	72.89	75	3.3.4	ICT patent applications	4.52	29
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	46.70	51	4	COMPETITIVENESS	50.63	24
2.1	Attract	48.34	54	4.1	Digital Policies	67.94	39
2.1.1	Brain gain	68.33	20	4.1.1	ICT regulation	78.36	66
2.1.2	International students	17.90	36	4.1.2	Cybersecurity	98.02	8
2.1.3	Tolerance of minorities	47.87	57	4.1.3	Rule of law	57.65	37
2.1.4	Tolerance of immigrants	9.23	120	4.1.4	Regulatory quality	60.88	38
2.1.5	Gender parity in high-skilled jobs	65.41	74	4.1.5	Corruption	44.78	45
2.1.6	FDI and technology transfer	81.28	9	4.2	Market Environment	52.50	27
2.2	Grow	45.09	48	4.2.1	Extent of market dominance	65.76	25
2.2.1	Tertiary enrolment	28.60	72	4.2.2	Labour productivity	15.96	79
2.2.2	Reading, maths, and science	39.53	47	4.2.3	Urbanisation	71.33	41
2.2.3	Use of virtual professional networks	26.55	36	4.2.4	Domestic credit to private sector	60.75	15
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	48.69	11
2.2.5	Youth inclusion	85.70	35	4.3	R&D	45.97	25
2.3	Retain	47.79	78	4.3.1	R&D spending	20.86	35
2.3.1	Pension coverage	16.94	96	4.3.2	University ranking	41.59	40
2.3.2	Environmental performance	39.72	61	4.3.3	Gender parity in R&D	91.56	11
2.3.3	Physician density	18.80	77	4.3.4	Scientific journal articles	29.86	36
2.3.4	Sanitation	99.54	20	4.4	Innovation	36.13	25
2.3.5	Personal safety	63.96	40	4.4.1	Medium- and high-tech industry	54.55	23
2.4	Skills	45.60	35	4.4.2	High-tech exports	83.30	3
2.4.1	Workforce with tertiary education	28.36	61	4.4.3	Venture capital recipients, deals	6.48	57
2.4.2	High-skilled workforce	42.30	51	4.4.4	New product entrepreneurial activity	57.92	29
2.4.3	Researchers	26.97	35	4.4.5	New business density	9.88	49
2.4.4	Ease of finding skilled employees	78.33	21	4.4.6	Patent applications	4.62	43
2.4.5	Digital skills	52.02	14				

Key Indicators

Rank (out of 124)	116	GDP per capita (PPP US\$)	2,419.79
Income group	Low income	GDP (US\$ billions)	17.39
Regional group	Sub-Saharan Africa	FREI score	19.54
Population (millions)	20.25	FREI score (income group average)	17.76

FREI 2022 scores by pillar and sub-pillar (0–100)

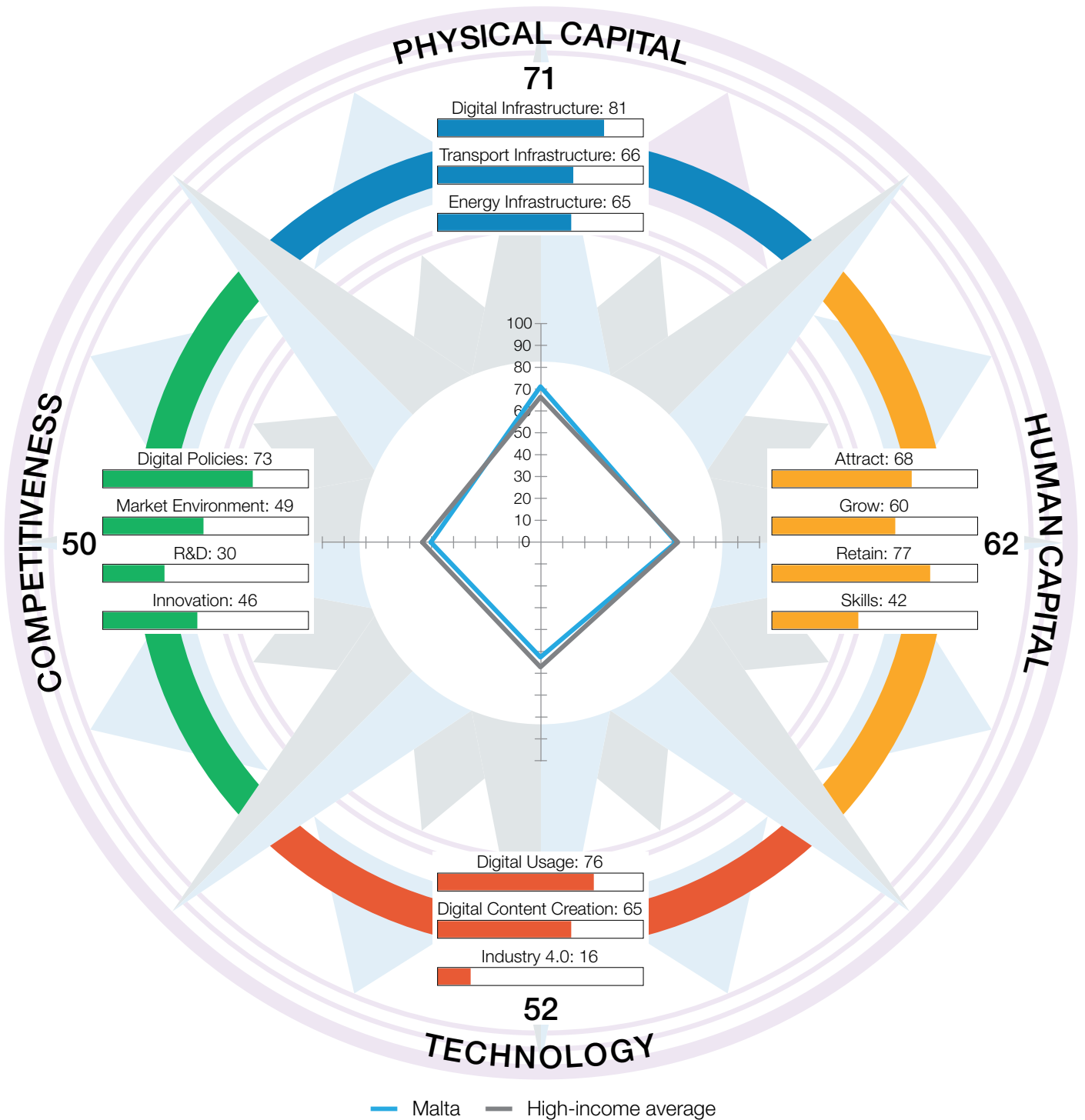


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	32.19	105	3	TECHNOLOGY	13.58	107
1.1	Digital Infrastructure	28.00	114	3.1	Digital Usage	18.00	116
1.1.1	Internet access	20.34	100	3.1.1	Internet users	11.42	115
1.1.2	International Internet bandwidth	17.99	117	3.1.2	Active mobile-broadband subscriptions	19.48	107
1.1.3	Fixed-broadband subscriptions	20.26	99	3.1.3	Gender parity in Internet usage	n/a	n/a
1.1.4	4G-mobile network coverage	45.00	107	3.1.4	Firms with website	35.06	80
1.1.5	Fixed broadband affordability	44.17	114	3.1.5	Internet shopping	3.32	104
1.1.6	Mobile broadband affordability	46.67	111	3.1.6	Government online services	18.98	117
1.1.7	Computer software spending	1.58	110	3.1.7	E-Participation	19.71	117
1.2	Transport Infrastructure	10.47	120	3.2	Digital Content Creation	22.63	91
1.2.1	Quality of infrastructure	26.33	99	3.2.1	GitHub commits	0.07	118
1.2.2	Rural access	14.35	119	3.2.2	Wikipedia edits	22.35	105
1.2.3	Air connectivity	0.19	117	3.2.3	Internet domain registrations	n/a	n/a
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	45.47	100
1.3	Energy Infrastructure	58.10	58	3.3	Industry 4.0	0.12	123
1.3.1	Access to electricity	41.47	111	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	0.09	118
1.3.3	Electrical outages	62.09	69	3.3.3	AI research	0.14	111
1.3.4	Energy intensity	70.74	82	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	18.98	122	4	COMPETITIVENESS	13.41	117
2.1	Attract	28.30	120	4.1	Digital Policies	24.99	111
2.1.1	Brain gain	48.39	62	4.1.1	ICT regulation	69.71	79
2.1.2	International students	2.21	85	4.1.2	Cybersecurity	8.12	123
2.1.3	Tolerance of minorities	19.15	101	4.1.3	Rule of law	10.48	112
2.1.4	Tolerance of immigrants	66.15	48	4.1.4	Regulatory quality	23.22	99
2.1.5	Gender parity in high-skilled jobs	9.30	117	4.1.5	Corruption	13.43	102
2.1.6	FDI and technology transfer	24.62	103	4.2	Market Environment	22.59	100
2.2	Grow	17.38	115	4.2.1	Extent of market dominance	47.88	56
2.2.1	Tertiary enrolment	3.17	116	4.2.2	Labour productivity	2.31	104
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	31.03	100
2.2.3	Use of virtual professional networks	1.55	117	4.2.4	Domestic credit to private sector	9.14	99
2.2.4	Formal and non-formal studies	0.87	71	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	63.93	80	4.3	R&D	4.97	112
2.3	Retain	18.45	108	4.3.1	R&D spending	5.66	74
2.3.1	Pension coverage	5.41	111	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	7.49	117	4.3.3	Gender parity in R&D	14.08	94
2.3.3	Physician density	1.16	110	4.3.4	Scientific journal articles	0.15	117
2.3.4	Sanitation	34.55	106	4.4	Innovation	1.07	122
2.3.5	Personal safety	43.63	78	4.4.1	Medium- and high-tech industry	n/a	n/a
2.4	Skills	11.78	115	4.4.2	High-tech exports	2.00	105
2.4.1	Workforce with tertiary education	2.59	116	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	1.59	118	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	0.25	90	4.4.5	New business density	1.23	102
2.4.4	Ease of finding skilled employees	42.71	87	4.4.6	Patent applications	0.00	96
2.4.5	Digital skills	n/a	n/a				

Key Indicators

Rank (out of 124)	24	GDP per capita (PPP US\$)	46,071.22
Income group	High income	GDP (US\$ billions)	14.65
Regional group	Europe	FREI score	58.56
Population (millions)	0.53	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



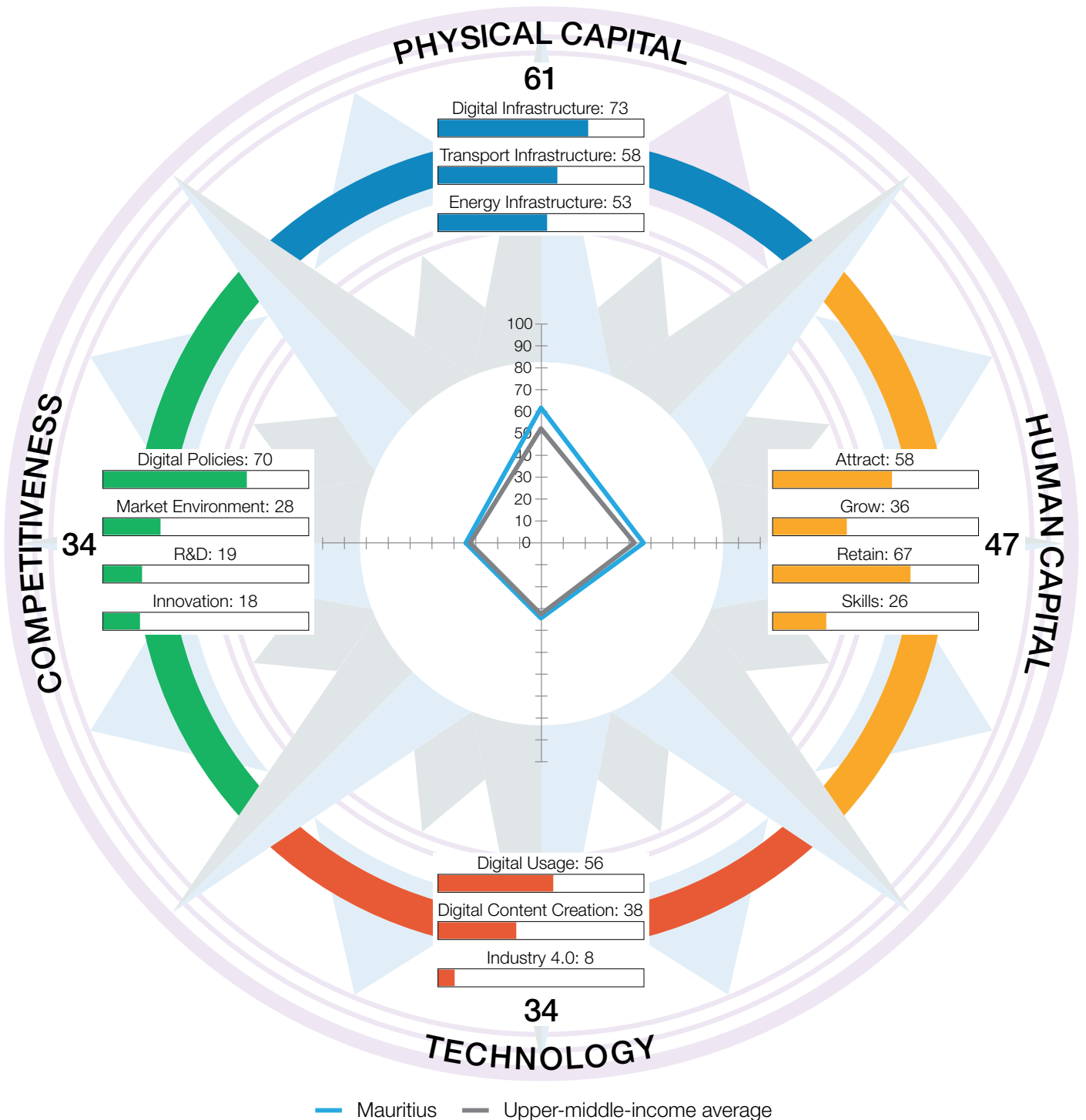
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	70.67	12	3	TECHNOLOGY	52.22	26
1.1	Digital Infrastructure	80.98	17	3.1	Digital Usage	75.55	27
1.1.1	Internet access	90.38	31	3.1.1	Internet users	86.21	32
1.1.2	International Internet bandwidth	63.75	10	3.1.2	Active mobile-broadband subscriptions	41.77	44
1.1.3	Fixed-broadband subscriptions	99.83	4	3.1.3	Gender parity in Internet usage	99.45	6
1.1.4	4G-mobile network coverage	100.00	1	3.1.4	Firms with website	84.74	13
1.1.5	Fixed broadband affordability	98.54	28	3.1.5	Internet shopping	59.74	25
1.1.6	Mobile broadband affordability	86.11	42	3.1.6	Government online services	76.65	40
1.1.7	Computer software spending	28.27	32	3.1.7	E-Participation	80.28	38
1.2	Transport Infrastructure	66.16	7	3.2	Digital Content Creation	64.94	18
1.2.1	Quality of infrastructure	47.69	52	3.2.1	GitHub commits	45.78	20
1.2.2	Rural access	97.55	11	3.2.2	Wikipedia edits	80.13	16
1.2.3	Air connectivity	100.00	1	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	92.67	16
1.3	Energy Infrastructure	64.88	21	3.3	Industry 4.0	16.19	36
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	11.58	33
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	n/a	n/a
1.3.3	Electrical outages	95.83	13	3.3.3	AI research	n/a	n/a
1.3.4	Energy intensity	100.00	1	3.3.4	ICT patent applications	26.91	20
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	61.60	24	4	COMPETITIVENESS	49.74	27
2.1	Attract	68.07	18	4.1	Digital Policies	72.74	27
2.1.1	Brain gain	78.74	12	4.1.1	ICT regulation	94.23	10
2.1.2	International students	33.17	16	4.1.2	Cybersecurity	83.28	57
2.1.3	Tolerance of minorities	76.60	17	4.1.3	Rule of law	65.33	33
2.1.4	Tolerance of immigrants	75.38	33	4.1.4	Regulatory quality	73.08	23
2.1.5	Gender parity in high-skilled jobs	62.30	78	4.1.5	Corruption	47.76	41
2.1.6	FDI and technology transfer	82.24	7	4.2	Market Environment	49.43	32
2.2	Grow	59.90	24	4.2.1	Extent of market dominance	49.73	52
2.2.1	Tertiary enrolment	43.36	45	4.2.2	Labour productivity	54.26	27
2.2.2	Reading, maths, and science	50.93	41	4.2.3	Urbanisation	93.55	6
2.2.3	Use of virtual professional networks	65.49	6	4.2.4	Domestic credit to private sector	36.63	37
2.2.4	Formal and non-formal studies	49.07	32	4.2.5	Market capitalisation	12.97	43
2.2.5	Youth inclusion	90.65	22	4.3	R&D	30.42	58
2.3	Retain	76.51	28	4.3.1	R&D spending	11.36	56
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	33.14	57
2.3.2	Environmental performance	79.44	23	4.3.3	Gender parity in R&D	42.54	65
2.3.3	Physician density	35.40	50	4.3.4	Scientific journal articles	34.66	33
2.3.4	Sanitation	99.95	14	4.4	Innovation	46.37	14
2.3.5	Personal safety	67.78	37	4.4.1	Medium- and high-tech industry	44.18	39
2.4	Skills	41.93	42	4.4.2	High-tech exports	47.84	7
2.4.1	Workforce with tertiary education	40.65	37	4.4.3	Venture capital recipients, deals	34.07	16
2.4.2	High-skilled workforce	72.83	18	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	24.01	37	4.4.5	New business density	74.07	5
2.4.4	Ease of finding skilled employees	34.64	100	4.4.6	Patent applications	31.71	20
2.4.5	Digital skills	37.51	30				

Mauritius

Key Indicators

Rank (out of 124)	49	GDP per capita (PPP US\$)	23,841.01
Income group	Upper-middle income	GDP (US\$ billions)	10.91
Regional group	Sub-Saharan Africa	FREI score	44.01
Population (millions)	1.27	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



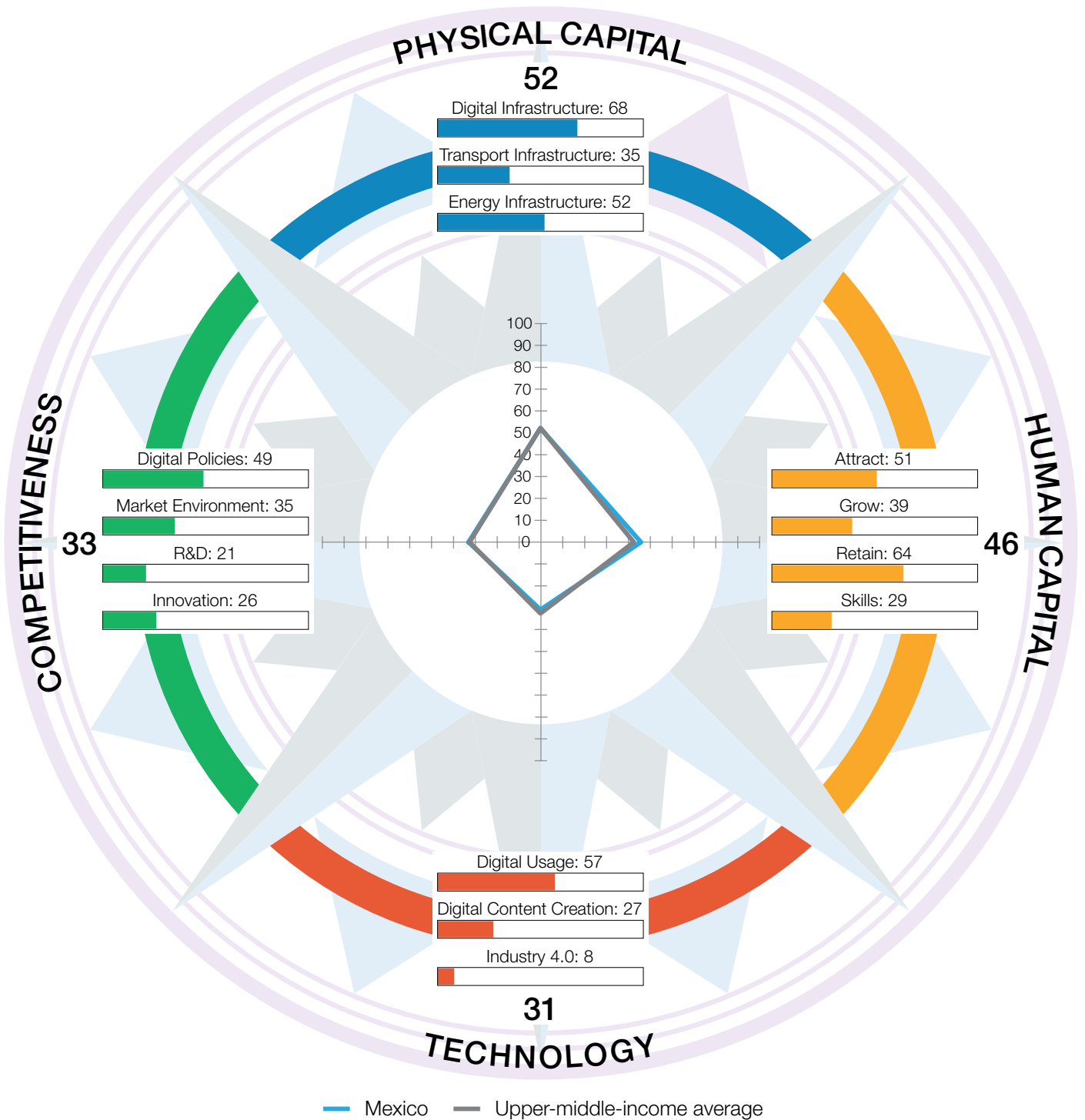
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	61.26	43	3	TECHNOLOGY	34.13	59
1.1	Digital Infrastructure	72.61	53	3.1	Digital Usage	56.37	66
1.1.1	Internet access	72.32	69	3.1.1	Internet users	63.15	82
1.1.2	International Internet bandwidth	55.66	24	3.1.2	Active mobile-broadband subscriptions	42.67	40
1.1.3	Fixed-broadband subscriptions	82.48	56	3.1.3	Gender parity in Internet usage	93.43	52
1.1.4	4G-mobile network coverage	99.00	39	3.1.4	Firms with website	n/a	n/a
1.1.5	Fixed broadband affordability	97.64	39	3.1.5	Internet shopping	18.46	61
1.1.6	Mobile broadband affordability	87.73	34	3.1.6	Government online services	62.77	68
1.1.7	Computer software spending	13.44	74	3.1.7	E-Participation	57.75	79
1.2	Transport Infrastructure	58.01	19	3.2	Digital Content Creation	38.31	48
1.2.1	Quality of infrastructure	44.13	59	3.2.1	GitHub commits	12.82	44
1.2.2	Rural access	95.62	17	3.2.2	Wikipedia edits	60.97	48
1.2.3	Air connectivity	30.52	25	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	72.60	57
1.3	Energy Infrastructure	53.16	86	3.3	Industry 4.0	7.70	60
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	13.01	51
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	6.88	57
1.3.4	Energy intensity	93.03	8	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	46.59	52	4	COMPETITIVENESS	34.05	62
2.1	Attract	57.58	32	4.1	Digital Policies	70.21	32
2.1.1	Brain gain	62.68	27	4.1.1	ICT regulation	70.43	78
2.1.2	International students	17.86	37	4.1.2	Cybersecurity	96.82	23
2.1.3	Tolerance of minorities	58.51	43	4.1.3	Rule of law	65.52	31
2.1.4	Tolerance of immigrants	84.62	15	4.1.4	Regulatory quality	70.54	26
2.1.5	Gender parity in high-skilled jobs	76.46	57	4.1.5	Corruption	47.76	41
2.1.6	FDI and technology transfer	45.35	68	4.2	Market Environment	28.28	87
2.2	Grow	35.72	61	4.2.1	Extent of market dominance	21.43	110
2.2.1	Tertiary enrolment	29.41	70	4.2.2	Labour productivity	27.13	60
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	29.16	102
2.2.3	Use of virtual professional networks	34.29	27	4.2.4	Domestic credit to private sector	42.52	30
2.2.4	Formal and non-formal studies	2.05	66	4.2.5	Market capitalisation	21.15	35
2.2.5	Youth inclusion	77.13	57	4.3	R&D	19.36	90
2.3	Retain	67.06	43	4.3.1	R&D spending	6.78	71
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	34.84	71	4.3.3	Gender parity in R&D	66.68	39
2.3.3	Physician density	31.31	55	4.3.4	Scientific journal articles	3.96	79
2.3.4	Sanitation	95.15	57	4.4	Innovation	18.34	65
2.3.5	Personal safety	74.01	25	4.4.1	Medium- and high-tech industry	5.47	112
2.4	Skills	25.99	81	4.4.2	High-tech exports	3.44	96
2.4.1	Workforce with tertiary education	23.94	70	4.4.3	Venture capital recipients, deals	25.30	20
2.4.2	High-skilled workforce	35.30	62	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	5.72	66	4.4.5	New business density	39.13	16
2.4.4	Ease of finding skilled employees	47.56	80	4.4.6	Patent applications	n/a	n/a
2.4.5	Digital skills	17.42	54				

Mexico

Key Indicators

Rank (out of 124)	62	GDP per capita (PPP US\$)	20,447.89
Income group	Upper-middle income	GDP (US\$ billions)	1,076.16
Regional group	Latin America and the Caribbean	FREI score	40.18
Population (millions)	128.93	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



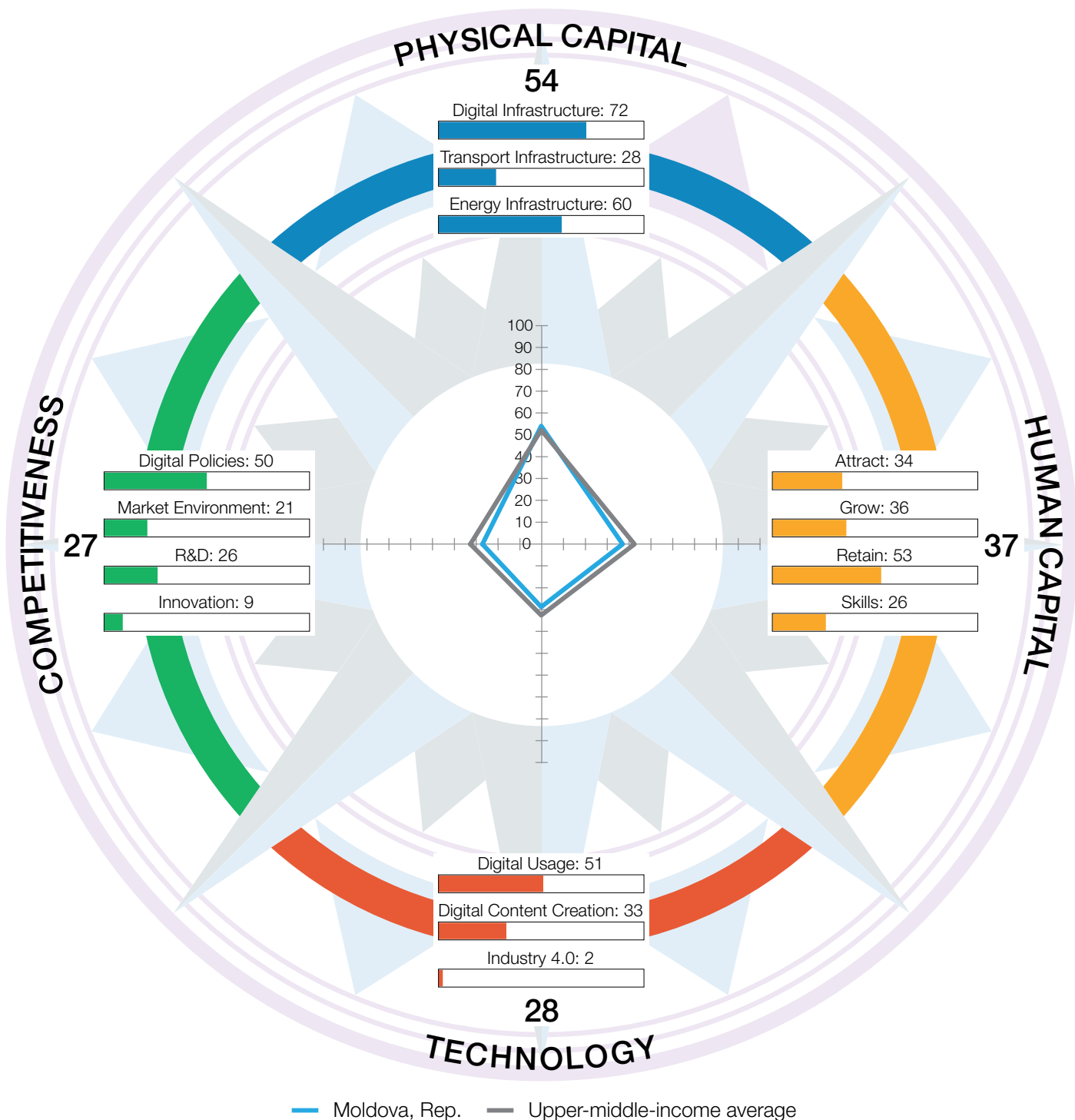
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	51.76	70	3	TECHNOLOGY	30.65	68
1.1	Digital Infrastructure	67.98	66	3.1	Digital Usage	57.09	65
1.1.1	Internet access	60.01	79	3.1.1	Internet users	70.58	70
1.1.2	International Internet bandwidth	37.96	87	3.1.2	Active mobile-broadband subscriptions	33.27	75
1.1.3	Fixed-broadband subscriptions	93.41	38	3.1.3	Gender parity in Internet usage	95.71	39
1.1.4	4G-mobile network coverage	93.47	74	3.1.4	Firms with website	34.15	82
1.1.5	Fixed broadband affordability	95.45	62	3.1.5	Internet shopping	8.94	74
1.1.6	Mobile broadband affordability	76.78	72	3.1.6	Government online services	78.10	38
1.1.7	Computer software spending	18.79	63	3.1.7	E-Participation	78.87	41
1.2	Transport Infrastructure	35.28	56	3.2	Digital Content Creation	26.74	76
1.2.1	Quality of infrastructure	45.91	56	3.2.1	GitHub commits	2.99	68
1.2.2	Rural access	74.57	52	3.2.2	Wikipedia edits	38.20	78
1.2.3	Air connectivity	8.65	58	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	62.87	74
1.3	Energy Infrastructure	52.02	90	3.3	Industry 4.0	8.13	56
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	12.04	32
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	7.27	72
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	3.88	68
1.3.4	Energy intensity	85.89	31	3.3.4	ICT patent applications	0.27	58
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	45.68	55	4	COMPETITIVENESS	32.63	66
2.1	Attract	50.99	43	4.1	Digital Policies	48.92	69
2.1.1	Brain gain	38.97	81	4.1.1	ICT regulation	88.46	29
2.1.2	International students	1.82	89	4.1.2	Cybersecurity	81.27	60
2.1.3	Tolerance of minorities	38.30	75	4.1.3	Rule of law	18.03	100
2.1.4	Tolerance of immigrants	58.46	64	4.1.4	Regulatory quality	41.91	67
2.1.5	Gender parity in high-skilled jobs	99.81	3	4.1.5	Corruption	14.93	97
2.1.6	FDI and technology transfer	68.58	25	4.2	Market Environment	34.68	64
2.2	Grow	39.10	58	4.2.1	Extent of market dominance	39.84	79
2.2.1	Tertiary enrolment	28.44	73	4.2.2	Labour productivity	28.29	58
2.2.2	Reading, maths, and science	33.50	54	4.2.3	Urbanisation	76.26	35
2.2.3	Use of virtual professional networks	18.92	54	4.2.4	Domestic credit to private sector	15.14	80
2.2.4	Formal and non-formal studies	41.09	35	4.2.5	Market capitalisation	13.89	42
2.2.5	Youth inclusion	73.57	64	4.3	R&D	20.87	82
2.3	Retain	63.84	46	4.3.1	R&D spending	6.09	73
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	33.22	55
2.3.2	Environmental performance	47.91	48	4.3.3	Gender parity in R&D	39.06	71
2.3.3	Physician density	60.34	15	4.3.4	Scientific journal articles	5.12	71
2.3.4	Sanitation	90.49	67	4.4	Innovation	26.06	40
2.3.5	Personal safety	20.47	111	4.4.1	Medium- and high-tech industry	52.74	25
2.4	Skills	28.78	77	4.4.2	High-tech exports	32.81	22
2.4.1	Workforce with tertiary education	22.89	72	4.4.3	Venture capital recipients, deals	2.07	78
2.4.2	High-skilled workforce	28.59	76	4.4.4	New product entrepreneurial activity	63.31	19
2.4.3	Researchers	3.76	72	4.4.5	New business density	4.09	78
2.4.4	Ease of finding skilled employees	46.24	82	4.4.6	Patent applications	1.32	67
2.4.5	Digital skills	42.41	22				

Moldova, Rep.

Key Indicators

Rank (out of 124)	74	GDP per capita (PPP US\$)	13,572.70
Income group	Upper-middle income	GDP (US\$ billions)	11.91
Regional group	Europe	FREI score	36.46
Population (millions)	2.62	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



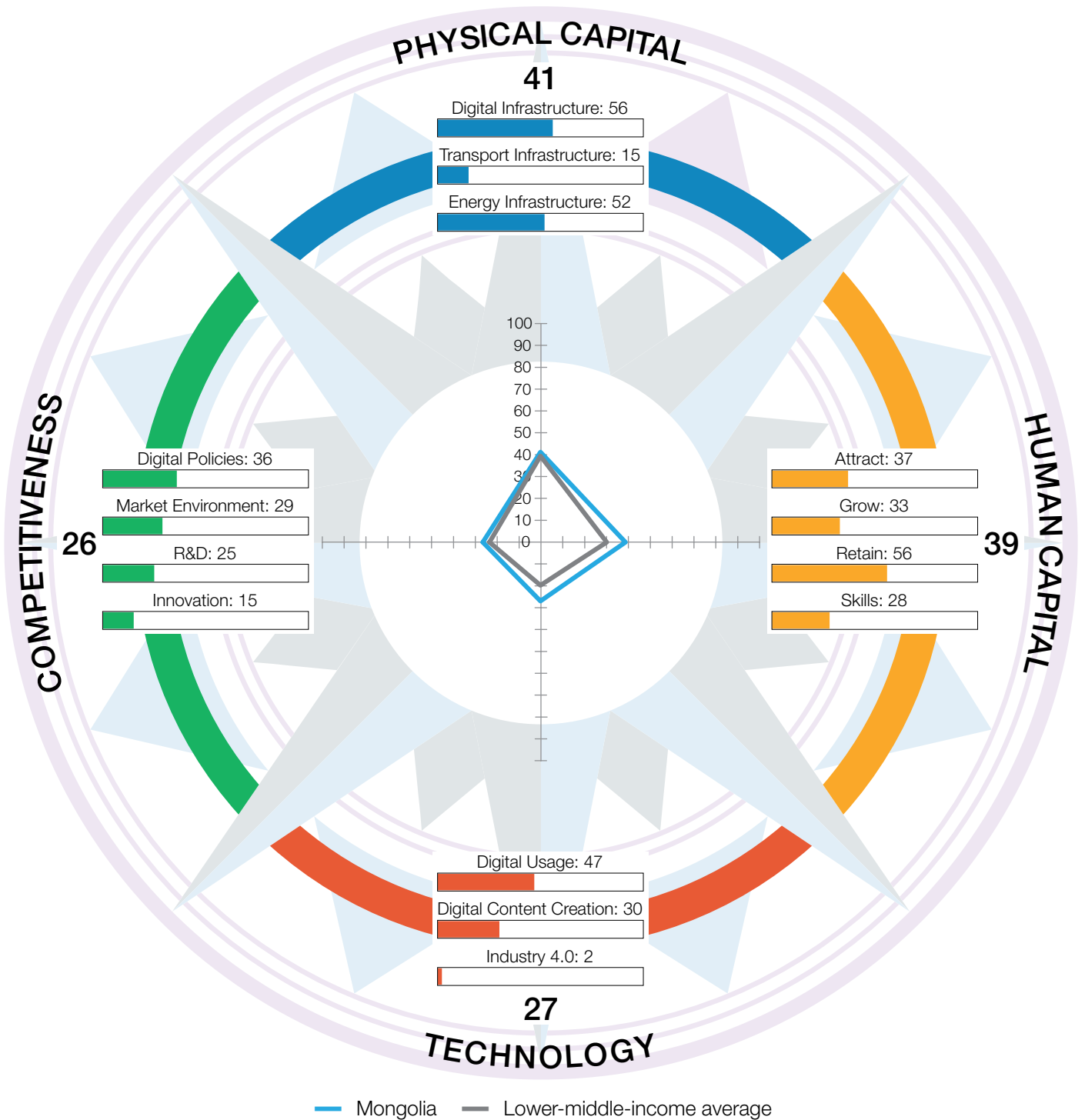
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	53.63	58	3	TECHNOLOGY	28.48	76
1.1	Digital Infrastructure	72.45	54	3.1	Digital Usage	51.12	76
1.1.1	Internet access	64.14	75	3.1.1	Internet users	74.94	62
1.1.2	International Internet bandwidth	50.82	38	3.1.2	Active mobile-broadband subscriptions	24.89	95
1.1.3	Fixed-broadband subscriptions	97.39	20	3.1.3	Gender parity in Internet usage	n/a	n/a
1.1.4	4G-mobile network coverage	99.00	39	3.1.4	Firms with website	42.19	70
1.1.5	Fixed broadband affordability	95.50	60	3.1.5	Internet shopping	23.53	53
1.1.6	Mobile broadband affordability	91.94	23	3.1.6	Government online services	69.34	51
1.1.7	Computer software spending	8.37	85	3.1.7	E-Participation	71.83	54
1.2	Transport Infrastructure	28.43	79	3.2	Digital Content Creation	32.76	60
1.2.1	Quality of infrastructure	16.37	119	3.2.1	GitHub commits	8.85	48
1.2.2	Rural access	90.04	31	3.2.2	Wikipedia edits	44.52	70
1.2.3	Air connectivity	5.23	73	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	74.57	50
1.3	Energy Infrastructure	60.01	47	3.3	Industry 4.0	1.54	108
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	0.10	65
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	1.62	102
1.3.3	Electrical outages	89.24	36	3.3.3	AI research	1.09	92
1.3.4	Energy intensity	67.90	86	3.3.4	ICT patent applications	0.00	74
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	37.07	80	4	COMPETITIVENESS	26.68	82
2.1	Attract	33.53	110	4.1	Digital Policies	49.97	67
2.1.1	Brain gain	15.88	113	4.1.1	ICT regulation	88.46	29
2.1.2	International students	17.65	39	4.1.2	Cybersecurity	75.24	71
2.1.3	Tolerance of minorities	37.23	76	4.1.3	Rule of law	25.76	84
2.1.4	Tolerance of immigrants	41.54	91	4.1.4	Regulatory quality	40.97	68
2.1.5	Gender parity in high-skilled jobs	54.46	90	4.1.5	Corruption	19.40	90
2.1.6	FDI and technology transfer	34.41	88	4.2	Market Environment	21.31	102
2.2	Grow	36.27	60	4.2.1	Extent of market dominance	28.84	96
2.2.1	Tertiary enrolment	38.69	54	4.2.2	Labour productivity	15.09	80
2.2.2	Reading, maths, and science	36.85	50	4.2.3	Urbanisation	31.35	99
2.2.3	Use of virtual professional networks	7.96	86	4.2.4	Domestic credit to private sector	9.95	96
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	61.59	88	4.3	R&D	26.03	67
2.3	Retain	52.59	69	4.3.1	R&D spending	4.85	78
2.3.1	Pension coverage	74.69	60	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	33.62	74	4.3.3	Gender parity in R&D	96.22	7
2.3.3	Physician density	31.63	54	4.3.4	Scientific journal articles	3.06	80
2.3.4	Sanitation	74.44	89	4.4	Innovation	9.40	99
2.3.5	Personal safety	48.57	70	4.4.1	Medium- and high-tech industry	21.93	79
2.4	Skills	25.91	83	4.4.2	High-tech exports	4.76	91
2.4.1	Workforce with tertiary education	33.75	48	4.4.3	Venture capital recipients, deals	10.23	41
2.4.2	High-skilled workforce	47.17	45	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	8.48	56	4.4.5	New business density	7.74	55
2.4.4	Ease of finding skilled employees	14.23	119	4.4.6	Patent applications	2.34	58
2.4.5	Digital skills	n/a	n/a				

Mongolia

Key Indicators

Rank (out of 124)	87	GDP per capita (PPP US\$)	12,837.67
Income group	Lower-middle income	GDP (US\$ billions)	13.14
Regional group	Asia and Pacific	FREI score	33.11
Population (millions)	3.28	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



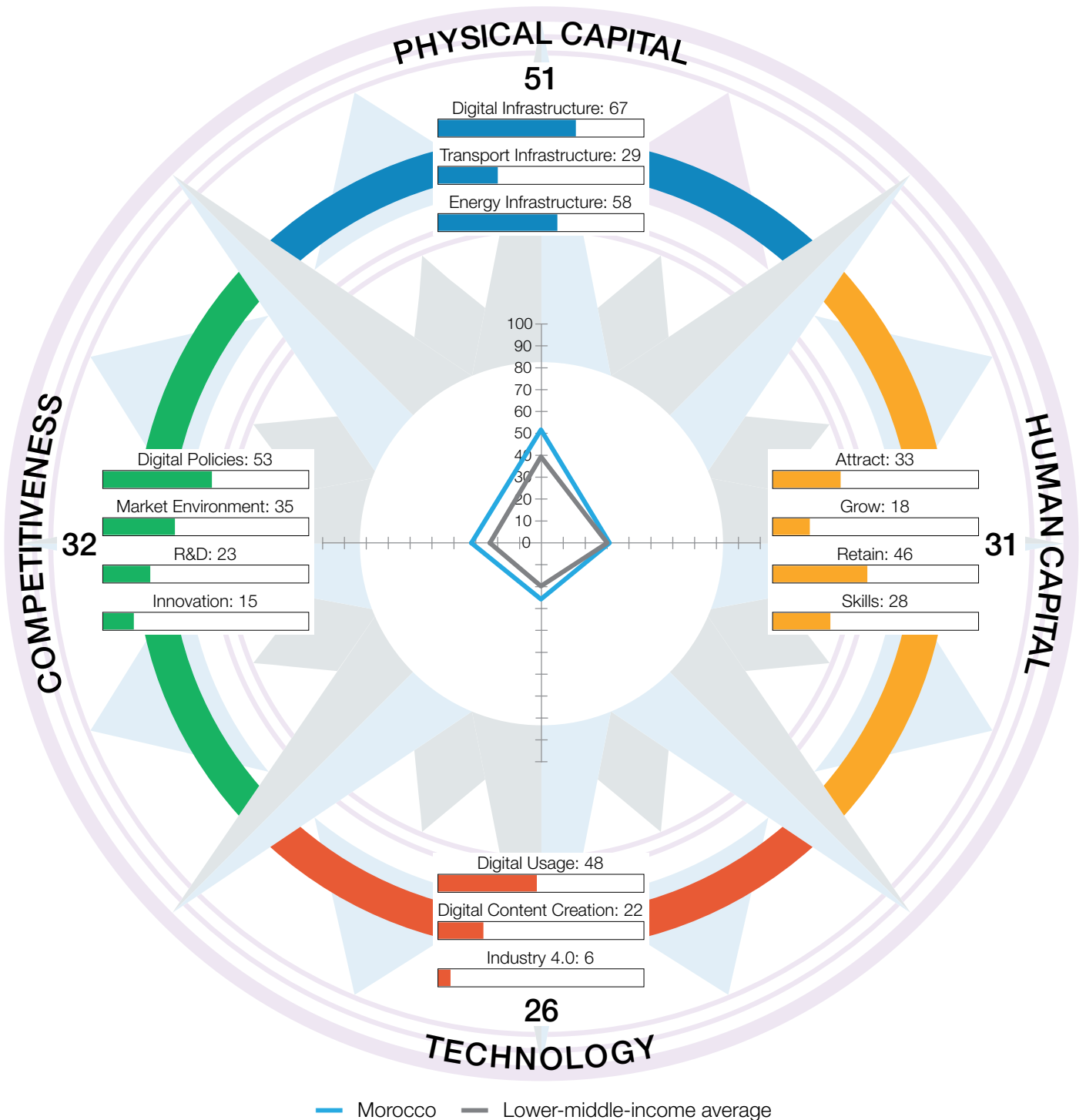
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	40.94	95	3	TECHNOLOGY	26.74	79
1.1	Digital Infrastructure	55.88	85	3.1	Digital Usage	47.49	81
1.1.1	Internet access	45.91	85	3.1.1	Internet users	60.64	84
1.1.2	International Internet bandwidth	40.14	81	3.1.2	Active mobile-broadband subscriptions	47.78	28
1.1.3	Fixed-broadband subscriptions	54.98	78	3.1.3	Gender parity in Internet usage	90.03	64
1.1.4	4G-mobile network coverage	73.00	98	3.1.4	Firms with website	29.38	86
1.1.5	Fixed broadband affordability	96.40	56	3.1.5	Internet shopping	9.46	72
1.1.6	Mobile broadband affordability	68.43	87	3.1.6	Government online services	41.61	95
1.1.7	Computer software spending	12.27	78	3.1.7	E-Participation	53.51	84
1.2	Transport Infrastructure	15.19	113	3.2	Digital Content Creation	30.32	66
1.2.1	Quality of infrastructure	19.22	117	3.2.1	GitHub commits	1.74	83
1.2.2	Rural access	28.68	108	3.2.2	Wikipedia edits	47.27	65
1.2.3	Air connectivity	5.45	71	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	70.96	63
1.3	Energy Infrastructure	51.74	92	3.3	Industry 4.0	2.42	100
1.3.1	Access to electricity	99.01	87	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	4.41	88
1.3.3	Electrical outages	90.72	30	3.3.3	AI research	0.87	94
1.3.4	Energy intensity	56.88	102	3.3.4	ICT patent applications	0.00	74
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	38.59	75	4	COMPETITIVENESS	26.18	83
2.1	Attract	37.39	95	4.1	Digital Policies	36.08	97
2.1.1	Brain gain	27.74	99	4.1.1	ICT regulation	67.55	84
2.1.2	International students	3.78	79	4.1.2	Cybersecurity	24.54	111
2.1.3	Tolerance of minorities	77.66	14	4.1.3	Rule of law	30.15	71
2.1.4	Tolerance of immigrants	30.77	111	4.1.4	Regulatory quality	37.29	75
2.1.5	Gender parity in high-skilled jobs	55.08	89	4.1.5	Corruption	20.90	86
2.1.6	FDI and technology transfer	29.29	97	4.2	Market Environment	28.99	86
2.2	Grow	32.94	74	4.2.1	Extent of market dominance	5.88	119
2.2.1	Tertiary enrolment	45.99	36	4.2.2	Labour productivity	n/a	n/a
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	62.24	57
2.2.3	Use of virtual professional networks	10.51	74	4.2.4	Domestic credit to private sector	18.84	72
2.2.4	Formal and non-formal studies	0.63	75	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	74.62	62	4.3	R&D	24.80	70
2.3	Retain	55.74	61	4.3.1	R&D spending	1.81	95
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	12.37	108	4.3.3	Gender parity in R&D	95.67	9
2.3.3	Physician density	47.84	30	4.3.4	Scientific journal articles	1.73	88
2.3.4	Sanitation	55.20	102	4.4	Innovation	14.83	76
2.3.5	Personal safety	63.28	42	4.4.1	Medium- and high-tech industry	5.54	111
2.4	Skills	28.32	78	4.4.2	High-tech exports	30.43	25
2.4.1	Workforce with tertiary education	48.51	24	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	41.24	54	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	23.36	27
2.4.4	Ease of finding skilled employees	0.00	121	4.4.6	Patent applications	0.00	96
2.4.5	Digital skills	23.51	48				

Morocco

Key Indicators

Rank (out of 124)	84	GDP per capita (PPP US\$)	7,296.16
Income group	Lower-middle income	GDP (US\$ billions)	112.87
Regional group	Middle East and North Africa	FREI score	34.88
Population (millions)	36.91	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



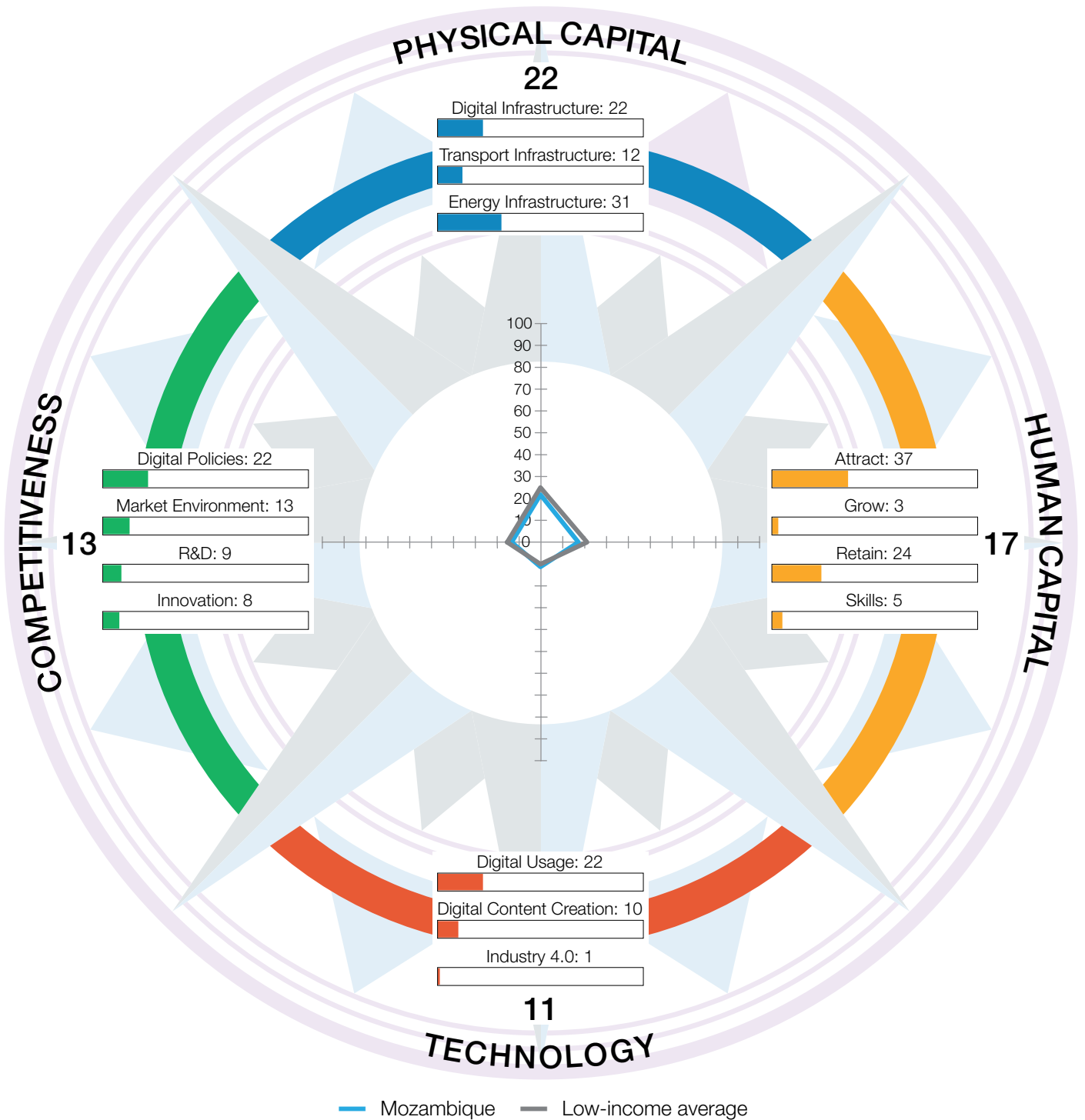
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	51.36	71	3	TECHNOLOGY	25.52	81
1.1	Digital Infrastructure	67.07	70	3.1	Digital Usage	48.07	80
1.1.1	Internet access	84.43	45	3.1.1	Internet users	83.33	42
1.1.2	International Internet bandwidth	46.72	54	3.1.2	Active mobile-broadband subscriptions	32.33	77
1.1.3	Fixed-broadband subscriptions	41.55	87	3.1.3	Gender parity in Internet usage	84.66	73
1.1.4	4G-mobile network coverage	98.75	48	3.1.4	Firms with website	51.02	60
1.1.5	Fixed broadband affordability	91.42	81	3.1.5	Internet shopping	2.04	111
1.1.6	Mobile broadband affordability	85.33	46	3.1.6	Government online services	40.87	96
1.1.7	Computer software spending	21.27	55	3.1.7	E-Participation	42.25	96
1.2	Transport Infrastructure	28.78	77	3.2	Digital Content Creation	22.01	92
1.2.1	Quality of infrastructure	30.96	88	3.2.1	GitHub commits	0.78	98
1.2.2	Rural access	64.92	66	3.2.2	Wikipedia edits	29.24	92
1.2.3	Air connectivity	4.48	77	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	56.97	85
1.3	Energy Infrastructure	58.23	57	3.3	Industry 4.0	6.48	66
1.3.1	Access to electricity	99.55	83	3.3.1	Robot density	1.40	49
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	7.77	65
1.3.3	Electrical outages	94.00	26	3.3.3	AI research	2.93	71
1.3.4	Energy intensity	84.42	36	3.3.4	ICT patent applications	0.13	62
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	31.09	93	4	COMPETITIVENESS	31.54	69
2.1	Attract	32.98	111	4.1	Digital Policies	53.44	61
2.1.1	Brain gain	48.32	63	4.1.1	ICT regulation	84.86	38
2.1.2	International students	5.44	72	4.1.2	Cybersecurity	82.01	58
2.1.3	Tolerance of minorities	14.89	107	4.1.3	Rule of law	35.38	63
2.1.4	Tolerance of immigrants	38.46	96	4.1.4	Regulatory quality	36.61	76
2.1.5	Gender parity in high-skilled jobs	n/a	n/a	4.1.5	Corruption	28.36	65
2.1.6	FDI and technology transfer	57.80	47	4.2	Market Environment	35.24	63
2.2	Grow	17.64	113	4.2.1	Extent of market dominance	45.94	60
2.2.1	Tertiary enrolment	26.95	74	4.2.2	Labour productivity	14.84	81
2.2.2	Reading, maths, and science	13.80	72	4.2.3	Urbanisation	55.07	68
2.2.3	Use of virtual professional networks	12.17	72	4.2.4	Domestic credit to private sector	38.59	34
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	21.77	34
2.2.5	Youth inclusion	n/a	n/a	4.3	R&D	22.61	74
2.3	Retain	45.83	79	4.3.1	R&D spending	n/a	n/a
2.3.1	Pension coverage	n/a	n/a	4.3.2	University ranking	24.49	72
2.3.2	Environmental performance	29.97	82	4.3.3	Gender parity in R&D	37.80	72
2.3.3	Physician density	8.71	93	4.3.4	Scientific journal articles	5.55	68
2.3.4	Sanitation	87.60	73	4.4	Innovation	14.85	75
2.3.5	Personal safety	57.05	59	4.4.1	Medium- and high-tech industry	42.26	43
2.4	Skills	27.93	79	4.4.2	High-tech exports	7.87	82
2.4.1	Workforce with tertiary education	n/a	n/a	4.4.3	Venture capital recipients, deals	3.32	69
2.4.2	High-skilled workforce	6.00	113	4.4.4	New product entrepreneurial activity	25.25	74
2.4.3	Researchers	13.17	48	4.4.5	New business density	7.92	53
2.4.4	Ease of finding skilled employees	43.58	86	4.4.6	Patent applications	2.51	55
2.4.5	Digital skills	48.95	17				

Mozambique

Key Indicators

Rank (out of 124)	122	GDP per capita (PPP US\$)	1,335.70
Income group	Low income	GDP (US\$ billions)	14.02
Regional group	Sub-Saharan Africa	FREI score	15.73
Population (millions)	31.26	FREI score (income group average)	17.76

FREI 2022 scores by pillar and sub-pillar (0–100)



