Future Readiness Economic Index

2023

Digital Policies Are the Linchpin of Future Readiness

A Descartes Institute Global Report commissioned by Google, issued in cooperation with Qatar's Communications Regulatory Authority

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Future Readiness Economic Index

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Digital Policies Are the Linchpin of Future Readiness

Bruno Lanvin
Author

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Descartes Institute for the Future Sàrl (2023): *Future Readiness Economic Index 2023: Digital Policies Are the Linchpin of Future Readiness*. A Descartes Institute for the Future Global Report commissioned by Google, and issued in cooperation with the Communications Regulatory Authority of Qatar (CRA).

Descartes Institute for the Future Sàrl is a think tank based in Geneva, Switzerland. It is fully owned by D&L Partners SA, a consultancy entity, also based in Geneva.

ISBN: 978-2-8399-4066-5

Designed by Kenneth Benson, edited by Number Forty Two and published by Descartes Institute for the Future.

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Acknowledgements

The Future Readiness Economic Index 2023 was prepared under the general direction of **Bruno Lanvin** (Founder and Executive Director of Descartes Institute, and creator of the Index) and commissioned by Google.

The report and rankings are produced by a core team managed by Bruno Lanvin comprising **Michael Bratt** (lead researcher) and **Anna Henry** (senior project manager), who managed the daily work and background support required by this ambitious project.

We are grateful to the following individuals who also provided substantial inputs and without whom the Index would not be what it is:

Sarah Carrington and **Emma Walker** (Number Forty Two), our editors, for their constant support during its production.

Kenneth Benson (Pegasus Type), our graphic designer, for his creative production.

And another thank you goes to website developer **Patrick Eriksen** (DotModus).

Bruno Lanvin

Michael Bratt

Anna Henry

Sarah Carrington

Emma Walker

Kenneth Benson

Patrick Eriksen

Section I: Digital policies matter

Executive summary

Digital transformation is at the core of the Future Readiness Economic Index (FREI), and for good reason. Digital technologies present an opportunity for greater prosperity, and are considered essential to achieving the UN Sustainable Development Goals (SDGs). This has been recognised by world leaders, who will seek to develop a Global Digital Compact when they meet at the multi-stakeholder Summit of the Future in September 2024.

Critical components of digital transformation are digital policies and regulations. This is also reflected in the FREI model, which includes a specific focus on digital policies. However, the digital sector is notoriously fast-changing—just consider the emergence of ChatGPT and other generative AI tools since the launch of the last FREI report in September 2022—and it is imperative that digital governance remain up to date, while continuously looking forward.

In an effort to stay abreast of developments, this year's FREI includes a more comprehensive examination of digital policies, which extends into areas at the forefront of digital technologies. FREI 2023 is a unique assessment of the future readiness of countries that includes how well they are adapting and updating their governance on issues such as data privacy, AI, and cloud computing.

Main results and findings

Singapore continues to be the world's most future-ready country, while Denmark and Switzerland come in second and third, respectively. They are followed, in order, by the United States, Sweden, Finland, Norway, the Netherlands, the United Kingdom, and Australia.

Smaller, more developed economies dominate the top 10, although several large economies are also able to achieve a high degree of future readiness. A case in point is the United States, the world's largest economy, which climbs to fourth this year (up from sixth in 2022). Another example is China: ranked 38th this year, it is the most future-ready country among economies outside the high-income group.

Few countries perform extremely well across all areas. Singapore is one exception and is the global leader in two of the four main pillars: Technology and Competitiveness. Denmark also stands out in this regard, with 2nd-place positions in the Human Capital and Technology pillars. The top performer in Physical Capital is Norway, while Australia leads the rankings for Human Capital.

As for Digital Policies, the United Kingdom, Australia, and Estonia make up the top three (in that order). All three countries perform impressively well across various aspects of digital governance, including regulation of information and communication technology (ICT), cybersecurity measures, and policies related to emerging technologies. Although there is a clear, positive relationship between digital governance and income levels, the economies with the most advanced digital policies and regulations come from different regions and vary notably in size.

At an aggregate level, Europe and Northern America are the most future-ready regions in the world. Asia Pacific includes several countries with a high degree of future readiness, not least Singapore, the global leader. But it is also the region that exhibits the starkest contrasts. In fact, Asia Pacific is behind the Middle East and North Africa in most summary statistics. Elsewhere, levels of future readiness remain similar throughout much of the Latin America and Caribbean region, while Sub-Saharan Africa is the least future-ready region of all.

Key messages

One of the features that the three most future-ready countries share is that they do well across various areas covered by the Index. In fact, they feature in the top 10 in all four of the main pillars. To achieve future readiness, countries have to find the sweet spot that combines more traditional measures for promoting growth, such as investment in infrastructure or strengthening of education, with more forward-looking policies and initiatives, especially as they relate to digital technologies.

A key takeaway from the analysis of digital governance is that advanced digital policies and

regulations have been adopted by countries of various sizes. Small or big, rich or poor, countries have considerable leeway to shape their own institutions and policies to become Digital Sprinters and ready for the future.

Future readiness is inextricably linked to the ability to tap into the wealth of opportunities provided by digital technologies, while acknowledging and addressing their associated challenges. The potential of digital technologies can only be realised to the fullest if countries work together on issues that range from strengthening digital infrastructure and improving digital access, to embracing emerging technologies and adopting forward-looking digital policies.

In other words, multilateralism in digital technologies is key for greater future readiness. Indeed, as highlighted by UN Member States: improved international digital co-operation is one priority as we work towards "the sustainability of our planet as well as the welfare of generations for decades to come."

Introduction

In today's rapidly evolving world, characterised by technological advancements, global interconnectivity, and shifting socio-economic landscapes, future readiness has emerged as a critical concept. We can define future readiness as the ability to anticipate and adapt to emerging challenges while harnessing opportunities for sustainable development and global competitiveness.

Measuring countries' future readiness is essential for policymakers, businesses, and other stakeholders as they strive to navigate uncertainties and proactively shape their futures. It provides a systematic framework to assess strengths, weaknesses, and areas for improvement, as well as facilitating evidence-based policy formulation and decision-making.

It is against this background that the Future Readiness Economic Index (FREI) was created. By understanding the factors that contribute to future readiness, countries can develop targeted strategies and allocate resources effectively to enhance their long-term sustainability. FREI enables benchmarking and comparisons among countries, and fosters the identification of best practices and knowledge sharing. Moreover, it serves as a tool for monitoring progress, enabling countries to track their performance and adapt policies as needed.

Just as improving future readiness is a constant work in progress, the FREI itself is continuously revisited and improved. Although it is well-known in the development literature that a favourable institutional environment is important for development, research and analysis of the Index has further underscored that a vital element of strengthening future readiness is to embrace digital policies that foster innovation, economic growth, and social progress.

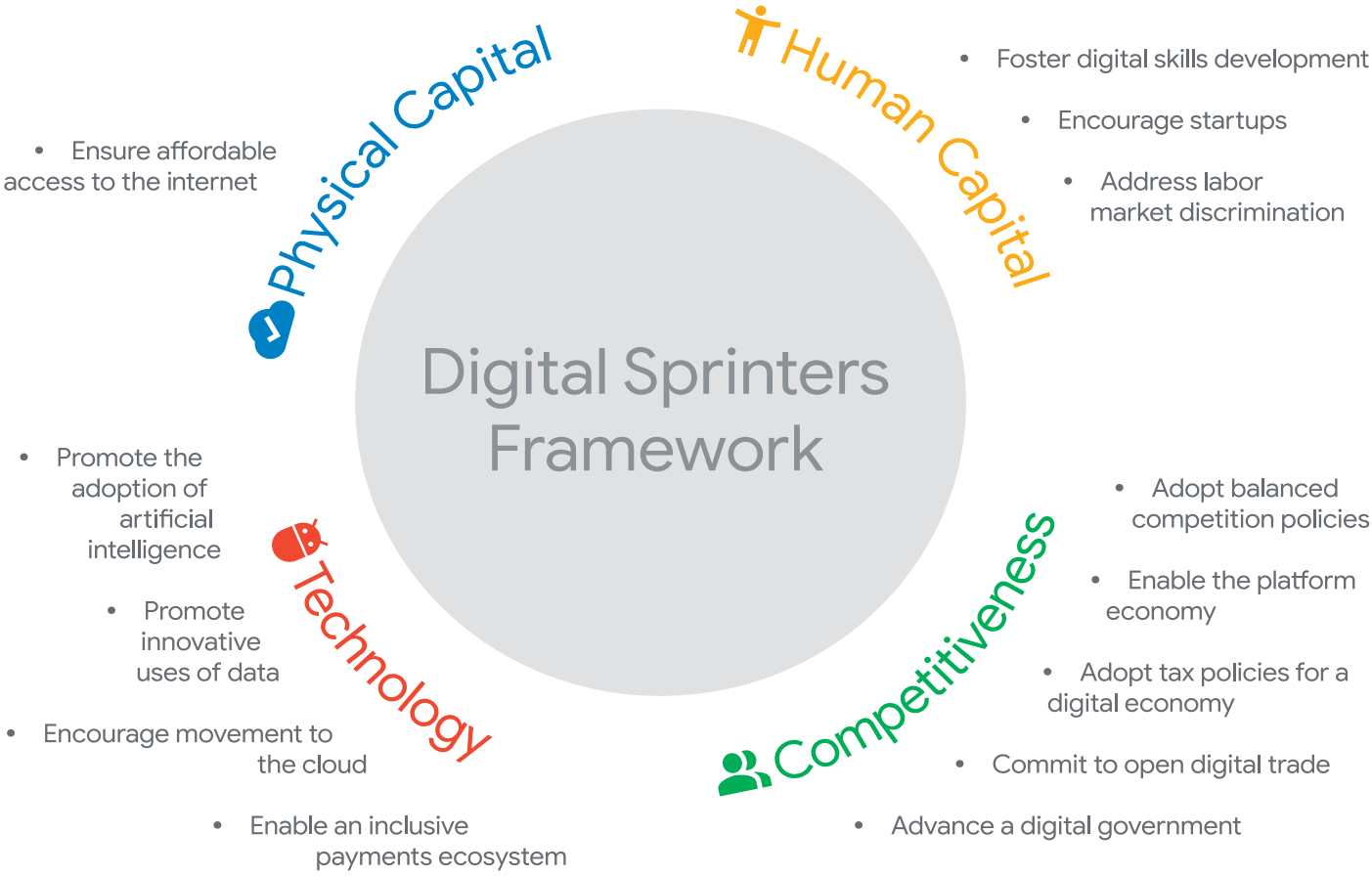
For this reason, this third edition of the Index (FREI 3.0) pays particular attention to digital policies, with respect to more traditional information and communications technology (ICT) as well as emerging technologies. As part of this effort, FREI 3.0 includes exclusive research on policies related to artificial intelligence (AI), cloud computing, and online content, among others. Although they differ in several respects, it is encouraging that five of the top-10 performers for digital policies also feature in the top 10 of the International Telecommunication Union (ITU) G5 Benchmark, which is a measure of digital transformation readiness.

António Guterres, the UN Secretary General, has singled out digital transformation as one of the two monumental trends of this century (the other being the climate crisis). In this vein, the UN is looking to agree on a Global Digital Compact at the 2024 Summit of the Future. It is our hope that FREI 3.0 will contribute to these deliberations and, more generally, to the ongoing discussion on how digital technologies can be a force for good.

The Future Readiness Economic Index framework

The foundation of the Future Readiness Economic Index (FREI) model is *The Digital Sprinters: Driving Growth in Emerging Markets*, presented by Google in 2020. The report focuses on how digital policies can facilitate digital transformation and stimulate growth in emerging markets. More specifically, it proposes a framework for analysing the impact of digital policies based on four broad categories: Physical Capital; Human Capital; Technology; and Competitiveness (Figure 1). This analytical framework is then used to flag the importance of ensuring affordable access to the internet, fostering digital skills development, promoting technological innovation in areas such as artificial intelligence (AI) and cloud computing, and encouraging a regulatory ecosystem that includes competitive markets, open digital trade, and digital governments.

Figure 1: The Digital Sprinters framework



Source: Google (2020).

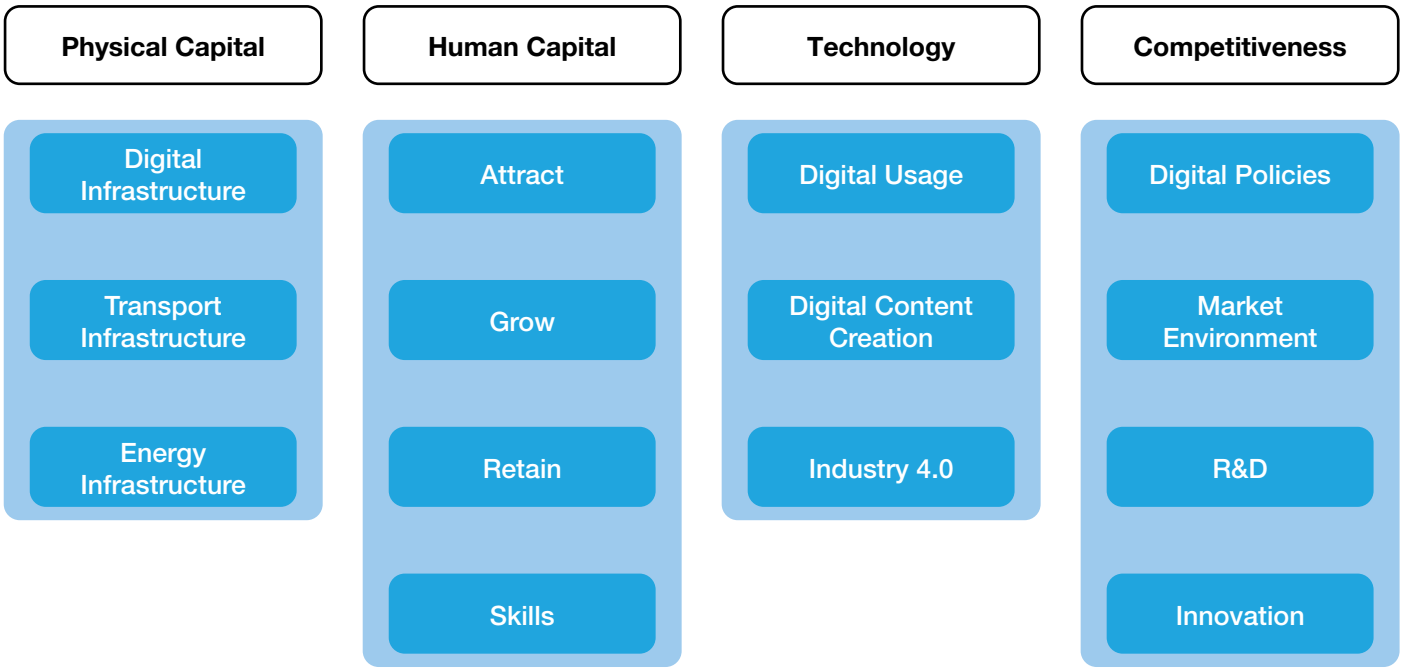
The FREI described in this present report is first and foremost an attempt to quantify the various components of the Digital Sprinters framework. The four-pillar structure of the Digital Sprinters framework therefore serves as a basis for the FREI model. For the purposes of quantification and analysis, the FREI model subsequently divides these four pillars into separate sub-pillars that measure specific aspects of each area.

The sub-pillars have been identified and built by combining several of the action areas highlighted in Google's Digital Sprinters report, as well as data and analysis stemming from three global indices that cover technology, talent, and innovation. These are: the Network Readiness Index; the Global Talent Competitiveness Index; and the Global Innovation Index.

The end result is a model that consists of 14 sub-pillars grouped under the four main pillars of the *Digital Sprinters* report as follows (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 access to electricity and the extent to which energy is efficiently and sustainably produced and consumed
- Human Capital
  - *Attract:* measures the ability to draw talent from abroad (external) and from domestic underprivileged groups (internal)
  - *Grow:* measures the production of talent through formal education and training, including reskilling and collaboration
  - *Retain:* measures the inclination of workers to stay in-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 any potential skills gap
- Technology
  - *Digital Usage:* measures the extent to which a country's individuals, businesses, and government bodies 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 cloud computing, AI, and Internet of Things (IoT)
- Competitiveness
  - *Digital Policies:* measures the enabling conditions for regulations of information and communication technology (ICT), including emerging technologies
  - *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, 72 indicators have been identified to populate the pillars and sub-pillars of FREI 2023. Recognising that real digital transformation and future readiness cannot take place when issues of inequality and sustainability are not adequately addressed, indicators on gender gaps and environmental aspects have been included in the model. Because by their nature they touch on several areas, these indicators have been interspersed throughout various sub-pillars (Figure 3).

Figure 3: FREI detailed framework and indicators

1. Physical Capital

1.1 Digital Infrastructure
1.1.1 Internet access
1.1.2 International internet bandwidth
1.1.3 Fixed-broadband subscriptions
1.1.4 4G-mobile network coverage
1.1.5 Fixed broadband affordability
1.1.6 Mobile broadband affordability
1.1.7 Computer software spending

1.2 Transport Infrastructure
1.2.1 Quality of infrastructure
1.2.2 Rural access
1.2.3 Air connectivity
1.2.4 Infrastructure investment

1.3 Energy Infrastructure
1.3.1 Access to electricity
1.3.2 Electricity consumption
1.3.3 Electrical outages
1.3.4 Energy intensity

2. Human Capital

2.1 Attract
2.1.1 Brain gain
2.1.2 International students
2.1.3 Tolerance of minorities
2.1.4 Tolerance of immigrants
2.1.5 Gender parity in high-skilled jobs

2.2 Grow
2.2.1 Tertiary enrolment
2.2.2 Reading, maths, and science
2.2.3 Use of virtual professional networks
2.2.4 Youth inclusion

2.3 Retain
2.3.1 Pension coverage
2.3.2 Environmental performance
2.3.3 Physician density
2.3.4 Sanitation
2.3.5 Personal safety

2.4 Skills
2.4.1 Workforce with tertiary education
2.4.2 High-skilled workforce
2.4.3 Researchers
2.4.4 Relevance of education system to the economy
2.4.5 Digital skills

3. Technology

3.1 Digital Usage
3.1.1 Internet users
3.1.2 Active mobile-broadband subscriptions
3.1.3 Gender parity in internet usage
3.1.4 Firms with website
3.1.5 Internet shopping
3.1.6 Government online services
3.1.7 E-Participation

3.2 Digital Content Creation
3.2.1 GitHub commits
3.2.2 Wikipedia edits
3.2.3 Internet domain registrations
3.2.4 Mobile apps development

3.3 Industry 4.0
3.3.1 Cloud computing
3.3.2 AI software development
3.3.3 AI research
3.3.4 ICT patent applications
3.3.5 Internet of Things

4. Competitiveness

4.1 Digital Policies
4.1.1 ICT regulation
4.1.2 Cybersecurity
4.1.3 AI regulation
4.1.4 Cloud governance
4.1.5 Online content
4.1.6 Data privacy
4.1.7 Data transfer

4.2 Market Environment
4.2.1 Extent of market dominance
4.2.2 Labour productivity
4.2.3 Urbanisation
4.2.4 Domestic credit to private sector
4.2.5 Market capitalisation

4.3 R&D
4.3.1 R&D spending
4.3.2 University ranking
4.3.3 Gender parity in R&D
4.3.4 Scientific journal articles

4.4 Innovation
4.4.1 Medium- and high-tech industry
4.4.2 High-tech exports
4.4.3 Venture capital recipients, deals
4.4.4 New product entrepreneurial activity
4.4.5 New business density
4.4.6 Patent applications

As highlighted in the introduction, the main new feature of this year's edition is the particular focus on digital policies. This is in line with the rationale of the *Digital Sprinters* report to explore the impact of digital policies on digital transformation. As emphasised in *Digital Sprinters* and other studies by international organisations and researchers, digital policies and regulations are essential for fostering trust, protecting privacy and security, promoting innovation, and ensuring fair competition in the digital economy.* Ultimately, by establishing clear rules and standards, digital policies create an enabling environment that supports digital transformation, unlocks the full potential of the digital economy, and facilitates inclusive and sustainable growth. As such, they play a crucial role in a country's future readiness.

The Digital Policies sub-pillar included in the FREI has until now encompassed two types of indicator: variables directly related to digital technologies; and more general indicators that measure the overall institutional landscape. However, in order to make this sub-pillar even more focused on digital, a decision was made to drop the three indicators relating to the general regulatory environment—Rule of law, Regulatory quality, and Corruption—used in previous editions, and to expand the digital component to encompass more topical areas of digital technology, especially those that relate to emerging technologies.

* See, for instance, ITU (2023) and OECD (2019).

Drawing on internally developed frameworks for digital regulation, a total of eight areas were initially identified. Although collecting data on digital policies and regulation is fraught with difficulties, despite the existence of several initiatives that do so (see Box 1), the choice was made to carry out exclusive research so as to home in on areas found to be particularly relevant and forward-looking for digital transformation and future readiness. Due mainly to a lack of data, the eight original areas were honed down to the following six: Cybersecurity, AI regulation, Cloud governance, Online content, Data privacy, and Data transfer.

Following the data-gathering process, these six areas were incorporated into the FREI as additional indicators, each of which is a composite based on research conducted for this year's FREI.*

This year therefore marks a first attempt at updating this particular area of the FREI. Inevitably, there are further improvements that can—and will—be made to the Digital Policies sub-pillar in the future. Nonetheless, it is our firm belief that the sub-pillar has been strengthened and made more forward-looking in this year's edition of FREI.

Box 1: The challenge of mapping digital policies and regulations

Despite their importance, it is often difficult to evaluate digital policies and regulations, not least with respect to emerging technologies such as AI, cloud computing, and IoT because of the fast-paced development of these technologies.

One key challenge is how various approaches in different jurisdictions to any given issue can be quantitatively assessed to ensure valid cross-country comparison. Consider, for instance, a seemingly straightforward question on whether a country has a cloud-first policy: should a distinction be made between a country with an explicit policy and a country where 'cloud-first' is mentioned as part of a more general declaration on digital transformation?

A second challenge is how best to differentiate actual policies and regulations from their implementation. Continuing the example of cloud-first policies: a country's adoption of a cloud-first policy does not necessarily imply that cloud services are procured, even though the policy states that they should be.

A third challenge concerns actual data collection. Data might be readily available or easy to find for some indicators, such as whether an AI strategy exists or not. But other indicators may require in-depth textual analysis, which is both resource intensive and more difficult to replicate across multiple countries.

Despite these challenges, there are several ongoing efforts to map national digital policies and regulations around the world. Chief among these are the data compilations carried out by the International Telecommunication Union (ITU), the leading international agency in the field, which has three indices relating to digital regulatory frameworks: the ICT Regulatory Tracker (which is still part of the FREI's Digital Policies sub-pillar), the G5 Benchmark, and the Global Cybersecurity Index. The Organisation for Economic Co-operation and Development (OECD) is another international organisation that collects data on digital governance, but its geographic scope is limited to its 38 member states. Initiatives by other researchers and experts, such as law firm DLA Piper's mapping of national data-protection laws and the National Cyber Security Index developed by the e-Governance Academy Foundation in Estonia, are even more area-specific.

* The one exception is the indicator 4.1.4 Cloud governance, which is a composite indicator that—in addition to our own collected data—also includes a variable taken from ITU's G5 Benchmark.

Future Readiness Economic Index 2023: Overall results

The Future Readiness Economic Index (FREI) 2023 shows Singapore to be the world's most future-ready country, followed by Denmark and Switzerland (see Table 1). This means that the top three performers in this year's edition are identical to those of 2022. Compared with last year, however, Singapore has strengthened its position, and the gap over the other two countries has widened.

The top three are followed by the United States, which climbs from 6th position in FREI 2022 to 4th this year. The rankings tend to be dominated by smaller, rich economies, which makes the strong performance of the world's largest economy all the more remarkable. Just behind the United States are three Nordic countries—Sweden, Finland, and Norway—all of which also featured in the top 10 last year. The Netherlands drops from 7th in 2022 to 8th in 2023, while the United Kingdom climbs one position from 10th to 9th. The only country that is new to the top 10 in this year's rankings is Australia, which enters at 10th position. It replaces Canada, which drops from 10th place last year, to 11th place this year.

It is notable that only a few countries do exceptionally well in all pillars. The top three countries stand out because they are the only countries to feature in the top 10 in all four pillars. First-placed Singapore is the global leader in two of them—Technology and Competitiveness—and is also ranked 2nd for Physical Capital, behind Norway and ahead of Luxembourg (which is ranked 12th overall). It is 5th for Human Capital. Denmark (2nd place overall) also features in the top three for Technology, as does Finland, and is also in the top three for Human Capital behind Australia in 1st place, and ahead of Luxembourg. Switzerland (ranked 3rd overall) is in the top three for Competitiveness just behind the United States.

In a composite indicator like this, countries with higher income levels typically perform better than those with lower income levels. FREI is no exception: it is telling that six of the top-10 performers are also in the top 10 countries for gross domestic product (GDP) per capita.* Moreover, they tend to be primarily countries with a fairly small population: indeed, the top three performers in FREI all have fewer than 10 million inhabitants. However, there is no hard-and-fast rule that smaller, more developed economies are more future ready than other countries. It is worth highlighting success stories, such as the United States and the United Kingdom, which achieve a high degree of future readiness, even though they are among the largest economies in the world and, in the case of the United States, has the world's third-largest population.

Similarly, when it comes to digital policies, there is a tendency for higher-income countries to outperform lower-income economies. This can be seen in the Digital Policies sub-pillar of FREI 2023, as well as the two International Telecommunication Union (ITU) indices (the ICT Regulatory Tracker and the G5 Benchmark) that relate to digital policies and regulations. There are however, two important caveats here. The first is that digital policies are notoriously difficult to measure. The second is that this year's edition of FREI represents a first attempt to collect our own data on digital policies and regulations, and remains a work in progress on this front (see Box 1).

It should be noted, however, that the positive correlation between digital policies and GDP per capita is less strong than the positive correlation between future readiness and GDP per capita. Furthermore, it is by no means smaller, developed economies that dominate the ranking in the Digital Policies sub-pillar. Indeed, the United Kingdom, the world's sixth-largest economy, tops Digital Policies (and ranks 2nd in ITU's G5 Benchmark) and half of the countries in the top 10 for Digital Policies have populations greater than 25 million. The weaker correlations between digital policies and, respectively, income level and size of the economy may be explained by countries having greater flexibility in this area compared to other factors that

* In order of FREI 2023 ranking: Singapore, Denmark, Switzerland, the United States, Norway, and the Netherlands.

contribute to future readiness such as investing in infrastructure or increasing R&D.

Level of development is a good predictor for future readiness and for digital policies, but it does not tell the whole story and is by no means destiny. Rather, it is in the hands of countries themselves—big or small, rich or poor—to shape their own institutions and policies to become Digital Sprinters and ready for the future.

Table 1: Future Readiness Economic Index 2023 (overall and by pillar)

Country	Future Readiness Score	Future Readiness Rank	Physical Capital	Human Capital	Technology	Competitiveness
Singapore	78.01	1	2	5	1	1
Denmark	75.08	2	10	2	2	4
Switzerland	74.33	3	7	6	6	3
United States	73.50	4	13	13	7	2
Sweden	72.51	5	14	4	5	7
Finland	72.33	6	12	7	3	8
Norway	71.55	7	1	9	9	14
Netherlands	70.58	8	11	10	4	18
United Kingdom	70.23	9	27	14	8	5
Australia	69.94	10	23	1	13	6
Canada	68.93	11	16	11	11	10
Luxembourg	67.01	12	3	3	19	28
Iceland	66.57	13	8	12	21	16
South Korea	66.27	14	20	22	14	9
Ireland	66.17	15	15	8	16	20
Germany	65.52	16	18	20	10	19
Belgium	64.08	17	17	17	22	12
Austria	63.59	18	19	18	17	21
Estonia	63.49	19	33	26	12	13
New Zealand	63.05	20	31	15	15	23
France	62.18	21	25	23	23	11
Japan	61.56	22	28	28	20	15
Malta	61.32	23	6	19	24	34
Israel	61.26	24	32	29	18	17
Spain	59.13	25	24	25	25	22
Portugal	59.10	26	21	16	29	36
United Arab Emirates	59.04	27	4	21	36	42
Cyprus	57.93	28	30	24	26	29

Table 1: Future Readiness Economic Index 2023 (overall and by pillar) *(continued)*

Country	Future Readiness Score	Future Readiness Rank	Physical Capital	Human Capital	Technology	Competitiveness
Italy	56.47	29	26	33	32	26
Slovenia	56.22	30	37	27	27	35
Czech Republic	55.75	31	39	30	28	32
Lithuania	55.41	32	34	32	33	33
Greece	55.11	33	22	31	37	39
Qatar	54.58	34	5	53	50	25
Croatia	52.94	35	38	43	38	27
Latvia	52.81	36	41	35	34	38
Poland	52.74	37	42	37	31	44
China	52.50	38	35	42	41	31
Hungary	51.39	39	40	39	35	49
Malaysia	51.29	40	29	62	44	24
Slovakia	50.91	41	43	40	39	45
Saudi Arabia	50.44	42	46	44	51	30
Chile	49.60	43	54	34	43	47
Serbia	49.59	44	62	54	30	40
Bahrain	49.50	45	9	59	52	56
Bulgaria	49.47	46	51	47	42	37
Uruguay	48.94	47	59	38	45	43
Russia	47.96	48	58	36	46	55
Armenia	46.50	49	63	56	40	57
Romania	46.49	50	47	61	48	54
Ukraine	46.18	51	60	46	47	59
Argentina	45.42	52	67	45	60	51
Türkiye	45.18	53	36	75	55	65
Brazil	45.11	54	70	71	49	41
Thailand	44.89	55	45	79	59	48
Georgia	44.81	56	64	51	68	52
Costa Rica	44.49	57	65	52	62	58
Kuwait	44.39	58	49	58	66	66
Mauritius	44.12	59	44	48	63	90
Belarus	43.73	60	55	50	53	86

Table 1: Future Readiness Economic Index 2023 (overall and by pillar) *(continued)*

Country	Future Readiness Score	Future Readiness Rank	Physical Capital	Human Capital	Technology	Competitiveness
Viet Nam	42.97	61	48	77	72	61
Albania	42.65	62	53	55	56	93
Oman	42.61	63	50	81	57	69
North Macedonia	42.11	64	69	65	54	74
South Africa	42.06	65	80	83	58	46
Kazakhstan	42.06	66	83	49	61	76
Colombia	41.73	67	81	76	64	53
Mexico	41.54	68	68	66	70	68
Ecuador	41.51	69	71	74	73	60
Jordan	40.90	70	76	72	75	62
Moldova	40.68	71	66	70	71	79
Bosnia and Herzegovina	39.67	72	73	78	69	78
Indonesia	39.60	73	52	86	82	70
Azerbaijan	39.36	74	84	73	76	71
Mongolia	39.23	75	86	68	65	83
Egypt	39.05	76	57	88	85	63
Lebanon	38.83	77	56	63	86	99
Panama	38.43	78	61	84	74	89
Peru	38.37	79	78	80	67	85
Tunisia	38.27	80	79	82	77	75
Kyrgyzstan	38.23	81	89	60	80	80
Philippines	38.15	82	82	87	89	50
Jamaica	38.05	83	77	57	87	95
Trinidad and Tobago	37.93	84	97	41	92	73
Paraguay	37.55	85	87	64	79	94
Bolivia	36.27	86	92	67	84	88
Iran	36.19	87	88	93	78	67
India	36.14	88	74	104	83	64
Botswana	36.12	89	91	69	95	77
Dominican Republic	34.90	90	90	85	88	81
Sri Lanka	34.59	91	75	89	93	96
Morocco	33.94	92	72	99	81	100

Table 1: Future Readiness Economic Index 2023 (overall and by pillar) *(continued)*

Country	Future Readiness Score	Future Readiness Rank	Physical Capital	Human Capital	Technology	Competitiveness
Algeria	33.38	93	85	90	99	84
El Salvador	31.89	94	93	92	90	101
Honduras	30.89	95	98	98	102	72
Kenya	29.67	96	100	97	91	106
Cambodia	29.15	97	95	101	96	109
Guatemala	28.34	98	99	115	97	103
Ghana	28.15	99	105	96	94	102
Rwanda	27.83	100	101	114	98	97
Bangladesh	27.71	101	96	105	100	111
Senegal	27.53	102	108	100	103	82
Laos	26.68	103	94	102	104	115
Pakistan	26.54	104	103	117	110	87
Nepal	26.50	105	102	91	101	120
Côte d'Ivoire	25.93	106	104	112	109	98
Nigeria	25.20	107	112	94	117	92
Benin	23.51	108	119	103	111	91
Togo	23.49	109	109	111	113	107
Myanmar	23.33	110	106	107	105	118
Zambia	22.94	111	122	95	108	105
Zimbabwe	22.06	112	117	113	107	110
Cameroon	21.99	113	113	106	106	116
Uganda	21.91	114	116	116	116	104
Angola	21.38	115	111	120	112	113
Tanzania	21.28	116	115	108	121	108
Mali	20.40	117	110	122	114	114
Burkina Faso	19.37	118	118	118	120	112
Malawi	19.02	119	114	109	119	123
Guinea	18.31	120	107	121	123	124
Mozambique	17.46	121	120	123	115	117
Madagascar	16.82	122	123	110	118	119
Ethiopia	16.54	123	121	119	122	122
Niger	11.49	124	124	124	124	121

Top-10 performers

1. Singapore remains the world's most future-ready country by virtue of strong performances in all key pillars. Most notably, it claims the top spot in both Technology and Competitiveness, where it is the global leader in the Innovation sub-pillar. It is also the 2nd-ranked performer in emerging Industry 4.0 technologies, which includes cloud computing, artificial intelligence (AI) research and Internet of Things (IoT), and boasts one of the world's most advanced set of Digital Policies (for which it is ranked 4th). It also features among the top-five performers for Physical Capital (for which it is ranked 2nd), aided by its 1st-place ranking for Transport Infrastructure, and for Human Capital (ranked 5th) where it has particular strengths in Growing talent (for which it is ranked 1st) and a strong pool of Skills (also ranked 1st). Areas where Singapore has room for improvement include Energy Infrastructure (for which it is currently ranked 22nd) and Retaining talent (54th).

2. Denmark ranks 2nd in both the Human Capital and Technology pillars, 4th in the Competitiveness pillar, and takes 10th place in Physical Capital pillar. At the sub-pillar level, Denmark stands out in Digital Usage, while its high levels of sustainability and lifestyle quality contribute to its 2nd place ranking for ability to Retain talent. The country has a highly skilled workforce, although more could be done to Attract talent (ranked 15th), especially from overseas. Denmark's strong position in the Competitiveness pillar derives from its excellent Market Environment (ranked 3rd), R&D landscape (4th), and Innovation capacities (6th). It would be strengthened further with even more effective Digital Policies, for which it is currently ranked 15th. Greater investment in both Digital Infrastructure (12th) and Transport Infrastructure (10th) would also increase the level of Physical Capital in Denmark.

3. Switzerland owes its stellar position in the FREI to a strong all-round performance, with top-10 positions in all four pillars: Physical Capital (ranked 7th), Human Capital (6th), Technology (6th), and Competitiveness (3rd). The country has strong performances in several sub-pillars, although within each of the main pillars, rankings are held back by one area of weakness. For example, when it comes to Competitiveness, Switzerland is the global leader for R&D activity and is 2nd for Market Environment, but it is ranked only 22nd for Digital Policies. In the case of Technology, Switzerland's performance in the Digital Content Creation (2nd) and Industry 4.0 (4th) sub-pillars is impressive, but there is scope to increase Digital Usage (32nd), especially with regards to on-line shopping. As for Physical Capital and Human Capital, strong performances in most sub-pillars are partly offset by a weaker performance for Energy Infrastructure (ranked 30th) and ability to Grow talent (18th).

4. The United States has a strong future readiness position that rests on its standing as one of the world's most competitive and technologically advanced countries. It ranks 2nd in the Competitiveness pillar—boosted in particular by its 1st place ranking for Market Environment and its world-class R&D and Innovation (ranked 2nd in both sub-pillars). It also ranks 7th in the Technology pillar, with top-10 performances in all three sub-pillars. The country is less strong in the Physical Capital and Human Capital pillars, achieving only a 13th place ranking in each case. In Physical Capital, the United States boasts the world's best Digital Infrastructure, but there is room to increase investment in Transport Infrastructure and Energy Infrastructure (it is currently ranked 19th in both). When it comes to Human Capital, the country benefits from a highly skilled labour force and a strong ability to Grow talent (5th). However, its ability to Attract and Retain talent (ranked 25th and 32nd respectively) would increase with greater tolerance towards minorities, improvements to its environmental performance, and better personal safety.

5. Sweden achieves a top-10 position in three of the four core FREI pillars: Human Capital (4th), Technology (5th), and Competitiveness (7th). When it comes to Human Capital, the country enjoys a strong pool of skilled labour, which earns it a 2nd-place ranking for Skills and a strong ability to Retain talent (ranked 5th). Sweden's strength in digital literacy is reflected in its leading position in the Industry 4.0 sub-pillar, which can be partly attributed to its attractive Market Environment (for which it is ranked 5th), and vibrant ecosystems for R&D (7th) and Innovation (8th). Increasing the effectiveness of Digital Policies—in which

the country achieves a surprisingly low 39th-place ranking—would probably strengthen the Technology and Competitiveness pillars even further. The weakest area for Sweden is Physical Capital (14th), where there is a need to boost investments in Digital Infrastructure (for which it currently is ranked 16th) and Transport Infrastructure (23rd).

6. Finland is one of the global leaders in the Digital Usage sub-pillar (for which it is ranked 2nd) and for emerging technologies (it is ranked 3rd in the Industry 4.0 sub-pillar), which help it secure the 3rd-place ranking overall for Technology. The country also ranks highly in the Human Capital (7th) and Competitiveness (8th) pillars. High rates of talent retention and a highly skilled workforce (ranking 4th and 7th, respectively) account for its strengths in Human Capital—although a greater degree of external openness would help Attract talent (16th) on a global basis. When it comes to Competitiveness, Finland benefits from consistent performances across all four sub-pillars. The country's weakest pillar is Physical Capital (12th): its world-class Energy Infrastructure is particularly impressive and earns a 3rd-place ranking, but there is room to strengthen Digital Infrastructure (currently 15th) and Transport Infrastructure (20th).

7. Norway boasts the world's best Physical Capital, with both its Energy Infrastructure (1st-place ranking) and Transport Infrastructure (4th) being particularly impressive. The country also achieves a top-10 position in Human Capital and Technology (ranked 9th in both cases). Its strong performance in Human Capital is mainly driven by the country's high-quality lifestyle and a highly skilled workforce, which contribute both to its ability to Retain talent (ranked 7th) and overall Skills ranking (8th). As for Technology, Norway is a top-10 performer in terms of Digital Content Creation (6th), including software development and knowledge creation. The greatest challenge for Norway, however, is raising the effectiveness of its Digital Policies (currently ranked 32nd) and its level of Innovation (23rd)—including entrepreneurial activity. Doing so could move the country up from 14th place in the Competitiveness pillar and make it a top-10 performer.

8. The Netherlands performs particularly well when it comes to Technology, in which it is ranked 4th. This can be attributed chiefly to its global leadership in Digital Content Creation, especially knowledge creation and volume of produced internet content. It is also one of the best-performing countries when it comes to Digital Usage (ranked 4th) and Industry 4.0 (ranked 11th) technologies. The Netherlands is also a leading country for Growing talent (4th), which contributes to its high ranking for Human Capital (10th). That digital technologies are a key asset in the country is also reflected in the Physical Capital pillar (where it is ranked 11th), which is driven by the excellent Digital Infrastructure (ranked 8th). However, the future readiness of the Netherlands would be even higher with more forward-looking Digital Policies (50th)—including adopting strategies on AI, cloud computing, and IoT—which currently constrain the country's ranking for Competitiveness (18th).

9. The United Kingdom is one of the top countries for Competitiveness (5th), which is due in no small part to it having the world's most forward-looking Digital Policies. It also boasts an impressive ecosystem for Innovation (earning a 3rd-place ranking) and for R&D (ranked 6th). The United Kingdom also makes it into the top 10 in the Technology pillar, (ranked 9th) where its digital policies and regulations may well be contributing factors to the country's solid performances in the three relevant sub-pillars: Digital Usage (ranked 11th); Digital Content Creation (8th); and Industry 4.0 (8th). The country ranks 14th for Human Capital, where its strongest sub-pillar is the ability to Retain talent (8th), as a result of excellent levels of sustainability and lifestyle, although it could do more to Attract talent (20th) by addressing issues around gender equality. However, the United Kingdom's greatest challenge is to improve Physical Capital, where it currently ranks 27th. Although it is a leading country in terms of Digital Infrastructure (4th), the United Kingdom is lagging in both Transport Infrastructure (29th) and Energy Infrastructure (67th).

10. Australia makes it into the FREI top 10 for the first time, mainly due to its 1st-place ranking in the Human Capital pillar. Its top-5 performance in three of the four sub-pillars related to talent is particularly impressive: it is 2nd for Attracting talent; 3rd for Growing talent; and 5th for Skills. The country also has a notable edge when it comes to Competitiveness (ranked 6th), which is mainly the result of excellent Digital Policies (2nd) and a high level of R&D activity (3rd). Its weakest pillar is

Physical Capital (it ranks 23rd), where it has scope to improve its Digital Infrastructure (48th) and Energy Infrastructure (42nd) by boosting internet bandwidth and increasing energy efficiency. As for the Technology pillar, where it ranks 13th, Australia has an impressive level of Digital Usage (6th)—especially in terms of public use of digital technologies—and is highly active in Industry 4.0 technologies (ranked 13th).

Other notable performers

11. Canada is one of the top-10 performers for Competitiveness (for which it is ranked 10th), which is achieved as a result of forward-looking Digital Policies (9th)—including on artificial intelligence (AI) and online content—coupled with a conducive Market Environment (10th) and vibrant R&D scene (also 10th). The country is also a strong performer in the Human Capital and Technology pillars, ranking 11th in both. For Human Capital, Canada stands out with its ability to Attract foreign talent (ranked 3rd)—with a high level of tolerance towards immigrants—and its highly educated workforce (it is ranked 6th for Skills). As for Technology, Canada's key strengths are in Industry 4.0 technologies (10th), including AI, and in Digital Content Creation (12th). However, there is scope to expand Digital Usage (currently ranked 23rd) among individuals and governmental authorities. The greatest room for improvement, however, is Physical Capital (ranked 16th), where greater energy efficiency would improve its ranking for Energy Infrastructure (for which it is currently 34th).

14. The Republic of Korea (South Korea) is one of the world's most innovative economies, (ranking 5th in the Innovation sub-pillar) backed by excellent R&D (ranked 9th). This makes it one of the top-10 countries for Competitiveness (9th), although there is room to strengthen its Digital Policies (currently ranked 24th). The country also does particularly well in Technology (14th), mainly due to high levels of Digital Usage (8th) among individuals and government bodies, and to its involvement in Industry 4.0 technologies (7th), especially Internet of Things (IoT). South Korea enjoys a strong pool of Skills (11th), although its Human Capital (22nd) would improve if it strengthened its ability to Attract, Grow, and Retain talent—currently ranked 32nd, 33rd, and 35th respectively. As for Physical Capital (where it is ranked 20th), South Korea has a solid Transport Infrastructure (11th), although greater energy efficiency would improve its 40th-place ranking for Energy Infrastructure.

16. Germany has an advantage in software development and its involvement in emerging technologies. This is reflected in its excellent performances in Digital Content Creation (ranked 9th) and Industry 4.0 (12th), which contribute to the country's 10th-place ranking in the Technology pillar. Germany also has solid performances in Physical Capital (ranked 18th), Human Capital (20th), and Competitiveness (19th). Above all, the country does well in the Energy Infrastructure sub-pillar (9th), which can be partly attributed to its energy efficiency, and in the Retaining talent sub-pillar (10th) thanks to its wide access to social protection and benefits. Areas in need of improvement, meanwhile, include: the ability to Grow talent (currently ranked 30th) through higher enrolment rates of students in tertiary education; increasing Skills (25th), including digital skills; and creating a more favourable Market Environment (26th) for private enterprise.

22. Japan makes it into the top 20 in two of the four pillars: Technology (20th) and Competitiveness (15th). For Technology, the country boasts an impressive level of Digital Usage (for which it is ranked 3rd), especially among businesses. It is also highly engaged in Industry 4.0 technologies (ranked 15th), such as IoT. Japan's strong position for Competitiveness is primarily driven by its conducive Market Environment (ranked 7th) which is marked by strong private sector development in a highly competitive landscape. However, the country would become even more future ready with more advanced Digital Policies (it is currently ranked 25th)—including regulation of more established information and communication technology (ICT), such as issues around licencing and spectrum broadband—and increased support for Digital Content Creation (39th). Japan's ability to Retain talent (ranked 25th) boosts its Human Capital pillar (where it ranks 28th), but the country could take steps to improve ways in which to Attract talent (currently 34th), with measures that include increasing its appeal to international students and addressing gender inequalities. The country's weakest sub-pillars are Digital Infrastructure (46th) and Energy Infrastructure (45th), where making mobile-broadband usage plans more affordable and boosting IT spending are priorities. However, Japan's reliable Transport Infrastructure (ranked 16th) boosts its position in the Physical Capital pillar (28th).

27. The United Arab Emirates (UAE) makes it into the top 10 in one of the four key pillars—Physical Capital (ranked 7th)—thanks to impressive

performances in Digital Infrastructure (7th) and Transport Infrastructure (3rd). This is, in turn, partly due to widespread internet access and large infrastructure investments. The UAE is also a top-10 performer when it comes to Attracting talent (6th), especially from overseas. However, its Human Capital ranking (21st) is mainly hampered by a weak ability to Retain talent (ranked 67th), which would improve with more extensive social protections and a more sustainable environment. UAE's performance in the remaining two pillars also vary considerably. In the case of Technology (ranked 36th), its high levels of Digital Usage (14th), especially by individuals, stands in contrast to more lacklustre performances in Digital Content Creation (49th) and involvement in Industry 4.0 technologies (41st). As for Competitiveness (ranked 42nd), the UAE has a good Market Environment (19th), but there is scope to make Digital Policies (59th) more effective by focusing on digital transformation enabling governance as well as regulations of more established ICT.

38. China is the most future-ready of the non-high-income countries. The country makes it into the top quarter in the Competitiveness pillar (31st), which is primarily due to its impressive Innovation ecosystem (ranked 7th), which contributes to its large share of high-tech exports and its high levels of patent activity. China's levels of Digital Usage (ranked 18th), especially its online government services and use of e-commerce is impressive, but its ranking in the Technology pillar (41st) is hampered by a comparatively low level of Digital Content Creation (89th). China could also improve its future readiness with more advanced Digital Policies (at 95th position, the country's weakest sub-pillar), including on issues such as online content, data privacy, and data transfer. China posts solid performances in the Physical Capital pillar (35th), although there is room to increase energy efficiency to strengthen its Energy Infrastructure (54th). As for Human Capital (42nd), China is 28th position for Skills (putting it in the top quartile), but lacklustre in other sub-pillars, with tolerance towards immigrants and minorities, environmental sustainability, and variables linked to lifestyle most in need of improvement.

42. Saudi Arabia features in the top quartile in the Competitiveness pillar (30th of 124), which is chiefly due to its favourable Market Environment (for which it is ranked 7th). This stands in stark contrast to the country's weaker position in Innovation (106th) and start-up ecosystem—although this should improve under the diversification efforts that form part of the country's Vision 2030 programme. The labour force exhibits a good level of Skills (14th position) and employability, and the country's oil riches contribute to a solid Energy Infrastructure (ranking 18th). However, the country's position in the Human Capital pillar (44th) is stymied by its low ability to Retain talent (ranked 81st) due to weak environmental sustainability, among other factors. Similarly, its ranking for Physical Capital (46th) is driven by a Transport Infrastructure (61st) that is marked by fairly low road and air connectivity. Saudi Arabia's lowest-ranked pillar is Technology (51st). Boosting software development and the markets for cloud computing and IoT would raise its ranking in the Digital Content Creation sub-pillar and the Industry 4.0 sub-pillar from 68th and 60th positions respectively.

54. Brazil features in the top half of the rankings in two of the four pillars: Technology (49th) and Competitiveness (41st). In the case of Technology, it enjoys a relatively high level of Digital Usage (43rd), especially the digitalisation of government services. As for Competitiveness, the country's Digital Policies are impressive and earn it a 6th-place ranking. However, more attention should be paid to advancing R&D (currently 70th) and Innovation activities (68th). Regarding Physical Capital (ranked 70th), Brazil's greatest strengths are in Digital Infrastructure (63rd), despite the need to expand mobile-network coverage. Ranked 71st, Human Capital remains the country's weakest pillar, where the greatest challenge is to improve Skills (currently ranked 86th) with measures that include improving digital skills and aligning the educational system to labour-market needs more effectively.

65. South Africa has clear strengths in the factors that contribute to Competitiveness (for which it is ranked 46th). Most notably, the country enjoys a favourable Market Environment (ranked 24th), with impressive market capitalisation and comparatively high levels of R&D (42nd). It also makes it into the top half of the rankings for Technology (58th), which can be partly attributed to its activity in Industry 4.0 (ranked 30th) technologies such as cloud computing and IoT. South Africa ranks lower for Physical Capital and Human Capital (80th and

83rd respectively). In Physical Capital, the country's solid Transport Infrastructure (ranked 50th) is offset by an Energy Infrastructure (102nd) that is plagued by electrical outages and low energy efficiency. For Human Capital, the country is open to Attracting global talent (for which it ranks 48th), but has a lower ability to Grow talent and Retain talent (ranked 83rd for both), with youth inclusion and personal safety representing two of South Africa's greatest challenges.

68. Mexico is one of the more consistent performers in the FREI, with rankings that do not vary much across the different pillars and sub-pillars. The biggest disparities are found in the Human Capital pillar (currently ranked 66th) where positive sustainability measures help Mexico's ability to Retain talent (for which it is ranked 56th), while weak employability holds the country back from achieving a higher Skills ranking (currently 82nd). The weakest sub-pillar, however, relates to Energy Infrastructure (87th), which would improve with more efficient energy consumption. This would, in turn, strengthen the country's Physical Capital (68th). As for digital technologies, the Digital Usage (65th) among governmental authorities has had a positive impact on Mexico's performance in the Technology pillar (70th). Digital Policies (71st) backed by solid ICT regulation contributes to the country's 68th position for overall Competitiveness.

88. India is particularly strong when it comes to Competitiveness (64th), which can be primarily attributed to conducive Digital Policies (37th)—both in terms of regulating more established ICT and readiness for digital transformation. This might also be an important factor behind India's strong performance in the Industry 4.0 (34th) sub-pillar. However, when it comes to overall performance for Technology (83rd), low Digital Usage (92nd) among its citizens and poor Digital Content Creation rankings (95th) keep the country low down the rankings. Low levels of digital technologies use also reflects weak Digital Infrastructure (82nd), including poor internet access, which has a detrimental effect on India's ranking for Physical Capital (74th). Human Capital (104th) remains the area where India has most room for improvement, including by strengthening the ability to Attract (123rd), Grow (93rd), and Retain (96th) talent by addressing inequalities faced by minorities and women, increasing opportunities for the country's youth, and tackling environmental pollution, among others.

95. Kenya achieves its highest rank in the Technology pillar (91st). Its greatest strength is its use of and investment in Industry 4.0 technologies that include AI, cloud computing, and IoT, for which it is currently ranked 45th. However, there is considerable room to improve Digital Content Creation (currently 109th) with greater knowledge creation and higher volumes of produced internet content, among others. Kenya makes the top half of the rankings for Attracting talent (62nd), but the country faces several challenges when it comes to raising its Human Capital ranking from 97th place, not least its ability to Retain talent (ranked 116th) with better sustainability and lifestyle measures. Kenya's lowest-ranked pillars are Physical Capital (ranked 100th) and Competitiveness (106th). For Physical Capital, the focus needs to be on various types of Infrastructure: Digital is currently ranked 96th; Transport is 92nd; and Energy 99th. As for Competitiveness, fairly high entrepreneurial activity contributes to a strong position in the Innovation sub-pillar (60th), but is offset by an unfavourable Market Environment (ranked 115th) and a weak R&D scene (118th).

107. Nigeria makes it into the third quartile in two pillars: Competitiveness (92nd of 124) and Human Capital (94th). In particular, its Competitiveness is boosted by comparatively strong showings for Digital Policies (58th) and Innovation (54th), which can be partly attributed to its ICT regulation and entrepreneurial activity respectively. As for Human Capital, Nigeria has advantages with respect to Skills (58th) and Attracting talent (51st), but needs to strengthen its ability to Grow and Retain talent—ranked 117th and 105th respectively—by raising rates of enrolment in tertiary education and improving social and environmental sustainability. Nigeria is in the lowest quartile in both of the other two pillars. With respect to Physical Capital (112th overall), expanding internet access and making mobile broadband more affordable would both improve the country's Digital Infrastructure (currently ranked 106th). As for Technology (117th overall), across-the-board effort is needed, including expanding Digital Usage (for which Nigeria ranks 114th) among individuals, businesses, and government bodies.

Qatar's Digital Policies Outlook: A case study in enhancing digital governance

The main new feature in this year's FREI edition is the revamping, and significant strengthening, of the model's Digital Policies sub-pillar. This change reflects the understanding that digital policies should be at the very centre of national future-readiness strategies. To assess how well various countries are doing in this regard, it is important to consider the degree to which emerging digital technologies have been adopted as well as how effective the local policy and regulatory environment has been with regard to both existing Information and Communication Technology (ICT) and emerging and future technologies.

The top-10 performers in the Digital Policies sub-pillar are all noteworthy examples of countries that, with different characteristics, have adopted policies and regulations to promote digital transformation. Qatar—a true digital sprinter in the GCC region and ranked 8th globally in this sub-pillar—is an interesting story of best practice that shows how significant strides can be made towards more advanced digital policies.

The hope of the authors of this report is that the example of Qatar's journey towards better digital policies can be of benefit to other economies, and a source of inspiration to those that are still in the process of formulating their own approaches to becoming more future ready.

Qatar's experience and the success of its digital-transformation journey can be summarised as the combination of three main elements:

1. An ambitious and clear vision, supported by detailed roadmaps.
2. A strong will and consistent effort to offer top-notch infrastructure.
3. A constant monitoring of digital performance, guided by international best practice.

Qatar's digital policies have been based on a clear vision supported by detailed roadmaps

The foundation for Qatar's progress in digital policymaking, and other areas, is the country's long-term vision, which was launched in 2008: the **Qatar National Vision 2030**. The ultimate objective of this vision is that Qatar should become "an advanced society capable of sustaining its development and providing a high standard of living for its people," with a "knowledge-based, diversified, and competitive economy." It also emphasises that "enhancing competitiveness and attracting investment will be needed in a dynamic and increasingly borderless international economy," and hence calls for "a stimulating business climate capable of attracting foreign funds and technologies and of encouraging national investment."