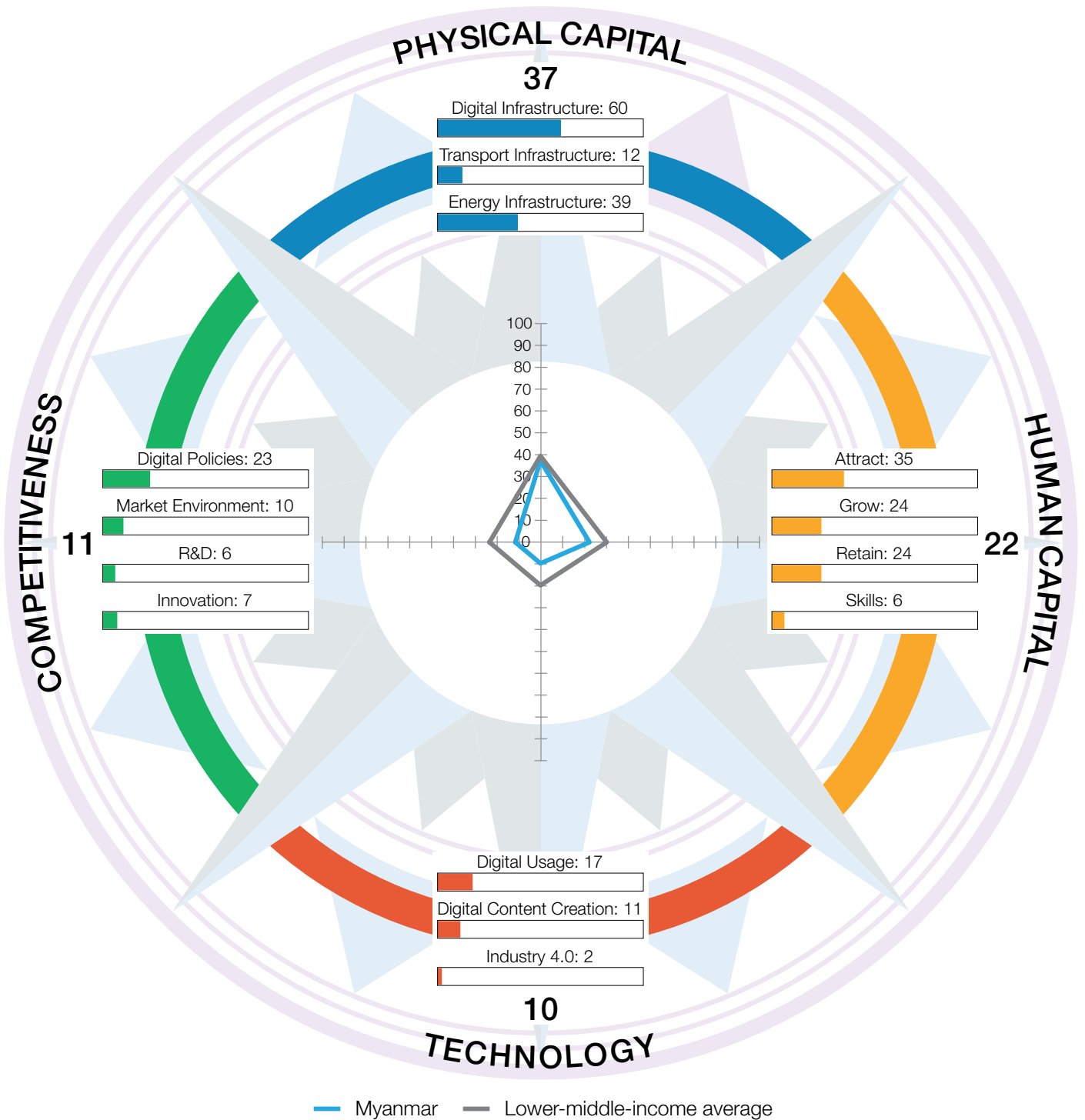
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	21.53	121	3	TECHNOLOGY	11.18	116
1.1	Digital Infrastructure	21.65	118	3.1	Digital Usage	22.18	111
1.1.1	Internet access	0.50	116	3.1.1	Internet users	3.24	122
1.1.2	International Internet bandwidth	28.90	105	3.1.2	Active mobile-broadband subscriptions	6.24	118
1.1.3	Fixed-broadband subscriptions	34.68	90	3.1.3	Gender parity in Internet usage	23.78	95
1.1.4	4G-mobile network coverage	40.00	112	3.1.4	Firms with website	32.76	83
1.1.5	Fixed broadband affordability	13.54	118	3.1.5	Internet shopping	5.48	87
1.1.6	Mobile broadband affordability	32.05	115	3.1.6	Government online services	40.14	98
1.1.7	Computer software spending	1.88	106	3.1.7	E-Participation	43.66	94
1.2	Transport Infrastructure	12.08	118	3.2	Digital Content Creation	10.06	117
1.2.1	Quality of infrastructure	24.13	104	3.2.1	GitHub commits	0.19	111
1.2.2	Rural access	21.38	115	3.2.2	Wikipedia edits	15.45	115
1.2.3	Air connectivity	0.06	119	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	24.54	115
1.3	Energy Infrastructure	30.85	116	3.3	Industry 4.0	1.30	112
1.3.1	Access to electricity	20.74	120	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	0.36	115
1.3.3	Electrical outages	78.07	59	3.3.3	AI research	1.56	85
1.3.4	Energy intensity	12.91	122	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	17.22	123	4	COMPETITIVENESS	13.00	119
2.1	Attract	37.07	97	4.1	Digital Policies	22.21	115
2.1.1	Brain gain	43.31	73	4.1.1	ICT regulation	54.09	104
2.1.2	International students	0.89	98	4.1.2	Cybersecurity	22.47	112
2.1.3	Tolerance of minorities	43.62	64	4.1.3	Rule of law	7.53	118
2.1.4	Tolerance of immigrants	63.08	55	4.1.4	Regulatory quality	20.97	107
2.1.5	Gender parity in high-skilled jobs	39.12	102	4.1.5	Corruption	5.97	115
2.1.6	FDI and technology transfer	32.39	91	4.2	Market Environment	13.10	117
2.2	Grow	3.08	123	4.2.1	Extent of market dominance	20.23	115
2.2.1	Tertiary enrolment	4.40	112	4.2.2	Labour productivity	0.25	113
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	23.41	108
2.2.3	Use of virtual professional networks	1.77	115	4.2.4	Domestic credit to private sector	8.52	104
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	n/a	n/a	4.3	R&D	8.96	106
2.3	Retain	23.56	102	4.3.1	R&D spending	6.10	72
2.3.1	Pension coverage	51.53	73	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	15.33	101	4.3.3	Gender parity in R&D	29.58	80
2.3.3	Physician density	0.61	117	4.3.4	Scientific journal articles	0.15	118
2.3.4	Sanitation	23.78	112	4.4	Innovation	7.74	106
2.3.5	Personal safety	26.56	107	4.4.1	Medium- and high-tech industry	13.25	95
2.4	Skills	5.18	124	4.4.2	High-tech exports	9.07	74
2.4.1	Workforce with tertiary education	1.91	118	4.4.3	Venture capital recipients, deals	8.62	49
2.4.2	High-skilled workforce	0.82	119	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	0.37	86	4.4.5	New business density	n/a	n/a
2.4.4	Ease of finding skilled employees	17.60	116	4.4.6	Patent applications	0.00	96
2.4.5	Digital skills	n/a	n/a				

Myanmar

Key Indicators

Rank (out of 124)	112	GDP per capita (PPP US\$)	5,412.94
Income group	Lower-middle income	GDP (US\$ billions)	76.19
Regional group	Asia and Pacific	FREI score	20.07
Population (millions)	54.41	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



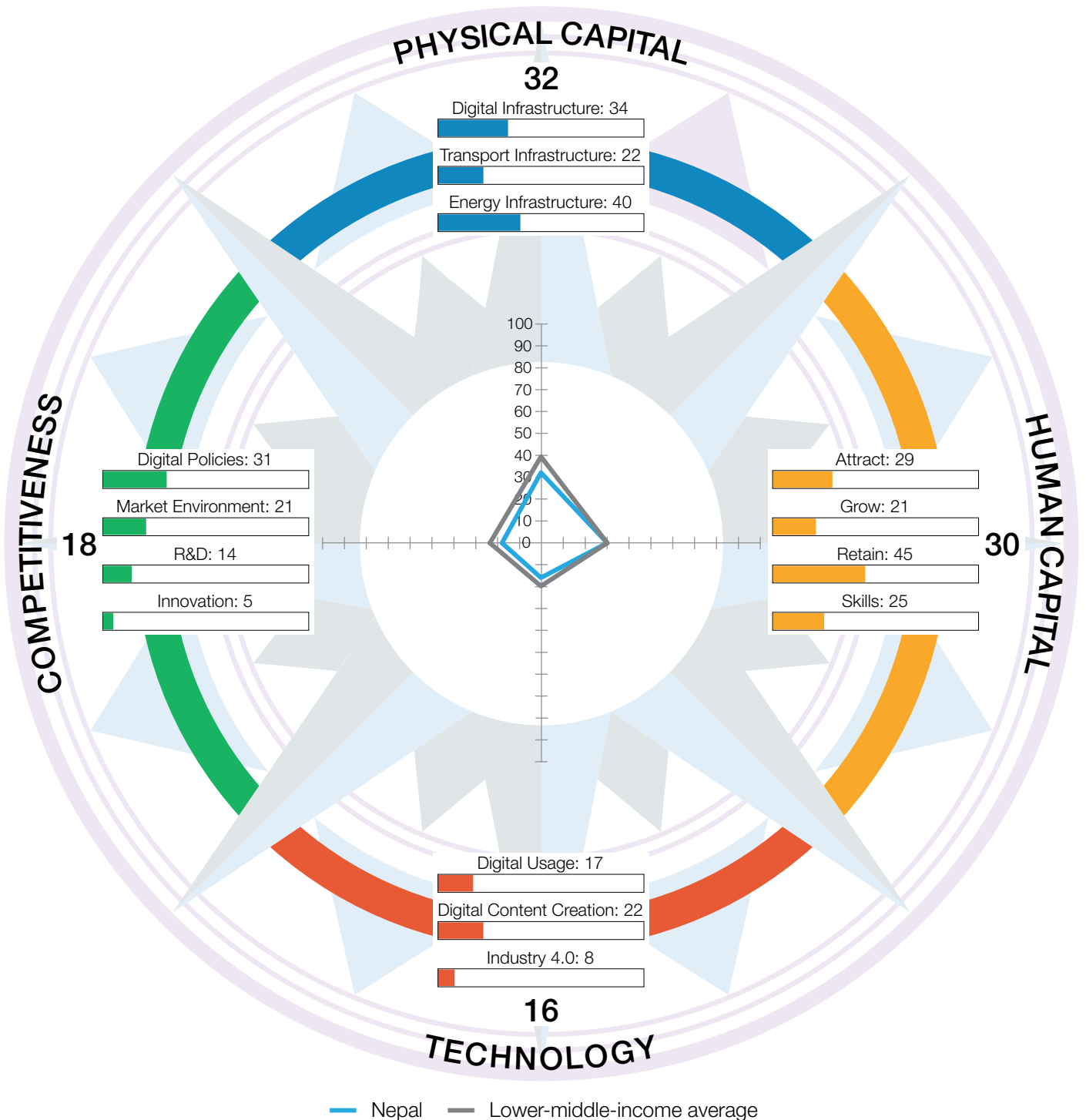
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	37.02	101	3	TECHNOLOGY	9.62	120
1.1	Digital Infrastructure	60.05	81	3.1	Digital Usage	16.67	119
1.1.1	Internet access	n/a	n/a	3.1.1	Internet users	19.84	106
1.1.2	International Internet bandwidth	24.27	111	3.1.2	Active mobile-broadband subscriptions	40.29	49
1.1.3	Fixed-broadband subscriptions	47.22	84	3.1.3	Gender parity in Internet usage	32.49	94
1.1.4	4G-mobile network coverage	75.00	94	3.1.4	Firms with website	0.00	106
1.1.5	Fixed broadband affordability	72.90	101	3.1.5	Internet shopping	3.36	103
1.1.6	Mobile broadband affordability	80.85	62	3.1.6	Government online services	8.03	121
1.1.7	Computer software spending	n/a	n/a	3.1.7	E-Participation	12.67	122
1.2	Transport Infrastructure	11.71	119	3.2	Digital Content Creation	10.57	115
1.2.1	Quality of infrastructure	15.30	121	3.2.1	GitHub commits	0.18	112
1.2.2	Rural access	24.65	112	3.2.2	Wikipedia edits	11.81	119
1.2.3	Air connectivity	1.55	96	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	30.25	111
1.3	Energy Infrastructure	39.31	108	3.3	Industry 4.0	1.62	107
1.3.1	Access to electricity	64.37	106	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	0.88	110
1.3.3	Electrical outages	42.76	84	3.3.3	AI research	0.29	105
1.3.4	Energy intensity	79.95	55	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	22.33	116	4	COMPETITIVENESS	11.32	123
2.1	Attract	35.04	104	4.1	Digital Policies	22.82	112
2.1.1	Brain gain	n/a	n/a	4.1.1	ICT regulation	43.27	117
2.1.2	International students	0.06	104	4.1.2	Cybersecurity	34.98	101
2.1.3	Tolerance of minorities	0.00	124	4.1.3	Rule of law	2.86	122
2.1.4	Tolerance of immigrants	60.00	61	4.1.4	Regulatory quality	22.56	103
2.1.5	Gender parity in high-skilled jobs	80.11	51	4.1.5	Corruption	10.45	108
2.1.6	FDI and technology transfer	n/a	n/a	4.2	Market Environment	9.62	121
2.2	Grow	23.81	98	4.2.1	Extent of market dominance	n/a	n/a
2.2.1	Tertiary enrolment	12.18	93	4.2.2	Labour productivity	1.52	107
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	16.94	114
2.2.3	Use of virtual professional networks	0.88	120	4.2.4	Domestic credit to private sector	10.41	94
2.2.4	Formal and non-formal studies	0.25	77	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	81.94	45	4.3	R&D	6.13	110
2.3	Retain	24.16	100	4.3.1	R&D spending	0.37	103
2.3.1	Pension coverage	13.16	99	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	0.00	124	4.3.3	Gender parity in R&D	24.02	85
2.3.3	Physician density	8.79	92	4.3.4	Scientific journal articles	0.13	121
2.3.4	Sanitation	61.52	96	4.4	Innovation	6.71	107
2.3.5	Personal safety	37.31	92	4.4.1	Medium- and high-tech industry	9.18	103
2.4	Skills	6.32	123	4.4.2	High-tech exports	9.68	71
2.4.1	Workforce with tertiary education	16.19	88	4.4.3	Venture capital recipients, deals	6.51	56
2.4.2	High-skilled workforce	2.57	115	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	0.20	92	4.4.5	New business density	1.47	98
2.4.4	Ease of finding skilled employees	n/a	n/a	4.4.6	Patent applications	n/a	n/a
2.4.5	Digital skills	n/a	n/a				

Nepal

Key Indicators

Rank (out of 124)	103	GDP per capita (PPP US\$)	3,692.72
Income group	Lower-middle income	GDP (US\$ billions)	33.66
Regional group	Asia and Pacific	FREI score	23.86
Population (millions)	29.14	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



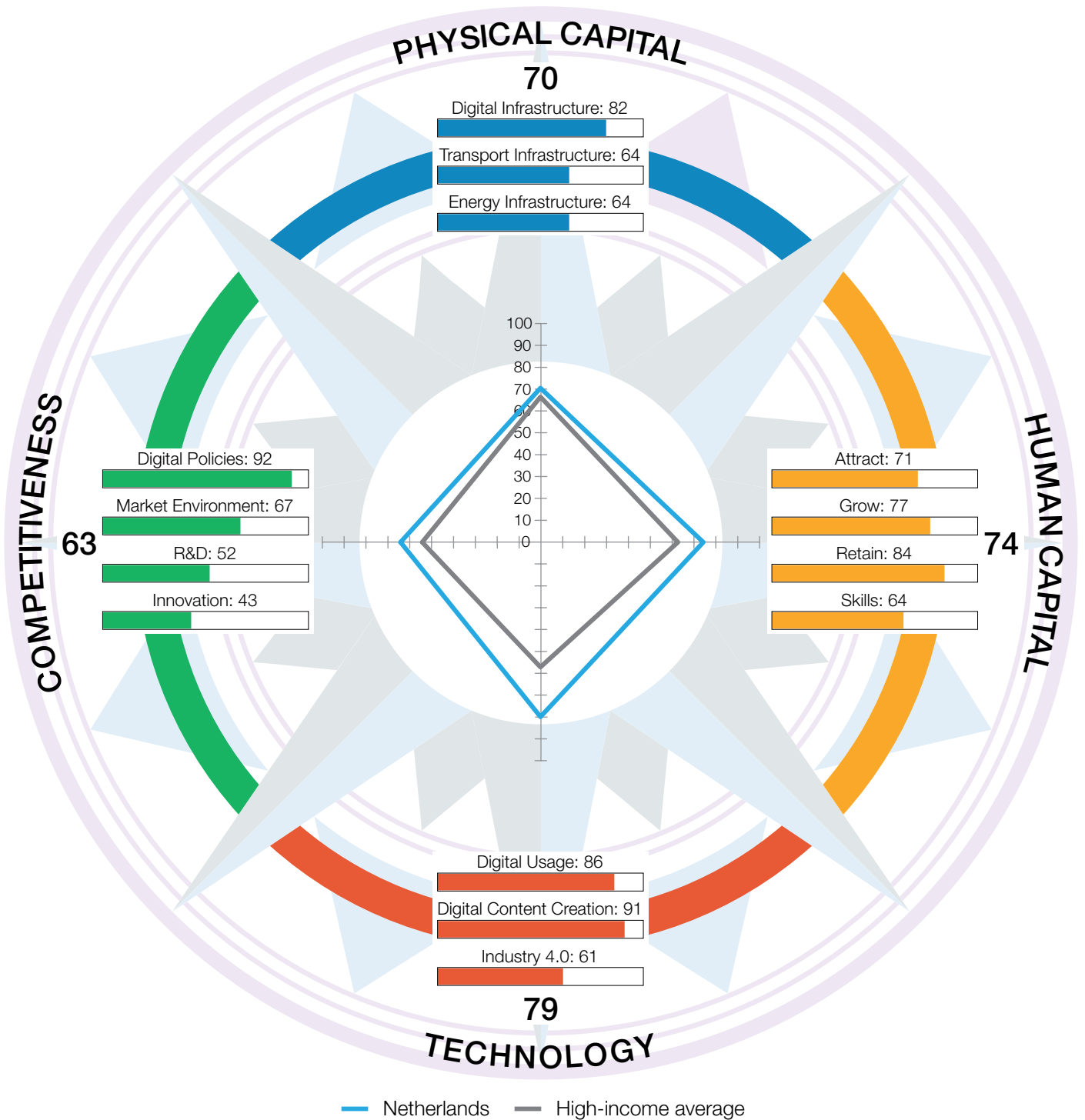
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	31.90	106	3	TECHNOLOGY	15.77	103
1.1	Digital Infrastructure	33.75	107	3.1	Digital Usage	17.37	118
1.1.1	Internet access	1.69	115	3.1.1	Internet users	15.72	111
1.1.2	International Internet bandwidth	25.44	110	3.1.2	Active mobile-broadband subscriptions	19.78	104
1.1.3	Fixed-broadband subscriptions	n/a	n/a	3.1.3	Gender parity in Internet usage	n/a	n/a
1.1.4	4G-mobile network coverage	15.47	119	3.1.4	Firms with website	15.59	96
1.1.5	Fixed broadband affordability	96.21	57	3.1.5	Internet shopping	2.20	110
1.1.6	Mobile broadband affordability	62.29	95	3.1.6	Government online services	25.55	112
1.1.7	Computer software spending	1.42	112	3.1.7	E-Participation	25.34	111
1.2	Transport Infrastructure	21.54	97	3.2	Digital Content Creation	21.63	93
1.2.1	Quality of infrastructure	22.42	110	3.2.1	GitHub commits	2.36	75
1.2.2	Rural access	57.91	78	3.2.2	Wikipedia edits	26.78	100
1.2.3	Air connectivity	2.15	89	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	56.73	86
1.3	Energy Infrastructure	40.41	103	3.3	Industry 4.0	8.30	55
1.3.1	Access to electricity	88.63	98	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	21.87	33
1.3.3	Electrical outages	47.68	82	3.3.3	AI research	0.83	95
1.3.4	Energy intensity	56.37	103	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	30.09	96	4	COMPETITIVENESS	17.67	108
2.1	Attract	29.28	118	4.1	Digital Policies	30.78	104
2.1.1	Brain gain	27.01	101	4.1.1	ICT regulation	48.07	112
2.1.2	International students	0.00	105	4.1.2	Cybersecurity	43.75	97
2.1.3	Tolerance of minorities	5.32	118	4.1.3	Rule of law	23.37	88
2.1.4	Tolerance of immigrants	84.62	15	4.1.4	Regulatory quality	20.81	108
2.1.5	Gender parity in high-skilled jobs	43.06	98	4.1.5	Corruption	17.91	92
2.1.6	FDI and technology transfer	15.66	114	4.2	Market Environment	20.94	104
2.2	Grow	21.13	108	4.2.1	Extent of market dominance	20.20	116
2.2.1	Tertiary enrolment	8.56	101	4.2.2	Labour productivity	n/a	n/a
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	3.97	120
2.2.3	Use of virtual professional networks	4.09	103	4.2.4	Domestic credit to private sector	38.64	33
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	50.74	104	4.3	R&D	13.82	99
2.3	Retain	45.00	82	4.3.1	R&D spending	n/a	n/a
2.3.1	Pension coverage	83.88	56	4.3.2	University ranking	26.56	66
2.3.2	Environmental performance	13.24	107	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	9.69	89	4.3.4	Scientific journal articles	1.08	93
2.3.4	Sanitation	59.06	97	4.4	Innovation	5.13	113
2.3.5	Personal safety	59.15	49	4.4.1	Medium- and high-tech industry	10.12	100
2.4	Skills	24.95	87	4.4.2	High-tech exports	1.90	107
2.4.1	Workforce with tertiary education	10.92	95	4.4.3	Venture capital recipients, deals	2.95	74
2.4.2	High-skilled workforce	17.76	94	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	5.53	70
2.4.4	Ease of finding skilled employees	46.17	83	4.4.6	Patent applications	n/a	n/a
2.4.5	Digital skills	n/a	n/a				

Netherlands

Key Indicators

Rank (out of 124)	7	GDP per capita (PPP US\$)	59,469.08
Income group	High income	GDP (US\$ billions)	913.87
Regional group	Europe	FREI score	71.67
Population (millions)	17.44	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



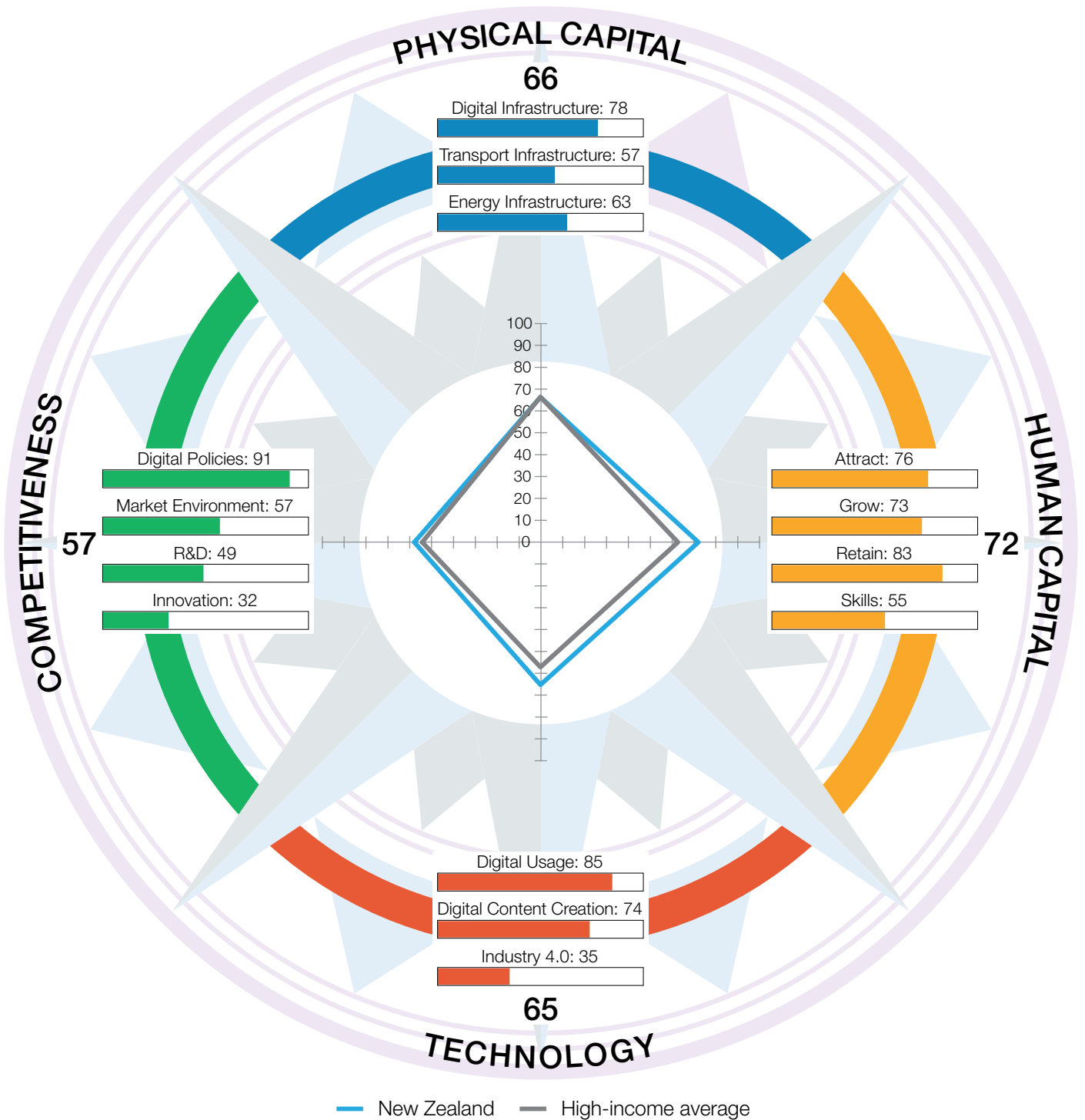
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	69.98	14	3	TECHNOLOGY	79.32	3
1.1	Digital Infrastructure	82.22	12	3.1	Digital Usage	86.35	7
1.1.1	Internet access	93.83	15	3.1.1	Internet users	90.90	22
1.1.2	International Internet bandwidth	51.26	37	3.1.2	Active mobile-broadband subscriptions	55.08	13
1.1.3	Fixed-broadband subscriptions	98.97	12	3.1.3	Gender parity in Internet usage	91.51	62
1.1.4	4G-mobile network coverage	99.00	39	3.1.4	Firms with website	85.76	9
1.1.5	Fixed broadband affordability	97.69	38	3.1.5	Internet shopping	97.11	2
1.1.6	Mobile broadband affordability	88.36	32	3.1.6	Government online services	88.32	12
1.1.7	Computer software spending	46.45	15	3.1.7	E-Participation	95.78	9
1.2	Transport Infrastructure	63.71	11	3.2	Digital Content Creation	91.10	1
1.2.1	Quality of infrastructure	94.31	4	3.2.1	GitHub commits	79.07	5
1.2.2	Rural access	98.13	9	3.2.2	Wikipedia edits	85.33	8
1.2.3	Air connectivity	31.04	23	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	100.00	1
1.3	Energy Infrastructure	64.00	25	3.3	Industry 4.0	60.50	10
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	53.69	10
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	66.48	11
1.3.3	Electrical outages	97.82	4	3.3.3	AI research	66.67	7
1.3.4	Energy intensity	84.68	34	3.3.4	ICT patent applications	43.20	10
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	73.92	10	4	COMPETITIVENESS	63.47	10
2.1	Attract	70.82	12	4.1	Digital Policies	91.65	5
2.1.1	Brain gain	80.15	9	4.1.1	ICT regulation	92.07	19
2.1.2	International students	31.17	18	4.1.2	Cybersecurity	96.98	22
2.1.3	Tolerance of minorities	67.02	29	4.1.3	Rule of law	90.49	11
2.1.4	Tolerance of immigrants	76.92	28	4.1.4	Regulatory quality	87.66	7
2.1.5	Gender parity in high-skilled jobs	88.10	37	4.1.5	Corruption	91.04	8
2.1.6	FDI and technology transfer	81.58	8	4.2	Market Environment	67.07	10
2.2	Grow	76.70	3	4.2.1	Extent of market dominance	85.53	5
2.2.1	Tertiary enrolment	58.41	14	4.2.2	Labour productivity	65.50	15
2.2.2	Reading, maths, and science	68.74	14	4.2.3	Urbanisation	89.82	11
2.2.3	Use of virtual professional networks	71.68	3	4.2.4	Domestic credit to private sector	44.86	27
2.2.4	Formal and non-formal studies	86.83	4	4.2.5	Market capitalisation	49.66	10
2.2.5	Youth inclusion	97.85	4	4.3	R&D	52.46	16
2.3	Retain	83.82	14	4.3.1	R&D spending	43.65	13
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	72.10	9
2.3.2	Environmental performance	87.46	11	4.3.3	Gender parity in R&D	23.71	86
2.3.3	Physician density	46.02	33	4.3.4	Scientific journal articles	70.38	9
2.3.4	Sanitation	97.53	47	4.4	Innovation	42.70	21
2.3.5	Personal safety	88.08	10	4.4.1	Medium- and high-tech industry	61.88	11
2.4	Skills	64.32	14	4.4.2	High-tech exports	37.05	16
2.4.1	Workforce with tertiary education	49.13	22	4.4.3	Venture capital recipients, deals	17.94	29
2.4.2	High-skilled workforce	79.82	10	4.4.4	New product entrepreneurial activity	45.49	47
2.4.3	Researchers	69.44	9	4.4.5	New business density	27.07	23
2.4.4	Ease of finding skilled employees	76.69	24	4.4.6	Patent applications	66.77	10
2.4.5	Digital skills	46.55	18				

New Zealand

Key Indicators

Rank (out of 124)	15	GDP per capita (PPP US\$)	44,251.79
Income group	High income	GDP (US\$ billions)	210.89
Regional group	Asia and Pacific	FREI score	64.90
Population (millions)	5.08	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)

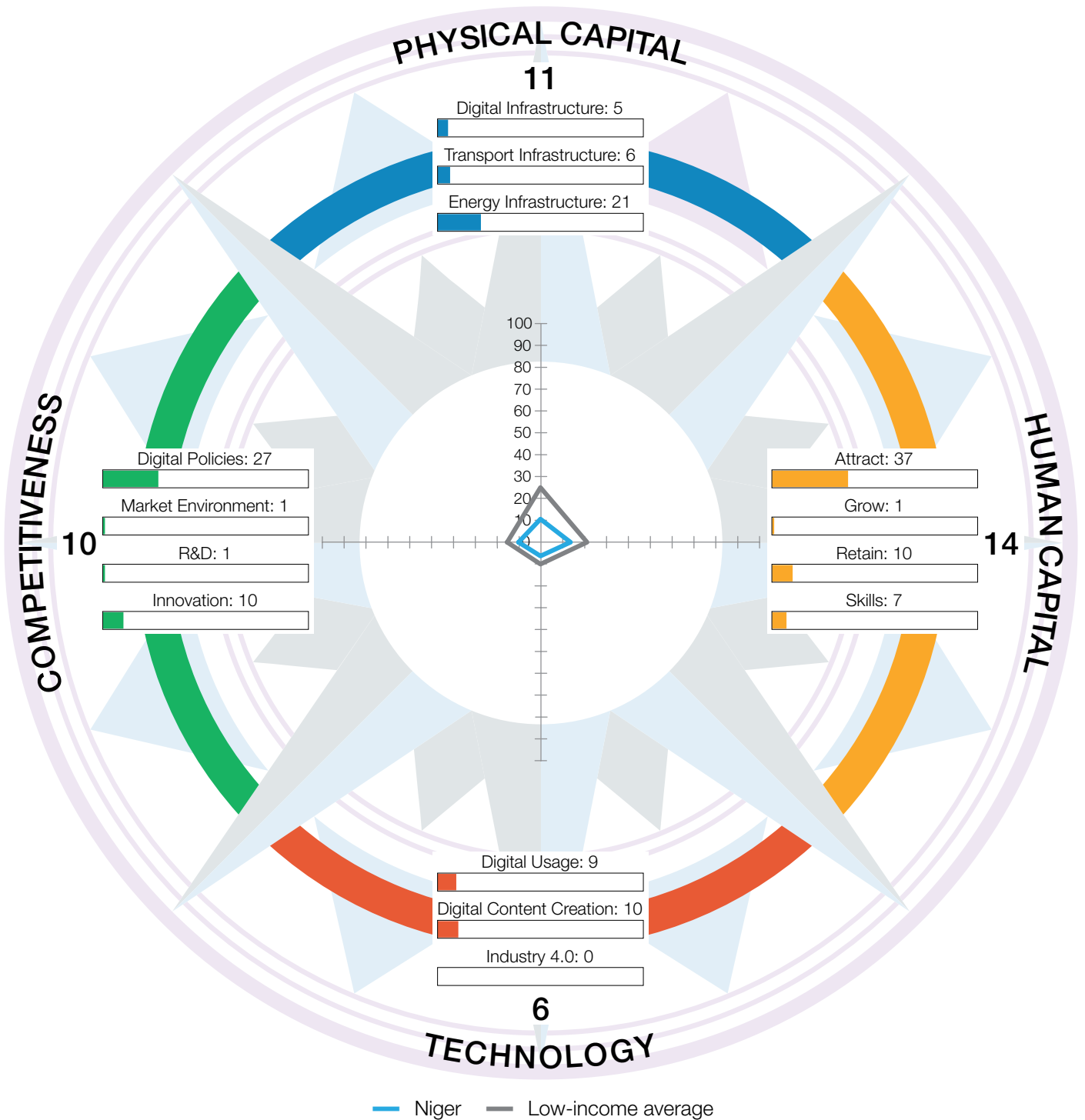


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	65.87	22	3	TECHNOLOGY	64.79	14
1.1	Digital Infrastructure	77.75	31	3.1	Digital Usage	85.33	11
1.1.1	Internet access	76.56	60	3.1.1	Internet users	87.09	30
1.1.2	International Internet bandwidth	55.43	25	3.1.2	Active mobile-broadband subscriptions	50.17	25
1.1.3	Fixed-broadband subscriptions	99.03	11	3.1.3	Gender parity in Internet usage	97.46	26
1.1.4	4G-mobile network coverage	97.00	61	3.1.4	Firms with website	84.09	14
1.1.5	Fixed broadband affordability	97.91	36	3.1.5	Internet shopping	88.63	8
1.1.6	Mobile broadband affordability	94.67	13	3.1.6	Government online services	91.24	10
1.1.7	Computer software spending	23.64	43	3.1.7	E-Participation	98.59	4
1.2	Transport Infrastructure	57.14	20	3.2	Digital Content Creation	74.08	10
1.2.1	Quality of infrastructure	86.48	13	3.2.1	GitHub commits	77.27	6
1.2.2	Rural access	75.94	49	3.2.2	Wikipedia edits	85.03	9
1.2.3	Air connectivity	42.68	15	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	92.45	19
1.3	Energy Infrastructure	62.72	29	3.3	Industry 4.0	34.97	20
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	14.42	28
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	45.99	16
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	55.80	12
1.3.4	Energy intensity	75.90	66	3.3.4	ICT patent applications	9.23	25
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	71.70	13	4	COMPETITIVENESS	57.25	21
2.1	Attract	75.83	8	4.1	Digital Policies	90.75	6
2.1.1	Brain gain	77.52	13	4.1.1	ICT regulation	84.86	38
2.1.2	International students	55.42	6	4.1.2	Cybersecurity	83.68	56
2.1.3	Tolerance of minorities	77.66	14	4.1.3	Rule of law	94.17	3
2.1.4	Tolerance of immigrants	95.38	3	4.1.4	Regulatory quality	91.03	2
2.1.5	Gender parity in high-skilled jobs	n/a	n/a	4.1.5	Corruption	100.00	1
2.1.6	FDI and technology transfer	73.17	19	4.2	Market Environment	57.36	20
2.2	Grow	72.66	5	4.2.1	Extent of market dominance	58.18	38
2.2.1	Tertiary enrolment	53.81	21	4.2.2	Labour productivity	50.31	31
2.2.2	Reading, maths, and science	68.92	12	4.2.3	Urbanisation	83.89	20
2.2.3	Use of virtual professional networks	64.49	8	4.2.4	Domestic credit to private sector	70.93	9
2.2.4	Formal and non-formal studies	91.07	3	4.2.5	Market capitalisation	23.50	29
2.2.5	Youth inclusion	85.00	37	4.3	R&D	49.17	19
2.3	Retain	83.49	16	4.3.1	R&D spending	27.07	27
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	56.35	21
2.3.2	Environmental performance	80.49	19	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	42.43	37	4.3.4	Scientific journal articles	64.10	11
2.3.4	Sanitation	100.00	1	4.4	Innovation	31.73	31
2.3.5	Personal safety	94.55	4	4.4.1	Medium- and high-tech industry	22.78	76
2.4	Skills	54.81	24	4.4.2	High-tech exports	16.29	47
2.4.1	Workforce with tertiary education	38.60	42	4.4.3	Venture capital recipients, deals	19.30	27
2.4.2	High-skilled workforce	n/a	n/a	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	68.50	10	4.4.5	New business density	75.57	3
2.4.4	Ease of finding skilled employees	57.34	57	4.4.6	Patent applications	24.71	22
2.4.5	Digital skills	n/a	n/a				

Key Indicators

Rank (out of 124)	124	GDP per capita (PPP US\$)	1,276.29
Income group	Low income	GDP (US\$ billions)	13.68
Regional group	Sub-Saharan Africa	FREI score	10.06
Population (millions)	24.21	FREI score (income group average)	17.76

FREI 2022 scores by pillar and sub-pillar (0–100)



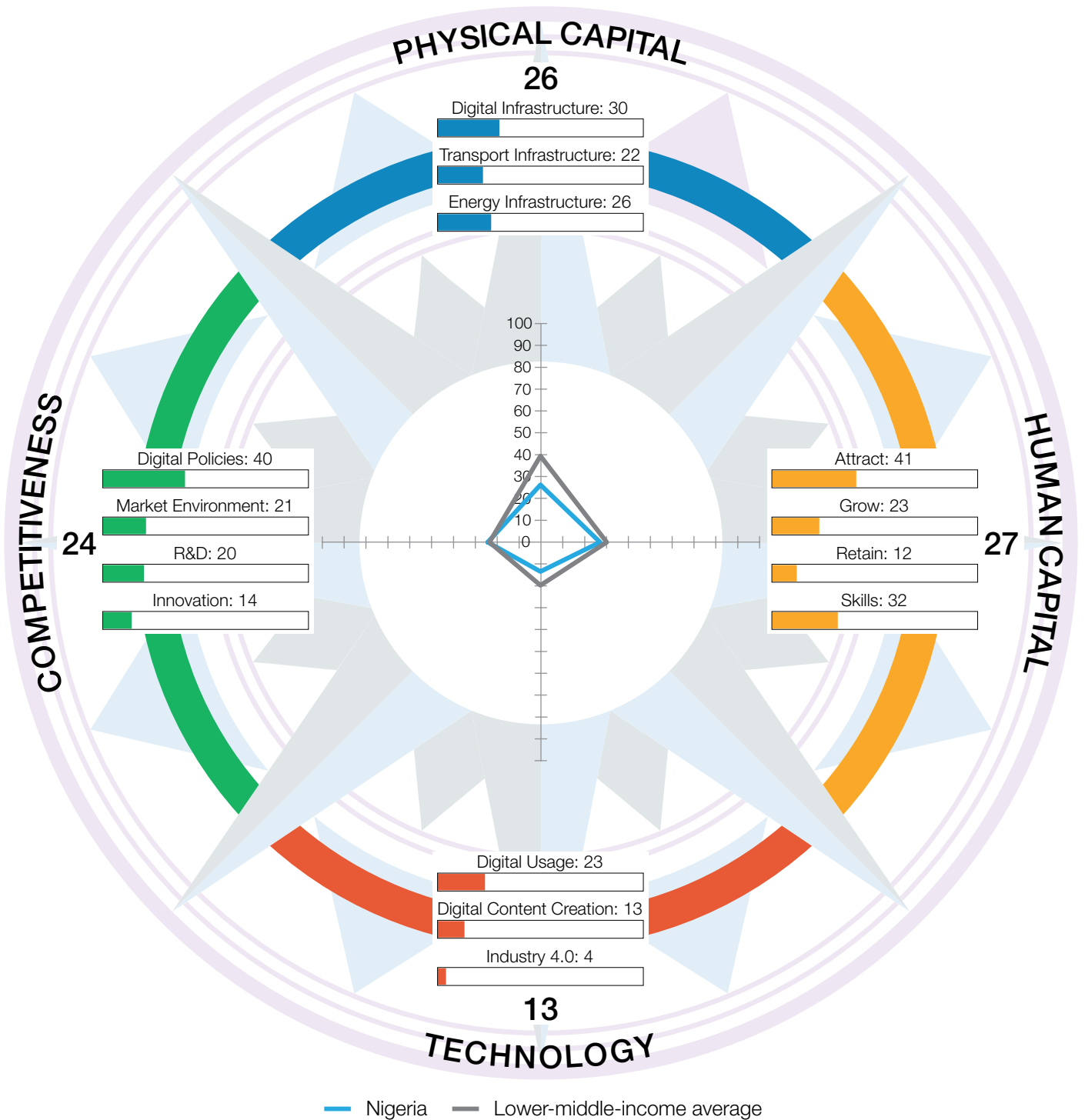
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	10.51	124	3	TECHNOLOGY	6.21	122
1.1	Digital Infrastructure	4.87	124	3.1	Digital Usage	8.67	123
1.1.1	Internet access	8.24	109	3.1.1	Internet users	5.78	121
1.1.2	International Internet bandwidth	10.16	122	3.1.2	Active mobile-broadband subscriptions	0.00	124
1.1.3	Fixed-broadband subscriptions	0.39	118	3.1.3	Gender parity in Internet usage	0.00	100
1.1.4	4G-mobile network coverage	0.00	123	3.1.4	Firms with website	23.94	90
1.1.5	Fixed broadband affordability	0.00	120	3.1.5	Internet shopping	1.69	114
1.1.6	Mobile broadband affordability	13.55	120	3.1.6	Government online services	12.41	118
1.1.7	Computer software spending	1.77	109	3.1.7	E-Participation	16.90	120
1.2	Transport Infrastructure	5.75	123	3.2	Digital Content Creation	9.94	118
1.2.1	Quality of infrastructure	15.66	120	3.2.1	GitHub commits	0.03	121
1.2.2	Rural access	6.81	123	3.2.2	Wikipedia edits	20.53	109
1.2.3	Air connectivity	0.02	123	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	18.94	119
1.3	Energy Infrastructure	20.90	124	3.3	Industry 4.0	0.02	124
1.3.1	Access to electricity	8.53	122	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	0.00	121
1.3.3	Electrical outages	27.72	87	3.3.3	AI research	0.05	118
1.3.4	Energy intensity	67.21	87	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	13.64	124	4	COMPETITIVENESS	9.87	124
2.1	Attract	36.76	98	4.1	Digital Policies	27.35	108
2.1.1	Brain gain	n/a	n/a	4.1.1	ICT regulation	69.71	79
2.1.2	International students	14.37	46	4.1.2	Cybersecurity	9.39	122
2.1.3	Tolerance of minorities	25.53	93	4.1.3	Rule of law	21.69	90
2.1.4	Tolerance of immigrants	66.15	48	4.1.4	Regulatory quality	19.54	111
2.1.5	Gender parity in high-skilled jobs	40.96	99	4.1.5	Corruption	16.42	96
2.1.6	FDI and technology transfer	n/a	n/a	4.2	Market Environment	0.84	124
2.2	Grow	0.80	124	4.2.1	Extent of market dominance	n/a	n/a
2.2.1	Tertiary enrolment	2.41	118	4.2.2	Labour productivity	0.22	114
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	0.00	124
2.2.3	Use of virtual professional networks	0.00	123	4.2.4	Domestic credit to private sector	2.30	117
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	0.00	113	4.3	R&D	1.18	117
2.3	Retain	9.76	123	4.3.1	R&D spending	n/a	n/a
2.3.1	Pension coverage	3.88	114	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	9.93	112	4.3.3	Gender parity in R&D	3.48	98
2.3.3	Physician density	0.09	123	4.3.4	Scientific journal articles	0.06	122
2.3.4	Sanitation	6.74	122	4.4	Innovation	10.09	94
2.3.5	Personal safety	28.17	105	4.4.1	Medium- and high-tech industry	20.95	81
2.4	Skills	7.25	120	4.4.2	High-tech exports	4.77	90
2.4.1	Workforce with tertiary education	3.28	114	4.4.3	Venture capital recipients, deals	24.56	21
2.4.2	High-skilled workforce	20.25	88	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	0.17	94	4.4.5	New business density	0.20	111
2.4.4	Ease of finding skilled employees	n/a	n/a	4.4.6	Patent applications	0.00	96
2.4.5	Digital skills	5.29	70				

Nigeria

Key Indicators

Rank (out of 124)	106	GDP per capita (PPP US\$)	5,352.68
Income group	Lower-middle income	GDP (US\$ billions)	432.29
Regional group	Sub-Saharan Africa	FREI score	22.58
Population (millions)	206.14	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



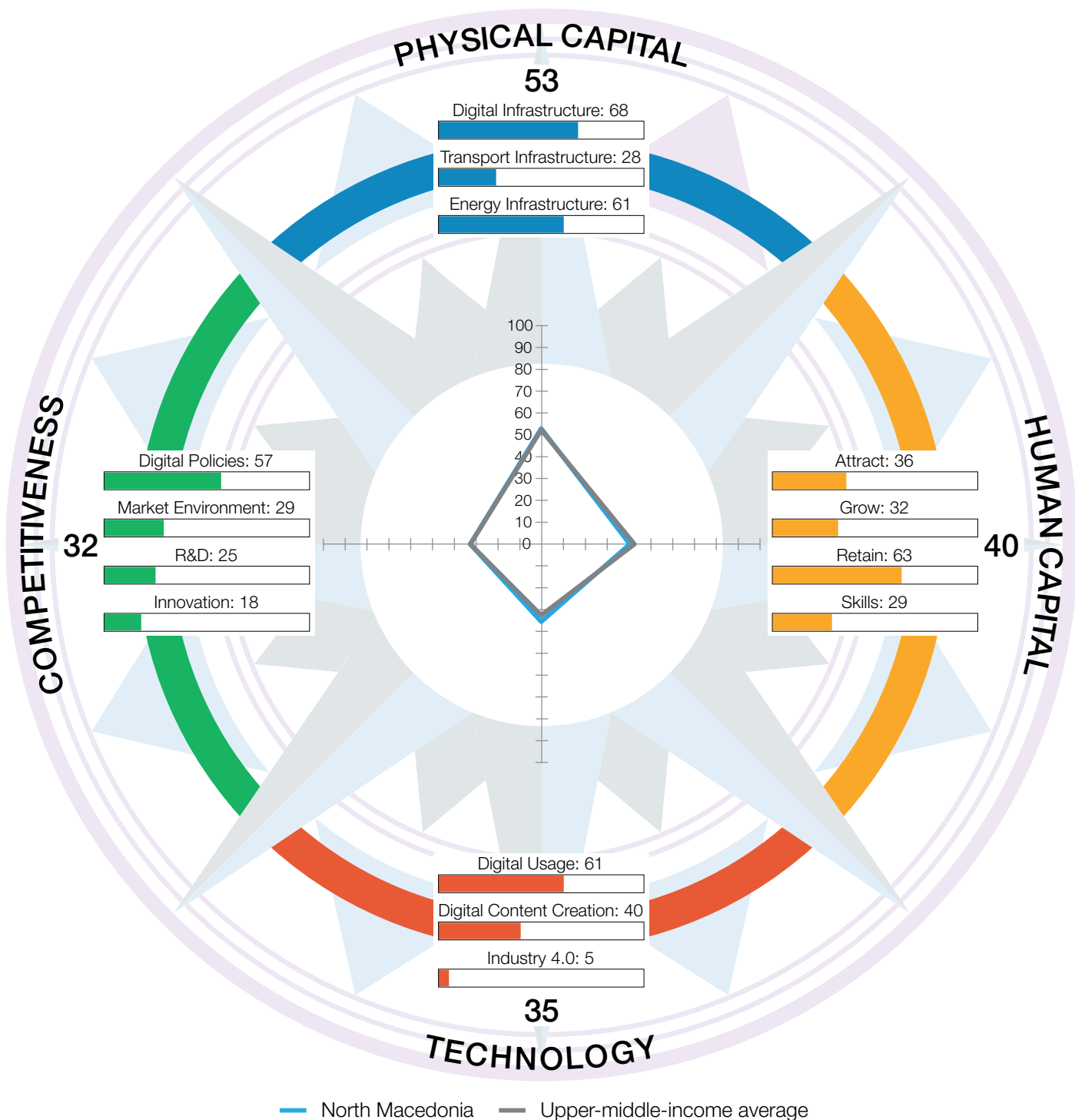
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	26.04	113	3	TECHNOLOGY	13.33	108
1.1	Digital Infrastructure	30.45	111	3.1	Digital Usage	22.89	110
1.1.1	Internet access	5.96	111	3.1.1	Internet users	24.44	102
1.1.2	International Internet bandwidth	21.06	115	3.1.2	Active mobile-broadband subscriptions	17.14	111
1.1.3	Fixed-broadband subscriptions	17.01	102	3.1.3	Gender parity in Internet usage	n/a	n/a
1.1.4	4G-mobile network coverage	40.53	110	3.1.4	Firms with website	11.00	100
1.1.5	Fixed broadband affordability	47.30	113	3.1.5	Internet shopping	5.21	89
1.1.6	Mobile broadband affordability	71.26	84	3.1.6	Government online services	40.14	98
1.1.7	Computer software spending	10.02	81	3.1.7	E-Participation	39.43	101
1.2	Transport Infrastructure	21.67	95	3.2	Digital Content Creation	13.02	111
1.2.1	Quality of infrastructure	35.59	75	3.2.1	GitHub commits	0.99	97
1.2.2	Rural access	50.09	85	3.2.2	Wikipedia edits	13.66	118
1.2.3	Air connectivity	0.22	116	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	37.14	106
1.3	Energy Infrastructure	26.00	121	3.3	Industry 4.0	4.07	84
1.3.1	Access to electricity	49.77	108	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	8.50	63
1.3.3	Electrical outages	18.81	89	3.3.3	AI research	1.61	83
1.3.4	Energy intensity	54.65	105	3.3.4	ICT patent applications	0.01	73
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	27.05	101	4	COMPETITIVENESS	23.89	90
2.1	Attract	41.45	79	4.1	Digital Policies	39.89	88
2.1.1	Brain gain	51.88	52	4.1.1	ICT regulation	81.73	56
2.1.2	International students	n/a	n/a	4.1.2	Cybersecurity	84.42	55
2.1.3	Tolerance of minorities	11.70	113	4.1.3	Rule of law	13.79	107
2.1.4	Tolerance of immigrants	61.54	58	4.1.4	Regulatory quality	13.54	120
2.1.5	Gender parity in high-skilled jobs	47.51	95	4.1.5	Corruption	5.97	115
2.1.6	FDI and technology transfer	34.64	87	4.2	Market Environment	21.01	103
2.2	Grow	22.77	102	4.2.1	Extent of market dominance	49.85	51
2.2.1	Tertiary enrolment	6.33	105	4.2.2	Labour productivity	7.29	94
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	40.58	91
2.2.3	Use of virtual professional networks	5.20	97	4.2.4	Domestic credit to private sector	2.48	115
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	4.84	66
2.2.5	Youth inclusion	56.79	98	4.3	R&D	20.34	85
2.3	Retain	11.68	119	4.3.1	R&D spending	n/a	n/a
2.3.1	Pension coverage	9.18	105	4.3.2	University ranking	39.58	43
2.3.2	Environmental performance	10.28	111	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	4.32	98	4.3.4	Scientific journal articles	1.10	92
2.3.4	Sanitation	34.37	107	4.4	Innovation	14.34	78
2.3.5	Personal safety	0.26	123	4.4.1	Medium- and high-tech industry	41.37	45
2.4	Skills	32.29	65	4.4.2	High-tech exports	2.38	100
2.4.1	Workforce with tertiary education	17.87	83	4.4.3	Venture capital recipients, deals	5.92	60
2.4.2	High-skilled workforce	42.56	50	4.4.4	New product entrepreneurial activity	32.99	62
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	3.34	81
2.4.4	Ease of finding skilled employees	36.43	97	4.4.6	Patent applications	0.06	95
2.4.5	Digital skills	n/a	n/a				

North Macedonia

Key Indicators

Rank (out of 124)	63	GDP per capita (PPP US\$)	17,583.38
Income group	Upper-middle income	GDP (US\$ billions)	12.27
Regional group	Europe	FREI score	40.10
Population (millions)	2.08	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



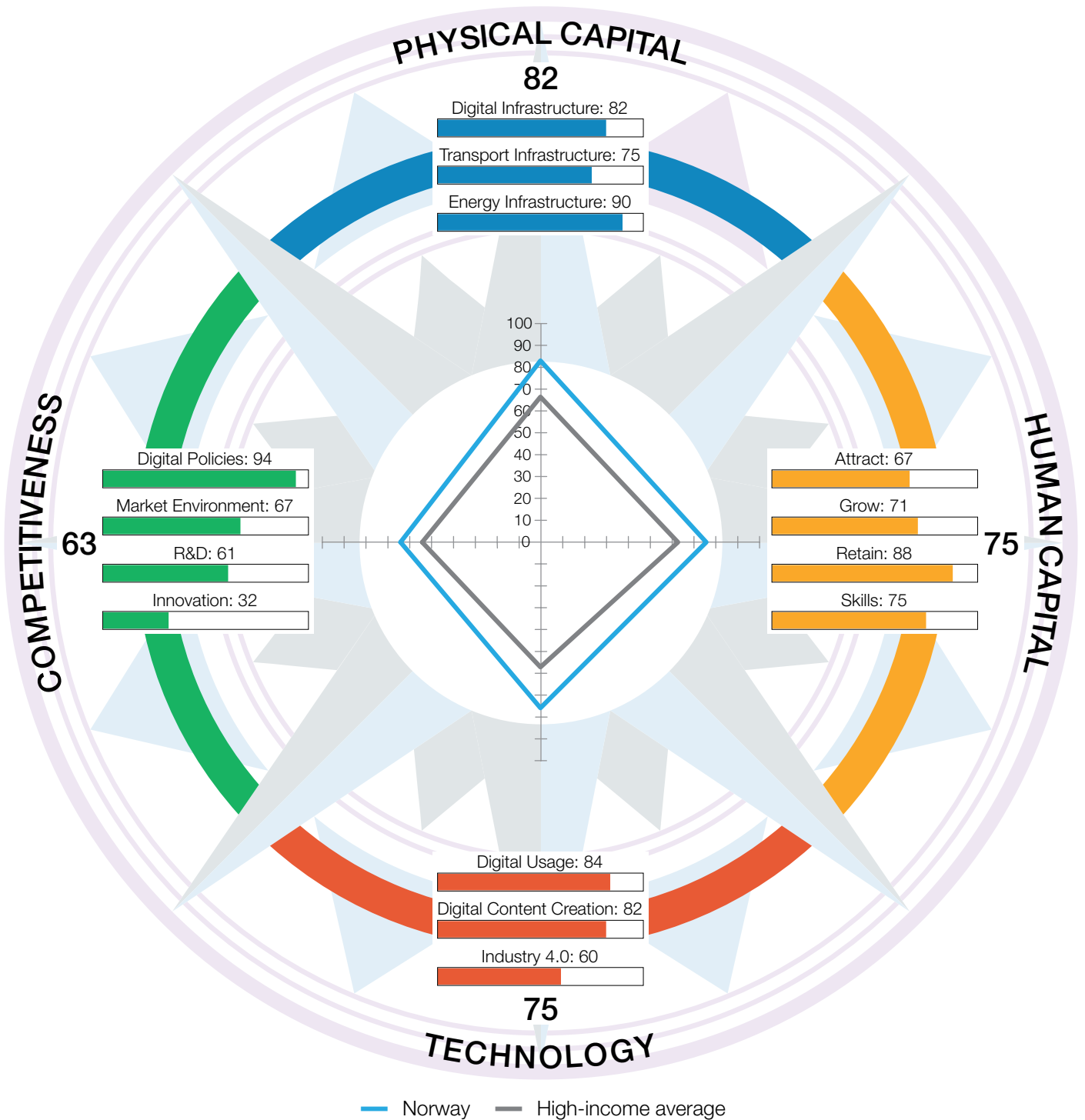
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	52.57	68	3	TECHNOLOGY	35.27	57
1.1	Digital Infrastructure	68.09	65	3.1	Digital Usage	61.12	55
1.1.1	Internet access	79.74	55	3.1.1	Internet users	80.49	48
1.1.2	International Internet bandwidth	33.94	98	3.1.2	Active mobile-broadband subscriptions	27.60	89
1.1.3	Fixed-broadband subscriptions	86.48	51	3.1.3	Gender parity in Internet usage	89.21	65
1.1.4	4G-mobile network coverage	99.58	30	3.1.4	Firms with website	60.81	47
1.1.5	Fixed broadband affordability	92.83	78	3.1.5	Internet shopping	21.59	55
1.1.6	Mobile broadband affordability	71.64	83	3.1.6	Government online services	67.89	57
1.1.7	Computer software spending	12.42	77	3.1.7	E-Participation	80.28	38
1.2	Transport Infrastructure	28.25	82	3.2	Digital Content Creation	39.65	45
1.2.1	Quality of infrastructure	32.38	83	3.2.1	GitHub commits	7.82	51
1.2.2	Rural access	65.88	63	3.2.2	Wikipedia edits	71.12	37
1.2.3	Air connectivity	5.04	75	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	73.95	53
1.3	Energy Infrastructure	61.36	36	3.3	Industry 4.0	5.03	75
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	7.34	69
1.3.3	Electrical outages	82.99	51	3.3.3	AI research	8.59	52
1.3.4	Energy intensity	83.73	39	3.3.4	ICT patent applications	0.00	74
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	40.30	71	4	COMPETITIVENESS	32.28	67
2.1	Attract	36.35	99	4.1	Digital Policies	56.89	53
2.1.1	Brain gain	7.66	120	4.1.1	ICT regulation	84.13	44
2.1.2	International students	13.69	49	4.1.2	Cybersecurity	89.69	46
2.1.3	Tolerance of minorities	41.49	67	4.1.3	Rule of law	36.08	60
2.1.4	Tolerance of immigrants	35.38	101	4.1.4	Regulatory quality	53.67	45
2.1.5	Gender parity in high-skilled jobs	97.84	10	4.1.5	Corruption	20.90	86
2.1.6	FDI and technology transfer	22.07	109	4.2	Market Environment	29.41	84
2.2	Grow	32.42	75	4.2.1	Extent of market dominance	20.51	113
2.2.1	Tertiary enrolment	28.64	71	4.2.2	Labour productivity	23.93	65
2.2.2	Reading, maths, and science	26.92	64	4.2.3	Urbanisation	49.70	75
2.2.3	Use of virtual professional networks	16.26	61	4.2.4	Domestic credit to private sector	23.51	60
2.2.4	Formal and non-formal studies	17.02	46	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	73.28	66	4.3	R&D	25.21	68
2.3	Retain	63.00	50	4.3.1	R&D spending	7.15	69
2.3.1	Pension coverage	67.96	66	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	52.79	41	4.3.3	Gender parity in R&D	84.28	21
2.3.3	Physician density	35.57	48	4.3.4	Scientific journal articles	9.39	56
2.3.4	Sanitation	99.06	29	4.4	Innovation	17.61	67
2.3.5	Personal safety	59.62	48	4.4.1	Medium- and high-tech industry	36.60	49
2.4	Skills	29.41	76	4.4.2	High-tech exports	6.71	86
2.4.1	Workforce with tertiary education	33.47	49	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	45.14	46	4.4.4	New product entrepreneurial activity	26.66	70
2.4.3	Researchers	9.77	53	4.4.5	New business density	15.25	36
2.4.4	Ease of finding skilled employees	30.30	108	4.4.6	Patent applications	2.84	53
2.4.5	Digital skills	28.36	41				

Norway

Key Indicators

Rank (out of 124)	5	GDP per capita (PPP US\$)	67,978.72
Income group	High income	GDP (US\$ billions)	362.52
Regional group	Europe	FREI score	74.07
Population (millions)	5.38	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0-100)

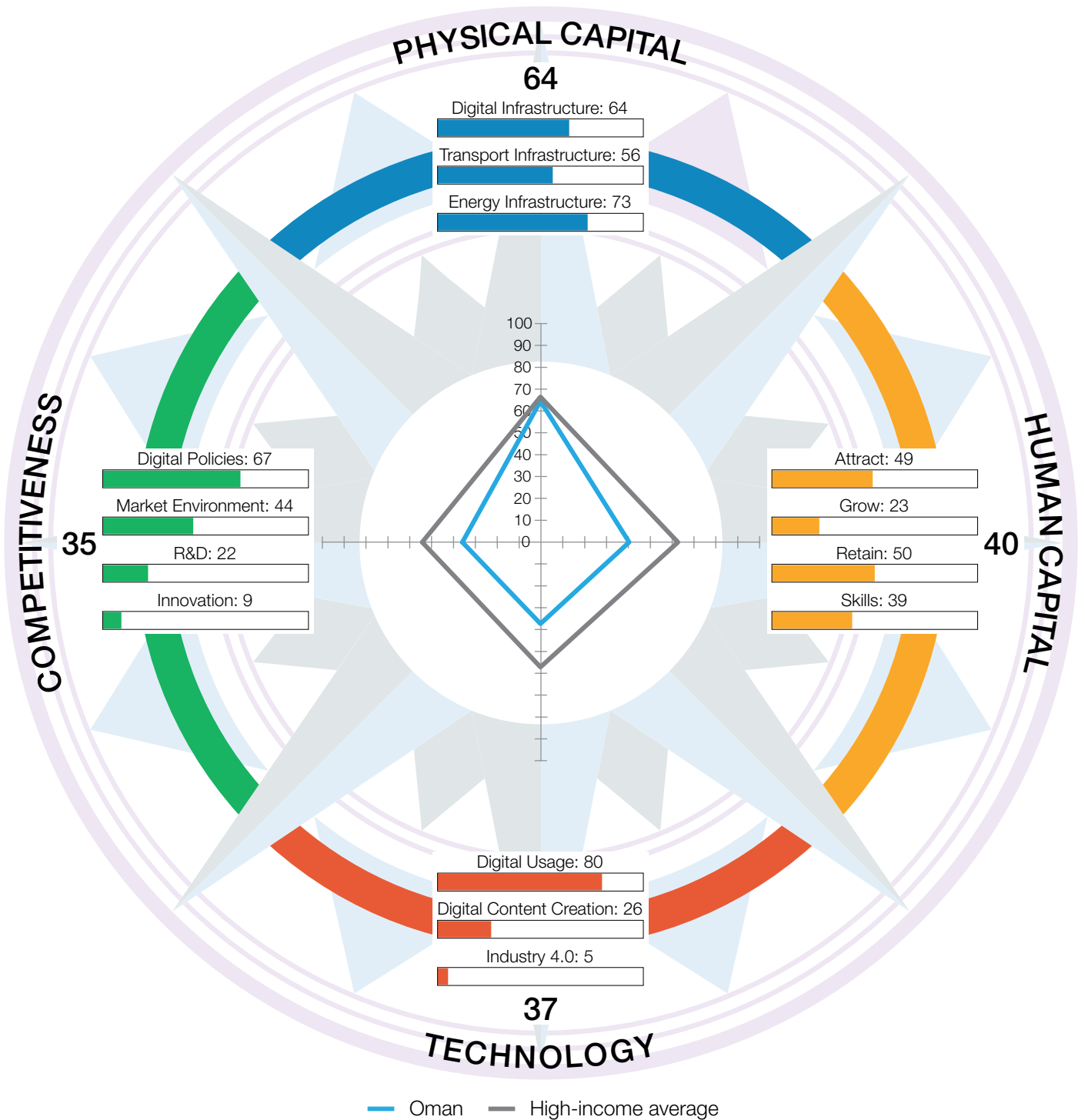


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	82.37	1	3	TECHNOLOGY	75.21	8
1.1	Digital Infrastructure	82.24	11	3.1	Digital Usage	84.23	13
1.1.1	Internet access	96.25	9	3.1.1	Internet users	96.85	8
1.1.2	International Internet bandwidth	48.67	43	3.1.2	Active mobile-broadband subscriptions	45.29	35
1.1.3	Fixed-broadband subscriptions	96.87	23	3.1.3	Gender parity in Internet usage	97.84	22
1.1.4	4G-mobile network coverage	99.90	15	3.1.4	Firms with website	79.25	22
1.1.5	Fixed broadband affordability	99.00	13	3.1.5	Internet shopping	96.99	3
1.1.6	Mobile broadband affordability	91.01	29	3.1.6	Government online services	84.68	19
1.1.7	Computer software spending	43.97	18	3.1.7	E-Participation	88.74	18
1.2	Transport Infrastructure	75.10	4	3.2	Digital Content Creation	81.68	4
1.2.1	Quality of infrastructure	75.80	22	3.2.1	GitHub commits	93.70	2
1.2.2	Rural access	68.55	61	3.2.2	Wikipedia edits	89.05	5
1.2.3	Air connectivity	60.25	10	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	94.31	14
1.3	Energy Infrastructure	89.77	1	3.3	Industry 4.0	59.71	11
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	16.47	25
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	88.65	5
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	73.23	5
1.3.4	Energy intensity	81.33	49	3.3.4	ICT patent applications	34.95	14
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	75.25	5	4	COMPETITIVENESS	63.46	11
2.1	Attract	67.25	21	4.1	Digital Policies	93.54	4
2.1.1	Brain gain	64.29	26	4.1.1	ICT regulation	93.51	11
2.1.2	International students	11.35	54	4.1.2	Cybersecurity	96.82	23
2.1.3	Tolerance of minorities	70.21	25	4.1.3	Rule of law	97.17	2
2.1.4	Tolerance of immigrants	95.38	3	4.1.4	Regulatory quality	86.15	8
2.1.5	Gender parity in high-skilled jobs	98.47	8	4.1.5	Corruption	94.03	7
2.1.6	FDI and technology transfer	63.82	36	4.2	Market Environment	67.24	9
2.2	Grow	71.27	7	4.2.1	Extent of market dominance	75.25	15
2.2.1	Tertiary enrolment	55.79	18	4.2.2	Labour productivity	79.11	5
2.2.2	Reading, maths, and science	66.48	21	4.2.3	Urbanisation	78.76	28
2.2.3	Use of virtual professional networks	55.53	14	4.2.4	Domestic credit to private sector	75.77	5
2.2.4	Formal and non-formal studies	81.26	6	4.2.5	Market capitalisation	27.33	23
2.2.5	Youth inclusion	97.27	5	4.3	R&D	60.62	7
2.3	Retain	87.74	5	4.3.1	R&D spending	41.80	15
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	54.73	23
2.3.2	Environmental performance	91.64	9	4.3.3	Gender parity in R&D	57.46	50
2.3.3	Physician density	60.79	14	4.3.4	Scientific journal articles	88.49	3
2.3.4	Sanitation	97.90	40	4.4	Innovation	32.43	28
2.3.5	Personal safety	88.38	9	4.4.1	Medium- and high-tech industry	49.80	31
2.4	Skills	74.73	4	4.4.2	High-tech exports	36.33	17
2.4.1	Workforce with tertiary education	54.54	15	4.4.3	Venture capital recipients, deals	16.04	33
2.4.2	High-skilled workforce	82.28	6	4.4.4	New product entrepreneurial activity	23.20	76
2.4.3	Researchers	80.14	6	4.4.5	New business density	36.43	17
2.4.4	Ease of finding skilled employees	92.76	6	4.4.6	Patent applications	32.80	18
2.4.5	Digital skills	63.94	9				

Key Indicators

Rank (out of 124)	48	GDP per capita (PPP US\$)	28,448.86
Income group	High income	GDP (US\$ billions)	76.33
Regional group	Middle East and North Africa	FREI score	44.18
Population (millions)	5.11	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



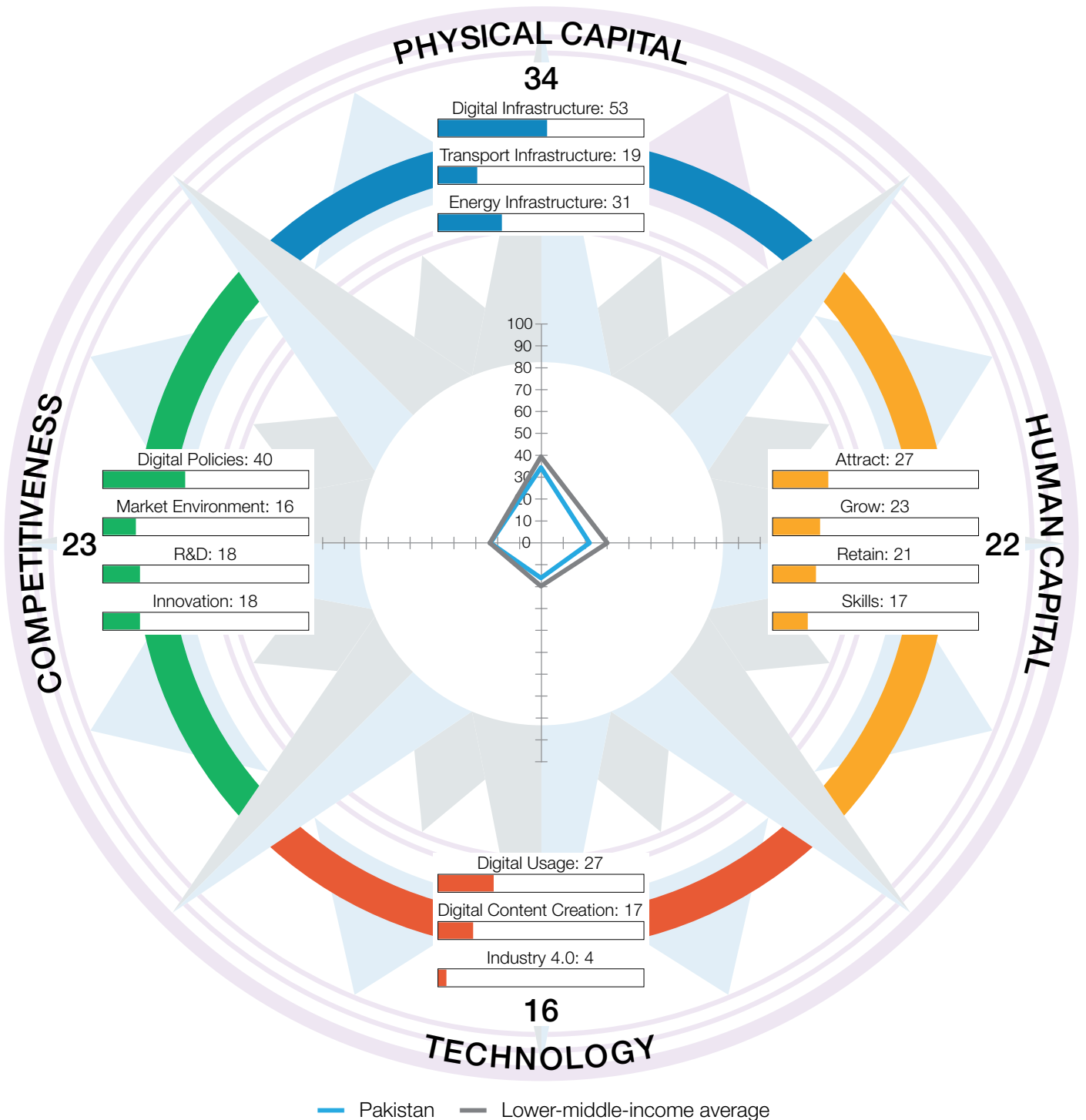
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	64.02	29	3	TECHNOLOGY	37.01	52
1.1	Digital Infrastructure	64.04	75	3.1	Digital Usage	80.28	19
1.1.1	Internet access	94.50	14	3.1.1	Internet users	95.00	11
1.1.2	International Internet bandwidth	54.02	29	3.1.2	Active mobile-broadband subscriptions	50.34	24
1.1.3	Fixed-broadband subscriptions	23.81	98	3.1.3	Gender parity in Internet usage	94.06	49
1.1.4	4G-mobile network coverage	97.60	59	3.1.4	Firms with website	n/a	n/a
1.1.5	Fixed broadband affordability	93.51	73	3.1.5	Internet shopping	n/a	n/a
1.1.6	Mobile broadband affordability	81.19	59	3.1.6	Government online services	81.75	24
1.1.7	Computer software spending	3.68	97	3.1.7	E-Participation	80.28	38
1.2	Transport Infrastructure	55.52	25	3.2	Digital Content Creation	26.14	78
1.2.1	Quality of infrastructure	56.94	37	3.2.1	GitHub commits	0.13	115
1.2.2	Rural access	26.70	110	3.2.2	Wikipedia edits	37.79	79
1.2.3	Air connectivity	38.42	16	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	65.76	68
1.3	Energy Infrastructure	72.50	7	3.3	Industry 4.0	4.62	80
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	0.14	63
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	1.99	99
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	5.79	60
1.3.4	Energy intensity	45.01	112	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	40.24	72	4	COMPETITIVENESS	35.44	53
2.1	Attract	49.02	48	4.1	Digital Policies	66.87	41
2.1.1	Brain gain	69.24	19	4.1.1	ICT regulation	80.28	60
2.1.2	International students	7.62	64	4.1.2	Cybersecurity	95.95	28
2.1.3	Tolerance of minorities	80.85	10	4.1.3	Rule of law	56.51	38
2.1.4	Tolerance of immigrants	n/a	n/a	4.1.4	Regulatory quality	52.34	48
2.1.5	Gender parity in high-skilled jobs	38.50	103	4.1.5	Corruption	49.25	38
2.1.6	FDI and technology transfer	48.87	59	4.2	Market Environment	44.35	39
2.2	Grow	23.30	100	4.2.1	Extent of market dominance	68.36	22
2.2.1	Tertiary enrolment	30.24	69	4.2.2	Labour productivity	30.97	52
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	81.50	24
2.2.3	Use of virtual professional networks	16.37	59	4.2.4	Domestic credit to private sector	32.57	43
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	8.36	56
2.2.5	Youth inclusion	n/a	n/a	4.3	R&D	21.88	75
2.3	Retain	49.61	75	4.3.1	R&D spending	4.20	82
2.3.1	Pension coverage	45.82	75	4.3.2	University ranking	29.49	62
2.3.2	Environmental performance	23.34	87	4.3.3	Gender parity in R&D	46.79	56
2.3.3	Physician density	23.75	71	4.3.4	Scientific journal articles	7.03	63
2.3.4	Sanitation	100.00	1	4.4	Innovation	8.65	103
2.3.5	Personal safety	55.16	61	4.4.1	Medium- and high-tech industry	25.41	70
2.4	Skills	39.03	46	4.4.2	High-tech exports	2.02	103
2.4.1	Workforce with tertiary education	n/a	n/a	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	30.64	72	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	3.33	73	4.4.5	New business density	5.76	67
2.4.4	Ease of finding skilled employees	76.02	25	4.4.6	Patent applications	1.39	66
2.4.5	Digital skills	46.12	19				

Pakistan

Key Indicators

Rank (out of 124)	104	GDP per capita (PPP US\$)	4,888.85
Income group	Lower-middle income	GDP (US\$ billions)	263.69
Regional group	Asia and Pacific	FREI score	23.77
Population (millions)	220.89	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



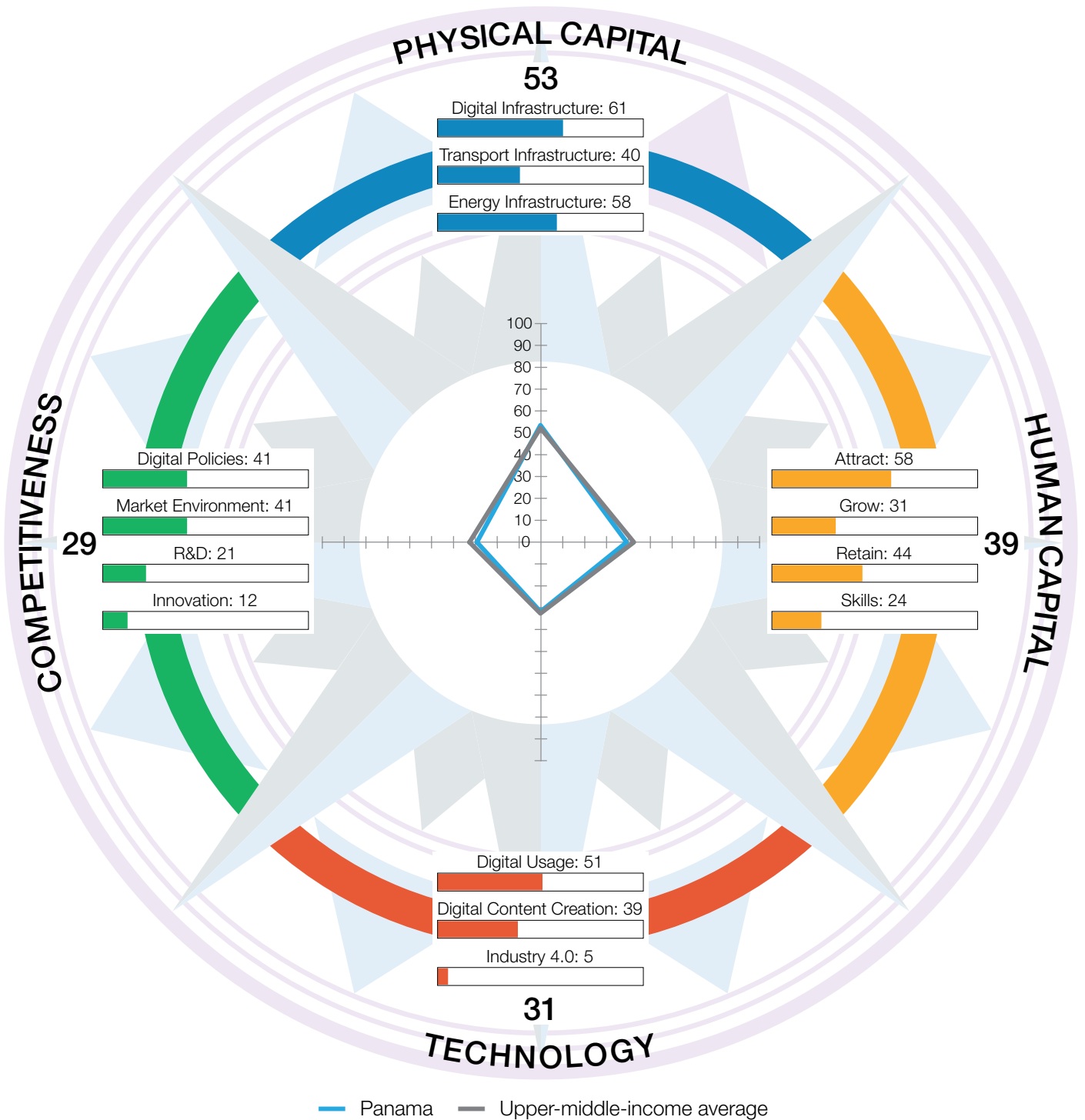
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	34.19	104	3	TECHNOLOGY	15.90	102
1.1	Digital Infrastructure	52.95	92	3.1	Digital Usage	26.64	104
1.1.1	Internet access	33.08	91	3.1.1	Internet users	12.97	113
1.1.2	International Internet bandwidth	42.80	68	3.1.2	Active mobile-broadband subscriptions	16.81	112
1.1.3	Fixed-broadband subscriptions	32.57	92	3.1.3	Gender parity in Internet usage	17.21	97
1.1.4	4G-mobile network coverage	68.80	99	3.1.4	Firms with website	40.74	72
1.1.5	Fixed broadband affordability	73.70	100	3.1.5	Internet shopping	1.05	118
1.1.6	Mobile broadband affordability	91.24	26	3.1.6	Government online services	54.01	80
1.1.7	Computer software spending	28.47	31	3.1.7	E-Participation	43.66	94
1.2	Transport Infrastructure	18.86	103	3.2	Digital Content Creation	17.38	102
1.2.1	Quality of infrastructure	22.78	108	3.2.1	GitHub commits	0.48	102
1.2.2	Rural access	49.28	86	3.2.2	Wikipedia edits	15.40	116
1.2.3	Air connectivity	0.82	104	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	53.37	92
1.3	Energy Infrastructure	30.76	117	3.3	Industry 4.0	3.70	87
1.3.1	Access to electricity	70.62	101	3.3.1	Robot density	0.00	68
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	10.82	58
1.3.3	Electrical outages	0.00	91	3.3.3	AI research	2.50	76
1.3.4	Energy intensity	71.86	79	3.3.4	ICT patent applications	0.01	71
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	22.04	117	4	COMPETITIVENESS	22.94	95
2.1	Attract	27.15	122	4.1	Digital Policies	39.58	92
2.1.1	Brain gain	40.01	80	4.1.1	ICT regulation	81.25	57
2.1.2	International students	n/a	n/a	4.1.2	Cybersecurity	64.09	85
2.1.3	Tolerance of minorities	11.70	113	4.1.3	Rule of law	17.39	102
2.1.4	Tolerance of immigrants	36.92	100	4.1.4	Regulatory quality	20.25	109
2.1.5	Gender parity in high-skilled jobs	4.27	118	4.1.5	Corruption	14.93	97
2.1.6	FDI and technology transfer	42.86	72	4.2	Market Environment	15.89	111
2.2	Grow	23.31	99	4.2.1	Extent of market dominance	43.39	69
2.2.1	Tertiary enrolment	7.72	103	4.2.2	Labour productivity	1.31	109
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	24.22	104
2.2.3	Use of virtual professional networks	4.76	100	4.2.4	Domestic credit to private sector	4.86	107
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	5.66	64
2.2.5	Youth inclusion	57.45	97	4.3	R&D	17.91	93
2.3	Retain	20.91	105	4.3.1	R&D spending	4.54	79
2.3.1	Pension coverage	3.88	114	4.3.2	University ranking	37.84	45
2.3.2	Environmental performance	13.94	106	4.3.3	Gender parity in R&D	26.89	83
2.3.3	Physician density	13.56	82	4.3.4	Scientific journal articles	2.38	84
2.3.4	Sanitation	56.70	99	4.4	Innovation	18.36	64
2.3.5	Personal safety	16.49	116	4.4.1	Medium- and high-tech industry	30.37	61
2.4	Skills	16.79	109	4.4.2	High-tech exports	3.03	99
2.4.1	Workforce with tertiary education	10.04	96	4.4.3	Venture capital recipients, deals	2.12	77
2.4.2	High-skilled workforce	13.97	102	4.4.4	New product entrepreneurial activity	56.03	31
2.4.3	Researchers	4.01	71	4.4.5	New business density	0.27	110
2.4.4	Ease of finding skilled employees	47.68	79	4.4.6	Patent applications	n/a	n/a
2.4.5	Digital skills	8.26	63				

Panama

Key Indicators

Rank (out of 124)	68	GDP per capita (PPP US\$)	32,767.70
Income group	Upper-middle income	GDP (US\$ billions)	52.94
Regional group	Latin America and the Caribbean	FREI score	38.15
Population (millions)	4.31	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



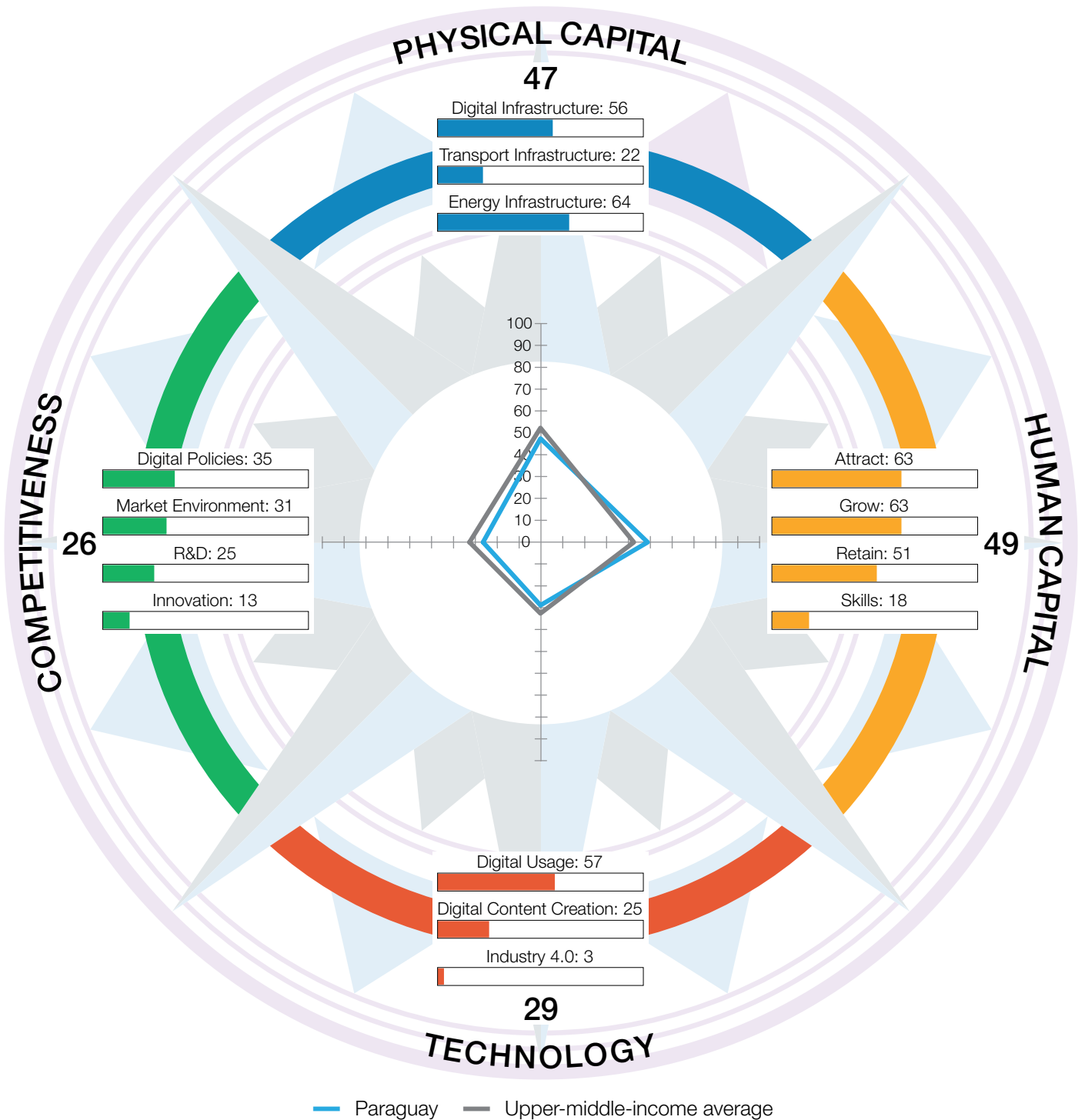
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	53.13	62	3	TECHNOLOGY	31.49	65
1.1	Digital Infrastructure	61.43	78	3.1	Digital Usage	51.12	75
1.1.1	Internet access	70.36	71	3.1.1	Internet users	61.83	83
1.1.2	International Internet bandwidth	46.97	52	3.1.2	Active mobile-broadband subscriptions	34.36	72
1.1.3	Fixed-broadband subscriptions	81.33	59	3.1.3	Gender parity in Internet usage	98.76	11
1.1.4	4G-mobile network coverage	52.00	106	3.1.4	Firms with website	n/a	n/a
1.1.5	Fixed broadband affordability	90.06	85	3.1.5	Internet shopping	7.81	76
1.1.6	Mobile broadband affordability	70.77	85	3.1.6	Government online services	53.28	81
1.1.7	Computer software spending	18.49	65	3.1.7	E-Participation	50.70	88
1.2	Transport Infrastructure	40.45	49	3.2	Digital Content Creation	38.82	47
1.2.1	Quality of infrastructure	55.87	40	3.2.1	GitHub commits	7.48	52
1.2.2	Rural access	20.93	116	3.2.2	Wikipedia edits	48.38	63
1.2.3	Air connectivity	23.18	33	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	71.88	60
1.3	Energy Infrastructure	57.51	67	3.3	Industry 4.0	4.53	83
1.3.1	Access to electricity	95.31	92	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	5.73	78
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	1.15	91
1.3.4	Energy intensity	99.74	2	3.3.4	ICT patent applications	2.88	38
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	39.15	74	4	COMPETITIVENESS	28.83	74
2.1	Attract	57.71	30	4.1	Digital Policies	41.15	84
2.1.1	Brain gain	52.47	51	4.1.1	ICT regulation	71.87	73
2.1.2	International students	n/a	n/a	4.1.2	Cybersecurity	32.63	103
2.1.3	Tolerance of minorities	45.74	59	4.1.3	Rule of law	31.82	69
2.1.4	Tolerance of immigrants	43.08	88	4.1.4	Regulatory quality	48.52	53
2.1.5	Gender parity in high-skilled jobs	75.53	61	4.1.5	Corruption	20.90	86
2.1.6	FDI and technology transfer	71.74	22	4.2	Market Environment	41.47	48
2.2	Grow	31.01	78	4.2.1	Extent of market dominance	46.46	59
2.2.1	Tertiary enrolment	31.81	66	4.2.2	Labour productivity	n/a	n/a
2.2.2	Reading, maths, and science	12.53	73	4.2.3	Urbanisation	61.36	59
2.2.3	Use of virtual professional networks	29.54	33	4.2.4	Domestic credit to private sector	48.25	23
2.2.4	Formal and non-formal studies	5.04	55	4.2.5	Market capitalisation	9.82	53
2.2.5	Youth inclusion	76.12	59	4.3	R&D	21.03	80
2.3	Retain	44.18	83	4.3.1	R&D spending	2.73	88
2.3.1	Pension coverage	27.86	86	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	38.68	63	4.3.3	Gender parity in R&D	79.80	28
2.3.3	Physician density	20.01	75	4.3.4	Scientific journal articles	1.61	90
2.3.4	Sanitation	82.00	85	4.4	Innovation	11.66	88
2.3.5	Personal safety	52.37	65	4.4.1	Medium- and high-tech industry	7.42	108
2.4	Skills	23.68	96	4.4.2	High-tech exports	22.02	33
2.4.1	Workforce with tertiary education	20.90	77	4.4.3	Venture capital recipients, deals	2.22	76
2.4.2	High-skilled workforce	35.66	59	4.4.4	New product entrepreneurial activity	15.28	83
2.4.3	Researchers	0.33	87	4.4.5	New business density	20.32	30
2.4.4	Ease of finding skilled employees	37.83	95	4.4.6	Patent applications	2.67	54
2.4.5	Digital skills	n/a	n/a				

Paraguay

Key Indicators

Rank (out of 124)	70	GDP per capita (PPP US\$)	13,231.71
Income group	Upper-middle income	GDP (US\$ billions)	35.30
Regional group	Latin America and the Caribbean	FREI score	37.57
Population (millions)	7.13	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



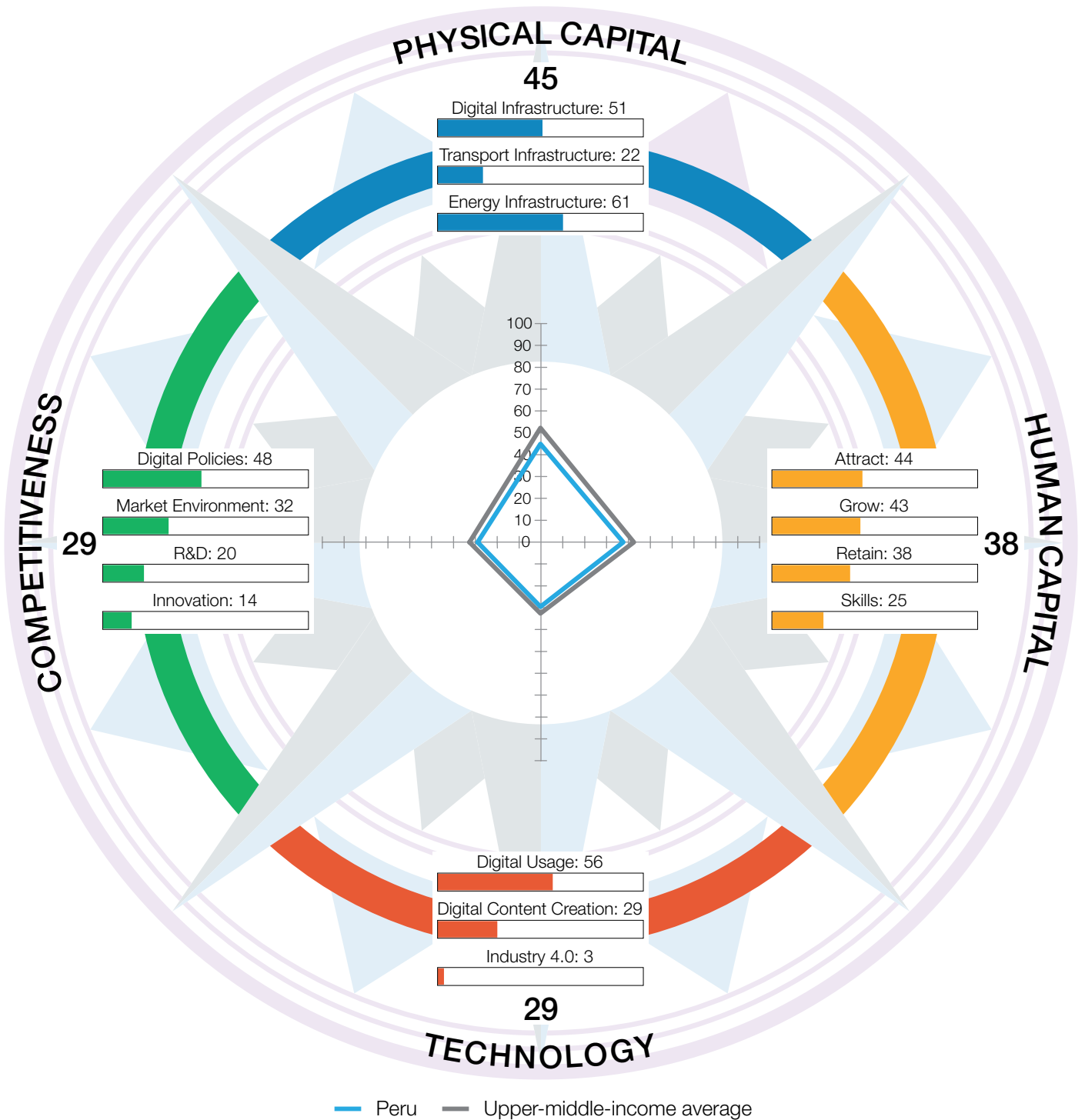
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	47.03	78	3	TECHNOLOGY	28.57	75
1.1	Digital Infrastructure	55.64	87	3.1	Digital Usage	57.24	64
1.1.1	Internet access	35.53	89	3.1.1	Internet users	73.25	64
1.1.2	International Internet bandwidth	30.14	103	3.1.2	Active mobile-broadband subscriptions	26.01	92
1.1.3	Fixed-broadband subscriptions	76.17	65	3.1.3	Gender parity in Internet usage	93.68	51
1.1.4	4G-mobile network coverage	96.60	65	3.1.4	Firms with website	70.60	33
1.1.5	Fixed broadband affordability	88.87	88	3.1.5	Internet shopping	3.22	107
1.1.6	Mobile broadband affordability	58.77	99	3.1.6	Government online services	63.51	64
1.1.7	Computer software spending	3.41	100	3.1.7	E-Participation	70.42	56
1.2	Transport Infrastructure	21.59	96	3.2	Digital Content Creation	25.40	80
1.2.1	Quality of infrastructure	35.23	76	3.2.1	GitHub commits	1.38	90
1.2.2	Rural access	39.53	98	3.2.2	Wikipedia edits	34.80	84
1.2.3	Air connectivity	1.18	100	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	64.18	71
1.3	Energy Infrastructure	63.84	27	3.3	Industry 4.0	3.08	92
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	1.71	101
1.3.3	Electrical outages	77.20	60	3.3.3	AI research	0.65	97
1.3.4	Energy intensity	82.44	45	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	48.68	45	4	COMPETITIVENESS	26.01	84
2.1	Attract	63.07	25	4.1	Digital Policies	35.15	101
2.1.1	Brain gain	44.99	69	4.1.1	ICT regulation	49.27	111
2.1.2	International students	n/a	n/a	4.1.2	Cybersecurity	56.12	89
2.1.3	Tolerance of minorities	56.38	45	4.1.3	Rule of law	25.64	85
2.1.4	Tolerance of immigrants	87.69	12	4.1.4	Regulatory quality	34.29	83
2.1.5	Gender parity in high-skilled jobs	94.07	20	4.1.5	Corruption	10.45	108
2.1.6	FDI and technology transfer	32.20	93	4.2	Market Environment	30.68	76
2.2	Grow	62.81	16	4.2.1	Extent of market dominance	32.15	93
2.2.1	Tertiary enrolment	n/a	n/a	4.2.2	Labour productivity	16.08	78
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	54.03	69
2.2.3	Use of virtual professional networks	11.28	73	4.2.4	Domestic credit to private sector	20.45	70
2.2.4	Formal and non-formal studies	100.00	1	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	77.16	56	4.3	R&D	25.13	69
2.3	Retain	50.87	71	4.3.1	R&D spending	2.71	89
2.3.1	Pension coverage	63.88	68	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	37.11	66	4.3.3	Gender parity in R&D	97.30	3
2.3.3	Physician density	16.53	79	4.3.4	Scientific journal articles	0.52	103
2.3.4	Sanitation	88.98	71	4.4	Innovation	13.08	86
2.3.5	Personal safety	47.83	71	4.4.1	Medium- and high-tech industry	26.90	67
2.4	Skills	17.97	105	4.4.2	High-tech exports	11.54	62
2.4.1	Workforce with tertiary education	17.40	84	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	25.93	79	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	1.58	77	4.4.5	New business density	0.80	104
2.4.4	Ease of finding skilled employees	26.96	110	4.4.6	Patent applications	n/a	n/a
2.4.5	Digital skills	n/a	n/a				

Peru

Key Indicators

Rank (out of 124)	83	GDP per capita (PPP US\$)	13,302.11
Income group	Upper-middle income	GDP (US\$ billions)	202.01
Regional group	Latin America and the Caribbean	FREI score	35.00
Population (millions)	32.97	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



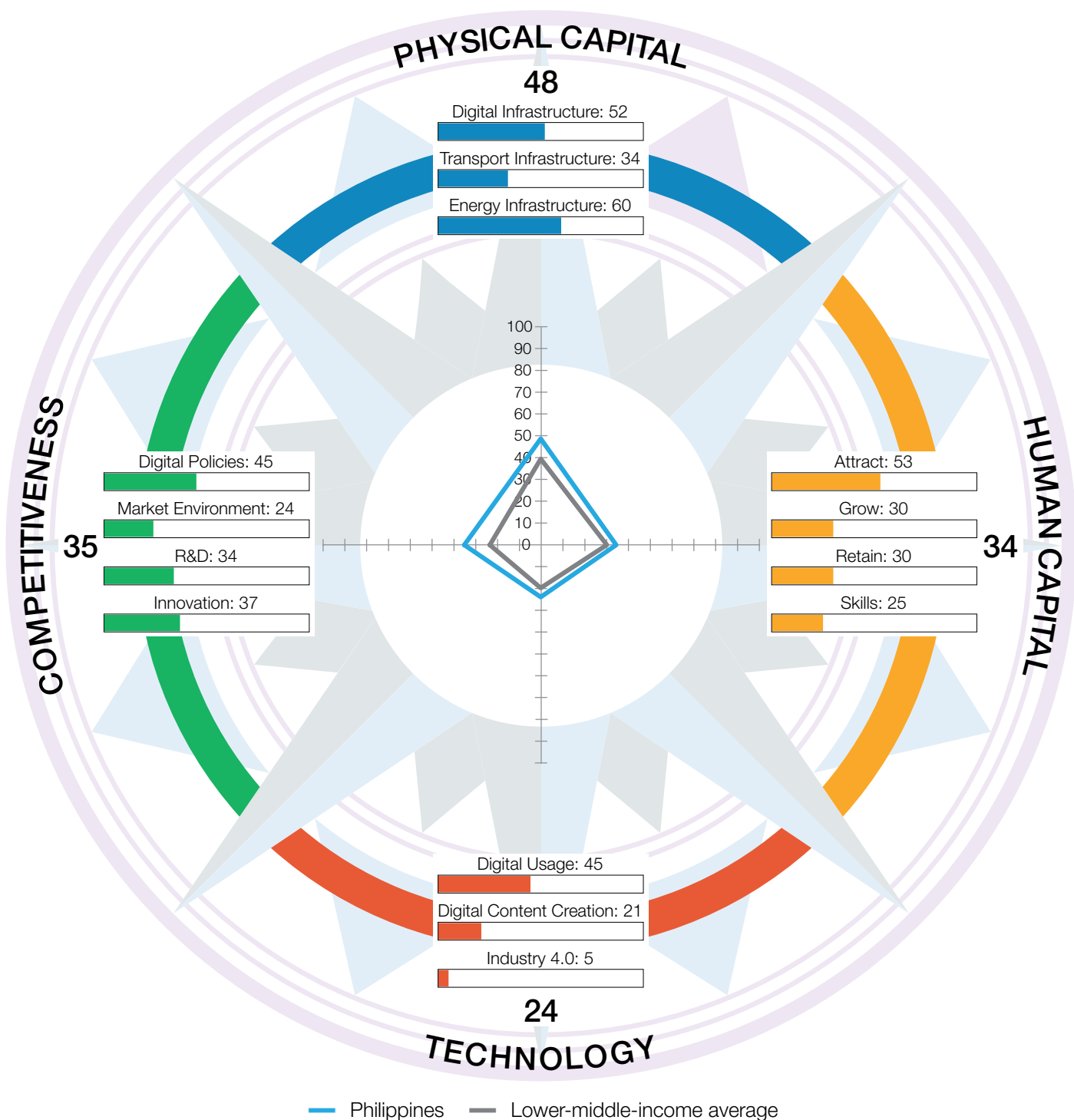
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	44.65	85	3	TECHNOLOGY	29.27	74
1.1	Digital Infrastructure	50.55	95	3.1	Digital Usage	55.59	70
1.1.1	Internet access	37.77	86	3.1.1	Internet users	63.53	80
1.1.2	International Internet bandwidth	36.80	89	3.1.2	Active mobile-broadband subscriptions	28.02	87
1.1.3	Fixed-broadband subscriptions	38.11	89	3.1.3	Gender parity in Internet usage	83.17	75
1.1.4	4G-mobile network coverage	52.24	105	3.1.4	Firms with website	67.70	38
1.1.5	Fixed broadband affordability	92.32	79	3.1.5	Internet shopping	5.56	85
1.1.6	Mobile broadband affordability	73.84	77	3.1.6	Government online services	69.34	51
1.1.7	Computer software spending	22.79	48	3.1.7	E-Participation	71.83	54
1.2	Transport Infrastructure	21.92	94	3.2	Digital Content Creation	29.21	68
1.2.1	Quality of infrastructure	25.62	102	3.2.1	GitHub commits	3.14	67
1.2.2	Rural access	44.47	93	3.2.2	Wikipedia edits	49.14	62
1.2.3	Air connectivity	5.40	72	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	61.81	75
1.3	Energy Infrastructure	61.48	34	3.3	Industry 4.0	3.02	93
1.3.1	Access to electricity	98.14	89	3.3.1	Robot density	0.19	62
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	4.53	87
1.3.3	Electrical outages	90.72	30	3.3.3	AI research	1.94	80
1.3.4	Energy intensity	89.33	18	3.3.4	ICT patent applications	0.06	69
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	37.56	78	4	COMPETITIVENESS	28.51	75
2.1	Attract	44.24	68	4.1	Digital Policies	48.36	72
2.1.1	Brain gain	36.30	89	4.1.1	ICT regulation	79.81	63
2.1.2	International students	n/a	n/a	4.1.2	Cybersecurity	54.67	90
2.1.3	Tolerance of minorities	13.83	108	4.1.3	Rule of law	27.79	78
2.1.4	Tolerance of immigrants	50.77	77	4.1.4	Regulatory quality	54.18	43
2.1.5	Gender parity in high-skilled jobs	72.04	68	4.1.5	Corruption	25.37	72
2.1.6	FDI and technology transfer	48.28	61	4.2	Market Environment	31.90	72
2.2	Grow	42.99	51	4.2.1	Extent of market dominance	31.99	94
2.2.1	Tertiary enrolment	47.33	32	4.2.2	Labour productivity	14.81	82
2.2.2	Reading, maths, and science	27.52	63	4.2.3	Urbanisation	73.56	39
2.2.3	Use of virtual professional networks	28.32	34	4.2.4	Domestic credit to private sector	23.02	62
2.2.4	Formal and non-formal studies	46.58	33	4.2.5	Market capitalisation	16.14	38
2.2.5	Youth inclusion	65.21	79	4.3	R&D	19.60	89
2.3	Retain	38.25	90	4.3.1	R&D spending	2.32	92
2.3.1	Pension coverage	34.39	81	4.3.2	University ranking	32.66	58
2.3.2	Environmental performance	32.93	76	4.3.3	Gender parity in R&D	41.43	67
2.3.3	Physician density	9.83	88	4.3.4	Scientific journal articles	1.99	86
2.3.4	Sanitation	72.32	92	4.4	Innovation	14.15	81
2.3.5	Personal safety	41.78	83	4.4.1	Medium- and high-tech industry	19.29	83
2.4	Skills	24.76	90	4.4.2	High-tech exports	6.55	87
2.4.1	Workforce with tertiary education	28.53	58	4.4.3	Venture capital recipients, deals	0.64	89
2.4.2	High-skilled workforce	19.25	90	4.4.4	New product entrepreneurial activity	41.13	54
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	15.76	34
2.4.4	Ease of finding skilled employees	34.55	101	4.4.6	Patent applications	1.57	64
2.4.5	Digital skills	16.73	55				

Philippines

Key Indicators

Rank (out of 124)	81	GDP per capita (PPP US\$)	9,291.04
Income group	Lower-middle income	GDP (US\$ billions)	361.49
Regional group	Asia and Pacific	FREI score	35.29
Population (millions)	109.58	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



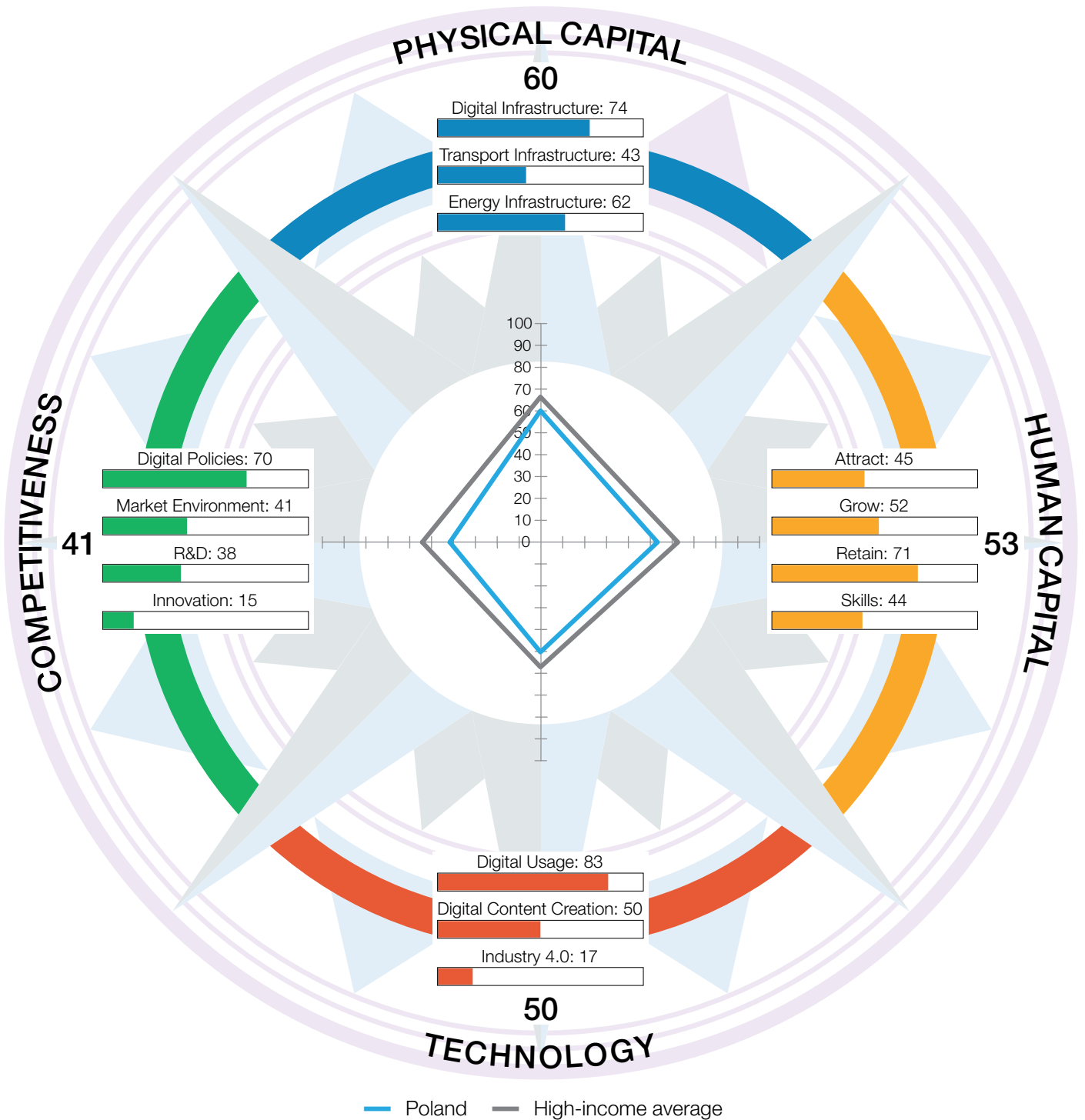
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	48.28	75	3	TECHNOLOGY	23.74	89
1.1	Digital Infrastructure	51.55	94	3.1	Digital Usage	44.90	85
1.1.1	Internet access	16.29	103	3.1.1	Internet users	44.25	91
1.1.2	International Internet bandwidth	34.22	96	3.1.2	Active mobile-broadband subscriptions	29.28	85
1.1.3	Fixed-broadband subscriptions	n/a	n/a	3.1.3	Gender parity in Internet usage	n/a	n/a
1.1.4	4G-mobile network coverage	80.00	88	3.1.4	Firms with website	47.39	63
1.1.5	Fixed broadband affordability	81.89	93	3.1.5	Internet shopping	11.62	67
1.1.6	Mobile broadband affordability	75.91	75	3.1.6	Government online services	66.42	59
1.1.7	Computer software spending	20.96	57	3.1.7	E-Participation	70.42	56
1.2	Transport Infrastructure	33.54	61	3.2	Digital Content Creation	21.07	94
1.2.1	Quality of infrastructure	41.64	65	3.2.1	GitHub commits	1.77	82
1.2.2	Rural access	79.07	44	3.2.2	Wikipedia edits	35.70	83
1.2.3	Air connectivity	6.80	63	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	46.26	99
1.3	Energy Infrastructure	59.76	50	3.3	Industry 4.0	5.26	74
1.3.1	Access to electricity	95.08	94	3.3.1	Robot density	1.18	50
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	7.53	68
1.3.3	Electrical outages	97.82	4	3.3.3	AI research	1.27	89
1.3.4	Energy intensity	87.87	22	3.3.4	ICT patent applications	0.10	65
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	34.38	87	4	COMPETITIVENESS	34.74	57
2.1	Attract	53.16	39	4.1	Digital Policies	44.55	79
2.1.1	Brain gain	36.78	88	4.1.1	ICT regulation	64.66	88
2.1.2	International students	n/a	n/a	4.1.2	Cybersecurity	76.48	69
2.1.3	Tolerance of minorities	27.66	88	4.1.3	Rule of law	21.56	92
2.1.4	Tolerance of immigrants	63.08	55	4.1.4	Regulatory quality	40.63	69
2.1.5	Gender parity in high-skilled jobs	73.63	65	4.1.5	Corruption	19.40	90
2.1.6	FDI and technology transfer	64.66	34	4.2	Market Environment	23.76	99
2.2	Grow	30.05	82	4.2.1	Extent of market dominance	20.04	117
2.2.1	Tertiary enrolment	23.46	78	4.2.2	Labour productivity	12.51	85
2.2.2	Reading, maths, and science	6.37	75	4.2.3	Urbanisation	36.47	96
2.2.3	Use of virtual professional networks	14.05	67	4.2.4	Domestic credit to private sector	21.46	67
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	28.30	21
2.2.5	Youth inclusion	76.30	58	4.3	R&D	33.87	48
2.3	Retain	29.57	96	4.3.1	R&D spending	2.92	87
2.3.1	Pension coverage	18.88	91	4.3.2	University ranking	31.77	61
2.3.2	Environmental performance	23.17	88	4.3.3	Gender parity in R&D	100.00	1
2.3.3	Physician density	7.08	95	4.3.4	Scientific journal articles	0.80	98
2.3.4	Sanitation	74.68	88	4.4	Innovation	36.77	24
2.3.5	Personal safety	24.05	110	4.4.1	Medium- and high-tech industry	52.46	26
2.4	Skills	24.75	91	4.4.2	High-tech exports	100.00	1
2.4.1	Workforce with tertiary education	30.85	55	4.4.3	Venture capital recipients, deals	2.95	73
2.4.2	High-skilled workforce	25.65	80	4.4.4	New product entrepreneurial activity	63.60	18
2.4.3	Researchers	1.15	79	4.4.5	New business density	1.06	103
2.4.4	Ease of finding skilled employees	62.30	51	4.4.6	Patent applications	0.56	78
2.4.5	Digital skills	3.79	73				

Poland

Key Indicators

Rank (out of 124)	35	GDP per capita (PPP US\$)	34,151.79
Income group	High income	GDP (US\$ billions)	594.16
Regional group	Europe	FREI score	50.97
Population (millions)	37.95	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