This long-term plan has served, and continues to serve, as a framework for detailed policies and actions for transforming Qatar from a country that is reliant on energy resources to a well-diversified, knowledge-based economy.

The roadmap produced for the realisation of the Qatar National Vision 2030 is traced by the successive national development strategies that have been adopted and implemented to date.

Among the issues and priorities identified in these strategies is the need to harness ICT for economic and social good. Innovation, education, health, and economic diversification and growth are just some of the areas that, directly or indirectly, benefit from integrating key digital technologies into the fabric of today's and tomorrow's economy and society of Qatar.

Table 2 summarises the key digital policies developed and implemented in Qatar since 2011.

Table 2: Qatar's Digital Policies Roadmap (2008–2023)			
Policy/Strategy	**Description**	**Domain Areas**	**Date Issued**
Qatar National Vision 2030 (QNV2030)	Qatar's roadmap for economic diversification and sustainable development, aiming to balance growth with environmental care and human capital enhancement.	Economic growth, social development, human capital, environmental sustainability	2008
Qatar's e-Accessibility Policy	Ensures digital accessibility across all sectors of society.	Digital inclusion	2011
Qatar National ICT Plan 2015	Plan for developing a viable ICT sector aligned with QNV2030.	ICT infrastructure, cybersecurity, e-services, digital inclusion, market development	2011
National Development Strategy 1 (NDS 1)	Initial phase of implementing QNV2030, setting up specific goals and strategies	Various sectors	2011–2016
E-Transactions Law	Provides the legal basis for electronic contracts and transactions	Digital transactions, legal framework	2012
National Broadband Plan	Ensures nationwide high-speed broadband access	Telecommunications	2013
Cybersecurity Law	Provides the legal basis for cybersecurity action plans and measures	Cybersecurity	2015
National Cybersecurity Strategy 2020	Framework for national cybersecurity and protection of critical infrastructure	Cybersecurity	2015
Digital Government Strategy 2020	Strategy to digitise government services for enhanced public access and efficiency	E-government, digital services	2015
Qatar National E-Commerce Roadmap	Comprehensive strategy to promote and regulate the growth of e-commerce in Qatar	E-commerce, digital economy	2015
Data Protection and Privacy Law	Provides the legal basis for data protection and privacy	Data protection	2016
National Development Strategy 2 (NDS 2)	Follow-up to NDS 1, deepening previous achievements and tackling emerging challenges	Various sectors	2018–2022
National AI Strategy	Framework for integrating AI across different economic sectors	Artificial intelligence	2019

Table 2: Qatar's Digital Policies Roadmap (2008–2023) *(continued)*			
Policy/Strategy	**Description**	**Domain Areas**	**Date Issued**
Cloud Policy Framework	Details strategic objectives and actions to be implemented to support adoption of cloud computing services	Cloud computing	2022
Digital Factory	Enhances government digital service delivery through a unified, user-focused platform, supporting QNV2030's objective of a diversified, knowledge-based economy	Digital governance, service delivery, user experience	2023–2027
National Blockchain Blueprint	Provides a strategic framework for leveraging blockchain across different sectors, including finance, healthcare, and logistics	Blockchain, digital transactions	2023
Cloud-First Policy	Implements the Cloud Policy Framework for government entities and mandates the prioritisation of cloud computing solutions.	Cloud computing, government services	2023
Qatar Fintech Strategy	Strategy of the Qatar Central Bank to integrate digital innovations such as blockchain, Islamic banking, insurance technology, and education technology. Cryptocurrencies remain banned under the new strategy	Fintech, insurance technology, e-payments, wallets	2023
ICT Sector Taxonomy Principles and Categories (ICT Sector Classification)	Details national ICT sector taxonomy principles and categories and establishes a national framework that supports further development of relevant policies	ICT supply-side value chain	2023
Digital Signature and Digital Identity	Establishes secure digital identity and signature frameworks for transactions	Cybersecurity, digital identity	2023–2024
National Development Strategy 3 (NDS 3)	Follow-up to NDS 2, deepening previous achievements and tackling emerging challenges, following a bottom-up process	Various sectors	2024-2027

Striving to offer top-notch infrastructure and assess progress

Although it had been seen by some as a major gamble, the 2022 FIFA World Cup was a widely recognised success that provided Qatar with an exceptional opportunity to display its achievements to a global audience. In this respect, the quality of digital infrastructure and services was a vital component. Qatar proved agile and determined enough to seize this opportunity to update, build, and integrate local ICT infrastructure and capabilities.* As a result, Qatar is emerging as one of the leading countries in the world in new technology adaptation, innovation, and system automation.

Although the modernisation of Qatar's digital infrastructure and regulatory environment started long before 2022, several notable initiatives are worth highlighting as examples of what a modern economy can do to become more future ready by accelerating its digital transformation.† The following facts and actions deserve special attention:

- **Growing the national ICT market.** Qatar's ICT market has been growing rapidly over the past decade. According to IDC, the country's ICT spending is expected to be $5.8 billion in 2024 and is projected to rise to $6.3 billion by 2027.‡ IT spending is estimated to grow from $3.14 billion to $3.6 billion during the same period.
- Enhancing government institutional set-up to focus on growing the digital economy. In October 2021, the Ministry of Transport and Communications (MOTC) de-merged into two separate ministries, resulting in the establishment of the Ministry of Communications and Information Technology (MCIT), led by His Excellency Mohammed bin Ali bin Mohammed Al Mannai. The MCIT focuses on digitally modernising Qatar, further developing Qatar's ICT infrastructure, transforming Doha into one of the most connected cities globally, and living up to Qatar's ambition to become a digital hub both regionally and globally. It aims to harness technology and innovation across five priority sectors: transportation, logistics, environment, healthcare, and sport. In March 2021, the National Cyber Security Agency was established with a focus on securing the state's cyberspace and maintaining national cyber security. The governance of the ICT sector as enabler of the digital economy is strongly supported by the role of the Communications Regulatory Authority (CRA) as the regulator of IT, telecom, access to digital media, and the postal sector. Since 2020, the CRA has been quite active in implementing various strategic initiatives across the ICT domain, targeting a revamp of the regulatory framework in support of technology innovation, opening and developing the ICT market, proactive engagement with the industry, and promoting a world-class ICT ecosystem in Qatar.
- **Advancing e-government, promoting the Digital Factory approach.** Qatar's e-Government 2020 Strategy set the foundation for a more open and efficient government, focusing on enhancing online services for individuals and businesses. As an extension of this strategy, various government agencies are advancing their digitalisation efforts, integrating advanced technologies such as artificial intelligence (AI), blockchain, cloud computing, big data analytics, and the Internet of Things (IoT), to develop smart solutions across key sectors. Recently, the MCIT has announced the Digital Factory initiative. This initiative marks a significant transformation in the delivery of government digital services, moving from traditional methods to a more unified and integrated approach. Central to this initiative is user-centric design, aimed at making government services more intuitive and responsive to the needs of citizens, residents, businesses, and visitors. The Digital Factory initiative incorporates advanced technologies, and includes comprehensive components such as state-of-the-art infrastructure and data aggregation. It is set to follow a structured three-year implementation timeline, with each year aimed at expanding its scope and impact. This initiative is poised to enhance the quality

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* The MCIT's report on the ICT legacy of the 2022 FIFA World Cup, *Connected Tournament*, is available here: https://www.mcit.gov.qa/sites/default/files/fifa_world_cup_qatar_2022tm_-_mcit_connected_tournament_-_a_digital_legacy_english-1.pdf)

† For additional information, see *Qatar's ICT Landscape & Digital Trends 2022 Report*, published by the CRA. https://www.cra.gov.qa/Services/ICT-Business/ICT-Sector-Research-Report

‡ Worldwide Black Book: Live Edition. IDC, October 2023. https://www.idc.com/getdoc.jsp?containerId=IDC_P336

of government services and make a significant contribution to Qatar's GDP, aligning with the country's broader goals of technological advancement and economic diversification.

- **TASMU: Smart Qatar.** TASMU, Qatar's Smart Programme,* is driven by the TASMU Central Platform, a cloud-based IoT system that powers the Smart Qatar vision. It serves as a unified hub for smart-city services, catering to citizens, service providers, and other stakeholders, and aims to transform lives through economic opportunities and accessible services via the TASMU marketplace portal and mobile application. The programme's objective is a nationwide digital transformation that fosters a digital culture and offers smart-city and government services. Leveraging data-driven decision-making and machine learning, it aligns with Qatar's National Vision 2030 goals. In collaboration with key partners like Qatar's Ministry of Transport, Ooredoo, Microsoft, Malomatia, Delta Partners, PwC, and Accenture, TASMU is instrumental in deploying innovative digital solutions. Its capabilities were prominently displayed during the 2022 FIFA World Cup, where TASMU's platform played a critical role in crowd management and stadium management systems, demonstrating its essential contribution to Qatar's journey towards becoming a digitally advanced, connected nation.
- **Qatar's cloud-first policy places cloud computing at the heart of its digital transformation strategy.** Introduced in 2023, the cloud-first policy builds on the Cloud Policy Framework issued by the CRA on June 7, 2022.† This forward-looking policy framework sets the stage for a cloud-friendly environment in Qatar, emphasising crucial aspects such as security, privacy, data protection, transparency, and digital inclusion. By adhering to principles of trust, security, and transparency, the policy aims to support Qatar's aspirations to become a digital hub and aligns with CRA's Strategy for 2020–2024. Its primary objectives include attracting both foreign and domestic investments in new digital services, facilitating the nation's full digitalisation, and reducing carbon emissions by promoting carbon-neutral facilities and reducing on-premises data centres. It also involves public and private stakeholders in the cloud value chain, including policy and regulatory recommendations such as the Cloud-First Policy and the National Information Assurance Policy. This comprehensive approach underscores Qatar's commitment to leveraging cloud technologies for its digital transformation and sustainability goals.

* https://tasmu.gov.qa/

† https://www.cra.gov.qa/Law-and-Regulations/Policies-and-Strategy/Cloud-Policy

A constant monitoring of digital performance, guided by international benchmarks

Over the past thirty years or so, Qatar has shown that it did not fear the dynamics of international rankings, referring to them as a benchmarking and guiding tool while consistently focusing on improving its policies and accelerating its digital development in line with its national development goals. For example, as early as 2006–07 Qatar was one of the first countries in the world to make the Network Readiness Index (then part of the Global Information Technology Index and Report, co-published by INSEAD and the World Economic Forum) a central element of its National ICT Strategy.

All the elements described above largely explain why, year after year, the digital performance of Qatar has attracted increasing global attention. The progress that Qatar has made in digital policies, and in digital transformation more generally, is reflected in its position in various indices that measure the state of digital frameworks across countries. **The 8th-place ranking in the Digital Policies sub-pillar** of FREI 2023 is the highest position achieved by Qatar in the ICT-related sub-pillars of the FREI model. Qatar is particularly impressive in topical issues: AI regulation, cloud governance, online content, data privacy, and data transfer.

This remarkable performance, however, did not come about by chance. It was the result of continuous efforts and of an unwavering will to excel. It is now expected that this same attitude will usher similar progress in other facets of digital transformation.

Digital Horizons: Charting Qatar's transformative journey toward 2030

As Qatar advances towards the realisation of its ambitious National Vision 2030, the imminent release of the National Development Strategy 3 (NDS3) marks a significant step. Focusing on

economic diversification across key sectors, NDS3 is poised to leverage the nation's strategic position and demographic composition to bolster its digital transformation efforts.

This strategy aligns with the demographic dynamics of the country, where a substantial proportion of the population are expatriates, and taps into the economic potential derived from its position as a major player in the global liquefied natural gas (LNG) market. NDS3 aims to build on this foundation, pivoting the economy towards a more knowledge-driven and technologically advanced future.

The Digital Agenda 2030, a key element of NDS3, outlines a range of initiatives that will increase digitalisation across various sectors, driving the growth of Qatar's digital economy. This includes enhancing cloud capabilities, fostering environmental technology programmes, transforming government services to be more user-focused, and refining the regulatory landscape for ICT. In addition, the agenda aims to develop a national framework for emerging technologies, establish a framework for attracting FDI, and prioritise the digital transformation of key sectors. The spill-over effect of this widespread digitalisation is expected to substantially contribute to the evolution of Qatar's digital economy.

In line with these objectives, Qatar is also focused on becoming a regional digital hub. It is actively creating an ecosystem that attracts international talent, stimulates job creation, and encourages the development and scaling of new technologies. This endeavour is part of Qatar's broader strategy to attract digital businesses and cultivate an environment that fosters innovation and global competitiveness.

Moreover, Qatar places a strong emphasis on regional collaboration in digital policy-making. The country seeks to ensure interoperability and foster a collective approach to challenges such as data governance and digital commerce. This collaborative stance is expected to enhance Qatar's digital infrastructure and contribute to the expansion of the digital economy across the broader region.

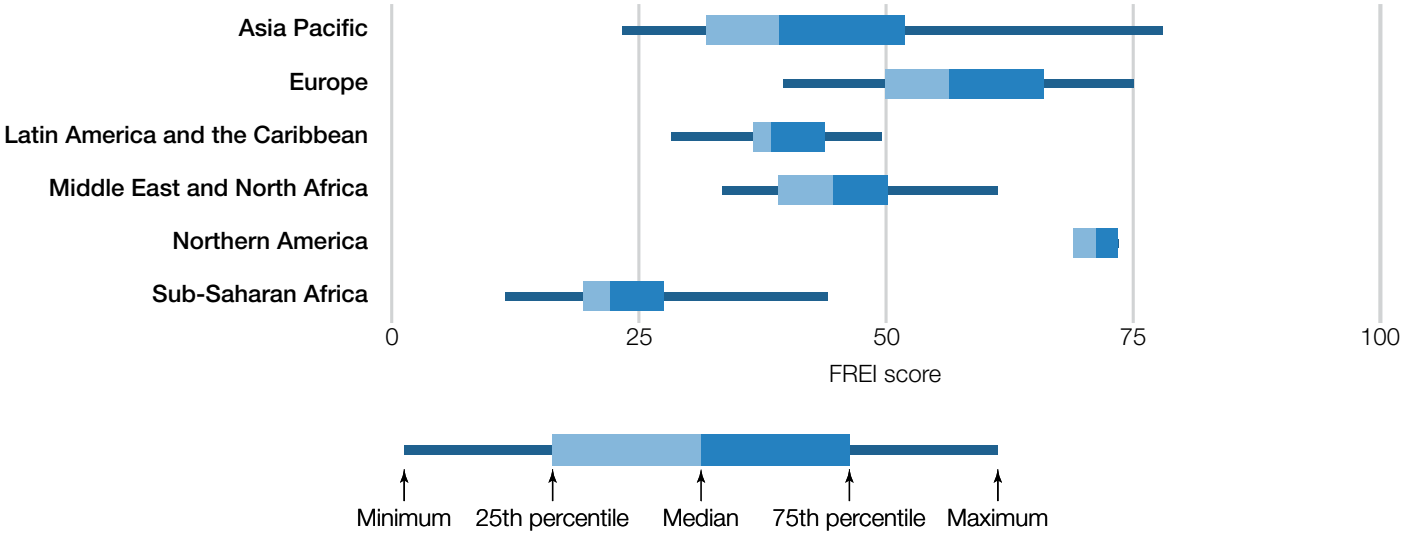
In summary, through NDS3 and the Digital Agenda 2030, Qatar is not only reinforcing its commitment to economic diversification, but it is also aiming to create a future that is digitally enabled, aligns with Qatar's natural gas heritage, and paves the way for sustainable, long-term economic prosperity.

Performances by income group* and region†

In total, 124 countries are included in the Future Readiness Economic Index (FREI) 2023 report. In terms of regional distribution, 23 are in Asia Pacific; 38 are in Europe; 18 are in Latin America and the Caribbean; 18 are in the Middle East and North Africa; two are in Northern America; and 25 are in Sub-Saharan Africa. When it comes to income levels, 10 are classed as low-income countries; 34 are lower-middle-income countries; 32 are upper-middle-income countries; and 48 are high-income countries.

There is a strong, positive correlation between future readiness and income level, which can clearly be seen when comparing the summary statistics across regions and income groups (Figures 4 and 5, respectively). Northern America is the region with the highest average score, although it should be noted that the region consists only of two countries, Canada and the United States. This is followed by Europe, which has a high share of developed countries, which are also among the most future-ready (seven of the top-10 performers are European). Singapore is the leader in Asia Pacific, but it is interesting to note the wide divergence in levels of future readiness in the region, and that it lags behind the Middle East and North Africa in most summary statistics. Latin America and the Caribbean and, primarily, Sub-Saharan Africa are the least future-ready regions in general.

Figure 4: FREI scores by region



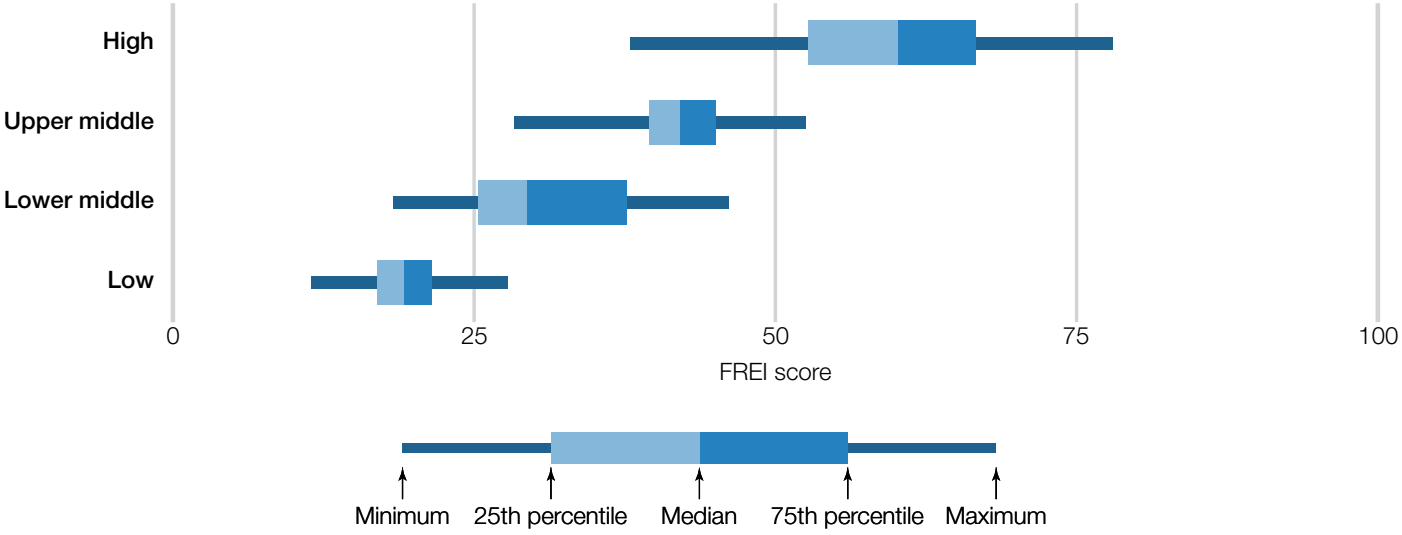
Note: The figure for Northern America has only two bars because it contains only two countries: Canada and the United States.

* There are four income groups: low income; lower-middle income; upper-middle income; and high income. The income group classifications are taken from the World Bank, whereby countries are grouped based on their 2022 gross national income (GNI) per capita, calculated using the World Bank Atlas method (see https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups).

† There are six regional groups: Asia Pacific; Europe; Latin America and the Caribbean; Middle East and North Africa; Northern America; and Sub-Saharan Africa. The categories are based on United Nations Regional Classifications, although the terminology is sometimes different (e.g. Middle East and North Africa instead of Northern Africa and Western Asia).

The contrasts are even starker when comparing future readiness across income groups. Figure 5 vividly illustrates that countries at higher income levels outperform those at lower income levels in what can be described as a stairway towards greater future readiness: every step up in terms of income group is associated with a forward step with respect to future readiness.

Figure 5: FREI scores by income group



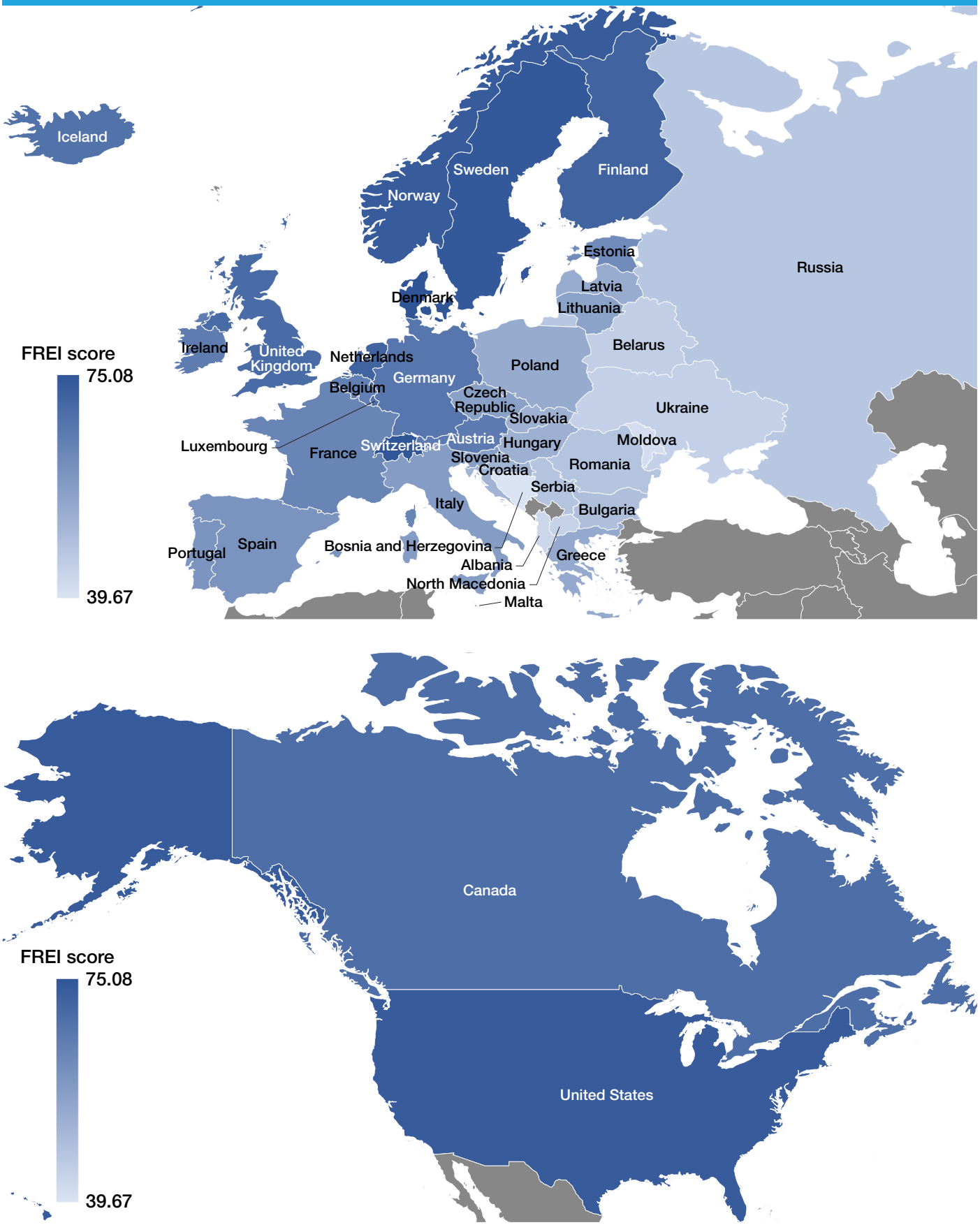
Regional results: Europe and Northern America

The FREI rankings are dominated by countries from Europe and Northern America, although the global leader—Singapore—is in Asia Pacific. Both Northern American countries, Canada and the United States, have impressive levels of future readiness: the United States earning 4th place and Canada just outside the top 10 in 11th position. As for the 38 countries in Europe included in the Index, 21 countries make it into the top quartile of the rankings (that is, ranked in the top 31). A further 14 European countries are positioned in the second quartile, while three are ranked in the third quartile. (Figure 6).

On average, the Europe and Northern America regions do not perform notably better in any particular pillar(s). However, at the sub-pillar level, Europe exhibits a clear advantage in terms of Growing and Retaining talent, and with respect to its Energy Infrastructure. Both Northern American countries, meanwhile, feature in the top 10 in several sub-pillars, including Growing talent, Skills, Market Environment, and R&D.

Looking at sub-pillars that relate directly to digital technologies, several countries in Europe show comparative strengths in Digital Content Creation and Digital Infrastructure—and a relative weakness in Digital Policies. There is, however, considerable variation within the region, with the United Kingdom and Estonia standing out for their top-three global rankings (1st and 3rd, respectively). As to Northern America, it shines in several areas related to digital technologies, especially Digital Infrastructure and Industry 4.0.

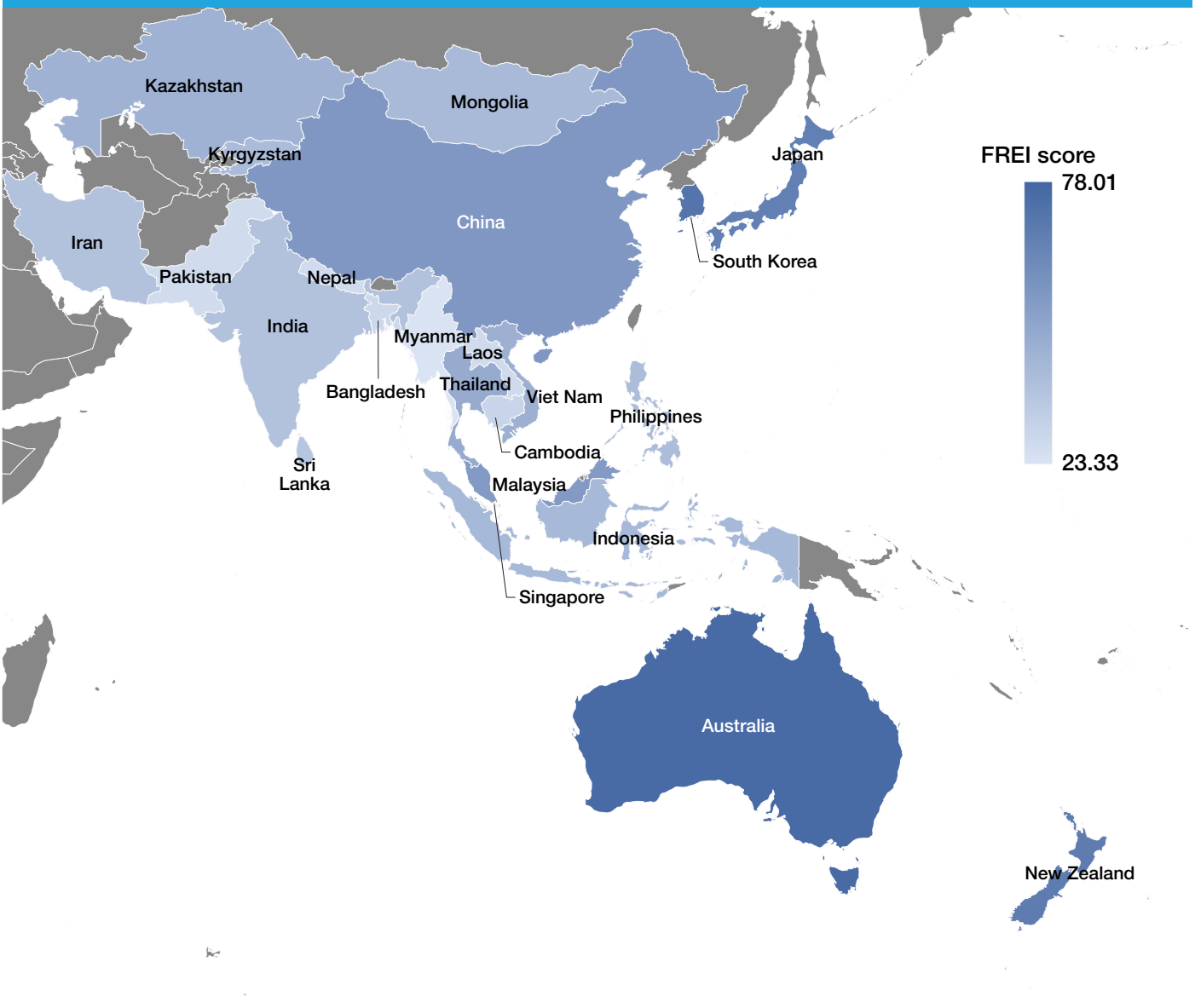
Figure 6: Overall FREI performance in Europe and Northern America



Regional results: Asia Pacific

Asia Pacific remains the most heterogeneous region in the FREI 2023, with individual country rankings going from 1st place for Singapore to 110th for Myanmar. In total, there are 23 countries in the region included in the FREI, with rankings spread throughout all quartiles. Five Asia Pacific countries are positioned in the top quartile of the FREI, four are in the second quartile, eight are in the third quartile, and six are in the bottom quartile (Figure 7).

Figure 7: Overall FREI performance in Asia Pacific



In general, Asia Pacific performs particularly well in the pillars associated with Physical Capital and Competitiveness. Above all, the region has strengths in Innovation, with nine countries making it into this sub-pillar's top quartile. As in the previous FREI edition, Human Capital is Asia Pacific's weakest pillar on average, especially when it comes to Attracting and Retaining talent.

As for digital technologies, both Digital Content Creation and Digital Policies are sub-pillars in which several Asia Pacific countries struggle the most. Again, however, there are large differences within the region as a whole. For instance, in the case of Digital Policies, Australia and Singapore are among the top-10 performers (4th and 2nd, respectively), while Laos and Nepal are firmly placed in the bottom (122nd and 123rd, respectively). Among the digital technologies sub-pillars, Asia Pacific tends to perform well in Industry 4.0, which might be connected to the region's strength in Innovation.

Regional results: Latin America and the Caribbean

Latin America and the Caribbean is the region outside Northern America that exhibits the least variation in terms of future readiness. In total, the FREI includes 18 countries from the region, ranked in the second, third and fourth quartiles, ranging from a high of 43rd position for Chile to a low of 98th position for Guatemala. Five countries are positioned in the second quartile, ten are in the third quartile, and three in the bottom quartile (Figure 8).

Figure 8: Overall FREI performance in Latin America and the Caribbean

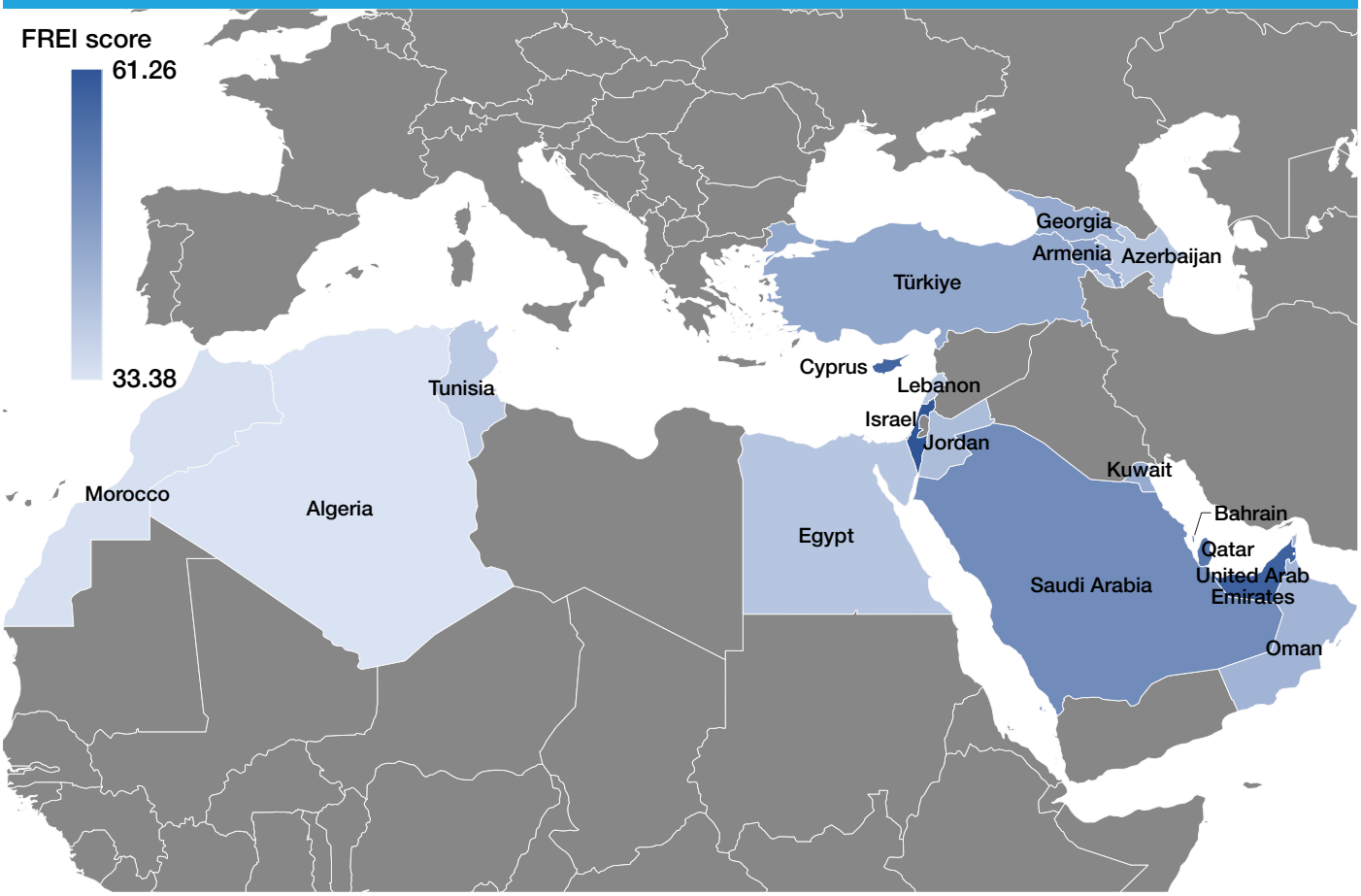
The region as a whole has clear strengths in the Human Capital pillar, in which half of the countries in the region achieve their best rankings. Above all, the ability to Attract talent is strong in many of the countries in Latin America and the Caribbean. The main challenge for the region is to improve Physical Capital, where there is a need to invest in all types of infrastructure: Digital, Transport, and Energy.

In terms of sub-pillars directly linked to digital technologies, most countries in Latin America and the Caribbean achieve their best performance in Digital Usage, Digital Content Creation, or Digital Policies. For instance, several governments in the region, notably in Brazil, Chile, and Mexico, are highly active in providing online public services. At the same time, differences among the countries appear to be particularly pronounced with respect to Digital Usage and Digital Policies. Often, the worst-performing sub-pillar in digital technologies is Industry 4.0, where eight of the countries in the region are positioned in the bottom quartile.

Regional results: The Middle East and North Africa

The Middle East and North Africa is, on average, third for future readiness behind Europe and Northern America. In total, 18 countries from the region are included in the FREI 2023, and can be found in the top three quartiles—although Algeria, ranked 93rd, only just makes it into the third quartile. In 24th place, Israel is the highest-ranked country in the region, with United Arab Emirates and Cyprus also featured in the top quartile (at 27th and 28th position respectively). Seven countries feature in the second quartile, while the remaining eight are positioned in the third quartile (Figure 9). Although treated as one region in this report, it should be noted that the future readiness of the Middle East is generally higher than that of North Africa. In fact, all four North African countries featured in the FREI are among the region's five worst-performing. At 77th, Lebanon is the only Middle Eastern country in the region's bottom five.

Figure 9: Overall FREI performance in the Middle East and North Africa



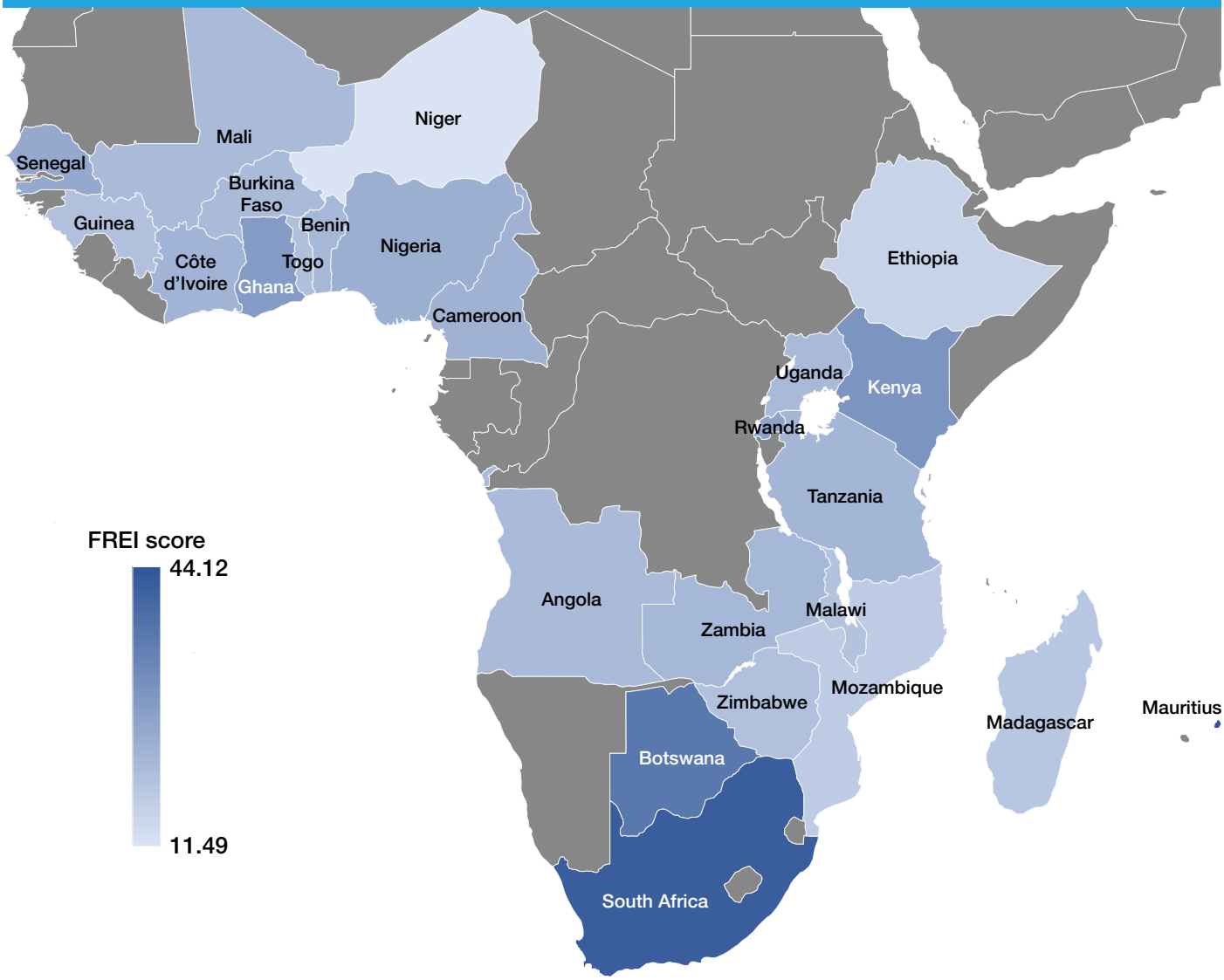
Bearing in mind the considerable variation within the region, there is a tendency for countries to perform better in pillars and sub-pillars that are more about enabling future readiness than in those that are concerned with the impact of future readiness. This means that several countries in the Middle East and North Africa do relatively well in the three sub-pillars associated with Physical Capital (Digital Infrastructure, Transport Infrastructure, and Energy Infrastructure) as well as the Market Environment sub-pillar, but are less prominent in the Industry 4.0 and Innovation sub-pillars. The main exception is the Human Capital pillar, where more countries do better in the output-related Skills sub-pillar than in the input-related sub-pillars of Attracting, Growing, and Retaining talent.

A similar observation can be made regarding digital technologies. As was pointed out in the previous FREI edition, several countries have comparative strengths relating to the access and use of digital technologies, such as Digital Infrastructure, rather than the impact of digital transformation on the generation and production of goods and services—such as Industry 4.0. As for Digital Policies, this is the sub-pillar with the largest in-region variation, with a top-10 performance by Qatar (ranked 8th) a stark contrast to Lebanon's position in the fourth quartile (ranked 118th).

Regional results: Sub-Saharan Africa

Sub-Saharan Africa remains, on average, the least future-ready region. In total, there are 25 countries from the region included in the FREI, but only one makes it into the upper half of the rankings (Mauritius at 59th position). Two Sub-Saharan African countries are in the third quartile—South Africa at 65th and Botswana at 89th—while the remaining 22 are in the fourth quartile (Figure 10).

Figure 10: Overall FREI performance in Sub-Saharan Africa



In general, the region has lacklustre showings in all four pillars. That said, it does perform slightly better in the Competitiveness pillar, which is mainly due to the relatively higher performance in the Digital Policies and Innovation sub-pillars by several countries. However, the clearest strength in the region is the ability to Attract talent, which is the highest-ranked sub-pillar in 11 countries.

The region's relative strengths shown in the Digital Policies sub-pillar can be partly attributed to fairly solid ICT Regulation and Cybersecurity in several countries, such as Nigeria, Rwanda, and South Africa. Another sub-pillar linked to digital technologies in which the region performs comparatively well is Industry 4.0, which is almost certainly linked to the entrepreneurial spirit found in some countries. The key challenge for Sub-Saharan Africa, meanwhile, is to improve Digital Infrastructure in order to raise access to and affordability of the internet. For example, less than a handful of countries in the region meet the affordability target for mobile and fixed broadband data, which states that the cost of a basket of services should not exceed two percent of gross national income per capita. Strengthening Digital Infrastructure would, in turn, increase Digital Usage and Digital Content Creation, which also tend to be at very low levels in the region.

Conclusion

Future readiness is a critical determinant of a country's ability to navigate the challenges and seize the opportunities of the rapidly evolving global landscape. In an era where digital technologies are reshaping industries and societies, embracing digital transformation is no longer an option but a necessity. Countries that prioritise future readiness and proactively embrace digital transformation are better positioned to drive innovation, enhance competitiveness, and achieve sustainable growth.

No wonder, then, that UN Member States have highlighted the transformative potential of digital technologies as one of the key issues of our times. For this reason, country representatives and other stakeholders will meet in September 2024 in an effort to improve digital cooperation through the creation of a Global Digital Compact. Although the precise content of these deliberations is yet to be decided, it is likely to cover the following three objectives:*

- Closing the digital divide and advancing the Sustainable Development Goals
- Making the online space safe and open for everyone
- Governing artificial intelligence (AI) for humanity

The results and analysis discussed in this report give rise to several recommendations to support the achievement of these objectives:

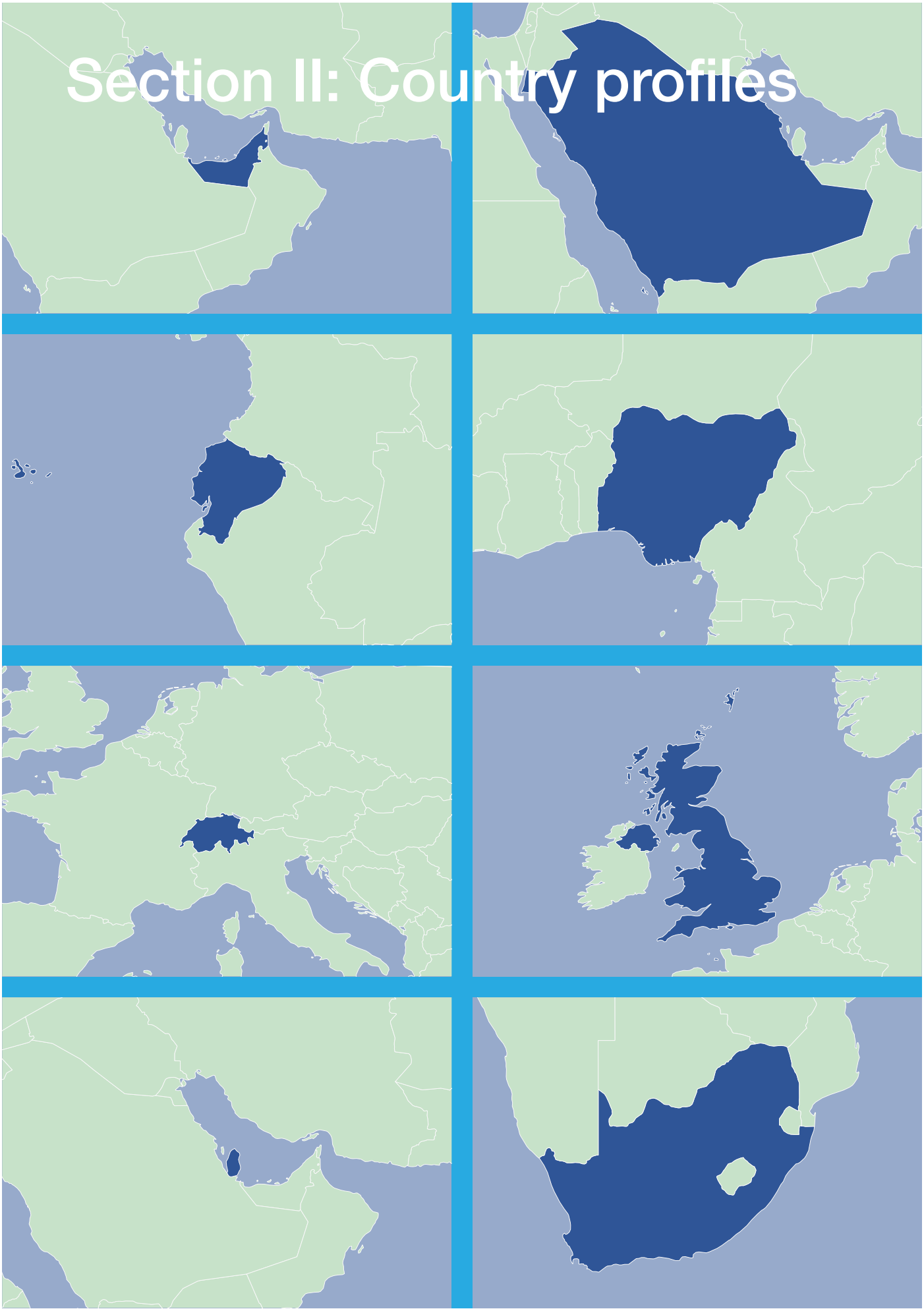
First, the fact that the most future-ready countries perform well across the various dimensions of the Index underlines the importance of a holistic approach towards digital transformation. Countries should not have an undue focus on a few particular areas at the expense of the development of other areas. More specifically, countries need to adopt measures that range from ensuring affordable digital access for all to facilitating the use and development of emerging technologies such as AI, cloud computing, and Internet of Things (IoT).

Second, in the case of digital governance, analysis shows that the most advanced policies are found in a diverse range of countries. Consider the top-10 countries in the Digital Policies sub-pillar, which includes countries like Australia, Brazil, Canada, Estonia, Qatar, Singapore, and the United Kingdom. They cover economies of various sizes, from different regions, and very different income levels. This suggests that countries have considerable policy space to implement a digital policy framework that encourages innovation, safeguards privacy and security, and promotes fair competition, as well as building trust in the digital ecosystem. Drawing on the first recommendation, it is important that such a framework is wide-ranging in the issues it addresses.

Third, as acknowledged by the UN Member States, some of the existing and future challenges of digital technologies are best tackled at the global level. The widely reported transformative impact that AI might have on humanity, for instance, can only be addressed effectively by countries that work in concert to develop and harmonise appropriate standards. The mapping of national digital regulatory frameworks as attempted in this year's Index, which complements efforts by the International Telecommunication Union (ITU) and others, is one contribution to the necessary multilateralism for digital technologies.

* United Nations (May 2023).

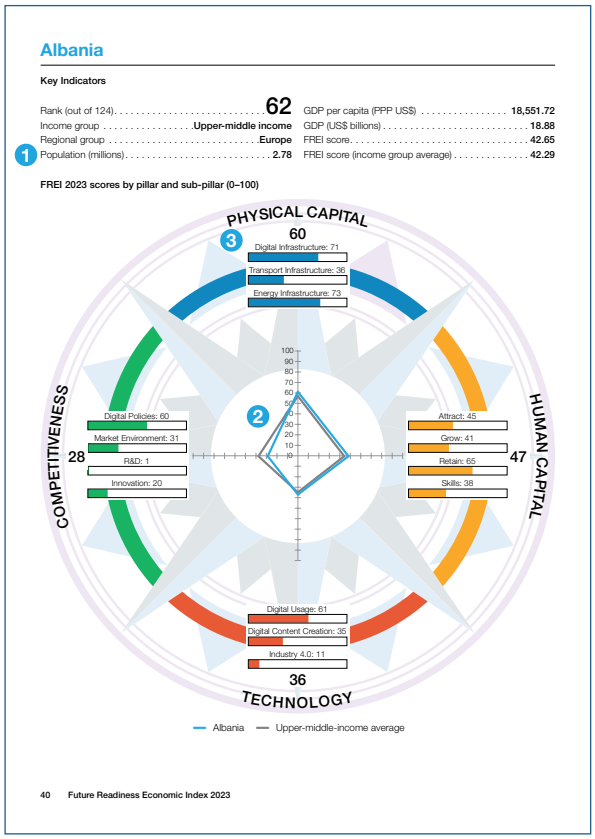
Section II: Country profiles



How to read the country profiles

The country profiles provide more granular information on how each of the 124 countries performs in the various areas covered by 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.



The first page includes three specific parts:

1. Key indicators
2. Radar chart
3. Bar charts

1. Each country profile begins with a summary of key indicators. More specifically, a country's FREI rank (out of 124) 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 are also depicted with progress bar charts.

The results on the second page detail a country's normalised scores and ranks across all pillars, sub-pillars, and indicators. 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 72 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 Methodology of the Future Readiness Economic Index and Sources and definitions, respectively.

* The income group is based on the World Bank's Income Group Classification as of July 2022, whereas the regional affiliation is primarily based on the United Nations' sub-regional groups.