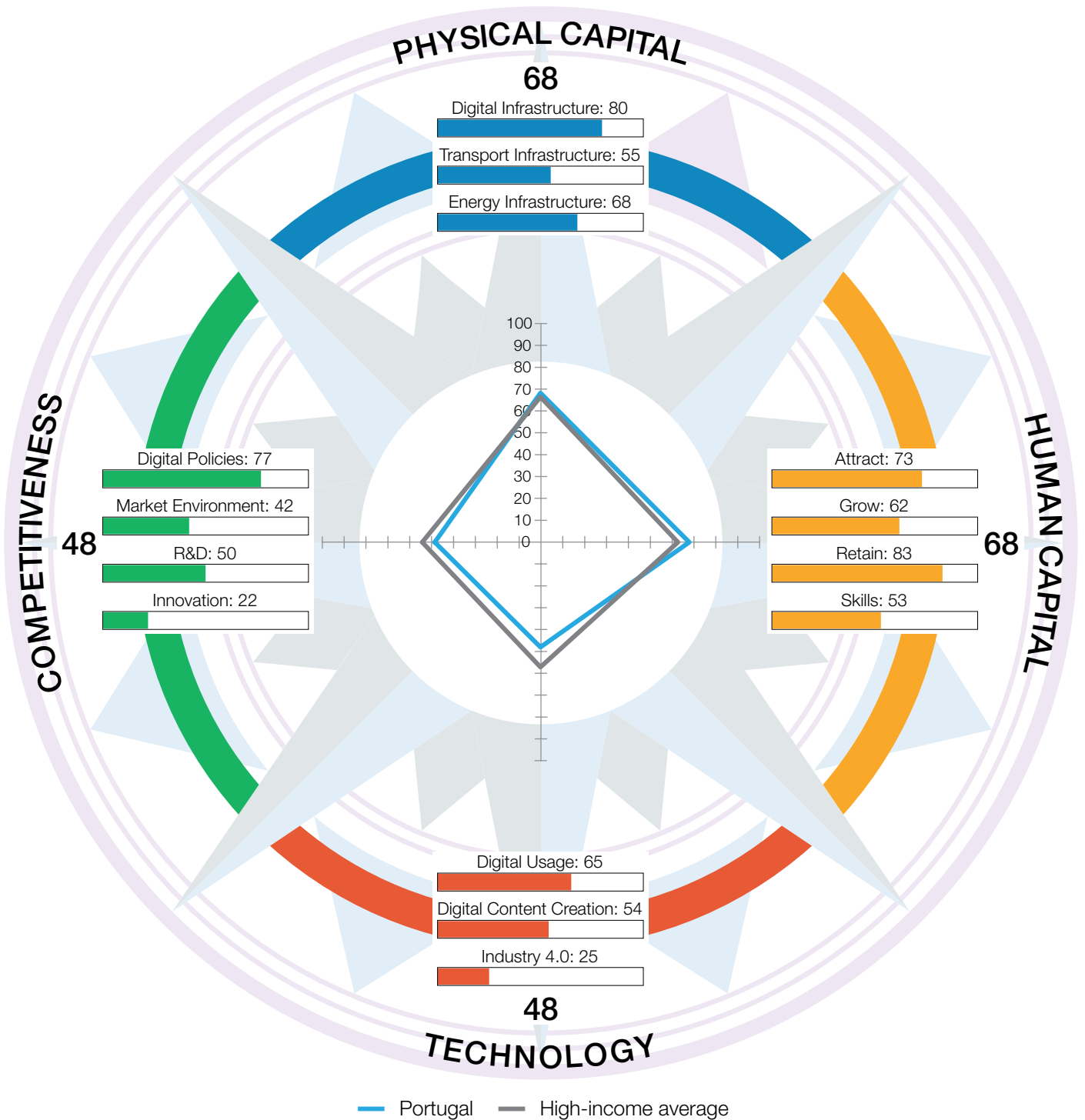
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	59.74	44	3	TECHNOLOGY	49.89	29
1.1	Digital Infrastructure	74.29	47	3.1	Digital Usage	83.32	15
1.1.1	Internet access	90.40	30	3.1.1	Internet users	86.19	33
1.1.2	International Internet bandwidth	32.24	100	3.1.2	Active mobile-broadband subscriptions	87.83	3
1.1.3	Fixed-broadband subscriptions	79.48	63	3.1.3	Gender parity in Internet usage	99.45	7
1.1.4	4G-mobile network coverage	100.00	1	3.1.4	Firms with website	70.26	35
1.1.5	Fixed broadband affordability	97.91	36	3.1.5	Internet shopping	61.28	23
1.1.6	Mobile broadband affordability	99.10	2	3.1.6	Government online services	82.48	22
1.1.7	Computer software spending	20.88	58	3.1.7	E-Participation	95.78	9
1.2	Transport Infrastructure	43.32	43	3.2	Digital Content Creation	49.57	33
1.2.1	Quality of infrastructure	58.72	31	3.2.1	GitHub commits	29.65	28
1.2.2	Rural access	92.03	25	3.2.2	Wikipedia edits	70.99	38
1.2.3	Air connectivity	6.74	65	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	81.43	39
1.3	Energy Infrastructure	61.61	33	3.3	Industry 4.0	16.76	34
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	12.54	30
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	31.44	25
1.3.3	Electrical outages	95.83	13	3.3.3	AI research	18.68	37
1.3.4	Energy intensity	80.12	53	3.3.4	ICT patent applications	2.97	36
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	53.10	37	4	COMPETITIVENESS	41.15	42
2.1	Attract	45.14	63	4.1	Digital Policies	69.78	34
2.1.1	Brain gain	28.29	96	4.1.1	ICT regulation	84.86	38
2.1.2	International students	10.23	56	4.1.2	Cybersecurity	93.72	37
2.1.3	Tolerance of minorities	45.74	59	4.1.3	Rule of law	54.11	41
2.1.4	Tolerance of immigrants	50.77	77	4.1.4	Regulatory quality	63.99	34
2.1.5	Gender parity in high-skilled jobs	77.84	55	4.1.5	Corruption	52.24	36
2.1.6	FDI and technology transfer	57.96	45	4.2	Market Environment	41.41	49
2.2	Grow	51.79	36	4.2.1	Extent of market dominance	73.61	17
2.2.1	Tertiary enrolment	46.28	35	4.2.2	Labour productivity	49.42	33
2.2.2	Reading, maths, and science	72.98	8	4.2.3	Urbanisation	52.21	71
2.2.3	Use of virtual professional networks	13.72	69	4.2.4	Domestic credit to private sector	20.68	68
2.2.4	Formal and non-formal studies	34.41	37	4.2.5	Market capitalisation	11.16	47
2.2.5	Youth inclusion	91.57	16	4.3	R&D	38.16	38
2.3	Retain	71.34	35	4.3.1	R&D spending	24.29	31
2.3.1	Pension coverage	83.27	57	4.3.2	University ranking	32.30	59
2.3.2	Environmental performance	62.37	37	4.3.3	Gender parity in R&D	58.69	48
2.3.3	Physician density	29.37	61	4.3.4	Scientific journal articles	37.38	32
2.3.4	Sanitation	98.70	33	4.4	Innovation	15.22	73
2.3.5	Personal safety	83.00	19	4.4.1	Medium- and high-tech industry	42.07	44
2.4	Skills	44.11	38	4.4.2	High-tech exports	16.24	48
2.4.1	Workforce with tertiary education	44.53	32	4.4.3	Venture capital recipients, deals	3.33	67
2.4.2	High-skilled workforce	63.16	28	4.4.4	New product entrepreneurial activity	19.13	80
2.4.3	Researchers	38.41	28	4.4.5	New business density	5.95	65
2.4.4	Ease of finding skilled employees	51.31	69	4.4.6	Patent applications	4.63	42
2.4.5	Digital skills	23.13	49				

Portugal

Key Indicators

Rank (out of 124)	26	GDP per capita (PPP US\$)	36,760.12
Income group	High income	GDP (US\$ billions)	231.23
Regional group	Europe	FREI score	57.72
Population (millions)	10.31	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)

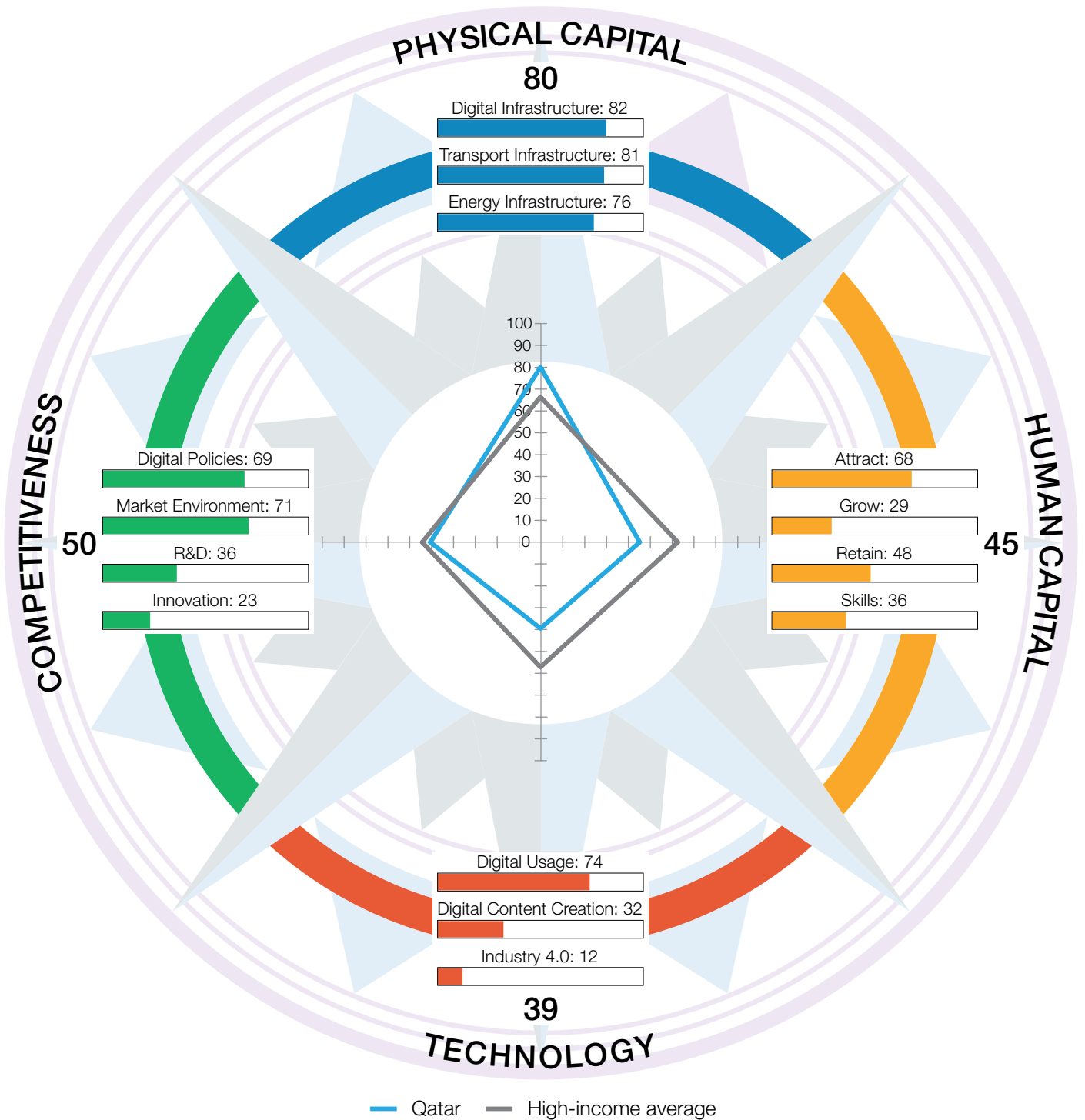


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	67.76	17	3	TECHNOLOGY	47.64	32
1.1	Digital Infrastructure	80.38	20	3.1	Digital Usage	64.70	49
1.1.1	Internet access	84.40	46	3.1.1	Internet users	77.19	56
1.1.2	International Internet bandwidth	50.02	41	3.1.2	Active mobile-broadband subscriptions	34.05	73
1.1.3	Fixed-broadband subscriptions	99.45	7	3.1.3	Gender parity in Internet usage	92.54	53
1.1.4	4G-mobile network coverage	99.90	15	3.1.4	Firms with website	58.45	51
1.1.5	Fixed broadband affordability	97.35	46	3.1.5	Internet shopping	32.24	41
1.1.6	Mobile broadband affordability	83.46	52	3.1.6	Government online services	79.56	35
1.1.7	Computer software spending	48.09	8	3.1.7	E-Participation	78.87	41
1.2	Transport Infrastructure	55.08	27	3.2	Digital Content Creation	53.53	27
1.2.1	Quality of infrastructure	60.14	30	3.2.1	GitHub commits	30.57	26
1.2.2	Rural access	98.41	7	3.2.2	Wikipedia edits	66.94	41
1.2.3	Air connectivity	37.54	17	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	85.10	33
1.3	Energy Infrastructure	67.81	15	3.3	Industry 4.0	24.68	25
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	20.21	24
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	36.30	21
1.3.3	Electrical outages	94.00	26	3.3.3	AI research	45.01	17
1.3.4	Energy intensity	89.07	19	3.3.4	ICT patent applications	5.67	28
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	67.53	18	4	COMPETITIVENESS	47.95	31
2.1	Attract	72.61	9	4.1	Digital Policies	77.12	23
2.1.1	Brain gain	53.53	46	4.1.1	ICT regulation	92.79	14
2.1.2	International students	25.87	26	4.1.2	Cybersecurity	97.26	20
2.1.3	Tolerance of minorities	91.49	4	4.1.3	Rule of law	73.30	22
2.1.4	Tolerance of immigrants	92.31	8	4.1.4	Regulatory quality	62.55	36
2.1.5	Gender parity in high-skilled jobs	96.17	15	4.1.5	Corruption	59.70	27
2.1.6	FDI and technology transfer	76.31	16	4.2	Market Environment	42.32	45
2.2	Grow	61.51	20	4.2.1	Extent of market dominance	55.24	44
2.2.1	Tertiary enrolment	45.43	39	4.2.2	Labour productivity	43.99	40
2.2.2	Reading, maths, and science	64.46	25	4.2.3	Urbanisation	58.37	64
2.2.3	Use of virtual professional networks	44.36	18	4.2.4	Domestic credit to private sector	44.46	28
2.2.4	Formal and non-formal studies	62.38	23	4.2.5	Market capitalisation	9.54	55
2.2.5	Youth inclusion	90.91	19	4.3	R&D	50.02	18
2.3	Retain	82.86	18	4.3.1	R&D spending	27.09	26
2.3.1	Pension coverage	90.20	51	4.3.2	University ranking	45.67	32
2.3.2	Environmental performance	73.00	27	4.3.3	Gender parity in R&D	71.98	37
2.3.3	Physician density	66.14	8	4.3.4	Scientific journal articles	55.34	18
2.3.4	Sanitation	99.58	18	4.4	Innovation	22.32	50
2.3.5	Personal safety	85.40	18	4.4.1	Medium- and high-tech industry	31.50	59
2.4	Skills	53.14	26	4.4.2	High-tech exports	11.38	63
2.4.1	Workforce with tertiary education	36.15	43	4.4.3	Venture capital recipients, deals	11.64	38
2.4.2	High-skilled workforce	60.38	30	4.4.4	New product entrepreneurial activity	39.09	56
2.4.3	Researchers	56.19	20	4.4.5	New business density	27.40	22
2.4.4	Ease of finding skilled employees	69.69	34	4.4.6	Patent applications	12.92	30
2.4.5	Digital skills	43.27	21				

Key Indicators

Rank (out of 124)	33	GDP per capita (PPP US\$)	93,851.75
Income group	High income	GDP (US\$ billions)	146.37
Regional group	Middle East and North Africa	FREI score	53.45
Population (millions)	2.88	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0-100)



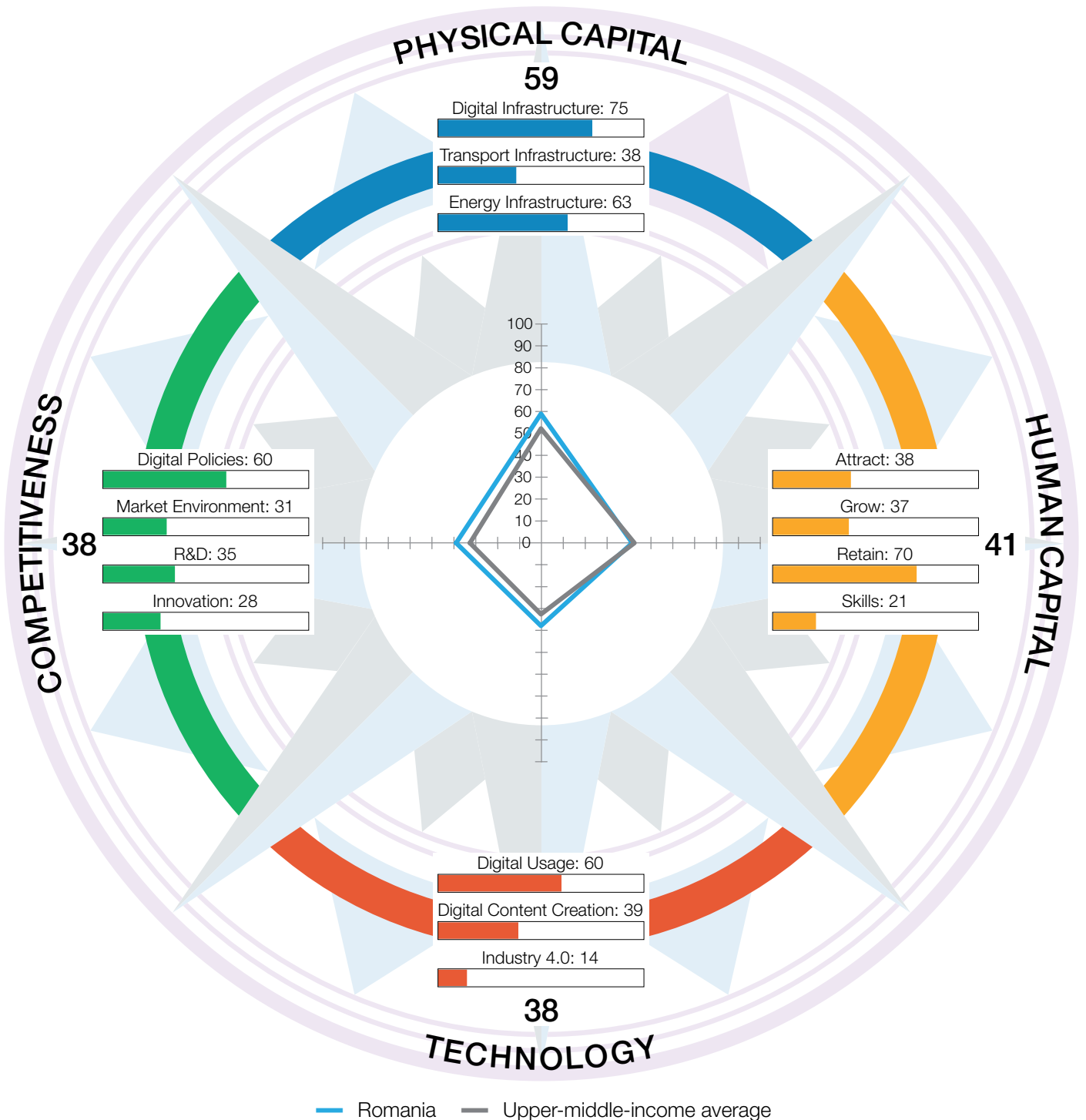
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	79.55	2	3	TECHNOLOGY	39.17	45
1.1	Digital Infrastructure	81.74	15	3.1	Digital Usage	73.57	31
1.1.1	Internet access	95.12	13	3.1.1	Internet users	99.64	2
1.1.2	International Internet bandwidth	56.22	22	3.1.2	Active mobile-broadband subscriptions	52.83	16
1.1.3	Fixed-broadband subscriptions	99.39	8	3.1.3	Gender parity in Internet usage	98.57	13
1.1.4	4G-mobile network coverage	99.80	26	3.1.4	Firms with website	n/a	n/a
1.1.5	Fixed broadband affordability	96.79	50	3.1.5	Internet shopping	n/a	n/a
1.1.6	Mobile broadband affordability	96.26	6	3.1.6	Government online services	57.66	75
1.1.7	Computer software spending	28.59	30	3.1.7	E-Participation	59.16	76
1.2	Transport Infrastructure	80.81	3	3.2	Digital Content Creation	31.64	61
1.2.1	Quality of infrastructure	64.77	25	3.2.1	GitHub commits	1.88	80
1.2.2	Rural access	58.46	77	3.2.2	Wikipedia edits	45.21	68
1.2.3	Air connectivity	100.00	1	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	76.18	46
1.3	Energy Infrastructure	76.12	4	3.3	Industry 4.0	12.29	43
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	0.10	66
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	7.27	70
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	21.15	35
1.3.4	Energy intensity	52.24	109	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	45.14	57	4	COMPETITIVENESS	49.96	26
2.1	Attract	67.70	20	4.1	Digital Policies	69.42	35
2.1.1	Brain gain	84.36	7	4.1.1	ICT regulation	59.14	96
2.1.2	International students	100.00	1	4.1.2	Cybersecurity	94.38	34
2.1.3	Tolerance of minorities	69.15	28	4.1.3	Rule of law	67.86	27
2.1.4	Tolerance of immigrants	83.08	20	4.1.4	Regulatory quality	63.04	35
2.1.5	Gender parity in high-skilled jobs	2.45	120	4.1.5	Corruption	62.69	25
2.1.6	FDI and technology transfer	67.17	27	4.2	Market Environment	71.04	7
2.2	Grow	28.73	87	4.2.1	Extent of market dominance	77.96	10
2.2.1	Tertiary enrolment	13.52	92	4.2.2	Labour productivity	73.73	9
2.2.2	Reading, maths, and science	32.41	57	4.2.3	Urbanisation	98.97	3
2.2.3	Use of virtual professional networks	40.27	22	4.2.4	Domestic credit to private sector	62.11	14
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	42.42	14
2.2.5	Youth inclusion	n/a	n/a	4.3	R&D	35.99	43
2.3	Retain	47.98	77	4.3.1	R&D spending	10.07	62
2.3.1	Pension coverage	17.76	93	4.3.2	University ranking	49.64	28
2.3.2	Environmental performance	20.91	94	4.3.3	Gender parity in R&D	62.75	44
2.3.3	Physician density	30.71	57	4.3.4	Scientific journal articles	21.48	42
2.3.4	Sanitation	100.00	1	4.4	Innovation	23.41	47
2.3.5	Personal safety	70.54	30	4.4.1	Medium- and high-tech industry	59.35	15
2.4	Skills	36.13	55	4.4.2	High-tech exports	0.00	123
2.4.1	Workforce with tertiary education	21.80	74	4.4.3	Venture capital recipients, deals	0.68	88
2.4.2	High-skilled workforce	31.49	70	4.4.4	New product entrepreneurial activity	52.54	41
2.4.3	Researchers	7.01	60	4.4.5	New business density	26.42	24
2.4.4	Ease of finding skilled employees	91.11	8	4.4.6	Patent applications	1.46	65
2.4.5	Digital skills	29.24	38				

Romania

Key Indicators

Rank (out of 124)	50	GDP per capita (PPP US\$)	32,349.20
Income group	Upper-middle income	GDP (US\$ billions)	248.72
Regional group	Europe	FREI score	44.00
Population (millions)	19.29	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



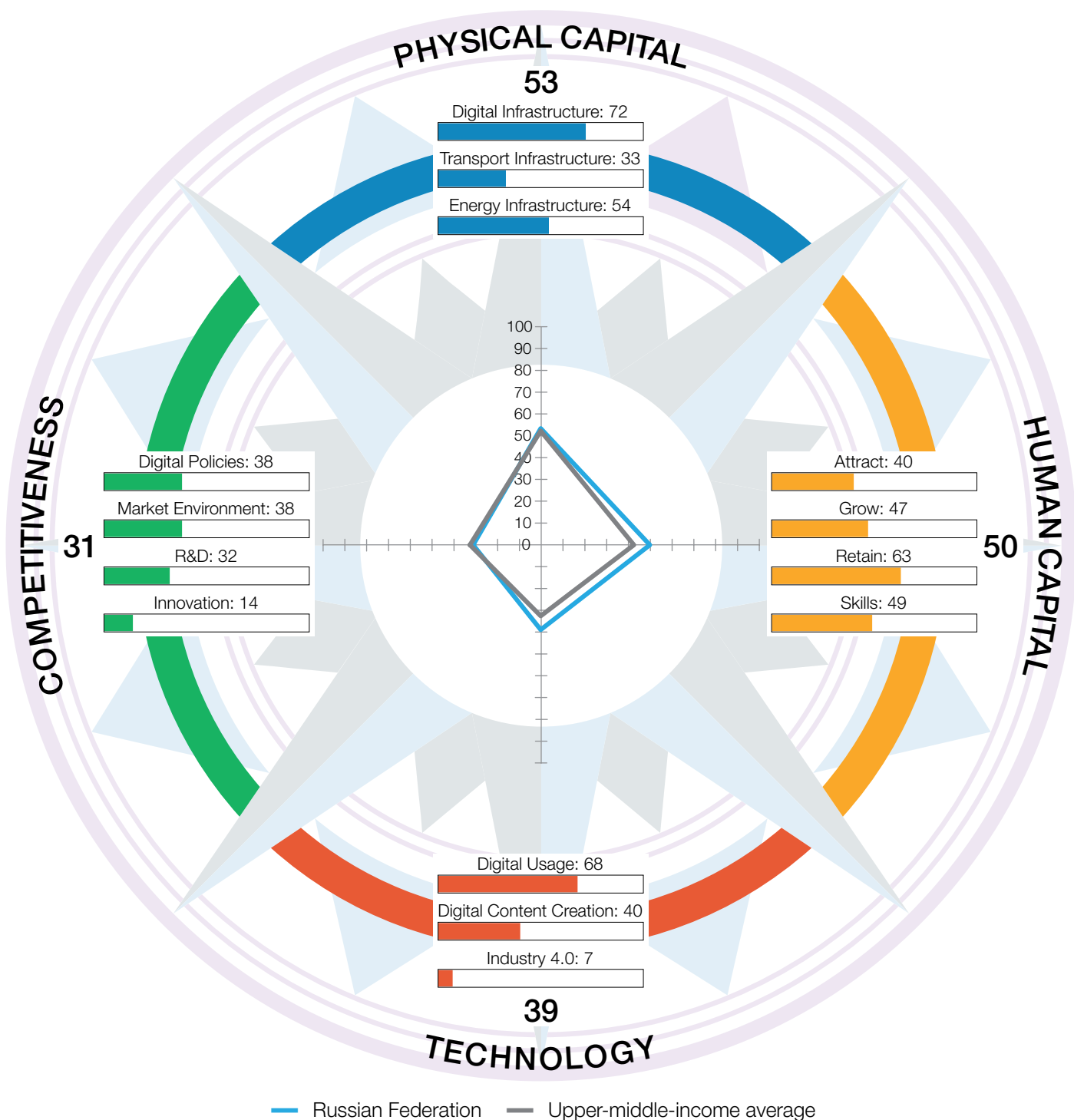
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	58.55	48	3	TECHNOLOGY	37.61	49
1.1	Digital Infrastructure	75.43	44	3.1	Digital Usage	59.86	60
1.1.1	Internet access	86.18	39	3.1.1	Internet users	77.39	53
1.1.2	International Internet bandwidth	41.19	76	3.1.2	Active mobile-broadband subscriptions	39.98	51
1.1.3	Fixed-broadband subscriptions	96.84	25	3.1.3	Gender parity in Internet usage	91.27	63
1.1.4	4G-mobile network coverage	99.22	36	3.1.4	Firms with website	47.27	64
1.1.5	Fixed broadband affordability	99.34	6	3.1.5	Internet shopping	19.99	58
1.1.6	Mobile broadband affordability	84.01	50	3.1.6	Government online services	65.69	60
1.1.7	Computer software spending	21.25	56	3.1.7	E-Participation	77.46	46
1.2	Transport Infrastructure	37.71	52	3.2	Digital Content Creation	39.33	46
1.2.1	Quality of infrastructure	48.04	50	3.2.1	GitHub commits	13.24	43
1.2.2	Rural access	73.97	54	3.2.2	Wikipedia edits	54.88	55
1.2.3	Air connectivity	6.61	67	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	81.11	40
1.3	Energy Infrastructure	62.52	30	3.3	Industry 4.0	13.65	40
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	6.25	37
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	21.77	34
1.3.3	Electrical outages	81.92	52	3.3.3	AI research	13.08	42
1.3.4	Energy intensity	89.93	16	3.3.4	ICT patent applications	1.10	47
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	41.46	65	4	COMPETITIVENESS	38.38	47
2.1	Attract	38.06	92	4.1	Digital Policies	59.56	49
2.1.1	Brain gain	15.22	114	4.1.1	ICT regulation	88.46	29
2.1.2	International students	15.09	44	4.1.2	Cybersecurity	75.76	70
2.1.3	Tolerance of minorities	41.49	67	4.1.3	Rule of law	49.01	45
2.1.4	Tolerance of immigrants	35.38	101	4.1.4	Regulatory quality	50.25	52
2.1.5	Gender parity in high-skilled jobs	82.81	45	4.1.5	Corruption	34.33	53
2.1.6	FDI and technology transfer	38.38	81	4.2	Market Environment	30.52	77
2.2	Grow	36.86	59	4.2.1	Extent of market dominance	49.69	53
2.2.1	Tertiary enrolment	34.21	62	4.2.2	Labour productivity	45.04	38
2.2.2	Reading, maths, and science	38.25	48	4.2.3	Urbanisation	44.96	86
2.2.3	Use of virtual professional networks	20.35	52	4.2.4	Domestic credit to private sector	9.13	101
2.2.4	Formal and non-formal studies	9.28	49	4.2.5	Market capitalisation	3.78	72
2.2.5	Youth inclusion	82.22	44	4.3	R&D	35.29	45
2.3	Retain	70.37	38	4.3.1	R&D spending	9.90	63
2.3.1	Pension coverage	93.37	43	4.3.2	University ranking	28.74	63
2.3.2	Environmental performance	68.99	32	4.3.3	Gender parity in R&D	81.39	25
2.3.3	Physician density	36.92	46	4.3.4	Scientific journal articles	21.13	43
2.3.4	Sanitation	83.07	82	4.4	Innovation	28.17	34
2.3.5	Personal safety	69.51	33	4.4.1	Medium- and high-tech industry	57.06	19
2.4	Skills	20.54	101	4.4.2	High-tech exports	17.78	43
2.4.1	Workforce with tertiary education	25.06	68	4.4.3	Venture capital recipients, deals	2.68	75
2.4.2	High-skilled workforce	35.55	60	4.4.4	New product entrepreneurial activity	59.44	24
2.4.3	Researchers	10.80	51	4.4.5	New business density	30.90	19
2.4.4	Ease of finding skilled employees	24.27	112	4.4.6	Patent applications	1.14	70
2.4.5	Digital skills	7.05	65				

Russian Federation

Key Indicators

Rank (out of 124)	54	GDP per capita (PPP US\$)	28,213.45
Income group	Upper-middle income	GDP (US\$ billions)	1,483.50
Regional group	Europe	FREI score	42.98
Population (millions)	144.10	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)

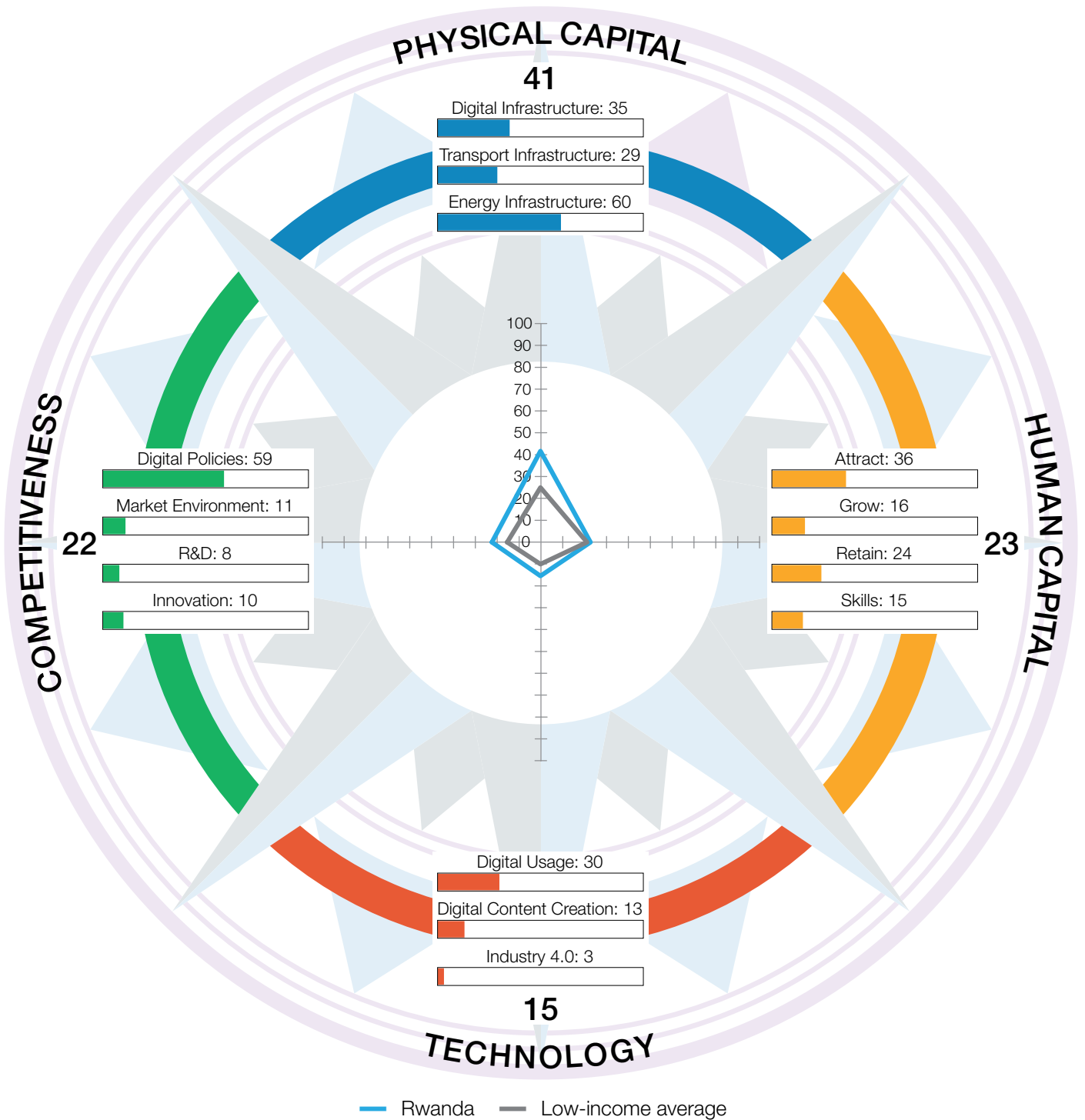


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	52.96	65	3	TECHNOLOGY	38.61	48
1.1	Digital Infrastructure	71.55	57	3.1	Digital Usage	68.11	41
1.1.1	Internet access	79.86	54	3.1.1	Internet users	84.25	40
1.1.2	International Internet bandwidth	43.84	64	3.1.2	Active mobile-broadband subscriptions	43.78	38
1.1.3	Fixed-broadband subscriptions	81.60	58	3.1.3	Gender parity in Internet usage	97.66	24
1.1.4	4G-mobile network coverage	88.73	79	3.1.4	Firms with website	54.76	55
1.1.5	Fixed broadband affordability	99.42	5	3.1.5	Internet shopping	34.47	39
1.1.6	Mobile broadband affordability	83.10	54	3.1.6	Government online services	77.37	39
1.1.7	Computer software spending	24.31	41	3.1.7	E-Participation	84.50	27
1.2	Transport Infrastructure	33.20	64	3.2	Digital Content Creation	40.36	44
1.2.1	Quality of infrastructure	43.42	60	3.2.1	GitHub commits	13.87	40
1.2.2	Rural access	62.57	69	3.2.2	Wikipedia edits	60.02	50
1.2.3	Air connectivity	6.33	69	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	79.19	41
1.3	Energy Infrastructure	54.13	81	3.3	Industry 4.0	7.36	62
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	1.42	48
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	9.40	61
1.3.3	Electrical outages	95.83	13	3.3.3	AI research	9.92	49
1.3.4	Energy intensity	41.82	115	3.3.4	ICT patent applications	2.78	39
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	49.63	43	4	COMPETITIVENESS	30.71	72
2.1	Attract	39.68	86	4.1	Digital Policies	38.38	94
2.1.1	Brain gain	41.58	76	4.1.1	ICT regulation	37.26	119
2.1.2	International students	13.19	50	4.1.2	Cybersecurity	98.02	8
2.1.3	Tolerance of minorities	20.21	98	4.1.3	Rule of law	15.34	104
2.1.4	Tolerance of immigrants	72.31	38	4.1.4	Regulatory quality	27.87	94
2.1.5	Gender parity in high-skilled jobs	60.13	82	4.1.5	Corruption	13.43	102
2.1.6	FDI and technology transfer	30.66	95	4.2	Market Environment	37.70	58
2.2	Grow	47.16	45	4.2.1	Extent of market dominance	40.12	77
2.2.1	Tertiary enrolment	57.94	17	4.2.2	Labour productivity	36.11	46
2.2.2	Reading, maths, and science	60.11	30	4.2.3	Urbanisation	69.41	45
2.2.3	Use of virtual professional networks	5.86	94	4.2.4	Domestic credit to private sector	25.32	58
2.2.4	Formal and non-formal studies	26.09	42	4.2.5	Market capitalisation	17.53	37
2.2.5	Youth inclusion	85.79	34	4.3	R&D	32.29	52
2.3	Retain	63.11	49	4.3.1	R&D spending	19.68	37
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	54.72	24
2.3.2	Environmental performance	44.25	55	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	55.20	18	4.3.4	Scientific journal articles	22.46	41
2.3.4	Sanitation	89.73	69	4.4	Innovation	14.46	77
2.3.5	Personal safety	26.38	108	4.4.1	Medium- and high-tech industry	37.69	47
2.4	Skills	48.57	31	4.4.2	High-tech exports	20.89	38
2.4.1	Workforce with tertiary education	62.71	6	4.4.3	Venture capital recipients, deals	0.24	91
2.4.2	High-skilled workforce	72.34	19	4.4.4	New product entrepreneurial activity	9.90	85
2.4.3	Researchers	34.42	31	4.4.5	New business density	13.67	40
2.4.4	Ease of finding skilled employees	66.38	42	4.4.6	Patent applications	4.36	45
2.4.5	Digital skills	7.03	66				

Key Indicators

Rank (out of 124)	99	GDP per capita (PPP US\$)	2,321.37
Income group	Low income	GDP (US\$ billions)	10.33
Regional group	Sub-Saharan Africa	FREI score	25.35
Population (millions)	12.95	FREI score (income group average)	17.76

FREI 2022 scores by pillar and sub-pillar (0–100)



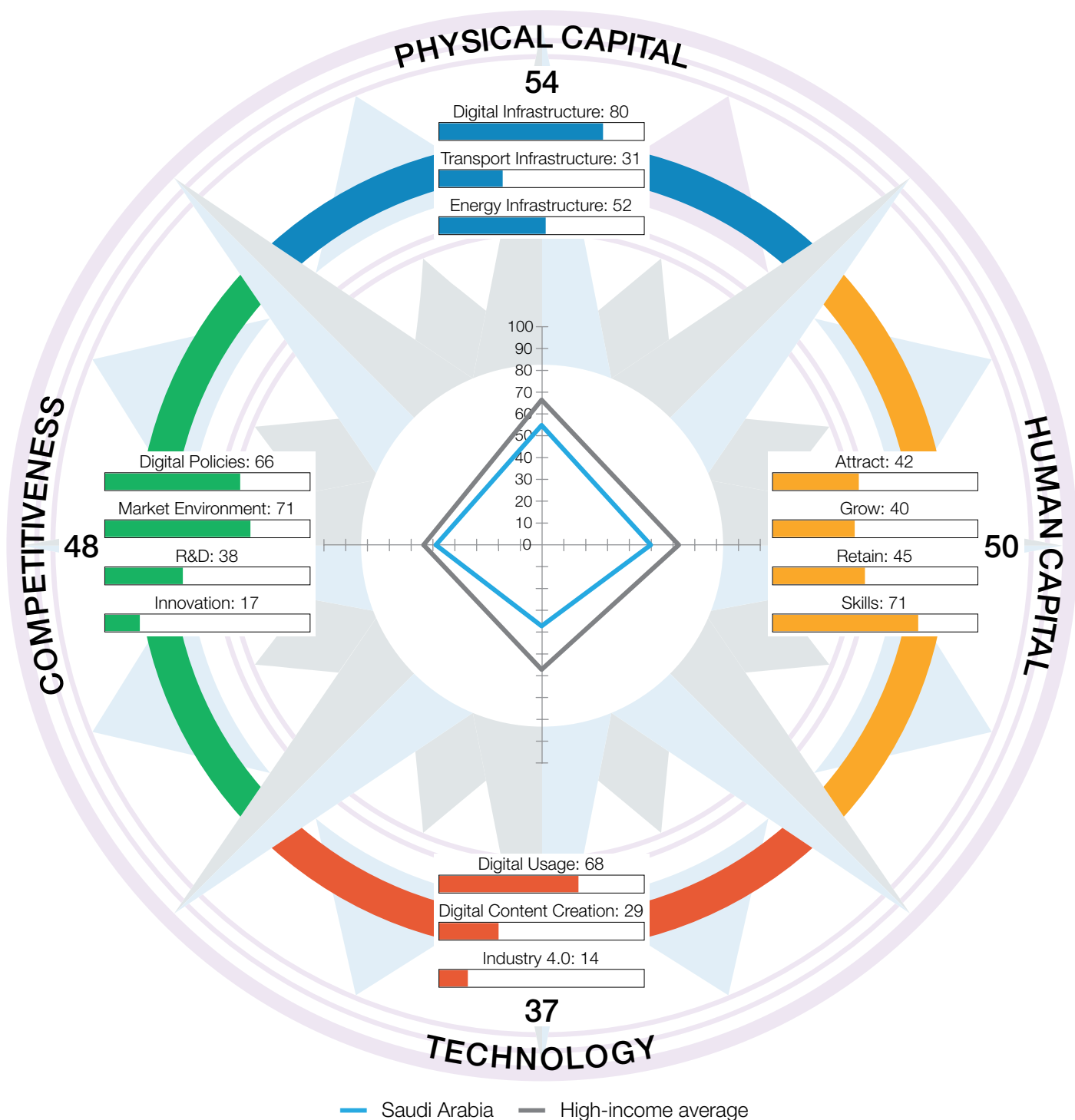
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	41.38	94	3	TECHNOLOGY	15.30	104
1.1	Digital Infrastructure	34.99	105	3.1	Digital Usage	30.20	100
1.1.1	Internet access	7.78	110	3.1.1	Internet users	17.90	110
1.1.2	International Internet bandwidth	27.76	106	3.1.2	Active mobile-broadband subscriptions	17.66	110
1.1.3	Fixed-broadband subscriptions	71.09	70	3.1.3	Gender parity in Internet usage	n/a	n/a
1.1.4	4G-mobile network coverage	98.07	52	3.1.4	Firms with website	35.54	77
1.1.5	Fixed broadband affordability	0.00	120	3.1.5	Internet shopping	1.23	117
1.1.6	Mobile broadband affordability	36.29	114	3.1.6	Government online services	52.55	83
1.1.7	Computer software spending	3.95	96	3.1.7	E-Participation	56.34	81
1.2	Transport Infrastructure	29.24	76	3.2	Digital Content Creation	12.89	112
1.2.1	Quality of infrastructure	42.70	63	3.2.1	GitHub commits	0.39	105
1.2.2	Rural access	73.20	55	3.2.2	Wikipedia edits	27.12	99
1.2.3	Air connectivity	0.45	107	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	23.95	116
1.3	Energy Infrastructure	59.90	48	3.3	Industry 4.0	2.80	96
1.3.1	Access to electricity	29.94	118	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	6.59	75
1.3.3	Electrical outages	71.89	63	3.3.3	AI research	0.35	104
1.3.4	Energy intensity	77.88	62	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	22.71	114	4	COMPETITIVENESS	22.02	97
2.1	Attract	35.91	102	4.1	Digital Policies	58.87	51
2.1.1	Brain gain	64.79	25	4.1.1	ICT regulation	80.28	60
2.1.2	International students	9.65	58	4.1.2	Cybersecurity	79.50	65
2.1.3	Tolerance of minorities	3.19	121	4.1.3	Rule of law	41.21	55
2.1.4	Tolerance of immigrants	41.54	91	4.1.4	Regulatory quality	44.08	62
2.1.5	Gender parity in high-skilled jobs	53.46	92	4.1.5	Corruption	49.25	38
2.1.6	FDI and technology transfer	42.84	73	4.2	Market Environment	11.16	119
2.2	Grow	16.04	119	4.2.1	Extent of market dominance	33.81	91
2.2.1	Tertiary enrolment	3.67	114	4.2.2	Labour productivity	0.97	111
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	0.94	122
2.2.3	Use of virtual professional networks	2.65	111	4.2.4	Domestic credit to private sector	8.46	105
2.2.4	Formal and non-formal studies	3.18	62	4.2.5	Market capitalisation	11.59	45
2.2.5	Youth inclusion	54.67	101	4.3	R&D	7.96	108
2.3	Retain	23.82	101	4.3.1	R&D spending	12.86	50
2.3.1	Pension coverage	1.12	119	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	15.16	102	4.3.3	Gender parity in R&D	18.48	91
2.3.3	Physician density	1.03	111	4.3.4	Scientific journal articles	0.51	104
2.3.4	Sanitation	63.94	94	4.4	Innovation	10.08	95
2.3.5	Personal safety	37.84	88	4.4.1	Medium- and high-tech industry	7.98	106
2.4	Skills	15.05	111	4.4.2	High-tech exports	16.95	45
2.4.1	Workforce with tertiary education	10.02	97	4.4.3	Venture capital recipients, deals	19.20	28
2.4.2	High-skilled workforce	9.40	110	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	0.01	97	4.4.5	New business density	6.26	62
2.4.4	Ease of finding skilled employees	40.77	89	4.4.6	Patent applications	0.00	96
2.4.5	Digital skills	n/a	n/a				

Saudi Arabia

Key Indicators

Rank (out of 124)	44	GDP per capita (PPP US\$)	48,948.17
Income group	High income	GDP (US\$ billions)	700.12
Regional group	Middle East and North Africa	FREI score	47.25
Population (millions)	34.81	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)

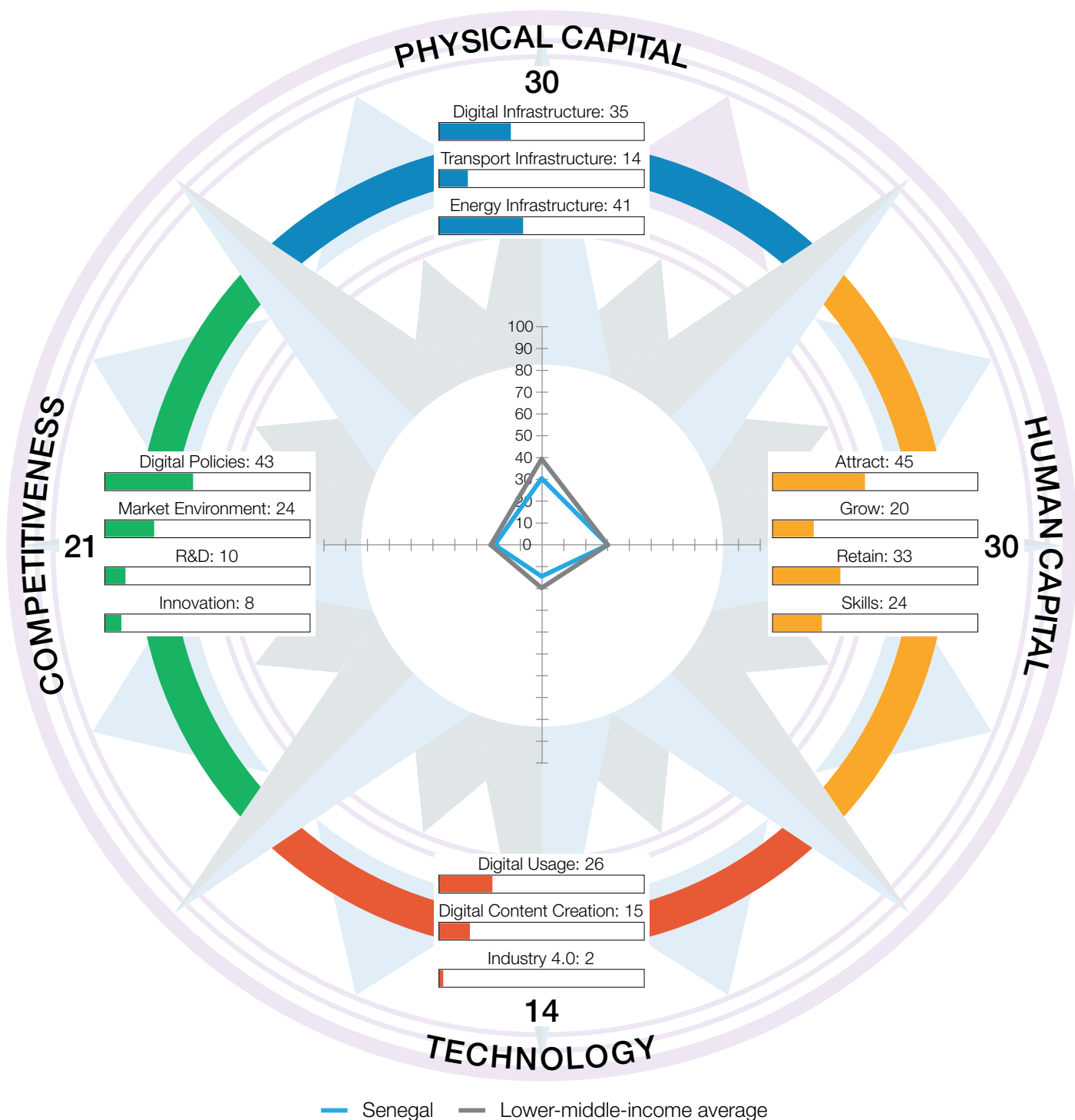


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	54.43	57	3	TECHNOLOGY	36.91	53
1.1	Digital Infrastructure	80.43	19	3.1	Digital Usage	67.93	42
1.1.1	Internet access	99.69	4	3.1.1	Internet users	97.76	7
1.1.2	International Internet bandwidth	63.64	11	3.1.2	Active mobile-broadband subscriptions	52.17	18
1.1.3	Fixed-broadband subscriptions	93.08	39	3.1.3	Gender parity in Internet usage	98.21	15
1.1.4	4G-mobile network coverage	98.25	50	3.1.4	Firms with website	n/a	n/a
1.1.5	Fixed broadband affordability	93.97	70	3.1.5	Internet shopping	31.95	43
1.1.6	Mobile broadband affordability	86.71	38	3.1.6	Government online services	61.31	70
1.1.7	Computer software spending	27.65	35	3.1.7	E-Participation	66.20	65
1.2	Transport Infrastructure	30.96	69	3.2	Digital Content Creation	29.15	69
1.2.1	Quality of infrastructure	55.16	41	3.2.1	GitHub commits	0.45	103
1.2.2	Rural access	14.12	120	3.2.2	Wikipedia edits	49.32	61
1.2.3	Air connectivity	20.34	39	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	65.31	69
1.3	Energy Infrastructure	51.91	91	3.3	Industry 4.0	13.65	39
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	0.47	59
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	13.80	48
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	12.83	43
1.3.4	Energy intensity	63.68	94	3.3.4	ICT patent applications	3.07	35
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	49.65	42	4	COMPETITIVENESS	48.02	30
2.1	Attract	42.10	77	4.1	Digital Policies	66.46	42
2.1.1	Brain gain	87.11	6	4.1.1	ICT regulation	92.79	14
2.1.2	International students	11.43	53	4.1.2	Cybersecurity	99.53	2
2.1.3	Tolerance of minorities	9.57	115	4.1.3	Rule of law	45.19	51
2.1.4	Tolerance of immigrants	80.00	25	4.1.4	Regulatory quality	47.03	56
2.1.5	Gender parity in high-skilled jobs	0.00	121	4.1.5	Corruption	47.76	41
2.1.6	FDI and technology transfer	64.46	35	4.2	Market Environment	70.94	8
2.2	Grow	39.84	55	4.2.1	Extent of market dominance	76.76	13
2.2.1	Tertiary enrolment	47.26	34	4.2.2	Labour productivity	74.80	8
2.2.2	Reading, maths, and science	21.27	68	4.2.3	Urbanisation	80.67	25
2.2.3	Use of virtual professional networks	21.24	50	4.2.4	Domestic credit to private sector	22.46	64
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	100.00	1
2.2.5	Youth inclusion	69.58	72	4.3	R&D	37.58	39
2.3	Retain	45.23	81	4.3.1	R&D spending	16.28	45
2.3.1	Pension coverage	31.84	83	4.3.2	University ranking	50.81	27
2.3.2	Environmental performance	32.93	76	4.3.3	Gender parity in R&D	70.38	38
2.3.3	Physician density	32.29	52	4.3.4	Scientific journal articles	12.84	50
2.3.4	Sanitation	100.00	1	4.4	Innovation	17.12	68
2.3.5	Personal safety	29.08	102	4.4.1	Medium- and high-tech industry	43.79	40
2.4	Skills	71.45	10	4.4.2	High-tech exports	1.04	115
2.4.1	Workforce with tertiary education	32.85	52	4.4.3	Venture capital recipients, deals	2.05	79
2.4.2	High-skilled workforce	64.93	26	4.4.4	New product entrepreneurial activity	44.20	49
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	1.96	93
2.4.4	Ease of finding skilled employees	93.70	5	4.4.6	Patent applications	9.70	32
2.4.5	Digital skills	94.34	2				

Key Indicators

Rank (out of 124)	101	GDP per capita (PPP US\$)	3,544.49
Income group	Lower-middle income	GDP (US\$ billions)	24.91
Regional group	Sub-Saharan Africa	FREI score	24.04
Population (millions)	16.74	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)