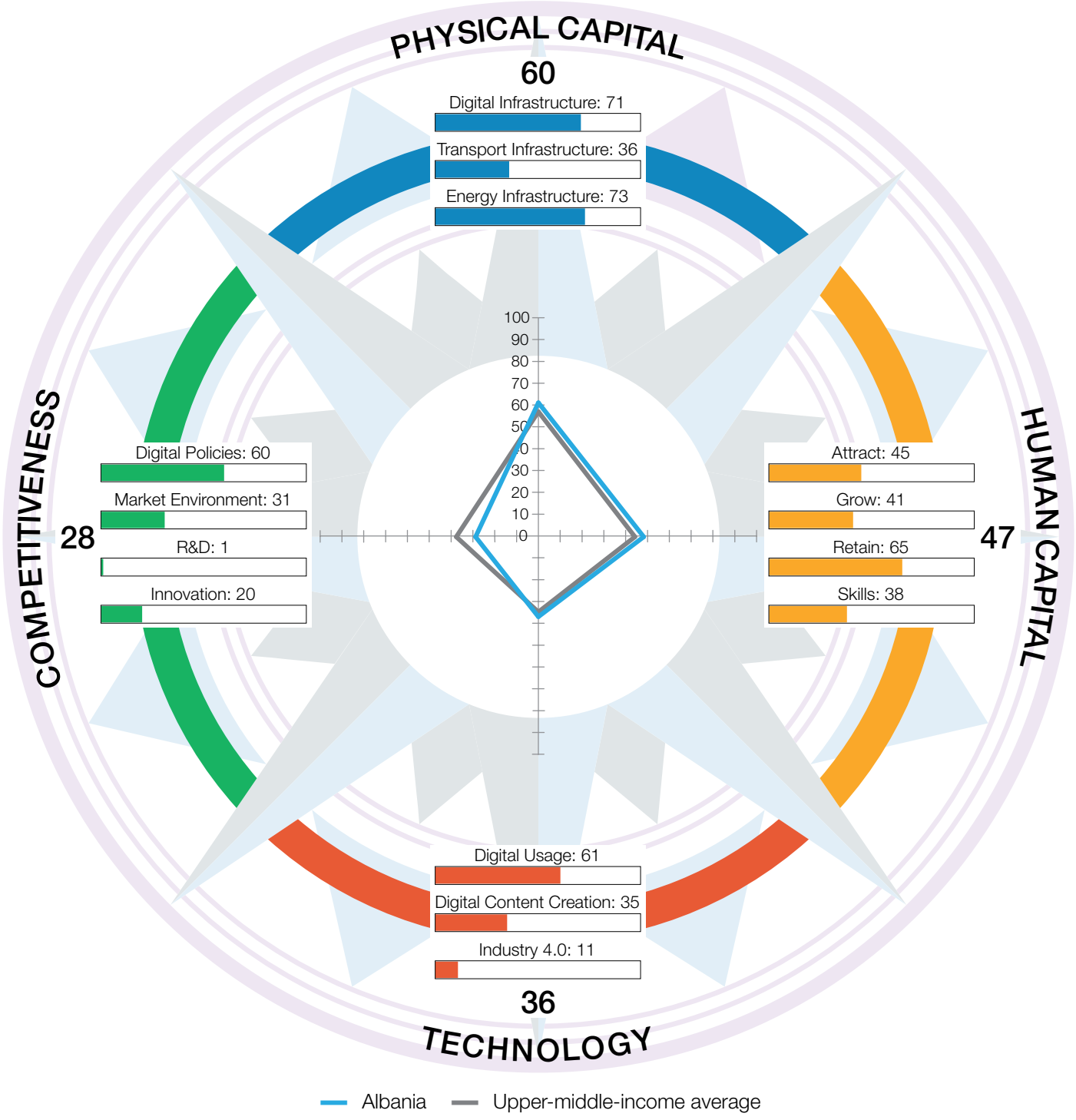
Index of countries

Albania

Key Indicators

Rank (out of 124)	**62**	GDP per capita (PPP US$)	**18,551.72**
Income group	**Upper-middle income**	GDP (US$ billions)	**18.88**
Regional group	**Europe**	FREI score	**42.65**
Population (millions)	**2.78**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**59.87**	**53**
1.1	Digital Infrastructure	70.84	61
1.1.1	Internet access	88.06	38
1.1.2	International internet bandwidth	47.81	50
1.1.3	Fixed-broadband subscriptions	82.56	67
1.1.4	4G-mobile network coverage	98.82	48
1.1.5	Fixed broadband affordability	86.34	42
1.1.6	Mobile broadband affordability	83.16	87
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	35.99	53
1.2.1	Quality of infrastructure	32.14	70
1.2.2	Rural access	84.73	37
1.2.3	Air connectivity	6.78	64
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	72.79	49
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	88.72	62
1.3.4	Energy intensity	92.78	13
2	**HUMAN CAPITAL**	**47.02**	**55**
2.1	Attract	45.11	58
2.1.1	Brain gain	38.78	82
2.1.2	International students	4.36	78
2.1.3	Tolerance of minorities	62.77	36
2.1.4	Tolerance of immigrants	40.00	95
2.1.5	Gender parity in high-skilled jobs	79.62	46
2.2	Grow	40.54	67
2.2.1	Tertiary enrolment	37.00	57
2.2.2	Reading, maths, and science	34.98	53
2.2.3	Use of virtual professional networks	24.80	53
2.2.4	Youth inclusion	65.38	91
2.3	Retain	64.86	53
2.3.1	Pension coverage	n/a	n/a
2.3.2	Environmental performance	47.80	47
2.3.3	Physician density	29.47	75
2.3.4	Sanitation	99.23	26
2.3.5	Personal safety	82.93	31
2.4	Skills	37.57	44
2.4.1	Workforce with tertiary education	26.34	68
2.4.2	High-skilled workforce	24.84	73
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	80.94	8
2.4.5	Digital skills	18.16	51

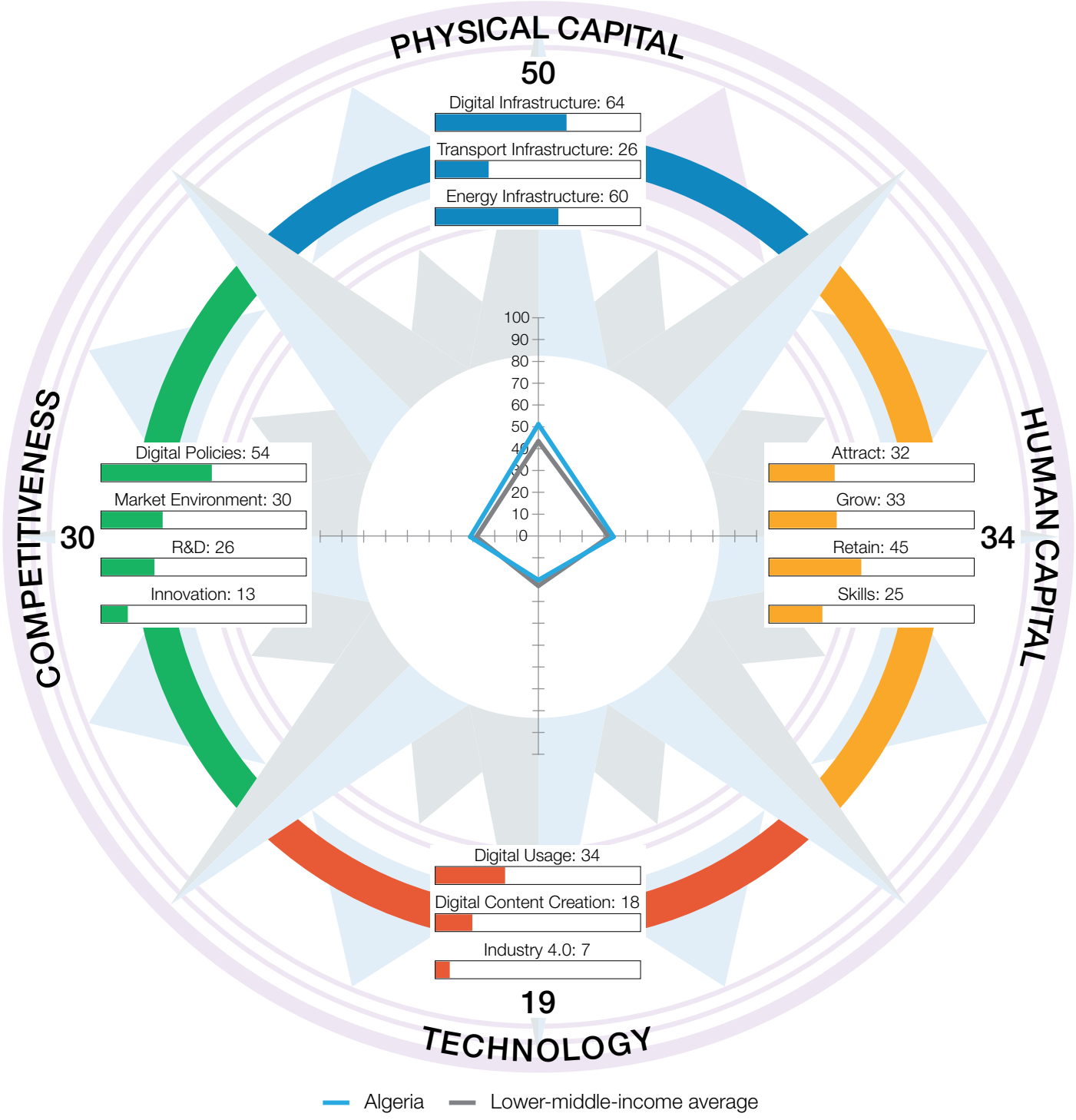
		Score	Rank
3	**TECHNOLOGY**	**35.66**	**56**
3.1	Digital Usage	61.00	57
3.1.1	Internet users	77.98	60
3.1.2	Active mobile-broadband subscriptions	28.18	85
3.1.3	Gender parity in internet usage	95.78	54
3.1.4	Firms with website	56.24	51
3.1.5	Internet shopping	19.36	69
3.1.6	Government online services	76.03	33
3.1.7	E-Participation	73.42	22
3.2	Digital Content Creation	35.40	56
3.2.1	Software development	4.61	57
3.2.2	Wikipedia edits	57.44	52
3.2.3	Internet domain registrations	4.44	53
3.2.4	Mobile apps development	75.13	63
3.3	Industry 4.0	10.58	69
3.3.1	Cloud computing	—	—
3.3.2	AI software development	2.75	96
3.3.3	AI research	4.04	73
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**28.04**	**93**
4.1	Digital Policies	60.38	73
4.1.1	ICT regulation	85.14	45
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	30.62	75
4.2.1	Extent of market dominance	35.26	75
4.2.2	Labour productivity per employee	22.25	70
4.2.3	Urbanisation	52.52	70
4.2.4	Domestic credit to private sector	12.43	84
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	1.08	114
4.3.1	R&D spending	n/a	n/a
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	n/a	n/a
4.3.4	Scientific journal articles	2.16	90
4.4	Innovation	20.08	95
4.4.1	Medium- and high-tech industry	4.87	111
4.4.2	High-tech exports	0.29	121
4.4.3	Venture capital recipients, deals	8.44	50
4.4.4	New product entrepreneurial activity	54.57	37
4.4.5	New business density	6.14	63
4.4.6	Patent applications	46.17	70

Algeria

Key Indicators

Rank (out of 124)	**93**	GDP per capita (PPP US$)	**13,209.60**
Income group	**Lower-middle income**	GDP (US$ billions)	**191.91**
Regional group	**Middle East and North Africa**	FREI score	**33.38**
Population (millions)	**44.90**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**50.25**	**85**
1.1	Digital Infrastructure	64.14	79
1.1.1	Internet access	73.88	70
1.1.2	International internet bandwidth	36.56	95
1.1.3	Fixed-broadband subscriptions	98.33	20
1.1.4	4G-mobile network coverage	78.38	97
1.1.5	Fixed broadband affordability	67.80	84
1.1.6	Mobile broadband affordability	94.05	54
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	26.20	83
1.2.1	Quality of infrastructure	10.71	115
1.2.2	Rural access	69.21	60
1.2.3	Air connectivity	1.92	91
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	60.42	95
1.3.1	Access to electricity	99.75	82
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	75.14	93
2	**HUMAN CAPITAL**	**33.56**	**90**
2.1	Attract	31.51	114
2.1.1	Brain gain	28.02	97
2.1.2	International students	1.52	92
2.1.3	Tolerance of minorities	29.79	83
2.1.4	Tolerance of immigrants	38.46	96
2.1.5	Gender parity in high-skilled jobs	59.77	87
2.2	Grow	32.61	85
2.2.1	Tertiary enrolment	35.01	62
2.2.2	Reading, maths, and science	11.28	74
2.2.3	Use of virtual professional networks	11.33	84
2.2.4	Youth inclusion	72.82	75
2.3	Retain	45.31	87
2.3.1	Pension coverage	n/a	n/a
2.3.2	Environmental performance	18.14	106
2.3.3	Physician density	27.06	76
2.3.4	Sanitation	84.59	83
2.3.5	Personal safety	51.45	83
2.4	Skills	24.80	72
2.4.1	Workforce with tertiary education	22.66	77
2.4.2	High-skilled workforce	24.03	75
2.4.3	Researchers	9.26	54
2.4.4	Relevance of education system to the economy	33.57	80
2.4.5	Digital skills	34.49	27

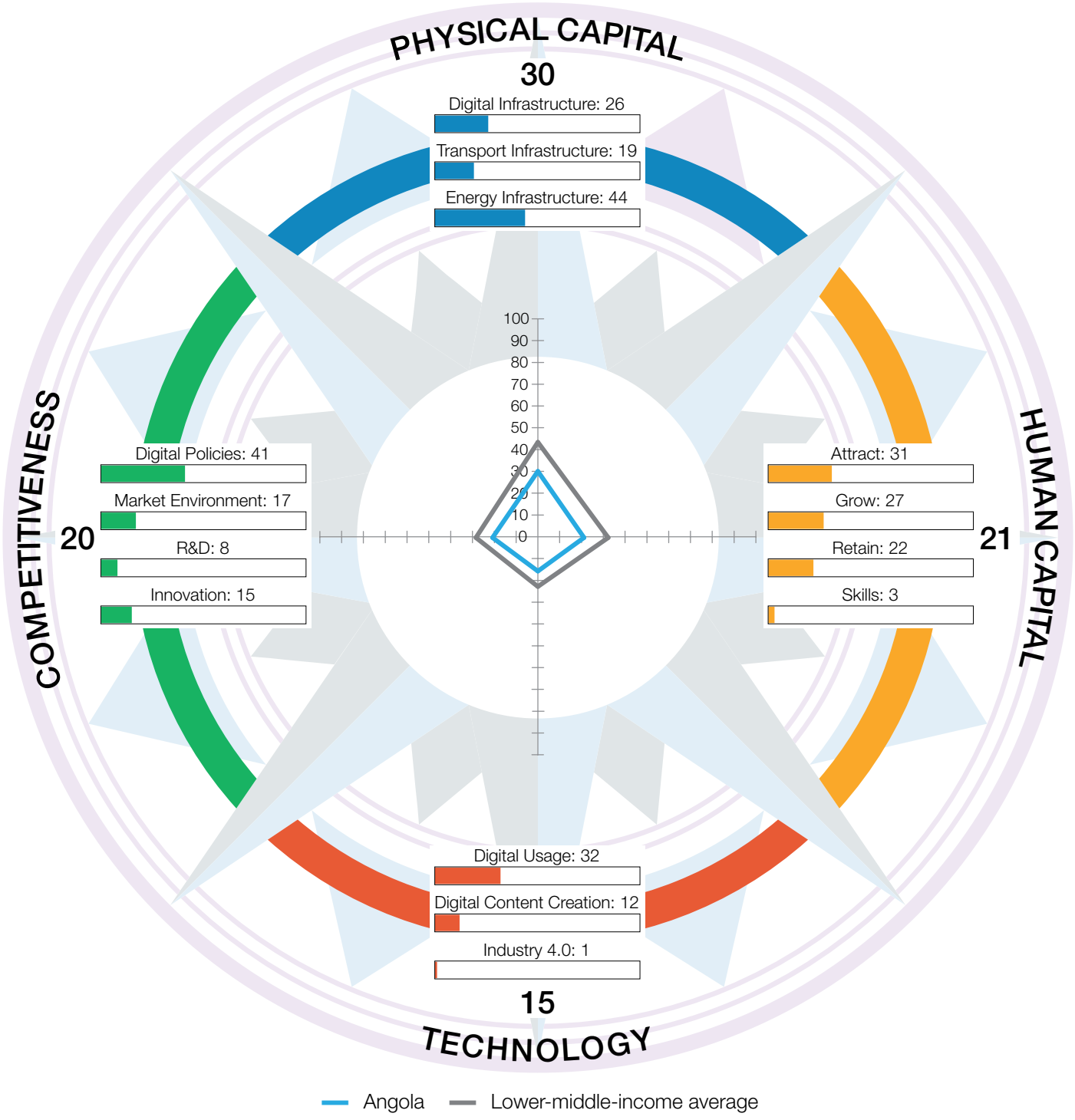
		Score	Rank
3	**TECHNOLOGY**	**19.31**	**99**
3.1	Digital Usage	33.54	96
3.1.1	Internet users	60.49	89
3.1.2	Active mobile-broadband subscriptions	39.03	48
3.1.3	Gender parity in internet usage	61.56	95
3.1.4	Firms with website	n/a	n/a
3.1.5	Internet shopping	8.78	95
3.1.6	Government online services	17.49	114
3.1.7	E-Participation	13.92	116
3.2	Digital Content Creation	17.87	105
3.2.1	Software development	1.92	82
3.2.2	Wikipedia edits	27.64	97
3.2.3	Internet domain registrations	0.23	104
3.2.4	Mobile apps development	41.69	109
3.3	Industry 4.0	6.51	100
3.3.1	Cloud computing	—	—
3.3.2	AI software development	5.19	84
3.3.3	AI research	5.42	62
3.3.4	ICT patent applications	0.08	72
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**30.40**	**84**
4.1	Digital Policies	53.64	86
4.1.1	ICT regulation	58.78	105
4.1.2	Cybersecurity	0.00	106
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	29.79	76
4.2.1	Extent of market dominance	49.41	45
4.2.2	Labour productivity per employee	25.89	63
4.2.3	Urbanisation	67.25	48
4.2.4	Domestic credit to private sector	6.38	104
4.2.5	Market capitalisation	0.00	76
4.3	R&D	25.66	71
4.3.1	R&D spending	9.76	57
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	88.00	16
4.3.4	Scientific journal articles	4.85	75
4.4	Innovation	12.52	121
4.4.1	Medium- and high-tech industry	2.97	116
4.4.2	High-tech exports	1.34	112
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	1.29	94
4.4.6	Patent applications	44.49	77

Angola

Key Indicators

Rank (out of 124)	**115**	GDP per capita (PPP US$)	**6,973.70**
Income group	**Lower-middle income**	GDP (US$ billions)	**106.71**
Regional group	**Sub-Saharan Africa**	FREI score	**21.38**
Population (millions)	**35.59**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**29.66**	**111**
1.1	Digital Infrastructure	26.36	115
1.1.1	Internet access	4.66	111
1.1.2	International internet bandwidth	18.50	117
1.1.3	Fixed-broadband subscriptions	17.19	107
1.1.4	4G-mobile network coverage	27.96	117
1.1.5	Fixed broadband affordability	44.98	107
1.1.6	Mobile broadband affordability	71.26	103
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	18.59	98
1.2.1	Quality of infrastructure	10.71	115
1.2.2	Rural access	28.47	109
1.2.3	Air connectivity	0.43	109
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	44.04	110
1.3.1	Access to electricity	39.66	114
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	91.02	24
2	**HUMAN CAPITAL**	**20.61**	**120**
2.1	Attract	31.03	115
2.1.1	Brain gain	44.54	70
2.1.2	International students	n/a	n/a
2.1.3	Tolerance of minorities	13.83	109
2.1.4	Tolerance of immigrants	46.15	85
2.1.5	Gender parity in high-skilled jobs	19.60	114
2.2	Grow	27.08	106
2.2.1	Tertiary enrolment	6.16	105
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	3.40	109
2.2.4	Youth inclusion	71.69	78
2.3	Retain	21.61	107
2.3.1	Pension coverage	12.76	100
2.3.2	Environmental performance	19.66	103
2.3.3	Physician density	2.81	107
2.3.4	Sanitation	46.93	105
2.3.5	Personal safety	25.88	115
2.4	Skills	2.72	123
2.4.1	Workforce with tertiary education	3.83	114
2.4.2	High-skilled workforce	7.01	105
2.4.3	Researchers	0.06	100
2.4.4	Relevance of education system to the economy	0.00	121
2.4.5	Digital skills	n/a	n/a

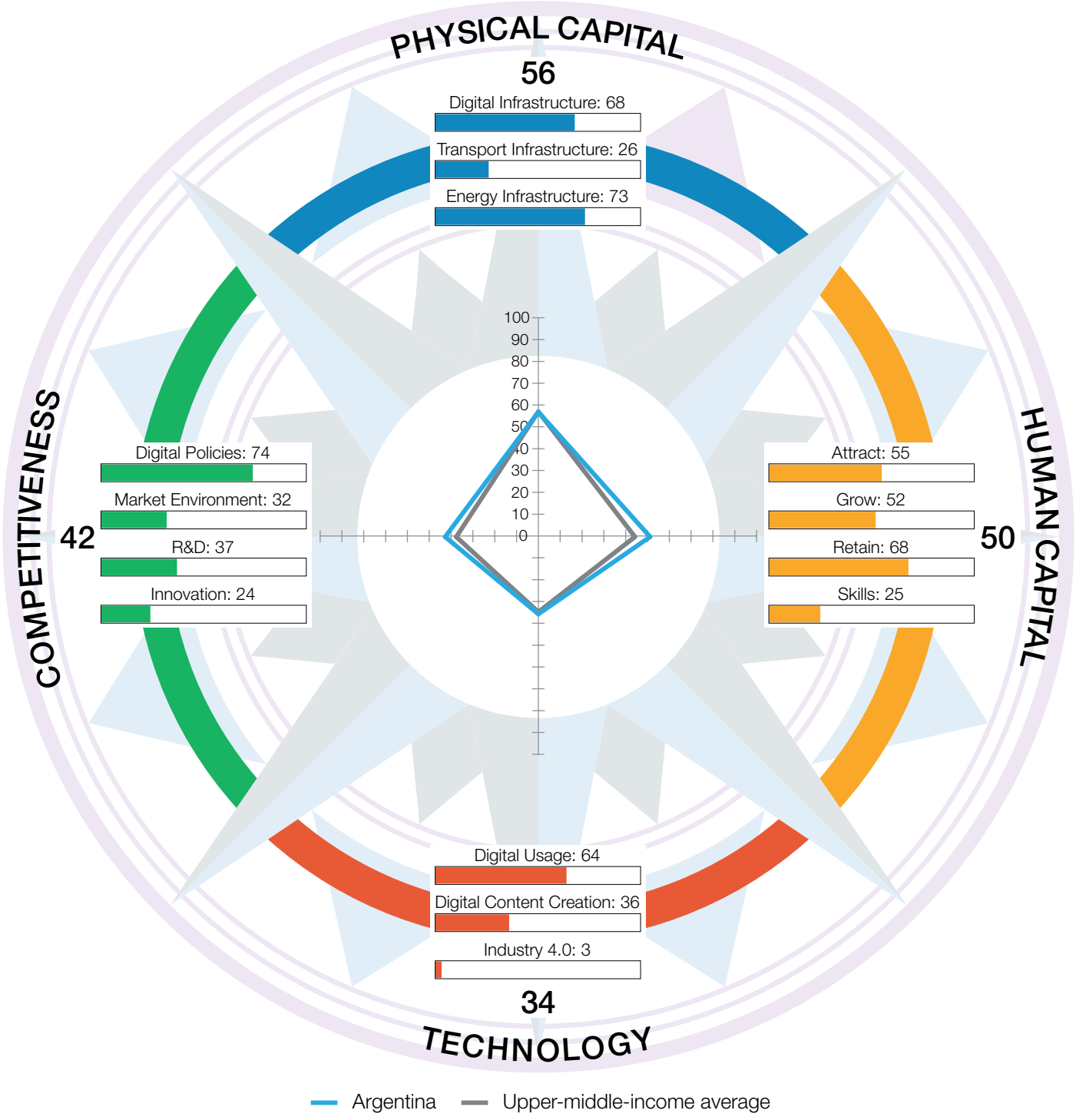
		Score	Rank
3	**TECHNOLOGY**	**14.98**	**112**
3.1	Digital Usage	31.89	98
3.1.1	Internet users	31.84	103
3.1.2	Active mobile-broadband subscriptions	6.61	118
3.1.3	Gender parity in internet usage	83.09	87
3.1.4	Firms with website	n/a	n/a
3.1.5	Internet shopping	n/a	n/a
3.1.6	Government online services	30.32	101
3.1.7	E-Participation	7.60	122
3.2	Digital Content Creation	12.16	118
3.2.1	Software development	0.19	114
3.2.2	Wikipedia edits	15.25	117
3.2.3	Internet domain registrations	0.00	121
3.2.4	Mobile apps development	33.19	118
3.3	Industry 4.0	0.87	123
3.3.1	Cloud computing	—	—
3.3.2	AI software development	0.52	114
3.3.3	AI research	0.00	120
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**20.26**	**113**
4.1	Digital Policies	40.74	104
4.1.1	ICT regulation	68.51	87
4.1.2	Cybersecurity	0.00	106
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	16.70	109
4.2.1	Extent of market dominance	0.00	121
4.2.2	Labour productivity per employee	7.93	94
4.2.3	Urbanisation	58.74	63
4.2.4	Domestic credit to private sector	0.14	120
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	8.35	104
4.3.1	R&D spending	0.37	104
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	33.04	85
4.3.4	Scientific journal articles	0.00	124
4.4	Innovation	15.24	112
4.4.1	Medium- and high-tech industry	3.80	114
4.4.2	High-tech exports	41.91	12
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	n/a	n/a
4.4.6	Patent applications	0.00	122

Argentina

Key Indicators

Rank (out of 124)	**52**	GDP per capita (PPP US$)	**26,504.59**
Income group	**Upper-middle income**	GDP (US$ billions)	**632.77**
Regional group	**Latin America and the Caribbean**	FREI score	**45.42**
Population (millions)	**46.23**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**55.72**	**67**
1.1	Digital Infrastructure	67.92	65
1.1.1	Internet access	90.26	34
1.1.2	International internet bandwidth	39.41	87
1.1.3	Fixed-broadband subscriptions	73.11	76
1.1.4	4G-mobile network coverage	97.51	63
1.1.5	Fixed broadband affordability	67.28	86
1.1.6	Mobile broadband affordability	89.71	73
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	26.30	82
1.2.1	Quality of infrastructure	35.71	63
1.2.2	Rural access	45.88	91
1.2.3	Air connectivity	3.51	85
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	72.93	48
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	93.98	47
1.3.4	Energy intensity	86.42	49
2	**HUMAN CAPITAL**	**49.87**	**45**
2.1	Attract	54.66	35
2.1.1	Brain gain	25.59	104
2.1.2	International students	9.23	58
2.1.3	Tolerance of minorities	65.96	30
2.1.4	Tolerance of immigrants	83.08	20
2.1.5	Gender parity in high-skilled jobs	89.43	24
2.2	Grow	51.79	44
2.2.1	Tertiary enrolment	65.40	5
2.2.2	Reading, maths, and science	24.86	66
2.2.3	Use of virtual professional networks	36.69	34
2.2.4	Youth inclusion	80.19	55
2.3	Retain	67.87	49
2.3.1	Pension coverage	89.59	52
2.3.2	Environmental performance	37.63	64
2.3.3	Physician density	61.56	26
2.3.4	Sanitation	94.97	60
2.3.5	Personal safety	55.60	76
2.4	Skills	25.17	69
2.4.1	Workforce with tertiary education	30.17	56
2.4.2	High-skilled workforce	36.24	51
2.4.3	Researchers	14.06	48
2.4.4	Relevance of education system to the economy	20.22	99
2.4.5	Digital skills	n/a	n/a

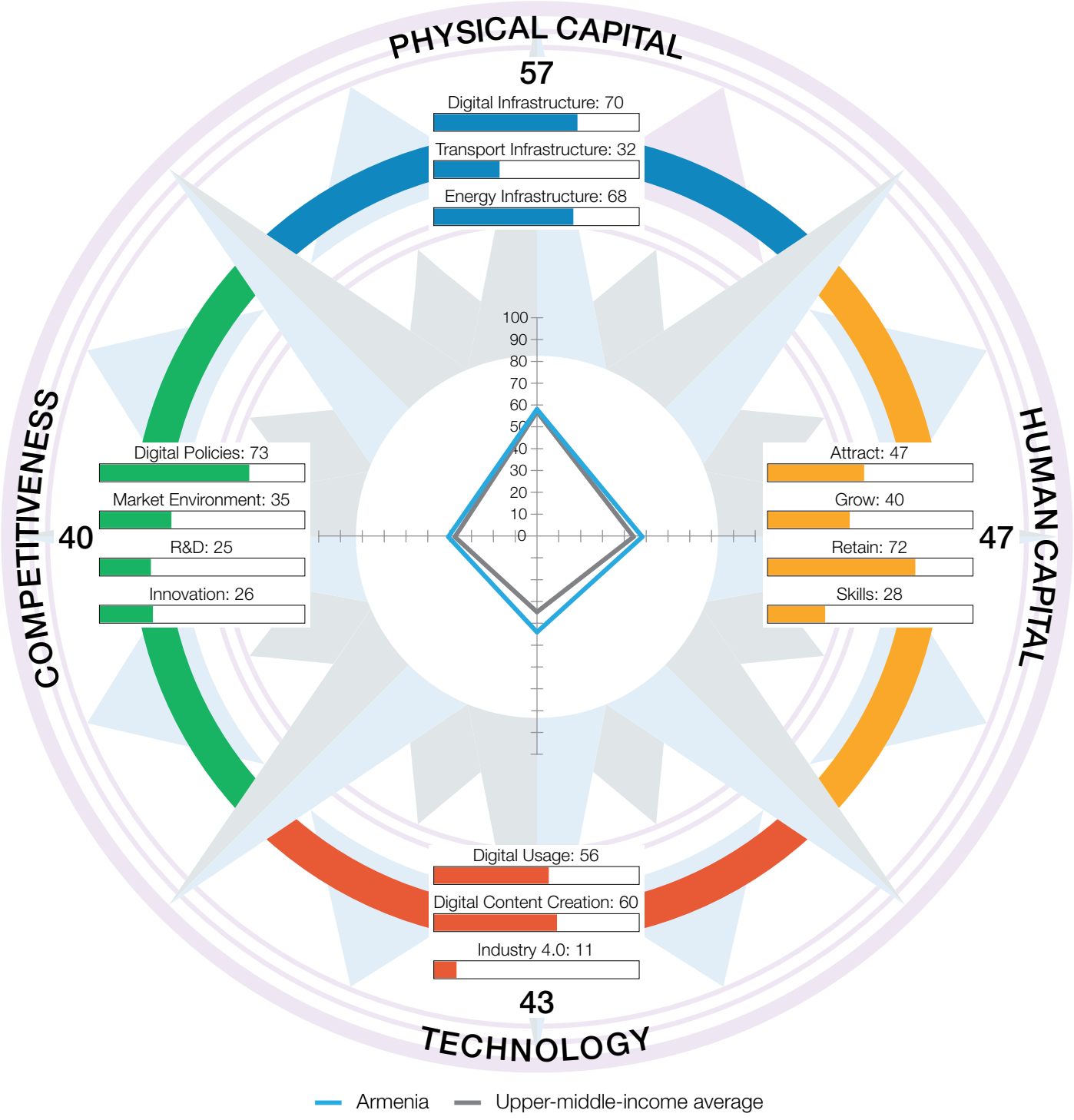
		Score	Rank
3	**TECHNOLOGY**	**34.45**	**60**
3.1	Digital Usage	64.19	53
3.1.1	Internet users	86.31	41
3.1.2	Active mobile-broadband subscriptions	26.85	89
3.1.3	Gender parity in internet usage	96.14	47
3.1.4	Firms with website	67.71	36
3.1.5	Internet shopping	36.76	53
3.1.6	Government online services	74.80	38
3.1.7	E-Participation	60.76	51
3.2	Digital Content Creation	36.08	54
3.2.1	Software development	6.61	50
3.2.2	Wikipedia edits	56.30	53
3.2.3	Internet domain registrations	3.60	58
3.2.4	Mobile apps development	77.82	53
3.3	Industry 4.0	3.09	118
3.3.1	Cloud computing	—	—
3.3.2	AI software development	9.91	60
3.3.3	AI research	2.43	84
3.3.4	ICT patent applications	0.10	70
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**41.62**	**51**
4.1	Digital Policies	73.99	44
4.1.1	ICT regulation	80.41	72
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	31.52	71
4.2.1	Extent of market dominance	33.40	81
4.2.2	Labour productivity per employee	27.57	62
4.2.3	Urbanisation	90.27	9
4.2.4	Domestic credit to private sector	3.74	109
4.2.5	Market capitalisation	2.60	71
4.3	R&D	36.90	37
4.3.1	R&D spending	9.59	58
4.3.2	University ranking	44.38	28
4.3.3	Gender parity in R&D	85.63	22
4.3.4	Scientific journal articles	7.98	61
4.4	Innovation	24.08	77
4.4.1	Medium- and high-tech industry	30.56	60
4.4.2	High-tech exports	6.74	83
4.4.3	Venture capital recipients, deals	1.46	85
4.4.4	New product entrepreneurial activity	63.84	25
4.4.5	New business density	0.65	100
4.4.6	Patent applications	41.23	82

Armenia

Key Indicators

Rank (out of 124)	**49**	GDP per capita (PPP US$)	**18,941.53**
Income group	**Upper-middle income**	GDP (US$ billions)	**19.50**
Regional group	**Middle East and North Africa**	FREI score	**46.50**
Population (millions)	**2.78**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**56.93**	**63**
1.1	Digital Infrastructure	70.43	62
1.1.1	Internet access	86.99	44
1.1.2	International internet bandwidth	60.95	16
1.1.3	Fixed-broadband subscriptions	70.55	79
1.1.4	4G-mobile network coverage	100.00	1
1.1.5	Fixed broadband affordability	72.82	75
1.1.6	Mobile broadband affordability	92.60	61
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	32.19	65
1.2.1	Quality of infrastructure	28.57	78
1.2.2	Rural access	87.05	35
1.2.3	Air connectivity	7.68	61
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	68.16	77
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	81.20	69
1.3.4	Energy intensity	83.02	69
2	**HUMAN CAPITAL**	**46.99**	**56**
2.1	Attract	46.96	50
2.1.1	Brain gain	40.03	78
2.1.2	International students	15.62	43
2.1.3	Tolerance of minorities	43.62	58
2.1.4	Tolerance of immigrants	56.92	69
2.1.5	Gender parity in high-skilled jobs	78.59	49
2.2	Grow	40.42	68
2.2.1	Tertiary enrolment	36.13	58
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	16.19	74
2.2.4	Youth inclusion	68.94	84
2.3	Retain	72.21	42
2.3.1	Pension coverage	64.49	66
2.3.2	Environmental performance	49.83	44
2.3.3	Physician density	71.93	12
2.3.4	Sanitation	93.34	63
2.3.5	Personal safety	81.44	36
2.4	Skills	28.39	62
2.4.1	Workforce with tertiary education	35.83	45
2.4.2	High-skilled workforce	25.37	72
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	23.99	91
2.4.5	Digital skills	n/a	n/a

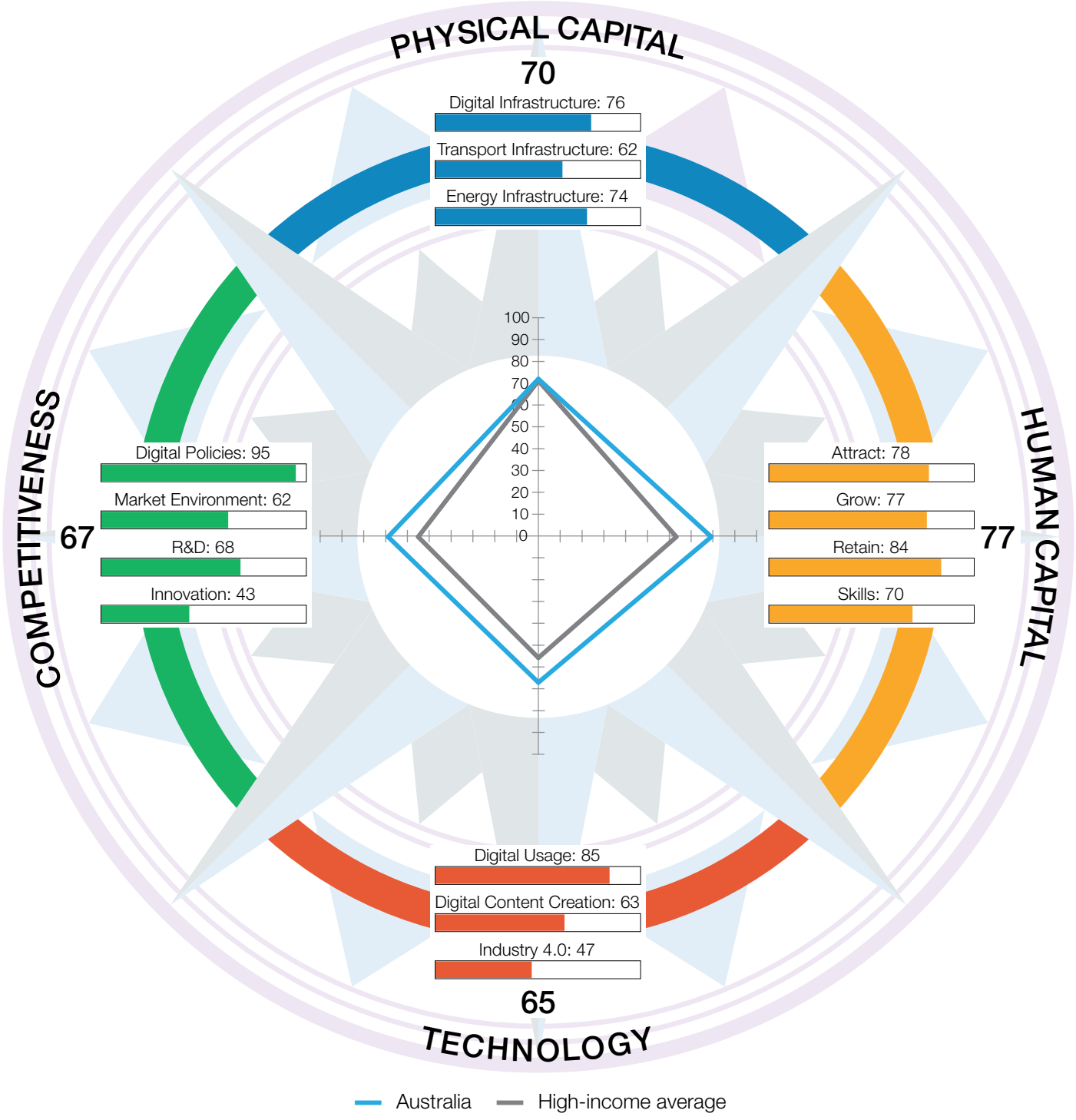
		Score	Rank
3	**TECHNOLOGY**	**42.53**	**40**
3.1	Digital Usage	56.19	67
3.1.1	Internet users	74.98	65
3.1.2	Active mobile-broadband subscriptions	38.28	51
3.1.3	Gender parity in internet usage	92.67	67
3.1.4	Firms with website	53.46	55
3.1.5	Internet shopping	17.42	75
3.1.6	Government online services	63.35	62
3.1.7	E-Participation	53.16	63
3.2	Digital Content Creation	60.47	20
3.2.1	Software development	7.78	48
3.2.2	Wikipedia edits	94.22	2
3.2.3	Internet domain registrations	n/a	n/a
3.2.4	Mobile apps development	79.42	50
3.3	Industry 4.0	10.93	67
3.3.1	Cloud computing	—	—
3.3.2	AI software development	12.85	52
3.3.3	AI research	4.62	68
3.3.4	ICT patent applications	0.15	64
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**39.57**	**57**
4.1	Digital Policies	72.78	49
4.1.1	ICT regulation	84.46	53
4.1.2	Cybersecurity	75.00	44
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	35.20	60
4.2.1	Extent of market dominance	39.54	61
4.2.2	Labour productivity per employee	24.02	69
4.2.3	Urbanisation	55.91	67
4.2.4	Domestic credit to private sector	21.34	61
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	24.69	73
4.3.1	R&D spending	3.61	83
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	87.19	17
4.3.4	Scientific journal articles	7.95	62
4.4	Innovation	25.59	70
4.4.1	Medium- and high-tech industry	9.72	103
4.4.2	High-tech exports	9.13	70
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	45.69	51
4.4.5	New business density	11.65	42
4.4.6	Patent applications	51.78	56

Australia

Key Indicators

Rank (out of 124)	**10**	GDP per capita (PPP US$)	**62,625.36**
Income group	**High income**	GDP (US$ billions)	**1,675.42**
Regional group	**Asia and Pacific**	FREI score	**69.94**
Population (millions)	**25.98**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**70.46**	**23**
1.1	Digital Infrastructure	75.89	48
1.1.1	Internet access	85.87	49
1.1.2	International internet bandwidth	44.76	66
1.1.3	Fixed-broadband subscriptions	94.63	39
1.1.4	4G-mobile network coverage	99.46	34
1.1.5	Fixed broadband affordability	88.83	32
1.1.6	Mobile broadband affordability	99.49	3
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	61.70	12
1.2.1	Quality of infrastructure	82.14	9
1.2.2	Rural access	81.00	41
1.2.3	Air connectivity	49.74	14
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	73.79	42
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	80.78	78
2	**HUMAN CAPITAL**	**77.21**	**1**
2.1	Attract	77.66	2
2.1.1	Brain gain	73.58	17
2.1.2	International students	69.16	5
2.1.3	Tolerance of minorities	69.15	23
2.1.4	Tolerance of immigrants	93.85	6
2.1.5	Gender parity in high-skilled jobs	82.57	41
2.2	Grow	77.45	3
2.2.1	Tertiary enrolment	75.45	3
2.2.2	Reading, maths, and science	67.32	19
2.2.3	Use of virtual professional networks	75.88	7
2.2.4	Youth inclusion	91.15	20
2.3	Retain	84.22	16
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	69.83	17
2.3.3	Physician density	64.85	22
2.3.4	Sanitation	99.99	9
2.3.5	Personal safety	86.44	24
2.4	Skills	69.52	5
2.4.1	Workforce with tertiary education	56.87	14
2.4.2	High-skilled workforce	79.22	8
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	72.46	18
2.4.5	Digital skills	n/a	n/a

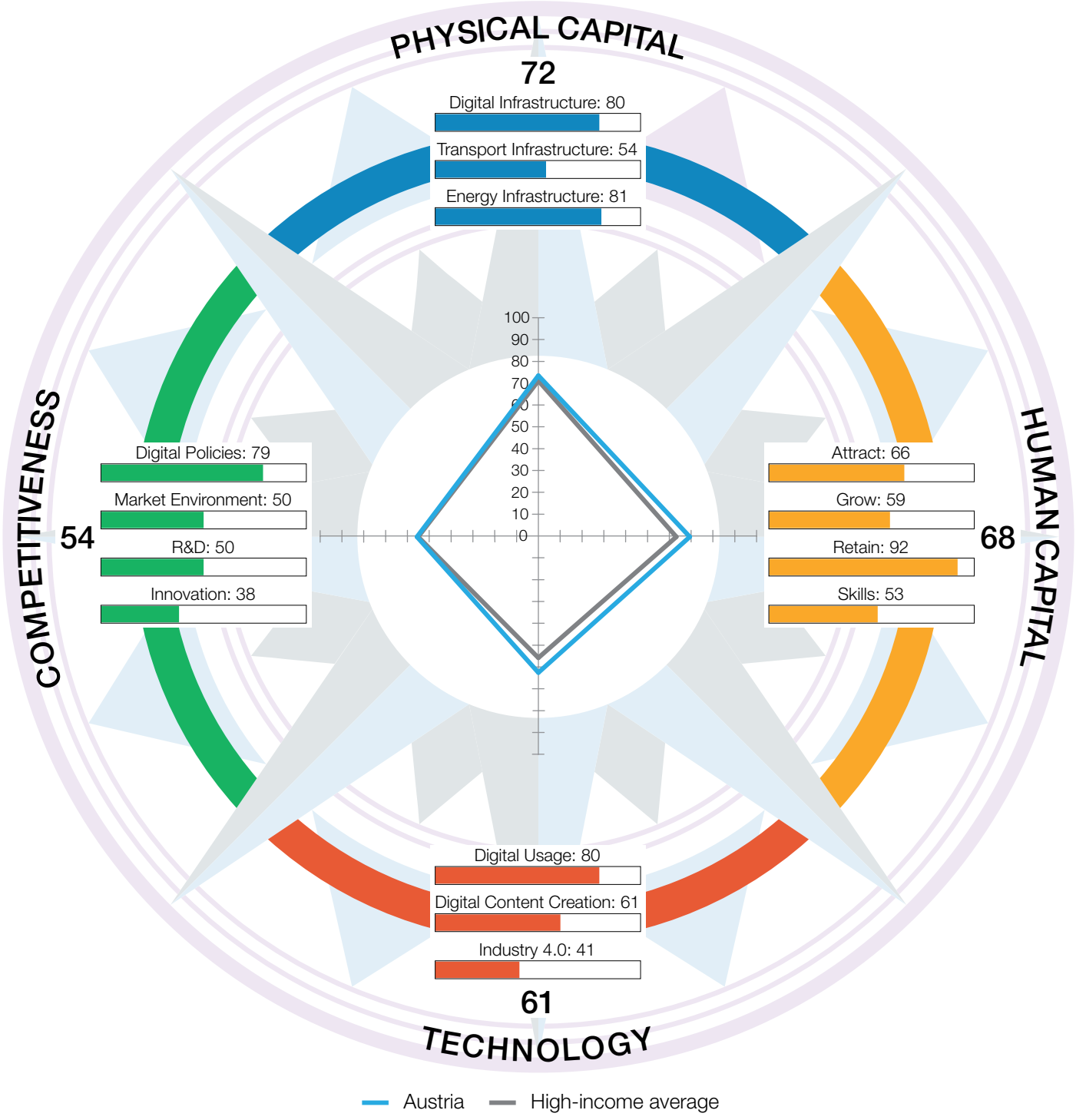
		Score	Rank
3	**TECHNOLOGY**	**65.01**	**13**
3.1	Digital Usage	85.36	6
3.1.1	Internet users	88.92	32
3.1.2	Active mobile-broadband subscriptions	49.47	19
3.1.3	Gender parity in internet usage	98.22	27
3.1.4	Firms with website	81.07	18
3.1.5	Internet shopping	89.30	6
3.1.6	Government online services	91.82	7
3.1.7	E-Participation	98.73	2
3.2	Digital Content Creation	63.03	17
3.2.1	Software development	29.40	20
3.2.2	Wikipedia edits	79.36	20
3.2.3	Internet domain registrations	49.62	10
3.2.4	Mobile apps development	93.73	21
3.3	Industry 4.0	46.63	13
3.3.1	Cloud computing	—	—
3.3.2	AI software development	59.15	12
3.3.3	AI research	61.23	8
3.3.4	ICT patent applications	20.86	22
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**67.09**	**6**
4.1	Digital Policies	94.96	2
4.1.1	ICT regulation	93.92	11
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	100.00	1
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	83.33	38
4.2	Market Environment	61.89	12
4.2.1	Extent of market dominance	63.60	29
4.2.2	Labour productivity per employee	62.39	17
4.2.3	Urbanisation	83.26	22
4.2.4	Domestic credit to private sector	61.05	12
4.2.5	Market capitalisation	39.16	11
4.3	R&D	68.34	3
4.3.1	R&D spending	34.00	20
4.3.2	University ranking	82.17	5
4.3.3	Gender parity in R&D	n/a	n/a
4.3.4	Scientific journal articles	88.84	4
4.4	Innovation	43.15	22
4.4.1	Medium- and high-tech industry	36.15	53
4.4.2	High-tech exports	34.76	16
4.4.3	Venture capital recipients, deals	25.34	19
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	58.92	6
4.4.6	Patent applications	60.57	33

Austria

Key Indicators

Rank (out of 124)	**18**	GDP per capita (PPP US$)	**67,935.85**
Income group	**High income**	GDP (US$ billions)	**471.40**
Regional group	**Europe**	FREI score	**63.59**
Population (millions)	**9.04**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**71.96**	**19**
1.1	Digital Infrastructure	80.49	22
1.1.1	Internet access	94.96	18
1.1.2	International internet bandwidth	41.89	80
1.1.3	Fixed-broadband subscriptions	89.37	59
1.1.4	4G-mobile network coverage	97.85	57
1.1.5	Fixed broadband affordability	94.87	9
1.1.6	Mobile broadband affordability	99.06	7
1.1.7	Computer software spending	45.45	13
1.2	Transport Infrastructure	54.43	21
1.2.1	Quality of infrastructure	75.00	15
1.2.2	Rural access	91.27	27
1.2.3	Air connectivity	33.79	21
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	80.95	6
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	99.25	6
1.3.4	Energy intensity	90.12	27
2	**HUMAN CAPITAL**	**67.60**	**18**
2.1	Attract	65.63	22
2.1.1	Brain gain	59.33	32
2.1.2	International students	47.79	11
2.1.3	Tolerance of minorities	64.89	32
2.1.4	Tolerance of immigrants	66.15	48
2.1.5	Gender parity in high-skilled jobs	89.99	22
2.2	Grow	59.32	26
2.2.1	Tertiary enrolment	57.40	14
2.2.2	Reading, maths, and science	64.07	27
2.2.3	Use of virtual professional networks	29.56	47
2.2.4	Youth inclusion	86.23	38
2.3	Retain	91.98	3
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	80.68	8
2.3.3	Physician density	86.49	4
2.3.4	Sanitation	99.97	10
2.3.5	Personal safety	92.75	11
2.4	Skills	53.48	20
2.4.1	Workforce with tertiary education	28.04	62
2.4.2	High-skilled workforce	67.36	24
2.4.3	Researchers	65.95	10
2.4.4	Relevance of education system to the economy	62.96	26
2.4.5	Digital skills	43.10	18

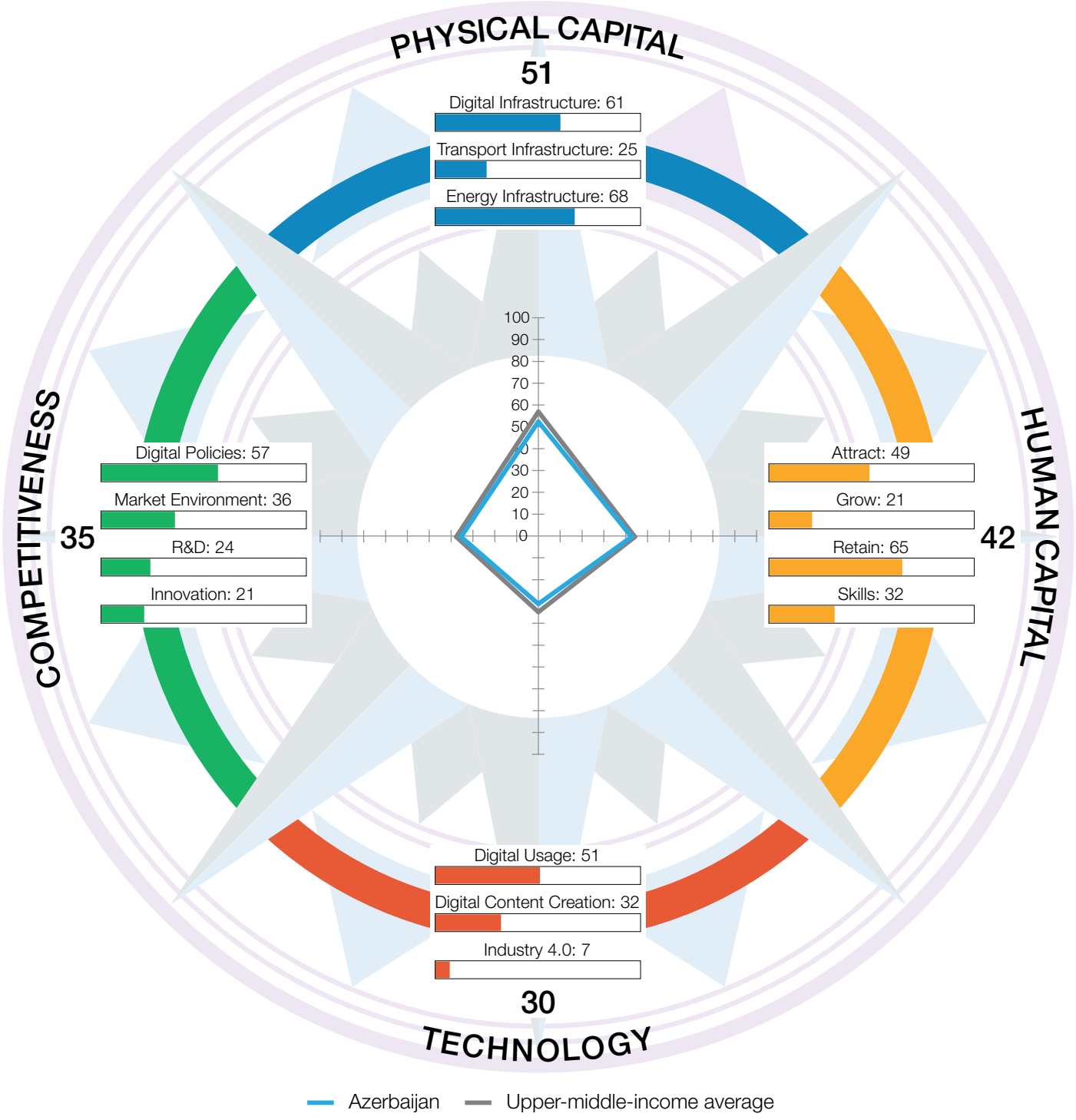
		Score	Rank
3	**TECHNOLOGY**	**60.59**	**17**
3.1	Digital Usage	80.08	16
3.1.1	Internet users	92.04	18
3.1.2	Active mobile-broadband subscriptions	47.96	23
3.1.3	Gender parity in internet usage	93.87	62
3.1.4	Firms with website	93.88	4
3.1.5	Internet shopping	73.57	20
3.1.6	Government online services	84.53	19
3.1.7	E-Participation	74.68	21
3.2	Digital Content Creation	60.89	19
3.2.1	Software development	27.59	21
3.2.2	Wikipedia edits	77.05	24
3.2.3	Internet domain registrations	44.72	13
3.2.4	Mobile apps development	94.18	20
3.3	Industry 4.0	40.81	18
3.3.1	Cloud computing	—	—
3.3.2	AI software development	37.17	20
3.3.3	AI research	47.43	15
3.3.4	ICT patent applications	27.72	18
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**54.19**	**21**
4.1	Digital Policies	79.12	28
4.1.1	ICT regulation	87.16	37
4.1.2	Cybersecurity	100.00	1
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	50.01	30
4.2.1	Extent of market dominance	82.66	6
4.2.2	Labour productivity per employee	67.39	12
4.2.3	Urbanisation	50.10	74
4.2.4	Domestic credit to private sector	40.80	32
4.2.5	Market capitalisation	9.12	46
4.3	R&D	49.61	17
4.3.1	R&D spending	59.42	8
4.3.2	University ranking	44.68	26
4.3.3	Gender parity in R&D	36.84	78
4.3.4	Scientific journal articles	57.49	16
4.4	Innovation	38.02	29
4.4.1	Medium- and high-tech industry	54.87	21
4.4.2	High-tech exports	21.32	37
4.4.3	Venture capital recipients, deals	10.45	40
4.4.4	New product entrepreneurial activity	64.35	23
4.4.5	New business density	2.03	85
4.4.6	Patent applications	75.12	12

Azerbaijan

Key Indicators

Rank (out of 124)	**74**	GDP per capita (PPP US$)	**17,764.45**
Income group	**Upper-middle income**	GDP (US$ billions)	**78.72**
Regional group	**Middle East and North Africa**	FREI score	**39.36**
Population (millions)	**10.18**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**51.39**	**84**
1.1	Digital Infrastructure	60.87	84
1.1.1	Internet access	84.52	52
1.1.2	International internet bandwidth	46.63	57
1.1.3	Fixed-broadband subscriptions	20.46	103
1.1.4	4G-mobile network coverage	93.55	77
1.1.5	Fixed broadband affordability	84.67	47
1.1.6	Mobile broadband affordability	87.16	79
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	25.20	86
1.2.1	Quality of infrastructure	32.65	69
1.2.2	Rural access	50.88	83
1.2.3	Air connectivity	3.96	81
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	68.09	78
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	84.21	65
1.3.4	Energy intensity	78.90	83
2	**HUMAN CAPITAL**	**41.60**	**73**
2.1	Attract	49.35	44
2.1.1	Brain gain	76.40	14
2.1.2	International students	5.94	72
2.1.3	Tolerance of minorities	41.49	64
2.1.4	Tolerance of immigrants	53.85	75
2.1.5	Gender parity in high-skilled jobs	69.09	67
2.2	Grow	20.50	119
2.2.1	Tertiary enrolment	24.64	77
2.2.2	Reading, maths, and science	27.81	62
2.2.3	Use of virtual professional networks	9.06	91
2.2.4	Youth inclusion	n/a	n/a
2.3	Retain	64.71	55
2.3.1	Pension coverage	72.24	61
2.3.2	Environmental performance	33.39	74
2.3.3	Physician density	49.05	46
2.3.4	Sanitation	95.75	58
2.3.5	Personal safety	73.14	48
2.4	Skills	31.83	55
2.4.1	Workforce with tertiary education	33.96	51
2.4.2	High-skilled workforce	32.85	59
2.4.3	Researchers	19.85	41
2.4.4	Relevance of education system to the economy	69.21	20
2.4.5	Digital skills	3.30	74

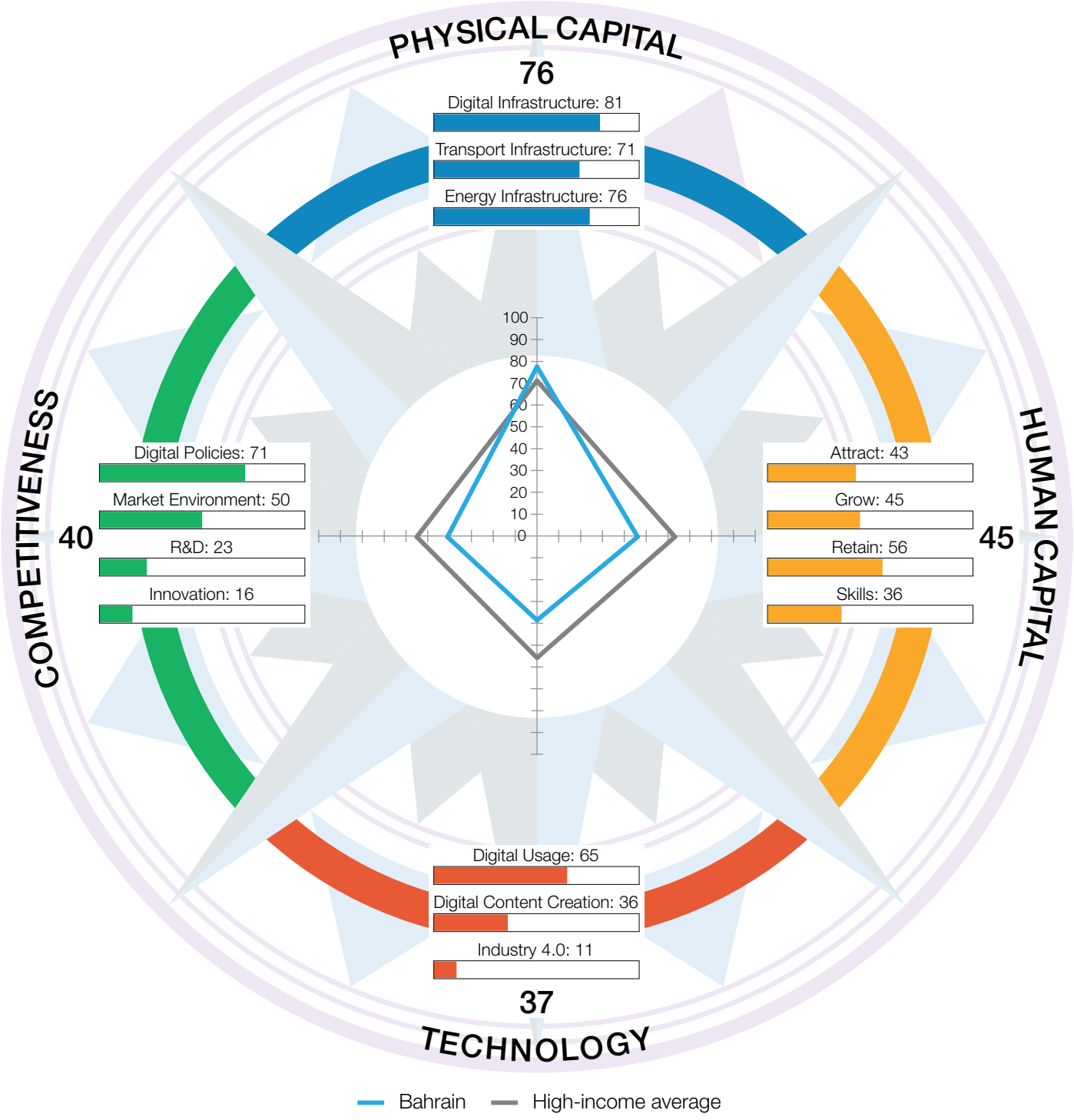
		Score	Rank
3	**TECHNOLOGY**	**29.94**	**76**
3.1	Digital Usage	50.78	78
3.1.1	Internet users	83.60	48
3.1.2	Active mobile-broadband subscriptions	26.83	90
3.1.3	Gender parity in internet usage	90.38	70
3.1.4	Firms with website	63.96	42
3.1.5	Internet shopping	10.25	88
3.1.6	Government online services	48.82	80
3.1.7	E-Participation	31.65	88
3.2	Digital Content Creation	32.37	62
3.2.1	Software development	1.75	85
3.2.2	Wikipedia edits	60.54	49
3.2.3	Internet domain registrations	1.08	84
3.2.4	Mobile apps development	66.12	78
3.3	Industry 4.0	6.66	99
3.3.1	Cloud computing	—	—
3.3.2	AI software development	5.37	83
3.3.3	AI research	3.38	79
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**34.53**	**71**
4.1	Digital Policies	57.03	79
4.1.1	ICT regulation	53.38	109
4.1.2	Cybersecurity	62.50	53
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	0.00	85
4.1.6	Data privacy	66.67	87
4.1.7	Data transfer	66.67	51
4.2	Market Environment	36.06	58
4.2.1	Extent of market dominance	75.01	9
4.2.2	Labour productivity per employee	17.38	78
4.2.3	Urbanisation	46.97	82
4.2.4	Domestic credit to private sector	4.88	107
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	23.60	78
4.3.1	R&D spending	3.68	82
4.3.2	University ranking	9.02	70
4.3.3	Gender parity in R&D	78.07	31
4.3.4	Scientific journal articles	3.64	81
4.4	Innovation	21.44	91
4.4.1	Medium- and high-tech industry	18.30	85
4.4.2	High-tech exports	3.11	98
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	29.47	68
4.4.5	New business density	5.21	68
4.4.6	Patent applications	51.13	60

Bahrain

Key Indicators

Rank (out of 124)	**45**	GDP per capita (PPP US$)	**61,227.90**
Income group	**High income**	GDP (US$ billions)	**44.39**
Regional group	**Middle East and North Africa**	FREI score	**49.50**
Population (millions)	**1.47**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**75.91**	**9**
1.1	Digital Infrastructure	81.20	18
1.1.1	Internet access	99.60	4
1.1.2	International internet bandwidth	74.58	5
1.1.3	Fixed-broadband subscriptions	95.39	35
1.1.4	4G-mobile network coverage	100.00	1
1.1.5	Fixed broadband affordability	79.03	61
1.1.6	Mobile broadband affordability	92.52	62
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	70.77	7
1.2.1	Quality of infrastructure	64.29	28
1.2.2	Rural access	97.21	13
1.2.3	Air connectivity	67.86	7
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	75.76	32
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	49.97	119
2	**HUMAN CAPITAL**	**44.92**	**59**
2.1	Attract	42.88	70
2.1.1	Brain gain	83.44	9
2.1.2	International students	30.95	21
2.1.3	Tolerance of minorities	1.06	122
2.1.4	Tolerance of immigrants	76.92	28
2.1.5	Gender parity in high-skilled jobs	22.02	110
2.2	Grow	45.12	57
2.2.1	Tertiary enrolment	42.23	48
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	48.02	23
2.2.4	Youth inclusion	n/a	n/a
2.3	Retain	55.58	69
2.3.1	Pension coverage	72.65	60
2.3.2	Environmental performance	39.15	63
2.3.3	Physician density	12.88	88
2.3.4	Sanitation	100.00	1
2.3.5	Personal safety	53.23	79
2.4	Skills	36.08	45
2.4.1	Workforce with tertiary education	11.84	92
2.4.2	High-skilled workforce	30.66	66
2.4.3	Researchers	4.08	73
2.4.4	Relevance of education system to the economy	58.66	32
2.4.5	Digital skills	75.16	4

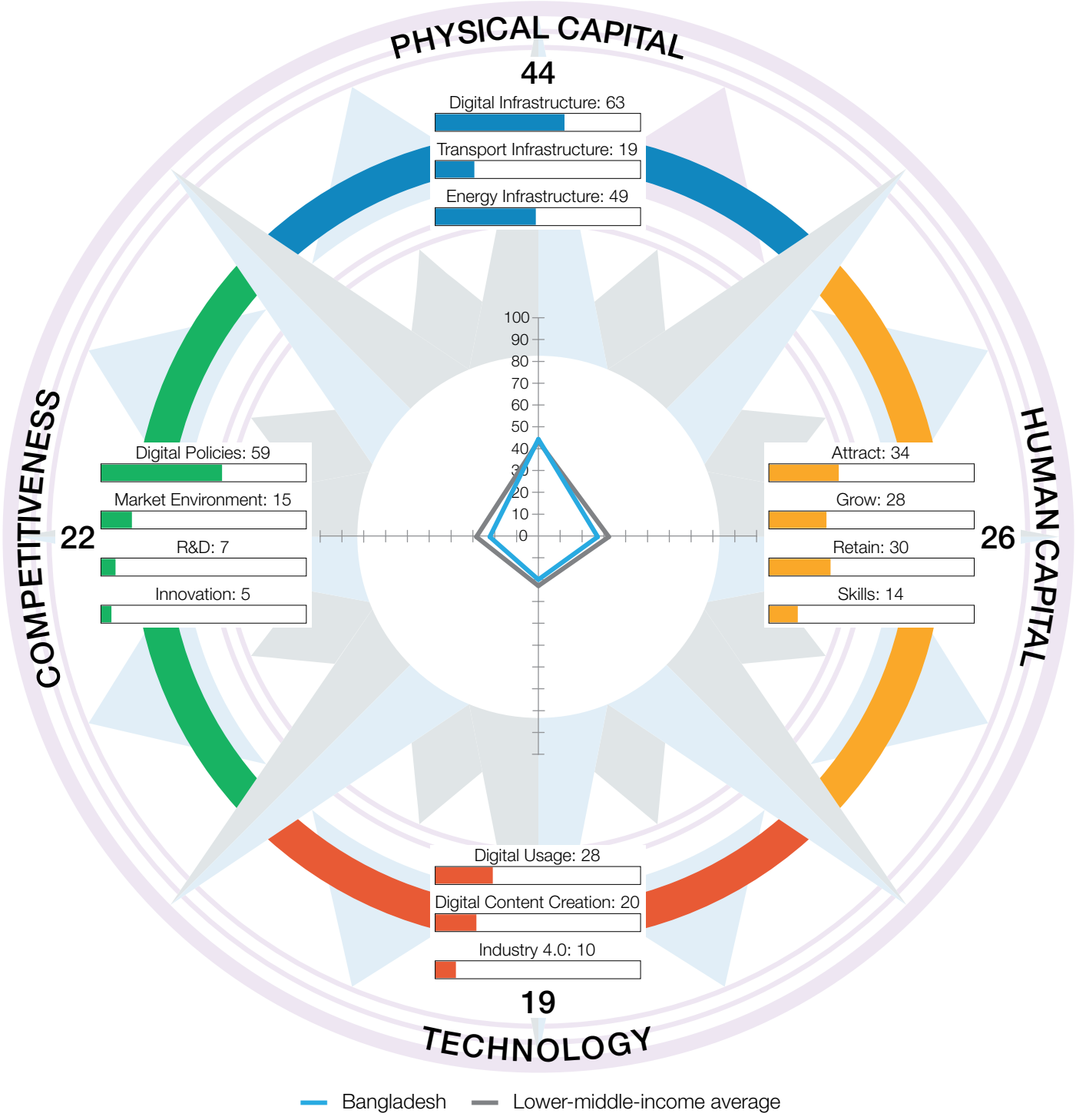
		Score	Rank
3	**TECHNOLOGY**	**37.21**	**52**
3.1	Digital Usage	64.78	51
3.1.1	Internet users	100.00	1
3.1.2	Active mobile-broadband subscriptions	55.00	13
3.1.3	Gender parity in internet usage	100.00	1
3.1.4	Firms with website	n/a	n/a
3.1.5	Internet shopping	28.38	62
3.1.6	Government online services	67.33	54
3.1.7	E-Participation	37.97	83
3.2	Digital Content Creation	35.85	55
3.2.1	Software development	3.34	65
3.2.2	Wikipedia edits	55.06	54
3.2.3	Internet domain registrations	2.21	70
3.2.4	Mobile apps development	82.78	41
3.3	Industry 4.0	10.99	65
3.3.1	Cloud computing	—	—
3.3.2	AI software development	5.89	76
3.3.3	AI research	24.65	33
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**39.97**	**56**
4.1	Digital Policies	70.61	55
4.1.1	ICT regulation	81.76	64
4.1.2	Cybersecurity	62.50	53
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	50.28	29
4.2.1	Extent of market dominance	47.08	48
4.2.2	Labour productivity per employee	64.15	15
4.2.3	Urbanisation	87.18	14
4.2.4	Domestic credit to private sector	31.58	43
4.2.5	Market capitalisation	21.43	25
4.3	R&D	22.92	83
4.3.1	R&D spending	1.66	98
4.3.2	University ranking	18.03	58
4.3.3	Gender parity in R&D	59.55	48
4.3.4	Scientific journal articles	12.44	52
4.4	Innovation	16.08	109
4.4.1	Medium- and high-tech industry	29.79	62
4.4.2	High-tech exports	6.78	82
4.4.3	Venture capital recipients, deals	11.23	39
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	12.71	37
4.4.6	Patent applications	19.89	114

Bangladesh

Key Indicators

Rank (out of 124)	**101**	GDP per capita (PPP US$)	**7,395.10**
Income group	**Lower-middle income**	GDP (US$ billions)	**460.20**
Regional group	**Asia and Pacific**	FREI score	**27.71**
Population (millions)	**171.19**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**43.58**	**96**
1.1	Digital Infrastructure	62.63	81
1.1.1	Internet access	36.25	90
1.1.2	International internet bandwidth	43.34	73
1.1.3	Fixed-broadband subscriptions	70.48	80
1.1.4	4G-mobile network coverage	97.96	54
1.1.5	Fixed broadband affordability	82.23	55
1.1.6	Mobile broadband affordability	89.97	72
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	19.15	94
1.2.1	Quality of infrastructure	17.86	100
1.2.2	Rural access	54.30	82
1.2.3	Air connectivity	0.54	106
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	48.97	106
1.3.1	Access to electricity	98.82	88
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	0.00	88
1.3.4	Energy intensity	95.21	9
2	**HUMAN CAPITAL**	**26.48**	**105**
2.1	Attract	34.14	107
2.1.1	Brain gain	53.32	47
2.1.2	International students	n/a	n/a
2.1.3	Tolerance of minorities	10.64	112
2.1.4	Tolerance of immigrants	56.92	69
2.1.5	Gender parity in high-skilled jobs	15.69	115
2.2	Grow	27.83	105
2.2.1	Tertiary enrolment	15.85	87
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	4.64	105
2.2.4	Youth inclusion	62.99	95
2.3	Retain	29.92	100
2.3.1	Pension coverage	37.76	78
2.3.2	Environmental performance	7.12	121
2.3.3	Physician density	10.14	97
2.3.4	Sanitation	49.68	104
2.3.5	Personal safety	44.91	94
2.4	Skills	14.01	104
2.4.1	Workforce with tertiary education	7.68	104
2.4.2	High-skilled workforce	8.36	102
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	26.00	89
2.4.5	Digital skills	n/a	n/a

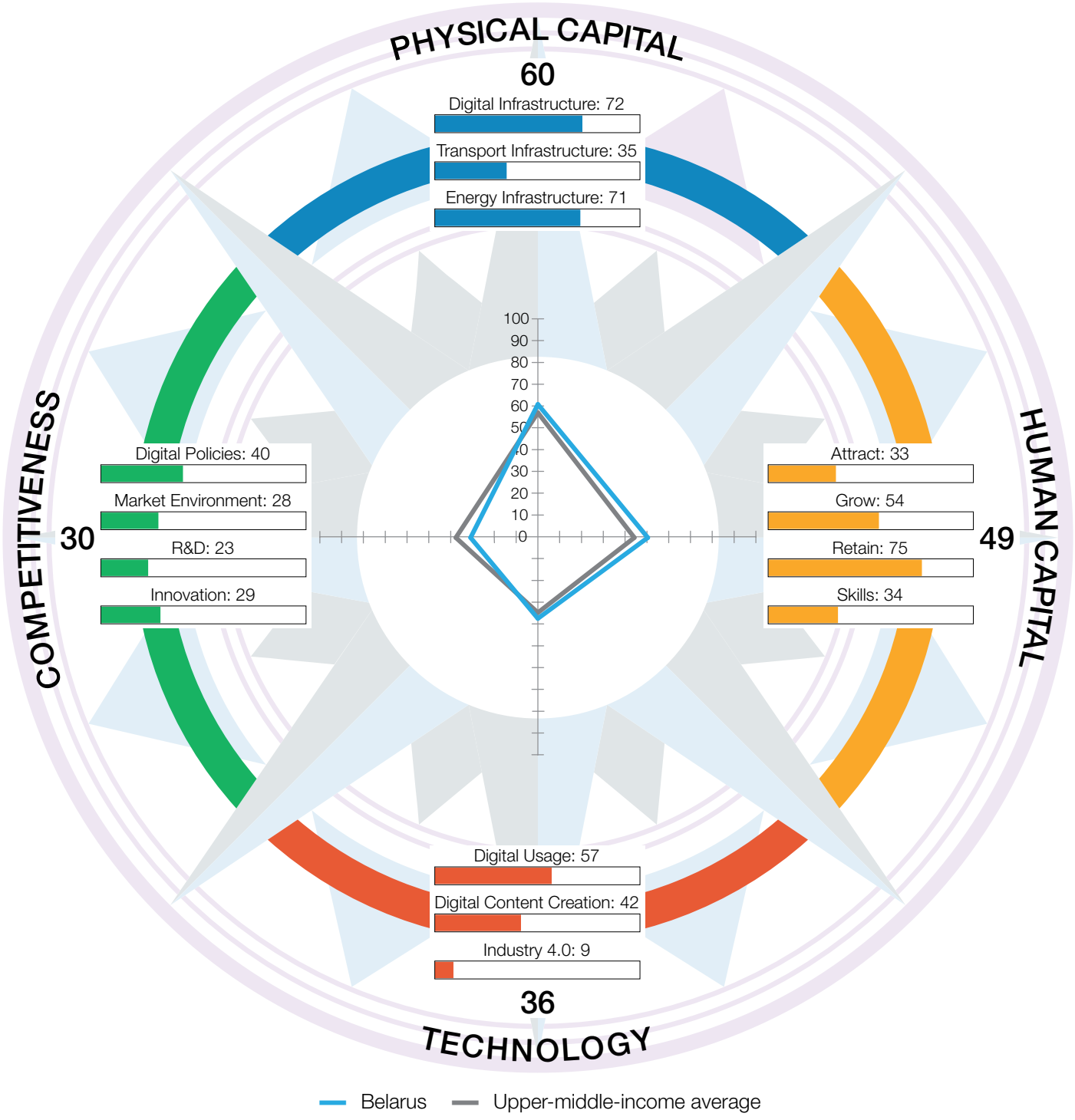
		Score	Rank
3	**TECHNOLOGY**	**19.09**	**100**
3.1	Digital Usage	28.04	105
3.1.1	Internet users	19.91	113
3.1.2	Active mobile-broadband subscriptions	22.48	98
3.1.3	Gender parity in internet usage	34.91	101
3.1.4	Firms with website	15.21	94
3.1.5	Internet shopping	2.79	112
3.1.6	Government online services	54.12	73
3.1.7	E-Participation	46.83	73
3.2	Digital Content Creation	19.65	101
3.2.1	Software development	1.20	92
3.2.2	Wikipedia edits	26.57	101
3.2.3	Internet domain registrations	0.17	109
3.2.4	Mobile apps development	50.68	101
3.3	Industry 4.0	9.57	73
3.3.1	Cloud computing	—	—
3.3.2	AI software development	12.12	53
3.3.3	AI research	1.82	87
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**21.68**	**111**
4.1	Digital Policies	59.41	76
4.1.1	ICT regulation	53.38	109
4.1.2	Cybersecurity	62.50	53
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	50.00	103
4.1.7	Data transfer	50.00	99
4.2	Market Environment	14.87	112
4.2.1	Extent of market dominance	20.10	103
4.2.2	Labour productivity per employee	8.06	93
4.2.3	Urbanisation	24.18	105
4.2.4	Domestic credit to private sector	14.79	76
4.2.5	Market capitalisation	7.20	55
4.3	R&D	7.16	105
4.3.1	R&D spending	n/a	n/a
4.3.2	University ranking	13.27	64
4.3.3	Gender parity in R&D	n/a	n/a
4.3.4	Scientific journal articles	1.05	97
4.4	Innovation	5.27	124
4.4.1	Medium- and high-tech industry	9.23	104
4.4.2	High-tech exports	0.32	120
4.4.3	Venture capital recipients, deals	0.46	90
4.4.4	New product entrepreneurial activity	0.00	94
4.4.5	New business density	0.00	109
4.4.6	Patent applications	21.60	111

Belarus

Key Indicators

Rank (out of 124)	**60**	GDP per capita (PPP US$)	**22,590.59**
Income group	**Upper-middle income**	GDP (US$ billions)	**72.79**
Regional group	**Europe**	FREI score	**43.73**
Population (millions)	**9.21**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**59.58**	**55**
1.1	Digital Infrastructure	72.04	55
1.1.1	Internet access	76.88	67
1.1.2	International internet bandwidth	60.64	17
1.1.3	Fixed-broadband subscriptions	70.97	78
1.1.4	4G-mobile network coverage	97.20	66
1.1.5	Fixed broadband affordability	94.42	12
1.1.6	Mobile broadband affordability	95.07	47
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	35.19	57
1.2.1	Quality of infrastructure	32.14	70
1.2.2	Rural access	93.82	18
1.2.3	Air connectivity	2.54	87
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	71.50	62
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	98.50	15
1.3.4	Energy intensity	72.04	100
2	**HUMAN CAPITAL**	**49.12**	**50**
2.1	Attract	33.48	109
2.1.1	Brain gain	34.05	92
2.1.2	International students	17.11	38
2.1.3	Tolerance of minorities	43.62	58
2.1.4	Tolerance of immigrants	32.31	108
2.1.5	Gender parity in high-skilled jobs	40.30	99
2.2	Grow	53.59	40
2.2.1	Tertiary enrolment	54.08	21
2.2.2	Reading, maths, and science	56.42	35
2.2.3	Use of virtual professional networks	10.87	86
2.2.4	Youth inclusion	92.99	16
2.3	Retain	75.05	37
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	50.17	43
2.3.3	Physician density	70.16	15
2.3.4	Sanitation	97.70	46
2.3.5	Personal safety	57.21	74
2.4	Skills	34.37	51
2.4.1	Workforce with tertiary education	41.51	36
2.4.2	High-skilled workforce	63.09	27
2.4.3	Researchers	16.14	47
2.4.4	Relevance of education system to the economy	43.18	55
2.4.5	Digital skills	7.95	62

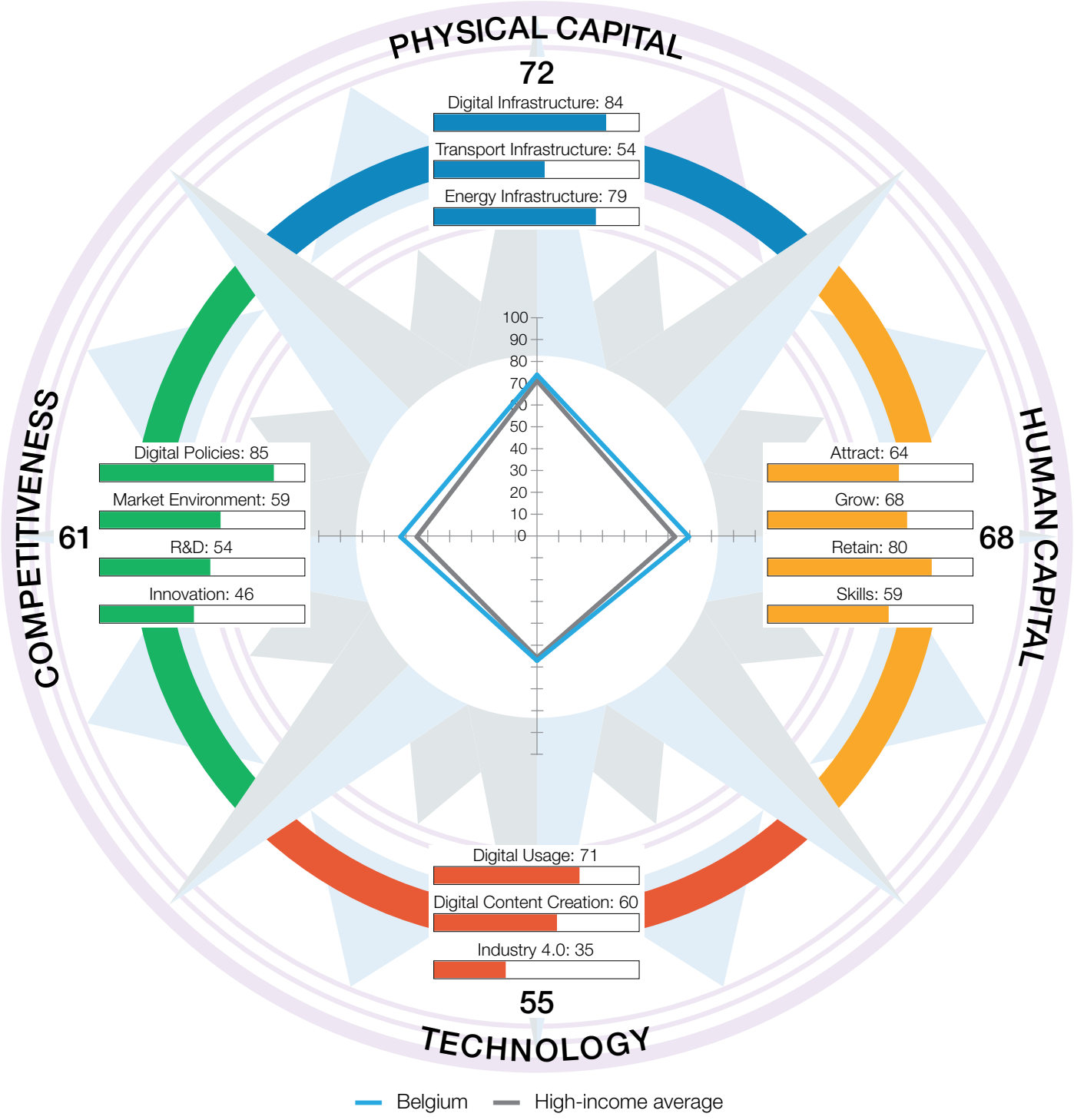
		Score	Rank
3	**TECHNOLOGY**	**36.14**	**53**
3.1	Digital Usage	57.48	66
3.1.1	Internet users	86.04	43
3.1.2	Active mobile-broadband subscriptions	37.74	54
3.1.3	Gender parity in internet usage	96.87	41
3.1.4	Firms with website	72.77	28
3.1.5	Internet shopping	34.18	59
3.1.6	Government online services	38.05	91
3.1.7	E-Participation	36.70	84
3.2	Digital Content Creation	41.61	42
3.2.1	Software development	19.02	32
3.2.2	Wikipedia edits	63.00	45
3.2.3	Internet domain registrations	3.57	59
3.2.4	Mobile apps development	80.87	46
3.3	Industry 4.0	9.32	76
3.3.1	Cloud computing	—	—
3.3.2	AI software development	7.81	64
3.3.3	AI research	4.40	71
3.3.4	ICT patent applications	0.62	54
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**30.07**	**86**
4.1	Digital Policies	39.69	105
4.1.1	ICT regulation	23.65	121
4.1.2	Cybersecurity	37.50	87
4.1.3	AI regulation	50.00	58
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	0.00	85
4.1.6	Data privacy	83.33	86
4.1.7	Data transfer	33.33	112
4.2	Market Environment	27.75	85
4.2.1	Extent of market dominance	29.08	88
4.2.2	Labour productivity per employee	24.49	68
4.2.3	Urbanisation	74.39	38
4.2.4	Domestic credit to private sector	10.09	91
4.2.5	Market capitalisation	0.72	75
4.3	R&D	23.40	79
4.3.1	R&D spending	8.55	60
4.3.2	University ranking	20.26	54
4.3.3	Gender parity in R&D	59.45	49
4.3.4	Scientific journal articles	5.35	74
4.4	Innovation	29.43	48
4.4.1	Medium- and high-tech industry	50.05	32
4.4.2	High-tech exports	8.56	72
4.4.3	Venture capital recipients, deals	3.33	68
4.4.4	New product entrepreneurial activity	51.35	41
4.4.5	New business density	4.55	71
4.4.6	Patent applications	58.77	36

Belgium

Key Indicators

Rank (out of 124)	**17**	GDP per capita (PPP US$)	**65,027.29**
Income group	**High income**	GDP (US$ billions)	**578.60**
Regional group	**Europe**	FREI score	**64.08**
Population (millions)	**11.67**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**72.32**	**17**
1.1	Digital Infrastructure	84.38	6
1.1.1	Internet access	92.19	26
1.1.2	International internet bandwidth	52.79	36
1.1.3	Fixed-broadband subscriptions	99.26	11
1.1.4	4G-mobile network coverage	100.00	1
1.1.5	Fixed broadband affordability	94.28	13
1.1.6	Mobile broadband affordability	97.62	20
1.1.7	Computer software spending	54.55	4
1.2	Transport Infrastructure	53.90	24
1.2.1	Quality of infrastructure	82.14	9
1.2.2	Rural access	98.86	5
1.2.3	Air connectivity	18.92	41
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	78.69	13
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	98.50	15
1.3.4	Energy intensity	84.72	61
2	**HUMAN CAPITAL**	**67.81**	**17**
2.1	Attract	64.11	23
2.1.1	Brain gain	71.81	18
2.1.2	International students	27.53	24
2.1.3	Tolerance of minorities	62.77	36
2.1.4	Tolerance of immigrants	60.00	61
2.1.5	Gender parity in high-skilled jobs	98.46	3
2.2	Grow	67.57	15
2.2.1	Tertiary enrolment	53.17	22
2.2.2	Reading, maths, and science	67.69	18
2.2.3	Use of virtual professional networks	55.95	19
2.2.4	Youth inclusion	93.47	11
2.3	Retain	80.32	26
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	66.61	21
2.3.3	Physician density	50.60	44
2.3.4	Sanitation	99.44	22
2.3.5	Personal safety	84.97	28
2.4	Skills	59.25	19
2.4.1	Workforce with tertiary education	61.31	11
2.4.2	High-skilled workforce	75.43	12
2.4.3	Researchers	65.94	11
2.4.4	Relevance of education system to the economy	69.66	19
2.4.5	Digital skills	23.93	43

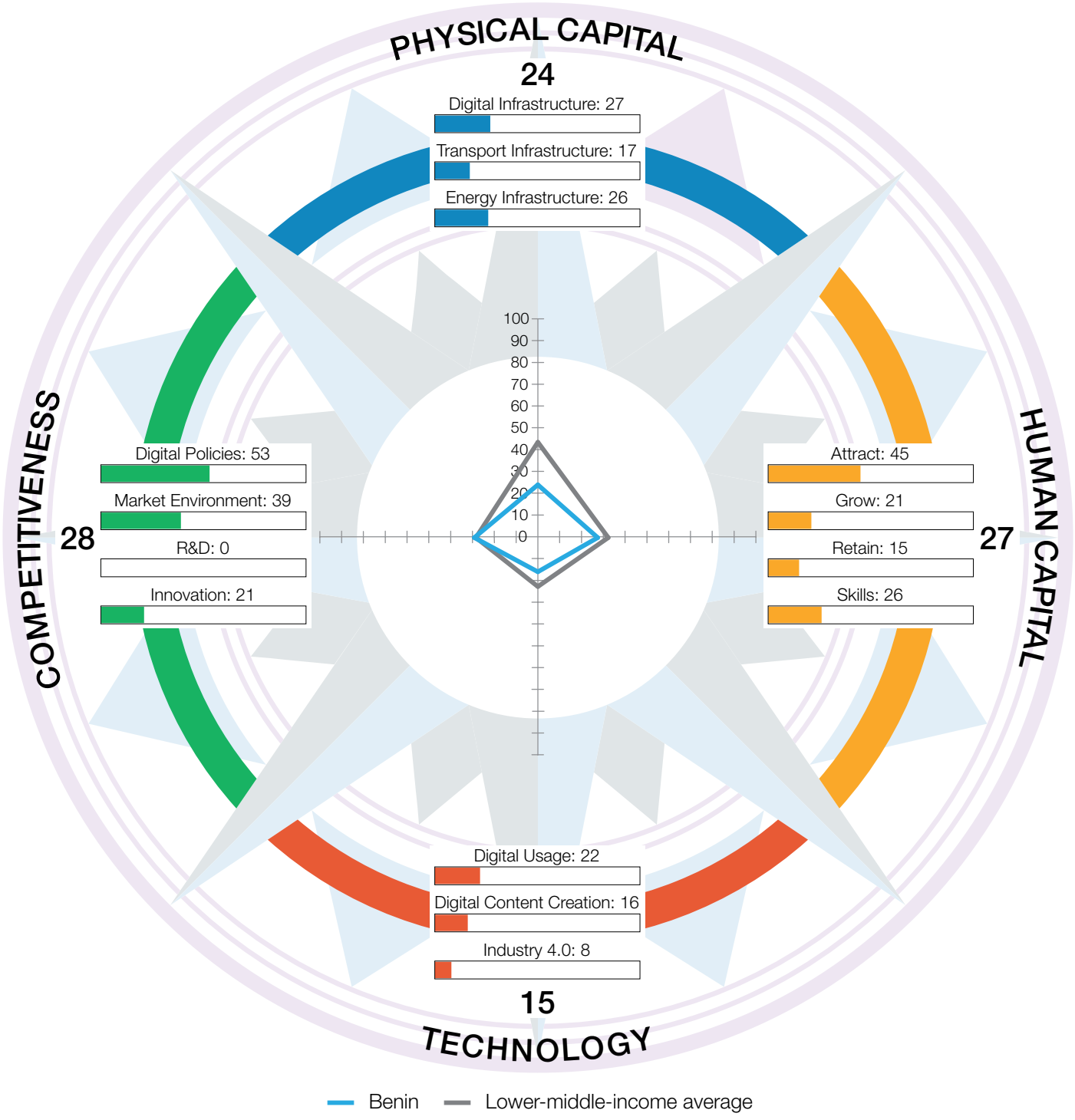
		Score	Rank
3	**TECHNOLOGY**	**55.26**	**22**
3.1	Digital Usage	70.67	35
3.1.1	Internet users	92.32	17
3.1.2	Active mobile-broadband subscriptions	37.17	58
3.1.3	Gender parity in internet usage	99.51	8
3.1.4	Firms with website	88.61	7
3.1.5	Internet shopping	78.72	16
3.1.6	Government online services	59.11	66
3.1.7	E-Participation	39.23	80
3.2	Digital Content Creation	60.41	22
3.2.1	Software development	36.21	15
3.2.2	Wikipedia edits	81.91	13
3.2.3	Internet domain registrations	36.80	16
3.2.4	Mobile apps development	86.73	33
3.3	Industry 4.0	34.69	21
3.3.1	Cloud computing	—	—
3.3.2	AI software development	32.24	24
3.3.3	AI research	36.93	21
3.3.4	ICT patent applications	22.30	21
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**60.91**	**12**
4.1	Digital Policies	84.56	18
4.1.1	ICT regulation	91.89	26
4.1.2	Cybersecurity	100.00	1
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	59.09	16
4.2.1	Extent of market dominance	72.62	15
4.2.2	Labour productivity per employee	75.17	7
4.2.3	Urbanisation	97.61	4
4.2.4	Domestic credit to private sector	32.24	42
4.2.5	Market capitalisation	17.81	31
4.3	R&D	54.10	13
4.3.1	R&D spending	64.44	4
4.3.2	University ranking	54.61	16
4.3.3	Gender parity in R&D	42.18	71
4.3.4	Scientific journal articles	55.18	19
4.4	Innovation	45.89	18
4.4.1	Medium- and high-tech industry	62.71	14
4.4.2	High-tech exports	28.43	25
4.4.3	Venture capital recipients, deals	19.86	26
4.4.4	New product entrepreneurial activity	75.16	13
4.4.5	New business density	19.16	27
4.4.6	Patent applications	70.04	17

Benin

Key Indicators

Rank (out of 124)	**108**	GDP per capita (PPP US$)	**4,056.11**
Income group	**Lower-middle income**	GDP (US$ billions)	**17.40**
Regional group	**Sub-Saharan Africa**	FREI score	**23.51**
Population (millions)	**13.35**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**23.62**	**119**
1.1	Digital Infrastructure	27.29	114
1.1.1	Internet access	2.49	113
1.1.2	International internet bandwidth	34.89	98
1.1.3	Fixed-broadband subscriptions	20.86	101
1.1.4	4G-mobile network coverage	41.94	112
1.1.5	Fixed broadband affordability	35.73	116
1.1.6	Mobile broadband affordability	46.00	113
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	17.34	103
1.2.1	Quality of infrastructure	25.00	81
1.2.2	Rural access	43.26	94
1.2.3	Air connectivity	0.04	121
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	26.24	122
1.3.1	Access to electricity	32.38	119
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	0.00	88
1.3.4	Energy intensity	72.41	98
2	**HUMAN CAPITAL**	**26.74**	**103**
2.1	Attract	44.64	59
2.1.1	Brain gain	50.88	57
2.1.2	International students	7.77	63
2.1.3	Tolerance of minorities	76.60	15
2.1.4	Tolerance of immigrants	87.69	12
2.1.5	Gender parity in high-skilled jobs	0.24	120
2.2	Grow	21.08	116
2.2.1	Tertiary enrolment	6.47	104
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	5.55	102
2.2.4	Youth inclusion	51.22	112
2.3	Retain	15.25	119
2.3.1	Pension coverage	9.18	104
2.3.2	Environmental performance	18.14	106
2.3.3	Physician density	0.44	120
2.3.4	Sanitation	8.84	121
2.3.5	Personal safety	39.65	102
2.4	Skills	25.99	66
2.4.1	Workforce with tertiary education	5.86	109
2.4.2	High-skilled workforce	4.65	109
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	67.47	22
2.4.5	Digital skills	n/a	n/a

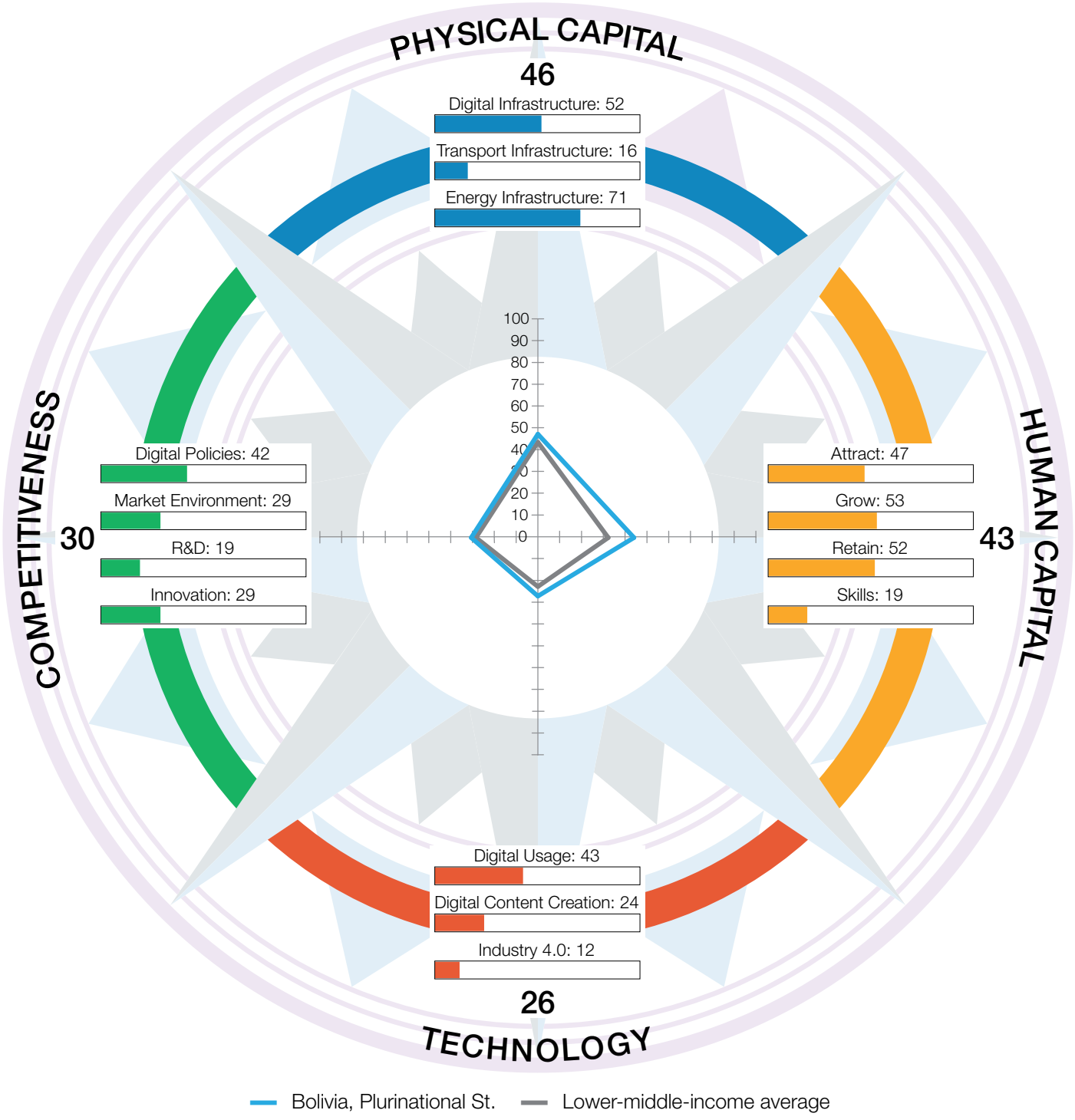
		Score	Rank
3	**TECHNOLOGY**	**15.27**	**111**
3.1	Digital Usage	21.82	110
3.1.1	Internet users	20.98	111
3.1.2	Active mobile-broadband subscriptions	11.76	115
3.1.3	Gender parity in internet usage	n/a	n/a
3.1.4	Firms with website	30.29	84
3.1.5	Internet shopping	4.03	108
3.1.6	Government online services	37.29	93
3.1.7	E-Participation	26.58	98
3.2	Digital Content Creation	16.19	110
3.2.1	Software development	0.34	108
3.2.2	Wikipedia edits	28.88	93
3.2.3	Internet domain registrations	0.20	108
3.2.4	Mobile apps development	35.33	117
3.3	Industry 4.0	7.81	89
3.3.1	Cloud computing	—	—
3.3.2	AI software development	0.83	111
3.3.3	AI research	0.62	101
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**28.40**	**91**
4.1	Digital Policies	53.14	87
4.1.1	ICT regulation	59.46	104
4.1.2	Cybersecurity	62.50	53
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	66.67	87
4.1.7	Data transfer	83.33	38
4.2	Market Environment	38.74	50
4.2.1	Extent of market dominance	74.97	10
4.2.2	Labour productivity per employee	n/a	n/a
4.2.3	Urbanisation	36.96	94
4.2.4	Domestic credit to private sector	4.29	108
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	0.40	119
4.3.1	R&D spending	n/a	n/a
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	n/a	n/a
4.3.4	Scientific journal articles	0.81	102
4.4	Innovation	21.33	93
4.4.1	Medium- and high-tech industry	n/a	n/a
4.4.2	High-tech exports	4.15	90
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	44.02	53
4.4.5	New business density	2.34	82
4.4.6	Patent applications	34.81	92

Bolivia, Plurinational St.

Key Indicators

Rank (out of 124)	**86**	GDP per capita (PPP US$)	**9,683.62**
Income group	**Lower-middle income**	GDP (US$ billions)	**43.07**
Regional group	**Latin America and the Caribbean**	FREI score	**36.27**
Population (millions)	**12.22**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**46.25**	**92**
1.1	Digital Infrastructure	52.11	95
1.1.1	Internet access	54.23	81
1.1.2	International internet bandwidth	43.97	70
1.1.3	Fixed-broadband subscriptions	8.09	113
1.1.4	4G-mobile network coverage	72.56	102
1.1.5	Fixed broadband affordability	56.11	95
1.1.6	Mobile broadband affordability	77.72	99
1.1.7	Computer software spending	n/a	n/a
1.2	Transport Infrastructure	15.94	108
1.2.1	Quality of infrastructure	21.43	87
1.2.2	Rural access	34.42	103
1.2.3	Air connectivity	1.49	98
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	70.69	68
1.3.1	Access to electricity	98.32	89
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	95.49	40
1.3.4	Energy intensity	85.87	54
2	**HUMAN CAPITAL**	**42.93**	**67**
2.1	Attract	47.07	49
2.1.1	Brain gain	16.93	110
2.1.2	International students	n/a	n/a
2.1.3	Tolerance of minorities	38.30	71
2.1.4	Tolerance of immigrants	58.46	64
2.1.5	Gender parity in high-skilled jobs	74.60	56
2.2	Grow	52.96	43
2.2.1	Tertiary enrolment	n/a	n/a
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	17.89	68
2.2.4	Youth inclusion	88.03	28
2.3	Retain	52.40	73
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	35.93	70
2.3.3	Physician density	15.53	85
2.3.4	Sanitation	62.41	102
2.3.5	Personal safety	48.14	86
2.4	Skills	19.26	92
2.4.1	Workforce with tertiary education	27.64	64
2.4.2	High-skilled workforce	17.57	86
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	12.58	111
2.4.5	Digital skills	n/a	n/a

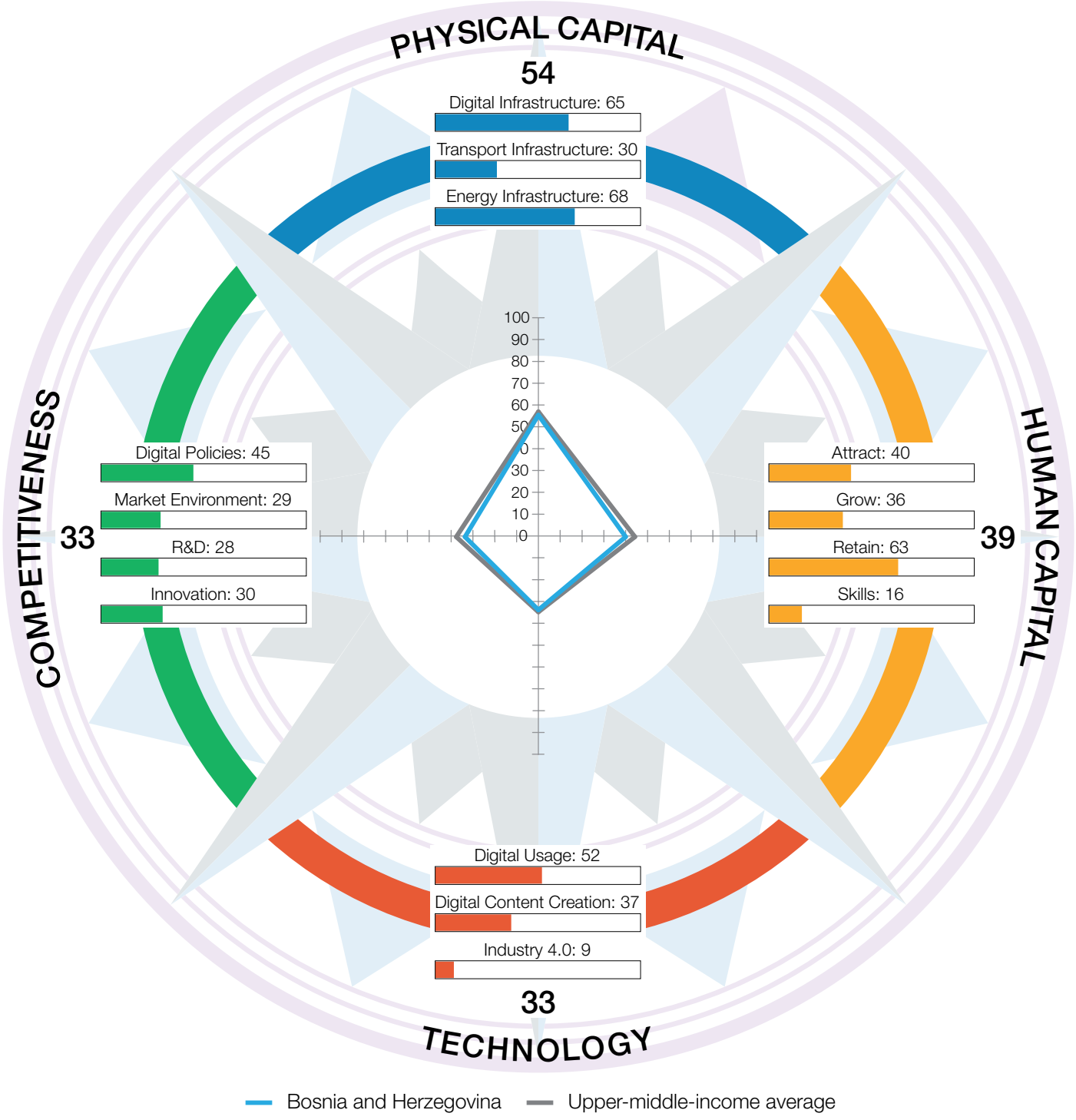
		Score	Rank
3	**TECHNOLOGY**	**26.14**	**84**
3.1	Digital Usage	42.59	85
3.1.1	Internet users	57.34	92
3.1.2	Active mobile-broadband subscriptions	34.40	69
3.1.3	Gender parity in internet usage	89.19	73
3.1.4	Firms with website	43.69	65
3.1.5	Internet shopping	12.87	82
3.1.6	Government online services	36.61	94
3.1.7	E-Participation	24.05	101
3.2	Digital Content Creation	24.00	91
3.2.1	Software development	1.89	83
3.2.2	Wikipedia edits	33.05	87
3.2.3	Internet domain registrations	0.84	89
3.2.4	Mobile apps development	60.22	89
3.3	Industry 4.0	11.83	61
3.3.1	Cloud computing	—	—
3.3.2	AI software development	7.62	66
3.3.3	AI research	0.53	103
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**29.77**	**88**
4.1	Digital Policies	41.73	101
4.1.1	ICT regulation	58.78	105
4.1.2	Cybersecurity	0.00	106
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	66.67	87
4.1.7	Data transfer	66.67	51
4.2	Market Environment	29.47	78
4.2.1	Extent of market dominance	14.60	112
4.2.2	Labour productivity per employee	9.58	91
4.2.3	Urbanisation	63.42	53
4.2.4	Domestic credit to private sector	30.28	45
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	18.62	88
4.3.1	R&D spending	n/a	n/a
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	55.42	56
4.3.4	Scientific journal articles	0.43	108
4.4	Innovation	29.28	50
4.4.1	Medium- and high-tech industry	14.28	93
4.4.2	High-tech exports	6.93	80
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	77.22	12
4.4.5	New business density	1.95	87
4.4.6	Patent applications	46.00	72

Bosnia and Herzegovina

Key Indicators

Rank (out of 124)	**72**	GDP per capita (PPP US$)	**20,376.89**
Income group	**Upper-middle income**	GDP (US$ billions)	**24.53**
Regional group	**Europe**	FREI score	**39.67**
Population (millions)	**3.23**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**54.35**	**73**
1.1	Digital Infrastructure	64.63	75
1.1.1	Internet access	75.00	69
1.1.2	International internet bandwidth	45.13	63
1.1.3	Fixed-broadband subscriptions	60.80	85
1.1.4	4G-mobile network coverage	92.47	80
1.1.5	Fixed broadband affordability	79.85	59
1.1.6	Mobile broadband affordability	90.05	71
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	29.91	72
1.2.1	Quality of infrastructure	28.57	78
1.2.2	Rural access	77.56	47
1.2.3	Air connectivity	3.66	82
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	68.50	75
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	90.23	58
1.3.4	Energy intensity	69.56	102
2	**HUMAN CAPITAL**	**38.96**	**78**
2.1	Attract	40.32	87
2.1.1	Brain gain	0.00	119
2.1.2	International students	17.59	37
2.1.3	Tolerance of minorities	36.17	74
2.1.4	Tolerance of immigrants	55.38	73
2.1.5	Gender parity in high-skilled jobs	92.44	18
2.2	Grow	36.28	76
2.2.1	Tertiary enrolment	25.30	76
2.2.2	Reading, maths, and science	27.97	60
2.2.3	Use of virtual professional networks	13.93	76
2.2.4	Youth inclusion	77.90	65
2.3	Retain	62.82	58
2.3.1	Pension coverage	68.88	64
2.3.2	Environmental performance	34.75	72
2.3.3	Physician density	32.99	72
2.3.4	Sanitation	94.93	61
2.3.5	Personal safety	82.55	32
2.4	Skills	16.43	101
2.4.1	Workforce with tertiary education	23.51	74
2.4.2	High-skilled workforce	36.12	52
2.4.3	Researchers	4.98	69
2.4.4	Relevance of education system to the economy	7.00	117
2.4.5	Digital skills	10.53	61

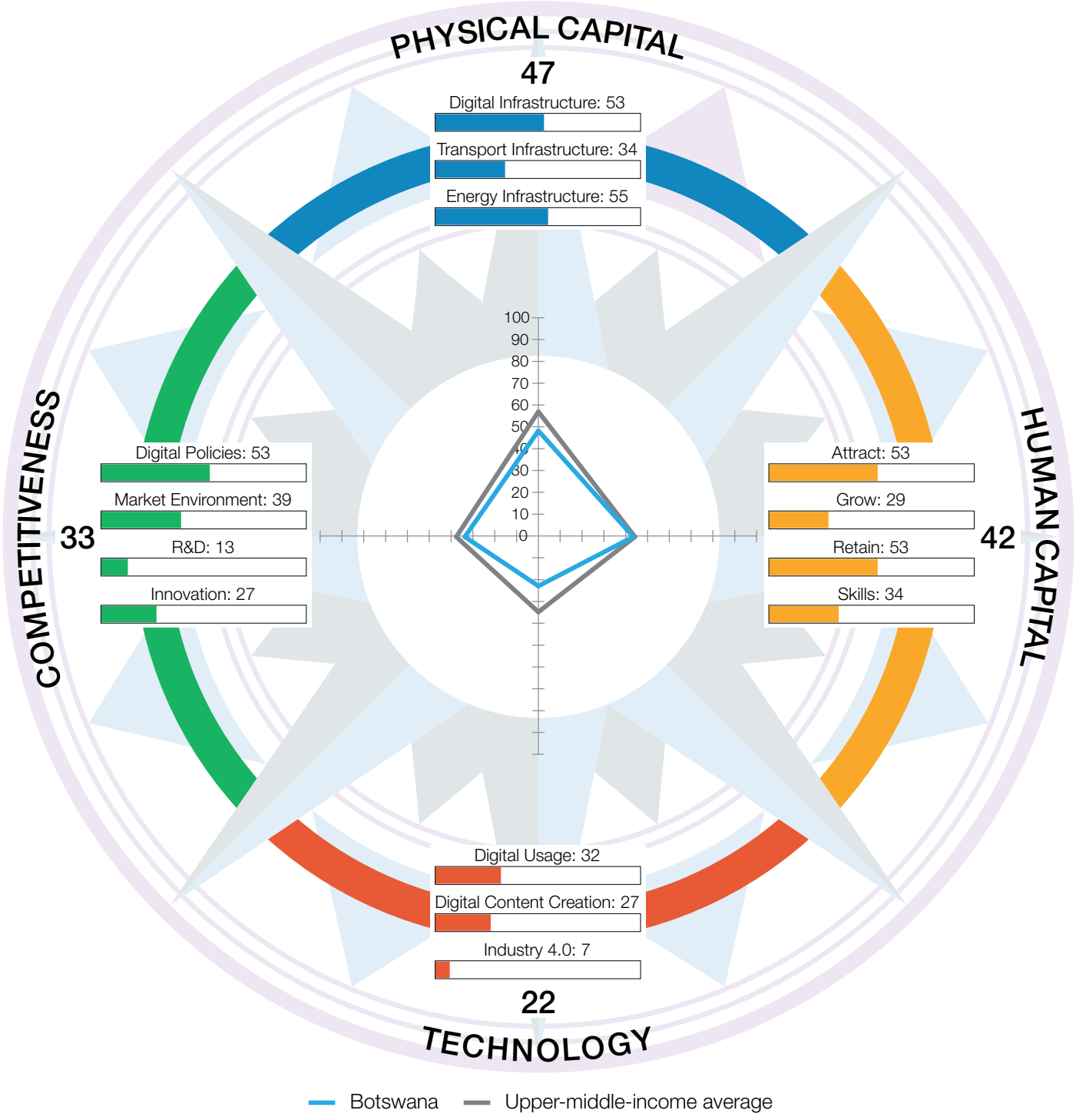
		Score	Rank
3	**TECHNOLOGY**	**32.62**	**69**
3.1	Digital Usage	51.85	73
3.1.1	Internet users	74.10	68
3.1.2	Active mobile-broadband subscriptions	21.19	102
3.1.3	Gender parity in internet usage	85.79	78
3.1.4	Firms with website	66.26	39
3.1.5	Internet shopping	34.79	56
3.1.6	Government online services	32.72	98
3.1.7	E-Participation	48.10	70
3.2	Digital Content Creation	36.52	52
3.2.1	Software development	5.61	53
3.2.2	Wikipedia edits	68.74	39
3.2.3	Internet domain registrations	2.57	66
3.2.4	Mobile apps development	69.15	70
3.3	Industry 4.0	9.49	75
3.3.1	Cloud computing	—	—
3.3.2	AI software development	4.04	90
3.3.3	AI research	8.99	54
3.3.4	ICT patent applications	0.00	76
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**32.76**	**78**
4.1	Digital Policies	44.69	97
4.1.1	ICT regulation	87.84	33
4.1.2	Cybersecurity	25.00	100
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	29.19	79
4.2.1	Extent of market dominance	20.56	102
4.2.2	Labour productivity per employee	38.93	46
4.2.3	Urbanisation	38.07	93
4.2.4	Domestic credit to private sector	19.19	68
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	27.58	59
4.3.1	R&D spending	3.37	84
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	96.48	5
4.3.4	Scientific journal articles	10.47	56
4.4	Innovation	29.58	47
4.4.1	Medium- and high-tech industry	21.52	81
4.4.2	High-tech exports	8.13	74
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	62.68	27
4.4.5	New business density	3.99	73
4.4.6	Patent applications	51.56	57