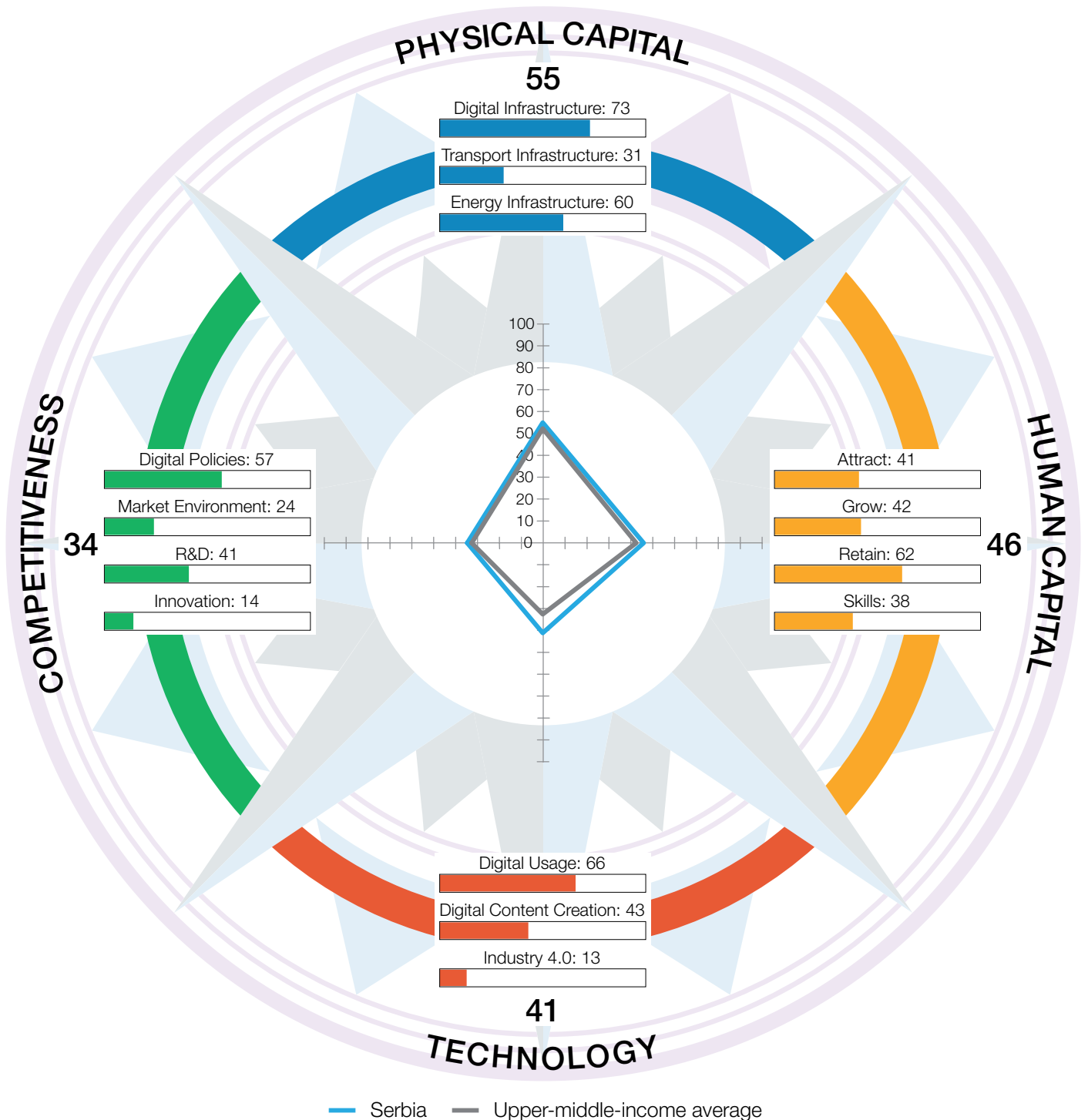


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	30.25	109	3	TECHNOLOGY	14.34	105
1.1	Digital Infrastructure	35.25	104	3.1	Digital Usage	25.80	107
1.1.1	Internet access	5.04	113	3.1.1	Internet users	26.16	101
1.1.2	International Internet bandwidth	18.30	116	3.1.2	Active mobile-broadband subscriptions	28.49	86
1.1.3	Fixed-broadband subscriptions	15.81	103	3.1.3	Gender parity in Internet usage	n/a	n/a
1.1.4	4G-mobile network coverage	74.70	96	3.1.4	Firms with website	25.87	88
1.1.5	Fixed broadband affordability	55.40	110	3.1.5	Internet shopping	3.24	106
1.1.6	Mobile broadband affordability	60.40	96	3.1.6	Government online services	37.23	103
1.1.7	Computer software spending	17.08	69	3.1.7	E-Participation	33.80	106
1.2	Transport Infrastructure	14.38	114	3.2	Digital Content Creation	14.73	106
1.2.1	Quality of infrastructure	23.49	106	3.2.1	GitHub commits	0.33	108
1.2.2	Rural access	29.80	107	3.2.2	Wikipedia edits	24.07	103
1.2.3	Air connectivity	1.03	102	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	34.16	109
1.3	Energy Infrastructure	41.11	102	3.3	Industry 4.0	2.48	99
1.3.1	Access to electricity	66.67	102	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	4.76	86
1.3.3	Electrical outages	55.22	73	3.3.3	AI research	0.47	101
1.3.4	Energy intensity	80.38	52	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	30.21	95	4	COMPETITIVENESS	21.36	98
2.1	Attract	44.76	66	4.1	Digital Policies	43.37	80
2.1.1	Brain gain	58.93	33	4.1.1	ICT regulation	82.69	50
2.1.2	International students	18.75	35	4.1.2	Cybersecurity	34.41	102
2.1.3	Tolerance of minorities	50.00	53	4.1.3	Rule of law	29.80	74
2.1.4	Tolerance of immigrants	73.85	36	4.1.4	Regulatory quality	34.14	84
2.1.5	Gender parity in high-skilled jobs	22.85	111	4.1.5	Corruption	35.82	52
2.1.6	FDI and technology transfer	44.19	70	4.2	Market Environment	24.08	98
2.2	Grow	19.74	111	4.2.1	Extent of market dominance	42.81	73
2.2.1	Tertiary enrolment	8.95	99	4.2.2	Labour productivity	6.21	95
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	36.81	95
2.2.3	Use of virtual professional networks	7.85	87	4.2.4	Domestic credit to private sector	10.47	93
2.2.4	Formal and non-formal studies	7.38	53	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	54.77	100	4.3	R&D	10.23	104
2.3	Retain	32.53	94	4.3.1	R&D spending	11.45	55
2.3.1	Pension coverage	28.47	85	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	9.76	113	4.3.3	Gender parity in R&D	28.54	81
2.3.3	Physician density	0.66	115	4.3.4	Scientific journal articles	0.94	95
2.3.4	Sanitation	47.64	103	4.4	Innovation	7.76	105
2.3.5	Personal safety	76.15	24	4.4.1	Medium- and high-tech industry	26.67	68
2.4	Skills	23.81	95	4.4.2	High-tech exports	1.50	111
2.4.1	Workforce with tertiary education	4.21	112	4.4.3	Venture capital recipients, deals	5.84	61
2.4.2	High-skilled workforce	2.13	116	4.4.4	New product entrepreneurial activity	10.17	84
2.4.3	Researchers	6.85	62	4.4.5	New business density	1.82	94
2.4.4	Ease of finding skilled employees	82.03	16	4.4.6	Patent applications	0.56	77
2.4.5	Digital skills	n/a	n/a				

Key Indicators

Rank (out of 124)	51	GDP per capita (PPP US\$)	18,929.88
Income group	Upper-middle income	GDP (US\$ billions)	52.96
Regional group	Europe	FREI score	43.81
Population (millions)	6.91	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



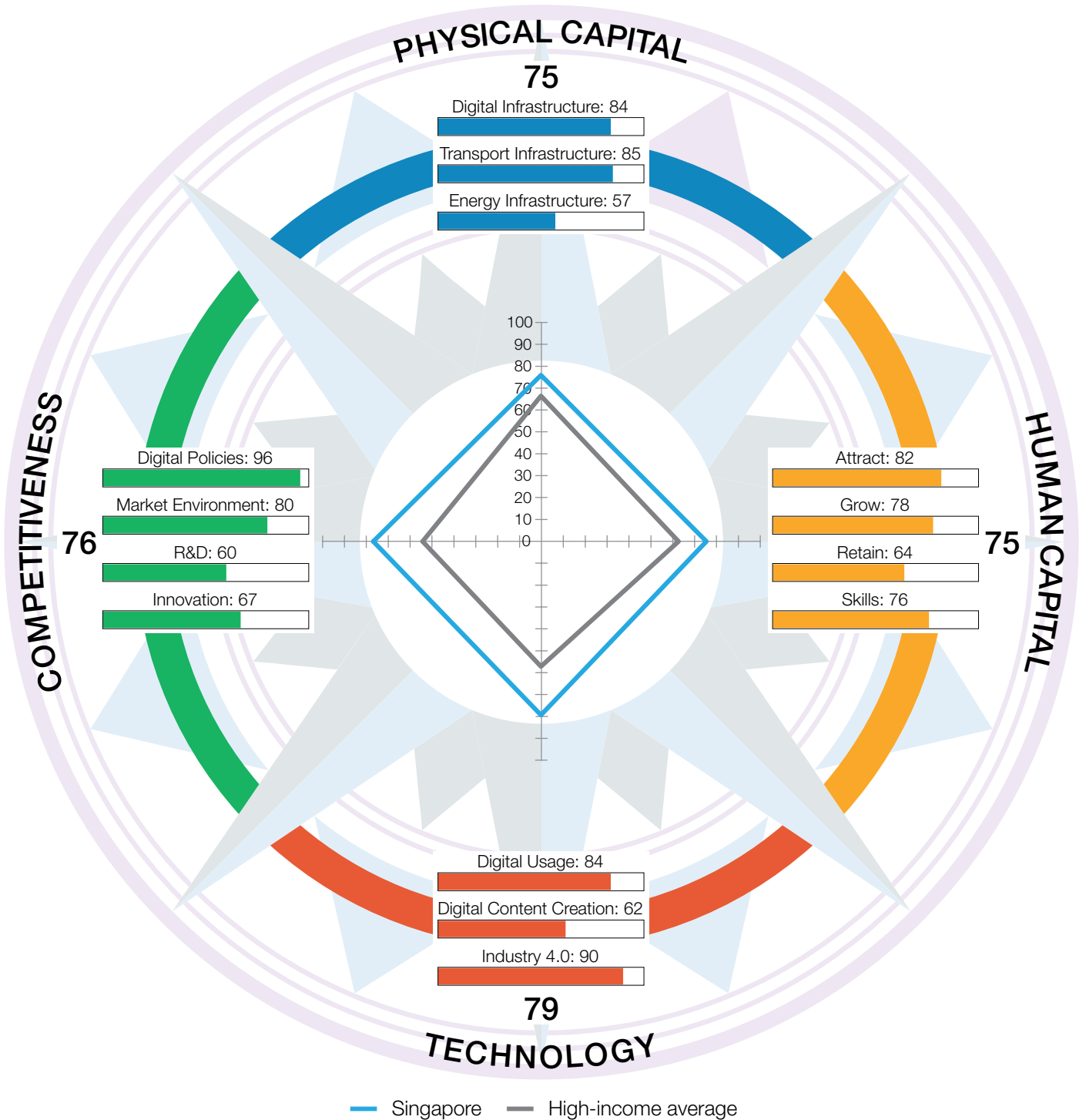
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	54.55	56	3	TECHNOLOGY	40.76	40
1.1	Digital Infrastructure	72.64	52	3.1	Digital Usage	65.96	47
1.1.1	Internet access	80.79	52	3.1.1	Internet users	77.30	54
1.1.2	International Internet bandwidth	56.75	21	3.1.2	Active mobile-broadband subscriptions	41.02	46
1.1.3	Fixed-broadband subscriptions	95.92	28	3.1.3	Gender parity in Internet usage	85.26	72
1.1.4	4G-mobile network coverage	98.10	51	3.1.4	Firms with website	79.67	21
1.1.5	Fixed broadband affordability	94.24	68	3.1.5	Internet shopping	25.17	51
1.1.6	Mobile broadband affordability	79.22	66	3.1.6	Government online services	74.45	42
1.1.7	Computer software spending	3.48	99	3.1.7	E-Participation	78.87	41
1.2	Transport Infrastructure	30.81	71	3.2	Digital Content Creation	43.04	40
1.2.1	Quality of infrastructure	37.01	73	3.2.1	GitHub commits	16.72	36
1.2.2	Rural access	65.82	64	3.2.2	Wikipedia edits	72.52	32
1.2.3	Air connectivity	8.82	57	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	79.05	42
1.3	Energy Infrastructure	60.19	45	3.3	Industry 4.0	13.28	41
1.3.1	Access to electricity	99.77	79	3.3.1	Robot density	0.99	52
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	18.12	36
1.3.3	Electrical outages	87.84	41	3.3.3	AI research	17.79	38
1.3.4	Energy intensity	66.09	89	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	45.74	54	4	COMPETITIVENESS	34.21	59
2.1	Attract	41.01	80	4.1	Digital Policies	56.81	54
2.1.1	Brain gain	14.38	116	4.1.1	ICT regulation	93.51	11
2.1.2	International students	12.54	51	4.1.2	Cybersecurity	89.57	47
2.1.3	Tolerance of minorities	29.79	82	4.1.3	Rule of law	32.50	68
2.1.4	Tolerance of immigrants	66.15	48	4.1.4	Regulatory quality	43.09	64
2.1.5	Gender parity in high-skilled jobs	84.35	41	4.1.5	Corruption	25.37	72
2.1.6	FDI and technology transfer	38.85	80	4.2	Market Environment	24.36	97
2.2	Grow	42.10	52	4.2.1	Extent of market dominance	25.62	104
2.2.1	Tertiary enrolment	45.58	38	4.2.2	Labour productivity	27.13	61
2.2.2	Reading, maths, and science	44.27	43	4.2.3	Urbanisation	47.46	80
2.2.3	Use of virtual professional networks	13.94	68	4.2.4	Domestic credit to private sector	18.57	73
2.2.4	Formal and non-formal studies	26.67	41	4.2.5	Market capitalisation	3.02	74
2.2.5	Youth inclusion	80.03	49	4.3	R&D	41.43	31
2.3	Retain	61.73	53	4.3.1	R&D spending	18.40	41
2.3.1	Pension coverage	62.76	69	4.3.2	University ranking	24.63	70
2.3.2	Environmental performance	52.44	43	4.3.3	Gender parity in R&D	96.93	6
2.3.3	Physician density	38.58	42	4.3.4	Scientific journal articles	25.77	39
2.3.4	Sanitation	97.38	49	4.4	Innovation	14.25	80
2.3.5	Personal safety	57.50	57	4.4.1	Medium- and high-tech industry	31.81	58
2.4	Skills	38.11	49	4.4.2	High-tech exports	n/a	n/a
2.4.1	Workforce with tertiary education	31.43	54	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	41.83	52	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	25.76	36	4.4.5	New business density	7.82	54
2.4.4	Ease of finding skilled employees	64.53	45	4.4.6	Patent applications	3.12	50
2.4.5	Digital skills	26.97	44				

Singapore

Key Indicators

Rank (out of 124)	1	GDP per capita (PPP US\$)	101,936.74
Income group	High income	GDP (US\$ billions)	340.00
Regional group	Asia and Pacific	FREI score	76.26
Population (millions)	5.69	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)

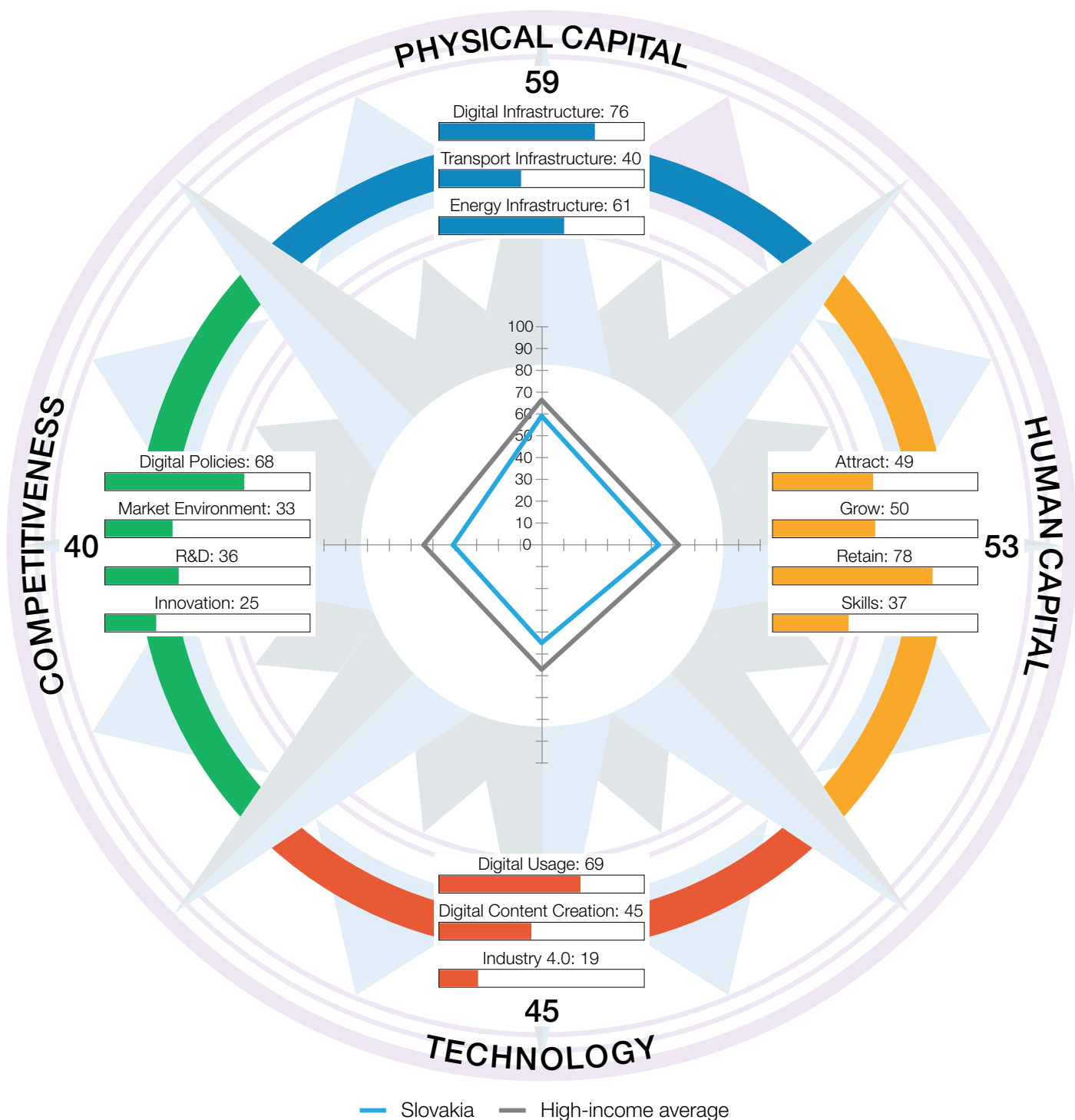


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	75.38	4	3	TECHNOLOGY	78.69	6
1.1	Digital Infrastructure	83.88	4	3.1	Digital Usage	84.08	14
1.1.1	Internet access	98.62	6	3.1.1	Internet users	91.61	19
1.1.2	International Internet bandwidth	75.10	3	3.1.2	Active mobile-broadband subscriptions	63.60	7
1.1.3	Fixed-broadband subscriptions	96.93	22	3.1.3	Gender parity in Internet usage	94.91	43
1.1.4	4G-mobile network coverage	100.00	1	3.1.4	Firms with website	n/a	n/a
1.1.5	Fixed broadband affordability	99.17	7	3.1.5	Internet shopping	61.58	22
1.1.6	Mobile broadband affordability	94.67	13	3.1.6	Government online services	95.62	5
1.1.7	Computer software spending	22.69	50	3.1.7	E-Participation	97.18	6
1.2	Transport Infrastructure	85.16	1	3.2	Digital Content Creation	61.71	20
1.2.1	Quality of infrastructure	88.97	6	3.2.1	GitHub commits	56.61	17
1.2.2	Rural access	100.00	1	3.2.2	Wikipedia edits	72.32	34
1.2.3	Air connectivity	100.00	1	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	100.00	1
1.3	Energy Infrastructure	57.10	70	3.3	Industry 4.0	90.27	1
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	100.00	1
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	100.00	1
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	99.10	2
1.3.4	Energy intensity	87.01	27	3.3.4	ICT patent applications	85.65	6
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	75.02	6	4	COMPETITIVENESS	75.96	2
2.1	Attract	82.17	2	4.1	Digital Policies	96.03	1
2.1.1	Brain gain	100.00	1	4.1.1	ICT regulation	92.07	19
2.1.2	International students	51.14	7	4.1.2	Cybersecurity	98.49	5
2.1.3	Tolerance of minorities	81.91	7	4.1.3	Rule of law	94.08	4
2.1.4	Tolerance of immigrants	84.62	15	4.1.4	Regulatory quality	100.00	1
2.1.5	Gender parity in high-skilled jobs	80.36	49	4.1.5	Corruption	95.52	3
2.1.6	FDI and technology transfer	94.98	2	4.2	Market Environment	80.49	4
2.2	Grow	78.40	1	4.2.1	Extent of market dominance	74.48	16
2.2.1	Tertiary enrolment	61.11	11	4.2.2	Labour productivity	95.81	2
2.2.2	Reading, maths, and science	90.79	2	4.2.3	Urbanisation	100.00	1
2.2.3	Use of virtual professional networks	65.49	6	4.2.4	Domestic credit to private sector	60.05	16
2.2.4	Formal and non-formal studies	76.67	10	4.2.5	Market capitalisation	72.12	6
2.2.5	Youth inclusion	97.94	3	4.3	R&D	60.35	8
2.3	Retain	63.50	48	4.3.1	R&D spending	38.80	19
2.3.1	Pension coverage	31.73	84	4.3.2	University ranking	82.44	5
2.3.2	Environmental performance	57.49	38	4.3.3	Gender parity in R&D	39.23	70
2.3.3	Physician density	28.30	64	4.3.4	Scientific journal articles	80.93	5
2.3.4	Sanitation	100.00	1	4.4	Innovation	66.97	1
2.3.5	Personal safety	99.98	2	4.4.1	Medium- and high-tech industry	100.00	1
2.4	Skills	76.02	3	4.4.2	High-tech exports	83.74	2
2.4.1	Workforce with tertiary education	66.77	3	4.4.3	Venture capital recipients, deals	100.00	1
2.4.2	High-skilled workforce	96.12	2	4.4.4	New product entrepreneurial activity	37.89	57
2.4.3	Researchers	84.31	5	4.4.5	New business density	42.33	13
2.4.4	Ease of finding skilled employees	89.29	10	4.4.6	Patent applications	37.83	16
2.4.5	Digital skills	43.60	20				

Key Indicators

Rank (out of 124)	41	GDP per capita (PPP US\$)	32,544.96
Income group	High income	GDP (US\$ billions)	104.57
Regional group	Europe	FREI score	49.21
Population (millions)	5.46	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)

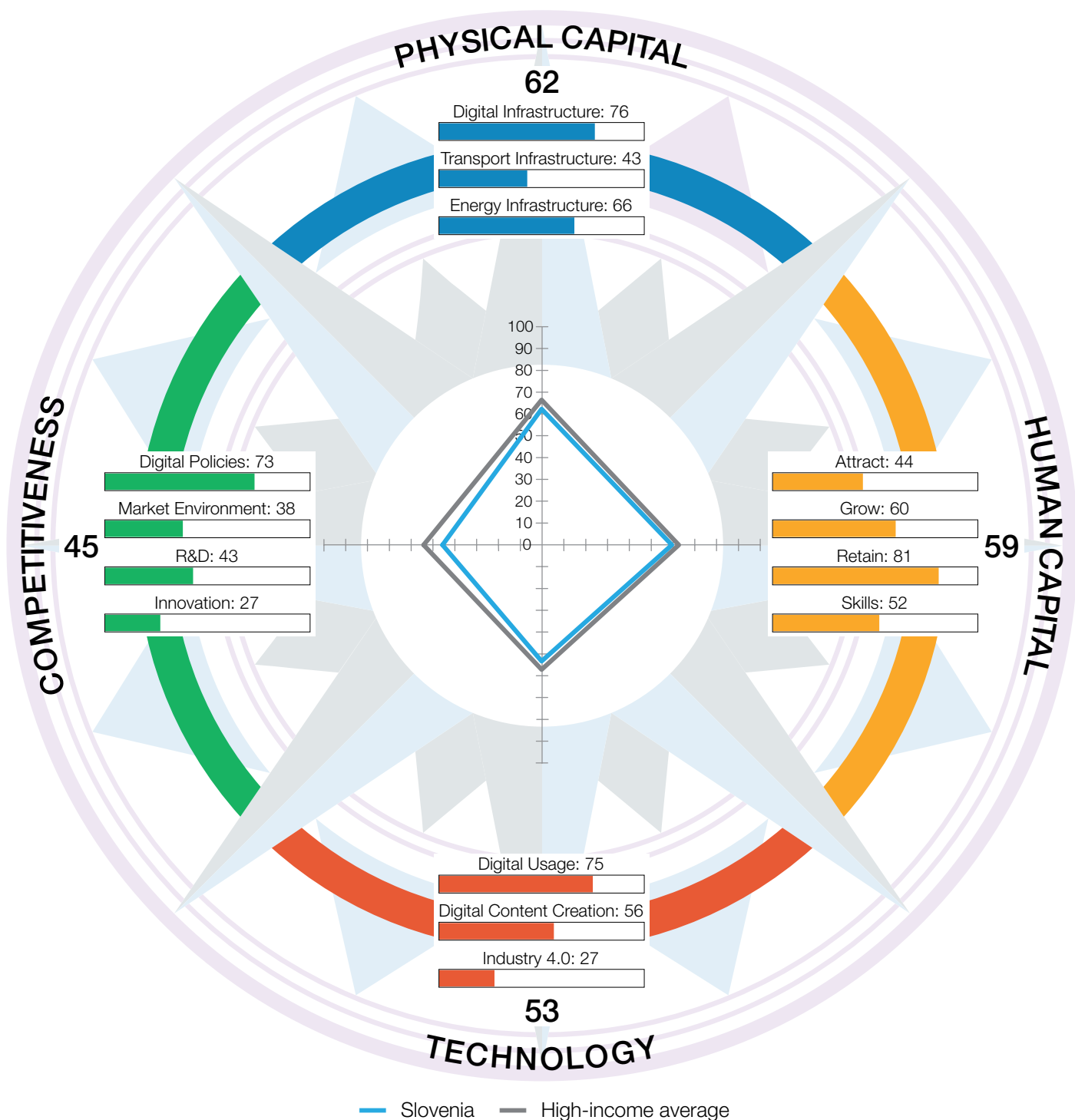


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	58.68	47	3	TECHNOLOGY	44.59	34
1.1	Digital Infrastructure	75.71	42	3.1	Digital Usage	69.37	37
1.1.1	Internet access	85.71	41	3.1.1	Internet users	89.42	24
1.1.2	International Internet bandwidth	39.92	82	3.1.2	Active mobile-broadband subscriptions	38.32	61
1.1.3	Fixed-broadband subscriptions	86.72	50	3.1.3	Gender parity in Internet usage	98.87	9
1.1.4	4G-mobile network coverage	99.00	39	3.1.4	Firms with website	75.70	26
1.1.5	Fixed broadband affordability	99.10	10	3.1.5	Internet shopping	53.52	30
1.1.6	Mobile broadband affordability	95.19	10	3.1.6	Government online services	64.96	62
1.1.7	Computer software spending	24.36	39	3.1.7	E-Participation	64.79	69
1.2	Transport Infrastructure	39.61	50	3.2	Digital Content Creation	45.21	37
1.2.1	Quality of infrastructure	51.25	46	3.2.1	GitHub commits	16.05	37
1.2.2	Rural access	93.30	20	3.2.2	Wikipedia edits	65.05	43
1.2.3	Air connectivity	1.74	93	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	83.73	35
1.3	Energy Infrastructure	60.72	42	3.3	Industry 4.0	19.19	31
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	48.76	15
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	12.07	54
1.3.3	Electrical outages	90.72	30	3.3.3	AI research	16.66	39
1.3.4	Energy intensity	75.90	66	3.3.4	ICT patent applications	2.22	42
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	53.36	36	4	COMPETITIVENESS	40.21	43
2.1	Attract	48.90	49	4.1	Digital Policies	67.56	40
2.1.1	Brain gain	14.45	115	4.1.1	ICT regulation	84.38	43
2.1.2	International students	24.08	29	4.1.2	Cybersecurity	92.19	42
2.1.3	Tolerance of minorities	44.68	62	4.1.3	Rule of law	58.24	36
2.1.4	Tolerance of immigrants	38.46	96	4.1.4	Regulatory quality	61.22	37
2.1.5	Gender parity in high-skilled jobs	95.44	18	4.1.5	Corruption	41.79	47
2.1.6	FDI and technology transfer	76.28	17	4.2	Market Environment	33.09	69
2.2	Grow	50.29	39	4.2.1	Extent of market dominance	42.07	74
2.2.1	Tertiary enrolment	30.88	68	4.2.2	Labour productivity	47.88	36
2.2.2	Reading, maths, and science	55.24	37	4.2.3	Urbanisation	44.63	87
2.2.3	Use of virtual professional networks	14.49	65	4.2.4	Domestic credit to private sector	28.96	51
2.2.4	Formal and non-formal studies	62.38	23	4.2.5	Market capitalisation	1.92	75
2.2.5	Youth inclusion	88.48	27	4.3	R&D	35.65	44
2.3	Retain	77.62	27	4.3.1	R&D spending	16.75	42
2.3.1	Pension coverage	90.41	49	4.3.2	University ranking	24.99	69
2.3.2	Environmental performance	75.26	26	4.3.3	Gender parity in R&D	61.97	46
2.3.3	Physician density	43.64	34	4.3.4	Scientific journal articles	38.89	31
2.3.4	Sanitation	97.78	42	4.4	Innovation	24.52	44
2.3.5	Personal safety	81.03	22	4.4.1	Medium- and high-tech industry	61.77	12
2.4	Skills	36.62	52	4.4.2	High-tech exports	15.92	50
2.4.1	Workforce with tertiary education	33.46	50	4.4.3	Venture capital recipients, deals	1.37	87
2.4.2	High-skilled workforce	55.32	39	4.4.4	New product entrepreneurial activity	41.26	53
2.4.3	Researchers	37.04	30	4.4.5	New business density	22.13	28
2.4.4	Ease of finding skilled employees	36.37	98	4.4.6	Patent applications	4.65	41
2.4.5	Digital skills	20.93	51				

Key Indicators

Rank (out of 124)	30	GDP per capita (PPP US\$)	41,193.84
Income group	High income	GDP (US\$ billions)	53.59
Regional group	Europe	FREI score	54.78
Population (millions)	2.10	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



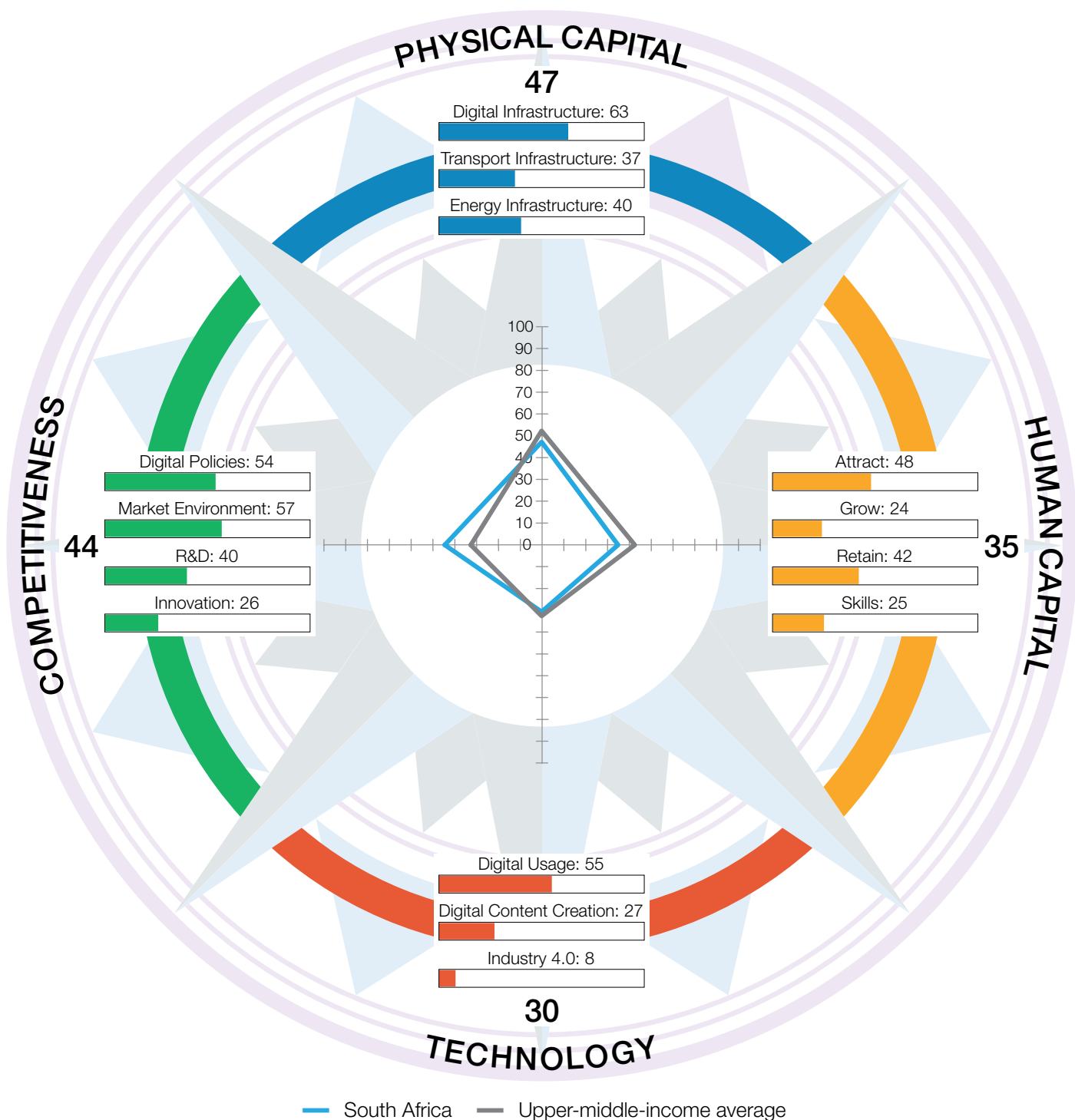
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	61.82	38	3	TECHNOLOGY	52.91	25
1.1	Digital Infrastructure	76.30	37	3.1	Digital Usage	75.13	28
1.1.1	Internet access	89.99	34	3.1.1	Internet users	85.94	35
1.1.2	International Internet bandwidth	61.43	14	3.1.2	Active mobile-broadband subscriptions	38.07	62
1.1.3	Fixed-broadband subscriptions	92.51	42	3.1.3	Gender parity in Internet usage	96.97	29
1.1.4	4G-mobile network coverage	99.90	15	3.1.4	Firms with website	81.71	17
1.1.5	Fixed broadband affordability	96.48	55	3.1.5	Internet shopping	58.35	27
1.1.6	Mobile broadband affordability	86.31	40	3.1.6	Government online services	81.75	24
1.1.7	Computer software spending	7.46	86	3.1.7	E-Participation	83.09	29
1.2	Transport Infrastructure	43.22	44	3.2	Digital Content Creation	56.29	25
1.2.1	Quality of infrastructure	60.50	29	3.2.1	GitHub commits	33.12	23
1.2.2	Rural access	90.96	28	3.2.2	Wikipedia edits	78.35	21
1.2.3	Air connectivity	7.90	60	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	92.30	20
1.3	Energy Infrastructure	65.95	18	3.3	Industry 4.0	27.32	24
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	51.53	12
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	29.81	26
1.3.3	Electrical outages	94.00	26	3.3.3	AI research	44.61	18
1.3.4	Energy intensity	80.03	54	3.3.4	ICT patent applications	3.52	33
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	59.33	27	4	COMPETITIVENESS	45.07	37
2.1	Attract	43.67	70	4.1	Digital Policies	73.18	26
2.1.1	Brain gain	22.73	107	4.1.1	ICT regulation	98.56	3
2.1.2	International students	17.76	38	4.1.2	Cybersecurity	74.37	75
2.1.3	Tolerance of minorities	67.02	29	4.1.3	Rule of law	69.81	25
2.1.4	Tolerance of immigrants	15.38	117	4.1.4	Regulatory quality	64.97	33
2.1.5	Gender parity in high-skilled jobs	90.46	32	4.1.5	Corruption	58.21	29
2.1.6	FDI and technology transfer	48.64	60	4.2	Market Environment	37.93	57
2.2	Grow	60.12	23	4.2.1	Extent of market dominance	71.61	19
2.2.1	Tertiary enrolment	52.17	23	4.2.2	Labour productivity	49.18	35
2.2.2	Reading, maths, and science	69.26	10	4.2.3	Urbanisation	45.61	85
2.2.3	Use of virtual professional networks	23.78	44	4.2.4	Domestic credit to private sector	17.40	76
2.2.4	Formal and non-formal studies	62.38	23	4.2.5	Market capitalisation	5.85	63
2.2.5	Youth inclusion	93.02	14	4.3	R&D	42.53	29
2.3	Retain	81.24	22	4.3.1	R&D spending	39.32	17
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	28.33	64
2.3.2	Environmental performance	81.71	18	4.3.3	Gender parity in R&D	40.92	69
2.3.3	Physician density	39.32	41	4.3.4	Scientific journal articles	61.56	12
2.3.4	Sanitation	99.04	31	4.4	Innovation	26.65	37
2.3.5	Personal safety	86.15	13	4.4.1	Medium- and high-tech industry	59.25	16
2.4	Skills	52.27	27	4.4.2	High-tech exports	11.81	60
2.4.1	Workforce with tertiary education	47.43	27	4.4.3	Venture capital recipients, deals	8.87	48
2.4.2	High-skilled workforce	71.94	21	4.4.4	New product entrepreneurial activity	49.36	42
2.4.3	Researchers	60.12	17	4.4.5	New business density	12.97	42
2.4.4	Ease of finding skilled employees	55.74	61	4.4.6	Patent applications	17.63	28
2.4.5	Digital skills	26.12	46				

South Africa

Key Indicators

Rank (out of 124)	66	GDP per capita (PPP US\$)	13,009.67
Income group	Upper-middle income	GDP (US\$ billions)	301.92
Regional group	Sub-Saharan Africa	FREI score	39.01
Population (millions)	59.31	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)



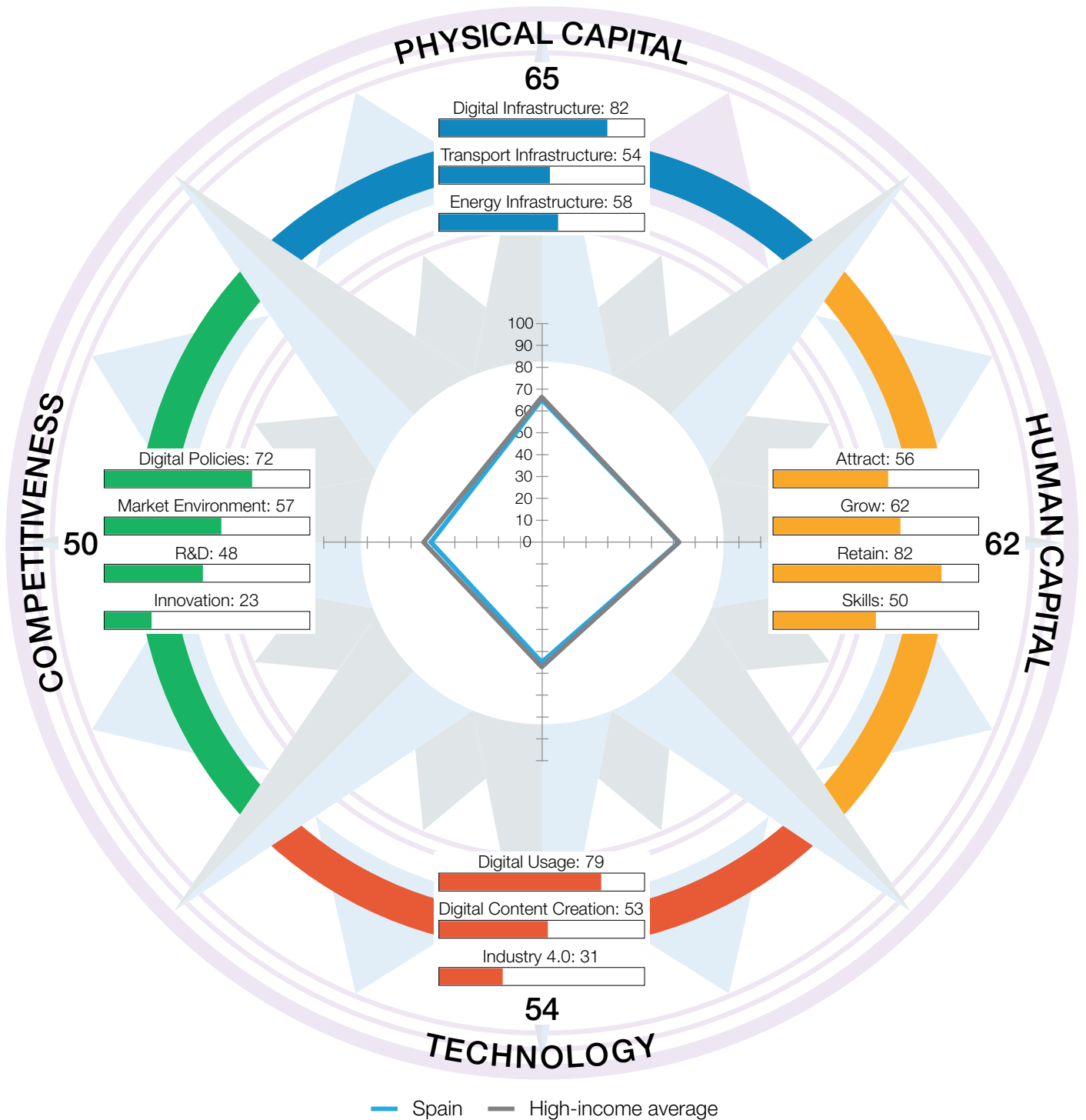
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	46.83	80	3	TECHNOLOGY	30.36	70
1.1	Digital Infrastructure	63.39	77	3.1	Digital Usage	55.30	71
1.1.1	Internet access	62.75	78	3.1.1	Internet users	54.00	85
1.1.2	International Internet bandwidth	34.29	95	3.1.2	Active mobile-broadband subscriptions	48.44	26
1.1.3	Fixed-broadband subscriptions	65.30	74	3.1.3	Gender parity in Internet usage	n/a	n/a
1.1.4	4G-mobile network coverage	96.45	66	3.1.4	Firms with website	80.27	20
1.1.5	Fixed broadband affordability	89.57	87	3.1.5	Internet shopping	10.05	70
1.1.6	Mobile broadband affordability	62.48	94	3.1.6	Government online services	68.62	54
1.1.7	Computer software spending	32.85	24	3.1.7	E-Participation	70.42	56
1.2	Transport Infrastructure	36.75	53	3.2	Digital Content Creation	27.41	74
1.2.1	Quality of infrastructure	58.01	34	3.2.1	GitHub commits	4.76	56
1.2.2	Rural access	63.57	67	3.2.2	Wikipedia edits	32.04	88
1.2.3	Air connectivity	4.02	80	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	67.40	66
1.3	Energy Infrastructure	40.35	104	3.3	Industry 4.0	8.36	54
1.3.1	Access to electricity	83.11	99	3.3.1	Robot density	7.36	35
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	10.71	59
1.3.3	Electrical outages	50.20	79	3.3.3	AI research	7.10	55
1.3.4	Energy intensity	45.44	111	3.3.4	ICT patent applications	1.90	43
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	34.80	86	4	COMPETITIVENESS	44.05	39
2.1	Attract	48.11	56	4.1	Digital Policies	53.64	60
2.1.1	Brain gain	38.82	82	4.1.1	ICT regulation	75.96	71
2.1.2	International students	9.20	62	4.1.2	Cybersecurity	77.98	67
2.1.3	Tolerance of minorities	42.55	65	4.1.3	Rule of law	34.57	64
2.1.4	Tolerance of immigrants	70.77	42	4.1.4	Regulatory quality	45.38	60
2.1.5	Gender parity in high-skilled jobs	76.98	56	4.1.5	Corruption	34.33	53
2.1.6	FDI and technology transfer	50.34	57	4.2	Market Environment	56.54	24
2.2	Grow	24.09	97	4.2.1	Extent of market dominance	36.07	85
2.2.1	Tertiary enrolment	15.60	88	4.2.2	Labour productivity	28.63	56
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	59.74	62
2.2.3	Use of virtual professional networks	22.35	46	4.2.4	Domestic credit to private sector	58.27	17
2.2.4	Formal and non-formal studies	3.18	63	4.2.5	Market capitalisation	100.00	1
2.2.5	Youth inclusion	55.25	99	4.3	R&D	39.94	34
2.3	Retain	42.35	84	4.3.1	R&D spending	16.63	43
2.3.1	Pension coverage	81.12	58	4.3.2	University ranking	56.14	22
2.3.2	Environmental performance	31.36	79	4.3.3	Gender parity in R&D	78.06	29
2.3.3	Physician density	9.48	90	4.3.4	Scientific journal articles	8.93	58
2.3.4	Sanitation	73.83	90	4.4	Innovation	26.06	39
2.3.5	Personal safety	15.96	118	4.4.1	Medium- and high-tech industry	30.14	62
2.4	Skills	24.66	92	4.4.2	High-tech exports	9.04	75
2.4.1	Workforce with tertiary education	20.19	79	4.4.3	Venture capital recipients, deals	9.60	43
2.4.2	High-skilled workforce	35.89	58	4.4.4	New product entrepreneurial activity	58.67	26
2.4.3	Researchers	6.27	63	4.4.5	New business density	43.17	11
2.4.4	Ease of finding skilled employees	32.06	106	4.4.6	Patent applications	5.77	38
2.4.5	Digital skills	28.90	40				

Spain

Key Indicators

Rank (out of 124)	25	GDP per capita (PPP US\$)	42,185.59
Income group	High income	GDP (US\$ billions)	1,281.48
Regional group	Europe	FREI score	57.95
Population (millions)	47.35	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)

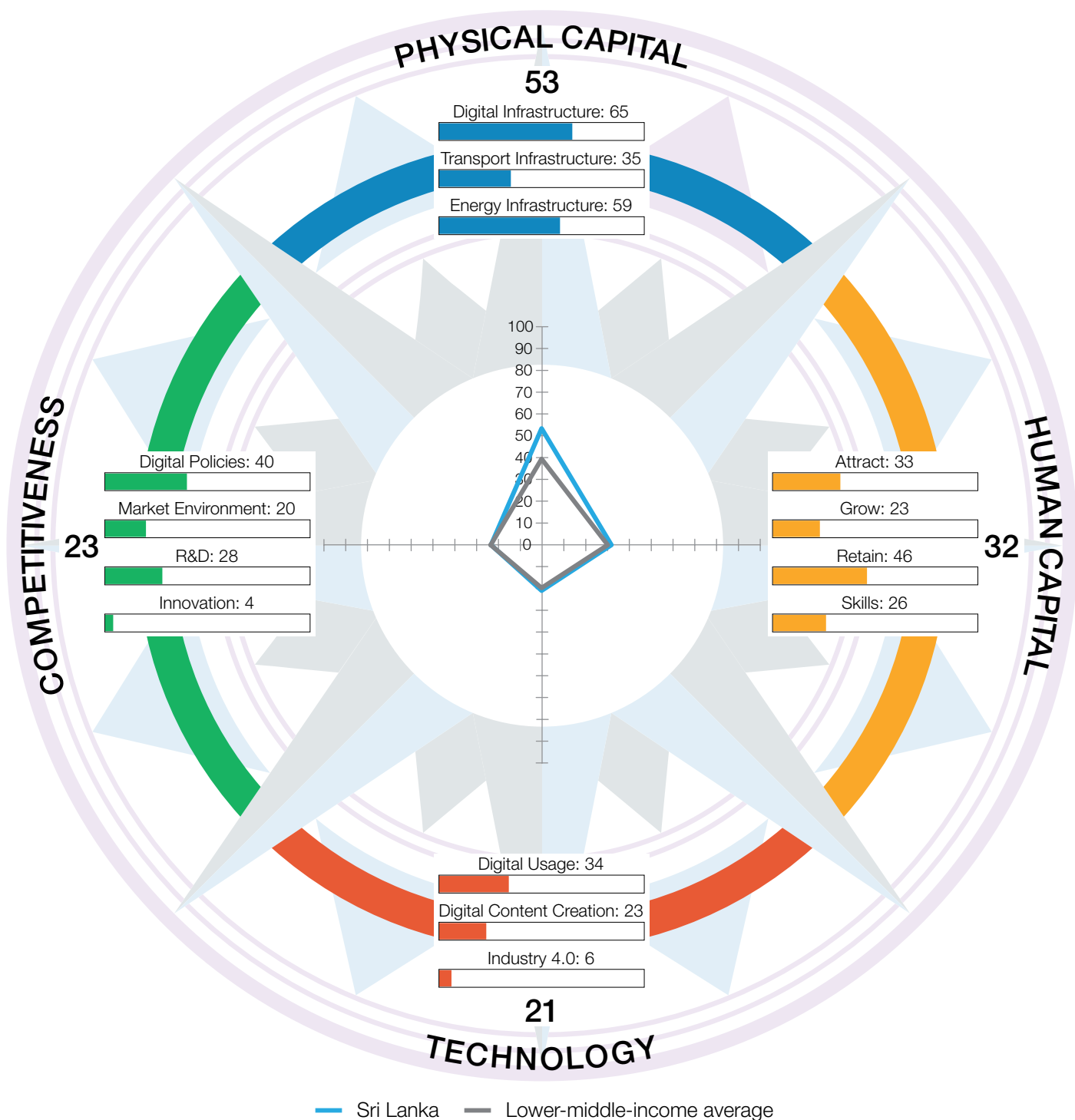


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	64.74	26	3	TECHNOLOGY	54.49	24
1.1	Digital Infrastructure	82.31	10	3.1	Digital Usage	78.73	21
1.1.1	Internet access	95.49	11	3.1.1	Internet users	92.87	15
1.1.2	International Internet bandwidth	34.08	97	3.1.2	Active mobile-broadband subscriptions	46.01	33
1.1.3	Fixed-broadband subscriptions	97.37	21	3.1.3	Gender parity in Internet usage	99.89	3
1.1.4	4G-mobile network coverage	99.40	34	3.1.4	Firms with website	75.05	27
1.1.5	Fixed broadband affordability	96.79	50	3.1.5	Internet shopping	69.47	18
1.1.6	Mobile broadband affordability	96.26	6	3.1.6	Government online services	86.13	17
1.1.7	Computer software spending	56.80	4	3.1.7	E-Participation	81.68	36
1.2	Transport Infrastructure	54.00	30	3.2	Digital Content Creation	53.35	28
1.2.1	Quality of infrastructure	81.14	18	3.2.1	GitHub commits	28.22	30
1.2.2	Rural access	85.64	36	3.2.2	Wikipedia edits	76.13	28
1.2.3	Air connectivity	36.48	19	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	89.71	25
1.3	Energy Infrastructure	57.92	61	3.3	Industry 4.0	31.40	21
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	49.72	14
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	40.62	19
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	34.39	25
1.3.4	Energy intensity	87.87	22	3.3.4	ICT patent applications	7.71	27
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	62.35	23	4	COMPETITIVENESS	50.23	25
2.1	Attract	55.85	34	4.1	Digital Policies	72.45	28
2.1.1	Brain gain	42.73	75	4.1.1	ICT regulation	76.92	70
2.1.2	International students	9.81	57	4.1.2	Cybersecurity	98.49	5
2.1.3	Tolerance of minorities	34.04	80	4.1.3	Rule of law	64.91	34
2.1.4	Tolerance of immigrants	87.69	12	4.1.4	Regulatory quality	60.76	39
2.1.5	Gender parity in high-skilled jobs	94.07	21	4.1.5	Corruption	61.19	26
2.1.6	FDI and technology transfer	66.75	29	4.2	Market Environment	57.02	21
2.2	Grow	61.60	19	4.2.1	Extent of market dominance	77.79	11
2.2.1	Tertiary enrolment	62.33	10	4.2.2	Labour productivity	60.16	23
2.2.2	Reading, maths, and science	64.22	26	4.2.3	Urbanisation	76.45	34
2.2.3	Use of virtual professional networks	39.16	23	4.2.4	Domestic credit to private sector	48.51	22
2.2.4	Formal and non-formal studies	58.72	29	4.2.5	Market capitalisation	22.20	31
2.2.5	Youth inclusion	83.56	40	4.3	R&D	48.12	20
2.3	Retain	82.21	19	4.3.1	R&D spending	24.97	29
2.3.1	Pension coverage	98.16	36	4.3.2	University ranking	58.87	17
2.3.2	Environmental performance	85.71	14	4.3.3	Gender parity in R&D	62.24	45
2.3.3	Physician density	50.07	27	4.3.4	Scientific journal articles	46.39	25
2.3.4	Sanitation	99.90	15	4.4	Innovation	23.32	48
2.3.5	Personal safety	77.19	23	4.4.1	Medium- and high-tech industry	49.29	33
2.4	Skills	49.73	29	4.4.2	High-tech exports	12.48	58
2.4.1	Workforce with tertiary education	52.16	18	4.4.3	Venture capital recipients, deals	9.34	46
2.4.2	High-skilled workforce	53.96	40	4.4.4	New product entrepreneurial activity	42.10	52
2.4.3	Researchers	37.10	29	4.4.5	New business density	12.87	43
2.4.4	Ease of finding skilled employees	67.52	41	4.4.6	Patent applications	13.83	29
2.4.5	Digital skills	37.91	28				

Key Indicators

Rank (out of 124)	90	GDP per capita (PPP US\$)	13,625.75
Income group	Lower-middle income	GDP (US\$ billions)	80.71
Regional group	Asia and Pacific	FREI score	32.17
Population (millions)	21.92	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



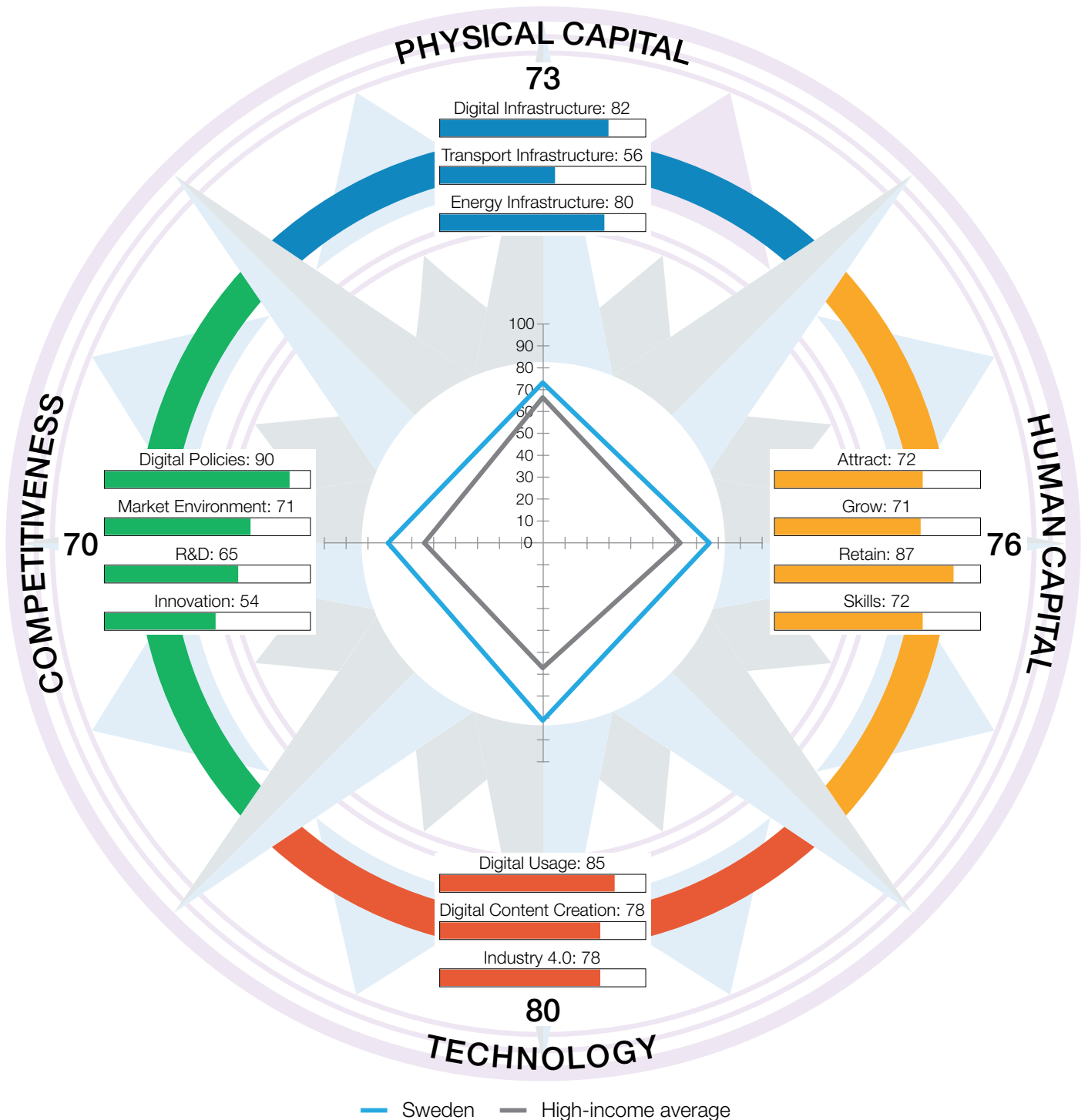
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	53.01	64	3	TECHNOLOGY	20.82	94
1.1	Digital Infrastructure	64.56	73	3.1	Digital Usage	33.95	97
1.1.1	Internet access	52.10	82	3.1.1	Internet users	31.78	99
1.1.2	International Internet bandwidth	40.67	78	3.1.2	Active mobile-broadband subscriptions	30.78	81
1.1.3	Fixed-broadband subscriptions	33.52	91	3.1.3	Gender parity in Internet usage	n/a	n/a
1.1.4	4G-mobile network coverage	95.00	69	3.1.4	Firms with website	6.53	104
1.1.5	Fixed broadband affordability	98.81	17	3.1.5	Internet shopping	3.45	102
1.1.6	Mobile broadband affordability	97.08	4	3.1.6	Government online services	64.96	62
1.1.7	Computer software spending	34.76	22	3.1.7	E-Participation	66.20	65
1.2	Transport Infrastructure	35.44	55	3.2	Digital Content Creation	22.73	90
1.2.1	Quality of infrastructure	33.10	80	3.2.1	GitHub commits	4.28	58
1.2.2	Rural access	92.22	24	3.2.2	Wikipedia edits	27.20	98
1.2.3	Air connectivity	4.86	76	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	58.83	81
1.3	Energy Infrastructure	59.01	53	3.3	Industry 4.0	5.79	69
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	13.71	49
1.3.3	Electrical outages	62.54	68	3.3.3	AI research	4.84	62
1.3.4	Energy intensity	96.56	5	3.3.4	ICT patent applications	0.20	61
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	31.79	92	4	COMPETITIVENESS	23.04	94
2.1	Attract	32.79	113	4.1	Digital Policies	40.36	87
2.1.1	Brain gain	45.93	66	4.1.1	ICT regulation	47.11	114
2.1.2	International students	0.96	96	4.1.2	Cybersecurity	57.72	88
2.1.3	Tolerance of minorities	13.83	108	4.1.3	Rule of law	36.66	58
2.1.4	Tolerance of immigrants	47.69	82	4.1.4	Regulatory quality	34.93	82
2.1.5	Gender parity in high-skilled jobs	59.95	83	4.1.5	Corruption	25.37	72
2.1.6	FDI and technology transfer	28.37	99	4.2	Market Environment	19.92	106
2.2	Grow	22.80	101	4.2.1	Extent of market dominance	47.95	55
2.2.1	Tertiary enrolment	14.08	91	4.2.2	Labour productivity	21.35	69
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	2.45	121
2.2.3	Use of virtual professional networks	8.41	82	4.2.4	Domestic credit to private sector	20.48	69
2.2.4	Formal and non-formal studies	0.90	69	4.2.5	Market capitalisation	7.37	60
2.2.5	Youth inclusion	67.81	75	4.3	R&D	28.18	63
2.3	Retain	45.67	80	4.3.1	R&D spending	2.33	91
2.3.1	Pension coverage	34.39	81	4.3.2	University ranking	34.49	52
2.3.2	Environmental performance	24.22	86	4.3.3	Gender parity in R&D	73.45	34
2.3.3	Physician density	14.02	81	4.3.4	Scientific journal articles	2.44	83
2.3.4	Sanitation	95.45	56	4.4	Innovation	3.70	120
2.3.5	Personal safety	60.28	47	4.4.1	Medium- and high-tech industry	9.33	102
2.4	Skills	25.92	82	4.4.2	High-tech exports	1.63	109
2.4.1	Workforce with tertiary education	6.33	106	4.4.3	Venture capital recipients, deals	3.27	70
2.4.2	High-skilled workforce	33.32	66	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	1.16	78	4.4.5	New business density	2.98	82
2.4.4	Ease of finding skilled employees	62.87	50	4.4.6	Patent applications	1.31	68
2.4.5	Digital skills	n/a	n/a				