Botswana

Key Indicators

Rank (out of 124)	**89**	GDP per capita (PPP US$)	**18,323.05**
Income group	**Upper-middle income**	GDP (US$ billions)	**20.35**
Regional group	**Sub-Saharan Africa**	FREI score	**36.12**
Population (millions)	**2.63**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**47.33**	**91**
1.1	Digital Infrastructure	52.86	93
1.1.1	Internet access	62.69	78
1.1.2	International internet bandwidth	54.24	33
1.1.3	Fixed-broadband subscriptions	5.73	114
1.1.4	4G-mobile network coverage	87.10	88
1.1.5	Fixed broadband affordability	59.56	91
1.1.6	Mobile broadband affordability	91.58	68
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	34.05	58
1.2.1	Quality of infrastructure	46.43	50
1.2.2	Rural access	39.01	100
1.2.3	Air connectivity	1.53	97
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	55.09	100
1.3.1	Access to electricity	69.38	103
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	89.93	29
2	**HUMAN CAPITAL**	**42.37**	**69**
2.1	Attract	52.76	37
2.1.1	Brain gain	57.62	37
2.1.2	International students	6.44	69
2.1.3	Tolerance of minorities	60.64	38
2.1.4	Tolerance of immigrants	64.62	54
2.1.5	Gender parity in high-skilled jobs	74.51	57
2.2	Grow	28.78	101
2.2.1	Tertiary enrolment	15.60	89
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	22.42	58
2.2.4	Youth inclusion	48.32	114
2.3	Retain	53.46	72
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	59.49	33
2.3.3	Physician density	5.00	101
2.3.4	Sanitation	78.07	89
2.3.5	Personal safety	24.72	117
2.4	Skills	34.49	49
2.4.1	Workforce with tertiary education	38.37	41
2.4.2	High-skilled workforce	33.02	58
2.4.3	Researchers	1.97	80
2.4.4	Relevance of education system to the economy	75.24	14
2.4.5	Digital skills	23.85	44

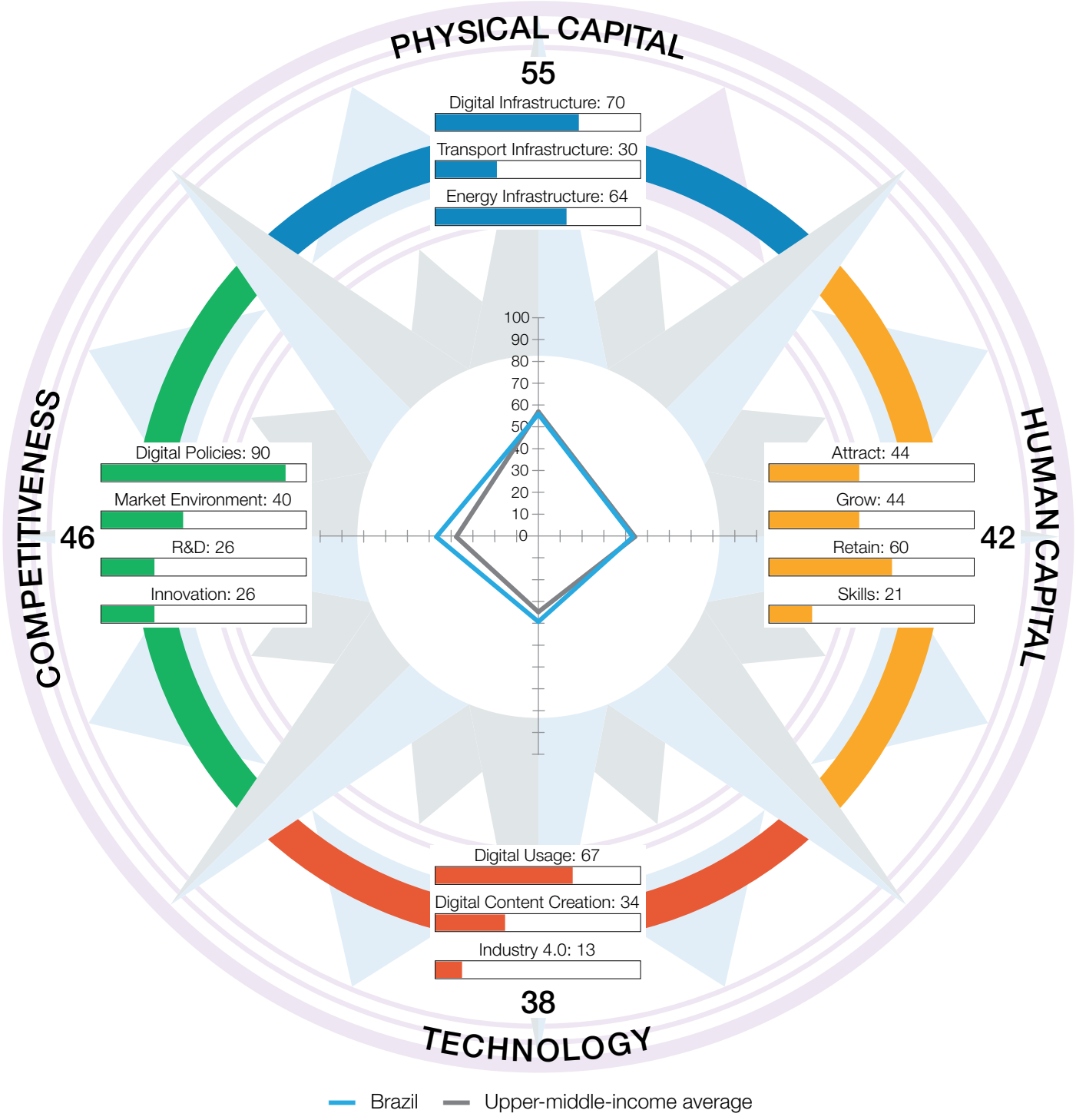
		Score	Rank
3	**TECHNOLOGY**	**21.96**	**95**
3.1	Digital Usage	31.95	97
3.1.1	Internet users	61.66	88
3.1.2	Active mobile-broadband subscriptions	37.49	57
3.1.3	Gender parity in internet usage	71.18	92
3.1.4	Firms with website	n/a	n/a
3.1.5	Internet shopping	9.51	90
3.1.6	Government online services	4.26	123
3.1.7	E-Participation	7.60	122
3.2	Digital Content Creation	26.67	79
3.2.1	Software development	0.73	104
3.2.2	Wikipedia edits	53.44	56
3.2.3	Internet domain registrations	0.96	86
3.2.4	Mobile apps development	51.57	100
3.3	Industry 4.0	7.27	93
3.3.1	Cloud computing	—	—
3.3.2	AI software development	11.30	56
3.3.3	AI research	4.37	72
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**32.81**	**77**
4.1	Digital Policies	52.90	88
4.1.1	ICT regulation	70.27	84
4.1.2	Cybersecurity	50.00	72
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	38.94	48
4.2.1	Extent of market dominance	59.70	37
4.2.2	Labour productivity per employee	19.95	73
4.2.3	Urbanisation	63.44	52
4.2.4	Domestic credit to private sector	12.68	83
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	12.52	96
4.3.1	R&D spending	10.26	56
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	35.04	82
4.3.4	Scientific journal articles	4.79	77
4.4	Innovation	26.87	61
4.4.1	Medium- and high-tech industry	9.73	102
4.4.2	High-tech exports	0.36	118
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	74.29	3
4.4.6	Patent applications	23.09	110

Brazil

Key Indicators

Rank (out of 124)	**54**	GDP per capita (PPP US$)	**17,821.74**
Income group	**Upper-middle income**	GDP (US$ billions)	**1,920.10**
Regional group	**Latin America and the Caribbean**	FREI score	**45.11**
Population (millions)	**215.31**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**54.79**	**70**
1.1	Digital Infrastructure	69.99	63
1.1.1	Internet access	82.85	55
1.1.2	International internet bandwidth	35.17	97
1.1.3	Fixed-broadband subscriptions	88.11	60
1.1.4	4G-mobile network coverage	87.42	87
1.1.5	Fixed broadband affordability	72.92	74
1.1.6	Mobile broadband affordability	96.17	37
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	30.21	71
1.2.1	Quality of infrastructure	50.00	45
1.2.2	Rural access	59.33	74
1.2.3	Air connectivity	4.22	79
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	64.18	89
1.3.1	Access to electricity	99.37	86
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	83.08	68
2	**HUMAN CAPITAL**	**42.23**	**71**
2.1	Attract	44.43	61
2.1.1	Brain gain	20.68	108
2.1.2	International students	0.53	101
2.1.3	Tolerance of minorities	24.47	93
2.1.4	Tolerance of immigrants	81.54	23
2.1.5	Gender parity in high-skilled jobs	94.93	12
2.2	Grow	43.81	60
2.2.1	Tertiary enrolment	35.57	61
2.2.2	Reading, maths, and science	26.91	65
2.2.3	Use of virtual professional networks	39.98	31
2.2.4	Youth inclusion	72.79	76
2.3	Retain	59.78	66
2.3.1	Pension coverage	91.33	45
2.3.2	Environmental performance	41.86	57
2.3.3	Physician density	33.61	71
2.3.4	Sanitation	89.11	74
2.3.5	Personal safety	42.99	99
2.4	Skills	20.92	86
2.4.1	Workforce with tertiary education	28.45	59
2.4.2	High-skilled workforce	33.89	57
2.4.3	Researchers	10.04	52
2.4.4	Relevance of education system to the economy	18.99	103
2.4.5	Digital skills	13.23	59

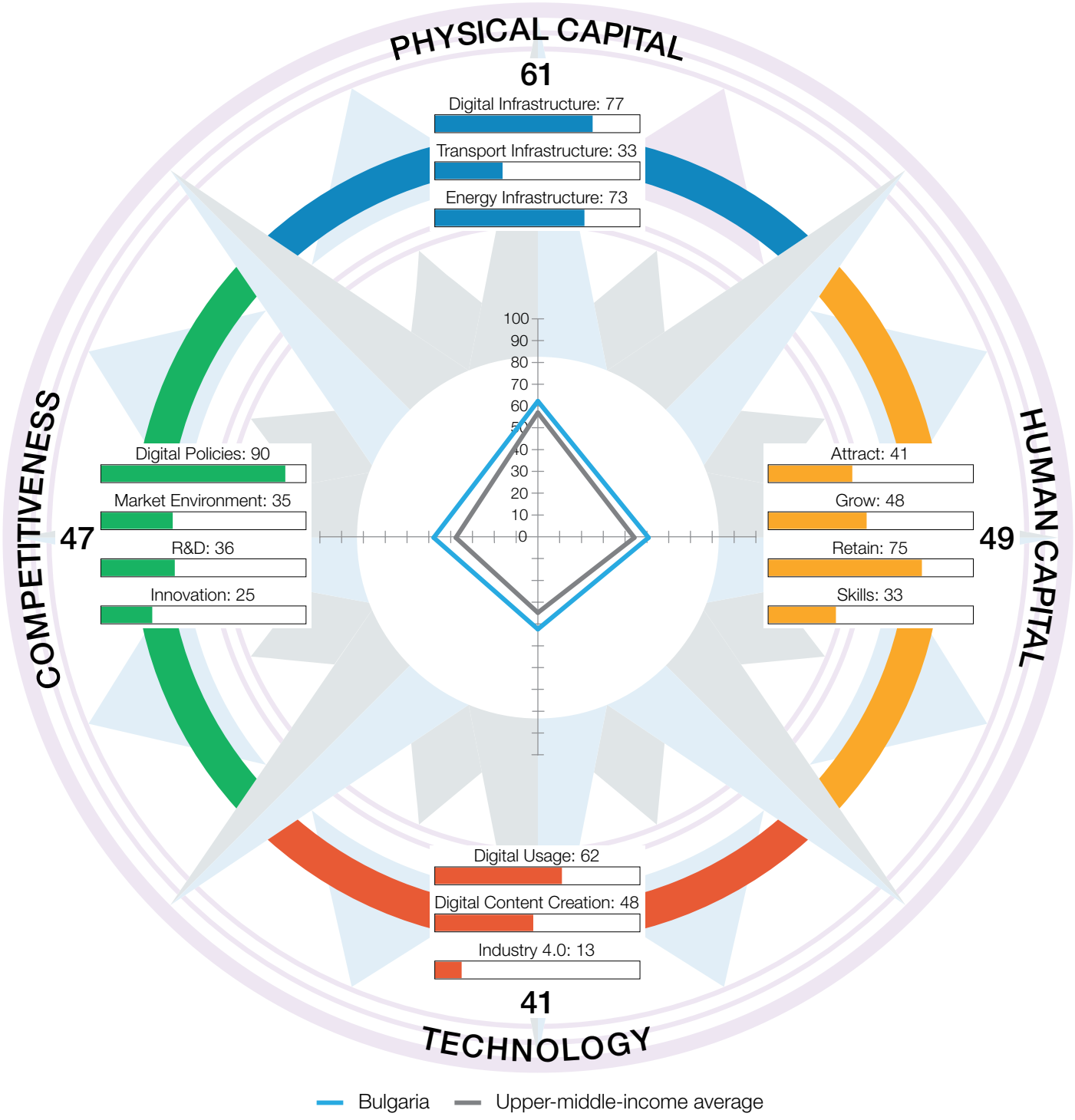
		Score	Rank
3	**TECHNOLOGY**	**37.88**	**49**
3.1	Digital Usage	67.11	43
3.1.1	Internet users	80.13	57
3.1.2	Active mobile-broadband subscriptions	38.32	50
3.1.3	Gender parity in internet usage	84.59	81
3.1.4	Firms with website	52.11	58
3.1.5	Internet shopping	39.66	51
3.1.6	Government online services	86.34	14
3.1.7	E-Participation	88.60	11
3.2	Digital Content Creation	33.94	59
3.2.1	Software development	7.46	49
3.2.2	Wikipedia edits	41.81	76
3.2.3	Internet domain registrations	4.54	52
3.2.4	Mobile apps development	81.93	44
3.3	Industry 4.0	12.59	58
3.3.1	Cloud computing	—	—
3.3.2	AI software development	24.21	30
3.3.3	AI research	4.58	69
3.3.4	ICT patent applications	0.79	51
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**45.55**	**41**
4.1	Digital Policies	90.11	6
4.1.1	ICT regulation	93.24	14
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	40.04	45
4.2.1	Extent of market dominance	46.44	51
4.2.2	Labour productivity per employee	19.08	75
4.2.3	Urbanisation	83.93	19
4.2.4	Domestic credit to private sector	30.56	44
4.2.5	Market capitalisation	20.19	27
4.3	R&D	26.03	70
4.3.1	R&D spending	21.61	35
4.3.2	University ranking	44.17	29
4.3.3	Gender parity in R&D	n/a	n/a
4.3.4	Scientific journal articles	12.30	53
4.4	Innovation	26.02	68
4.4.1	Medium- and high-tech industry	41.77	43
4.4.2	High-tech exports	13.88	54
4.4.3	Venture capital recipients, deals	7.74	54
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	11.15	43
4.4.6	Patent applications	55.56	46

Bulgaria

Key Indicators

Rank (out of 124)	**46**	GDP per capita (PPP US$)	**33,582.28**
Income group	**Upper-middle income**	GDP (US$ billions)	**89.04**
Regional group	**Europe**	FREI score	**49.47**
Population (millions)	**6.47**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**60.99**	**51**
1.1	Digital Infrastructure	77.08	38
1.1.1	Internet access	83.23	54
1.1.2	International internet bandwidth	62.81	14
1.1.3	Fixed-broadband subscriptions	98.65	17
1.1.4	4G-mobile network coverage	99.84	24
1.1.5	Fixed broadband affordability	84.49	48
1.1.6	Mobile broadband affordability	92.35	63
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	32.65	63
1.2.1	Quality of infrastructure	46.43	50
1.2.2	Rural access	61.44	71
1.2.3	Air connectivity	9.81	51
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	73.25	44
1.3.1	Access to electricity	99.77	81
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	93.98	47
1.3.4	Energy intensity	78.84	84
2	**HUMAN CAPITAL**	**49.44**	**47**
2.1	Attract	41.27	81
2.1.1	Brain gain	21.98	107
2.1.2	International students	20.54	34
2.1.3	Tolerance of minorities	57.45	40
2.1.4	Tolerance of immigrants	32.31	108
2.1.5	Gender parity in high-skilled jobs	74.08	59
2.2	Grow	47.99	50
2.2.1	Tertiary enrolment	49.50	26
2.2.2	Reading, maths, and science	37.78	49
2.2.3	Use of virtual professional networks	21.29	61
2.2.4	Youth inclusion	83.39	46
2.3	Retain	75.24	36
2.3.1	Pension coverage	93.88	42
2.3.2	Environmental performance	55.93	35
2.3.3	Physician density	65.91	19
2.3.4	Sanitation	84.67	82
2.3.5	Personal safety	75.79	45
2.4	Skills	33.28	53
2.4.1	Workforce with tertiary education	39.56	39
2.4.2	High-skilled workforce	48.27	42
2.4.3	Researchers	27.45	34
2.4.4	Relevance of education system to the economy	45.41	52
2.4.5	Digital skills	5.70	65

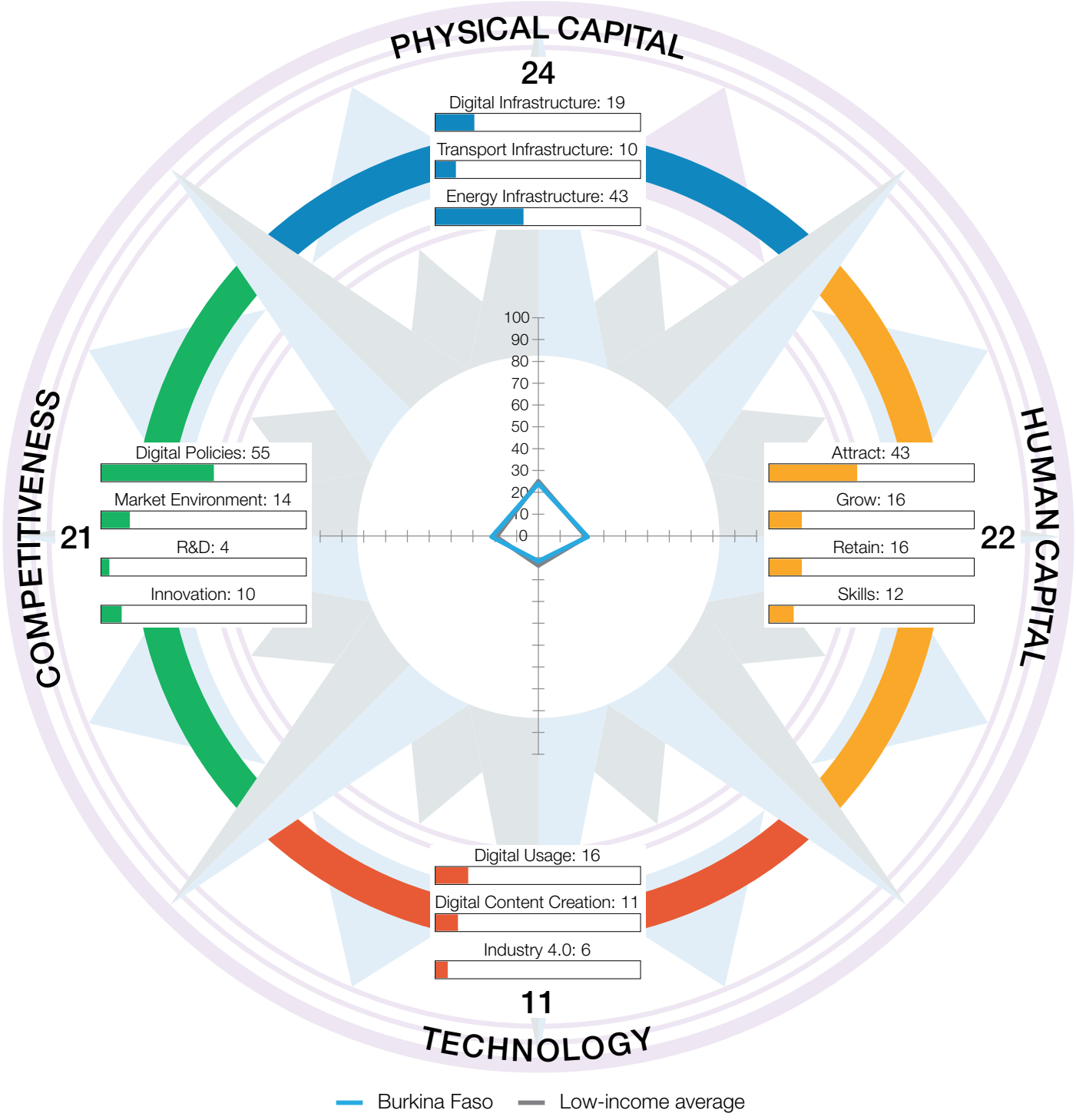
		Score	Rank
3	**TECHNOLOGY**	**40.92**	**42**
3.1	Digital Usage	62.34	54
3.1.1	Internet users	73.67	69
3.1.2	Active mobile-broadband subscriptions	44.49	31
3.1.3	Gender parity in internet usage	94.47	60
3.1.4	Firms with website	46.73	61
3.1.5	Internet shopping	44.48	47
3.1.6	Government online services	61.65	63
3.1.7	E-Participation	70.88	29
3.2	Digital Content Creation	47.58	34
3.2.1	Software development	15.54	34
3.2.2	Wikipedia edits	72.21	35
3.2.3	Internet domain registrations	11.31	36
3.2.4	Mobile apps development	91.29	26
3.3	Industry 4.0	12.84	56
3.3.1	Cloud computing	—	—
3.3.2	AI software development	11.79	55
3.3.3	AI research	14.61	45
3.3.4	ICT patent applications	0.94	49
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**46.54**	**37**
4.1	Digital Policies	90.11	6
4.1.1	ICT regulation	93.24	14
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	35.08	61
4.2.1	Extent of market dominance	48.92	47
4.2.2	Labour productivity per employee	29.52	60
4.2.3	Urbanisation	70.10	43
4.2.4	Domestic credit to private sector	19.30	67
4.2.5	Market capitalisation	7.54	53
4.3	R&D	36.38	38
4.3.1	R&D spending	15.66	44
4.3.2	University ranking	22.19	49
4.3.3	Gender parity in R&D	85.49	23
4.3.4	Scientific journal articles	22.19	43
4.4	Innovation	24.58	76
4.4.1	Medium- and high-tech industry	39.57	48
4.4.2	High-tech exports	17.45	44
4.4.3	Venture capital recipients, deals	9.50	44
4.4.4	New product entrepreneurial activity	21.36	76
4.4.5	New business density	5.65	65
4.4.6	Patent applications	53.96	52

Burkina Faso

Key Indicators

Rank (out of 124)	**118**	GDP per capita (PPP US$)	**2,545.86**
Income group	**Low income**	GDP (US$ billions)	**18.88**
Regional group	**Sub-Saharan Africa**	FREI score	**19.37**
Population (millions)	**22.67**	FREI score (income group average)	**19.43**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**23.80**	**118**
1.1	Digital Infrastructure	18.79	121
1.1.1	Internet access	1.27	115
1.1.2	International internet bandwidth	25.64	112
1.1.3	Fixed-broadband subscriptions	28.84	97
1.1.4	4G-mobile network coverage	31.83	116
1.1.5	Fixed broadband affordability	31.40	117
1.1.6	Mobile broadband affordability	12.59	119
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	9.55	120
1.2.1	Quality of infrastructure	17.86	100
1.2.2	Rural access	17.26	118
1.2.3	Air connectivity	0.06	119
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	43.04	111
1.3.1	Access to electricity	5.55	122
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	80.53	80
2	**HUMAN CAPITAL**	**21.97**	**118**
2.1	Attract	43.20	68
2.1.1	Brain gain	26.26	103
2.1.2	International students	4.95	75
2.1.3	Tolerance of minorities	44.68	57
2.1.4	Tolerance of immigrants	78.46	26
2.1.5	Gender parity in high-skilled jobs	61.65	81
2.2	Grow	16.49	122
2.2.1	Tertiary enrolment	5.44	109
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	1.81	117
2.2.4	Youth inclusion	42.22	115
2.3	Retain	16.47	117
2.3.1	Pension coverage	0.71	118
2.3.2	Environmental performance	28.14	85
2.3.3	Physician density	0.91	117
2.3.4	Sanitation	14.00	118
2.3.5	Personal safety	38.60	104
2.4	Skills	11.71	109
2.4.1	Workforce with tertiary education	3.30	116
2.4.2	High-skilled workforce	16.49	88
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	15.35	108
2.4.5	Digital skills	n/a	n/a

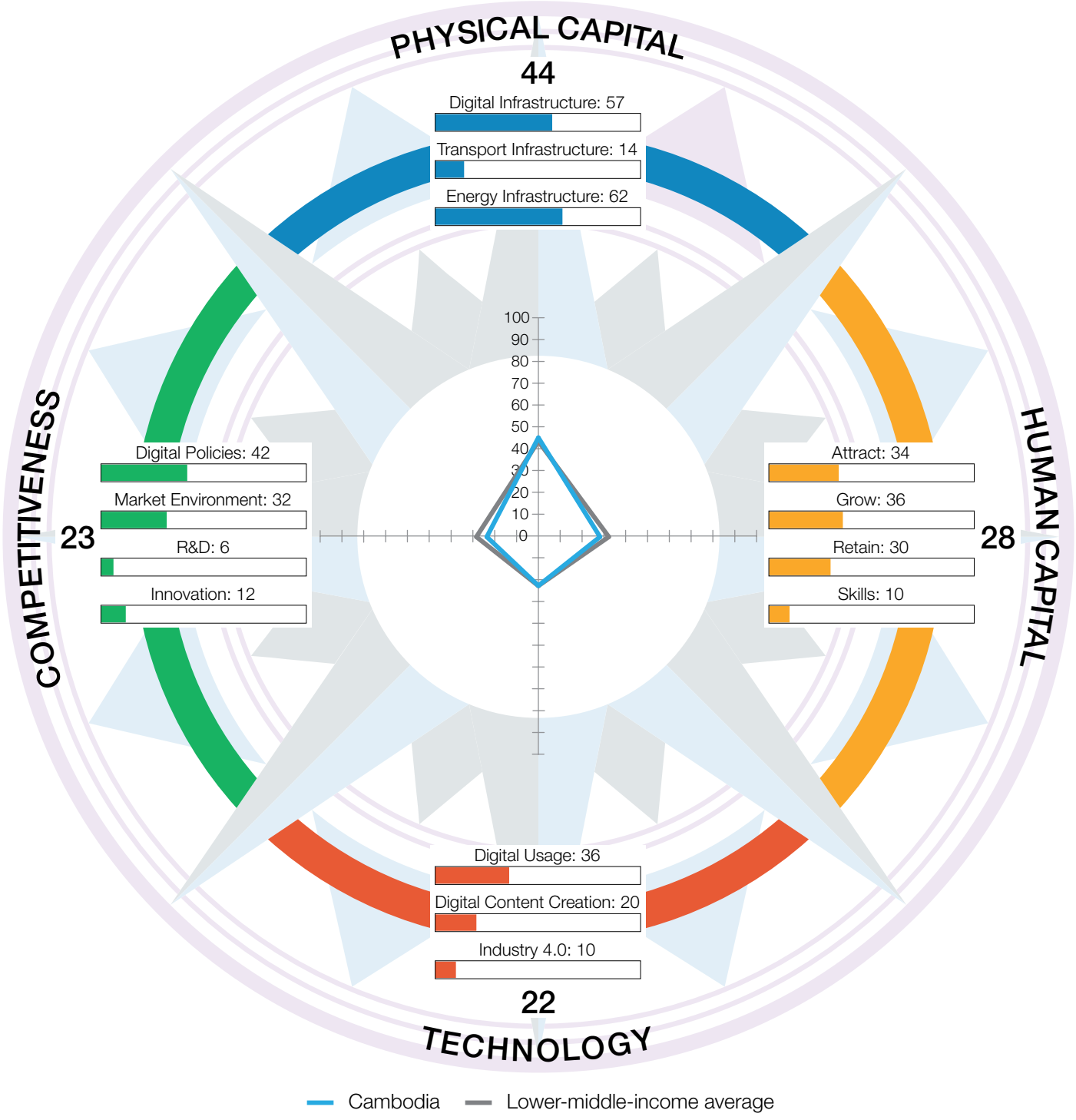
		Score	Rank
3	**TECHNOLOGY**	**10.91**	**120**
3.1	Digital Usage	16.13	120
3.1.1	Internet users	16.93	116
3.1.2	Active mobile-broadband subscriptions	23.46	97
3.1.3	Gender parity in internet usage	20.35	104
3.1.4	Firms with website	n/a	n/a
3.1.5	Internet shopping	4.82	105
3.1.6	Government online services	17.32	115
3.1.7	E-Participation	13.92	116
3.2	Digital Content Creation	10.86	120
3.2.1	Software development	0.04	122
3.2.2	Wikipedia edits	21.14	108
3.2.3	Internet domain registrations	0.03	118
3.2.4	Mobile apps development	22.24	121
3.3	Industry 4.0	5.75	105
3.3.1	Cloud computing	—	—
3.3.2	AI software development	0.03	120
3.3.3	AI research	0.15	115
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**20.80**	**112**
4.1	Digital Policies	54.63	83
4.1.1	ICT regulation	82.43	58
4.1.2	Cybersecurity	50.00	72
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	14.44	113
4.2.1	Extent of market dominance	29.00	89
4.2.2	Labour productivity per employee	2.21	109
4.2.3	Urbanisation	15.47	115
4.2.4	Domestic credit to private sector	11.07	86
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	4.09	108
4.3.1	R&D spending	4.44	80
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	11.54	99
4.3.4	Scientific journal articles	0.38	110
4.4	Innovation	10.04	123
4.4.1	Medium- and high-tech industry	n/a	n/a
4.4.2	High-tech exports	3.36	94
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	1.19	96
4.4.6	Patent applications	25.56	108

Cambodia

Key Indicators

Rank (out of 124)	**97**	GDP per capita (PPP US$)	**5,349.46**
Income group	**Lower-middle income**	GDP (US$ billions)	**29.96**
Regional group	**Asia and Pacific**	FREI score	**29.15**
Population (millions)	**16.77**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**44.26**	**95**
1.1	Digital Infrastructure	56.98	90
1.1.1	Internet access	48.94	87
1.1.2	International internet bandwidth	36.70	94
1.1.3	Fixed-broadband subscriptions	86.48	63
1.1.4	4G-mobile network coverage	95.38	72
1.1.5	Fixed broadband affordability	50.42	100
1.1.6	Mobile broadband affordability	80.95	92
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	13.73	113
1.2.1	Quality of infrastructure	10.71	115
1.2.2	Rural access	33.02	105
1.2.3	Air connectivity	9.08	55
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	62.07	93
1.3.1	Access to electricity	79.61	101
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	89.47	61
1.3.4	Energy intensity	76.53	88
2	**HUMAN CAPITAL**	**27.51**	**101**
2.1	Attract	33.66	108
2.1.1	Brain gain	54.69	45
2.1.2	International students	0.56	100
2.1.3	Tolerance of minorities	41.49	64
2.1.4	Tolerance of immigrants	9.23	120
2.1.5	Gender parity in high-skilled jobs	62.35	78
2.2	Grow	35.83	78
2.2.1	Tertiary enrolment	7.74	100
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	4.42	106
2.2.4	Youth inclusion	95.34	6
2.3	Retain	30.22	99
2.3.1	Pension coverage	4.69	111
2.3.2	Environmental performance	18.98	105
2.3.3	Physician density	2.87	106
2.3.4	Sanitation	65.71	98
2.3.5	Personal safety	58.83	69
2.4	Skills	10.31	114
2.4.1	Workforce with tertiary education	7.25	107
2.4.2	High-skilled workforce	4.46	110
2.4.3	Researchers	0.19	95
2.4.4	Relevance of education system to the economy	38.92	68
2.4.5	Digital skills	0.73	78

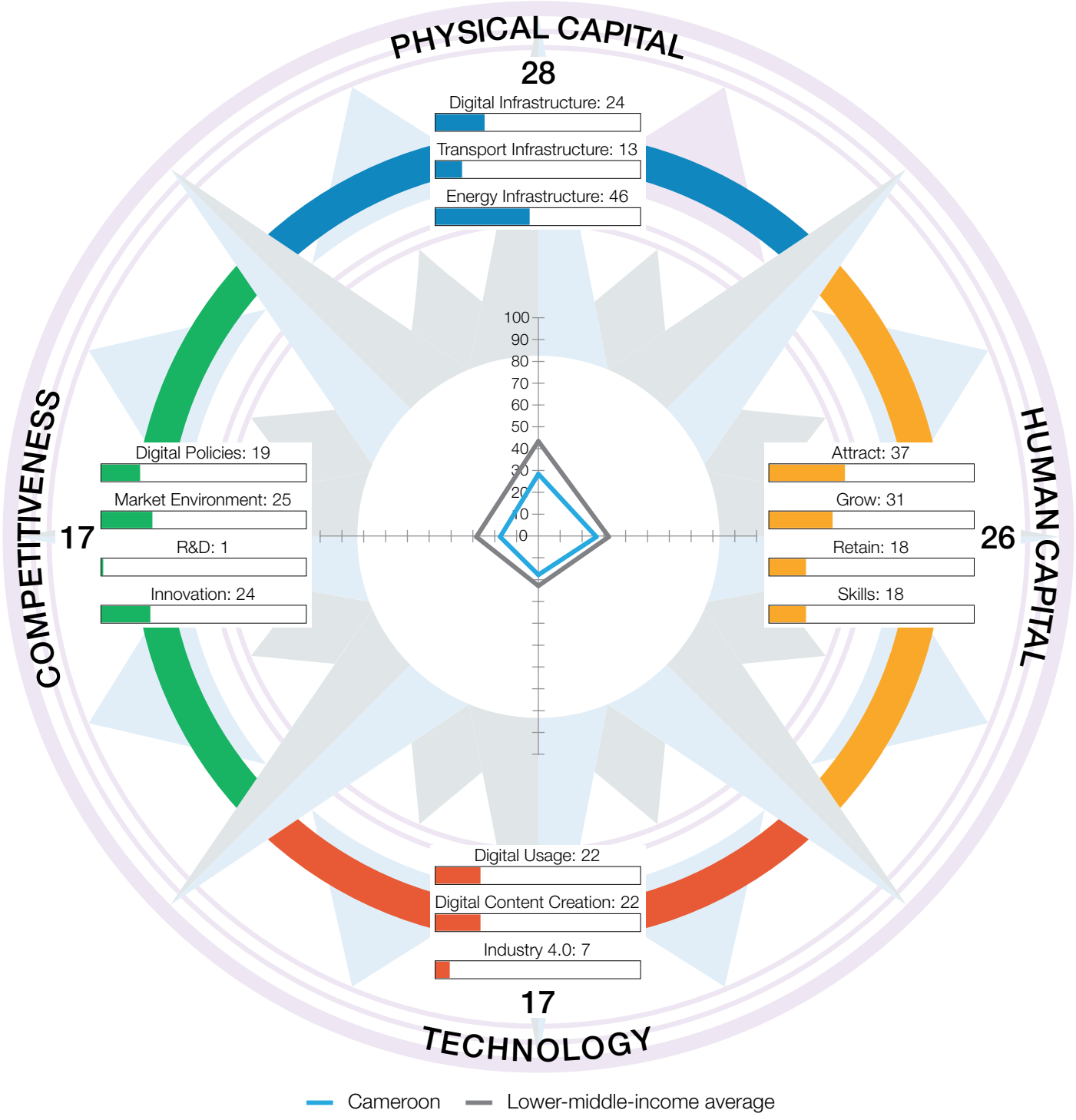
		Score	Rank
3	**TECHNOLOGY**	**21.80**	**96**
3.1	Digital Usage	35.54	94
3.1.1	Internet users	49.21	94
3.1.2	Active mobile-broadband subscriptions	42.48	40
3.1.3	Gender parity in internet usage	95.93	51
3.1.4	Firms with website	13.28	96
3.1.5	Internet shopping	4.34	107
3.1.6	Government online services	23.26	110
3.1.7	E-Participation	20.25	104
3.2	Digital Content Creation	20.34	100
3.2.1	Software development	1.10	95
3.2.2	Wikipedia edits	21.46	107
3.2.3	Internet domain registrations	0.33	100
3.2.4	Mobile apps development	58.46	91
3.3	Industry 4.0	9.54	74
3.3.1	Cloud computing	—	—
3.3.2	AI software development	0.92	108
3.3.3	AI research	0.70	99
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**23.03**	**109**
4.1	Digital Policies	41.63	102
4.1.1	ICT regulation	58.11	107
4.1.2	Cybersecurity	0.00	106
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	33.33	104
4.1.7	Data transfer	100.00	1
4.2	Market Environment	32.25	69
4.2.1	Extent of market dominance	36.57	72
4.2.2	Labour productivity per employee	2.83	105
4.2.3	Urbanisation	8.33	118
4.2.4	Domestic credit to private sector	81.26	5
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	6.23	107
4.3.1	R&D spending	1.97	97
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	22.64	95
4.3.4	Scientific journal articles	0.33	113
4.4	Innovation	12.00	122
4.4.1	Medium- and high-tech industry	0.00	118
4.4.2	High-tech exports	3.40	93
4.4.3	Venture capital recipients, deals	17.13	32
4.4.4	New product entrepreneurial activity	41.70	57
4.4.5	New business density	2.07	84
4.4.6	Patent applications	7.70	119

Cameroon

Key Indicators

Rank (out of 124)	**113**	GDP per capita (PPP US$)	**4,408.05**
Income group	**Lower-middle income**	GDP (US$ billions)	**44.34**
Regional group	**Sub-Saharan Africa**	FREI score	**21.99**
Population (millions)	**27.91**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**28.03**	**113**
1.1	Digital Infrastructure	24.50	117
1.1.1	Internet access	19.99	98
1.1.2	International internet bandwidth	10.83	122
1.1.3	Fixed-broadband subscriptions	17.32	106
1.1.4	4G-mobile network coverage	6.42	123
1.1.5	Fixed broadband affordability	39.89	112
1.1.6	Mobile broadband affordability	67.94	106
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	13.44	115
1.2.1	Quality of infrastructure	10.71	115
1.2.2	Rural access	40.75	97
1.2.3	Air connectivity	0.24	115
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	46.15	107
1.3.1	Access to electricity	59.73	107
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	42.86	81
1.3.4	Energy intensity	81.02	77
2	**HUMAN CAPITAL**	**25.91**	**106**
2.1	Attract	36.51	103
2.1.1	Brain gain	44.34	71
2.1.2	International students	7.37	67
2.1.3	Tolerance of minorities	13.83	109
2.1.4	Tolerance of immigrants	61.54	58
2.1.5	Gender parity in high-skilled jobs	55.46	91
2.2	Grow	31.29	90
2.2.1	Tertiary enrolment	8.60	99
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	6.46	99
2.2.4	Youth inclusion	78.83	58
2.3	Retain	18.27	113
2.3.1	Pension coverage	16.63	96
2.3.2	Environmental performance	19.15	104
2.3.3	Physician density	1.43	113
2.3.4	Sanitation	39.22	107
2.3.5	Personal safety	14.91	120
2.4	Skills	17.58	96
2.4.1	Workforce with tertiary education	7.46	105
2.4.2	High-skilled workforce	12.54	96
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	32.75	82
2.4.5	Digital skills	n/a	n/a

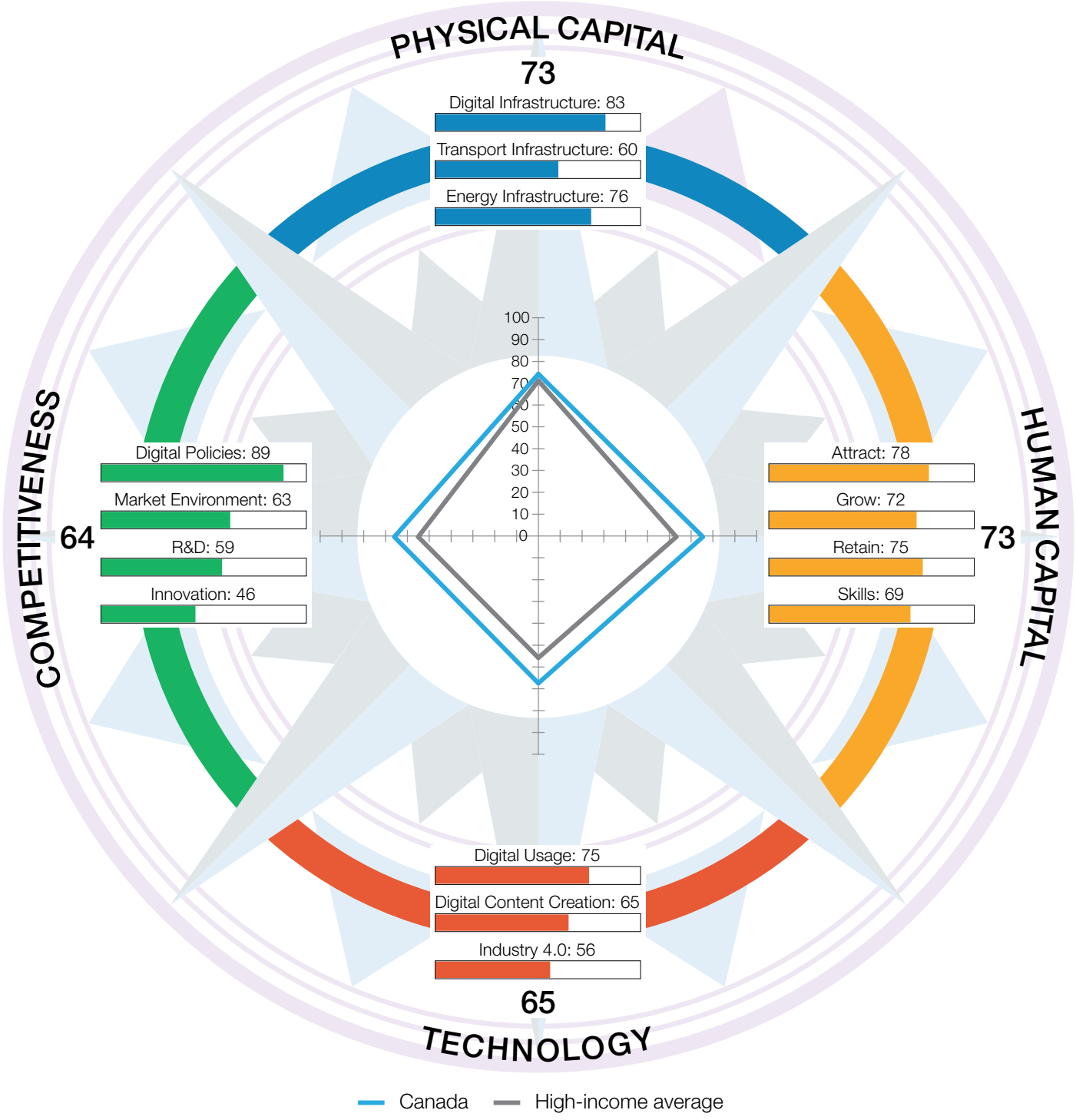
		Score	Rank
3	**TECHNOLOGY**	**16.95**	**106**
3.1	Digital Usage	21.61	111
3.1.1	Internet users	33.76	100
3.1.2	Active mobile-broadband subscriptions	12.50	114
3.1.3	Gender parity in internet usage	48.31	96
3.1.4	Firms with website	11.34	97
3.1.5	Internet shopping	5.31	102
3.1.6	Government online services	19.77	111
3.1.7	E-Participation	20.25	104
3.2	Digital Content Creation	22.12	97
3.2.1	Software development	0.53	106
3.2.2	Wikipedia edits	17.17	111
3.2.3	Internet domain registrations	n/a	n/a
3.2.4	Mobile apps development	48.65	103
3.3	Industry 4.0	7.14	96
3.3.1	Cloud computing	—	—
3.3.2	AI software development	3.29	94
3.3.3	AI research	1.48	90
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**17.07**	**116**
4.1	Digital Policies	18.60	121
4.1.1	ICT regulation	63.51	96
4.1.2	Cybersecurity	0.00	106
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	66.67	87
4.1.7	Data transfer	0.00	119
4.2	Market Environment	24.92	94
4.2.1	Extent of market dominance	43.84	56
4.2.2	Labour productivity per employee	4.90	102
4.2.3	Urbanisation	47.80	79
4.2.4	Domestic credit to private sector	3.13	112
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	0.77	116
4.3.1	R&D spending	n/a	n/a
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	n/a	n/a
4.3.4	Scientific journal articles	1.55	92
4.4	Innovation	23.99	79
4.4.1	Medium- and high-tech industry	8.99	105
4.4.2	High-tech exports	10.80	63
4.4.3	Venture capital recipients, deals	3.19	72
4.4.4	New product entrepreneurial activity	50.97	43
4.4.5	New business density	n/a	n/a
4.4.6	Patent applications	46.00	72

Canada

Key Indicators

Rank (out of 124)	**11**	GDP per capita (PPP US$)	**58,399.55**
Income group	**High income**	GDP (US$ billions)	**2,139.84**
Regional group	**Northern America**	FREI score	**68.93**
Population (millions)	**38.93**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**72.68**	**16**
1.1	Digital Infrastructure	82.88	9
1.1.1	Internet access	94.14	21
1.1.2	International internet bandwidth	45.83	59
1.1.3	Fixed-broadband subscriptions	91.10	51
1.1.4	4G-mobile network coverage	99.46	34
1.1.5	Fixed broadband affordability	89.85	29
1.1.6	Mobile broadband affordability	96.17	37
1.1.7	Computer software spending	63.64	2
1.2	Transport Infrastructure	59.59	14
1.2.1	Quality of infrastructure	89.29	3
1.2.2	Rural access	74.58	51
1.2.3	Air connectivity	30.87	24
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	75.56	34
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	66.28	107
2	**HUMAN CAPITAL**	**73.42**	**11**
2.1	Attract	77.66	3
2.1.1	Brain gain	79.39	11
2.1.2	International students	48.40	9
2.1.3	Tolerance of minorities	78.72	9
2.1.4	Tolerance of immigrants	98.46	2
2.1.5	Gender parity in high-skilled jobs	83.30	39
2.2	Grow	72.07	8
2.2.1	Tertiary enrolment	52.25	25
2.2.2	Reading, maths, and science	74.55	6
2.2.3	Use of virtual professional networks	74.75	8
2.2.4	Youth inclusion	86.74	37
2.3	Retain	74.71	39
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	52.71	41
2.3.3	Physician density	38.73	62
2.3.4	Sanitation	98.94	35
2.3.5	Personal safety	83.15	30
2.4	Skills	69.26	6
2.4.1	Workforce with tertiary education	84.47	2
2.4.2	High-skilled workforce	66.49	25
2.4.3	Researchers	51.75	22
2.4.4	Relevance of education system to the economy	74.33	15
2.4.5	Digital skills	n/a	n/a

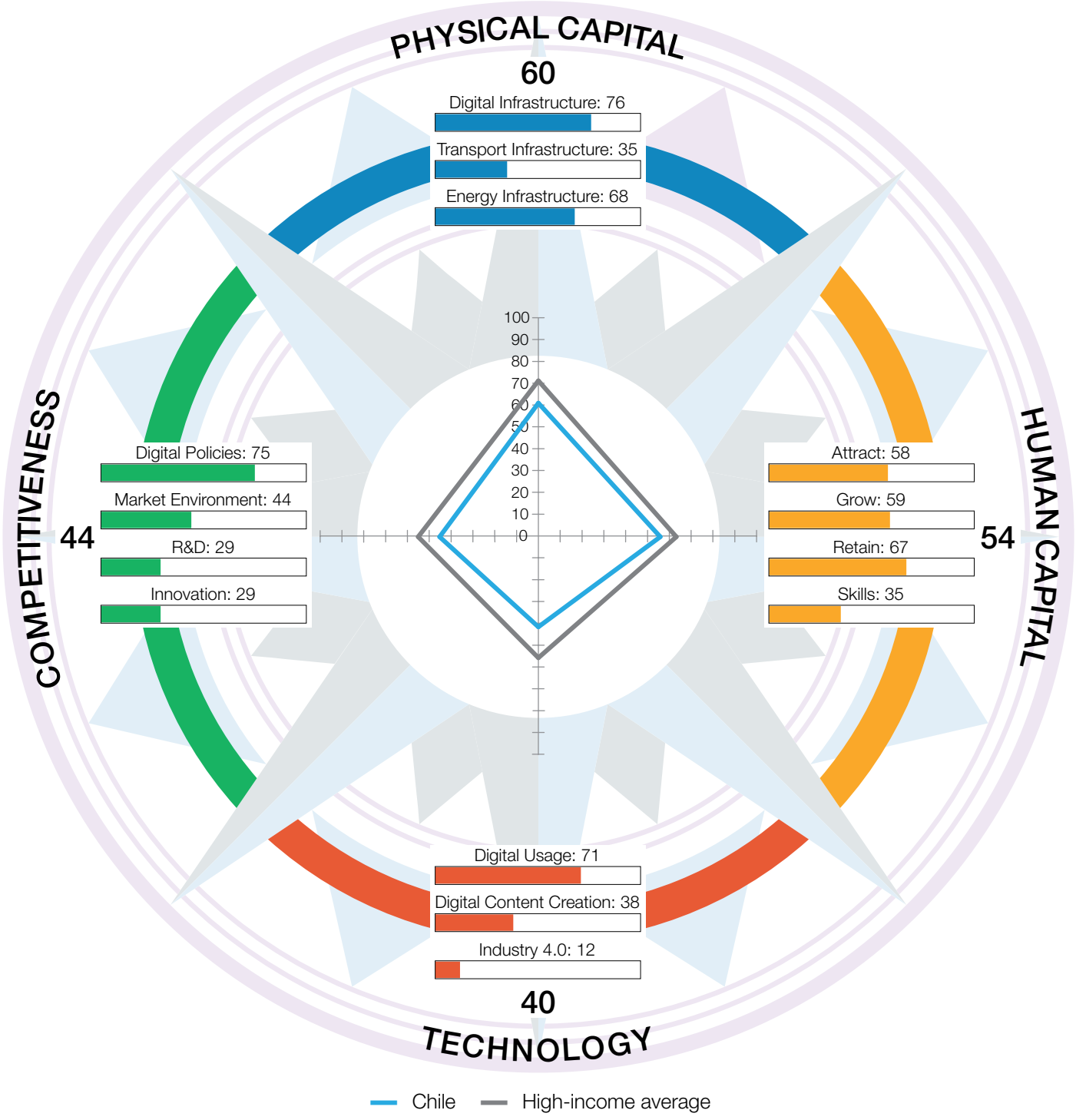
		Score	Rank
3	**TECHNOLOGY**	**65.32**	**11**
3.1	Digital Usage	75.36	23
3.1.1	Internet users	91.80	19
3.1.2	Active mobile-broadband subscriptions	32.53	73
3.1.3	Gender parity in internet usage	n/a	n/a
3.1.4	Firms with website	85.81	8
3.1.5	Internet shopping	80.76	14
3.1.6	Government online services	80.27	27
3.1.7	E-Participation	81.01	14
3.2	Digital Content Creation	64.87	12
3.2.1	Software development	40.87	11
3.2.2	Wikipedia edits	76.44	26
3.2.3	Internet domain registrations	47.01	11
3.2.4	Mobile apps development	95.17	17
3.3	Industry 4.0	55.73	10
3.3.1	Cloud computing	—	—
3.3.2	AI software development	100.00	1
3.3.3	AI research	51.29	11
3.3.4	ICT patent applications	40.04	12
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**64.30**	**10**
4.1	Digital Policies	88.85	9
4.1.1	ICT regulation	84.46	53
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	63.00	10
4.2.1	Extent of market dominance	66.22	23
4.2.2	Labour productivity per employee	59.59	22
4.2.3	Urbanisation	77.76	30
4.2.4	Domestic credit to private sector	n/a	n/a
4.2.5	Market capitalisation	48.43	7
4.3	R&D	59.16	10
4.3.1	R&D spending	31.52	23
4.3.2	University ranking	81.16	6
4.3.3	Gender parity in R&D	n/a	n/a
4.3.4	Scientific journal articles	64.81	12
4.4	Innovation	46.20	17
4.4.1	Medium- and high-tech industry	45.46	38
4.4.2	High-tech exports	23.18	34
4.4.3	Venture capital recipients, deals	100.00	1
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	0.72	98
4.4.6	Patent applications	61.61	31