Sweden

Key Indicators

Rank (out of 124)	4	GDP per capita (PPP US\$)	55,027.37
Income group	High income	GDP (US\$ billions)	541.06
Regional group	Europe	FREI score	74.72
Population (millions)	10.35	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



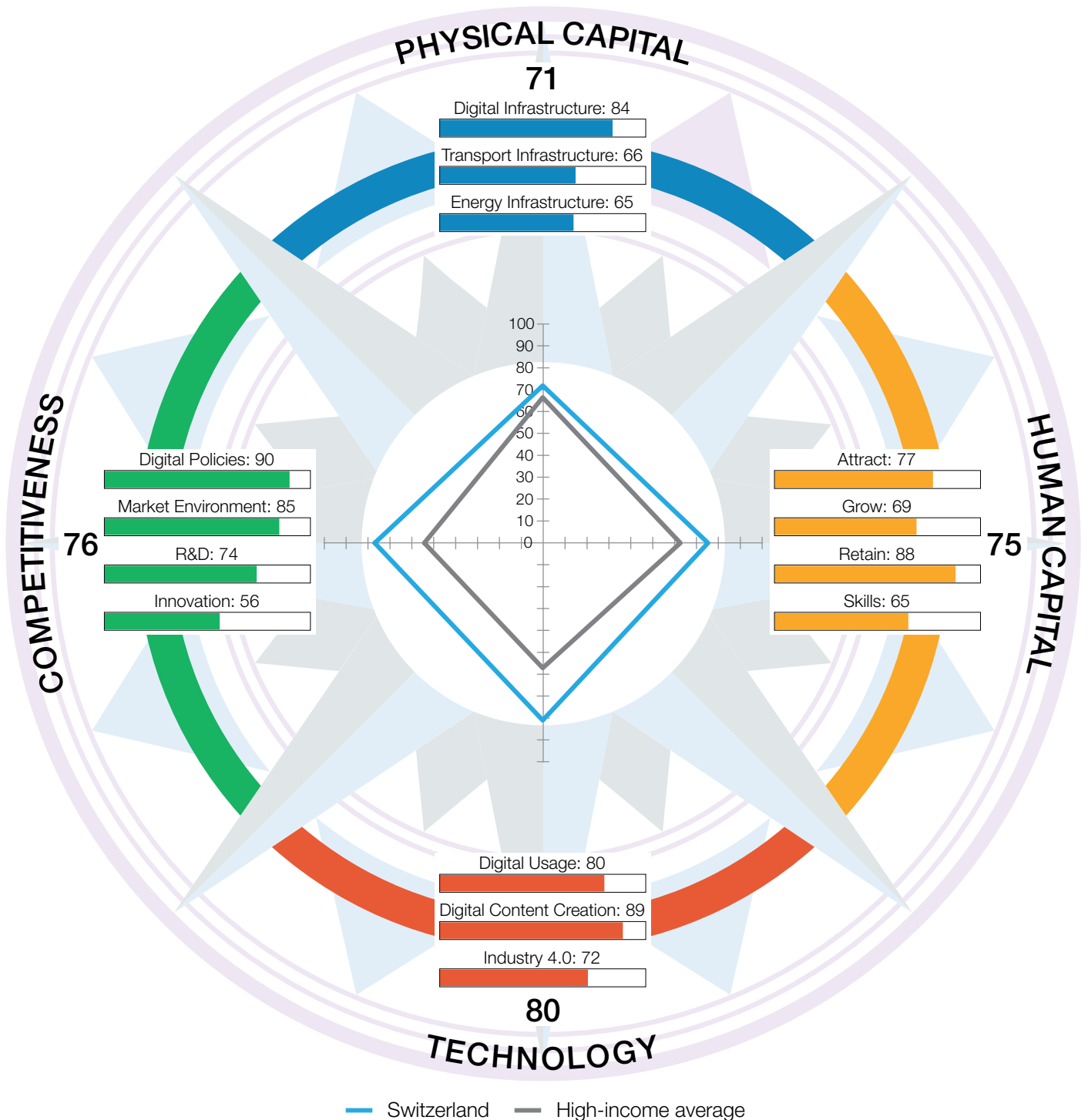
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	72.73	8	3	TECHNOLOGY	80.45	1
1.1	Digital Infrastructure	82.05	13	3.1	Digital Usage	85.49	10
1.1.1	Internet access	96.19	10	3.1.1	Internet users	94.27	14
1.1.2	International Internet bandwidth	45.00	61	3.1.2	Active mobile-broadband subscriptions	56.95	10
1.1.3	Fixed-broadband subscriptions	95.89	29	3.1.3	Gender parity in Internet usage	95.97	36
1.1.4	4G-mobile network coverage	100.00	1	3.1.4	Firms with website	92.90	6
1.1.5	Fixed broadband affordability	98.42	29	3.1.5	Internet shopping	91.90	6
1.1.6	Mobile broadband affordability	91.94	23	3.1.6	Government online services	87.59	15
1.1.7	Computer software spending	46.91	11	3.1.7	E-Participation	78.87	41
1.2	Transport Infrastructure	56.49	23	3.2	Digital Content Creation	78.09	5
1.2.1	Quality of infrastructure	95.37	3	3.2.1	GitHub commits	84.98	3
1.2.2	Rural access	87.34	34	3.2.2	Wikipedia edits	85.90	7
1.2.3	Air connectivity	29.72	26	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	95.43	12
1.3	Energy Infrastructure	79.66	2	3.3	Industry 4.0	77.76	2
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	72.93	5
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	80.74	6
1.3.3	Electrical outages	100.00	1	3.3.3	AI research	64.36	8
1.3.4	Energy intensity	78.57	59	3.3.4	ICT patent applications	100.00	1
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	75.59	4	4	COMPETITIVENESS	70.09	5
2.1	Attract	72.33	10	4.1	Digital Policies	90.05	8
2.1.1	Brain gain	58.12	35	4.1.1	ICT regulation	82.69	50
2.1.2	International students	19.04	34	4.1.2	Cybersecurity	94.43	33
2.1.3	Tolerance of minorities	87.23	5	4.1.3	Rule of law	91.87	8
2.1.4	Tolerance of immigrants	92.31	8	4.1.4	Regulatory quality	85.72	9
2.1.5	Gender parity in high-skilled jobs	97.06	11	4.1.5	Corruption	95.52	3
2.1.6	FDI and technology transfer	80.20	10	4.2	Market Environment	71.44	6
2.2	Grow	71.23	8	4.2.1	Extent of market dominance	67.81	23
2.2.1	Tertiary enrolment	51.80	25	4.2.2	Labour productivity	69.34	12
2.2.2	Reading, maths, and science	68.77	13	4.2.3	Urbanisation	84.96	18
2.2.3	Use of virtual professional networks	54.31	15	4.2.4	Domestic credit to private sector	63.64	12
2.2.4	Formal and non-formal studies	86.42	5	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	94.87	8	4.3	R&D	65.21	6
2.3	Retain	86.55	9	4.3.1	R&D spending	66.96	4
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	69.88	12
2.3.2	Environmental performance	93.38	8	4.3.3	Gender parity in R&D	44.06	62
2.3.3	Physician density	53.84	21	4.3.4	Scientific journal articles	79.92	6
2.3.4	Sanitation	99.24	23	4.4	Innovation	53.68	7
2.3.5	Personal safety	86.31	12	4.4.1	Medium- and high-tech industry	64.94	10
2.4	Skills	72.26	7	4.4.2	High-tech exports	23.09	32
2.4.1	Workforce with tertiary education	51.99	20	4.4.3	Venture capital recipients, deals	35.92	15
2.4.2	High-skilled workforce	89.50	3	4.4.4	New product entrepreneurial activity	67.83	13
2.4.3	Researchers	93.43	3	4.4.5	New business density	30.33	20
2.4.4	Ease of finding skilled employees	67.86	38	4.4.6	Patent applications	100.00	1
2.4.5	Digital skills	58.53	10				

Switzerland

Key Indicators

Rank (out of 124)	3	GDP per capita (PPP US\$)	70,276.55
Income group	High income	GDP (US\$ billions)	752.25
Regional group	Europe	FREI score	75.71
Population (millions)	8.64	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



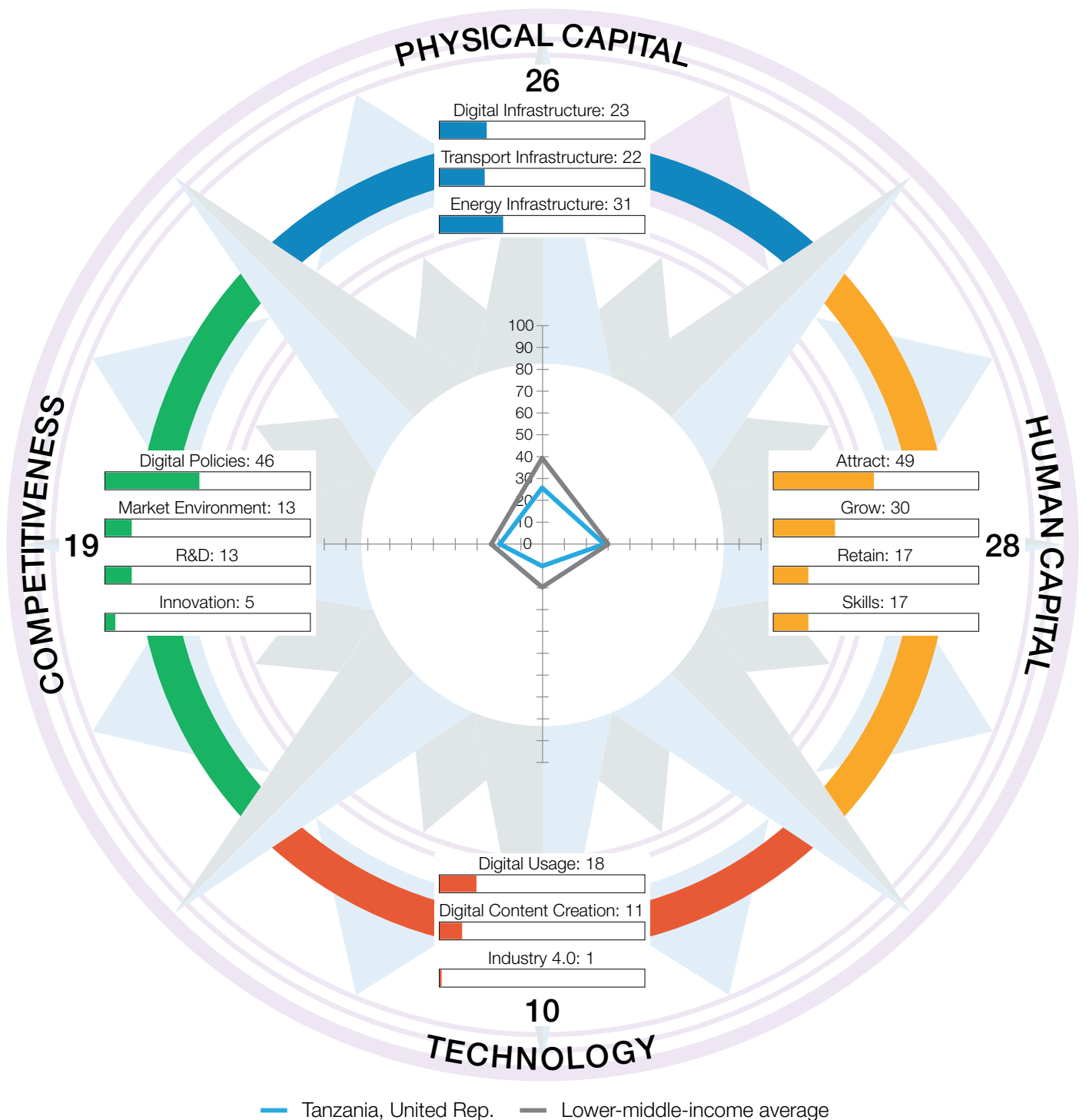
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	71.37	10	3	TECHNOLOGY	80.40	2
1.1	Digital Infrastructure	83.50	5	3.1	Digital Usage	80.43	18
1.1.1	Internet access	91.59	24	3.1.1	Internet users	92.81	16
1.1.2	International Internet bandwidth	47.23	49	3.1.2	Active mobile-broadband subscriptions	44.29	36
1.1.3	Fixed-broadband subscriptions	97.41	19	3.1.3	Gender parity in Internet usage	91.57	60
1.1.4	4G-mobile network coverage	99.95	13	3.1.4	Firms with website	94.95	3
1.1.5	Fixed broadband affordability	98.69	23	3.1.5	Internet shopping	71.84	15
1.1.6	Mobile broadband affordability	88.15	33	3.1.6	Government online services	78.83	36
1.1.7	Computer software spending	61.49	2	3.1.7	E-Participation	88.74	18
1.2	Transport Infrastructure	65.98	8	3.2	Digital Content Creation	88.97	2
1.2.1	Quality of infrastructure	87.54	9	3.2.1	GitHub commits	100.00	1
1.2.2	Rural access	93.75	19	3.2.2	Wikipedia edits	80.23	15
1.2.3	Air connectivity	60.33	9	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	98.31	7
1.3	Energy Infrastructure	64.63	22	3.3	Industry 4.0	71.81	5
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	43.32	17
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	100.00	1
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	100.00	1
1.3.4	Energy intensity	96.99	4	3.3.4	ICT patent applications	59.74	8
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	74.94	7	4	COMPETITIVENESS	76.12	1
2.1	Attract	77.20	5	4.1	Digital Policies	90.00	9
2.1.1	Brain gain	99.66	2	4.1.1	ICT regulation	92.07	19
2.1.2	International students	47.48	9	4.1.2	Cybersecurity	86.68	50
2.1.3	Tolerance of minorities	76.60	17	4.1.3	Rule of law	92.52	6
2.1.4	Tolerance of immigrants	76.92	28	4.1.4	Regulatory quality	83.21	11
2.1.5	Gender parity in high-skilled jobs	83.50	42	4.1.5	Corruption	95.52	3
2.1.6	FDI and technology transfer	79.07	12	4.2	Market Environment	84.80	1
2.2	Grow	69.35	10	4.2.1	Extent of market dominance	100.00	1
2.2.1	Tertiary enrolment	42.30	47	4.2.2	Labour productivity	78.19	6
2.2.2	Reading, maths, and science	66.99	20	4.2.3	Urbanisation	68.65	46
2.2.3	Use of virtual professional networks	48.78	16	4.2.4	Domestic credit to private sector	77.15	4
2.2.4	Formal and non-formal studies	93.62	2	4.2.5	Market capitalisation	100.00	1
2.2.5	Youth inclusion	95.03	7	4.3	R&D	73.53	1
2.3	Retain	88.11	4	4.3.1	R&D spending	68.08	3
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	80.08	6
2.3.2	Environmental performance	98.26	3	4.3.3	Gender parity in R&D	45.93	61
2.3.3	Physician density	53.87	20	4.3.4	Scientific journal articles	100.00	1
2.3.4	Sanitation	99.88	17	4.4	Innovation	56.16	5
2.3.5	Personal safety	88.54	8	4.4.1	Medium- and high-tech industry	80.17	2
2.4	Skills	65.09	12	4.4.2	High-tech exports	20.64	39
2.4.1	Workforce with tertiary education	52.05	19	4.4.3	Venture capital recipients, deals	53.83	8
2.4.2	High-skilled workforce	81.80	7	4.4.4	New product entrepreneurial activity	63.24	20
2.4.3	Researchers	67.52	11	4.4.5	New business density	19.06	31
2.4.4	Ease of finding skilled employees	74.52	27	4.4.6	Patent applications	100.00	1
2.4.5	Digital skills	49.53	16				

Tanzania, United Rep.

Key Indicators

Rank (out of 124)	109	GDP per capita (PPP US\$)	2,780.06
Income group	Lower-middle income	GDP (US\$ billions)	62.41
Regional group	Sub-Saharan Africa	FREI score	20.75
Population (millions)	59.73	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



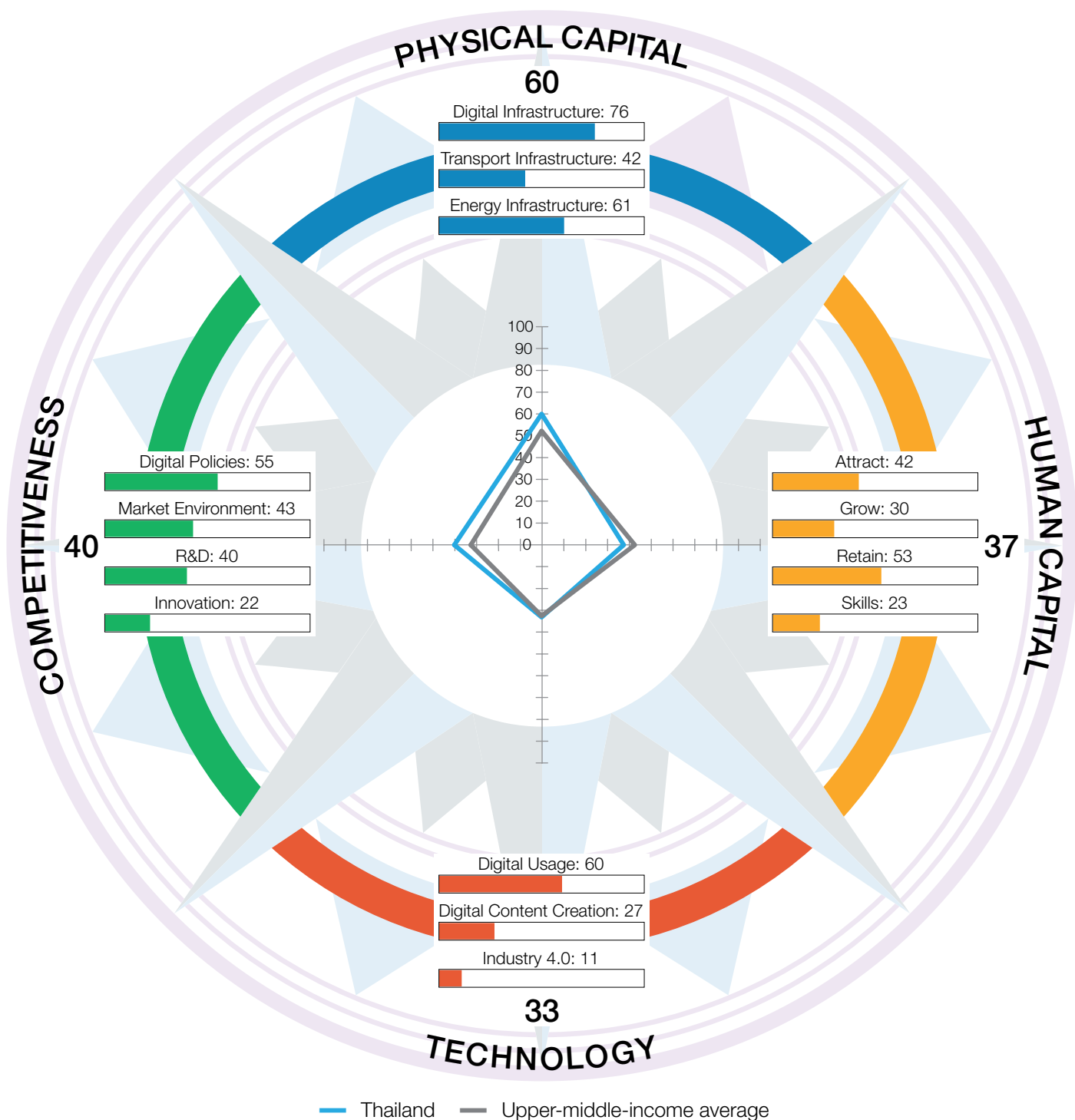
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	25.55	115	3	TECHNOLOGY	9.94	118
1.1	Digital Infrastructure	23.37	117	3.1	Digital Usage	18.16	115
1.1.1	Internet access	n/a	n/a	3.1.1	Internet users	11.84	114
1.1.2	International Internet bandwidth	17.80	118	3.1.2	Active mobile-broadband subscriptions	4.71	122
1.1.3	Fixed-broadband subscriptions	n/a	n/a	3.1.3	Gender parity in Internet usage	0.00	100
1.1.4	4G-mobile network coverage	13.00	120	3.1.4	Firms with website	11.36	98
1.1.5	Fixed broadband affordability	48.81	112	3.1.5	Internet shopping	6.82	79
1.1.6	Mobile broadband affordability	36.83	113	3.1.6	Government online services	44.52	93
1.1.7	Computer software spending	0.41	119	3.1.7	E-Participation	47.88	92
1.2	Transport Infrastructure	22.20	91	3.2	Digital Content Creation	10.55	116
1.2.1	Quality of infrastructure	44.54	58	3.2.1	GitHub commits	0.23	110
1.2.2	Rural access	42.80	95	3.2.2	Wikipedia edits	7.11	122
1.2.3	Air connectivity	0.39	110	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	34.75	108
1.3	Energy Infrastructure	31.09	115	3.3	Industry 4.0	1.10	113
1.3.1	Access to electricity	29.84	119	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	1.18	104
1.3.3	Electrical outages	47.21	83	3.3.3	AI research	0.39	102
1.3.4	Energy intensity	58.43	99	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	28.32	99	4	COMPETITIVENESS	19.18	105
2.1	Attract	49.26	47	4.1	Digital Policies	45.76	77
2.1.1	Brain gain	55.95	41	4.1.1	ICT regulation	71.15	74
2.1.2	International students	n/a	n/a	4.1.2	Cybersecurity	90.37	45
2.1.3	Tolerance of minorities	53.19	49	4.1.3	Rule of law	20.03	96
2.1.4	Tolerance of immigrants	41.54	91	4.1.4	Regulatory quality	21.87	105
2.1.5	Gender parity in high-skilled jobs	59.68	84	4.1.5	Corruption	25.37	72
2.1.6	FDI and technology transfer	35.93	85	4.2	Market Environment	13.20	116
2.2	Grow	29.63	84	4.2.1	Extent of market dominance	35.87	88
2.2.1	Tertiary enrolment	4.75	111	4.2.2	Labour productivity	2.56	102
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	20.76	112
2.2.3	Use of virtual professional networks	2.21	112	4.2.4	Domestic credit to private sector	2.97	114
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	3.83	71
2.2.5	Youth inclusion	81.94	45	4.3	R&D	12.94	100
2.3	Retain	17.25	111	4.3.1	R&D spending	10.18	61
2.3.1	Pension coverage	3.57	116	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	10.45	110	4.3.3	Gender parity in R&D	41.20	68
2.3.3	Physician density	0.31	122	4.3.4	Scientific journal articles	0.39	110
2.3.4	Sanitation	24.38	111	4.4	Innovation	4.84	114
2.3.5	Personal safety	47.52	73	4.4.1	Medium- and high-tech industry	7.74	107
2.4	Skills	17.16	108	4.4.2	High-tech exports	11.07	65
2.4.1	Workforce with tertiary education	0.72	120	4.4.3	Venture capital recipients, deals	4.80	63
2.4.2	High-skilled workforce	0.00	122	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	0.08	95	4.4.5	New business density	0.58	106
2.4.4	Ease of finding skilled employees	67.84	39	4.4.6	Patent applications	0.00	96
2.4.5	Digital skills	n/a	n/a				

Thailand

Key Indicators

Rank (out of 124)	56	GDP per capita (PPP US\$)	19,208.60
Income group	Upper-middle income	GDP (US\$ billions)	501.79
Regional group	Asia and Pacific	FREI score	42.37
Population (millions)	69.80	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)

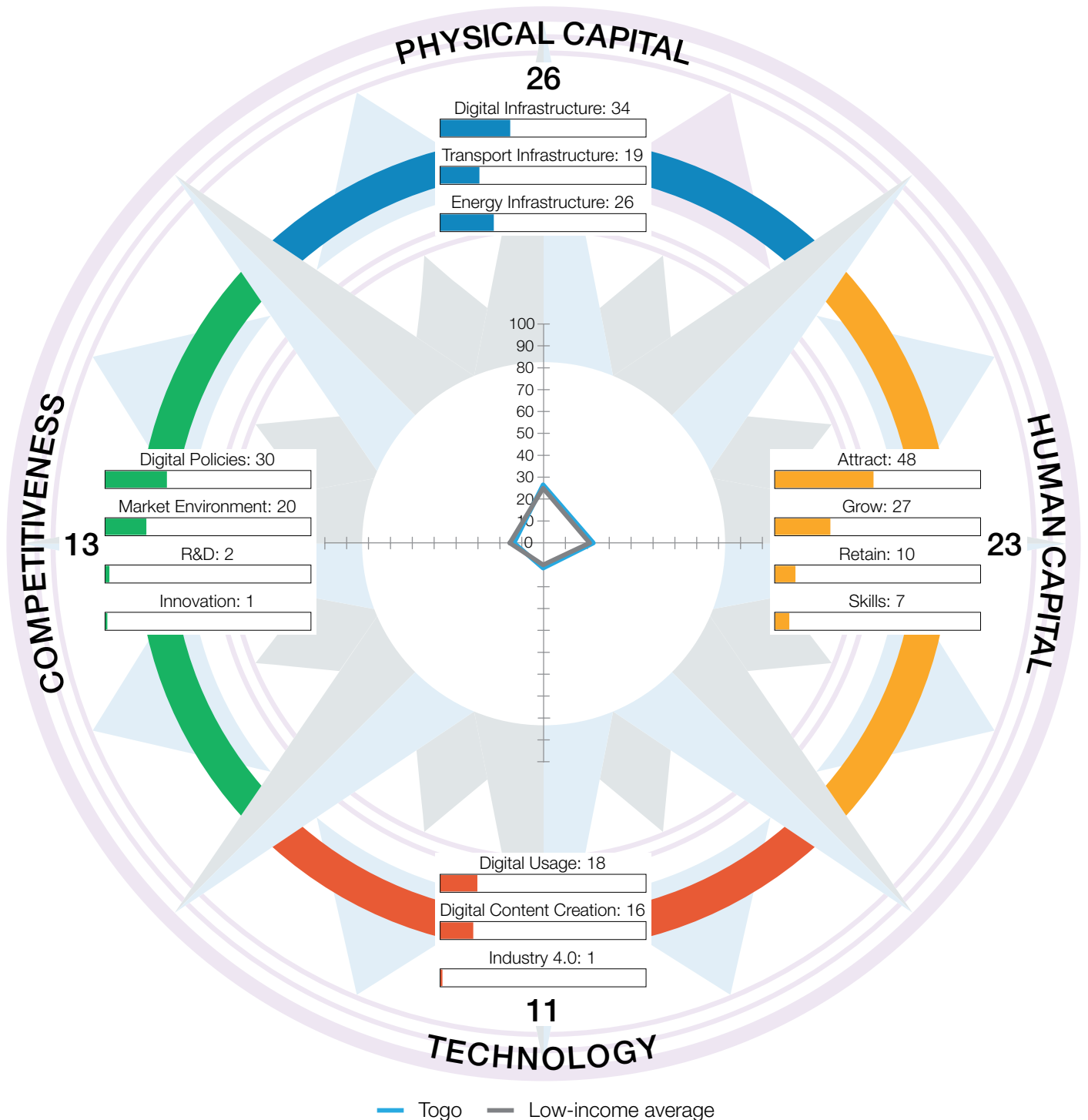


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	59.59	45	3	TECHNOLOGY	32.90	62
1.1	Digital Infrastructure	75.57	43	3.1	Digital Usage	59.79	61
1.1.1	Internet access	85.12	42	3.1.1	Internet users	76.75	59
1.1.2	International Internet bandwidth	53.11	30	3.1.2	Active mobile-broadband subscriptions	39.22	56
1.1.3	Fixed-broadband subscriptions	98.87	13	3.1.3	Gender parity in Internet usage	94.28	47
1.1.4	4G-mobile network coverage	98.00	53	3.1.4	Firms with website	39.05	74
1.1.5	Fixed broadband affordability	92.98	77	3.1.5	Internet shopping	21.54	56
1.1.6	Mobile broadband affordability	78.60	68	3.1.6	Government online services	74.45	42
1.1.7	Computer software spending	22.32	53	3.1.7	E-Participation	73.24	50
1.2	Transport Infrastructure	42.30	45	3.2	Digital Content Creation	27.48	73
1.2.1	Quality of infrastructure	56.23	39	3.2.1	GitHub commits	2.74	71
1.2.2	Rural access	70.84	58	3.2.2	Wikipedia edits	37.74	80
1.2.3	Air connectivity	21.95	35	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	66.93	67
1.3	Energy Infrastructure	60.91	39	3.3	Industry 4.0	11.42	46
1.3.1	Access to electricity	99.89	76	3.3.1	Robot density	15.19	27
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	10.85	57
1.3.3	Electrical outages	95.83	13	3.3.3	AI research	4.28	66
1.3.4	Energy intensity	72.72	76	3.3.4	ICT patent applications	0.24	60
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	37.33	79	4	COMPETITIVENESS	39.65	45
2.1	Attract	42.11	76	4.1	Digital Policies	54.53	59
2.1.1	Brain gain	57.63	36	4.1.1	ICT regulation	77.64	69
2.1.2	International students	3.43	80	4.1.2	Cybersecurity	86.20	52
2.1.3	Tolerance of minorities	27.66	88	4.1.3	Rule of law	41.63	54
2.1.4	Tolerance of immigrants	15.38	117	4.1.4	Regulatory quality	44.82	61
2.1.5	Gender parity in high-skilled jobs	88.66	35	4.1.5	Corruption	22.39	80
2.1.6	FDI and technology transfer	59.90	41	4.2	Market Environment	42.92	43
2.2	Grow	30.45	81	4.2.1	Extent of market dominance	40.64	75
2.2.1	Tertiary enrolment	32.81	64	4.2.2	Labour productivity	19.98	74
2.2.2	Reading, maths, and science	31.97	58	4.2.3	Urbanisation	40.11	92
2.2.3	Use of virtual professional networks	5.42	96	4.2.4	Domestic credit to private sector	73.22	8
2.2.4	Formal and non-formal studies	0.40	76	4.2.5	Market capitalisation	40.63	15
2.2.5	Youth inclusion	81.63	47	4.3	R&D	39.55	35
2.3	Retain	53.42	66	4.3.1	R&D spending	20.07	36
2.3.1	Pension coverage	88.88	54	4.3.2	University ranking	33.80	53
2.3.2	Environmental performance	35.37	68	4.3.3	Gender parity in R&D	97.20	4
2.3.3	Physician density	11.07	86	4.3.4	Scientific journal articles	7.14	62
2.3.4	Sanitation	98.65	36	4.4	Innovation	21.61	52
2.3.5	Personal safety	33.12	97	4.4.1	Medium- and high-tech industry	51.25	29
2.4	Skills	23.33	97	4.4.2	High-tech exports	37.93	14
2.4.1	Workforce with tertiary education	20.94	76	4.4.3	Venture capital recipients, deals	1.61	84
2.4.2	High-skilled workforce	19.92	89	4.4.4	New product entrepreneurial activity	31.86	63
2.4.3	Researchers	16.61	44	4.4.5	New business density	4.62	74
2.4.4	Ease of finding skilled employees	53.50	66	4.4.6	Patent applications	2.43	56
2.4.5	Digital skills	5.69	69				

Key Indicators

Rank (out of 124)	117	GDP per capita (PPP US\$)	1,681.69
Income group	Low income	GDP (US\$ billions)	7.57
Regional group	Sub-Saharan Africa	FREI score	18.48
Population (millions)	8.28	FREI score (income group average)	17.76

FREI 2022 scores by pillar and sub-pillar (0–100)



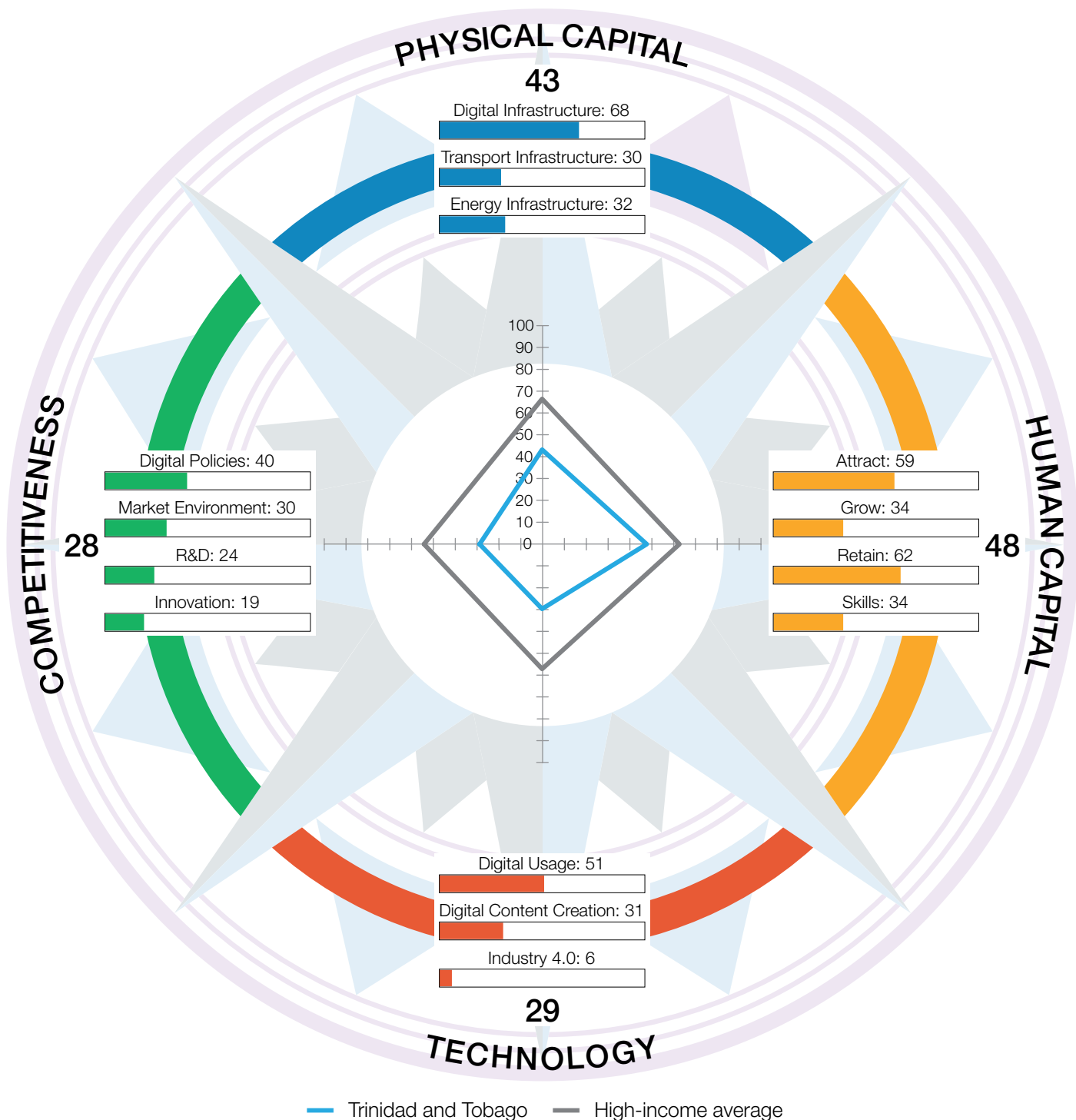
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	26.43	112	3	TECHNOLOGY	11.45	115
1.1	Digital Infrastructure	34.49	106	3.1	Digital Usage	17.65	117
1.1.1	Internet access	25.28	94	3.1.1	Internet users	8.02	119
1.1.2	International Internet bandwidth	29.72	104	3.1.2	Active mobile-broadband subscriptions	12.42	114
1.1.3	Fixed-broadband subscriptions	90.56	45	3.1.3	Gender parity in Internet usage	0.87	99
1.1.4	4G-mobile network coverage	67.00	102	3.1.4	Firms with website	20.07	93
1.1.5	Fixed broadband affordability	9.21	119	3.1.5	Internet shopping	1.95	113
1.1.6	Mobile broadband affordability	13.35	121	3.1.6	Government online services	37.96	102
1.1.7	Computer software spending	6.30	91	3.1.7	E-Participation	42.25	96
1.2	Transport Infrastructure	18.53	105	3.2	Digital Content Creation	16.10	104
1.2.1	Quality of infrastructure	23.84	105	3.2.1	GitHub commits	0.02	123
1.2.2	Rural access	48.29	88	3.2.2	Wikipedia edits	34.44	86
1.2.3	Air connectivity	0.28	114	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	29.72	112
1.3	Energy Infrastructure	26.28	120	3.3	Industry 4.0	0.61	119
1.3.1	Access to electricity	46.44	109	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	0.11	117
1.3.3	Electrical outages	56.93	72	3.3.3	AI research	0.24	108
1.3.4	Energy intensity	14.80	121	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	22.88	112	4	COMPETITIVENESS	13.17	118
2.1	Attract	47.93	57	4.1	Digital Policies	30.39	105
2.1.1	Brain gain	n/a	n/a	4.1.1	ICT regulation	66.35	85
2.1.2	International students	n/a	n/a	4.1.2	Cybersecurity	31.69	105
2.1.3	Tolerance of minorities	41.49	67	4.1.3	Rule of law	18.31	98
2.1.4	Tolerance of immigrants	63.08	55	4.1.4	Regulatory quality	23.69	98
2.1.5	Gender parity in high-skilled jobs	39.23	101	4.1.5	Corruption	11.94	106
2.1.6	FDI and technology transfer	n/a	n/a	4.2	Market Environment	19.81	107
2.2	Grow	26.73	91	4.2.1	Extent of market dominance	n/a	n/a
2.2.1	Tertiary enrolment	9.87	96	4.2.2	Labour productivity	n/a	n/a
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	30.24	101
2.2.3	Use of virtual professional networks	3.87	105	4.2.4	Domestic credit to private sector	9.38	98
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	66.43	76	4.3	R&D	1.62	115
2.3	Retain	10.27	121	4.3.1	R&D spending	5.15	77
2.3.1	Pension coverage	17.35	94	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	7.67	116	4.3.3	Gender parity in R&D	0.92	99
2.3.3	Physician density	0.52	119	4.3.4	Scientific journal articles	0.40	109
2.3.4	Sanitation	9.51	121	4.4	Innovation	0.85	124
2.3.5	Personal safety	16.30	117	4.4.1	Medium- and high-tech industry	n/a	n/a
2.4	Skills	6.58	121	4.4.2	High-tech exports	0.23	120
2.4.1	Workforce with tertiary education	4.82	110	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	18.25	92	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	0.44	85	4.4.5	New business density	2.33	86
2.4.4	Ease of finding skilled employees	n/a	n/a	4.4.6	Patent applications	0.00	96
2.4.5	Digital skills	2.80	78				

Trinidad and Tobago

Key Indicators

Rank (out of 124)	72	GDP per capita (PPP US\$)	28,151.29
Income group	High income	GDP (US\$ billions)	21.53
Regional group	Latin America and the Caribbean	FREI score	37.08
Population (millions)	1.40	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)

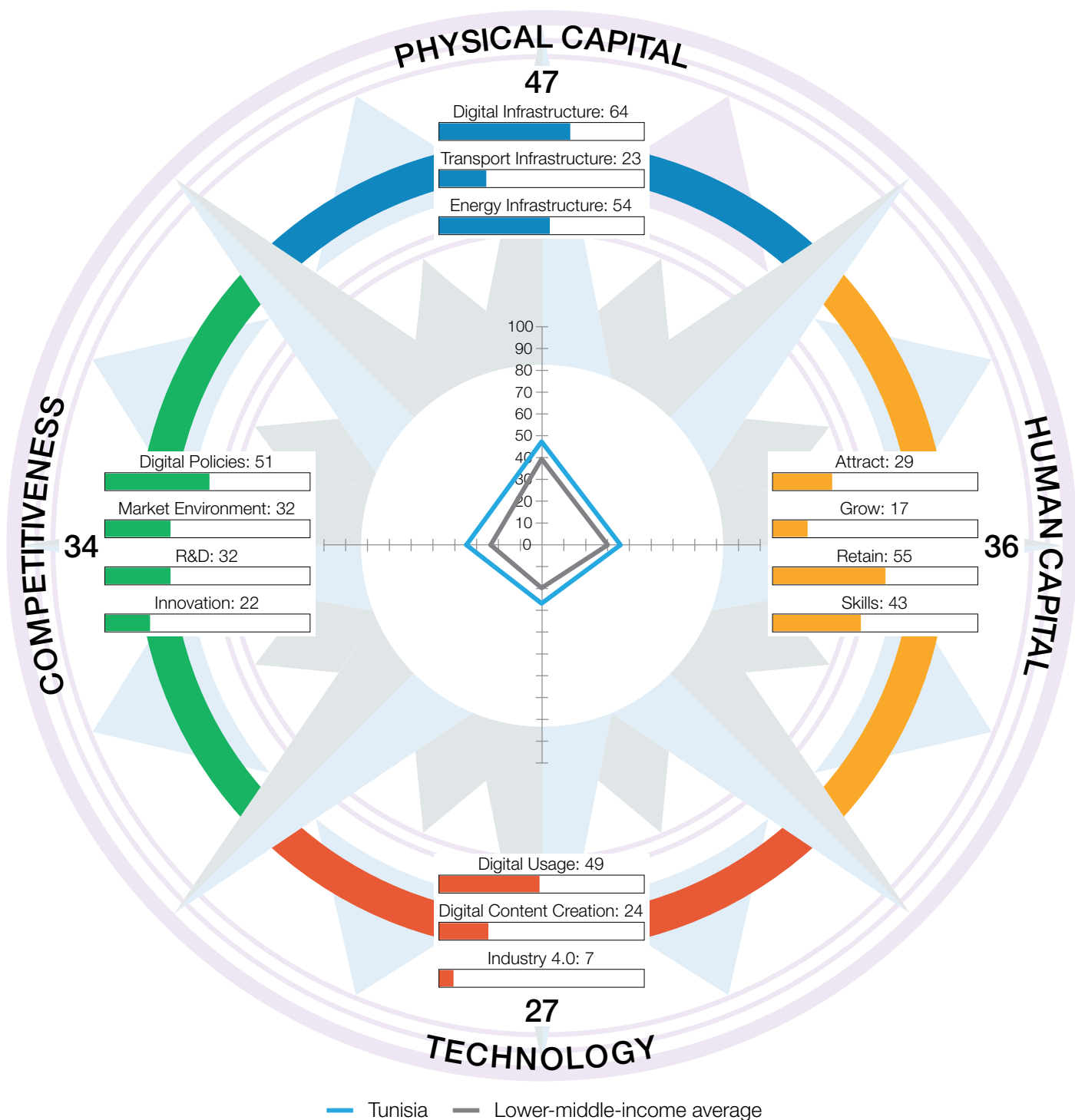


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	42.97	91	3	TECHNOLOGY	29.45	72
1.1	Digital Infrastructure	67.73	67	3.1	Digital Usage	50.73	77
1.1.1	Internet access	34.33	90	3.1.1	Internet users	76.20	61
1.1.2	International Internet bandwidth	55.32	26	3.1.2	Active mobile-broadband subscriptions	17.94	109
1.1.3	Fixed-broadband subscriptions	79.97	62	3.1.3	Gender parity in Internet usage	82.39	76
1.1.4	4G-mobile network coverage	75.00	94	3.1.4	Firms with website	n/a	n/a
1.1.5	Fixed broadband affordability	97.37	44	3.1.5	Internet shopping	21.09	57
1.1.6	Mobile broadband affordability	64.41	90	3.1.6	Government online services	51.83	84
1.1.7	Computer software spending	n/a	n/a	3.1.7	E-Participation	54.92	83
1.2	Transport Infrastructure	29.51	75	3.2	Digital Content Creation	31.42	62
1.2.1	Quality of infrastructure	29.18	94	3.2.1	GitHub commits	4.24	59
1.2.2	Rural access	69.98	59	3.2.2	Wikipedia edits	60.02	51
1.2.3	Air connectivity	11.64	49	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	58.94	80
1.3	Energy Infrastructure	31.68	114	3.3	Industry 4.0	6.21	67
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	17.39	43
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	0.66	96
1.3.4	Energy intensity	0.00	123	3.3.4	ICT patent applications	0.58	53
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	47.52	49	4	COMPETITIVENESS	28.37	76
2.1	Attract	59.13	29	4.1	Digital Policies	39.87	89
2.1.1	Brain gain	42.97	74	4.1.1	ICT regulation	80.28	60
2.1.2	International students	n/a	n/a	4.1.2	Cybersecurity	20.43	114
2.1.3	Tolerance of minorities	73.40	20	4.1.3	Rule of law	34.27	65
2.1.4	Tolerance of immigrants	50.77	77	4.1.4	Regulatory quality	36.02	78
2.1.5	Gender parity in high-skilled jobs	83.21	43	4.1.5	Corruption	28.36	65
2.1.6	FDI and technology transfer	45.32	69	4.2	Market Environment	30.06	78
2.2	Grow	34.37	70	4.2.1	Extent of market dominance	21.60	109
2.2.1	Tertiary enrolment	n/a	n/a	4.2.2	Labour productivity	36.46	45
2.2.2	Reading, maths, and science	36.31	52	4.2.3	Urbanisation	43.98	88
2.2.3	Use of virtual professional networks	41.59	20	4.2.4	Domestic credit to private sector	18.21	75
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	25.23	112	4.3	R&D	24.21	72
2.3	Retain	62.09	51	4.3.1	R&D spending	1.45	98
2.3.1	Pension coverage	90.92	47	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	39.02	62	4.3.3	Gender parity in R&D	89.36	15
2.3.3	Physician density	55.66	17	4.3.4	Scientific journal articles	6.02	65
2.3.4	Sanitation	92.88	62	4.4	Innovation	19.35	60
2.3.5	Personal safety	31.99	99	4.4.1	Medium- and high-tech industry	49.05	34
2.4	Skills	34.47	62	4.4.2	High-tech exports	0.22	121
2.4.1	Workforce with tertiary education	26.31	66	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	45.03	47	4.4.4	New product entrepreneurial activity	27.70	68
2.4.3	Researchers	6.88	61	4.4.5	New business density	n/a	n/a
2.4.4	Ease of finding skilled employees	59.67	53	4.4.6	Patent applications	0.45	82
2.4.5	Digital skills	n/a	n/a				

Key Indicators

Rank (out of 124)	78	GDP per capita (PPP US\$)	11,096.30
Income group	Lower-middle income	GDP (US\$ billions)	39.24
Regional group	Middle East and North Africa	FREI score	35.93
Population (millions)	11.82	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



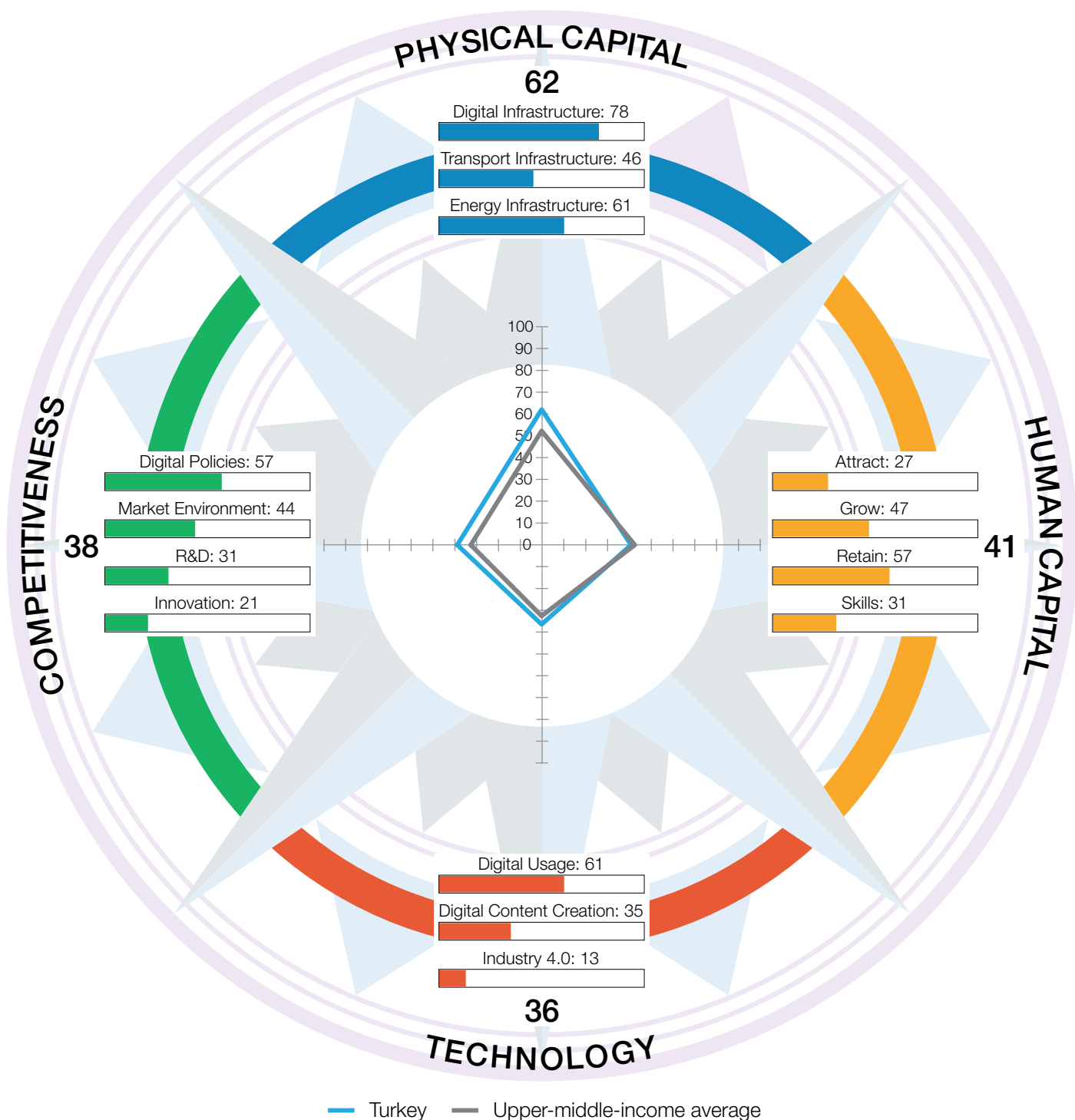
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	47.01	79	3	TECHNOLOGY	26.65	80
1.1	Digital Infrastructure	63.95	76	3.1	Digital Usage	48.55	79
1.1.1	Internet access	50.75	84	3.1.1	Internet users	65.05	78
1.1.2	International Internet bandwidth	48.54	44	3.1.2	Active mobile-broadband subscriptions	32.73	76
1.1.3	Fixed-broadband subscriptions	54.51	79	3.1.3	Gender parity in Internet usage	67.11	87
1.1.4	4G-mobile network coverage	95.00	69	3.1.4	Firms with website	52.35	59
1.1.5	Fixed broadband affordability	93.75	72	3.1.5	Internet shopping	5.96	84
1.1.6	Mobile broadband affordability	77.08	71	3.1.6	Government online services	53.28	81
1.1.7	Computer software spending	28.00	33	3.1.7	E-Participation	63.38	72
1.2	Transport Infrastructure	22.67	89	3.2	Digital Content Creation	23.94	84
1.2.1	Quality of infrastructure	19.22	117	3.2.1	GitHub commits	2.18	76
1.2.2	Rural access	59.09	75	3.2.2	Wikipedia edits	28.50	94
1.2.3	Air connectivity	5.85	70	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	63.24	73
1.3	Energy Infrastructure	54.42	80	3.3	Industry 4.0	7.46	61
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	0.95	53
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	17.63	40
1.3.3	Electrical outages	85.29	48	3.3.3	AI research	12.82	44
1.3.4	Energy intensity	78.57	59	3.3.4	ICT patent applications	0.24	59
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	35.89	83	4	COMPETITIVENESS	34.15	60
2.1	Attract	28.78	119	4.1	Digital Policies	51.28	65
2.1.1	Brain gain	18.61	110	4.1.1	ICT regulation	64.19	90
2.1.2	International students	5.85	70	4.1.2	Cybersecurity	85.92	53
2.1.3	Tolerance of minorities	29.79	82	4.1.3	Rule of law	42.11	53
2.1.4	Tolerance of immigrants	46.15	85	4.1.4	Regulatory quality	29.85	89
2.1.5	Gender parity in high-skilled jobs	36.13	104	4.1.5	Corruption	34.33	53
2.1.6	FDI and technology transfer	36.14	83	4.2	Market Environment	32.22	71
2.2	Grow	17.43	114	4.2.1	Extent of market dominance	31.34	95
2.2.1	Tertiary enrolment	21.01	81	4.2.2	Labour productivity	20.76	70
2.2.2	Reading, maths, and science	15.23	71	4.2.3	Urbanisation	62.84	55
2.2.3	Use of virtual professional networks	16.04	62	4.2.4	Domestic credit to private sector	38.02	35
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	8.14	57
2.2.5	Youth inclusion	n/a	n/a	4.3	R&D	31.57	53
2.3	Retain	54.56	62	4.3.1	R&D spending	11.94	54
2.3.1	Pension coverage	85.10	55	4.3.2	University ranking	20.65	78
2.3.2	Environmental performance	37.63	64	4.3.3	Gender parity in R&D	74.56	33
2.3.3	Physician density	15.88	80	4.3.4	Scientific journal articles	19.13	44
2.3.4	Sanitation	90.20	68	4.4	Innovation	21.54	53
2.3.5	Personal safety	43.98	77	4.4.1	Medium- and high-tech industry	34.05	52
2.4	Skills	42.79	41	4.4.2	High-tech exports	11.06	66
2.4.1	Workforce with tertiary education	26.57	65	4.4.3	Venture capital recipients, deals	12.29	36
2.4.2	High-skilled workforce	29.89	75	4.4.4	New product entrepreneurial activity	64.35	16
2.4.3	Researchers	21.84	40	4.4.5	New business density	6.97	56
2.4.4	Ease of finding skilled employees	49.14	76	4.4.6	Patent applications	0.53	79
2.4.5	Digital skills	86.51	3				

Turkey

Key Indicators

Rank (out of 124)	47	GDP per capita (PPP US\$)	27,318.43
Income group	Upper-middle income	GDP (US\$ billions)	720.10
Regional group	Middle East and North Africa	FREI score	44.21
Population (millions)	84.34	FREI score (income group average)	39.69

FREI 2022 scores by pillar and sub-pillar (0–100)

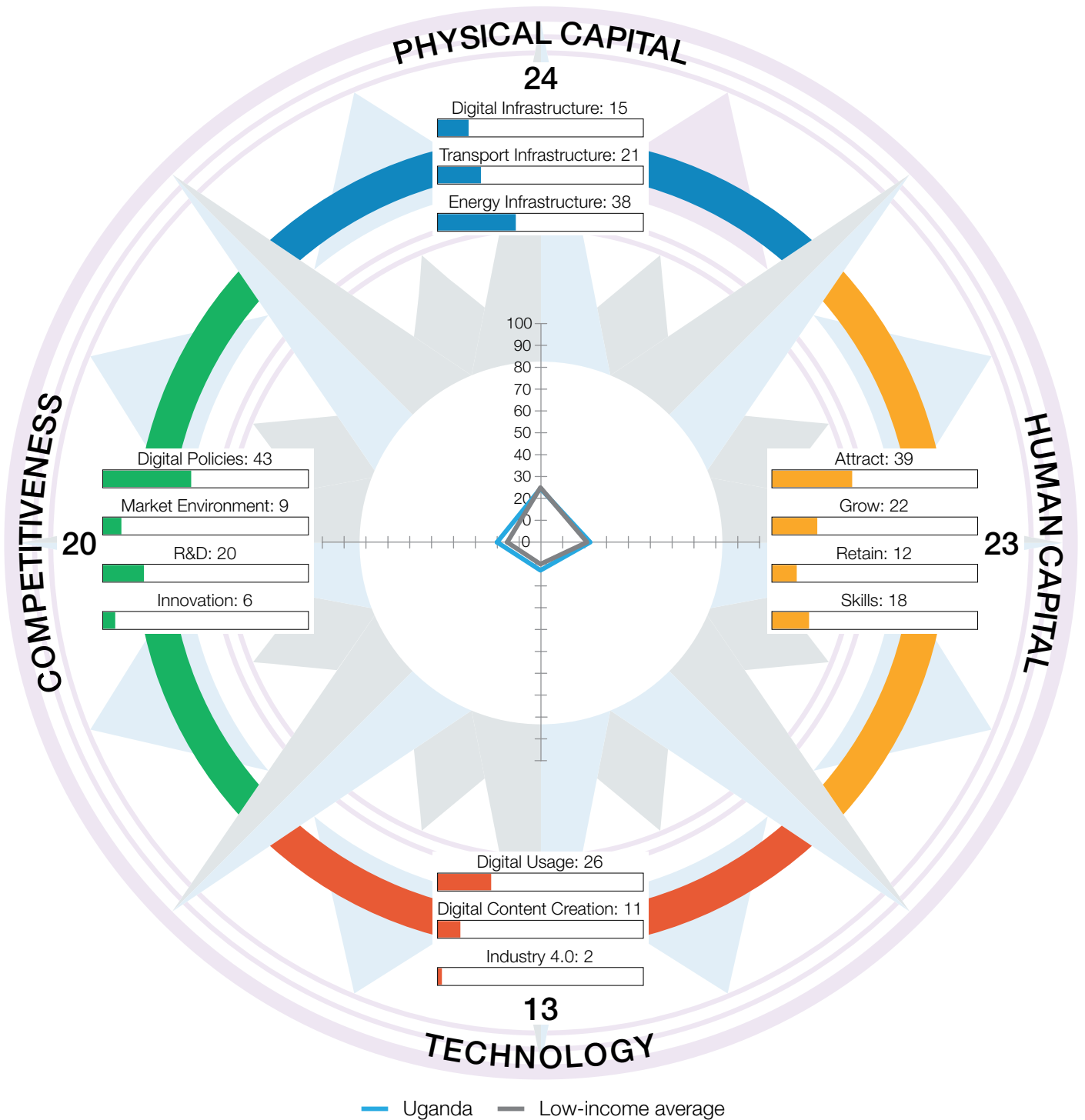


	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	61.62	40	3	TECHNOLOGY	36.15	55
1.1	Digital Infrastructure	78.05	29	3.1	Digital Usage	61.13	54
1.1.1	Internet access	90.76	28	3.1.1	Internet users	76.56	60
1.1.2	International Internet bandwidth	52.69	32	3.1.2	Active mobile-broadband subscriptions	33.54	74
1.1.3	Fixed-broadband subscriptions	80.49	60	3.1.3	Gender parity in Internet usage	71.71	84
1.1.4	4G-mobile network coverage	98.96	46	3.1.4	Firms with website	49.02	61
1.1.5	Fixed broadband affordability	98.66	24	3.1.5	Internet shopping	27.31	49
1.1.6	Mobile broadband affordability	82.39	56	3.1.6	Government online services	82.48	22
1.1.7	Computer software spending	42.38	20	3.1.7	E-Participation	87.33	23
1.2	Transport Infrastructure	45.57	39	3.2	Digital Content Creation	34.78	55
1.2.1	Quality of infrastructure	58.72	31	3.2.1	GitHub commits	3.70	62
1.2.2	Rural access	90.38	30	3.2.2	Wikipedia edits	53.13	57
1.2.3	Air connectivity	13.37	46	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	76.69	45
1.3	Energy Infrastructure	61.25	37	3.3	Industry 4.0	12.54	42
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	8.83	34
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	17.48	42
1.3.3	Electrical outages	87.84	41	3.3.3	AI research	11.09	47
1.3.4	Energy intensity	89.41	17	3.3.4	ICT patent applications	4.39	30
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	40.73	69	4	COMPETITIVENESS	38.34	48
2.1	Attract	27.05	123	4.1	Digital Policies	56.94	52
2.1.1	Brain gain	23.40	106	4.1.1	ICT regulation	92.07	19
2.1.2	International students	5.24	74	4.1.2	Cybersecurity	97.43	16
2.1.3	Tolerance of minorities	2.13	123	4.1.3	Rule of law	27.32	80
2.1.4	Tolerance of immigrants	44.62	87	4.1.4	Regulatory quality	39.52	71
2.1.5	Gender parity in high-skilled jobs	43.62	97	4.1.5	Corruption	28.36	65
2.1.6	FDI and technology transfer	43.29	71	4.2	Market Environment	44.23	41
2.2	Grow	47.28	44	4.2.1	Extent of market dominance	47.48	57
2.2.1	Tertiary enrolment	77.33	3	4.2.2	Labour productivity	58.57	24
2.2.2	Reading, maths, and science	52.41	40	4.2.3	Urbanisation	70.26	42
2.2.3	Use of virtual professional networks	17.04	58	4.2.4	Domestic credit to private sector	32.53	44
2.2.4	Formal and non-formal studies	28.16	40	4.2.5	Market capitalisation	12.32	44
2.2.5	Youth inclusion	61.48	89	4.3	R&D	31.23	56
2.3	Retain	57.22	59	4.3.1	R&D spending	19.22	39
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	42.75	36
2.3.2	Environmental performance	30.49	81	4.3.3	Gender parity in R&D	46.78	57
2.3.3	Physician density	22.20	72	4.3.4	Scientific journal articles	16.19	46
2.3.4	Sanitation	97.08	51	4.4	Innovation	20.95	55
2.3.5	Personal safety	36.36	93	4.4.1	Medium- and high-tech industry	39.76	46
2.4	Skills	31.37	67	4.4.2	High-tech exports	4.89	89
2.4.1	Workforce with tertiary education	33.28	51	4.4.3	Venture capital recipients, deals	1.69	82
2.4.2	High-skilled workforce	35.16	64	4.4.4	New product entrepreneurial activity	61.25	21
2.4.3	Researchers	16.97	43	4.4.5	New business density	6.45	60
2.4.4	Ease of finding skilled employees	55.13	62	4.4.6	Patent applications	11.69	31
2.4.5	Digital skills	16.30	56				

Key Indicators

Rank (out of 124)	113	GDP per capita (PPP US\$)	2,279.97
Income group	Low income	GDP (US\$ billions)	37.37
Regional group	Sub-Saharan Africa	FREI score	19.86
Population (millions)	45.74	FREI score (income group average)	17.76

FREI 2022 scores by pillar and sub-pillar (0–100)



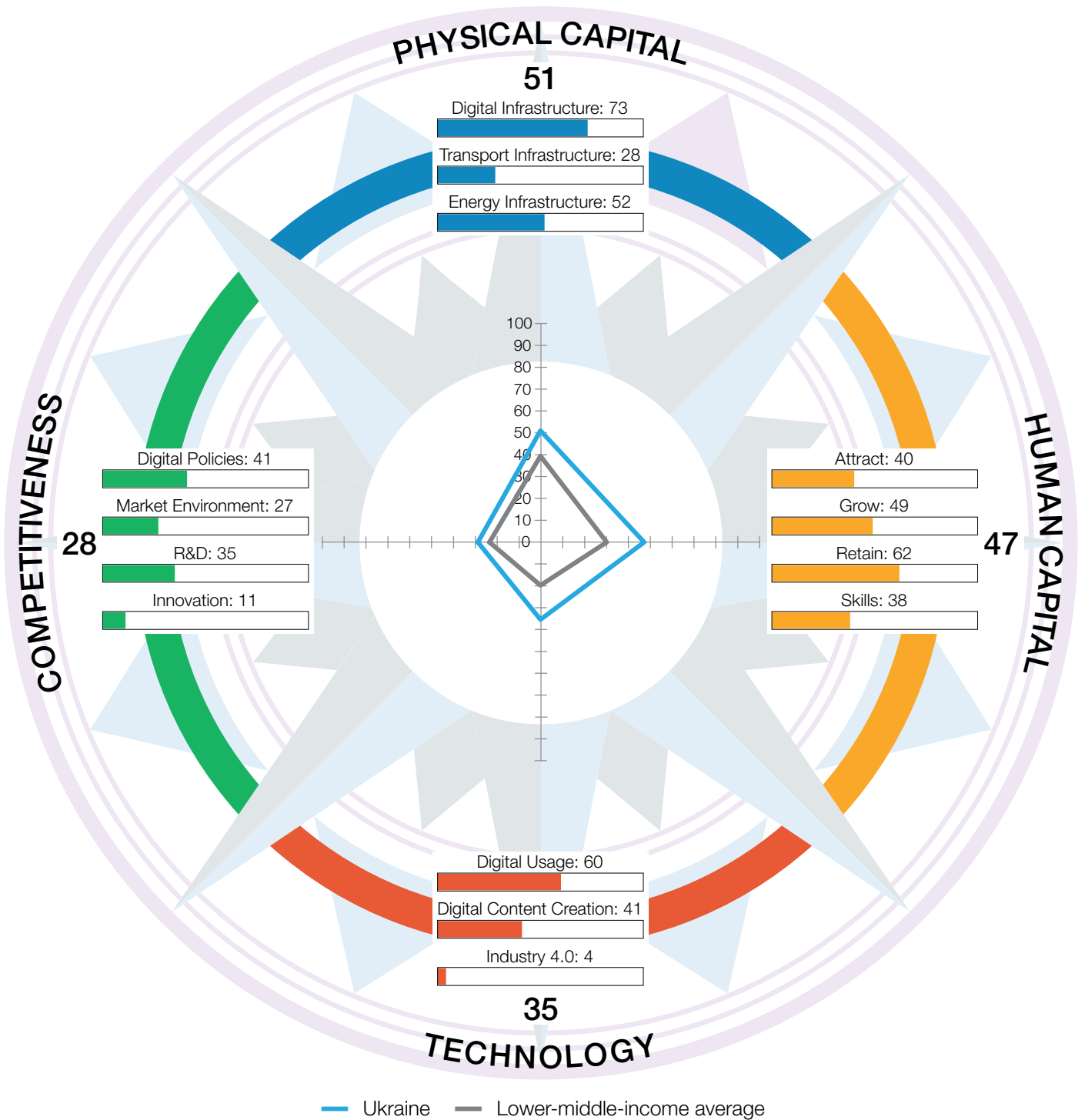
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	24.42	116	3	TECHNOLOGY	12.75	113
1.1	Digital Infrastructure	14.55	121	3.1	Digital Usage	25.82	106
1.1.1	Internet access	n/a	n/a	3.1.1	Internet users	n/a	n/a
1.1.2	International Internet bandwidth	n/a	n/a	3.1.2	Active mobile-broadband subscriptions	19.49	106
1.1.3	Fixed-broadband subscriptions	1.64	116	3.1.3	Gender parity in Internet usage	n/a	n/a
1.1.4	4G-mobile network coverage	40.00	112	3.1.4	Firms with website	7.25	102
1.1.5	Fixed broadband affordability	0.00	120	3.1.5	Internet shopping	4.91	90
1.1.6	Mobile broadband affordability	30.30	117	3.1.6	Government online services	48.18	88
1.1.7	Computer software spending	0.80	116	3.1.7	E-Participation	49.29	90
1.2	Transport Infrastructure	21.07	98	3.2	Digital Content Creation	10.63	114
1.2.1	Quality of infrastructure	22.42	110	3.2.1	GitHub commits	0.74	100
1.2.2	Rural access	61.23	72	3.2.2	Wikipedia edits	10.78	120
1.2.3	Air connectivity	0.30	113	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	30.89	110
1.3	Energy Infrastructure	37.64	110	3.3	Industry 4.0	1.81	104
1.3.1	Access to electricity	33.90	115	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	3.14	95
1.3.3	Electrical outages	54.25	74	3.3.3	AI research	0.56	99
1.3.4	Energy intensity	24.78	119	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	22.57	115	4	COMPETITIVENESS	19.69	103
2.1	Attract	39.06	88	4.1	Digital Policies	43.15	81
2.1.1	Brain gain	51.55	54	4.1.1	ICT regulation	81.25	57
2.1.2	International students	28.60	20	4.1.2	Cybersecurity	69.30	78
2.1.3	Tolerance of minorities	22.34	96	4.1.3	Rule of law	28.21	76
2.1.4	Tolerance of immigrants	33.85	106	4.1.4	Regulatory quality	28.05	93
2.1.5	Gender parity in high-skilled jobs	58.18	86	4.1.5	Corruption	8.96	112
2.1.6	FDI and technology transfer	39.86	77	4.2	Market Environment	9.26	122
2.2	Grow	21.59	107	4.2.1	Extent of market dominance	22.28	108
2.2.1	Tertiary enrolment	2.87	117	4.2.2	Labour productivity	2.44	103
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	8.79	117
2.2.3	Use of virtual professional networks	2.99	107	4.2.4	Domestic credit to private sector	3.54	113
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	58.90	95	4.3	R&D	20.11	87
2.3	Retain	11.90	118	4.3.1	R&D spending	2.66	90
2.3.1	Pension coverage	9.39	104	4.3.2	University ranking	42.34	38
2.3.2	Environmental performance	18.29	96	4.3.3	Gender parity in R&D	34.84	76
2.3.3	Physician density	1.66	107	4.3.4	Scientific journal articles	0.59	102
2.3.4	Sanitation	12.04	118	4.4	Innovation	6.25	109
2.3.5	Personal safety	18.13	115	4.4.1	Medium- and high-tech industry	13.48	94
2.4	Skills	17.71	106	4.4.2	High-tech exports	3.37	97
2.4.1	Workforce with tertiary education	0.00	121	4.4.3	Venture capital recipients, deals	8.30	51
2.4.2	High-skilled workforce	11.87	106	4.4.4	New product entrepreneurial activity	8.70	87
2.4.3	Researchers	0.19	93	4.4.5	New business density	3.50	80
2.4.4	Ease of finding skilled employees	58.81	56	4.4.6	Patent applications	0.15	93
2.4.5	Digital skills	n/a	n/a				

Ukraine

Key Indicators

Rank (out of 124)	61	GDP per capita (PPP US\$)	13,056.70
Income group	Lower-middle income	GDP (US\$ billions)	155.58
Regional group	Europe	FREI score	40.31
Population (millions)	44.13	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



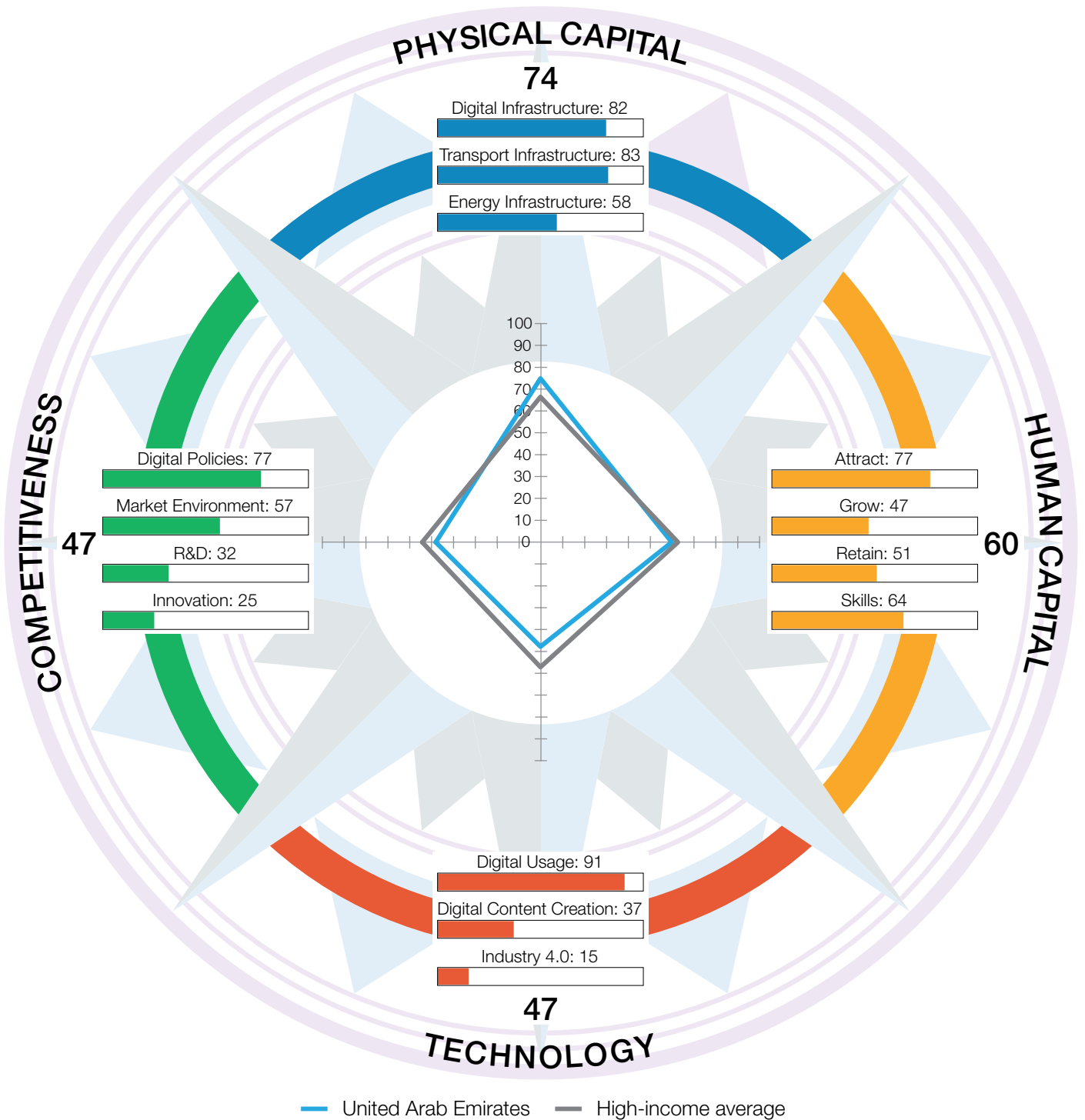
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	50.70	72	3	TECHNOLOGY	35.09	58
1.1	Digital Infrastructure	72.72	51	3.1	Digital Usage	60.07	58
1.1.1	Internet access	65.33	74	3.1.1	Internet users	68.65	75
1.1.2	International Internet bandwidth	45.66	57	3.1.2	Active mobile-broadband subscriptions	36.93	64
1.1.3	Fixed-broadband subscriptions	94.25	34	3.1.3	Gender parity in Internet usage	87.78	68
1.1.4	4G-mobile network coverage	87.15	82	3.1.4	Firms with website	61.29	46
1.1.5	Fixed broadband affordability	97.08	49	3.1.5	Internet shopping	27.80	48
1.1.6	Mobile broadband affordability	73.44	79	3.1.6	Government online services	60.59	71
1.1.7	Computer software spending	46.10	17	3.1.7	E-Participation	77.46	46
1.2	Transport Infrastructure	27.73	84	3.2	Digital Content Creation	41.18	43
1.2.1	Quality of infrastructure	23.49	106	3.2.1	GitHub commits	21.80	33
1.2.2	Rural access	77.85	46	3.2.2	Wikipedia edits	67.02	40
1.2.3	Air connectivity	3.64	83	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	71.62	62
1.3	Energy Infrastructure	51.65	93	3.3	Industry 4.0	4.01	85
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	0.74	55
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	7.55	67
1.3.3	Electrical outages	90.72	30	3.3.3	AI research	6.54	58
1.3.4	Energy intensity	47.07	110	3.3.4	ICT patent applications	1.27	45
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	47.12	50	4	COMPETITIVENESS	28.32	77
2.1	Attract	39.92	85	4.1	Digital Policies	40.51	86
2.1.1	Brain gain	41.03	78	4.1.1	ICT regulation	69.71	79
2.1.2	International students	10.60	55	4.1.2	Cybersecurity	65.16	84
2.1.3	Tolerance of minorities	44.68	62	4.1.3	Rule of law	18.03	99
2.1.4	Tolerance of immigrants	55.38	73	4.1.4	Regulatory quality	31.74	87
2.1.5	Gender parity in high-skilled jobs	67.25	73	4.1.5	Corruption	17.91	92
2.1.6	FDI and technology transfer	20.57	112	4.2	Market Environment	27.15	93
2.2	Grow	49.14	42	4.2.1	Extent of market dominance	40.25	76
2.2.1	Tertiary enrolment	55.41	19	4.2.2	Labour productivity	19.96	75
2.2.2	Reading, maths, and science	52.50	39	4.2.3	Urbanisation	63.33	54
2.2.3	Use of virtual professional networks	9.07	78	4.2.4	Domestic credit to private sector	11.02	90
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	1.19	76
2.2.5	Youth inclusion	79.59	50	4.3	R&D	35.00	46
2.3	Retain	61.80	52	4.3.1	R&D spending	9.30	65
2.3.1	Pension coverage	96.12	39	4.3.2	University ranking	35.56	50
2.3.2	Environmental performance	42.51	56	4.3.3	Gender parity in R&D	85.90	18
2.3.3	Physician density	37.06	45	4.3.4	Scientific journal articles	9.23	57
2.3.4	Sanitation	95.93	55	4.4	Innovation	10.64	92
2.3.5	Personal safety	37.40	90	4.4.1	Medium- and high-tech industry	32.98	56
2.4	Skills	37.63	50	4.4.2	High-tech exports	8.96	77
2.4.1	Workforce with tertiary education	65.54	4	4.4.3	Venture capital recipients, deals	0.19	92
2.4.2	High-skilled workforce	58.29	33	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	12.11	49	4.4.5	New business density	6.96	57
2.4.4	Ease of finding skilled employees	49.18	75	4.4.6	Patent applications	4.11	46
2.4.5	Digital skills	3.00	77				

United Arab Emirates

Key Indicators

Rank (out of 124)	27	GDP per capita (PPP US\$)	69,957.62
Income group	High income	GDP (US\$ billions)	421.14
Regional group	Middle East and North Africa	FREI score	57.22
Population (millions)	9.89	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



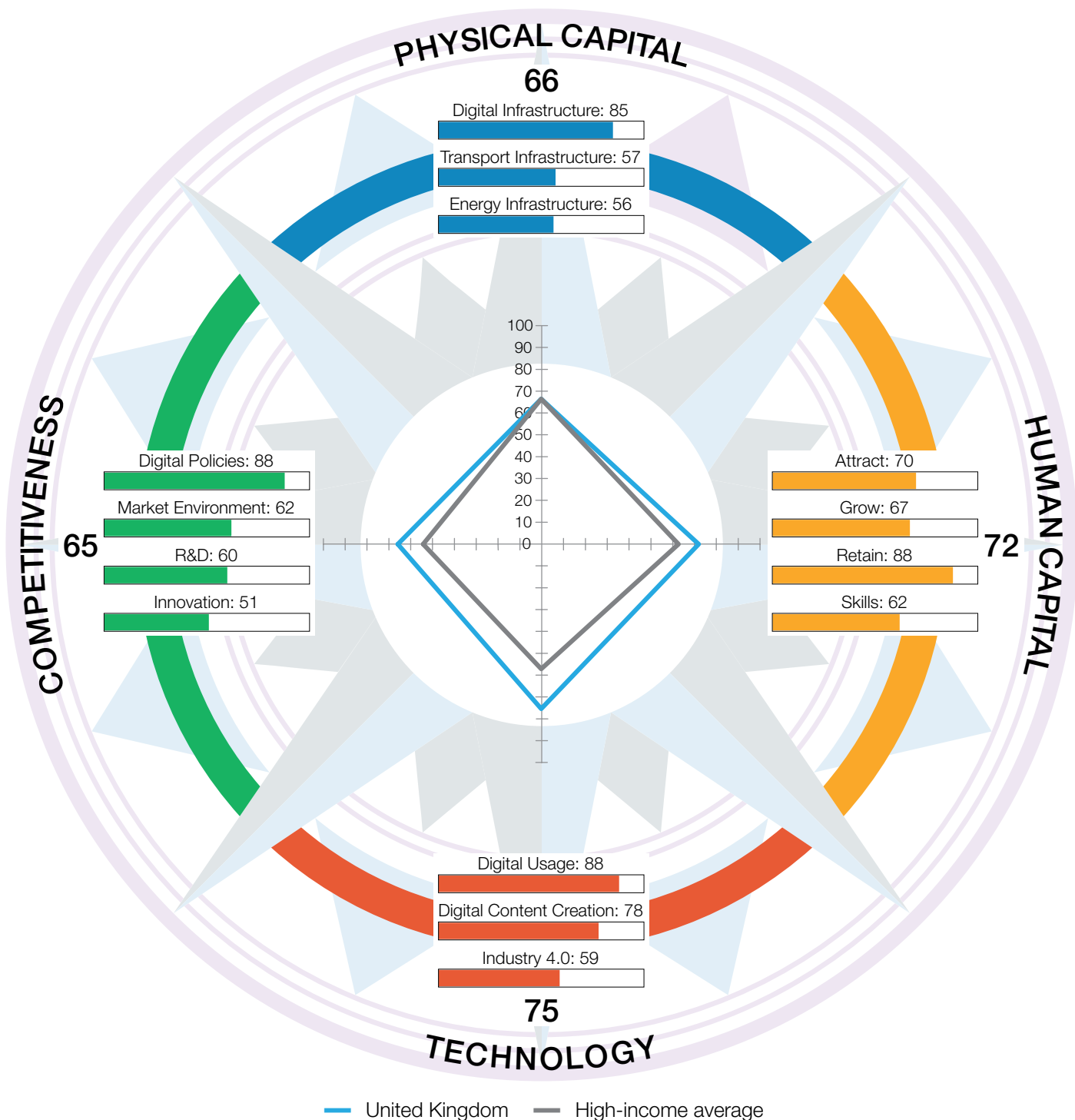
Score Rank			Score Rank				
1	PHYSICAL CAPITAL	74.40	6	3	TECHNOLOGY	47.43	33
1.1	Digital Infrastructure	82.45	8	3.1	Digital Usage	90.70	2
1.1.1	Internet access	100.00	1	3.1.1	Internet users	100.00	1
1.1.2	International Internet bandwidth	68.80	5	3.1.2	Active mobile-broadband subscriptions	100.00	1
1.1.3	Fixed-broadband subscriptions	96.66	26	3.1.3	Gender parity in Internet usage	100.00	1
1.1.4	4G-mobile network coverage	99.82	25	3.1.4	Firms with website	n/a	n/a
1.1.5	Fixed broadband affordability	99.64	3	3.1.5	Internet shopping	63.63	21
1.1.6	Mobile broadband affordability	85.33	46	3.1.6	Government online services	87.59	15
1.1.7	Computer software spending	26.89	38	3.1.7	E-Participation	92.96	16
1.2	Transport Infrastructure	82.75	2	3.2	Digital Content Creation	36.74	51
1.2.1	Quality of infrastructure	87.54	9	3.2.1	GitHub commits	5.41	55
1.2.2	Rural access	59.05	76	3.2.2	Wikipedia edits	45.89	66
1.2.3	Air connectivity	84.40	6	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	86.04	30
1.3	Energy Infrastructure	58.02	59	3.3	Industry 4.0	14.85	38
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	0.90	54
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	26.84	28
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	16.16	40
1.3.4	Energy intensity	73.92	73	3.3.4	ICT patent applications	3.79	31
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	59.60	26	4	COMPETITIVENESS	47.46	34
2.1	Attract	76.65	6	4.1	Digital Policies	76.57	24
2.1.1	Brain gain	89.80	4	4.1.1	ICT regulation	75.48	72
2.1.2	International students	100.00	1	4.1.2	Cybersecurity	98.02	8
2.1.3	Tolerance of minorities	75.53	19	4.1.3	Rule of law	65.35	32
2.1.4	Tolerance of immigrants	100.00	1	4.1.4	Regulatory quality	69.38	29
2.1.5	Gender parity in high-skilled jobs	17.75	114	4.1.5	Corruption	74.63	20
2.1.6	FDI and technology transfer	76.80	15	4.2	Market Environment	56.61	23
2.2	Grow	46.66	46	4.2.1	Extent of market dominance	82.40	7
2.2.1	Tertiary enrolment	35.81	59	4.2.2	Labour productivity	61.10	22
2.2.2	Reading, maths, and science	40.56	46	4.2.3	Urbanisation	83.87	21
2.2.3	Use of virtual professional networks	63.61	10	4.2.4	Domestic credit to private sector	33.73	41
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	21.96	33
2.2.5	Youth inclusion	n/a	n/a	4.3	R&D	31.51	55
2.3	Retain	50.81	72	4.3.1	R&D spending	25.68	28
2.3.1	Pension coverage	21.02	88	4.3.2	University ranking	44.04	34
2.3.2	Environmental performance	53.14	40	4.3.3	Gender parity in R&D	43.35	64
2.3.3	Physician density	31.24	56	4.3.4	Scientific journal articles	12.97	49
2.3.4	Sanitation	98.47	38	4.4	Innovation	25.13	43
2.3.5	Personal safety	50.17	69	4.4.1	Medium- and high-tech industry	45.35	38
2.4	Skills	64.29	15	4.4.2	High-tech exports	4.65	92
2.4.1	Workforce with tertiary education	44.01	33	4.4.3	Venture capital recipients, deals	30.39	18
2.4.2	High-skilled workforce	55.57	38	4.4.4	New product entrepreneurial activity	55.46	34
2.4.3	Researchers	29.38	32	4.4.5	New business density	12.75	45
2.4.4	Ease of finding skilled employees	92.48	7	4.4.6	Patent applications	2.17	59
2.4.5	Digital skills	100.00	1				

United Kingdom

Key Indicators

Rank (out of 124)	9	GDP per capita (PPP US\$)	48,438.58
Income group	High income	GDP (US\$ billions)	2,707.74
Regional group	Europe	FREI score	69.37
Population (millions)	67.22	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



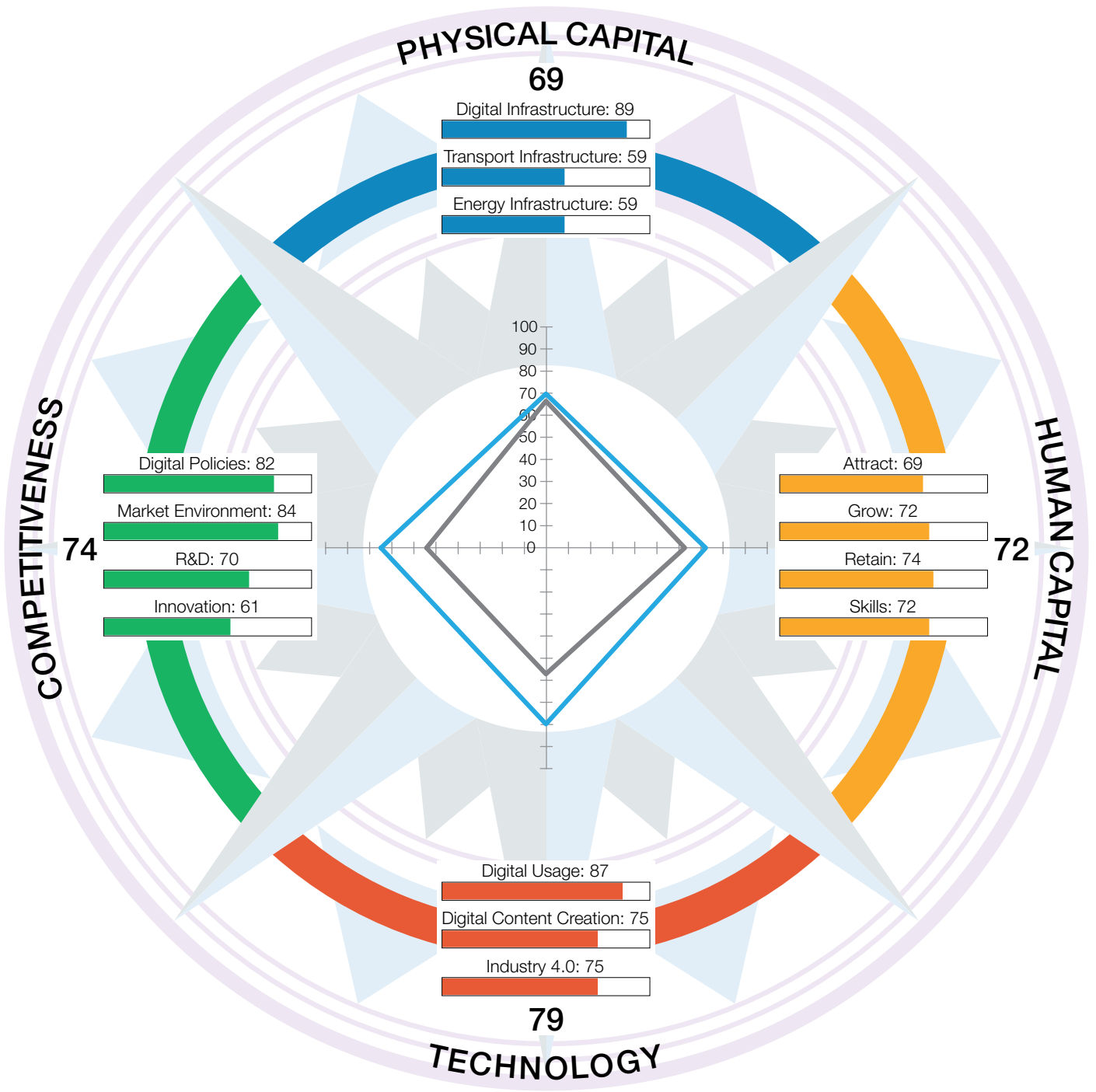
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	65.92	21	3	TECHNOLOGY	74.80	9
1.1	Digital Infrastructure	84.64	3	3.1	Digital Usage	87.63	5
1.1.1	Internet access	95.36	12	3.1.1	Internet users	94.56	12
1.1.2	International Internet bandwidth	66.14	9	3.1.2	Active mobile-broadband subscriptions	47.30	29
1.1.3	Fixed-broadband subscriptions	97.94	17	3.1.3	Gender parity in Internet usage	98.18	16
1.1.4	4G-mobile network coverage	99.90	15	3.1.4	Firms with website	85.44	11
1.1.5	Fixed broadband affordability	96.14	58	3.1.5	Internet shopping	95.86	4
1.1.6	Mobile broadband affordability	90.33	30	3.1.6	Government online services	94.89	6
1.1.7	Computer software spending	46.66	14	3.1.7	E-Participation	97.18	6
1.2	Transport Infrastructure	57.02	21	3.2	Digital Content Creation	77.89	6
1.2.1	Quality of infrastructure	87.90	8	3.2.1	GitHub commits	69.26	10
1.2.2	Rural access	96.39	15	3.2.2	Wikipedia edits	84.12	10
1.2.3	Air connectivity	29.38	27	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	94.93	13
1.3	Energy Infrastructure	56.10	74	3.3	Industry 4.0	58.87	12
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	26.94	21
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	70.81	10
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	61.97	10
1.3.4	Energy intensity	91.22	12	3.3.4	ICT patent applications	34.64	15
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	71.56	14	4	COMPETITIVENESS	65.20	7
2.1	Attract	69.54	15	4.1	Digital Policies	88.19	12
2.1.1	Brain gain	76.01	15	4.1.1	ICT regulation	94.95	8
2.1.2	International students	49.83	8	4.1.2	Cybersecurity	99.53	2
2.1.3	Tolerance of minorities	40.43	70	4.1.3	Rule of law	82.65	17
2.1.4	Tolerance of immigrants	81.54	23	4.1.4	Regulatory quality	80.23	14
2.1.5	Gender parity in high-skilled jobs	85.39	38	4.1.5	Corruption	83.58	11
2.1.6	FDI and technology transfer	84.03	6	4.2	Market Environment	62.33	16
2.2	Grow	66.63	13	4.2.1	Extent of market dominance	62.57	29
2.2.1	Tertiary enrolment	43.97	43	4.2.2	Labour productivity	58.56	25
2.2.2	Reading, maths, and science	69.14	11	4.2.3	Urbanisation	80.14	26
2.2.3	Use of virtual professional networks	60.84	13	4.2.4	Domestic credit to private sector	66.62	10
2.2.4	Formal and non-formal studies	70.53	15	4.2.5	Market capitalisation	43.73	13
2.2.5	Youth inclusion	88.68	26	4.3	R&D	59.54	10
2.3	Retain	88.46	3	4.3.1	R&D spending	34.29	21
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	98.17	2
2.3.2	Environmental performance	97.91	4	4.3.3	Gender parity in R&D	47.17	55
2.3.3	Physician density	72.55	6	4.3.4	Scientific journal articles	58.52	14
2.3.4	Sanitation	99.04	30	4.4	Innovation	50.75	9
2.3.5	Personal safety	72.80	26	4.4.1	Medium- and high-tech industry	55.07	22
2.4	Skills	61.60	18	4.4.2	High-tech exports	37.11	15
2.4.1	Workforce with tertiary education	54.17	16	4.4.3	Venture capital recipients, deals	73.14	7
2.4.2	High-skilled workforce	80.28	9	4.4.4	New product entrepreneurial activity	40.52	55
2.4.3	Researchers	57.00	19	4.4.5	New business density	66.25	7
2.4.4	Ease of finding skilled employees	64.99	44	4.4.6	Patent applications	32.41	19
2.4.5	Digital skills	51.54	15				

United States of America

Key Indicators

Rank (out of 124)	6	GDP per capita (PPP US\$)	65,279.53
Income group	High income	GDP (US\$ billions)	20,936.60
Regional group	Northern America	FREI score	73.55
Population (millions)	329.48	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



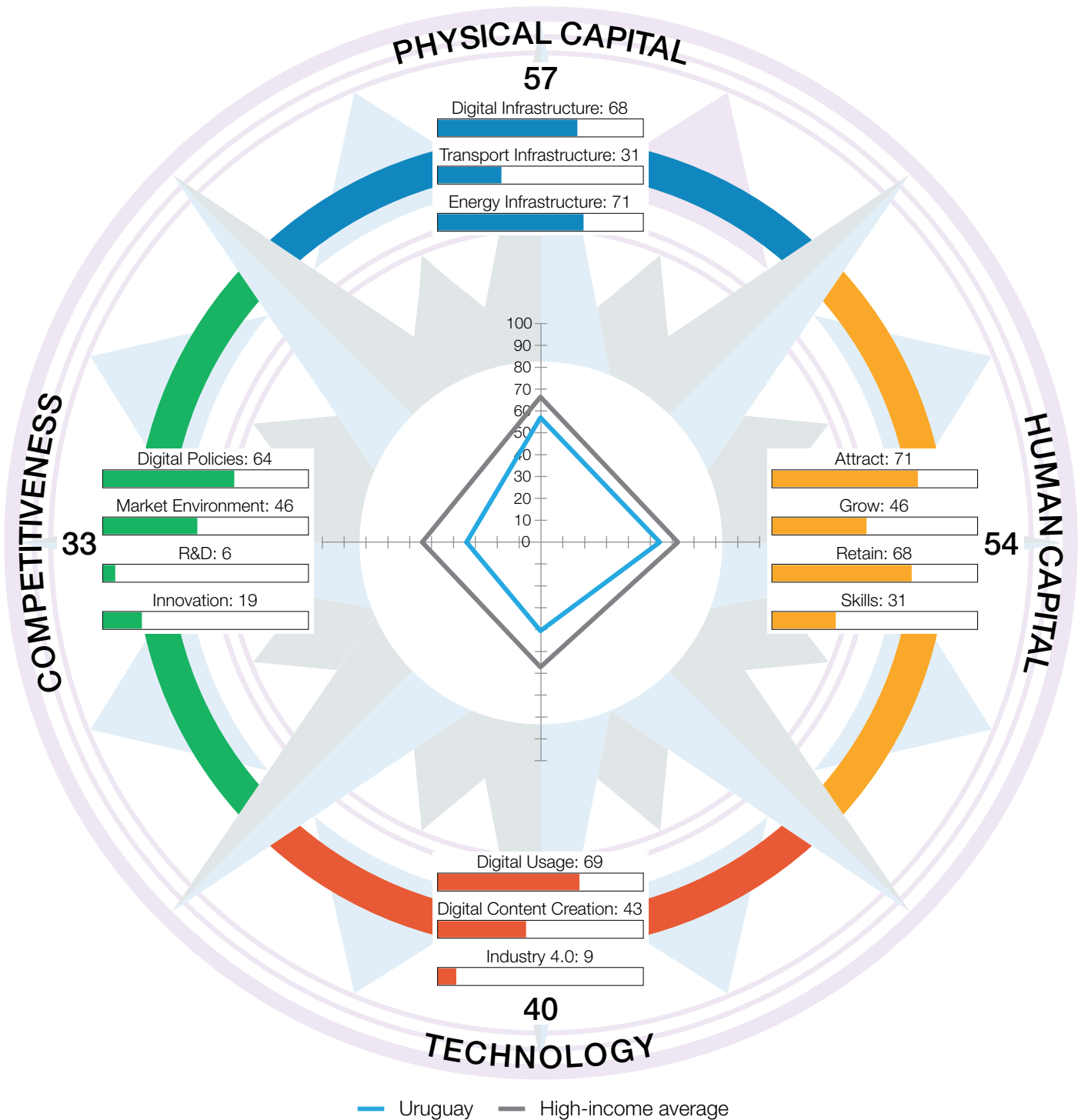
— United States of America — High-income average

	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	69.18	15	3	TECHNOLOGY	79.15	4
1.1	Digital Infrastructure	88.98	1	3.1	Digital Usage	87.17	6
1.1.1	Internet access	86.56	38	3.1.1	Internet users	88.91	27
1.1.2	International Internet bandwidth	50.05	40	3.1.2	Active mobile-broadband subscriptions	67.29	6
1.1.3	Fixed-broadband subscriptions	93.89	36	3.1.3	Gender parity in Internet usage	98.12	17
1.1.4	4G-mobile network coverage	99.90	15	3.1.4	Firms with website	72.11	32
1.1.5	Fixed broadband affordability	98.57	26	3.1.5	Internet shopping	90.33	7
1.1.6	Mobile broadband affordability	93.90	17	3.1.6	Government online services	93.44	7
1.1.7	Computer software spending	100.00	1	3.1.7	E-Participation	100.00	1
1.2	Transport Infrastructure	59.28	15	3.2	Digital Content Creation	75.47	9
1.2.1	Quality of infrastructure	88.61	7	3.2.1	GitHub commits	71.54	8
1.2.2	Rural access	82.45	38	3.2.2	Wikipedia edits	72.19	36
1.2.3	Air connectivity	53.03	12	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	100.00	1
1.3	Energy Infrastructure	59.28	51	3.3	Industry 4.0	74.82	3
1.3.1	Access to electricity	100.00	1	3.3.1	Robot density	64.06	7
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	73.64	8
1.3.3	Electrical outages	n/a	n/a	3.3.3	AI research	57.96	11
1.3.4	Energy intensity	71.60	80	3.3.4	ICT patent applications	82.10	7
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	71.79	12	4	COMPETITIVENESS	74.08	4
2.1	Attract	69.22	16	4.1	Digital Policies	81.80	20
2.1.1	Brain gain	88.41	5	4.1.1	ICT regulation	87.74	32
2.1.2	International students	13.79	48	4.1.2	Cybersecurity	100.00	1
2.1.3	Tolerance of minorities	36.17	78	4.1.3	Rule of law	78.81	20
2.1.4	Tolerance of immigrants	90.77	11	4.1.4	Regulatory quality	73.78	20
2.1.5	Gender parity in high-skilled jobs	91.85	23	4.1.5	Corruption	68.66	23
2.1.6	FDI and technology transfer	94.30	3	4.2	Market Environment	83.87	2
2.2	Grow	72.12	6	4.2.1	Extent of market dominance	79.87	9
2.2.1	Tertiary enrolment	58.95	13	4.2.2	Labour productivity	87.63	4
2.2.2	Reading, maths, and science	65.82	23	4.2.3	Urbanisation	78.77	27
2.2.3	Use of virtual professional networks	71.90	2	4.2.4	Domestic credit to private sector	100.00	1
2.2.4	Formal and non-formal studies	80.39	8	4.2.5	Market capitalisation	73.07	5
2.2.5	Youth inclusion	83.53	41	4.3	R&D	69.58	2
2.3	Retain	73.51	32	4.3.1	R&D spending	57.23	9
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	100.00	1
2.3.2	Environmental performance	77.00	24	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	32.19	53	4.3.4	Scientific journal articles	51.50	21
2.3.4	Sanitation	99.97	13	4.4	Innovation	61.10	2
2.3.5	Personal safety	58.40	51	4.4.1	Medium- and high-tech industry	58.83	17
2.4	Skills	72.33	6	4.4.2	High-tech exports	31.73	24
2.4.1	Workforce with tertiary education	61.28	8	4.4.3	Venture capital recipients, deals	100.00	1
2.4.2	High-skilled workforce	82.72	5	4.4.4	New product entrepreneurial activity	68.46	12
2.4.3	Researchers	54.63	21	4.4.5	New business density	n/a	n/a
2.4.4	Ease of finding skilled employees	90.70	9	4.4.6	Patent applications	46.48	12
2.4.5	Digital skills	n/a	n/a				

Key Indicators

Rank (out of 124)	45	GDP per capita (PPP US\$)	21,973.82
Income group	High income	GDP (US\$ billions)	53.63
Regional group	Latin America and the Caribbean	FREI score	46.10
Population (millions)	3.47	FREI score (income group average)	59.71

FREI 2022 scores by pillar and sub-pillar (0–100)



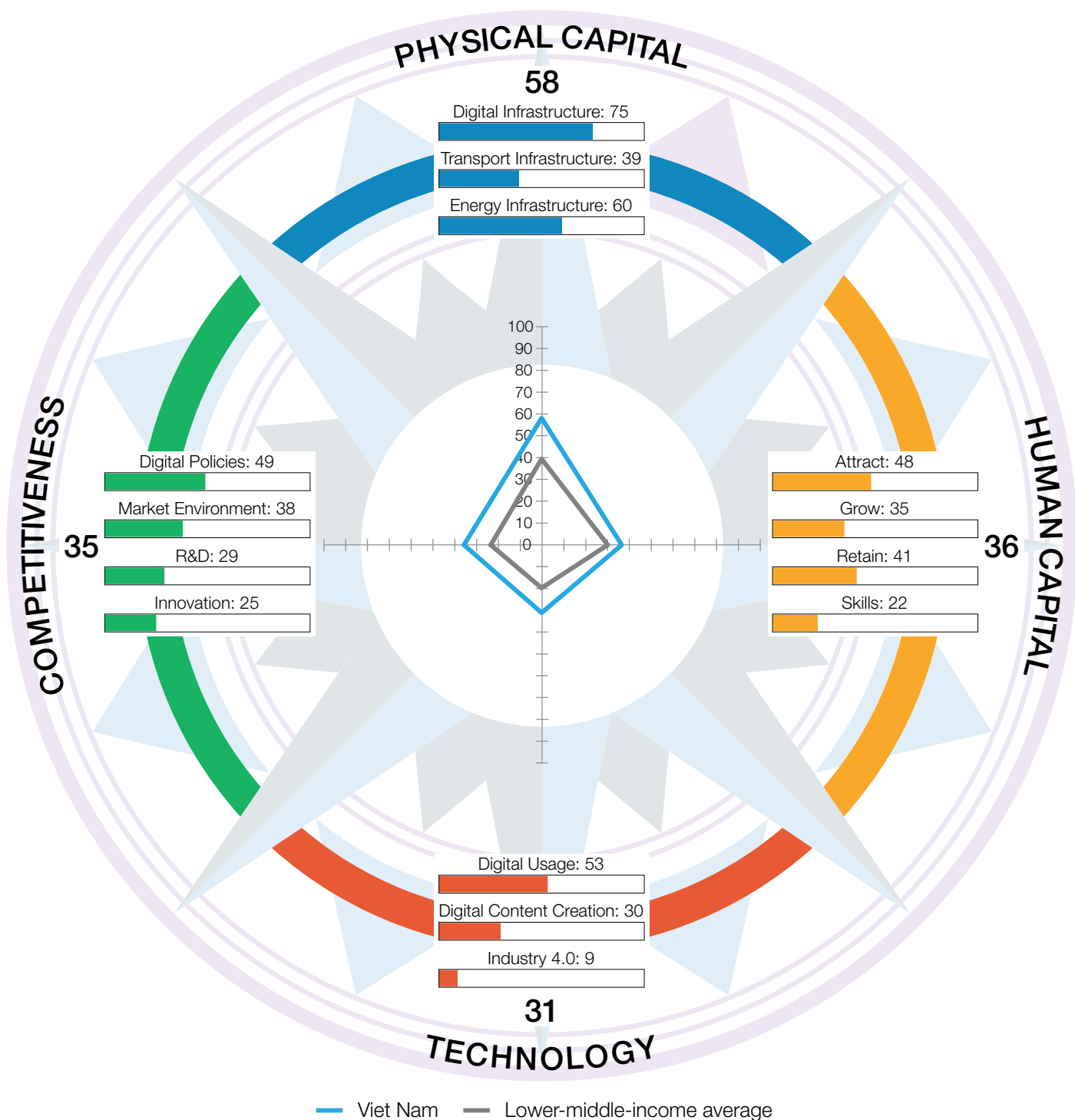
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	56.54	51	3	TECHNOLOGY	40.27	43
1.1	Digital Infrastructure	67.58	68	3.1	Digital Usage	69.23	39
1.1.1	Internet access	68.95	73	3.1.1	Internet users	82.53	44
1.1.2	International Internet bandwidth	49.97	42	3.1.2	Active mobile-broadband subscriptions	42.52	41
1.1.3	Fixed-broadband subscriptions	75.98	66	3.1.3	Gender parity in Internet usage	97.48	25
1.1.4	4G-mobile network coverage	82.50	85	3.1.4	Firms with website	67.58	39
1.1.5	Fixed broadband affordability	94.53	66	3.1.5	Internet shopping	31.10	44
1.1.6	Mobile broadband affordability	81.02	60	3.1.6	Government online services	80.30	31
1.1.7	Computer software spending	20.12	60	3.1.7	E-Participation	83.09	29
1.2	Transport Infrastructure	30.95	70	3.2	Digital Content Creation	42.71	41
1.2.1	Quality of infrastructure	30.96	88	3.2.1	GitHub commits	13.72	41
1.2.2	Rural access	71.59	56	3.2.2	Wikipedia edits	72.51	33
1.2.3	Air connectivity	4.26	78	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	77.08	43
1.3	Energy Infrastructure	71.10	10	3.3	Industry 4.0	8.88	53
1.3.1	Access to electricity	99.89	76	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	23.64	31
1.3.3	Electrical outages	86.53	43	3.3.3	AI research	6.21	59
1.3.4	Energy intensity	86.14	29	3.3.4	ICT patent applications	0.00	74
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	54.12	35	4	COMPETITIVENESS	33.47	63
2.1	Attract	71.33	11	4.1	Digital Policies	63.55	46
2.1.1	Brain gain	34.26	92	4.1.1	ICT regulation	54.57	100
2.1.2	International students	n/a	n/a	4.1.2	Cybersecurity	74.59	72
2.1.3	Tolerance of minorities	79.79	12	4.1.3	Rule of law	58.25	35
2.1.4	Tolerance of immigrants	92.31	8	4.1.4	Regulatory quality	55.70	41
2.1.5	Gender parity in high-skilled jobs	90.82	28	4.1.5	Corruption	74.63	20
2.1.6	FDI and technology transfer	59.46	43	4.2	Market Environment	45.52	38
2.2	Grow	45.97	47	4.2.1	Extent of market dominance	47.34	58
2.2.1	Tertiary enrolment	68.94	4	4.2.2	Labour productivity	31.35	51
2.2.2	Reading, maths, and science	36.51	51	4.2.3	Urbanisation	94.42	5
2.2.3	Use of virtual professional networks	39.05	24	4.2.4	Domestic credit to private sector	8.97	103
2.2.4	Formal and non-formal studies	7.68	52	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	77.69	54	4.3	R&D	6.01	111
2.3	Retain	68.10	42	4.3.1	R&D spending	8.24	67
2.3.1	Pension coverage	100.00	1	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	41.81	57	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	61.48	13	4.3.4	Scientific journal articles	9.80	54
2.3.4	Sanitation	96.33	52	4.4	Innovation	18.81	62
2.3.5	Personal safety	40.91	84	4.4.1	Medium- and high-tech industry	22.72	77
2.4	Skills	31.06	69	4.4.2	High-tech exports	13.16	55
2.4.1	Workforce with tertiary education	17.32	85	4.4.3	Venture capital recipients, deals	4.25	65
2.4.2	High-skilled workforce	35.52	61	4.4.4	New product entrepreneurial activity	48.77	43
2.4.3	Researchers	8.49	55	4.4.5	New business density	5.16	73
2.4.4	Ease of finding skilled employees	62.92	49	4.4.6	Patent applications	n/a	n/a
2.4.5	Digital skills	n/a	n/a				

Viet Nam

Key Indicators

Rank (out of 124)	64	GDP per capita (PPP US\$)	8,381.24
Income group	Lower-middle income	GDP (US\$ billions)	271.16
Regional group	Asia and Pacific	FREI score	40.07
Population (millions)	97.34	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



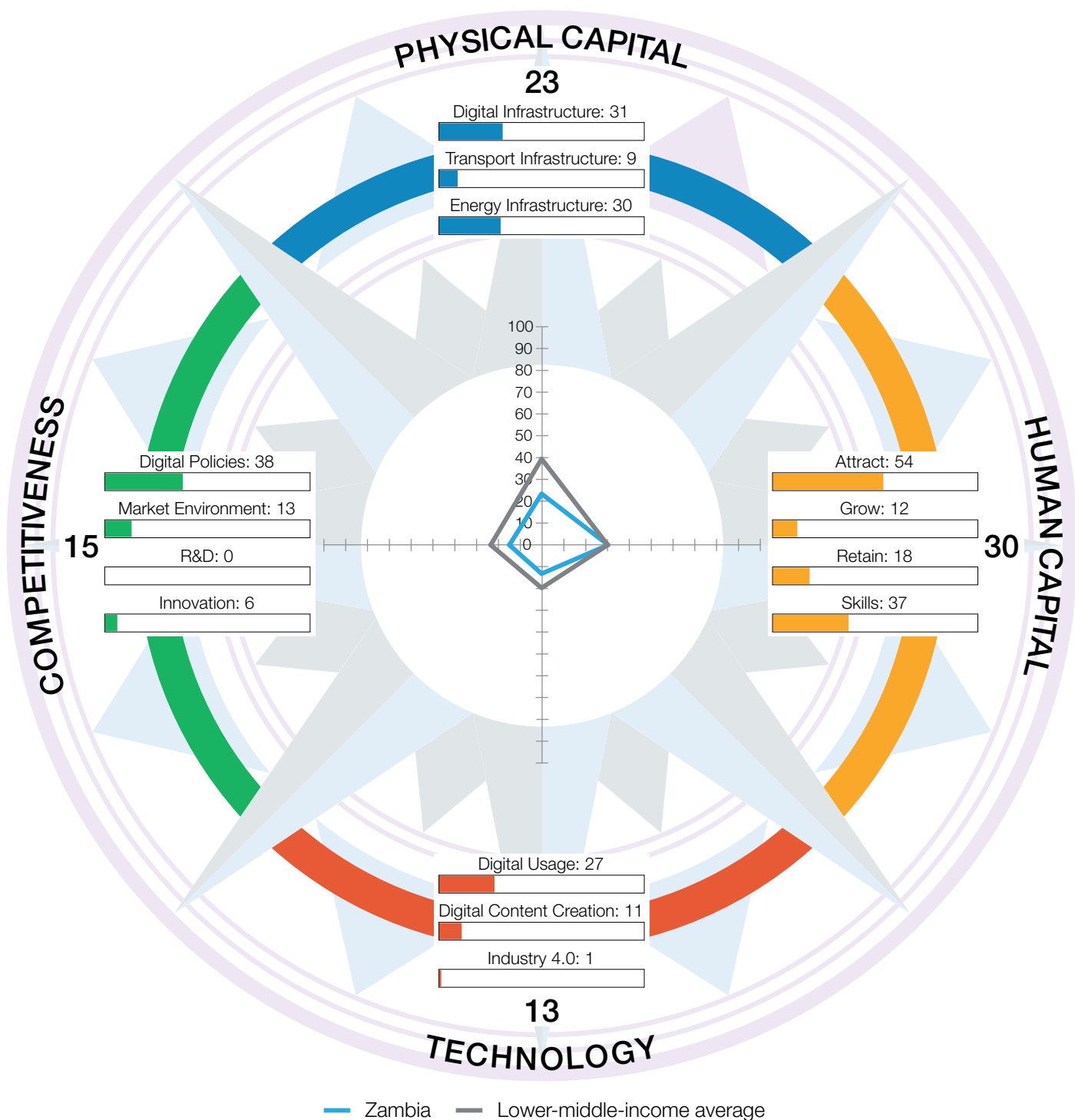
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	57.70	49	3	TECHNOLOGY	30.83	67
1.1	Digital Infrastructure	74.51	46	3.1	Digital Usage	53.19	72
1.1.1	Internet access	74.53	64	3.1.1	Internet users	68.82	73
1.1.2	International Internet bandwidth	52.90	31	3.1.2	Active mobile-broadband subscriptions	34.63	71
1.1.3	Fixed-broadband subscriptions	99.48	6	3.1.3	Gender parity in Internet usage	80.37	78
1.1.4	4G-mobile network coverage	99.50	32	3.1.4	Firms with website	42.80	69
1.1.5	Fixed broadband affordability	91.44	80	3.1.5	Internet shopping	24.00	52
1.1.6	Mobile broadband affordability	80.85	62	3.1.6	Government online services	56.93	77
1.1.7	Computer software spending	22.85	47	3.1.7	E-Participation	64.79	69
1.2	Transport Infrastructure	38.60	51	3.2	Digital Content Creation	30.26	67
1.2.1	Quality of infrastructure	51.60	44	3.2.1	GitHub commits	3.49	63
1.2.2	Rural access	78.99	45	3.2.2	Wikipedia edits	43.14	74
1.2.3	Air connectivity	9.13	54	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	72.36	58
1.3	Energy Infrastructure	60.01	46	3.3	Industry 4.0	9.04	52
1.3.1	Access to electricity	99.32	85	3.3.1	Robot density	4.36	41
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	5.53	80
1.3.3	Electrical outages	95.83	13	3.3.3	AI research	2.71	73
1.3.4	Energy intensity	70.22	83	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	36.44	81	4	COMPETITIVENESS	35.32	54
2.1	Attract	48.22	55	4.1	Digital Policies	48.87	70
2.1.1	Brain gain	60.32	31	4.1.1	ICT regulation	57.70	98
2.1.2	International students	0.91	97	4.1.2	Cybersecurity	94.47	32
2.1.3	Tolerance of minorities	50.00	53	4.1.3	Rule of law	34.02	66
2.1.4	Tolerance of immigrants	53.85	75	4.1.4	Regulatory quality	35.78	79
2.1.5	Gender parity in high-skilled jobs	88.72	34	4.1.5	Corruption	22.39	80
2.1.6	FDI and technology transfer	35.53	86	4.2	Market Environment	38.03	56
2.2	Grow	34.69	68	4.2.1	Extent of market dominance	67.52	24
2.2.1	Tertiary enrolment	18.83	84	4.2.2	Labour productivity	11.06	87
2.2.2	Reading, maths, and science	68.54	15	4.2.3	Urbanisation	23.33	109
2.2.3	Use of virtual professional networks	4.87	98	4.2.4	Domestic credit to private sector	62.55	13
2.2.4	Formal and non-formal studies	0.00	78	4.2.5	Market capitalisation	25.72	26
2.2.5	Youth inclusion	81.22	48	4.3	R&D	29.17	60
2.3	Retain	40.88	86	4.3.1	R&D spending	10.43	60
2.3.1	Pension coverage	39.69	77	4.3.2	University ranking	22.82	75
2.3.2	Environmental performance	14.46	105	4.3.3	Gender parity in R&D	81.67	24
2.3.3	Physician density	9.93	87	4.3.4	Scientific journal articles	1.75	87
2.3.4	Sanitation	82.21	84	4.4	Innovation	25.21	42
2.3.5	Personal safety	58.12	52	4.4.1	Medium- and high-tech industry	50.41	30
2.4	Skills	21.97	100	4.4.2	High-tech exports	64.96	4
2.4.1	Workforce with tertiary education	19.06	81	4.4.3	Venture capital recipients, deals	7.99	53
2.4.2	High-skilled workforce	16.80	97	4.4.4	New product entrepreneurial activity	22.95	77
2.4.3	Researchers	8.63	54	4.4.5	New business density	4.58	75
2.4.4	Ease of finding skilled employees	65.34	43	4.4.6	Patent applications	0.37	86
2.4.5	Digital skills	0.00	80				