Chile

Key Indicators

Rank (out of 124)	**43**	GDP per capita (PPP US$)	**30,208.81**
Income group	**High income**	GDP (US$ billions)	**301.03**
Regional group	**Latin America and the Caribbean**	FREI score	**49.60**
Population (millions)	**19.60**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**59.70**	**54**
1.1	Digital Infrastructure	76.27	44
1.1.1	Internet access	87.32	41
1.1.2	International internet bandwidth	57.24	24
1.1.3	Fixed-broadband subscriptions	89.96	57
1.1.4	4G-mobile network coverage	87.10	88
1.1.5	Fixed broadband affordability	78.44	63
1.1.6	Mobile broadband affordability	97.45	22
1.1.7	Computer software spending	36.36	21
1.2	Transport Infrastructure	35.23	56
1.2.1	Quality of infrastructure	35.71	63
1.2.2	Rural access	74.32	53
1.2.3	Air connectivity	9.32	52
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	67.59	82
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	85.69	56
2	**HUMAN CAPITAL**	**54.42**	**34**
2.1	Attract	57.73	33
2.1.1	Brain gain	55.43	44
2.1.2	International students	2.69	82
2.1.3	Tolerance of minorities	65.96	30
2.1.4	Tolerance of immigrants	67.69	45
2.1.5	Gender parity in high-skilled jobs	96.91	8
2.2	Grow	58.72	28
2.2.1	Tertiary enrolment	60.39	12
2.2.2	Reading, maths, and science	42.32	45
2.2.3	Use of virtual professional networks	49.94	22
2.2.4	Youth inclusion	82.25	49
2.3	Retain	66.61	50
2.3.1	Pension coverage	70.92	62
2.3.2	Environmental performance	47.12	49
2.3.3	Physician density	46.85	50
2.3.4	Sanitation	100.00	1
2.3.5	Personal safety	68.18	53
2.4	Skills	34.61	48
2.4.1	Workforce with tertiary education	29.93	57
2.4.2	High-skilled workforce	47.04	45
2.4.3	Researchers	5.71	67
2.4.4	Relevance of education system to the economy	32.54	83
2.4.5	Digital skills	57.82	9

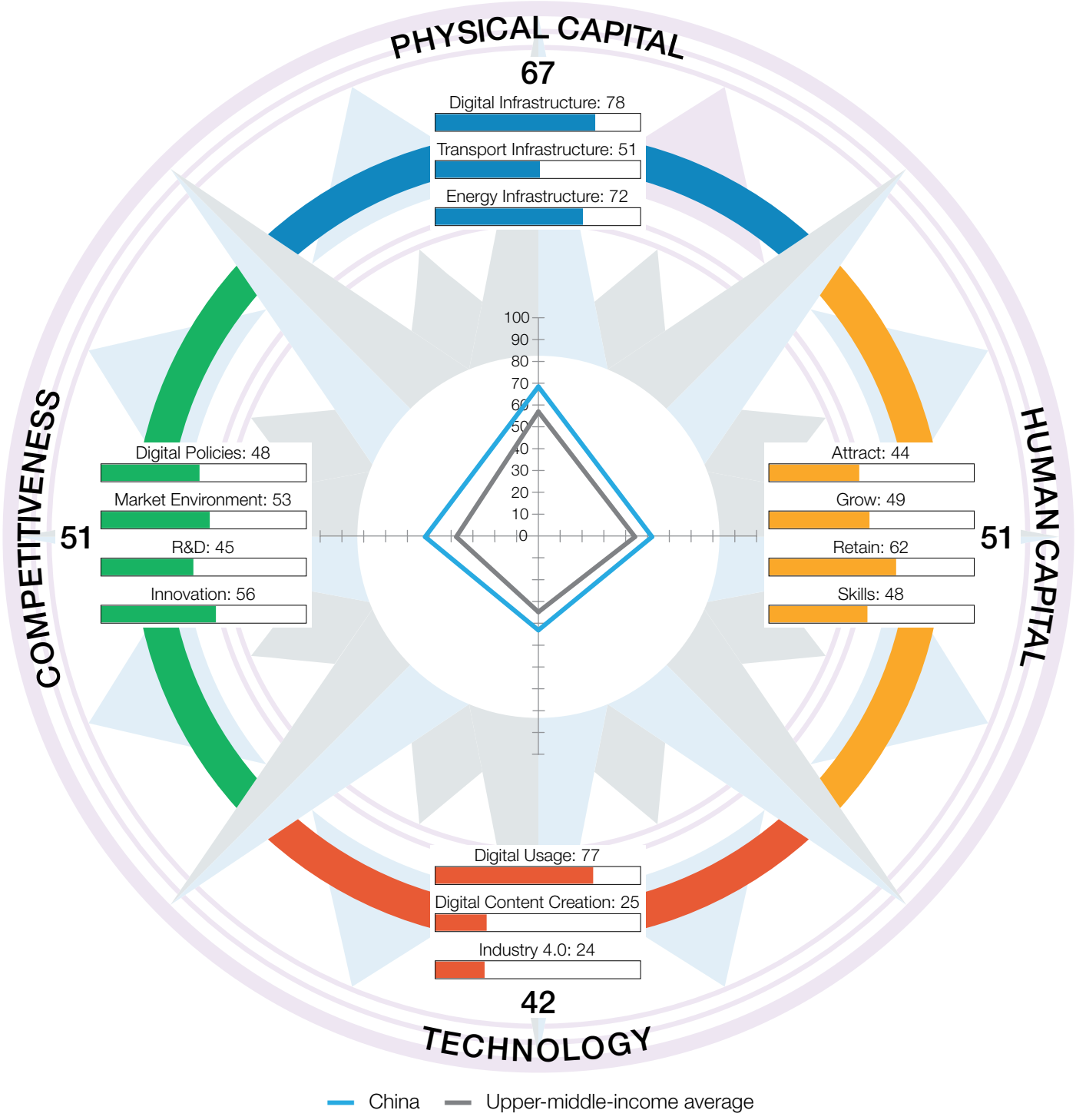
		Score	Rank
3	**TECHNOLOGY**	**40.20**	**43**
3.1	Digital Usage	70.78	34
3.1.1	Internet users	87.54	37
3.1.2	Active mobile-broadband subscriptions	44.64	30
3.1.3	Gender parity in internet usage	93.27	65
3.1.4	Firms with website	n/a	n/a
3.1.5	Internet shopping	56.09	39
3.1.6	Government online services	77.32	30
3.1.7	E-Participation	65.82	43
3.2	Digital Content Creation	38.03	48
3.2.1	Software development	4.82	55
3.2.2	Wikipedia edits	61.78	47
3.2.3	Internet domain registrations	7.14	45
3.2.4	Mobile apps development	78.39	52
3.3	Industry 4.0	11.80	62
3.3.1	Cloud computing	—	—
3.3.2	AI software development	15.60	44
3.3.3	AI research	9.35	53
3.3.4	ICT patent applications	0.71	52
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**44.09**	**47**
4.1	Digital Policies	74.86	40
4.1.1	ICT regulation	86.49	40
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	43.57	39
4.2.1	Extent of market dominance	27.39	91
4.2.2	Labour productivity per employee	33.16	52
4.2.3	Urbanisation	85.12	17
4.2.4	Domestic credit to private sector	50.27	19
4.2.5	Market capitalisation	21.90	23
4.3	R&D	28.61	55
4.3.1	R&D spending	6.16	69
4.3.2	University ranking	43.16	30
4.3.3	Gender parity in R&D	47.76	62
4.3.4	Scientific journal articles	17.38	49
4.4	Innovation	29.30	49
4.4.1	Medium- and high-tech industry	24.58	76
4.4.2	High-tech exports	19.24	40
4.4.3	Venture capital recipients, deals	3.95	66
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	49.96	9
4.4.6	Patent applications	48.79	66

China

Key Indicators

Rank (out of 124)	**38**	GDP per capita (PPP US$)	**21,475.61**
Income group	**Upper-middle income**	GDP (US$ billions)	**17,963.17**
Regional group	**Asia and Pacific**	FREI score	**52.50**
Population (millions)	**1,412.17**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**67.03**	**35**
1.1	Digital Infrastructure	77.58	34
1.1.1	Internet access	n/a	n/a
1.1.2	International internet bandwidth	41.82	81
1.1.3	Fixed-broadband subscriptions	99.24	12
1.1.4	4G-mobile network coverage	99.89	17
1.1.5	Fixed broadband affordability	100.00	1
1.1.6	Mobile broadband affordability	97.28	25
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	51.09	32
1.2.1	Quality of infrastructure	78.57	14
1.2.2	Rural access	71.16	57
1.2.3	Air connectivity	8.14	59
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	72.41	54
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	99.25	6
1.3.4	Energy intensity	68.77	103
2	**HUMAN CAPITAL**	**50.73**	**42**
2.1	Attract	43.68	64
2.1.1	Brain gain	84.43	7
2.1.2	International students	0.97	95
2.1.3	Tolerance of minorities	30.85	78
2.1.4	Tolerance of immigrants	58.46	64
2.1.5	Gender parity in high-skilled jobs	n/a	n/a
2.2	Grow	48.86	48
2.2.1	Tertiary enrolment	41.61	49
2.2.2	Reading, maths, and science	100.00	1
2.2.3	Use of virtual professional networks	4.98	103
2.2.4	Youth inclusion	n/a	n/a
2.3	Retain	61.93	59
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	16.10	111
2.3.3	Physician density	37.52	65
2.3.4	Sanitation	91.63	70
2.3.5	Personal safety	64.39	58
2.4	Skills	48.46	28
2.4.1	Workforce with tertiary education	n/a	n/a
2.4.2	High-skilled workforce	n/a	n/a
2.4.3	Researchers	18.06	46
2.4.4	Relevance of education system to the economy	78.87	10
2.4.5	Digital skills	n/a	n/a

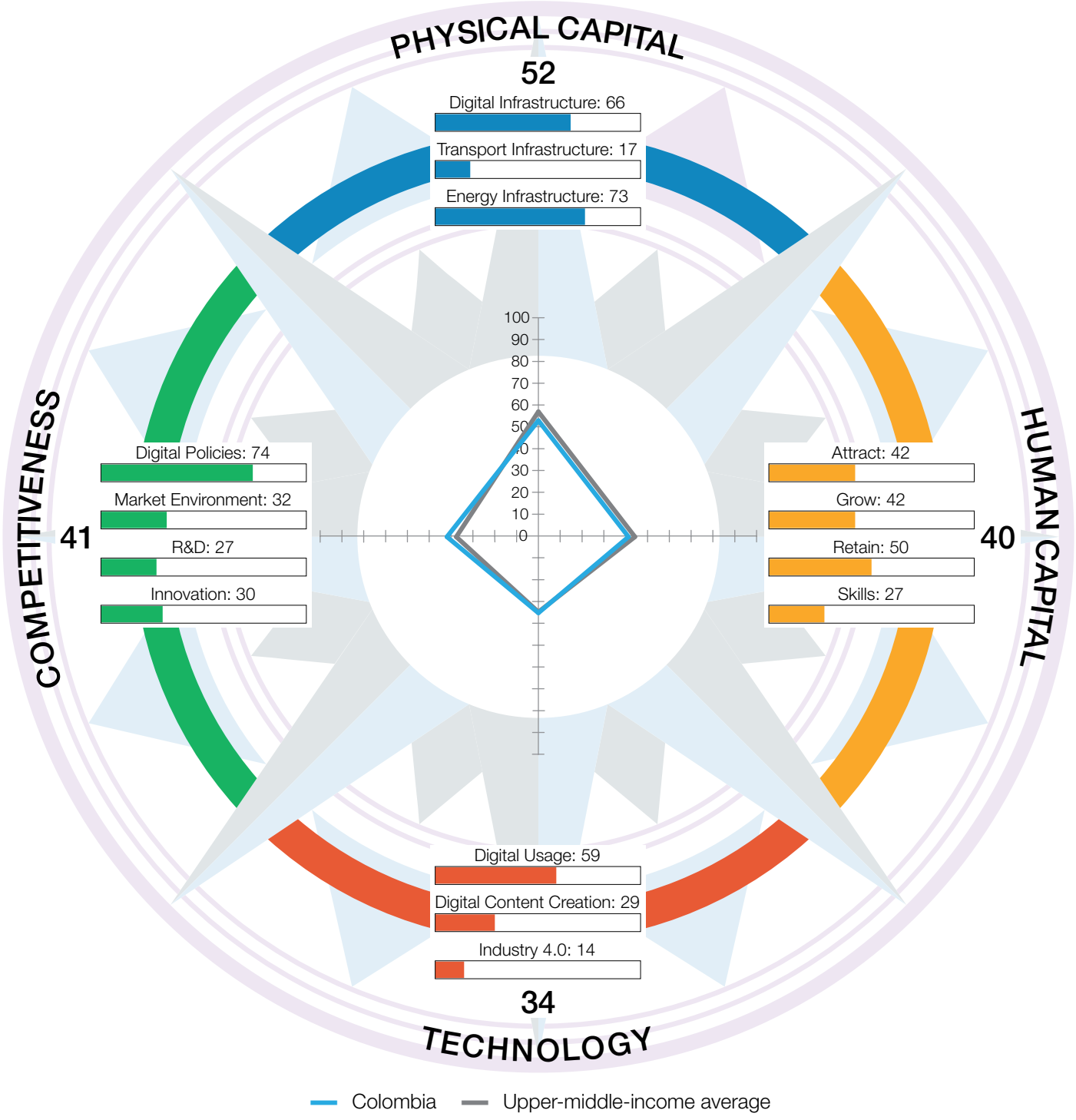
		Score	Rank
3	**TECHNOLOGY**	**41.65**	**41**
3.1	Digital Usage	76.80	18
3.1.1	Internet users	71.30	73
3.1.2	Active mobile-broadband subscriptions	42.08	41
3.1.3	Gender parity in internet usage	98.02	28
3.1.4	Firms with website	63.84	43
3.1.5	Internet shopping	92.37	3
3.1.6	Government online services	85.18	15
3.1.7	E-Participation	84.81	13
3.2	Digital Content Creation	24.56	89
3.2.1	Software development	1.66	88
3.2.2	Wikipedia edits	n/a	n/a
3.2.3	Internet domain registrations	4.04	55
3.2.4	Mobile apps development	67.99	74
3.3	Industry 4.0	23.60	27
3.3.1	Cloud computing	—	—
3.3.2	AI software development	2.55	98
3.3.3	AI research	14.32	46
3.3.4	ICT patent applications	34.10	13
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**50.57**	**31**
4.1	Digital Policies	48.41	95
4.1.1	ICT regulation	51.35	113
4.1.2	Cybersecurity	37.50	87
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	0.00	85
4.1.6	Data privacy	66.67	87
4.1.7	Data transfer	33.33	112
4.2	Market Environment	52.79	23
4.2.1	Extent of market dominance	84.25	4
4.2.2	Labour productivity per employee	18.34	77
4.2.3	Urbanisation	51.12	72
4.2.4	Domestic credit to private sector	85.13	4
4.2.5	Market capitalisation	25.09	21
4.3	R&D	45.05	25
4.3.1	R&D spending	44.82	13
4.3.2	University ranking	88.75	3
4.3.3	Gender parity in R&D	28.89	91
4.3.4	Scientific journal articles	17.73	48
4.4	Innovation	56.03	7
4.4.1	Medium- and high-tech industry	50.35	29
4.4.2	High-tech exports	46.56	9
4.4.3	Venture capital recipients, deals	31.02	17
4.4.4	New product entrepreneurial activity	56.11	35
4.4.5	New business density	n/a	n/a
4.4.6	Patent applications	96.09	2

Colombia

Key Indicators

Rank (out of 124)	**67**	GDP per capita (PPP US$)	**20,287.40**
Income group	**Upper-middle income**	GDP (US$ billions)	**343.94**
Regional group	**Latin America and the Caribbean**	FREI score	**41.73**
Population (millions)	**51.87**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**51.91**	**81**
1.1	Digital Infrastructure	65.66	72
1.1.1	Internet access	51.14	84
1.1.2	International internet bandwidth	56.98	25
1.1.3	Fixed-broadband subscriptions	79.30	72
1.1.4	4G-mobile network coverage	99.46	34
1.1.5	Fixed broadband affordability	68.85	83
1.1.6	Mobile broadband affordability	85.71	81
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	16.96	105
1.2.1	Quality of infrastructure	39.29	57
1.2.2	Rural access	12.42	121
1.2.3	Air connectivity	7.08	62
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	73.11	46
1.3.1	Access to electricity	100.00	78
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	93.98	47
1.3.4	Energy intensity	92.48	16
2	**HUMAN CAPITAL**	**40.23**	**76**
2.1	Attract	41.78	79
2.1.1	Brain gain	37.59	84
2.1.2	International students	0.41	103
2.1.3	Tolerance of minorities	22.34	94
2.1.4	Tolerance of immigrants	60.00	61
2.1.5	Gender parity in high-skilled jobs	88.54	26
2.2	Grow	42.04	65
2.2.1	Tertiary enrolment	37.26	56
2.2.2	Reading, maths, and science	29.15	59
2.2.3	Use of virtual professional networks	34.20	37
2.2.4	Youth inclusion	67.52	86
2.3	Retain	50.09	76
2.3.1	Pension coverage	49.59	73
2.3.2	Environmental performance	39.83	60
2.3.3	Physician density	37.11	66
2.3.4	Sanitation	93.06	65
2.3.5	Personal safety	30.88	111
2.4	Skills	27.03	65
2.4.1	Workforce with tertiary education	36.40	44
2.4.2	High-skilled workforce	34.40	55
2.4.3	Researchers	0.85	88
2.4.4	Relevance of education system to the economy	33.35	81
2.4.5	Digital skills	30.13	33

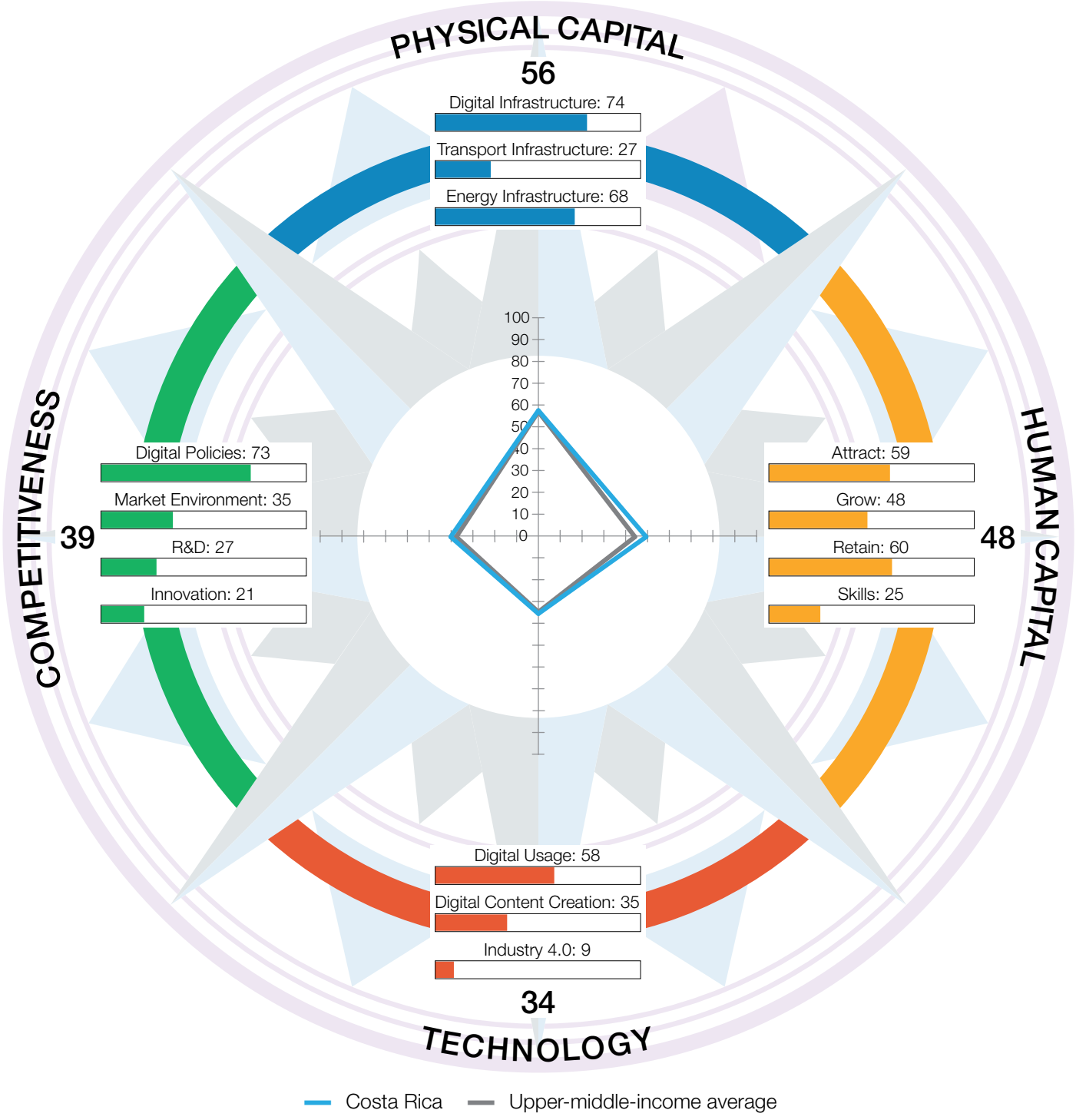
		Score	Rank
3	**TECHNOLOGY**	**33.95**	**64**
3.1	Digital Usage	58.59	63
3.1.1	Internet users	67.83	82
3.1.2	Active mobile-broadband subscriptions	27.90	87
3.1.3	Gender parity in internet usage	95.26	56
3.1.4	Firms with website	67.92	35
3.1.5	Internet shopping	16.89	76
3.1.6	Government online services	65.95	58
3.1.7	E-Participation	68.35	37
3.2	Digital Content Creation	29.23	71
3.2.1	Software development	4.29	59
3.2.2	Wikipedia edits	42.16	75
3.2.3	Internet domain registrations	10.66	38
3.2.4	Mobile apps development	59.78	90
3.3	Industry 4.0	14.04	48
3.3.1	Cloud computing	—	—
3.3.2	AI software development	17.77	38
3.3.3	AI research	3.54	76
3.3.4	ICT patent applications	0.27	58
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**40.81**	**53**
4.1	Digital Policies	74.28	41
4.1.1	ICT regulation	82.43	58
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	32.29	68
4.2.1	Extent of market dominance	33.69	80
4.2.2	Labour productivity per employee	21.65	71
4.2.3	Urbanisation	77.00	32
4.2.4	Domestic credit to private sector	17.28	73
4.2.5	Market capitalisation	11.84	40
4.3	R&D	26.57	66
4.3.1	R&D spending	5.18	75
4.3.2	University ranking	37.18	35
4.3.3	Gender parity in R&D	57.15	52
4.3.4	Scientific journal articles	6.79	65
4.4	Innovation	30.09	45
4.4.1	Medium- and high-tech industry	28.94	65
4.4.2	High-tech exports	12.64	57
4.4.3	Venture capital recipients, deals	3.20	71
4.4.4	New product entrepreneurial activity	82.88	7
4.4.5	New business density	7.97	56
4.4.6	Patent applications	44.89	76

Costa Rica

Key Indicators

Rank (out of 124)	**57**	GDP per capita (PPP US$)	**24,922.66**
Income group	**Upper-middle income**	GDP (US$ billions)	**68.38**
Regional group	**Latin America and the Caribbean**	FREI score	**44.49**
Population (millions)	**5.18**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**56.39**	**65**
1.1	Digital Infrastructure	74.09	51
1.1.1	Internet access	80.95	61
1.1.2	International internet bandwidth	62.59	15
1.1.3	Fixed-broadband subscriptions	76.08	75
1.1.4	4G-mobile network coverage	92.47	80
1.1.5	Fixed broadband affordability	83.88	51
1.1.6	Mobile broadband affordability	95.41	45
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	27.11	78
1.2.1	Quality of infrastructure	32.14	70
1.2.2	Rural access	54.99	79
1.2.3	Air connectivity	12.20	48
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	67.96	81
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	95.45	8
2	**HUMAN CAPITAL**	**48.11**	**52**
2.1	Attract	59.18	31
2.1.1	Brain gain	52.50	50
2.1.2	International students	2.97	81
2.1.3	Tolerance of minorities	74.47	20
2.1.4	Tolerance of immigrants	78.46	26
2.1.5	Gender parity in high-skilled jobs	87.50	30
2.2	Grow	47.82	52
2.2.1	Tertiary enrolment	37.64	55
2.2.2	Reading, maths, and science	32.95	56
2.2.3	Use of virtual professional networks	42.13	27
2.2.4	Youth inclusion	78.57	59
2.3	Retain	60.46	63
2.3.1	Pension coverage	55.31	71
2.3.2	Environmental performance	46.44	51
2.3.3	Physician density	43.62	55
2.3.4	Sanitation	97.71	45
2.3.5	Personal safety	59.24	66
2.4	Skills	24.98	71
2.4.1	Workforce with tertiary education	24.84	70
2.4.2	High-skilled workforce	30.46	67
2.4.3	Researchers	3.81	75
2.4.4	Relevance of education system to the economy	40.84	61
2.4.5	Digital skills	n/a	n/a

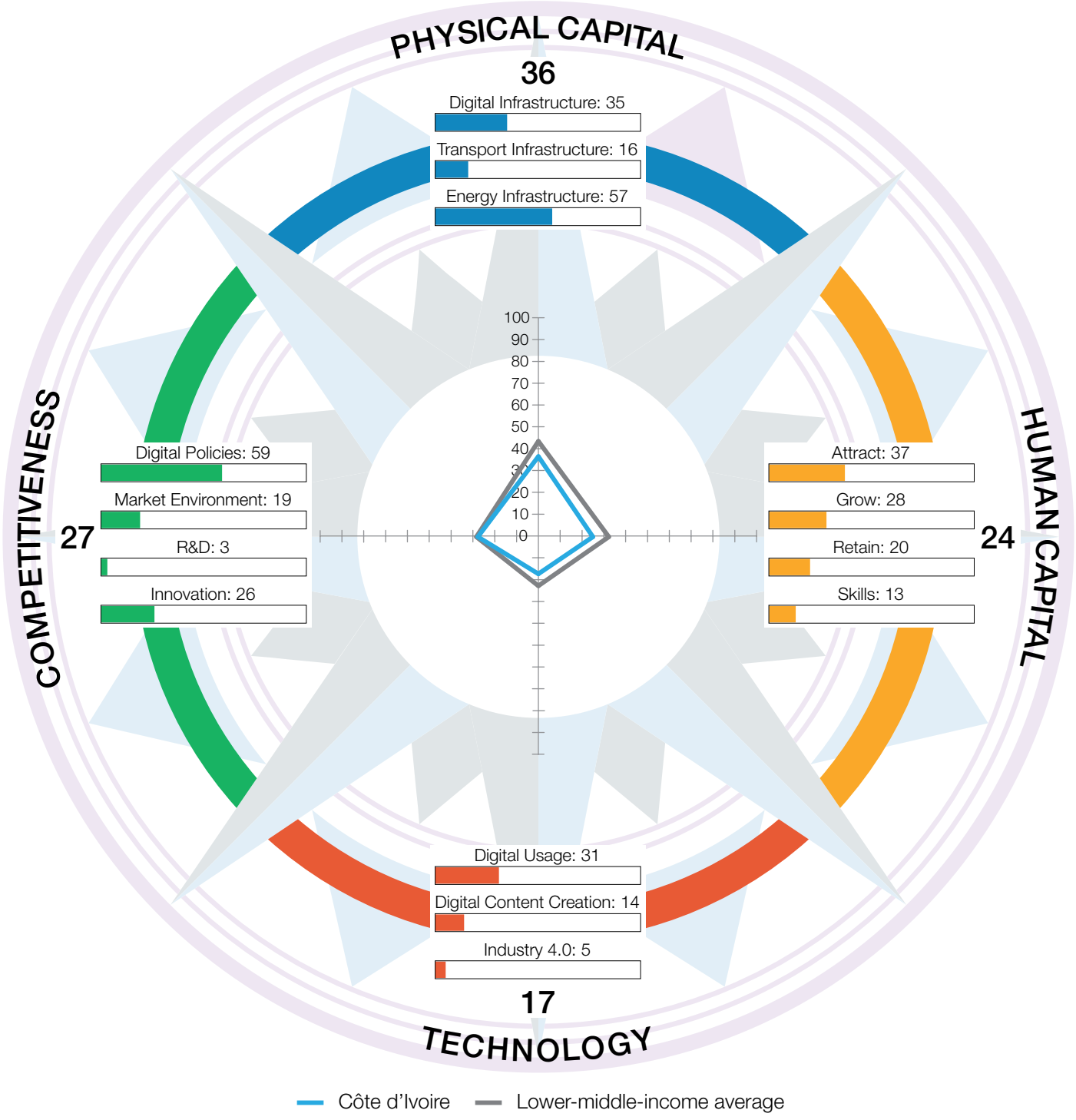
		Score	Rank
3	**TECHNOLOGY**	**34.29**	**62**
3.1	Digital Usage	58.38	64
3.1.1	Internet users	81.63	52
3.1.2	Active mobile-broadband subscriptions	34.68	66
3.1.3	Gender parity in internet usage	99.23	10
3.1.4	Firms with website	n/a	n/a
3.1.5	Internet shopping	26.18	63
3.1.6	Government online services	57.96	69
3.1.7	E-Participation	50.63	65
3.2	Digital Content Creation	35.31	57
3.2.1	Software development	8.35	47
3.2.2	Wikipedia edits	51.06	58
3.2.3	Internet domain registrations	5.44	49
3.2.4	Mobile apps development	76.41	58
3.3	Industry 4.0	9.18	78
3.3.1	Cloud computing	—	—
3.3.2	AI software development	7.23	73
3.3.3	AI research	3.41	78
3.3.4	ICT patent applications	0.68	53
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**39.15**	**58**
4.1	Digital Policies	73.46	47
4.1.1	ICT regulation	89.19	27
4.1.2	Cybersecurity	75.00	44
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	34.90	62
4.2.1	Extent of market dominance	45.60	53
4.2.2	Labour productivity per employee	31.08	53
4.2.3	Urbanisation	75.28	36
4.2.4	Domestic credit to private sector	21.70	59
4.2.5	Market capitalisation	0.86	74
4.3	R&D	26.90	63
4.3.1	R&D spending	6.71	67
4.3.2	University ranking	15.50	61
4.3.3	Gender parity in R&D	80.56	30
4.3.4	Scientific journal articles	4.82	76
4.4	Innovation	21.34	92
4.4.1	Medium- and high-tech industry	16.99	90
4.4.2	High-tech exports	24.30	32
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	14.79	34
4.4.6	Patent applications	29.30	102

Côte d'Ivoire

Key Indicators

Rank (out of 124)	**106**	GDP per capita (PPP US$)	**6,538.30**
Income group	**Lower-middle income**	GDP (US$ billions)	**70.02**
Regional group	**Sub-Saharan Africa**	FREI score	**25.93**
Population (millions)	**28.16**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**35.86**	**104**
1.1	Digital Infrastructure	34.95	108
1.1.1	Internet access	15.05	103
1.1.2	International internet bandwidth	22.07	114
1.1.3	Fixed-broadband subscriptions	20.59	102
1.1.4	4G-mobile network coverage	61.85	107
1.1.5	Fixed broadband affordability	45.47	104
1.1.6	Mobile broadband affordability	79.59	94
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	15.72	109
1.2.1	Quality of infrastructure	38.93	61
1.2.2	Rural access	22.01	114
1.2.3	Air connectivity	0.32	112
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	56.91	97
1.3.1	Access to electricity	66.36	105
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	73.68	70
1.3.4	Energy intensity	86.60	48
2	**HUMAN CAPITAL**	**24.33**	**112**
2.1	Attract	36.88	101
2.1.1	Brain gain	61.46	29
2.1.2	International students	6.37	70
2.1.3	Tolerance of minorities	28.72	85
2.1.4	Tolerance of immigrants	76.92	28
2.1.5	Gender parity in high-skilled jobs	10.91	117
2.2	Grow	28.13	104
2.2.1	Tertiary enrolment	5.68	108
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	7.36	94
2.2.4	Youth inclusion	71.34	79
2.3	Retain	19.56	110
2.3.1	Pension coverage	5.82	109
2.3.2	Environmental performance	23.56	94
2.3.3	Physician density	2.00	111
2.3.4	Sanitation	28.17	111
2.3.5	Personal safety	38.24	105
2.4	Skills	12.74	106
2.4.1	Workforce with tertiary education	5.96	108
2.4.2	High-skilled workforce	6.35	107
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	35.49	77
2.4.5	Digital skills	3.17	75

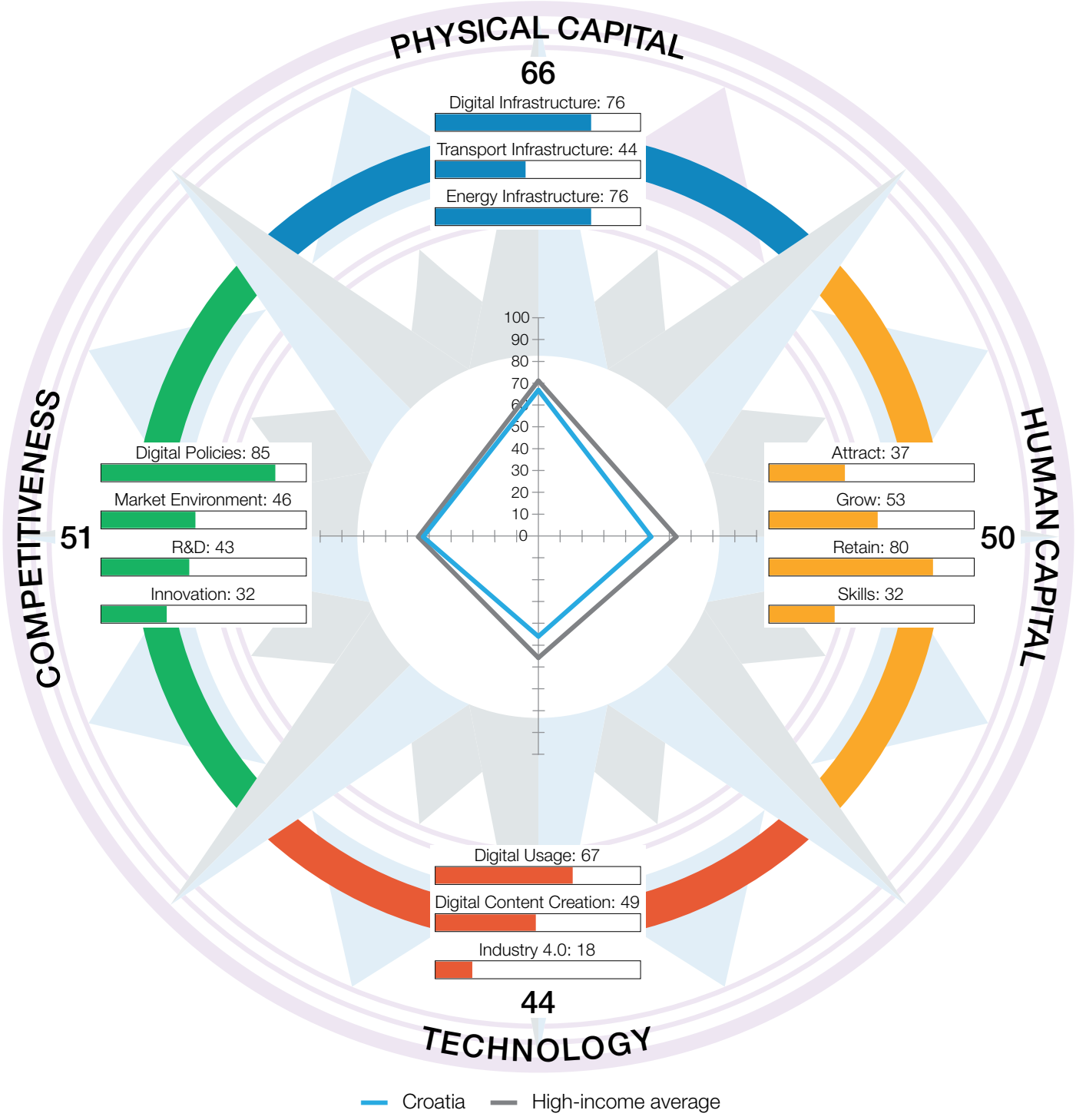
		Score	Rank
3	**TECHNOLOGY**	**16.53**	**109**
3.1	Digital Usage	30.90	100
3.1.1	Internet users	32.15	102
3.1.2	Active mobile-broadband subscriptions	31.29	77
3.1.3	Gender parity in internet usage	70.13	93
3.1.4	Firms with website	5.91	103
3.1.5	Internet shopping	6.21	100
3.1.6	Government online services	40.22	88
3.1.7	E-Participation	30.38	90
3.2	Digital Content Creation	13.59	114
3.2.1	Software development	0.23	113
3.2.2	Wikipedia edits	17.13	112
3.2.3	Internet domain registrations	0.21	107
3.2.4	Mobile apps development	36.78	116
3.3	Industry 4.0	5.11	112
3.3.1	Cloud computing	—	—
3.3.2	AI software development	1.13	106
3.3.3	AI research	0.20	113
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**27.02**	**98**
4.1	Digital Policies	59.46	75
4.1.1	ICT regulation	66.22	88
4.1.2	Cybersecurity	50.00	72
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	19.15	106
4.2.1	Extent of market dominance	37.39	69
4.2.2	Labour productivity per employee	7.57	95
4.2.3	Urbanisation	41.10	90
4.2.4	Domestic credit to private sector	6.23	105
4.2.5	Market capitalisation	3.46	66
4.3	R&D	3.03	110
4.3.1	R&D spending	1.08	100
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	10.77	101
4.3.4	Scientific journal articles	0.29	114
4.4	Innovation	26.42	64
4.4.1	Medium- and high-tech industry	18.01	86
4.4.2	High-tech exports	17.36	45
4.4.3	Venture capital recipients, deals	8.16	52
4.4.4	New product entrepreneurial activity	51.61	40
4.4.5	New business density	n/a	n/a
4.4.6	Patent applications	37.00	86

Croatia

Key Indicators

Rank (out of 124)	**35**	GDP per capita (PPP US$)	**40,379.57**
Income group	**High income**	GDP (US$ billions)	**70.96**
Regional group	**Europe**	FREI score	**52.94**
Population (millions)	**3.85**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**65.51**	**38**
1.1	Digital Infrastructure	76.27	43
1.1.1	Internet access	85.84	50
1.1.2	International internet bandwidth	60.42	18
1.1.3	Fixed-broadband subscriptions	86.22	64
1.1.4	4G-mobile network coverage	99.41	37
1.1.5	Fixed broadband affordability	97.44	3
1.1.6	Mobile broadband affordability	95.49	44
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	44.48	40
1.2.1	Quality of infrastructure	42.86	53
1.2.2	Rural access	93.04	21
1.2.3	Air connectivity	21.61	36
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	75.77	31
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	98.50	15
1.3.4	Energy intensity	88.30	38
2	**HUMAN CAPITAL**	**50.33**	**43**
2.1	Attract	36.54	102
2.1.1	Brain gain	9.60	116
2.1.2	International students	7.73	64
2.1.3	Tolerance of minorities	54.26	45
2.1.4	Tolerance of immigrants	23.08	116
2.1.5	Gender parity in high-skilled jobs	88.02	27
2.2	Grow	53.28	42
2.2.1	Tertiary enrolment	44.61	43
2.2.2	Reading, maths, and science	56.24	36
2.2.3	Use of virtual professional networks	26.84	51
2.2.4	Youth inclusion	85.42	40
2.3	Retain	79.68	28
2.3.1	Pension coverage	89.59	52
2.3.2	Environmental performance	70.00	16
2.3.3	Physician density	54.71	37
2.3.4	Sanitation	96.23	57
2.3.5	Personal safety	87.85	20
2.4	Skills	31.83	56
2.4.1	Workforce with tertiary education	34.90	48
2.4.2	High-skilled workforce	52.55	39
2.4.3	Researchers	25.36	37
2.4.4	Relevance of education system to the economy	18.04	105
2.4.5	Digital skills	28.30	35

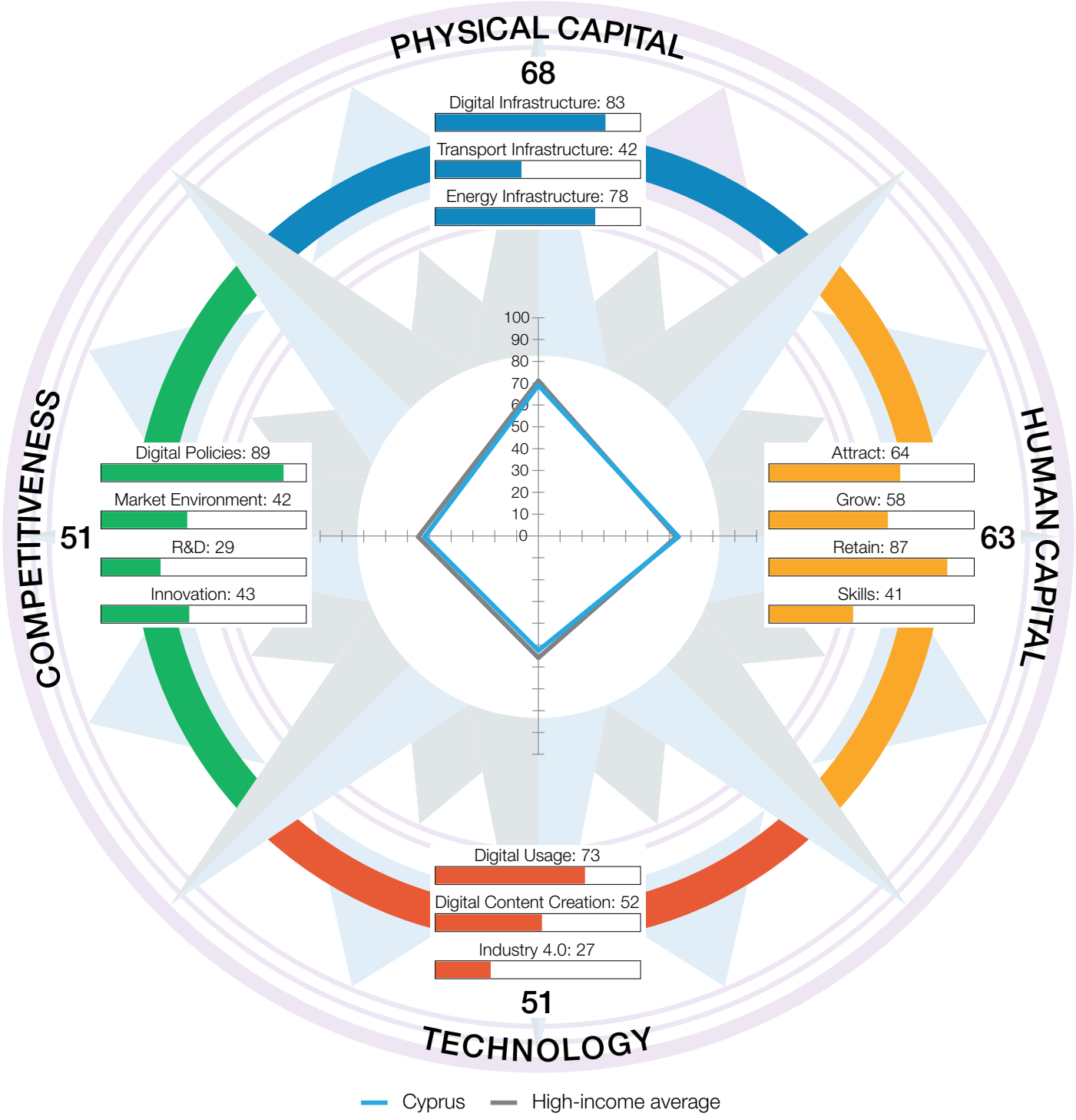
		Score	Rank
3	**TECHNOLOGY**	**44.46**	**38**
3.1	Digital Usage	66.92	44
3.1.1	Internet users	80.04	58
3.1.2	Active mobile-broadband subscriptions	44.12	32
3.1.3	Gender parity in internet usage	82.11	88
3.1.4	Firms with website	65.87	41
3.1.5	Internet shopping	50.39	42
3.1.6	Government online services	75.05	36
3.1.7	E-Participation	70.88	29
3.2	Digital Content Creation	48.54	33
3.2.1	Software development	26.26	23
3.2.2	Wikipedia edits	73.29	31
3.2.3	Internet domain registrations	11.23	37
3.2.4	Mobile apps development	83.39	39
3.3	Industry 4.0	17.91	36
3.3.1	Cloud computing	—	—
3.3.2	AI software development	17.52	41
3.3.3	AI research	27.32	28
3.3.4	ICT patent applications	0.98	48
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**51.45**	**27**
4.1	Digital Policies	84.75	16
4.1.1	ICT regulation	93.24	14
4.1.2	Cybersecurity	100.00	1
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	46.00	35
4.2.1	Extent of market dominance	24.06	96
4.2.2	Labour productivity per employee	45.84	38
4.2.3	Urbanisation	48.49	78
4.2.4	Domestic credit to private sector	100.00	1
4.2.5	Market capitalisation	11.60	41
4.3	R&D	43.31	29
4.3.1	R&D spending	23.02	33
4.3.2	University ranking	10.13	68
4.3.3	Gender parity in R&D	95.71	8
4.3.4	Scientific journal articles	44.37	28
4.4	Innovation	31.74	42
4.4.1	Medium- and high-tech industry	37.00	51
4.4.2	High-tech exports	14.75	50
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	39.25	59
4.4.5	New business density	18.21	29
4.4.6	Patent applications	49.45	65

Cyprus

Key Indicators

Rank (out of 124)	**28**	GDP per capita (PPP US$)	**49,930.87**
Income group	**High income**	GDP (US$ billions)	**28.44**
Regional group	**Middle East and North Africa**	FREI score	**57.93**
Population (millions)	**1.25**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**67.65**	**30**
1.1	Digital Infrastructure	82.62	10
1.1.1	Internet access	93.33	22
1.1.2	International internet bandwidth	81.37	3
1.1.3	Fixed-broadband subscriptions	98.45	19
1.1.4	4G-mobile network coverage	99.90	16
1.1.5	Fixed broadband affordability	92.47	19
1.1.6	Mobile broadband affordability	94.64	49
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	42.33	45
1.2.1	Quality of infrastructure	35.71	63
1.2.2	Rural access	23.26	113
1.2.3	Air connectivity	97.44	5
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	77.98	16
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	98.50	15
1.3.4	Energy intensity	91.81	21
2	**HUMAN CAPITAL**	**62.56**	**24**
2.1	Attract	63.78	24
2.1.1	Brain gain	51.63	53
2.1.2	International students	72.34	4
2.1.3	Tolerance of minorities	52.13	49
2.1.4	Tolerance of immigrants	50.77	77
2.1.5	Gender parity in high-skilled jobs	92.02	20
2.2	Grow	58.01	31
2.2.1	Tertiary enrolment	61.23	10
2.2.2	Reading, maths, and science	42.42	44
2.2.3	Use of virtual professional networks	44.62	26
2.2.4	Youth inclusion	83.78	44
2.3	Retain	87.14	11
2.3.1	Pension coverage	97.76	37
2.3.2	Environmental performance	66.27	22
2.3.3	Physician density	85.16	6
2.3.4	Sanitation	99.34	24
2.3.5	Personal safety	87.17	22
2.4	Skills	41.32	35
2.4.1	Workforce with tertiary education	60.53	12
2.4.2	High-skilled workforce	57.75	32
2.4.3	Researchers	19.28	42
2.4.4	Relevance of education system to the economy	49.53	46
2.4.5	Digital skills	19.52	49

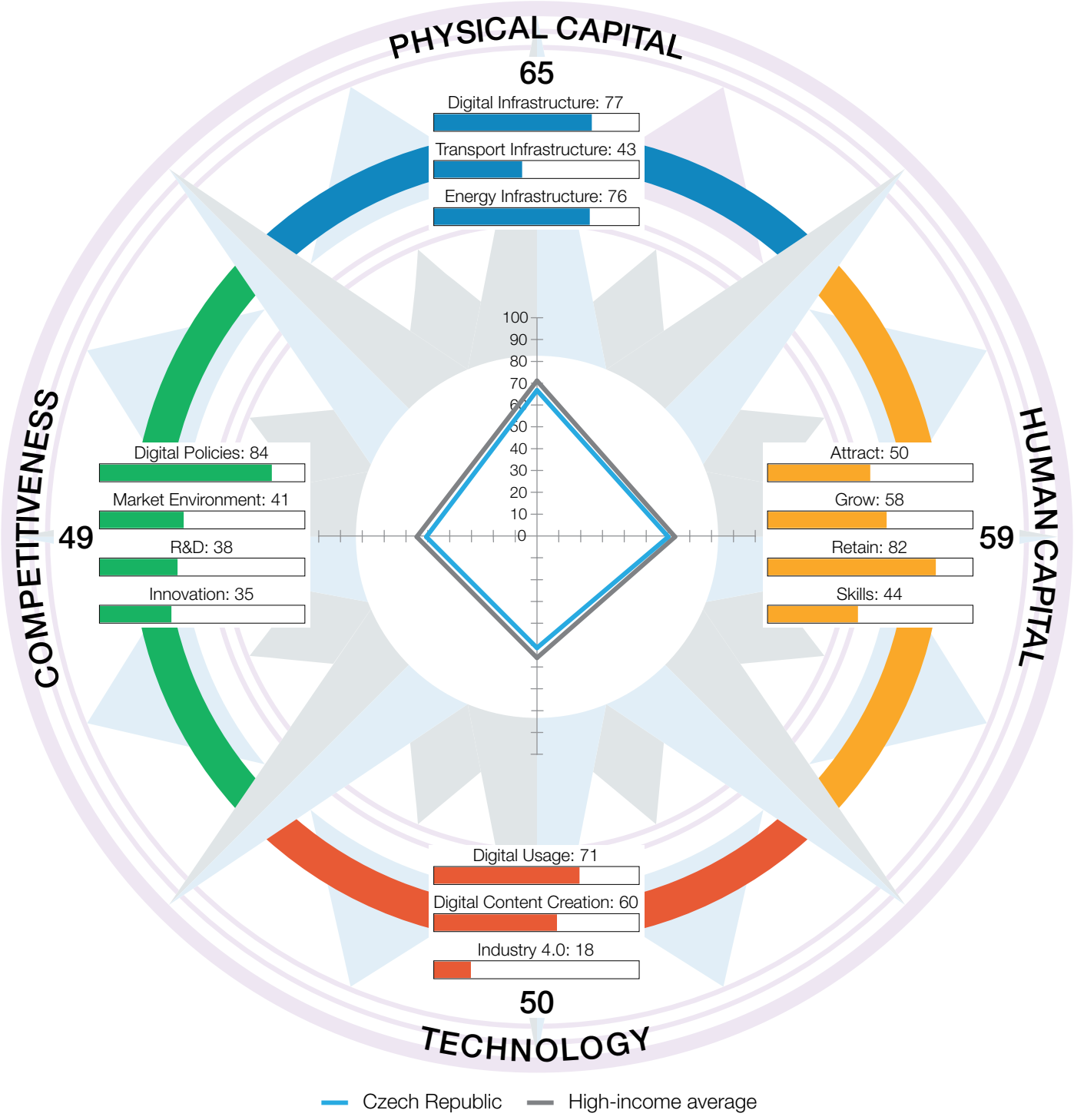
		Score	Rank
3	**TECHNOLOGY**	**50.74**	**26**
3.1	Digital Usage	73.17	27
3.1.1	Internet users	90.16	29
3.1.2	Active mobile-broadband subscriptions	56.55	10
3.1.3	Gender parity in internet usage	98.82	18
3.1.4	Firms with website	70.36	31
3.1.5	Internet shopping	53.27	40
3.1.6	Government online services	70.88	46
3.1.7	E-Participation	72.15	25
3.2	Digital Content Creation	51.63	28
3.2.1	Software development	9.92	41
3.2.2	Wikipedia edits	62.31	46
3.2.3	Internet domain registrations	34.31	18
3.2.4	Mobile apps development	100.00	1
3.3	Industry 4.0	27.42	24
3.3.1	Cloud computing	—	—
3.3.2	AI software development	32.66	23
3.3.3	AI research	87.19	2
3.3.4	ICT patent applications	1.65	42
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**50.76**	**29**
4.1	Digital Policies	88.70	10
4.1.1	ICT regulation	83.38	56
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	42.14	41
4.2.1	Extent of market dominance	51.02	41
4.2.2	Labour productivity per employee	52.84	29
4.2.3	Urbanisation	60.29	61
4.2.4	Domestic credit to private sector	40.97	30
4.2.5	Market capitalisation	5.61	61
4.3	R&D	28.83	53
4.3.1	R&D spending	14.91	45
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	55.53	54
4.3.4	Scientific journal articles	44.90	27
4.4	Innovation	43.35	21
4.4.1	Medium- and high-tech industry	34.03	55
4.4.2	High-tech exports	24.73	30
4.4.3	Venture capital recipients, deals	35.96	14
4.4.4	New product entrepreneurial activity	57.01	34
4.4.5	New business density	54.75	7
4.4.6	Patent applications	53.61	53

Czech Republic

Key Indicators

Rank (out of 124)	**31**	GDP per capita (PPP US$)	**49,945.50**
Income group	**High income**	GDP (US$ billions)	**290.92**
Regional group	**Europe**	FREI score	**55.75**
Population (millions)	**10.53**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**65.40**	**39**
1.1	Digital Infrastructure	76.59	40
1.1.1	Internet access	82.69	56
1.1.2	International internet bandwidth	43.43	72
1.1.3	Fixed-broadband subscriptions	95.80	32
1.1.4	4G-mobile network coverage	99.78	27
1.1.5	Fixed broadband affordability	89.97	28
1.1.6	Mobile broadband affordability	97.19	26
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	43.44	44
1.2.1	Quality of infrastructure	42.86	53
1.2.2	Rural access	99.54	3
1.2.3	Air connectivity	13.93	44
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	76.18	26
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	95.49	40
1.3.4	Energy intensity	82.66	71
2	**HUMAN CAPITAL**	**58.60**	**30**
2.1	Attract	49.87	42
2.1.1	Brain gain	37.10	85
2.1.2	International students	39.82	13
2.1.3	Tolerance of minorities	57.45	40
2.1.4	Tolerance of immigrants	35.38	101
2.1.5	Gender parity in high-skilled jobs	79.60	47
2.2	Grow	58.37	29
2.2.1	Tertiary enrolment	44.59	44
2.2.2	Reading, maths, and science	65.89	22
2.2.3	Use of virtual professional networks	28.31	48
2.2.4	Youth inclusion	94.70	9
2.3	Retain	82.09	24
2.3.1	Pension coverage	91.12	46
2.3.2	Environmental performance	69.49	19
2.3.3	Physician density	65.78	20
2.3.4	Sanitation	99.05	33
2.3.5	Personal safety	84.99	27
2.4	Skills	44.08	32
2.4.1	Workforce with tertiary education	32.38	53
2.4.2	High-skilled workforce	60.45	29
2.4.3	Researchers	47.29	24
2.4.4	Relevance of education system to the economy	56.13	38
2.4.5	Digital skills	24.13	42

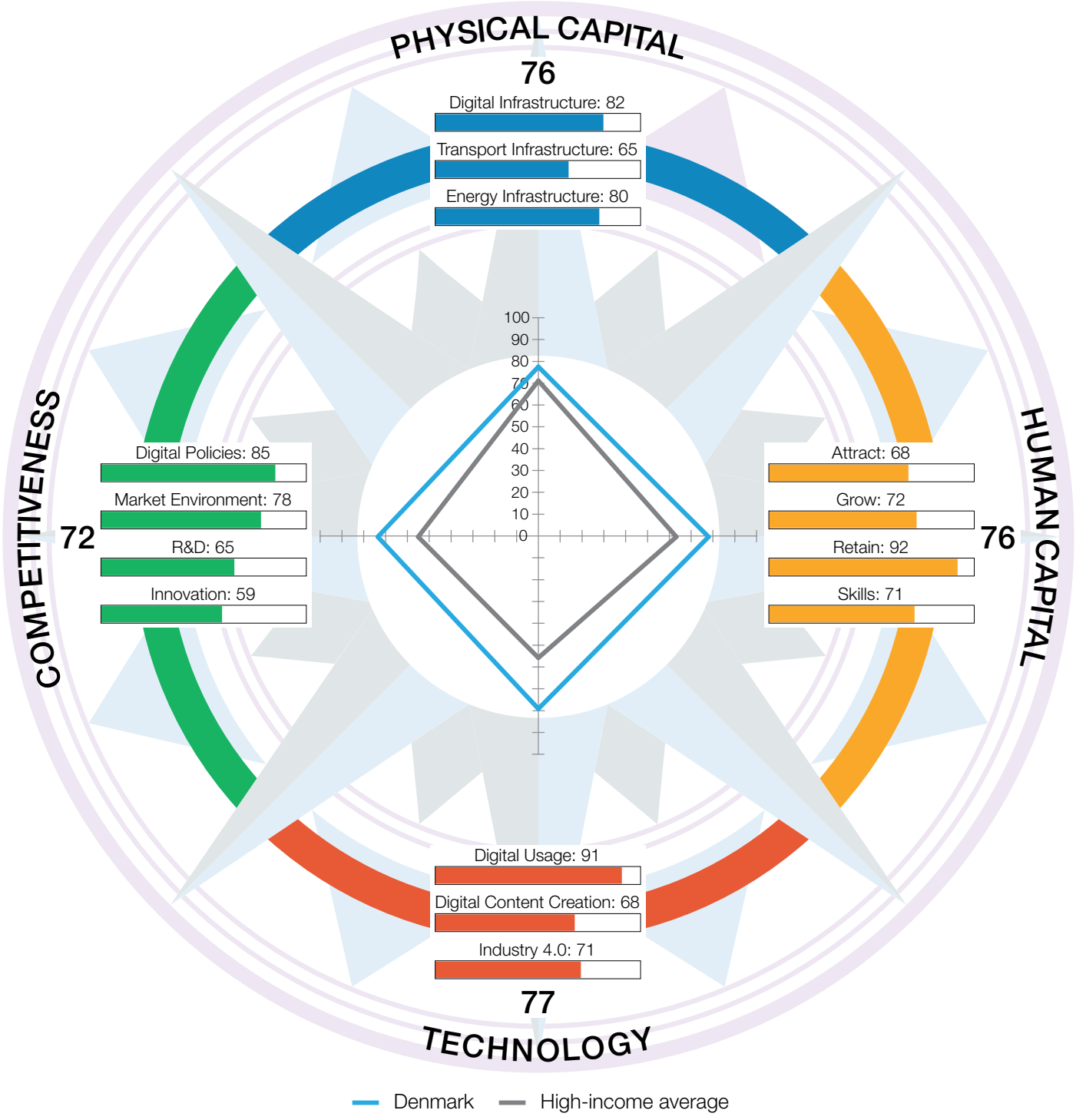
		Score	Rank
3	**TECHNOLOGY**	**49.57**	**28**
3.1	Digital Usage	71.12	33
3.1.1	Internet users	81.54	53
3.1.2	Active mobile-broadband subscriptions	40.77	46
3.1.3	Gender parity in internet usage	93.28	64
3.1.4	Firms with website	84.05	13
3.1.5	Internet shopping	86.12	10
3.1.6	Government online services	56.39	71
3.1.7	E-Participation	55.70	56
3.2	Digital Content Creation	59.66	23
3.2.1	Software development	37.14	14
3.2.2	Wikipedia edits	79.99	17
3.2.3	Internet domain registrations	31.87	19
3.2.4	Mobile apps development	89.64	29
3.3	Industry 4.0	17.94	35
3.3.1	Cloud computing	—	—
3.3.2	AI software development	21.76	35
3.3.3	AI research	27.20	29
3.3.4	ICT patent applications	4.31	32
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**49.41**	**32**
4.1	Digital Policies	83.59	20
4.1.1	ICT regulation	85.14	45
4.1.2	Cybersecurity	100.00	1
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	40.80	42
4.2.1	Extent of market dominance	61.07	34
4.2.2	Labour productivity per employee	49.16	34
4.2.3	Urbanisation	68.64	47
4.2.4	Domestic credit to private sector	21.89	57
4.2.5	Market capitalisation	3.21	67
4.3	R&D	38.13	32
4.3.1	R&D spending	36.94	18
4.3.2	University ranking	32.52	39
4.3.3	Gender parity in R&D	30.61	89
4.3.4	Scientific journal articles	52.44	21
4.4	Innovation	35.11	34
4.4.1	Medium- and high-tech industry	63.77	12
4.4.2	High-tech exports	31.49	22
4.4.3	Venture capital recipients, deals	1.83	81
4.4.4	New product entrepreneurial activity	40.67	58
4.4.5	New business density	15.54	33
4.4.6	Patent applications	57.34	42

Denmark

Key Indicators

Rank (out of 124)	**2**	GDP per capita (PPP US$)	**74,005.48**
Income group	**High income**	GDP (US$ billions)	**395.40**
Regional group	**Europe**	FREI score	**75.08**
Population (millions)	**5.90**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**75.90**	**10**
1.1	Digital Infrastructure	82.44	12
1.1.1	Internet access	96.12	12
1.1.2	International internet bandwidth	47.73	52
1.1.3	Fixed-broadband subscriptions	95.70	33
1.1.4	4G-mobile network coverage	100.00	1
1.1.5	Fixed broadband affordability	94.72	10
1.1.6	Mobile broadband affordability	97.36	23
1.1.7	Computer software spending	45.45	13
1.2	Transport Infrastructure	64.95	10
1.2.1	Quality of infrastructure	82.14	9
1.2.2	Rural access	97.07	14
1.2.3	Air connectivity	50.77	13
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	80.32	7
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	100.00	1
1.3.4	Energy intensity	95.51	7
2	**HUMAN CAPITAL**	**75.98**	**2**
2.1	Attract	68.40	15
2.1.1	Brain gain	65.52	23
2.1.2	International students	27.14	26
2.1.3	Tolerance of minorities	67.02	28
2.1.4	Tolerance of immigrants	84.62	15
2.1.5	Gender parity in high-skilled jobs	97.68	5
2.2	Grow	72.39	7
2.2.1	Tertiary enrolment	54.48	19
2.2.2	Reading, maths, and science	68.16	16
2.2.3	Use of virtual professional networks	72.93	11
2.2.4	Youth inclusion	93.99	10
2.3	Retain	92.13	2
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	100.00	1
2.3.3	Physician density	67.44	18
2.3.4	Sanitation	99.56	20
2.3.5	Personal safety	93.63	7
2.4	Skills	71.02	3
2.4.1	Workforce with tertiary education	48.27	27
2.4.2	High-skilled workforce	74.97	13
2.4.3	Researchers	88.26	3
2.4.4	Relevance of education system to the economy	78.43	11
2.4.5	Digital skills	65.16	6

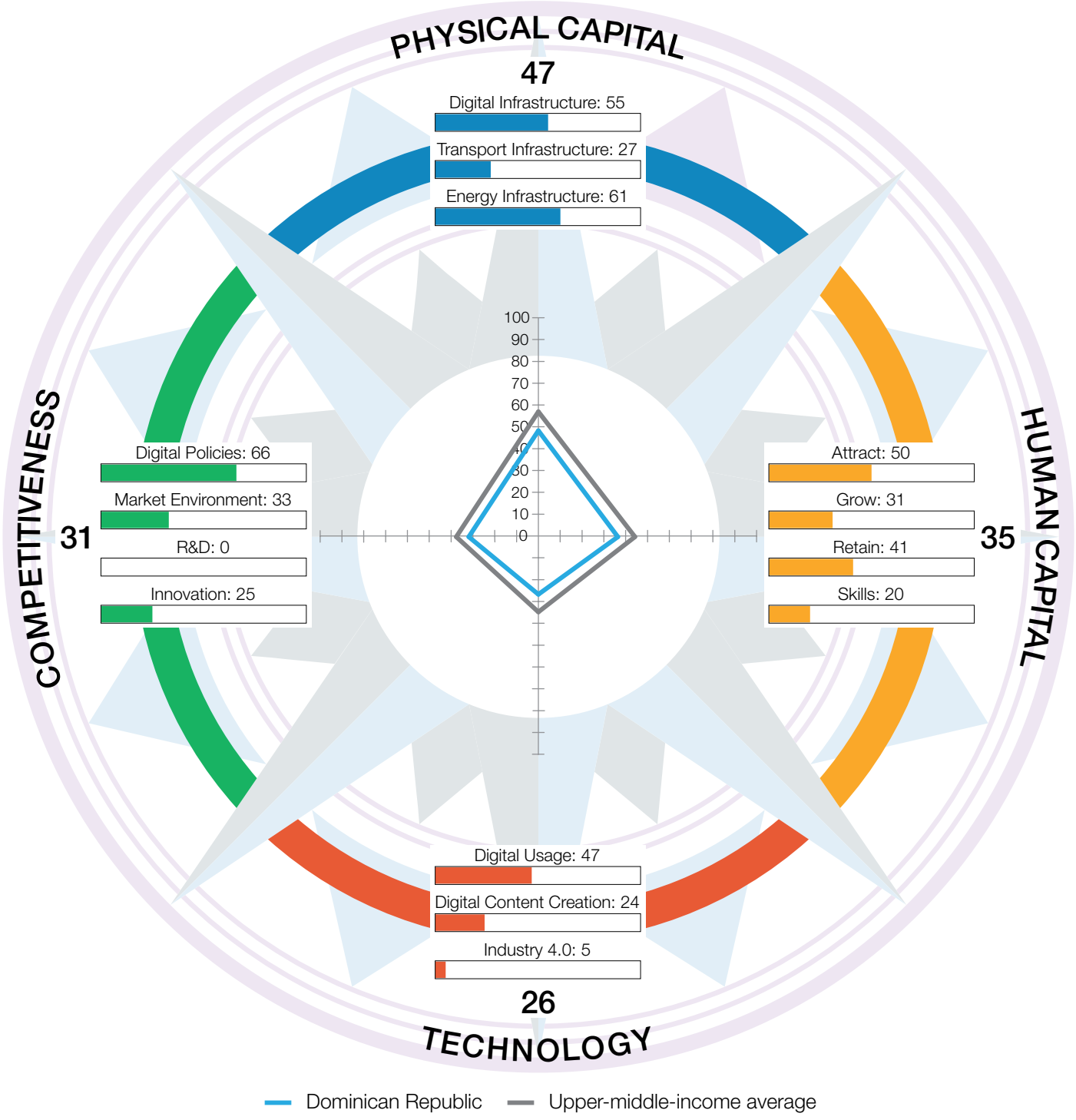
		Score	Rank
3	**TECHNOLOGY**	**76.75**	**2**
3.1	Digital Usage	90.63	1
3.1.1	Internet users	98.79	8
3.1.2	Active mobile-broadband subscriptions	56.32	11
3.1.3	Gender parity in internet usage	98.67	20
3.1.4	Firms with website	96.03	2
3.1.5	Internet shopping	99.93	2
3.1.6	Government online services	97.32	4
3.1.7	E-Participation	87.35	12
3.2	Digital Content Creation	68.40	11
3.2.1	Software development	34.20	17
3.2.2	Wikipedia edits	75.08	29
3.2.3	Internet domain registrations	64.55	5
3.2.4	Mobile apps development	99.78	8
3.3	Industry 4.0	71.20	5
3.3.1	Cloud computing	—	—
3.3.2	AI software development	74.39	7
3.3.3	AI research	80.35	5
3.3.4	ICT patent applications	61.93	8
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**71.69**	**4**
4.1	Digital Policies	84.94	15
4.1.1	ICT regulation	94.59	9
4.1.2	Cybersecurity	100.00	1
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	78.02	3
4.2.1	Extent of market dominance	85.77	3
4.2.2	Labour productivity per employee	68.71	11
4.2.3	Urbanisation	85.49	16
4.2.4	Domestic credit to private sector	72.11	8
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	65.11	4
4.3.1	R&D spending	55.34	10
4.3.2	University ranking	57.65	15
4.3.3	Gender parity in R&D	49.13	60
4.3.4	Scientific journal articles	98.34	2
4.4	Innovation	58.69	6
4.4.1	Medium- and high-tech industry	71.16	6
4.4.2	High-tech exports	21.16	38
4.4.3	Venture capital recipients, deals	40.88	11
4.4.4	New product entrepreneurial activity	100.00	1
4.4.5	New business density	41.30	12
4.4.6	Patent applications	77.64	9

Dominican Republic

Key Indicators

Rank (out of 124)	**90**	GDP per capita (PPP US$)	**22,833.53**
Income group	**Upper-middle income**	GDP (US$ billions)	**113.64**
Regional group	**Latin America and the Caribbean**	FREI score	**34.90**
Population (millions)	**11.23**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**47.39**	**90**
1.1	Digital Infrastructure	54.69	92
1.1.1	Internet access	32.25	93
1.1.2	International internet bandwidth	45.55	62
1.1.3	Fixed-broadband subscriptions	53.52	89
1.1.4	4G-mobile network coverage	97.42	64
1.1.5	Fixed broadband affordability	74.50	70
1.1.6	Mobile broadband affordability	79.59	94
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	26.70	80
1.2.1	Quality of infrastructure	32.14	70
1.2.2	Rural access	54.69	80
1.2.3	Air connectivity	13.39	45
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	60.79	94
1.3.1	Access to electricity	97.79	90
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	44.36	80
1.3.4	Energy intensity	95.88	6
2	**HUMAN CAPITAL**	**35.48**	**85**
2.1	Attract	50.22	40
2.1.1	Brain gain	55.78	42
2.1.2	International students	4.47	77
2.1.3	Tolerance of minorities	54.26	45
2.1.4	Tolerance of immigrants	67.69	45
2.1.5	Gender parity in high-skilled jobs	68.90	68
2.2	Grow	30.85	95
2.2.1	Tertiary enrolment	39.14	52
2.2.2	Reading, maths, and science	0.00	76
2.2.3	Use of virtual professional networks	21.18	62
2.2.4	Youth inclusion	63.08	94
2.3	Retain	40.56	91
2.3.1	Pension coverage	9.49	102
2.3.2	Environmental performance	39.49	62
2.3.3	Physician density	22.30	80
2.3.4	Sanitation	85.92	78
2.3.5	Personal safety	45.57	92
2.4	Skills	20.28	88
2.4.1	Workforce with tertiary education	16.30	89
2.4.2	High-skilled workforce	19.64	81
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	11.48	113
2.4.5	Digital skills	33.69	29

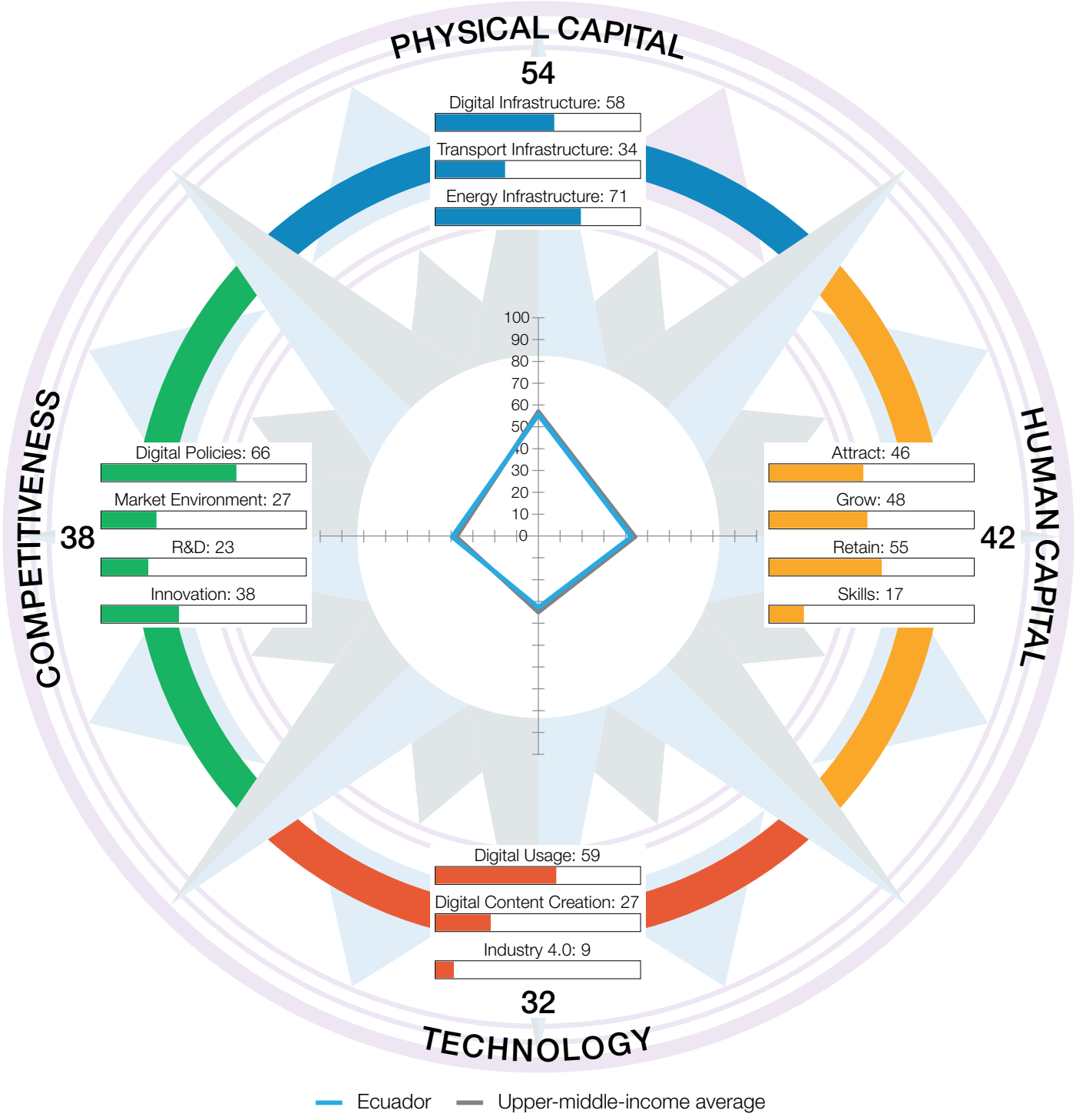
		Score	Rank
3	**TECHNOLOGY**	**25.68**	**88**
3.1	Digital Usage	47.45	81
3.1.1	Internet users	75.40	64
3.1.2	Active mobile-broadband subscriptions	25.92	92
3.1.3	Gender parity in internet usage	99.01	13
3.1.4	Firms with website	34.76	80
3.1.5	Internet shopping	8.19	97
3.1.6	Government online services	49.66	78
3.1.7	E-Participation	39.23	80
3.2	Digital Content Creation	24.23	90
3.2.1	Software development	2.19	76
3.2.2	Wikipedia edits	31.51	89
3.2.3	Internet domain registrations	1.53	77
3.2.4	Mobile apps development	61.71	87
3.3	Industry 4.0	5.37	108
3.3.1	Cloud computing	—	—
3.3.2	AI software development	3.95	92
3.3.3	AI research	0.45	105
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**31.07**	**81**
4.1	Digital Policies	65.69	63
4.1.1	ICT regulation	97.30	3
4.1.2	Cybersecurity	62.50	53
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	50.00	99
4.2	Market Environment	33.48	65
4.2.1	Extent of market dominance	21.68	98
4.2.2	Labour productivity per employee	25.42	66
4.2.3	Urbanisation	77.35	31
4.2.4	Domestic credit to private sector	9.46	94
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	0.12	123
4.3.1	R&D spending	n/a	n/a
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	n/a	n/a
4.3.4	Scientific journal articles	0.24	116
4.4	Innovation	24.98	75
4.4.1	Medium- and high-tech industry	n/a	n/a
4.4.2	High-tech exports	13.07	56
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	49.68	44
4.4.5	New business density	n/a	n/a
4.4.6	Patent applications	12.20	118

Ecuador

Key Indicators

Rank (out of 124)	**69**	GDP per capita (PPP US$)	**12,822.11**
Income group	**Upper-middle income**	GDP (US$ billions)	**115.05**
Regional group	**Latin America and the Caribbean**	FREI score	**41.51**
Population (millions)	**18.00**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**54.48**	**71**
1.1	Digital Infrastructure	58.29	88
1.1.1	Internet access	52.21	82
1.1.2	International internet bandwidth	22.83	113
1.1.3	Fixed-broadband subscriptions	73.04	77
1.1.4	4G-mobile network coverage	92.34	82
1.1.5	Fixed broadband affordability	66.35	87
1.1.6	Mobile broadband affordability	83.08	88
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	33.80	59
1.2.1	Quality of infrastructure	32.86	67
1.2.2	Rural access	54.34	81
1.2.3	Air connectivity	2.56	86
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	71.35	63
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	90.98	55
1.3.4	Energy intensity	88.48	35
2	**HUMAN CAPITAL**	**41.55**	**74**
2.1	Attract	45.64	53
2.1.1	Brain gain	31.23	93
2.1.2	International students	2.53	84
2.1.3	Tolerance of minorities	41.49	64
2.1.4	Tolerance of immigrants	58.46	64
2.1.5	Gender parity in high-skilled jobs	94.49	13
2.2	Grow	48.00	49
2.2.1	Tertiary enrolment	34.24	65
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	32.39	38
2.2.4	Youth inclusion	77.38	66
2.3	Retain	55.28	70
2.3.1	Pension coverage	59.80	69
2.3.2	Environmental performance	46.78	50
2.3.3	Physician density	35.04	68
2.3.4	Sanitation	90.70	71
2.3.5	Personal safety	44.10	97
2.4	Skills	17.26	98
2.4.1	Workforce with tertiary education	17.99	84
2.4.2	High-skilled workforce	15.19	91
2.4.3	Researchers	4.43	71
2.4.4	Relevance of education system to the economy	23.28	94
2.4.5	Digital skills	25.41	37

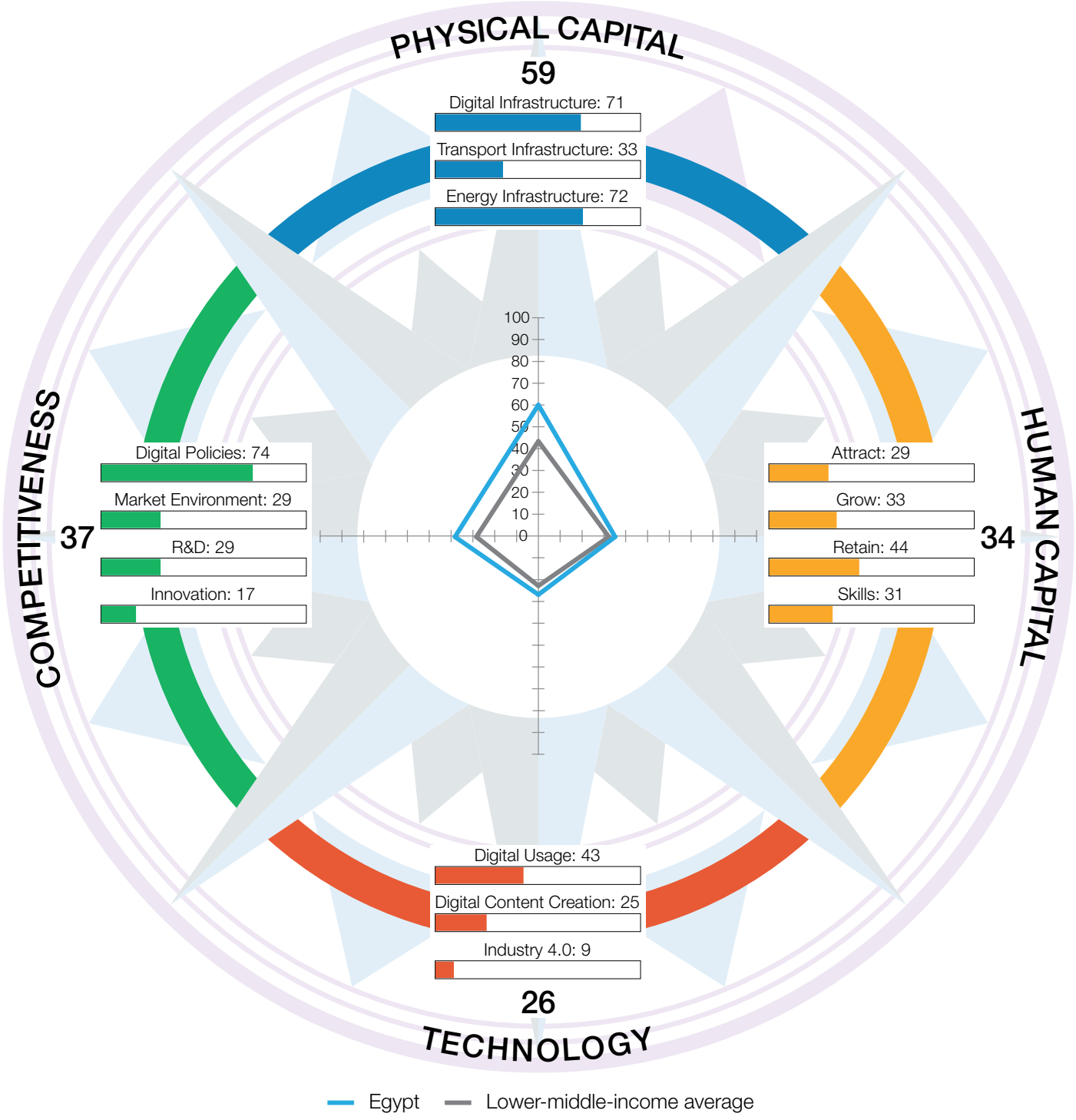
		Score	Rank
3	**TECHNOLOGY**	**31.54**	**73**
3.1	Digital Usage	59.13	61
3.1.1	Internet users	68.80	79
3.1.2	Active mobile-broadband subscriptions	21.65	100
3.1.3	Gender parity in internet usage	94.00	61
3.1.4	Firms with website	78.57	22
3.1.5	Internet shopping	14.79	81
3.1.6	Government online services	69.02	50
3.1.7	E-Participation	67.08	41
3.2	Digital Content Creation	26.96	78
3.2.1	Software development	2.23	75
3.2.2	Wikipedia edits	39.66	77
3.2.3	Internet domain registrations	1.27	80
3.2.4	Mobile apps development	64.66	82
3.3	Industry 4.0	8.52	83
3.3.1	Cloud computing	—	—
3.3.2	AI software development	6.81	74
3.3.3	AI research	4.72	66
3.3.4	ICT patent applications	0.38	57
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**38.47**	**60**
4.1	Digital Policies	65.78	62
4.1.1	ICT regulation	72.97	79
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	27.13	88
4.2.1	Extent of market dominance	17.00	107
4.2.2	Labour productivity per employee	13.33	85
4.2.3	Urbanisation	56.71	65
4.2.4	Domestic credit to private sector	21.48	60
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	23.35	80
4.3.1	R&D spending	8.05	64
4.3.2	University ranking	13.17	65
4.3.3	Gender parity in R&D	66.15	43
4.3.4	Scientific journal articles	6.01	69
4.4	Innovation	37.62	30
4.4.1	Medium- and high-tech industry	17.82	88
4.4.2	High-tech exports	7.39	78
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	93.18	3
4.4.5	New business density	n/a	n/a
4.4.6	Patent applications	32.09	98

Egypt

Key Indicators

Rank (out of 124)	**76**	GDP per capita (PPP US$)	**15,090.99**
Income group	**Lower-middle income**	GDP (US$ billions)	**476.75**
Regional group	**Middle East and North Africa**	FREI score	**39.05**
Population (millions)	**110.99**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**58.87**	**57**
1.1	Digital Infrastructure	70.99	60
1.1.1	Internet access	72.47	72
1.1.2	International internet bandwidth	40.54	86
1.1.3	Fixed-broadband subscriptions	100.00	2
1.1.4	4G-mobile network coverage	97.85	57
1.1.5	Fixed broadband affordability	75.60	68
1.1.6	Mobile broadband affordability	92.26	64
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	33.35	60
1.2.1	Quality of infrastructure	42.86	53
1.2.2	Rural access	81.37	40
1.2.3	Air connectivity	2.09	90
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	72.29	55
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	93.98	47
1.3.4	Energy intensity	89.21	32
2	**HUMAN CAPITAL**	**34.27**	**88**
2.1	Attract	29.19	117
2.1.1	Brain gain	52.90	48
2.1.2	International students	2.39	85
2.1.3	Tolerance of minorities	18.09	98
2.1.4	Tolerance of immigrants	43.08	88
2.1.5	Gender parity in high-skilled jobs	29.48	107
2.2	Grow	33.48	82
2.2.1	Tertiary enrolment	27.64	74
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	11.89	82
2.2.4	Youth inclusion	60.93	98
2.3	Retain	43.85	88
2.3.1	Pension coverage	36.73	79
2.3.2	Environmental performance	28.14	85
2.3.3	Physician density	10.76	95
2.3.4	Sanitation	97.06	55
2.3.5	Personal safety	46.54	89
2.4	Skills	30.56	60
2.4.1	Workforce with tertiary education	25.28	69
2.4.2	High-skilled workforce	32.07	62
2.4.3	Researchers	9.66	53
2.4.4	Relevance of education system to the economy	40.21	64
2.4.5	Digital skills	45.59	14

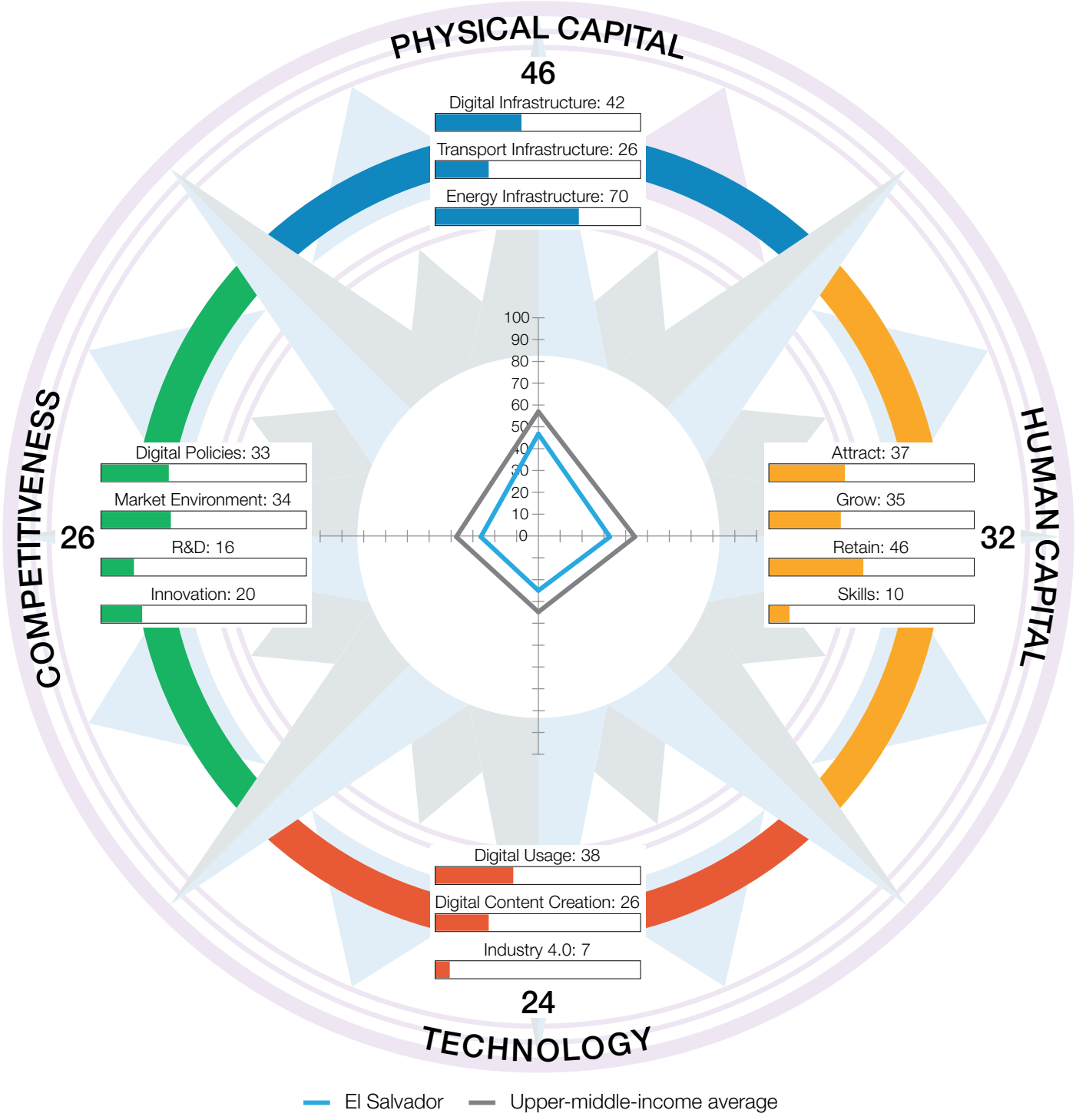
		Score	Rank
3	**TECHNOLOGY**	**25.80**	**85**
3.1	Digital Usage	43.35	84
3.1.1	Internet users	70.09	76
3.1.2	Active mobile-broadband subscriptions	30.30	82
3.1.3	Gender parity in internet usage	93.69	63
3.1.4	Firms with website	35.24	78
3.1.5	Internet shopping	2.62	113
3.1.6	Government online services	43.69	85
3.1.7	E-Participation	27.85	95
3.2	Digital Content Creation	24.96	88
3.2.1	Software development	1.11	94
3.2.2	Wikipedia edits	44.43	71
3.2.3	Internet domain registrations	0.44	96
3.2.4	Mobile apps development	53.88	97
3.3	Industry 4.0	9.09	79
3.3.1	Cloud computing	—	—
3.3.2	AI software development	14.13	46
3.3.3	AI research	5.11	63
3.3.4	ICT patent applications	0.05	73
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**37.24**	**63**
4.1	Digital Policies	74.18	43
4.1.1	ICT regulation	81.76	64
4.1.2	Cybersecurity	37.50	87
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	50.00	99
4.2	Market Environment	28.68	81
4.2.1	Extent of market dominance	62.34	31
4.2.2	Labour productivity per employee	35.53	49
4.2.3	Urbanisation	31.44	98
4.2.4	Domestic credit to private sector	10.90	89
4.2.5	Market capitalisation	3.19	68
4.3	R&D	28.67	54
4.3.1	R&D spending	17.70	41
4.3.2	University ranking	21.58	50
4.3.3	Gender parity in R&D	69.02	40
4.3.4	Scientific journal articles	6.39	67
4.4	Innovation	17.43	107
4.4.1	Medium- and high-tech industry	27.47	69
4.4.2	High-tech exports	4.26	89
4.4.3	Venture capital recipients, deals	6.20	59
4.4.4	New product entrepreneurial activity	2.06	93
4.4.5	New business density	n/a	n/a
4.4.6	Patent applications	47.17	69

El Salvador

Key Indicators

Rank (out of 124)	**94**	GDP per capita (PPP US$)	**11,096.21**
Income group	**Upper-middle income**	GDP (US$ billions)	**32.49**
Regional group	**Latin America and the Caribbean**	FREI score	**31.89**
Population (millions)	**6.34**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**45.94**	**93**
1.1	Digital Infrastructure	42.21	102
1.1.1	Internet access	26.04	95
1.1.2	International internet bandwidth	52.57	38
1.1.3	Fixed-broadband subscriptions	19.76	105
1.1.4	4G-mobile network coverage	74.19	98
1.1.5	Fixed broadband affordability	54.22	96
1.1.6	Mobile broadband affordability	59.61	108
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	25.84	84
1.2.1	Quality of infrastructure	14.29	109
1.2.2	Rural access	76.78	48
1.2.3	Air connectivity	6.48	68
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	69.78	72
1.3.1	Access to electricity	97.54	91
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	90.98	55
1.3.4	Energy intensity	86.90	47
2	**HUMAN CAPITAL**	**31.93**	**92**
2.1	Attract	37.03	100
2.1.1	Brain gain	26.31	102
2.1.2	International students	0.86	96
2.1.3	Tolerance of minorities	43.62	58
2.1.4	Tolerance of immigrants	66.15	48
2.1.5	Gender parity in high-skilled jobs	48.21	94
2.2	Grow	35.36	79
2.2.1	Tertiary enrolment	19.07	84
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	18.01	67
2.2.4	Youth inclusion	68.99	83
2.3	Retain	45.58	86
2.3.1	Pension coverage	18.47	91
2.3.2	Environmental performance	37.12	67
2.3.3	Physician density	45.90	51
2.3.4	Sanitation	80.73	87
2.3.5	Personal safety	45.70	91
2.4	Skills	9.74	115
2.4.1	Workforce with tertiary education	9.99	97
2.4.2	High-skilled workforce	18.99	83
2.4.3	Researchers	0.68	89
2.4.4	Relevance of education system to the economy	9.28	114
2.4.5	Digital skills	n/a	n/a

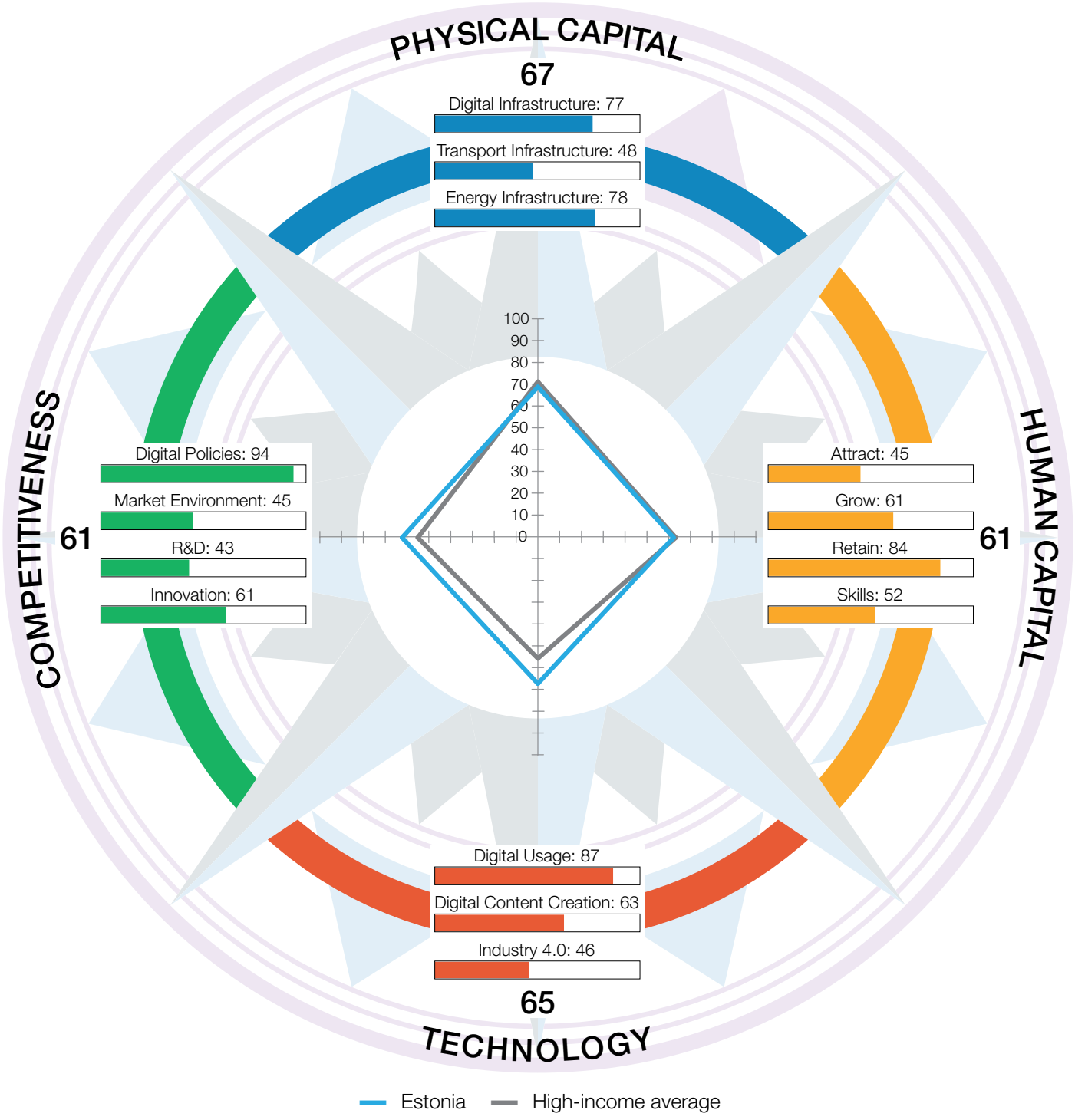
		Score	Rank
3	**TECHNOLOGY**	**23.98**	**90**
3.1	Digital Usage	38.50	91
3.1.1	Internet users	51.65	93
3.1.2	Active mobile-broadband subscriptions	30.31	81
3.1.3	Gender parity in internet usage	85.43	79
3.1.4	Firms with website	35.36	77
3.1.5	Internet shopping	9.16	93
3.1.6	Government online services	29.71	103
3.1.7	E-Participation	27.85	95
3.2	Digital Content Creation	26.37	81
3.2.1	Software development	2.14	77
3.2.2	Wikipedia edits	36.50	81
3.2.3	Internet domain registrations	1.21	82
3.2.4	Mobile apps development	65.62	80
3.3	Industry 4.0	7.07	98
3.3.1	Cloud computing	—	—
3.3.2	AI software development	5.37	82
3.3.3	AI research	0.48	104
3.3.4	ICT patent applications	0.00	76
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**25.70**	**101**
4.1	Digital Policies	32.59	109
4.1.1	ICT regulation	61.49	98
4.1.2	Cybersecurity	50.00	72
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	0.00	114
4.1.7	Data transfer	16.67	118
4.2	Market Environment	33.80	64
4.2.1	Extent of market dominance	9.28	117
4.2.2	Labour productivity per employee	n/a	n/a
4.2.3	Urbanisation	66.52	49
4.2.4	Domestic credit to private sector	25.58	50
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	16.40	92
4.3.1	R&D spending	2.86	89
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	62.69	45
4.3.4	Scientific journal articles	0.05	122
4.4	Innovation	20.00	96
4.4.1	Medium- and high-tech industry	23.07	78
4.4.2	High-tech exports	11.33	60
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	48.65	47
4.4.5	New business density	1.57	92
4.4.6	Patent applications	15.39	117

Estonia

Key Indicators

Rank (out of 124)	**19**	GDP per capita (PPP US$)	**46,697.36**
Income group	**High income**	GDP (US$ billions)	**38.10**
Regional group	**Europe**	FREI score	**63.49**
Population (millions)	**1.34**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**67.41**	**33**
1.1	Digital Infrastructure	76.58	41
1.1.1	Internet access	91.69	29
1.1.2	International internet bandwidth	51.64	41
1.1.3	Fixed-broadband subscriptions	92.47	47
1.1.4	4G-mobile network coverage	98.92	40
1.1.5	Fixed broadband affordability	92.73	18
1.1.6	Mobile broadband affordability	99.49	3
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	47.69	35
1.2.1	Quality of infrastructure	60.71	37
1.2.2	Rural access	97.24	12
1.2.3	Air connectivity	17.26	42
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	77.98	17
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	99.25	6
1.3.4	Energy intensity	83.20	67
2	**HUMAN CAPITAL**	**60.62**	**26**
2.1	Attract	45.48	56
2.1.1	Brain gain	62.15	28
2.1.2	International students	32.66	20
2.1.3	Tolerance of minorities	27.66	90
2.1.4	Tolerance of immigrants	35.38	101
2.1.5	Gender parity in high-skilled jobs	69.53	66
2.2	Grow	60.87	25
2.2.1	Tertiary enrolment	45.25	42
2.2.2	Reading, maths, and science	78.15	3
2.2.3	Use of virtual professional networks	31.94	40
2.2.4	Youth inclusion	88.13	26
2.3	Retain	83.66	18
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	72.03	14
2.3.3	Physician density	61.05	28
2.3.4	Sanitation	99.06	32
2.3.5	Personal safety	86.16	25
2.4	Skills	52.49	22
2.4.1	Workforce with tertiary education	51.26	22
2.4.2	High-skilled workforce	71.58	17
2.4.3	Researchers	44.05	26
2.4.4	Relevance of education system to the economy	61.78	29
2.4.5	Digital skills	33.77	28

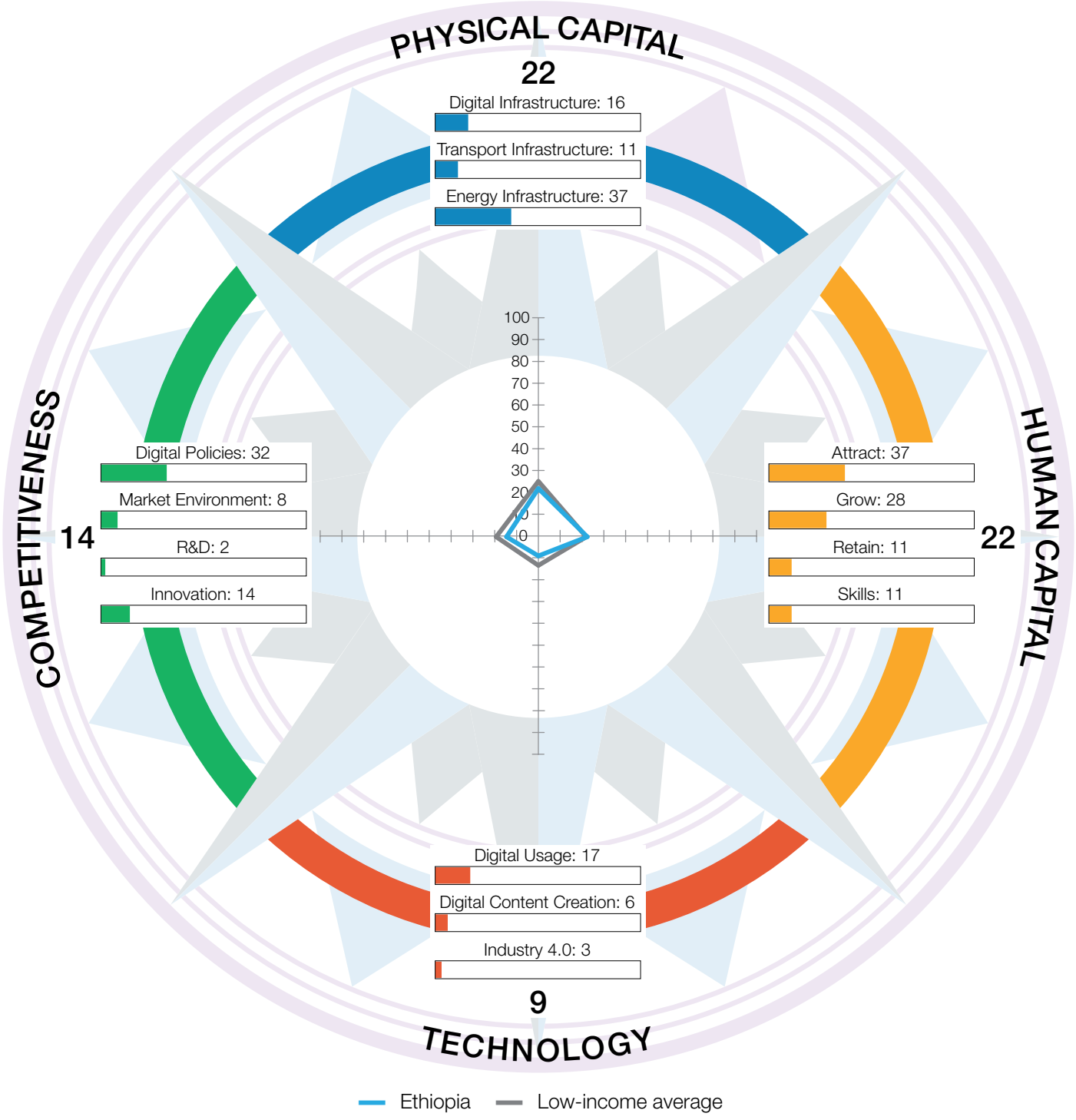
		Score	Rank
3	**TECHNOLOGY**	**65.24**	**12**
3.1	Digital Usage	86.61	5
3.1.1	Internet users	90.45	26
3.1.2	Active mobile-broadband subscriptions	61.95	6
3.1.3	Gender parity in internet usage	97.15	39
3.1.4	Firms with website	80.37	19
3.1.5	Internet shopping	78.87	15
3.1.6	Government online services	100.00	1
3.1.7	E-Participation	97.47	3
3.2	Digital Content Creation	63.17	16
3.2.1	Software development	37.57	13
3.2.2	Wikipedia edits	94.03	3
3.2.3	Internet domain registrations	23.16	24
3.2.4	Mobile apps development	97.93	11
3.3	Industry 4.0	45.92	14
3.3.1	Cloud computing	—	—
3.3.2	AI software development	45.94	17
3.3.3	AI research	48.92	13
3.3.4	ICT patent applications	20.68	23
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**60.68**	**13**
4.1	Digital Policies	93.60	3
4.1.1	ICT regulation	88.51	30
4.1.2	Cybersecurity	100.00	1
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	100.00	1
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	45.11	37
4.2.1	Extent of market dominance	46.77	49
4.2.2	Labour productivity per employee	46.35	36
4.2.3	Urbanisation	62.76	56
4.2.4	Domestic credit to private sector	24.57	52
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	43.37	28
4.3.1	R&D spending	32.55	21
4.3.2	University ranking	21.07	51
4.3.3	Gender parity in R&D	70.66	37
4.3.4	Scientific journal articles	49.18	26
4.4	Innovation	60.63	4
4.4.1	Medium- and high-tech industry	36.61	52
4.4.2	High-tech exports	32.01	21
4.4.3	Venture capital recipients, deals	89.82	5
4.4.4	New product entrepreneurial activity	47.36	48
4.4.5	New business density	100.00	1
4.4.6	Patent applications	57.96	40

Ethiopia

Key Indicators

Rank (out of 124)	**123**	GDP per capita (PPP US$)	**2,811.58**
Income group	**Low income**	GDP (US$ billions)	**126.78**
Regional group	**Sub-Saharan Africa**	FREI score	**16.54**
Population (millions)	**123.38**	FREI score (income group average)	**19.43**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**21.59**	**121**
1.1	Digital Infrastructure	16.15	122
1.1.1	Internet access	13.51	105
1.1.2	International internet bandwidth	0.00	124
1.1.3	Fixed-broadband subscriptions	3.03	116
1.1.4	4G-mobile network coverage	0.00	124
1.1.5	Fixed broadband affordability	40.36	111
1.1.6	Mobile broadband affordability	56.12	109
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	11.42	117
1.2.1	Quality of infrastructure	11.35	114
1.2.2	Rural access	25.95	111
1.2.3	Air connectivity	0.90	103
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	37.20	115
1.3.1	Access to electricity	46.61	110
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	38.35	83
1.3.4	Energy intensity	63.67	112
2	**HUMAN CAPITAL**	**21.84**	**119**
2.1	Attract	37.04	99
2.1.1	Brain gain	35.74	89
2.1.2	International students	n/a	n/a
2.1.3	Tolerance of minorities	5.32	116
2.1.4	Tolerance of immigrants	72.31	38
2.1.5	Gender parity in high-skilled jobs	34.77	104
2.2	Grow	28.17	103
2.2.1	Tertiary enrolment	6.03	106
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	0.45	121
2.2.4	Youth inclusion	78.04	63
2.3	Retain	11.24	123
2.3.1	Pension coverage	1.94	116
2.3.2	Environmental performance	21.86	97
2.3.3	Physician density	1.11	116
2.3.4	Sanitation	0.00	124
2.3.5	Personal safety	31.31	109
2.4	Skills	10.89	111
2.4.1	Workforce with tertiary education	1.19	120
2.4.2	High-skilled workforce	1.92	114
2.4.3	Researchers	0.88	86
2.4.4	Relevance of education system to the economy	39.59	66
2.4.5	Digital skills	n/a	n/a