Zambia

Key Indicators

Rank (out of 124)	110	GDP per capita (PPP US\$)	3,617.21
Income group	Lower-middle income	GDP (US\$ billions)	19.32
Regional group	Sub-Saharan Africa	FREI score	20.33
Population (millions)	18.38	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



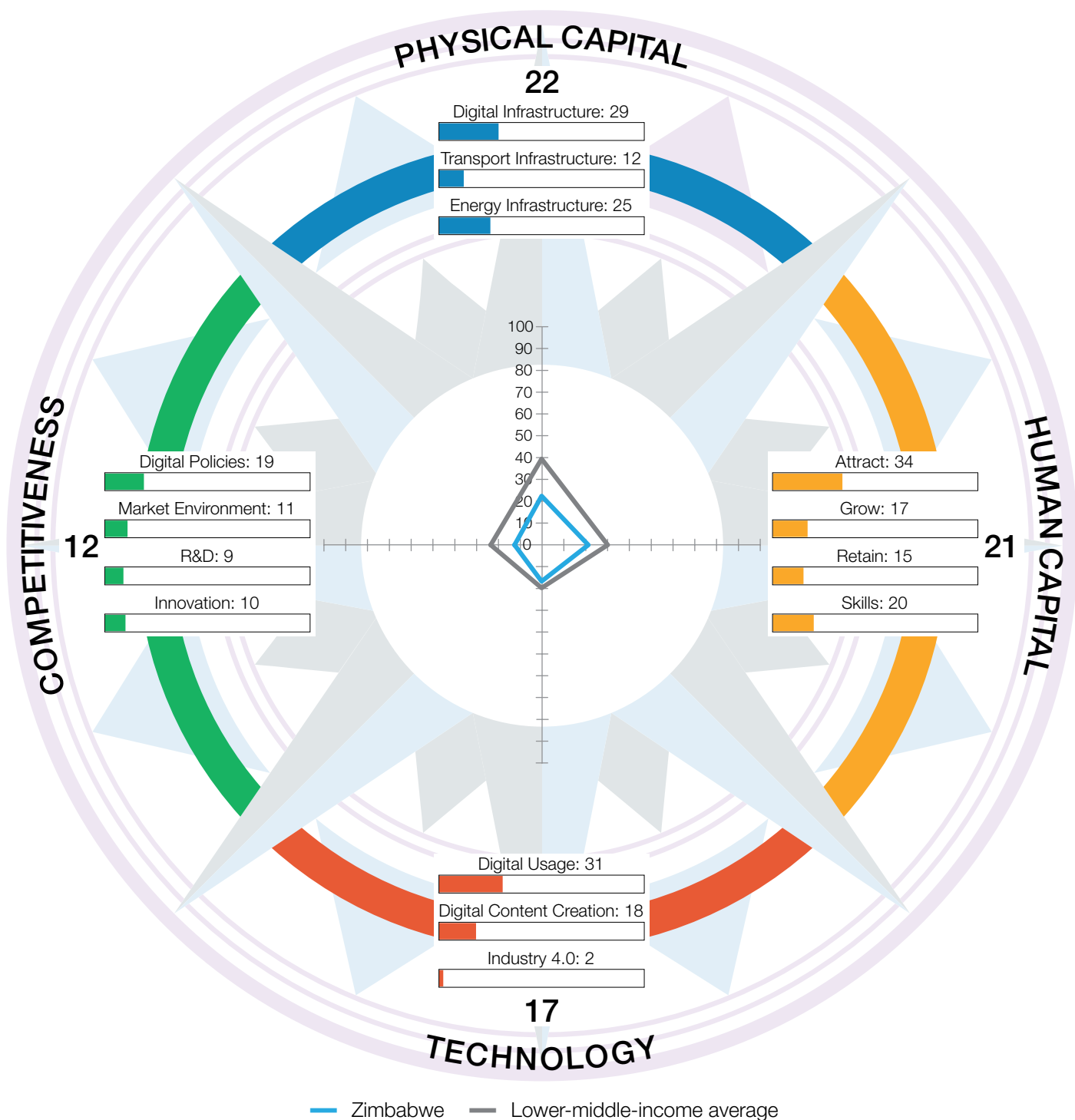
	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	23.29	118	3	TECHNOLOGY	13.10	110
1.1	Digital Infrastructure	30.60	110	3.1	Digital Usage	27.13	103
1.1.1	Internet access	16.34	102	3.1.1	Internet users	10.06	116
1.1.2	International Internet bandwidth	27.65	107	3.1.2	Active mobile-broadband subscriptions	23.45	98
1.1.3	Fixed-broadband subscriptions	0.79	117	3.1.3	Gender parity in Internet usage	68.22	85
1.1.4	4G-mobile network coverage	57.60	104	3.1.4	Firms with website	55.37	54
1.1.5	Fixed broadband affordability	56.59	109	3.1.5	Internet shopping	6.50	81
1.1.6	Mobile broadband affordability	53.42	107	3.1.6	Government online services	8.03	121
1.1.7	Computer software spending	1.79	108	3.1.7	E-Participation	18.30	118
1.2	Transport Infrastructure	9.10	121	3.2	Digital Content Creation	10.84	113
1.2.1	Quality of infrastructure	26.33	99	3.2.1	GitHub commits	0.30	109
1.2.2	Rural access	8.31	122	3.2.2	Wikipedia edits	22.91	104
1.2.3	Air connectivity	0.45	107	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	20.06	118
1.3	Energy Infrastructure	30.18	118	3.3	Industry 4.0	1.34	111
1.3.1	Access to electricity	35.81	113	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	1.81	100
1.3.3	Electrical outages	38.71	85	3.3.3	AI research	0.50	100
1.3.4	Energy intensity	37.87	117	3.3.4	ICT patent applications	n/a	n/a
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	30.37	94	4	COMPETITIVENESS	14.57	115
2.1	Attract	54.47	37	4.1	Digital Policies	38.38	95
2.1.1	Brain gain	56.12	39	4.1.1	ICT regulation	63.46	91
2.1.2	International students	n/a	n/a	4.1.2	Cybersecurity	68.18	79
2.1.3	Tolerance of minorities	48.94	55	4.1.3	Rule of law	19.45	97
2.1.4	Tolerance of immigrants	70.77	42	4.1.4	Regulatory quality	22.90	101
2.1.5	Gender parity in high-skilled jobs	58.81	85	4.1.5	Corruption	17.91	92
2.1.6	FDI and technology transfer	37.70	82	4.2	Market Environment	13.40	115
2.2	Grow	12.33	122	4.2.1	Extent of market dominance	20.28	114
2.2.1	Tertiary enrolment	2.23	119	4.2.2	Labour productivity	5.12	99
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	32.42	97
2.2.3	Use of virtual professional networks	4.76	100	4.2.4	Domestic credit to private sector	4.15	109
2.2.4	Formal and non-formal studies	4.29	57	4.2.5	Market capitalisation	5.03	65
2.2.5	Youth inclusion	38.03	110	4.3	R&D	0.23	122
2.3	Retain	17.64	110	4.3.1	R&D spending	n/a	n/a
2.3.1	Pension coverage	5.92	109	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	16.72	98	4.3.3	Gender parity in R&D	n/a	n/a
2.3.3	Physician density	0.71	114	4.3.4	Scientific journal articles	0.45	108
2.3.4	Sanitation	20.56	114	4.4	Innovation	6.27	108
2.3.5	Personal safety	44.29	76	4.4.1	Medium- and high-tech industry	11.81	98
2.4	Skills	37.06	51	4.4.2	High-tech exports	2.19	102
2.4.1	Workforce with tertiary education	14.44	92	4.4.3	Venture capital recipients, deals	9.41	45
2.4.2	High-skilled workforce	23.24	84	4.4.4	New product entrepreneurial activity	9.38	86
2.4.3	Researchers	n/a	n/a	4.4.5	New business density	4.56	76
2.4.4	Ease of finding skilled employees	73.50	28	4.4.6	Patent applications	0.26	90
2.4.5	Digital skills	n/a	n/a				

Zimbabwe

Key Indicators

Rank (out of 124)	119	GDP per capita (PPP US\$)	411.17
Income group	Lower-middle income	GDP (US\$ billions)	16.77
Regional group	Sub-Saharan Africa	FREI score	18.11
Population (millions)	14.86	FREI score (income group average)	27.97

FREI 2022 scores by pillar and sub-pillar (0–100)



	Score	Rank		Score	Rank		
1	PHYSICAL CAPITAL	22.29	120	3	TECHNOLOGY	16.60	99
1.1	Digital Infrastructure	29.33	113	3.1	Digital Usage	30.64	99
1.1.1	Internet access	29.18	93	3.1.1	Internet users	20.66	105
1.1.2	International Internet bandwidth	39.03	86	3.1.2	Active mobile-broadband subscriptions	24.77	96
1.1.3	Fixed-broadband subscriptions	8.04	110	3.1.3	Gender parity in Internet usage	57.31	91
1.1.4	4G-mobile network coverage	35.00	114	3.1.4	Firms with website	30.83	84
1.1.5	Fixed broadband affordability	76.52	98	3.1.5	Internet shopping	4.83	91
1.1.6	Mobile broadband affordability	0.00	124	3.1.6	Government online services	40.87	96
1.1.7	Computer software spending	17.57	67	3.1.7	E-Participation	35.21	104
1.2	Transport Infrastructure	12.45	117	3.2	Digital Content Creation	17.51	101
1.2.1	Quality of infrastructure	9.61	123	3.2.1	GitHub commits	0.33	106
1.2.2	Rural access	39.21	99	3.2.2	Wikipedia edits	25.69	102
1.2.3	Air connectivity	0.39	110	3.2.3	Internet domain registrations	—	—
1.2.4	Infrastructure investment	—	—	3.2.4	Mobile apps development	43.54	101
1.3	Energy Infrastructure	25.09	122	3.3	Industry 4.0	1.65	106
1.3.1	Access to electricity	33.66	116	3.3.1	Robot density	n/a	n/a
1.3.2	Electricity consumption	—	—	3.3.2	AI software development	3.58	93
1.3.3	Electrical outages	60.79	70	3.3.3	AI research	1.56	86
1.3.4	Energy intensity	16.87	120	3.3.4	ICT patent applications	0.00	74
1.3.5	Modern renewable energy	—	—	3.3.5	Smart home devices	—	—
2	HUMAN CAPITAL	21.30	119	4	COMPETITIVENESS	12.27	120
2.1	Attract	33.73	109	4.1	Digital Policies	18.97	121
2.1.1	Brain gain	13.32	117	4.1.1	ICT regulation	54.32	101
2.1.2	International students	1.17	94	4.1.2	Cybersecurity	35.06	100
2.1.3	Tolerance of minorities	40.43	70	4.1.3	Rule of law	0.00	124
2.1.4	Tolerance of immigrants	47.69	82	4.1.4	Regulatory quality	1.01	123
2.1.5	Gender parity in high-skilled jobs	99.77	4	4.1.5	Corruption	4.48	122
2.1.6	FDI and technology transfer	0.00	120	4.2	Market Environment	11.48	118
2.2	Grow	16.55	117	4.2.1	Extent of market dominance	24.24	106
2.2.1	Tertiary enrolment	5.45	109	4.2.2	Labour productivity	2.78	101
2.2.2	Reading, maths, and science	n/a	n/a	4.2.3	Urbanisation	18.89	113
2.2.3	Use of virtual professional networks	7.85	87	4.2.4	Domestic credit to private sector	0.00	121
2.2.4	Formal and non-formal studies	n/a	n/a	4.2.5	Market capitalisation	n/a	n/a
2.2.5	Youth inclusion	36.35	111	4.3	R&D	8.89	107
2.3	Retain	14.90	115	4.3.1	R&D spending	n/a	n/a
2.3.1	Pension coverage	20.41	89	4.3.2	University ranking	0.00	84
2.3.2	Environmental performance	20.73	95	4.3.3	Gender parity in R&D	25.73	84
2.3.3	Physician density	2.18	104	4.3.4	Scientific journal articles	0.95	94
2.3.4	Sanitation	31.19	109	4.4	Innovation	9.72	97
2.3.5	Personal safety	0.00	124	4.4.1	Medium- and high-tech industry	21.22	80
2.4	Skills	20.00	102	4.4.2	High-tech exports	7.96	81
2.4.1	Workforce with tertiary education	20.13	80	4.4.3	Venture capital recipients, deals	n/a	n/a
2.4.2	High-skilled workforce	15.99	98	4.4.4	New product entrepreneurial activity	n/a	n/a
2.4.3	Researchers	1.08	80	4.4.5	New business density	8.87	50
2.4.4	Ease of finding skilled employees	59.56	54	4.4.6	Patent applications	0.83	73
2.4.5	Digital skills	3.23	76				

Section III: Methodology, Sources and definitions, Bibliography and references



Methodology of the Future Readiness Economic Index

Structure of the Future Readiness Economic Index

The model of the Future Readiness Economic Index (FREI) is based on the Digital Sprinters framework and rests on four pillars: (1) Physical Capital, (2) Human Capital, (3) Technology, and (4) Competitiveness. The Physical Capital and Technology pillars consist, in turn, of three sub-pillars each; the other two pillars contain four sub-pillars each. Every sub-pillar is composed of four to seven variables. In total, the framework is populated by 73 indicators. Of these indicators, 48 are composed of hard/quantitative data, 13 are composed of index/composite indicator data, and 12 are composed of survey/qualitative data.

Any given indicator thus 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 (Air connectivity), which is placed in the second sub-pillar (Transport Infrastructure), which, in turn, belongs to the first pillar (Physical Capital).

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. More specifically, the overall composite indicator is the result of aggregations based on unweighted arithmetic means that have taken place in three steps: first, among individual indicators within each sub-pillar; second, among sub-pillars within each pillar; and, finally, among the four pillars that make up the overall index.

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 FREI. 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 in the index 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 outliers.* 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:‡

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

* This rule is adopted from Groeneveld & Meeden (1984).

† Winsorisation was needed for 13 indicators: 1.1.5 Fixed broadband affordability; 1.2.3 Air connectivity; 1.2.4 Infrastructure investment; 1.3.2 Electricity consumption; 1.3.4 Energy intensity; 2.1.2 International students; 3.1.3 Gender parity in Internet usage; 3.3.1 Robot density; 3.3.2 AI software development; 3.3.4 ICT patent applications; 4.2.5 Market capitalisation; 4.4.3 Venture capital recipients, deals; and 4.4.6 Patent applications.

‡ The formula ensures that natural logarithms are positive and start at zero. Two indicators needed to be log transformed: 1.1.6 Mobile broadband affordability and 1.3.3 Electrical outages.

The one exception from the general treatment rule is indicator 1.1.2 International Internet bandwidth. Despite having fewer than five outliers, because of the large distribution of the data the decision was made to follow the International Telecommunication Union and GSM Association to log transform the indicator.

Normalisation

The indicators need to be normalised to make them comparable for data aggregation. FREI applies the min-max normalisation method so that all values fall into the [0, 100] range, with

higher scores representing better outcomes. Most indicators are “goods” in that higher values indicate higher outcomes. For these indicators, the following normalisation formula is applied:

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

For indicators where higher values imply worse outcomes (i.e., “bads”), the following reverse normalisation formula has been applied:*

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

* Reverse normalisation was needed for six indicators: 1.1.5 Fixed broadband affordability; 1.1.6 Mobile broadband affordability; 1.3.3 Electrical outages; 1.3.4 Energy intensity; 2.1.3 Tolerance of minorities; and 2.2.5 Youth inclusion.

Sources and definitions

This appendix includes details on the definitions and sources of the 73 indicators used to construct the Future Readiness Economic Index (FREI). Each entry includes (1) the indicator name, (2) the indicator's full definition or technical name, (3) a detailed description of the indicator, and (4) the indicator's source(s). The indicator definition includes the latest year for which data are available (which might be different from the year with the most frequent data). The cut-off year has been set at 2011 and older observations have therefore been dropped from the sample.

1 Physical Capital

1.1 Digital Infrastructure

1.1.1 Internet access

Households with Internet access at home (%) | 2020

This indicator refers to the percentage of households with Internet access at home via a fixed or mobile network. A *household with Internet access* is defined as a household where the Internet is available for use by all members of the household at any time. This indicator can include both estimates and survey data corresponding to the proportion of individuals using the Internet based on results from national household surveys. The number should reflect the total population of the country or at least individuals 5 years of age and older.

Source: International Telecommunication Union (ITU), World Telecommunication/ICT Indicators Database, August 2021 (<https://www.itu.int/itu-d/sites/statistics/>)

1.1.2 International Internet bandwidth

International bandwidth per Internet user (kbit/s) | 2020

International Internet bandwidth refers to the usage of all international links including fibre-optic cables, radio links, and traffic processed by satellite ground stations and teleports to orbital satellites.

Source: International Telecommunication Union (ITU), World Telecommunication/ICT Indicators Database, August 2021 (<https://www.itu.int/itu-d/sites/statistics/>)

1.1.3 Fixed-broadband subscriptions

Fixed broadband subscriptions with speeds equal to or above 10 Mbit/s (% of total) | 2020

This indicator refers to the number of fixed subscriptions by residences and organisations to high-speed access to the public Internet (a TCP/IP connection) at downstream speeds equal to or greater than 10 Mbit/s, expressed as a percentage of total fixed broadband subscriptions.

Source: International Telecommunication Union (ITU), World Telecommunication/ICT Indicators Database, August 2021 (<https://www.itu.int/itu-d/sites/statistics/>)

1.1.4 4G-mobile network coverage

Population covered by at least a 4G mobile network (%) | 2020

This indicator measures the percentage of inhabitants out of the total population who are within range of an advanced mobile cellular signal, at least a 4G/LTE network, irrespective of whether or not they are subscribers.

Source: International Telecommunication Union (ITU), World Telecommunication/ICT Indicators Database, August 2021 (<https://www.itu.int/itu-d/sites/statistics/>)

1.1.5 Fixed broadband affordability

Fixed broadband basket (% of GNI per capita) | 2020

This indicator refers to the cheapest entry-level monthly subscription plan that provides at least 5 GB of high-speed data (≥ 256 kbit/s). For each economy, data are collected from the Internet service provider (ISP) with the largest market share (in terms of number of fixed broadband subscriptions).

Source: International Telecommunication Union (ITU), World Telecommunication/ICT Indicators Database, August 2021 (<https://www.itu.int/itu-d/sites/statistics/>)

1.1.6 Mobile broadband affordability

Mobile broadband basket (% of GNI per capita) | 2020

This indicator refers to the cheapest mobile broadband data-only plan that provides at least 1.5 GB of monthly high-speed data (\geq 256 kbit/s) usage. For each economy, data are collected from the operator with the largest market share (in terms of number of mobile broadband subscriptions or, if not available, mobile cellular subscriptions).

Source: International Telecommunication Union (ITU), World Telecommunication/ICT Indicators Database, August 2021 (<https://www.itu.int/itu-d/sites/statistics/>)

1.1.7 Computer software spending

Total computer software spending (% of GDP) | 2020

Computer software spending includes the total value of purchased or leased packaged software such as operating systems, database systems, programming tools, utilities, and applications. It excludes expenditures for internal software development and outsourced custom software development. The data are a combination of actual figures and estimates. Data are reported as a percentage of GDP.

Source: IHS Markit, Information and Communication Technology Database (<https://www.ihs.com/index.html>). Sourced from INSEAD, Cornell University, and World Intellectual Property Organization, *The Global Innovation Index 2021* (<https://www.globalinnovationindex.org>)

1.2 Transport Infrastructure

1.2.1 Quality of infrastructure

Quality of trade- and transport-related infrastructure (1 = low; 5 = high) | 2018

Infrastructure quality is one of six components of the Logistics Performance Index published by the World Bank. Data are based on surveys conducted in more than

160 countries among logistics professionals. In the case of infrastructure quality, the survey question reads 'Evaluate the quality of trade- and transport-related infrastructure (e.g., ports, railroads, roads, information technology) in [specific countries]:', whereupon the respondent is asked to rate specific countries on a 5-point scale that ranges from very low (1) to very high (5).

Source: World Bank and Turku School of Economics, Logistic Performance Index Surveys. Downloaded from World Bank, World Development Indicators (<http://data.worldbank.org/data-catalog/world-development-indicators>)

1.2.2 Rural access

Rural Access Index | 2019

The Rural Access Index seeks to measure Sustainable Development Goal (SDG) indicator 9.1.1: 'Proportion of the rural population who live within 2 km of an all-season road.' The index is estimated using three open data sources: OpenStreetMap, WorldPop, and GRUMP; it was initially developed by the World Bank in collaboration with the UK Department for International Development (DFID) and the Research for Community Access Partnerships (ReCAP).

Source: Research for Community Access Partnership (ReCap) in collaboration with TRL and Azavea (<https://rai.azavea.com/>)

1.2.3 Air connectivity

Air Connectivity Index (per 1,000 population) | 2019

The Air Connectivity Index is an indicator that measures 'the degree of integration of a country into the global air transport network'. The connectivity of an airport is computed by summing the number of annual outbound seats to each destination airport, taking into account the importance of every destination (determined by the number of annual passengers flowing through the airports). The data are reported per 1,000 inhabitants.

Source: International Air Transport Association (IATA), *Air Connectivity*:

Measuring the connections that drive economic growth (<https://www.iata.org/en/iata-repository/publications/economic-reports/air-connectivity-measuring-the-connections-that-drive-economic-growth/>)

1.2.4 Infrastructure investment

Gross fixed capital formation in civil engineering works | 2017

The World Bank's International Comparison Program collects and analyses data on expenditures and prices in order to compute purchasing power parities (PPPs) and price level indices (PLIs). This facilitates more accurate cross-country comparisons of GDP both in the aggregate and broken down by expenditure component. The variable *gross fixed capital formation in civil engineering works* has been identified as a useful proxy for infrastructure investment by Fay et al. (2019).

Source: World Bank, International Comparison Program 2017 (<https://www.worldbank.org/en/programs/icp>)

1.3 Energy Infrastructure

1.3.1 Access to electricity

Access to electricity (% of population) | 2019

This indicator refers to the percentage of the population that has access to electricity, which is primarily estimated based on national household surveys or censuses. It is one of the official indicators (7.1.1) related to Sustainable Development Goal (SDG) 7: 'Ensure access to affordable, reliable, sustainable and modern energy for all'.

Source: World Bank Global Electrification Database from 'Tracking SDG 7: The Energy Progress Report' led jointly by the custodian agencies: the International Energy Agency (IEA), the International Renewable Energy Agency (IRENA), the United Nations Statistics Division (UNSD), the World Bank, and the World Health Organization (WHO). Downloaded from World Bank, World Development Indicators (<http://data.worldbank.org/data-catalog/world-development-indicators>)

1.3.2 Electricity consumption

Electricity consumption (MWh) per capita | 2020

Electricity consumption refers to total electricity consumed in all sectors—industry, transport, residential, commercial and public services, and others—per inhabitant.

Source: The International Energy Agency (IEA), IEA Data Services, (<https://www.iea.org/fuels-and-technologies/electricity>)

1.3.3 Electrical outages

Number of electrical outages in a typical month | 2020

This indicator refers to the frequency of electrical outages in a typical month according to firms surveyed in the World Bank's Enterprise Survey, a firm-level survey of a representative sample of an economy's private sector. The survey covers a broad range of business environment topics including access to finance, corruption, infrastructure, crime, competition, and performance measures. Since 2005–06, under its developed Global Methodology, the World Bank's Enterprise Analysis Unit has collected these data based on over 171,000 interviews with top managers and business owners in 149 economies.

Source: World Bank, Enterprise Surveys (www.enterprisesurveys.org)

1.3.4 Energy intensity

Energy intensity level of primary energy (megajoules per constant 2017 purchasing power parity GDP) | 2018

Energy intensity is defined as 'the energy supplied to the economy per unit value of economic output'. Low energy intensity therefore implies that an increase in GDP is associated with less energy production, and vice versa. As such, the indicator is an inverse proxy—albeit an imperfect one—of energy efficiency.

Source: Energy Balances, UN Statistics Division (2020), and the International Energy Agency (IEA) (2020), World Energy Balances. Downloaded from United Nations, SDG Global Database (<https://unstats.un.org/sdgs/unsdg>)

1.3.5 Modern renewable energy

Modern renewable energy in final energy consumption (% of total) | 2018

This indicator refers to the share of renewable energy in total final energy consumption, expressed as a percentage. It takes into account only modern renewables and therefore excludes traditional uses of biomass (e.g., wood, charcoal, agricultural residues, and animal dung).

Source: The International Energy Agency (IEA), *Tracking SDG7: The Energy Progress Report, 2021*, (<https://www.iea.org/fuels-and-technologies/renewables>)

2 Human Capital

2.1 Attract

2.1.1 Brain gain

Average answer to the question: To what extent does your country attract talented people from abroad? [1 = not at all; 7 = to a great extent—the country attracts the best and brightest from around the world] | 2020

The World Economic Forum's Executive Opinion Survey (EOS) is conducted on an annual basis to gather information from business leaders on topics for which hard data sources are scarce or nonexistent. It is part of the effort to supplement *The Global Competitiveness Report* in assessing issues that drive national competitiveness.

Source: World Economic Forum, Executive Opinion Survey 2019–2020 (<https://www.weforum.org/reports/>)

2.1.2 International students

Tertiary inbound mobility ratio (%) | 2021

Tertiary inbound mobility ratio refers to the number of students from abroad studying in a given country as a percentage of the total tertiary enrolment in that country.

Source: United Nations Education, Scientific and Cultural Organization (UNESCO) Institute for Statistics, UIS.Stat (<http://data.uis.unesco.org/>)

2.1.3 Tolerance of minorities

Discrimination and violence against minorities | 2021

Tolerance of minorities is based on the Group Grievance indicator included in the *Fragile States Index* published by The Fund for Peace. Group Grievance 'focuses on divisions and schisms between different groups in society—particularly divisions based on social or political characteristics—and their role in access to services or resources, and inclusion in the political process'. Its dimensions include post-conflict response, equality, divisions, and communal violence. It is measured on a scale of 0 (low pressures) to 10 (very high pressures).

Source: The Fund for Peace, *Fragile States Index 2021* (<https://fragilestatesindex.org/>)

2.1.4 Tolerance of immigrants

The percentage of respondents answering 'Good place' to the question: Is the city or area where you live a good place or not a good place to live for immigrants from other countries? | 2020

The Gallup World Poll is an annual survey carried out in more than 140 countries. One of the topics included in the poll concerns social issues, where the question related to the Tolerance of immigrants indicator is one of four questions asked.

Source: The Gallup World Poll (2006–2020). Data kindly provided by Gallup, Inc. (<https://www.gallup.com/analytics/318875/global-research.aspx>)

2.1.5 Gender parity in high-skilled jobs

Adjusted gender parity in high-skilled jobs | 2020

Gender parity in high-skilled jobs refers to the ratio of managers, professionals, or technicians and associate professionals who are female to those who are male. Possible values range from 0 (total inequality) to 1 (perfect equality). The parity index is adjusted following the methodology of the United Nations Education, Scientific and Cultural Organization (UNESCO). The occupations correspond to skill levels 3 and 4 (high) in the International Standard

Classification of Occupations 2008 (ISCO-08).

Source: International Labour Organization (ILO), ILOSTAT (<https://ilostat.ilo.org/>)

2.1.6 FDI and technology transfer

Average answer to the question: To what extent does foreign direct investment (FDI) bring new technology into your country? [1 = not at all; 7 = to a great extent] | 2018

The World Economic Forum's Executive Opinion Survey (EOS) is conducted on an annual basis to gather information from business leaders on topics for which hard data sources are scarce or nonexistent. It is part of the effort to supplement *The Global Competitiveness Report* in assessing issues that drive national competitiveness.

Source: World Economic Forum, Executive Opinion Survey 2017–2018 (<https://www.weforum.org/reports/>)

2.2 Grow

2.2.1 Tertiary enrolment

Tertiary enrolment (%) | 2020

Tertiary enrolment refers to the ratio of total tertiary enrolment, regardless of age, to the population of the age group that officially corresponds to the tertiary level of education. Tertiary education, whether or not it leads to an advanced research qualification, normally requires as a minimum condition of admission the successful completion of education at the secondary level. The tertiary level is based on International Standard Classification of Education (ISCED) levels 5–8.

Source: United Nations Education, Scientific and Cultural Organization (UNESCO) Institute for Statistics, UIS.Stat (<http://data.uis.unesco.org/>)

2.2.2 Reading, maths, and science

PISA average scores in reading, mathematics, and science | 2018

The OECD Programme for International Student Assessment (PISA) develops triennial surveys that examine 15-year-old students' performance in reading,

mathematics, and science. The scores are calculated so that the mean is 500 and the standard deviation is 100. The scores for China come from Beijing-Shanghai-Jiangsu-Guangdong.

Source: Organisation for Economic Co-operation and Development (OECD) Programme for International Student Assessment (PISA) (www.oecd.org/pisa)

2.2.3 Use of virtual professional networks

LinkedIn's potential advertising audience (%) | 2020

Use of virtual professional networks refers to the potential advertising audience that marketers can reach using advertisements on LinkedIn. The potential audience is expressed as a percentage of the population who are 18 years old or above. The data are based on LinkedIn's self-service advertising tools.

Source: We Are Social and Hootsuite (2021) *Digital 2021* report series (<https://wearesocial.com/digital-2021>)

2.2.4 Formal and non-formal studies

Participation rate of youth and adults in formal or non-formal education or training in the previous 12 months (%) | 2018

This indicator refers to the share of individuals aged 16–65 who participated in formal or non-formal education or training in the 12 months prior to the interview. It is expressed as a percentage of the population of the same age.

Source: United Nations Education, Scientific and Cultural Organization (UNESCO) Institute for Statistics, UIS.Stat (<http://data.uis.unesco.org/>)

2.2.5 Youth inclusion

Proportion of youth (aged 15–24 years) not in education, employment, or training (%) | 2020

This indicator refers to the share of young people aged 15–24 who are not in education, employment, or training. It is known as the 'NEET rate' and is expressed as a percentage of the population of the same age.

Source: International Labour Organization (ILO), ILOSTAT (<https://ilostat.ilo.org/>)

2.3 Retain

2.3.1 Pension coverage

Population above statutory pensionable age receiving a pension (%) | 2020

Pension coverage refers to the share of people above statutory retirement age who receive an old-age pension, expressed as a percentage of the population above statutory retirement age. Data are originally sourced from International Labour Organization (ILO) estimates, which are based on country data compiled through the ILO Social Security Inquiry (SSI).

Source: United Nations, Global SDG Indicators Database (<https://unstats.un.org/sdgs/indicators/database/>)

2.3.2 Environmental performance

Environmental Performance Index | 2020

The Environmental Performance Index (EPI) ranks how well countries perform in two fundamental dimensions of sustainable development: environmental health and ecosystem vitality. Within these two policy objectives, the EPI scores country performance in 11 issue areas comprising a total of 32 indicators. Indicators in the EPI measure how close countries are to meeting internationally established targets or, in the absence of agreed-upon targets, how they compare relative to the best-performing countries.

Source: Wendling, Z.A., Emerson, J.W., de Sherbinin, A., Esty, D.C., et al. (2020), *2020 Environmental Performance Index*. New Haven, CT: Yale Center for Environmental Law & Policy (<https://epi.yale.edu>)

2.3.3 Physician density

Medical doctors (per 10,000 people) | 2019

Physician density refers to the number of medical doctors (physicians), including generalist and specialist medical practitioners, per 10,000 people.

Source: World Health Organization (WHO), Global Health Observatory (<https://www.who.int/data/gho>)

2.3.4 Sanitation

Population using at least basic sanitation services (%) | 2017

This indicator refers to the percentage of the population using at least basic sanitation services—that is, improved sanitation facilities that are not shared with other households. This indicator encompasses both people using basic sanitation services as well as those using safely managed sanitation services. Improved sanitation facilities include flush/pour-flush to piped sewer systems, septic tanks or pit latrines; pit latrines with slabs (including ventilated pit latrines); and composting toilets.

Source: World Health Organization (WHO), Global Health Observatory (<https://www.who.int/data/gho>)

2.3.5 Personal safety

Personal safety indicator | 2020

Personal safety is a component in the Basic Human Needs dimension of the Social Progress Index. This component is based on four variables: Homicide rate (deaths/100,000), Perceived criminality (1 = low; 5 = high), Political killings and torture (0 = low freedom; 1 = high freedom), and Traffic deaths (deaths/100,000).

Source: Social Progress Imperative, *The Social Progress Index 2020* (<https://www.socialprogress.org/>)

2.4 Skills

2.4.1 Workforce with tertiary education

Labour force with tertiary education (%) | 2020

Workforce with tertiary education refers to the percentage of the labour force (above 15 years old) whose highest educational attainment is at the tertiary level. The tertiary level is based on International Standard Classification of Education (ISCED) levels 5–8.

Source: International Labour Organization (ILO), ILOSTAT (<https://ilostat.ilo.org/>)

2.4.2 High-skilled workforce

Labour force employed in high-skilled occupations (%) | 2020

This indicator refers to the number of people employed in high-skilled occupations as a share of the total workforce. Occupations that have high skill levels are managers, professionals, and technicians and associate professionals because these professions correspond to skill levels 3 or 4 in the ILOSTAT database. The definition of *occupations* is based on the International Standard Classification of Occupation Revision 2008 (ISCO-08).

Source: International Labour Organization (ILO), ILOSTAT (<https://ilostat.ilo.org/>)

2.4.3 Researchers

Full-time equivalent researchers (per million population) | 2018

Researchers are professionals engaged in the conception or creation of new knowledge, products, processes, methods, or systems, as well as the management of these projects. Full-time equivalence (FTE) R&D data are a measure of the actual volume of human resources devoted to R&D and are especially useful for international comparisons. *‘One FTE may be thought of as one person-year. Thus, a person who normally spends 30% of time on R&D and the rest on other activities (such as teaching, university administration, and student counselling) should be considered as 0.3 FTE. Similarly, if a full-time R&D worker is employed at an R&D unit for only six months, this results in an FTE of 0.5.’* The data are reported per million population.

Source: United Nations Education, Scientific and Cultural Organization (UNESCO) Institute for Statistics, UIS.Stat (<http://data.uis.unesco.org/>)

2.4.4 Ease of finding skilled employees

Average answer to the question: In your country, to what extent can companies find people with the skills required to fill their vacancies? [1 = not at all; 7 = to a great extent] | 2020

The World Economic Forum’s Executive Opinion Survey (EOS) is conducted on an

annual basis to gather information from business leaders on topics for which hard data sources are scarce or nonexistent. It is part of the effort to supplement *The Global Competitiveness Report* in assessing issues that drive national competitiveness.

Source: World Economic Forum, Executive Opinion Survey 2019–2020 (<https://www.weforum.org/reports/>)

2.4.5 Digital skills

Individuals with advanced ICT skills (%) | 2020

Digital skills refers to the share of youth and adults who have written a computer program using a specialised programming language in the last three months, expressed as a percentage of individuals who have undertaken computer-related activities during that period.

Source: International Telecommunication Union (ITU), World Telecommunication/ICT Indicators Database, August 2021 (<https://www.itu.int/itu-d/sites/statistics/>)

3 Technology

3.1 Digital Usage

3.1.1 Internet users

Individuals using the Internet, total (%) | 2020

Internet users refers to the proportion of individuals who used the Internet in the last 12 months. Data are generally based on national household surveys where the percentage should reflect the total population of the country.

Source: International Telecommunication Union (ITU), World Telecommunication/ICT Indicators Database, August 2021 (<https://www.itu.int/itu-d/sites/statistics/>)

3.1.2 Active mobile broadband subscriptions

Active mobile broadband subscriptions (per 100 inhabitants) | 2020

This indicator refers to the sum of active handset-based and computer-based mobile broadband subscriptions to the public Internet where users have accessed

the Internet in the last three months. It covers actual subscribers, not potential subscribers, even though the latter may have broadband-enabled handsets.

Source: International Telecommunication Union (ITU), World Telecommunication/ICT Indicators Database, August 2021 (<https://www.itu.int/itu-d/sites/statistics/>)

3.1.3 Gender parity in Internet usage

Adjusted gender parity in Internet usage | 2020

Gender parity in Internet usage refers to the ratio of Internet users who are female to those who are male. Possible values range from 0 (total inequality) to 1 (perfect equality). The parity index is adjusted following the methodology of the United Nations Education, Scientific and Cultural Organization (UNESCO).

Source: International Telecommunication Union (ITU), World Telecommunication/ICT Indicators Database, August 2021 (<https://www.itu.int/itu-d/sites/statistics/>)

3.1.4 Firms with website

Firms with website (% of total) | 2020

Firms with website refers to the share of businesses that have their own website, expressed as a percentage of all firms. The data are based on enterprise surveys conducted by the OECD and the World Bank. The former survey is used for OECD countries and accession countries or key partners, while the latter is used for all other countries.

Source: Organisation for Economic Co-operation and Development (OECD), ICT Access and Use by Businesses, OECD Telecommunications and Internet Statistics (<https://doi.org/10.1787/9d2cb97b-en>); World Bank, Enterprise Surveys (www.enterprisesurveys.org)

3.1.5 Internet shopping

People who used the Internet to buy something online in the past year (%) | 2017

This indicator refers to the percentage of respondents aged at least 15 years old who have used the Internet in the past year to

buy something online. The data stem from a triennial survey conducted by Gallup, Inc., which is carried out in more than 140 economies.

Source: World Bank, Global Findex database (<https://globalfindex.worldbank.org/>)

3.1.6 Government online services

Government Online Service Index | 2020

The Government Online Service Index (OIS) is one of the three main components of the E-Government Development Index (EGDI) constructed and published by United Nations Department of Economic and Social Affairs (UNDESA). The OIS assesses the quality of a government's delivery of online services on a 0-to-1 (best) scale. The assessment is carried out by researchers, who evaluate *'each country's national website in the native language, including the national portal, e-services portal, and e-participation portal, as well as the websites of the related ministries of education, labor, social services, health, finance, and environment, as applicable.'*

Source: United Nations Department of Economic and Social Affairs (UNDESA), UN E-Government Knowledgebase (<https://publicadministration.un.org/egovkb/en-us/>)

3.1.7 E-Participation

E-Participation Index | 2020

The E-Participation Index assesses, on a 0-to-1 (best) scale, the quality, relevance, and usefulness of government websites in providing online information and participatory tools and services to their citizens. Within the E-Participation Index, countries are benchmarked in three areas: e-information, e-consultation, and e-decision-making. As such, the index indicates both the capacity and the willingness of the state in encouraging the citizen to promote deliberative, participatory decision-making in public policy and of the reach of its own socially inclusive governance program.

Source: United Nations Department of Economic and Social Affairs (UNDESA), UN

E-Government Knowledgebase (<https://publicadministration.un.org/egovkb/en-us/>)

3.2 Digital Content Creation

3.2.1 GitHub commits

[GitHub commits \(per 1,000 population\) | 2018](#)

GitHub is the world's largest host of source code, and a *commit* is the term used for a saved change on this platform. *GitHub commits* therefore refers to the number of saved changes on the GitHub website that are publicly available.

Source: Gousios, G. (2013), *The GHTorrent dataset and tool suite*. Data accessed through Google BigQuery. Data on population are sourced from World Bank, World Development Indicators (<http://data.worldbank.org/data-catalog/world-development-indicators>)

3.2.2 Wikipedia edits

[Wikipedia yearly page edits \(per million population 15–69 years old\) | 2020](#)

Wikipedia edits refers to data from economies with more than 100,000 edit counts on the Wikipedia website for the given year.

Source: Wikimedia Foundation (<https://wikimediafoundation.org>). Sourced from INSEAD, Cornell University, and World Intellectual Property Organization, *The Global Innovation Index 2021* (<https://www.globalinnovationindex.org>)

3.2.3 Internet domain registrations

[Generic Top-Level Domains \(gTLDs\) and Country Code Top-Level Domains \(ccTLDs\) per person | 2019](#)

This indicator provides a measure of the production of Internet content. It refers to two types of top-level domains: generic top-level domains and country code top-level domains. The gTLDs cover domain names that use com, net, org, biz, info, and mobi. A small number of countries has been excluded because a high volume of their ccTLDs are due to the specific meaning of the domain rather than any content produced in the country itself (e.g., the use

of the Tuvalu.tv domain by the entertainment industry).

Source: Data on Internet domain registrations kindly provided by ZookNIC (<http://zooknic.com/>). Data on population are sourced from World Bank, World Development Indicators (<http://data.worldbank.org/data-catalog/world-development-indicators>)

3.2.4 Mobile apps development

[Number of active mobile apps developed per person | 2019](#)

This indicator is included in the Mobile Connectivity Index published by the GSM Association. It is one of four indicators that make up its Local Relevance sub-index, which, in turn, is part of its Content & Services pillar.

Source: GSM Association, *The GSMA Mobile Connectivity Index 2020* (<http://www.mobileconnectivityindex.com>), based on data from Appfigures (<https://appfigures.com/>)

3.3 Industry 4.0

3.3.1 Robot density

[Number of robots in operation per 10,000 employees in manufacturing | 2019](#)

Robot density refers to the estimated number of multipurpose industrial robots per 10,000 persons employed in the manufacturing industry (ISIC rev.4: C). The International Federation of Robotics (IFR) collects country-level data on operational stock of industrial robots and, for some countries, computes robot densities. The computed robot densities are published in the annual *World Robotics* report.

Source: Data on robot density and operational stock of industrial robots kindly provided by the International Federation of Robotics (IFR, <https://ifr.org>). Data on employment in manufacturing in the countries for which IFR has not computed robot densities are sourced from the International Labour Organization, ILOSTAT (<https://ilostat ilo.org/>)

3.3.2 AI software development

GitHub commits made to AI projects (per million inhabitants) | 2020

This indicator refers to the number of saved changes ('commits') related to AI projects on the GitHub website that are publicly available. GitHub is the world's largest host of source code, and the frequency of AI-related commits provides a proxy of the activity of software developers in AI projects and, by extension, AI software development.

Source: [OECD.AI](#) (2021), visualisations powered by the Jožef Stefan Institute (JSI) using data from GitHub, accessed on 26 November 2021 (www.oecd.ai)

3.3.3 AI research

Number of AI research publications (per million inhabitants) | 2020

The indicator *AI research* is based on the number of scientific publications that fall into the categories 'artificial intelligence' or 'machine learning'. If a publication has one author, then the associated country's tally of papers increases by one unit. If multiple authors have written a research paper, then the number of publications in their respective countries increase by the proportion of residents involved (that is, if there are four authors from four countries, the total number of publications in each country increases by 0.25).

Source: [OECD.AI](#) (2021), visualisations powered by the Jožef Stefan Institute (JSI) using data from Microsoft Academic Graph, version of 27 September 2021, accessed on 26 November 2021 (www.oecd.ai)

3.3.4 ICT patent applications

Number of applications for information and communication technology-related patents (per million population) | 2018

This indicator refers to the count of applications filed under the Patent Cooperation Treaty (PCT) in the technology domain of information and communication technologies (ICT) by priority date and inventor nationality. The count is given per million people in the country's population. The classification of ICT-related patents is based on the International Patent

Classification (IPC), as described in Inaba and Squicciarini (2017).

Source: World Intellectual Property Organization (WIPO) PCT Data, sourced from the Organisation for Economic Co-operation and Development (OECD) Patent Database (<http://www.oecd.org/sti/inno/intellectual-property-statistics-and-analysis.htm>). Population data are sourced from World Bank, World Development Indicators (<http://data.worldbank.org/data-catalog/world-development-indicators>). The IPC classification is discussed in Inaba, T. and M. Squicciarini (2017), ICT: A new taxonomy based on the international patent classification. OECD Science, Technology and Industry Working Papers No. 2017/01. Paris: OECD Publishing (<https://doi.org/10.1787/ab16c396-en>)

3.3.5 Smart home devices

Smart home market (household penetration rate) | 2020

Smart home devices refers to the proportion of homes that include connected devices that enable home automation, expressed as a percentage of all households.

Source: We Are Social and Hootsuite (2021), *Digital 2021* report series (<https://wearesocial.com/digital-2021>), based on data from Statista (<https://www.statista.com/outlook/digital-markets>)

4 Competitiveness

4.1 Digital Policies

4.1.1 ICT regulation

ICT Regulatory Tracker | 2020

This indicator is based on a composite index—the ICT Regulatory Tracker—that provides a measure of the existence and features of ICT legal and regulatory frameworks. The index covers 50 indicators that are distributed across four pillars: Regulatory Authority, Regulatory Mandate, Regulatory Regime, and Competition Framework. Scores are standardised to a scale of 0 (worst) to 2 (best).

Source: International Telecommunication Union (ITU), *ICT Regulatory Tracker 2020* (<https://app.gen5.digital/tracker/metrics>)

4.1.2 Cybersecurity

[Global Cybersecurity Index | 2020](#)

The Global Cybersecurity Index (GCI) provides a measure of the level of cybersecurity commitment of countries. It is a composite index made up of 25 indicators that are distributed across five main pillars: Legal Measures, Technical Measures, Organizational Measures, Capacity Building Measures, and Cooperation Measures. Scores are standardised to a scale of 0 (worst) to 1 (best).

Source: International Telecommunication Union (ITU), *Global Cybersecurity Index (GCI) 2020* (<https://www.itu.int/epublications/publication/global-cybersecurity-index-2020/en>)

4.1.3 Rule of law

[Rule of law indicator | 2020](#)

The rule of law indicator 'reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence'. Scores are standardised (-2.5 = low; 2.5 = high).

Source: World Bank, *Worldwide Governance Indicators 2021 Update* (www.govindicators.org)

4.1.4 Regulatory quality

[Regulatory quality indicator | 2020](#)

The regulatory quality indicator captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Scores are standardised (-2.5 = low; 2.5 = high).

Source: World Bank, *Worldwide Governance Indicators 2021 Update* (www.govindicators.org)

4.1.5 Corruption

[Corruption Perceptions Index | 2020](#)

The Corruption Perceptions Index aggregates data from a number of different sources that provide perceptions of business people and country experts of the level of corruption in the public sector.

Source: Transparency International, *The Corruption Perceptions Index 2020* (<http://www.transparency.org/en/cpi>)

4.2 Market Environment

4.2.1 Extent of market dominance

[Average answer to the question: In your country, how do you characterize corporate activity? \[1 = dominated by a few business groups; 7 = spread among many firms\] | 2020](#)

The World Economic Forum's Executive Opinion Survey (EOS) is conducted on an annual basis to gather information from business leaders on topics for which hard data sources are scarce or nonexistent. It is part of the effort to supplement *The Global Competitiveness Report* in assessing issues that drive national competitiveness.

Source: World Economic Forum, Executive Opinion Survey 2019–2020 (<http://reports.weforum.org/reports>)

4.2.2 Labour productivity

[Labour productivity per person employed \(2020 US\\$ PPP\) | 2021](#)

Labour productivity estimates are obtained by dividing the total output (GDP in 2020 US\$ PPP) by the total labour input used (labour force) to produce that output. For China and the United States, the adjusted values (which take into account drops in prices of ICT goods) have been used.

Source: The Conference Board, Total Economy Database™ (www.conference-board.org/data/economydatabase)

4.2.3 Urbanisation

[Population of urban areas \(%\) | 2018](#)

Urbanisation refers to people living in urban areas as defined by national statistical offices. The data are collected and

smoothed by the United Nations Population Division.

Source: United Nations Department of Economic and Social Affairs (UNDESA), Population Division, *World Urbanization Prospects: The 2018 Revision* (<https://population.un.org/wup/>)

4.2.4 Domestic credit to private sector

Domestic credit to private sector (% GDP) | 2020

This indicator refers to loans, purchases of nonequity securities, trade credits, and other financial resources that need to be repaid and that are provided to the private sector by financial corporations. Financial corporations include monetary authorities, deposit money banks, finance and leasing companies, and money lenders, among others.

Source: International Monetary Fund (IMF) International Financial Statistics and data files, and World Bank and Organisation for Economic Co-operation and Development (OECD) GDP estimates. Downloaded from World Bank, World Development Indicators (<http://data.worldbank.org/data-catalog/world-development-indicators>)

4.2.5 Market capitalisation

Market capitalisation of listed domestic companies (% of GDP) | 2020

Market capitalisation estimates the stock market size of listed domestic companies. Values are based on share prices multiplied by the number of shares outstanding.

Source: World Federation of Exchanges database. Downloaded from World Bank, World Development Indicators (<http://data.worldbank.org/data-catalog/world-development-indicators>)

4.3 R&D

4.3.1 R&D expenditure

Gross expenditure on R&D (%) | 2019

R&D expenditure refers to the total domestic intramural expenditure on research and development (R&D) during a given period as a percentage of GDP. Intramural R&D

expenditure is all expenditure for R&D performed within a statistical unit or sector of the economy during a specific period, whatever the source of funds.

Source: United Nations Education, Scientific and Cultural Organization (UNESCO) Institute for Statistics, UIS.Stat (<http://data.uis.unesco.org/>)

4.3.2 University ranking

THE World University Rankings | 2019

The Times Higher Education (THE) World University Rankings is a composite indicator based on five pillars (weight in parentheses): (1) Teaching (30%); (2) Research (30%); (3) Citations (30%); (4) International outlook (7.5%); and (5) Industry income (2.5%). The value is derived from the average score of the top three universities per country. A country without any university in the ranking is given a score of 0.

Source: Times Higher Education World University Rankings 2021 (<https://www.timeshighereducation.com/world-university-rankings>)

4.3.3 Gender parity in R&D

Adjusted gender parity in R&D | 2018

Gender parity in R&D refers to the ratio of R&D personnel (headcount) who are female to those who are male. The values reflect the number of employed individuals involved in intramural R&D on either a full-time or a part-time basis. Possible values range from 0 (total inequality) to 1 (perfect equality). The parity index is adjusted following the methodology of the United Nations Education, Scientific and Cultural Organization (UNESCO).

Source: United Nations Education, Scientific and Cultural Organization (UNESCO) Institute for Statistics, UIS.Stat (<http://data.uis.unesco.org/>)

4.3.4 Scientific journal articles

Number of scientific and technical journal articles (per 10,000 inhabitants) | 2018

Scientific journal articles refers to the number of scientific and engineering articles published in the following fields: physics,

biology, chemistry, mathematics, clinical medicine, biomedical research, engineering and technology, and Earth and space sciences. The data are reported per 10,000 inhabitants.

Source: World Bank, World Development Indicators based on National Science Foundation, Science and Engineering Indicators; population data come from World Bank, World Development Indicators (<http://data.worldbank.org/data-catalog/world-development-indicators>)

4.4 Innovation

4.4.1 Medium- and high-tech industry

Proportion of medium- and high-tech industry value added in total value added (%) | 2018

This indicator refers to the percentage of the value added of medium- and high-tech industry out of the total value added of manufacturing. The manufacturing sector relates to sector D in the International Standard Industrial Classification of all Economic Activities (ISIC) revision 3 (1990) or sector C in ISIC revision 4 (2008). The definition of *medium- and high-tech industry* is based on the R&D intensity of economic activities. See United Nations (2019) or Galindo-Rueda & Verger (2016) for details on the classification.

Source: United Nations Industrial Development Organization (UNIDO), UNIDO CIP 2020 Database (<https://stat.unido.org>). Downloaded from United Nations, SDG Global Database (<https://unstats.un.org/sdgs/unsdg>). United Nations (2019), Metadata for Indicator 9.b.1 Proportion of medium and high-tech industry value added in total value added (<https://unstats.un.org/sdgs/metadata/files/Metadata-09-0B-01.pdf>). Galindo-Rueda, F. & Verger, F. (2016), OECD taxonomy of economic activities based on R&D intensity. OECD Science, Technology and Industry Working Paper No. 2016/04. Paris: OECD Publishing (<http://dx.doi.org/10.1787/5jlv73sqqp8r-en>)

4.4.2 High-tech exports

High-technology exports (% of manufactured exports) | 2020

High-tech exports refers to manufactures with high R&D intensity (e.g., computers, pharmaceuticals, scientific instruments, and electrical machinery), expressed as a percentage of exports of all manufactured goods. The definition of *high-technology* is based on the importance of expenditures on research and development relative to the gross output and value added of different types of industries that produce goods for export.

Source: World Bank, World Development Indicators (<http://data.worldbank.org/data-catalog/world-development-indicators>)

4.4.3 Venture capital recipients, deals

Venture capital recipients, deals (per billion PPP\$ GDP) | 2020

This indicator refers to the frequency of private equity investment in firms. The data on venture capital deals have been averaged over a three-year period to reduce the impact of annual fluctuations.

Source: Refinitiv, Eikon (private equity screener). Downloaded from INSEAD, Cornell University, and World Intellectual Property Organization, *The Global Innovation Index 2021* (<https://www.globalinnovationindex.org>)

4.4.4 New product entrepreneurial activity

New product entrepreneurial activity (%) | 2018

New product entrepreneurial activity refers to the percentage of total early-stage entrepreneurs 'who indicate that their product or service is new to at least some customers AND that few/no other businesses offer the same product'. The Global Entrepreneurship Monitor project is an annual assessment of the entrepreneurial activity, aspirations, and attitudes of individuals across a wide range of countries.

Source: Global Entrepreneurship Research Association, Global Entrepreneurship Monitor database (www.gemconsortium.org/data)

4.4.5 New business density

New corporate registrations (per 1,000 working-age population) | 2018

New business density is defined as the number of newly registered firms with limited liability per 1,000 working-age people (between 15 and 64 years old) per calendar year. The Enterprise Survey is a firm-level survey of a representative sample of an economy's private sector. The survey covers a broad range of business environment topics including access to finance, corruption, infrastructure, crime, competition, and performance measures. Since 2005–06, under its developed Global Methodology, the World Bank's Enterprise Analysis Unit has collected these data based on over 171,000 interviews with top managers and business owners in 149 economies.

Source: World Bank, Doing Business, Entrepreneurship Project (<http://www.doingbusiness.org/en/data/exploretopics/entrepreneurship>)

4.4.6 Patent applications

PCT patents by origin (billion PPP\$ GDP) | 2020

This indicator refers to the total count of applications filed under the Patent Cooperation Treaty (PCT), according to the residence of the first-named applicant. The count is divided by PPP\$ GDP (billions).

Source: World Intellectual Property Organization, Intellectual Property Statistics (www.wipo.int/ipstats). Downloaded from INSEAD, Cornell University, and World Intellectual Property Organization, *The Global Innovation Index 2021* (<https://www.globalinnovationindex.org>)

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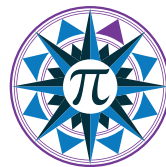
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Future Readiness Economic Index

2022

How digital sprinters can quantify, monitor,
and accelerate their transformation

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