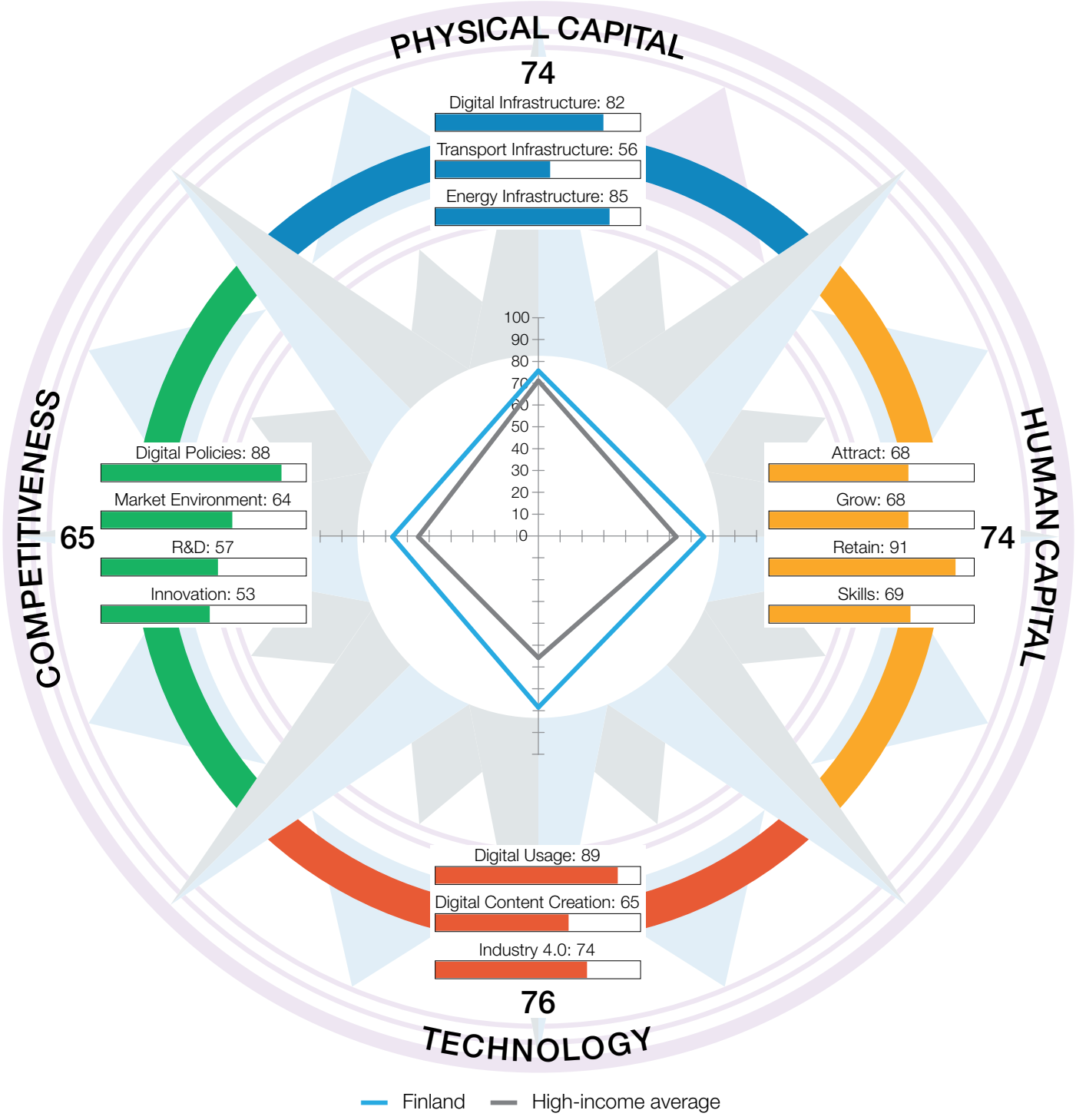
		Score	Rank
3	**TECHNOLOGY**	**8.51**	**122**
3.1	Digital Usage	17.01	118
3.1.1	Internet users	11.29	119
3.1.2	Active mobile-broadband subscriptions	5.93	119
3.1.3	Gender parity in internet usage	47.31	97
3.1.4	Firms with website	26.07	86
3.1.5	Internet shopping	1.06	118
3.1.6	Government online services	17.32	115
3.1.7	E-Participation	10.13	119
3.2	Digital Content Creation	5.83	124
3.2.1	Software development	0.18	116
3.2.2	Wikipedia edits	0.00	123
3.2.3	Internet domain registrations	0.00	120
3.2.4	Mobile apps development	23.14	120
3.3	Industry 4.0	2.70	120
3.3.1	Cloud computing	—	—
3.3.2	AI software development	0.58	113
3.3.3	AI research	1.45	92
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**14.24**	**122**
4.1	Digital Policies	32.50	110
4.1.1	ICT regulation	10.81	123
4.1.2	Cybersecurity	0.00	106
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	0.00	114
4.1.7	Data transfer	66.67	51
4.2	Market Environment	8.39	121
4.2.1	Extent of market dominance	18.56	105
4.2.2	Labour productivity per employee	1.41	111
4.2.3	Urbanisation	5.19	119
4.2.4	Domestic credit to private sector	n/a	n/a
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	2.13	111
4.3.1	R&D spending	4.90	77
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	2.39	103
4.3.4	Scientific journal articles	1.22	94
4.4	Innovation	13.93	114
4.4.1	Medium- and high-tech industry	19.33	84
4.4.2	High-tech exports	20.26	39
4.4.3	Venture capital recipients, deals	1.40	86
4.4.4	New product entrepreneurial activity	32.95	64
4.4.5	New business density	1.95	86
4.4.6	Patent applications	7.70	119

Finland

Key Indicators

Rank (out of 124)	**6**	GDP per capita (PPP US$)	**59,026.71**
Income group	**High income**	GDP (US$ billions)	**280.83**
Regional group	**Europe**	FREI score	**72.33**
Population (millions)	**5.56**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**74.13**	**12**
1.1	Digital Infrastructure	81.86	15
1.1.1	Internet access	91.56	30
1.1.2	International internet bandwidth	47.33	54
1.1.3	Fixed-broadband subscriptions	97.85	23
1.1.4	4G-mobile network coverage	99.89	17
1.1.5	Fixed broadband affordability	92.47	19
1.1.6	Mobile broadband affordability	98.47	11
1.1.7	Computer software spending	45.45	13
1.2	Transport Infrastructure	55.70	20
1.2.1	Quality of infrastructure	85.71	5
1.2.2	Rural access	81.39	39
1.2.3	Air connectivity	37.06	18
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	84.82	3
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	98.50	15
1.3.4	Energy intensity	76.65	86
2	**HUMAN CAPITAL**	**73.93**	**7**
2.1	Attract	67.85	16
2.1.1	Brain gain	47.65	63
2.1.2	International students	21.12	32
2.1.3	Tolerance of minorities	100.00	1
2.1.4	Tolerance of immigrants	76.92	28
2.1.5	Gender parity in high-skilled jobs	93.58	16
2.2	Grow	67.94	13
2.2.1	Tertiary enrolment	62.65	7
2.2.2	Reading, maths, and science	74.44	7
2.2.3	Use of virtual professional networks	41.56	28
2.2.4	Youth inclusion	93.12	15
2.3	Retain	90.85	4
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	97.63	3
2.3.3	Physician density	68.42	16
2.3.4	Sanitation	99.39	23
2.3.5	Personal safety	88.84	17
2.4	Skills	69.08	7
2.4.1	Workforce with tertiary education	50.31	24
2.4.2	High-skilled workforce	72.56	15
2.4.3	Researchers	86.36	4
2.4.4	Relevance of education system to the economy	90.38	2
2.4.5	Digital skills	45.75	13

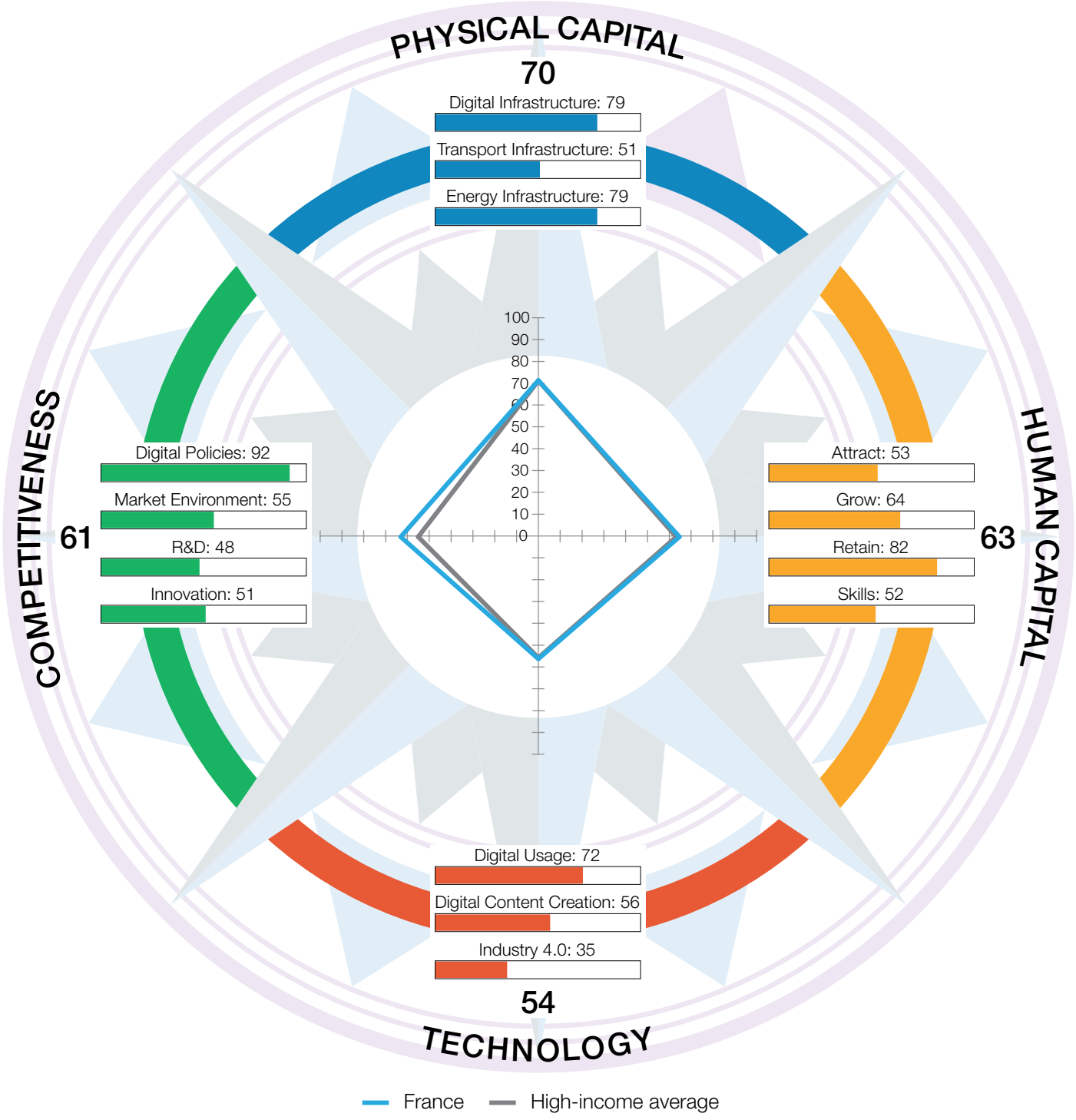
		Score	Rank
3	**TECHNOLOGY**	**76.11**	**3**
3.1	Digital Usage	89.50	2
3.1.1	Internet users	92.34	16
3.1.2	Active mobile-broadband subscriptions	64.32	5
3.1.3	Gender parity in internet usage	95.99	50
3.1.4	Firms with website	100.00	1
3.1.5	Internet shopping	81.10	13
3.1.6	Government online services	97.80	2
3.1.7	E-Participation	94.93	6
3.2	Digital Content Creation	64.67	13
3.2.1	Software development	45.44	7
3.2.2	Wikipedia edits	88.44	6
3.2.3	Internet domain registrations	29.01	21
3.2.4	Mobile apps development	95.79	16
3.3	Industry 4.0	74.16	3
3.3.1	Cloud computing	—	—
3.3.2	AI software development	72.38	9
3.3.3	AI research	71.88	6
3.3.4	ICT patent applications	100.00	1
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**65.16**	**8**
4.1	Digital Policies	87.71	11
4.1.1	ICT regulation	97.30	3
4.1.2	Cybersecurity	100.00	1
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	63.57	9
4.2.1	Extent of market dominance	66.74	22
4.2.2	Labour productivity per employee	61.18	20
4.2.3	Urbanisation	82.51	23
4.2.4	Domestic credit to private sector	43.83	26
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	56.61	11
4.3.1	R&D spending	54.28	11
4.3.2	University ranking	50.46	17
4.3.3	Gender parity in R&D	45.01	65
4.3.4	Scientific journal articles	76.68	7
4.4	Innovation	52.78	9
4.4.1	Medium- and high-tech industry	53.24	26
4.4.2	High-tech exports	15.89	46
4.4.3	Venture capital recipients, deals	43.97	10
4.4.4	New product entrepreneurial activity	99.36	2
4.4.5	New business density	24.17	23
4.4.6	Patent applications	80.03	6

France

Key Indicators

Rank (out of 124)	**21**	GDP per capita (PPP US$)	**55,492.57**
Income group	**High income**	GDP (US$ billions)	**2,782.91**
Regional group	**Europe**	FREI score	**62.18**
Population (millions)	**67.94**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**69.83**	**25**
1.1	Digital Infrastructure	79.15	28
1.1.1	Internet access	87.01	43
1.1.2	International internet bandwidth	42.50	77
1.1.3	Fixed-broadband subscriptions	95.49	34
1.1.4	4G-mobile network coverage	98.92	40
1.1.5	Fixed broadband affordability	88.72	33
1.1.6	Mobile broadband affordability	95.92	40
1.1.7	Computer software spending	45.45	13
1.2	Transport Infrastructure	51.37	31
1.2.1	Quality of infrastructure	71.43	18
1.2.2	Rural access	98.88	4
1.2.3	Air connectivity	19.22	40
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	78.97	11
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	99.25	6
1.3.4	Energy intensity	87.99	41
2	**HUMAN CAPITAL**	**62.97**	**23**
2.1	Attract	53.42	36
2.1.1	Brain gain	55.77	43
2.1.2	International students	24.35	28
2.1.3	Tolerance of minorities	31.91	77
2.1.4	Tolerance of immigrants	61.54	58
2.1.5	Gender parity in high-skilled jobs	93.52	17
2.2	Grow	63.57	21
2.2.1	Tertiary enrolment	45.45	40
2.2.2	Reading, maths, and science	65.14	24
2.2.3	Use of virtual professional networks	56.40	18
2.2.4	Youth inclusion	87.30	35
2.3	Retain	82.43	21
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	73.90	12
2.3.3	Physician density	52.45	40
2.3.4	Sanitation	98.52	39
2.3.5	Personal safety	87.30	21
2.4	Skills	52.44	23
2.4.1	Workforce with tertiary education	54.35	17
2.4.2	High-skilled workforce	73.08	14
2.4.3	Researchers	56.46	17
2.4.4	Relevance of education system to the economy	49.89	44
2.4.5	Digital skills	28.44	34

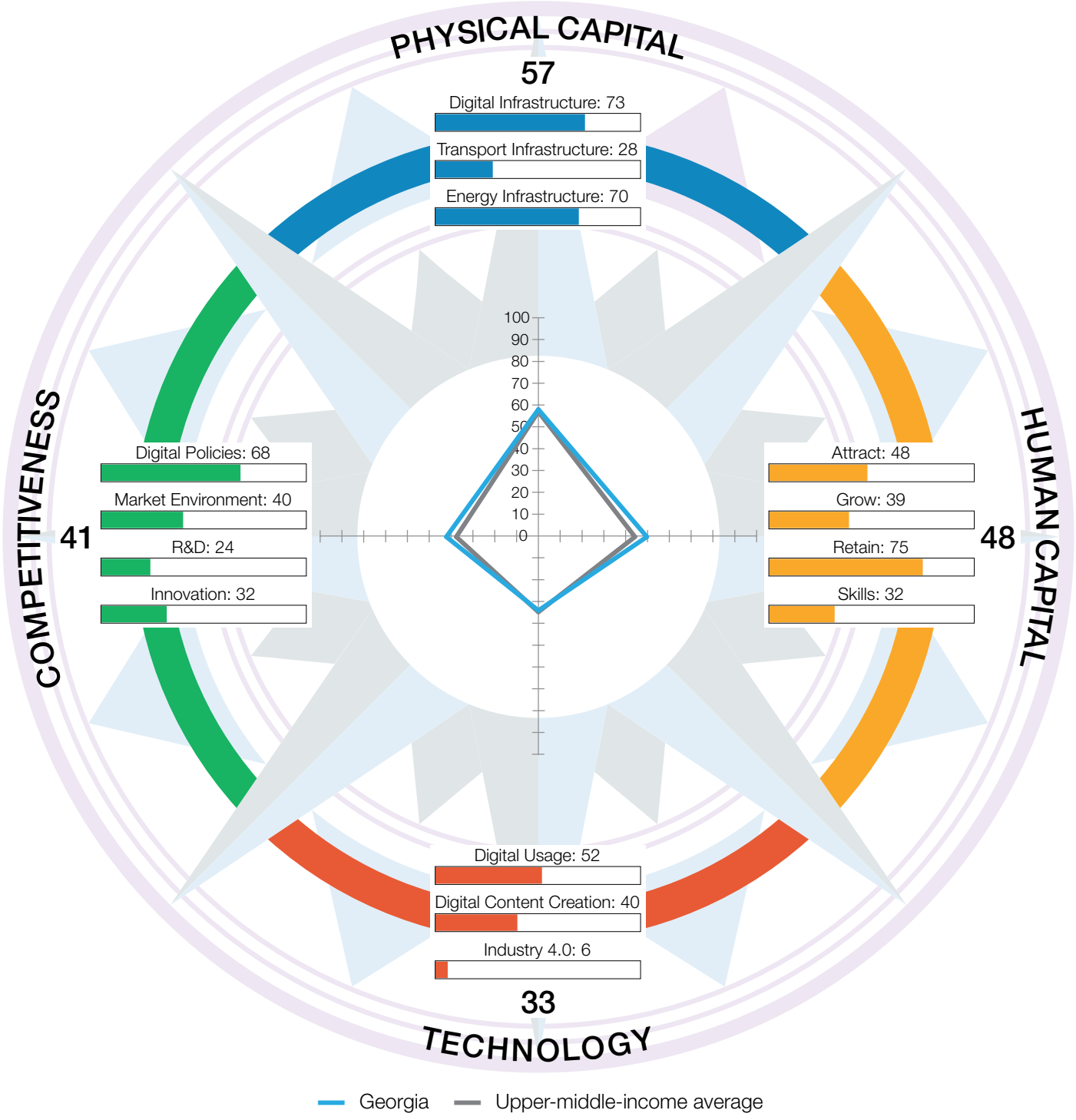
		Score	Rank
3	**TECHNOLOGY**	**54.47**	**23**
3.1	Digital Usage	72.10	30
3.1.1	Internet users	85.19	45
3.1.2	Active mobile-broadband subscriptions	40.26	47
3.1.3	Gender parity in internet usage	97.60	34
3.1.4	Firms with website	69.15	33
3.1.5	Internet shopping	60.40	30
3.1.6	Government online services	83.75	20
3.1.7	E-Participation	68.35	37
3.2	Digital Content Creation	56.35	24
3.2.1	Software development	25.66	24
3.2.2	Wikipedia edits	82.80	11
3.2.3	Internet domain registrations	25.66	23
3.2.4	Mobile apps development	91.28	27
3.3	Industry 4.0	34.94	20
3.3.1	Cloud computing	—	—
3.3.2	AI software development	45.28	18
3.3.3	AI research	27.04	30
3.3.4	ICT patent applications	29.48	17
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**61.45**	**11**
4.1	Digital Policies	92.18	5
4.1.1	ICT regulation	95.27	7
4.1.2	Cybersecurity	100.00	1
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	100.00	1
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	50.00	99
4.2	Market Environment	55.44	21
4.2.1	Extent of market dominance	55.93	38
4.2.2	Labour productivity per employee	64.84	14
4.2.3	Urbanisation	76.60	33
4.2.4	Domestic credit to private sector	54.24	17
4.2.5	Market capitalisation	25.58	18
4.3	R&D	47.63	20
4.3.1	R&D spending	43.70	14
4.3.2	University ranking	77.91	8
4.3.3	Gender parity in R&D	32.11	86
4.3.4	Scientific journal articles	36.80	32
4.4	Innovation	50.55	13
4.4.1	Medium- and high-tech industry	63.72	13
4.4.2	High-tech exports	34.02	19
4.4.3	Venture capital recipients, deals	49.59	9
4.4.4	New product entrepreneurial activity	60.36	28
4.4.5	New business density	21.58	25
4.4.6	Patent applications	74.05	13

Georgia

Key Indicators

Rank (out of 124)	**56**	GDP per capita (PPP US$)	**20,113.38**
Income group	**Upper-middle income**	GDP (US$ billions)	**24.61**
Regional group	**Middle East and North Africa**	FREI score	**44.81**
Population (millions)	**3.71**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**56.86**	**64**
1.1	Digital Infrastructure	72.99	54
1.1.1	Internet access	85.87	48
1.1.2	International internet bandwidth	57.53	23
1.1.3	Fixed-broadband subscriptions	88.03	61
1.1.4	4G-mobile network coverage	99.70	30
1.1.5	Fixed broadband affordability	76.40	67
1.1.6	Mobile broadband affordability	94.30	51
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	27.68	74
1.2.1	Quality of infrastructure	17.86	100
1.2.2	Rural access	75.13	50
1.2.3	Air connectivity	9.26	53
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	69.92	71
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	83.46	66
1.3.4	Energy intensity	83.26	65
2	**HUMAN CAPITAL**	**48.42**	**51**
2.1	Attract	48.05	47
2.1.1	Brain gain	45.32	66
2.1.2	International students	24.02	29
2.1.3	Tolerance of minorities	28.72	85
2.1.4	Tolerance of immigrants	72.31	38
2.1.5	Gender parity in high-skilled jobs	69.90	65
2.2	Grow	39.13	71
2.2.1	Tertiary enrolment	47.59	29
2.2.2	Reading, maths, and science	21.46	67
2.2.3	Use of virtual professional networks	20.72	64
2.2.4	Youth inclusion	66.77	88
2.3	Retain	74.83	38
2.3.1	Pension coverage	90.71	48
2.3.2	Environmental performance	34.24	73
2.3.3	Physician density	85.63	5
2.3.4	Sanitation	84.37	84
2.3.5	Personal safety	79.17	41
2.4	Skills	31.65	57
2.4.1	Workforce with tertiary education	41.53	35
2.4.2	High-skilled workforce	35.27	54
2.4.3	Researchers	18.50	44
2.4.4	Relevance of education system to the economy	57.68	36
2.4.5	Digital skills	5.27	66

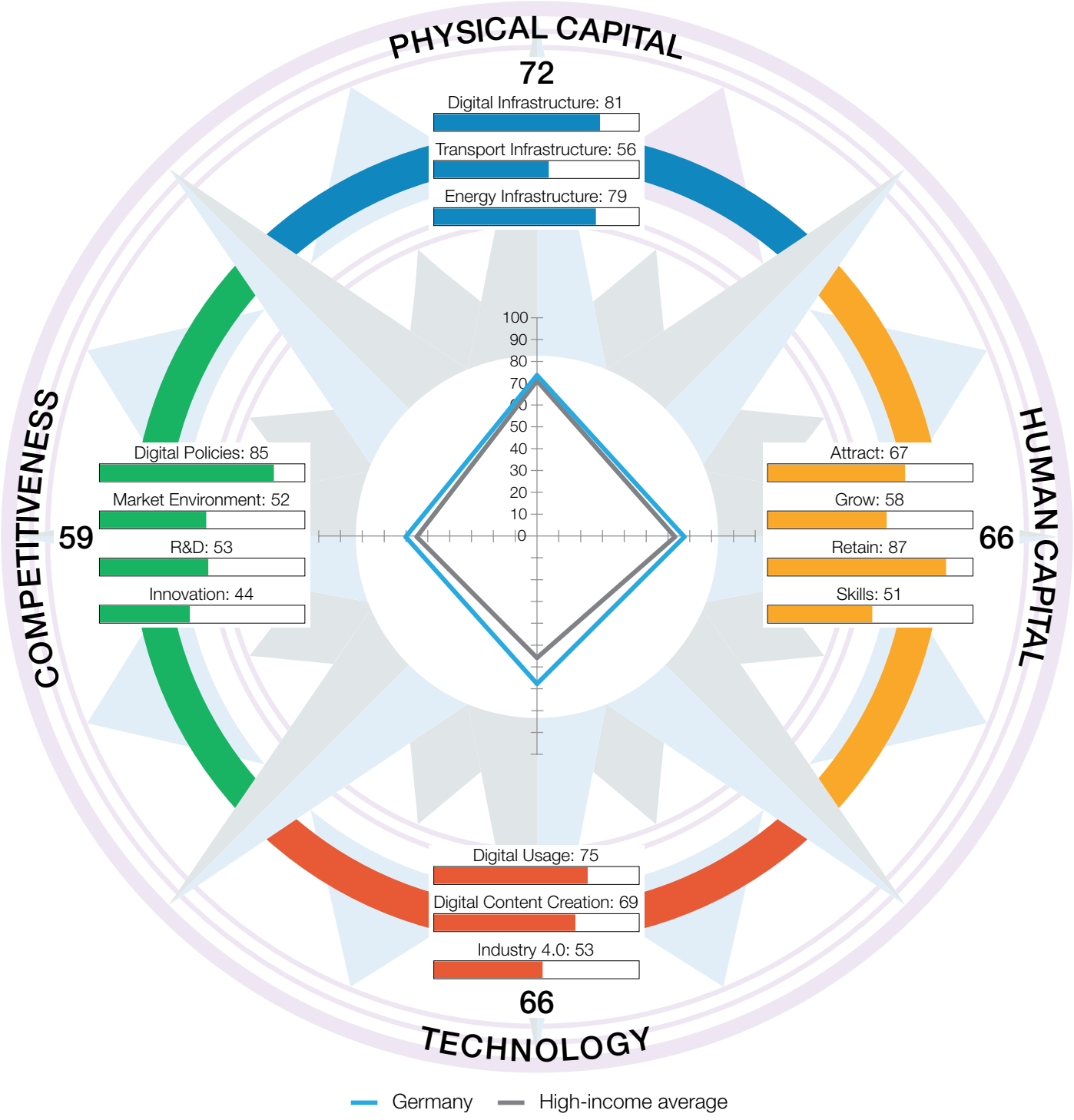
		Score	Rank
3	**TECHNOLOGY**	**32.88**	**68**
3.1	Digital Usage	52.47	72
3.1.1	Internet users	74.91	66
3.1.2	Active mobile-broadband subscriptions	34.62	67
3.1.3	Gender parity in internet usage	98.42	25
3.1.4	Firms with website	45.86	63
3.1.5	Internet shopping	16.67	77
3.1.6	Government online services	48.71	81
3.1.7	E-Participation	48.10	70
3.2	Digital Content Creation	40.27	44
3.2.1	Software development	5.34	54
3.2.2	Wikipedia edits	76.32	27
3.2.3	Internet domain registrations	2.64	65
3.2.4	Mobile apps development	76.77	57
3.3	Industry 4.0	5.89	103
3.3.1	Cloud computing	—	—
3.3.2	AI software development	5.43	81
3.3.3	AI research	7.38	57
3.3.4	ICT patent applications	0.15	63
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**41.08**	**52**
4.1	Digital Policies	68.00	60
4.1.1	ICT regulation	88.51	30
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	40.12	44
4.2.1	Extent of market dominance	52.29	39
4.2.2	Labour productivity per employee	30.84	56
4.2.3	Urbanisation	50.50	73
4.2.4	Domestic credit to private sector	26.84	49
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	24.26	76
4.3.1	R&D spending	4.47	79
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	86.37	19
4.3.4	Scientific journal articles	6.19	68
4.4	Innovation	31.95	41
4.4.1	Medium- and high-tech industry	14.90	92
4.4.2	High-tech exports	2.35	103
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	55.60	36
4.4.5	New business density	30.76	16
4.4.6	Patent applications	56.14	45

Germany

Key Indicators

Rank (out of 124)	**16**	GDP per capita (PPP US$)	**63,149.60**
Income group	**High income**	GDP (US$ billions)	**4,072.19**
Regional group	**Europe**	FREI score	**65.52**
Population (millions)	**84.08**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**72.13**	**18**
1.1	Digital Infrastructure	80.64	21
1.1.1	Internet access	91.76	28
1.1.2	International internet bandwidth	42.20	78
1.1.3	Fixed-broadband subscriptions	94.35	40
1.1.4	4G-mobile network coverage	99.82	25
1.1.5	Fixed broadband affordability	91.81	23
1.1.6	Mobile broadband affordability	99.06	7
1.1.7	Computer software spending	45.45	13
1.2	Transport Infrastructure	56.31	17
1.2.1	Quality of infrastructure	89.29	3
1.2.2	Rural access	98.41	8
1.2.3	Air connectivity	23.89	32
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	79.46	9
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	100.00	1
1.3.4	Energy intensity	90.84	25
2	**HUMAN CAPITAL**	**65.77**	**20**
2.1	Attract	66.74	21
2.1.1	Brain gain	67.10	21
2.1.2	International students	29.83	23
2.1.3	Tolerance of minorities	63.83	35
2.1.4	Tolerance of immigrants	75.38	33
2.1.5	Gender parity in high-skilled jobs	97.56	6
2.2	Grow	58.14	30
2.2.1	Tertiary enrolment	47.89	28
2.2.2	Reading, maths, and science	67.91	17
2.2.3	Use of virtual professional networks	23.44	55
2.2.4	Youth inclusion	93.32	12
2.3	Retain	87.25	10
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	73.73	13
2.3.3	Physician density	71.50	13
2.3.4	Sanitation	99.15	29
2.3.5	Personal safety	91.87	13
2.4	Skills	50.94	25
2.4.1	Workforce with tertiary education	39.45	40
2.4.2	High-skilled workforce	70.44	20
2.4.3	Researchers	61.83	14
2.4.4	Relevance of education system to the economy	57.84	35
2.4.5	Digital skills	25.13	40

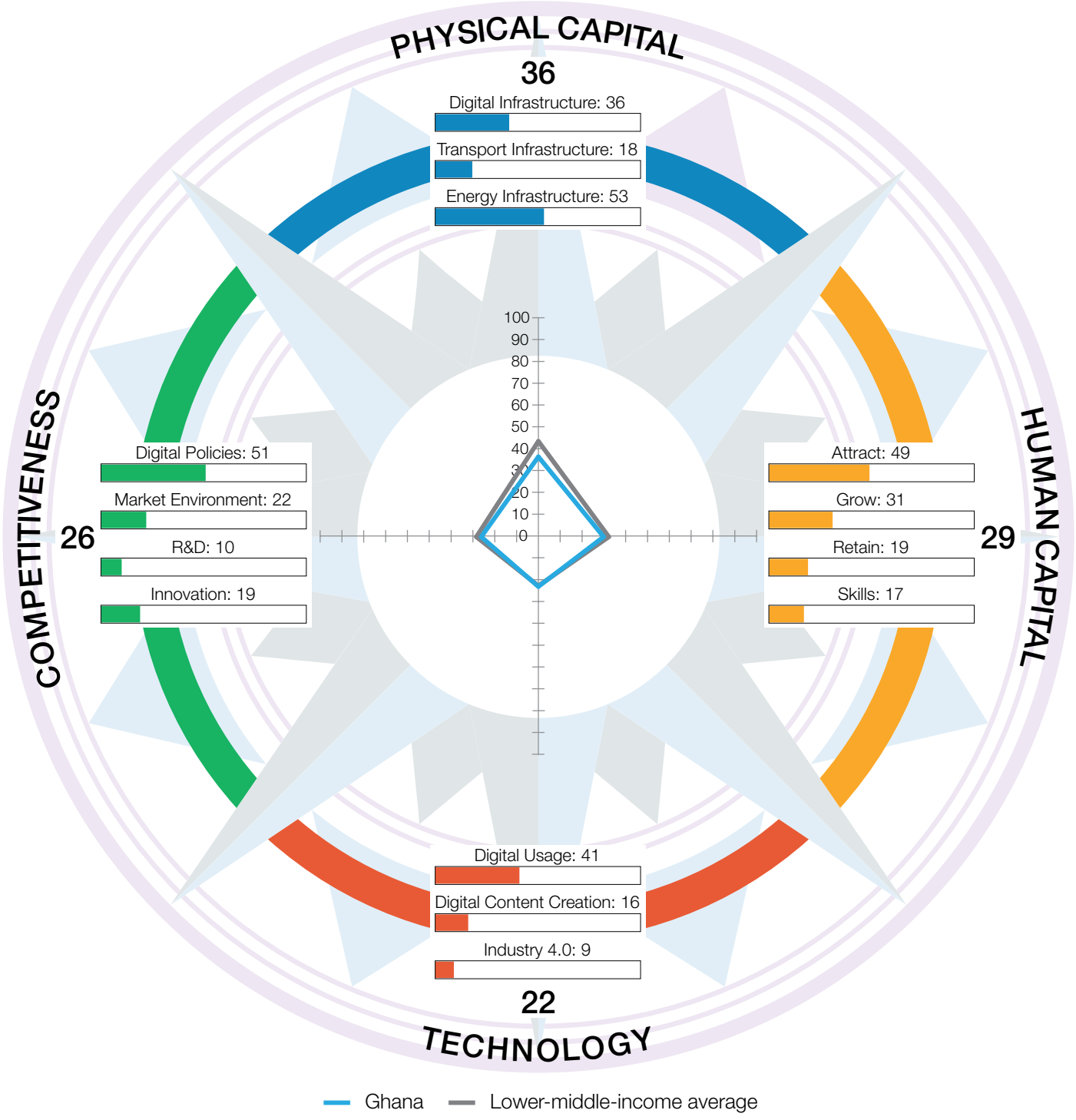
		Score	Rank
3	**TECHNOLOGY**	**65.58**	**10**
3.1	Digital Usage	75.41	22
3.1.1	Internet users	90.87	24
3.1.2	Active mobile-broadband subscriptions	37.67	55
3.1.3	Gender parity in internet usage	96.75	42
3.1.4	Firms with website	91.94	6
3.1.5	Internet shopping	68.62	23
3.1.6	Government online services	72.37	44
3.1.7	E-Participation	69.62	32
3.2	Digital Content Creation	68.69	9
3.2.1	Software development	34.80	16
3.2.2	Wikipedia edits	81.29	14
3.2.3	Internet domain registrations	60.81	7
3.2.4	Mobile apps development	97.87	12
3.3	Industry 4.0	52.63	12
3.3.1	Cloud computing	—	—
3.3.2	AI software development	50.98	13
3.3.3	AI research	34.35	23
3.3.4	ICT patent applications	61.04	10
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**58.60**	**19**
4.1	Digital Policies	84.65	17
4.1.1	ICT regulation	92.57	21
4.1.2	Cybersecurity	100.00	1
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	50.00	99
4.2	Market Environment	52.40	26
4.2.1	Extent of market dominance	74.26	11
4.2.2	Labour productivity per employee	60.92	21
4.2.3	Urbanisation	72.85	40
4.2.4	Domestic credit to private sector	36.26	35
4.2.5	Market capitalisation	17.70	32
4.3	R&D	52.91	15
4.3.1	R&D spending	57.97	9
4.3.2	University ranking	72.85	10
4.3.3	Gender parity in R&D	31.59	87
4.3.4	Scientific journal articles	49.21	25
4.4	Innovation	44.43	19
4.4.1	Medium- and high-tech industry	74.56	5
4.4.2	High-tech exports	23.58	33
4.4.3	Venture capital recipients, deals	22.49	24
4.4.4	New product entrepreneurial activity	59.33	29
4.4.5	New business density	5.45	66
4.4.6	Patent applications	81.15	5

Ghana

Key Indicators

Rank (out of 124)	**99**	GDP per capita (PPP US$)	**6,498.39**
Income group	**Lower-middle income**	GDP (US$ billions)	**72.84**
Regional group	**Sub-Saharan Africa**	FREI score	**28.15**
Population (millions)	**33.48**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**35.74**	**105**
1.1	Digital Infrastructure	35.82	107
1.1.1	Internet access	14.97	104
1.1.2	International internet bandwidth	39.40	88
1.1.3	Fixed-broadband subscriptions	0.00	119
1.1.4	4G-mobile network coverage	65.22	105
1.1.5	Fixed broadband affordability	49.46	102
1.1.6	Mobile broadband affordability	81.72	91
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	18.36	99
1.2.1	Quality of infrastructure	21.43	87
1.2.2	Rural access	49.27	87
1.2.3	Air connectivity	0.67	105
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	53.02	101
1.3.1	Access to electricity	84.03	100
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	36.84	84
1.3.4	Energy intensity	89.39	31
2	**HUMAN CAPITAL**	**29.13**	**96**
2.1	Attract	48.92	45
2.1.1	Brain gain	56.78	38
2.1.2	International students	2.30	87
2.1.3	Tolerance of minorities	68.09	24
2.1.4	Tolerance of immigrants	72.31	38
2.1.5	Gender parity in high-skilled jobs	45.12	96
2.2	Grow	31.05	92
2.2.1	Tertiary enrolment	12.13	93
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	11.33	84
2.2.4	Youth inclusion	69.69	82
2.3	Retain	19.14	111
2.3.1	Pension coverage	17.35	93
2.3.2	Environmental performance	14.92	118
2.3.3	Physician density	2.07	110
2.3.4	Sanitation	16.24	117
2.3.5	Personal safety	45.15	93
2.4	Skills	17.40	97
2.4.1	Workforce with tertiary education	8.04	102
2.4.2	High-skilled workforce	10.42	99
2.4.3	Researchers	0.86	87
2.4.4	Relevance of education system to the economy	50.28	43
2.4.5	Digital skills	n/a	n/a

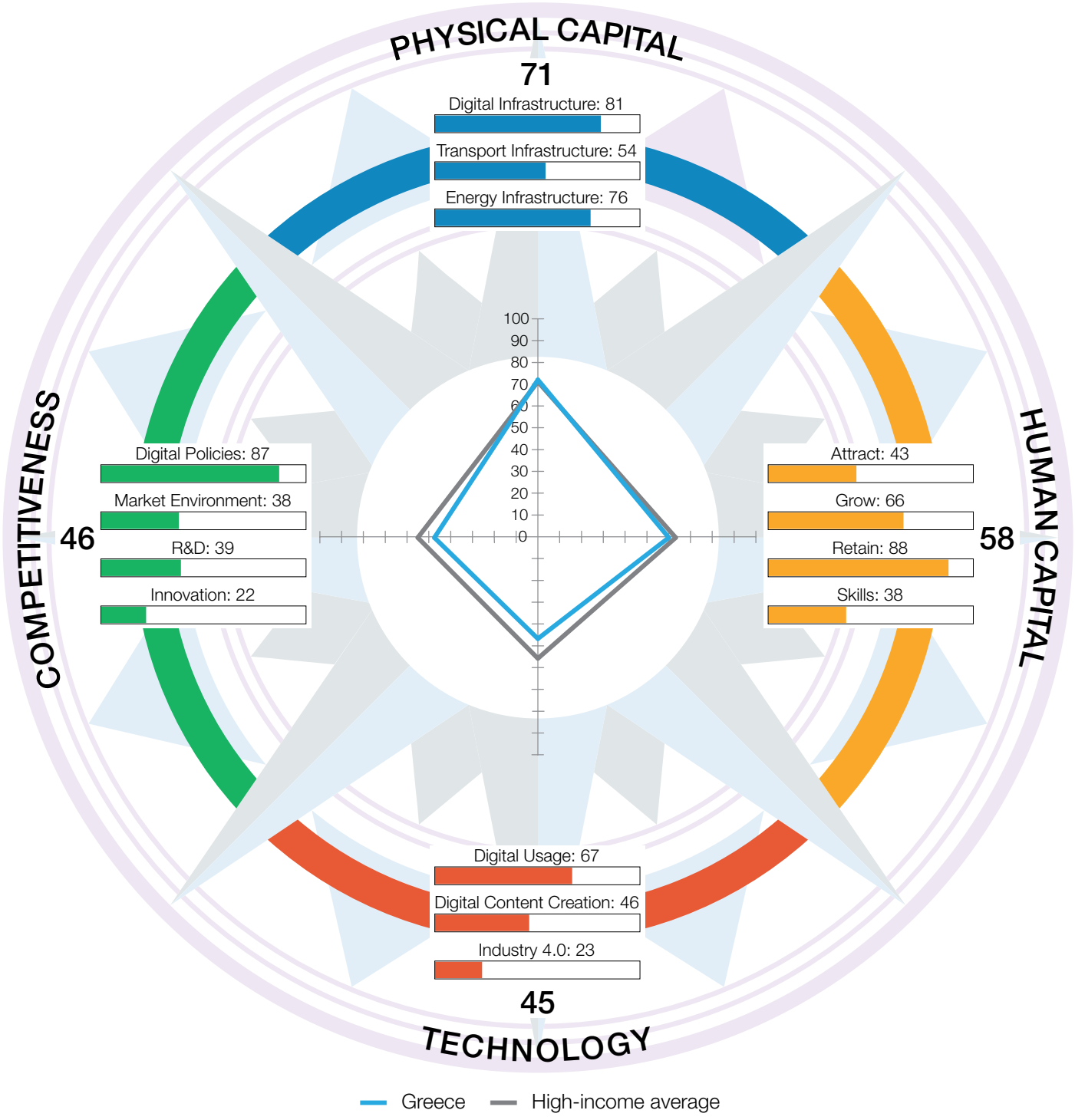
		Score	Rank
3	**TECHNOLOGY**	**22.20**	**94**
3.1	Digital Usage	41.41	87
3.1.1	Internet users	66.56	83
3.1.2	Active mobile-broadband subscriptions	27.94	86
3.1.3	Gender parity in internet usage	83.93	86
3.1.4	Firms with website	24.14	88
3.1.5	Internet shopping	9.28	91
3.1.6	Government online services	38.82	90
3.1.7	E-Participation	39.23	80
3.2	Digital Content Creation	15.95	111
3.2.1	Software development	0.85	100
3.2.2	Wikipedia edits	16.64	113
3.2.3	Internet domain registrations	0.23	105
3.2.4	Mobile apps development	46.08	107
3.3	Industry 4.0	9.24	77
3.3.1	Cloud computing	—	—
3.3.2	AI software development	8.93	62
3.3.3	AI research	2.65	83
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**25.52**	**102**
4.1	Digital Policies	50.90	91
4.1.1	ICT regulation	72.97	79
4.1.2	Cybersecurity	50.00	72
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	66.67	87
4.1.7	Data transfer	66.67	51
4.2	Market Environment	21.87	101
4.2.1	Extent of market dominance	49.85	43
4.2.2	Labour productivity per employee	6.25	98
4.2.3	Urbanisation	47.42	81
4.2.4	Domestic credit to private sector	1.92	116
4.2.5	Market capitalisation	3.93	64
4.3	R&D	9.93	100
4.3.1	R&D spending	n/a	n/a
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	27.39	92
4.3.4	Scientific journal articles	2.40	87
4.4	Innovation	19.38	100
4.4.1	Medium- and high-tech industry	12.93	97
4.4.2	High-tech exports	1.61	108
4.4.3	Venture capital recipients, deals	9.12	47
4.4.4	New product entrepreneurial activity	67.57	19
4.4.5	New business density	3.43	76
4.4.6	Patent applications	21.60	111

Greece

Key Indicators

Rank (out of 124)	**33**	GDP per capita (PPP US$)	**36,834.87**
Income group	**High income**	GDP (US$ billions)	**219.07**
Regional group	**Europe**	FREI score	**55.11**
Population (millions)	**10.57**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**70.55**	**22**
1.1	Digital Infrastructure	81.38	17
1.1.1	Internet access	84.80	51
1.1.2	International internet bandwidth	58.90	20
1.1.3	Fixed-broadband subscriptions	99.80	6
1.1.4	4G-mobile network coverage	98.71	49
1.1.5	Fixed broadband affordability	77.00	66
1.1.6	Mobile broadband affordability	95.92	40
1.1.7	Computer software spending	54.55	4
1.2	Transport Infrastructure	54.43	22
1.2.1	Quality of infrastructure	67.86	23
1.2.2	Rural access	91.40	26
1.2.3	Air connectivity	32.63	22
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	75.83	28
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	93.23	52
1.3.4	Energy intensity	90.12	27
2	**HUMAN CAPITAL**	**58.50**	**31**
2.1	Attract	42.71	73
2.1.1	Brain gain	16.48	111
2.1.2	International students	7.32	68
2.1.3	Tolerance of minorities	57.45	40
2.1.4	Tolerance of immigrants	32.31	108
2.1.5	Gender parity in high-skilled jobs	100.00	1
2.2	Grow	65.70	17
2.2.1	Tertiary enrolment	100.00	1
2.2.2	Reading, maths, and science	48.73	42
2.2.3	Use of virtual professional networks	26.61	52
2.2.4	Youth inclusion	87.47	34
2.3	Retain	87.62	9
2.3.1	Pension coverage	95.71	40
2.3.2	Environmental performance	63.22	28
2.3.3	Physician density	100.00	1
2.3.4	Sanitation	98.90	36
2.3.5	Personal safety	80.28	37
2.4	Skills	37.95	42
2.4.1	Workforce with tertiary education	46.12	31
2.4.2	High-skilled workforce	47.18	43
2.4.3	Researchers	45.94	25
2.4.4	Relevance of education system to the economy	28.56	86
2.4.5	Digital skills	21.96	47

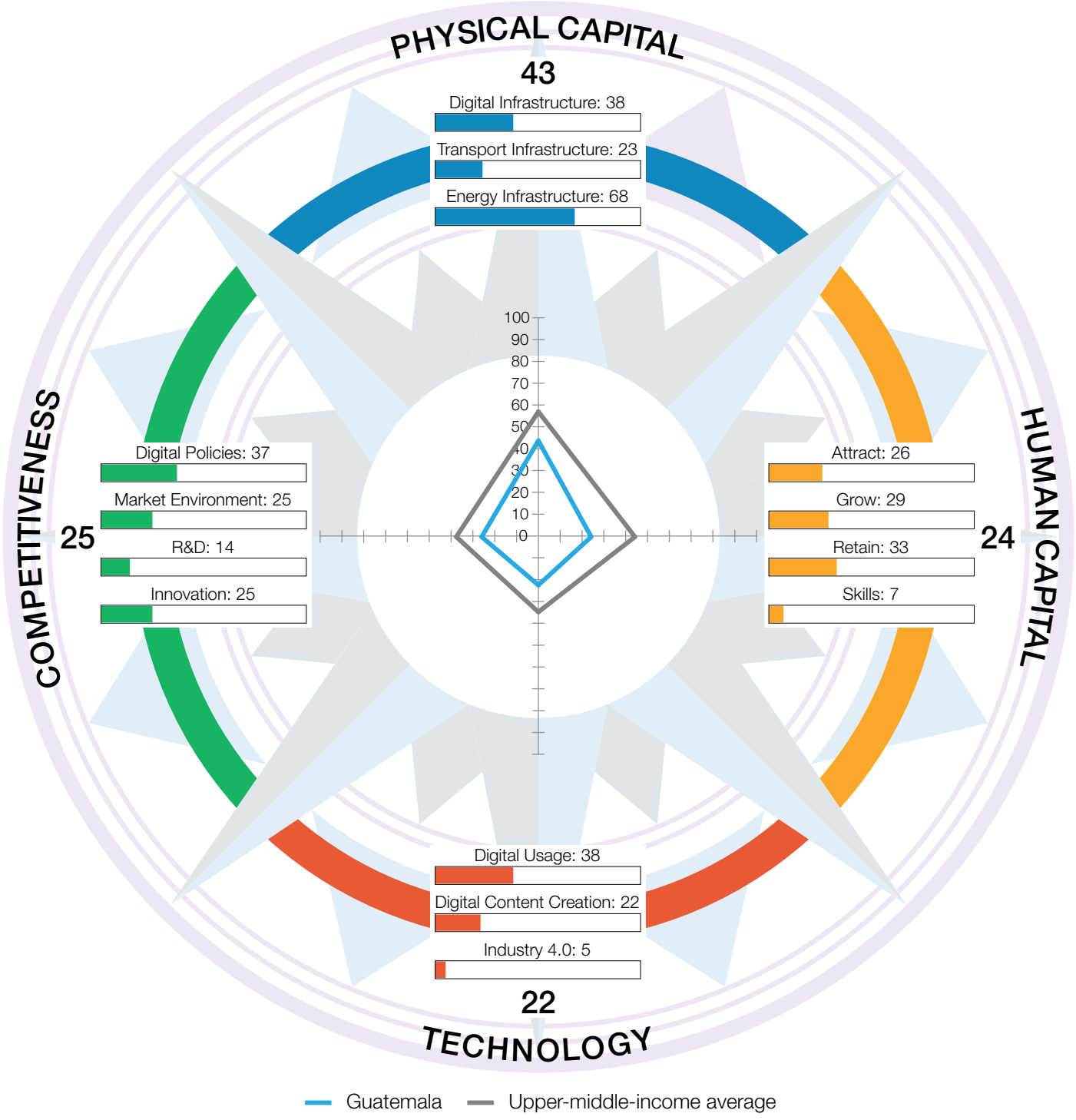
		Score	Rank
3	**TECHNOLOGY**	**45.17**	**37**
3.1	Digital Usage	66.50	45
3.1.1	Internet users	77.10	62
3.1.2	Active mobile-broadband subscriptions	35.14	62
3.1.3	Gender parity in internet usage	97.21	38
3.1.4	Firms with website	58.23	50
3.1.5	Internet shopping	70.53	22
3.1.6	Government online services	70.37	48
3.1.7	E-Participation	56.96	55
3.2	Digital Content Creation	46.25	37
3.2.1	Software development	12.90	38
3.2.2	Wikipedia edits	73.31	30
3.2.3	Internet domain registrations	13.59	34
3.2.4	Mobile apps development	85.18	36
3.3	Industry 4.0	22.76	29
3.3.1	Cloud computing	—	—
3.3.2	AI software development	35.33	22
3.3.3	AI research	40.20	18
3.3.4	ICT patent applications	5.04	30
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**46.24**	**39**
4.1	Digital Policies	86.55	12
4.1.1	ICT regulation	89.19	27
4.1.2	Cybersecurity	100.00	1
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	37.79	52
4.2.1	Extent of market dominance	42.06	59
4.2.2	Labour productivity per employee	40.34	45
4.2.3	Urbanisation	74.94	37
4.2.4	Domestic credit to private sector	23.51	53
4.2.5	Market capitalisation	8.10	50
4.3	R&D	38.64	31
4.3.1	R&D spending	27.76	27
4.3.2	University ranking	23.20	48
4.3.3	Gender parity in R&D	59.74	46
4.3.4	Scientific journal articles	43.85	29
4.4	Innovation	22.00	89
4.4.1	Medium- and high-tech industry	26.26	72
4.4.2	High-tech exports	9.37	68
4.4.3	Venture capital recipients, deals	1.94	80
4.4.4	New product entrepreneurial activity	29.09	69
4.4.5	New business density	7.10	58
4.4.6	Patent applications	58.26	38

Guatemala

Key Indicators

Rank (out of 124)	**98**	GDP per capita (PPP US$)	**10,818.17**
Income group	**Upper-middle income**	GDP (US$ billions)	**95.00**
Regional group	**Latin America and the Caribbean**	FREI score	**28.34**
Population (millions)	**17.36**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**42.90**	**99**
1.1	Digital Infrastructure	38.01	104
1.1.1	Internet access	28.48	94
1.1.2	International internet bandwidth	31.06	107
1.1.3	Fixed-broadband subscriptions	n/a	n/a
1.1.4	4G-mobile network coverage	35.86	114
1.1.5	Fixed broadband affordability	60.06	90
1.1.6	Mobile broadband affordability	72.62	102
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	22.66	88
1.2.1	Quality of infrastructure	21.43	87
1.2.2	Rural access	44.91	92
1.2.3	Air connectivity	1.64	95
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	68.04	80
1.3.1	Access to electricity	97.51	92
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	90.23	58
1.3.4	Energy intensity	81.75	73
2	**HUMAN CAPITAL**	**23.58**	**115**
2.1	Attract	25.65	120
2.1.1	Brain gain	38.05	83
2.1.2	International students	0.48	102
2.1.3	Tolerance of minorities	4.26	118
2.1.4	Tolerance of immigrants	13.85	119
2.1.5	Gender parity in high-skilled jobs	71.60	63
2.2	Grow	28.60	102
2.2.1	Tertiary enrolment	13.87	92
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	12.23	80
2.2.4	Youth inclusion	59.69	100
2.3	Retain	32.58	97
2.3.1	Pension coverage	15.00	97
2.3.2	Environmental performance	15.42	116
2.3.3	Physician density	19.87	81
2.3.4	Sanitation	64.79	100
2.3.5	Personal safety	47.84	87
2.4	Skills	7.48	117
2.4.1	Workforce with tertiary education	8.95	99
2.4.2	High-skilled workforce	12.63	94
2.4.3	Researchers	0.00	102
2.4.4	Relevance of education system to the economy	8.34	115
2.4.5	Digital skills	n/a	n/a

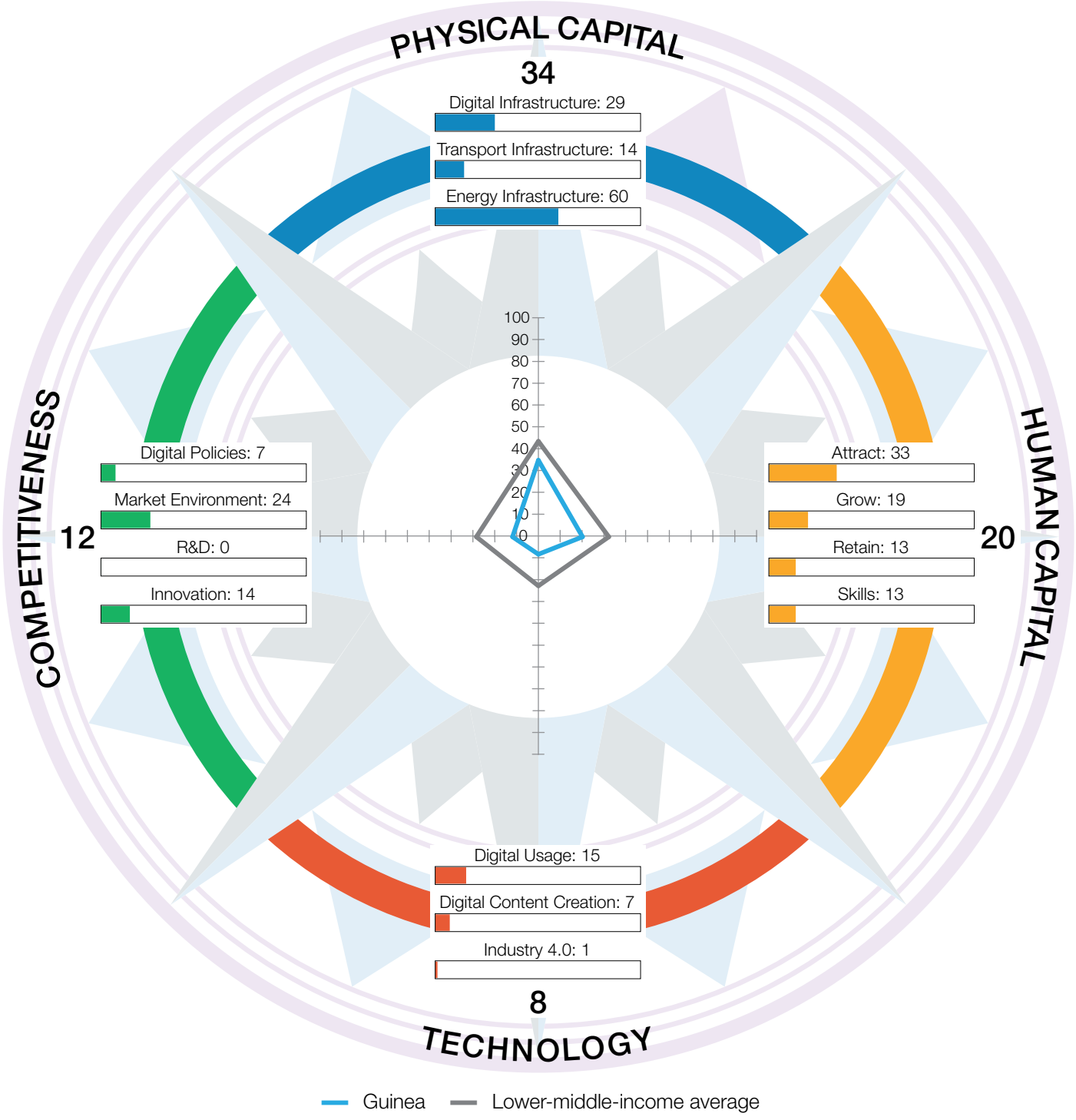
		Score	Rank
3	**TECHNOLOGY**	**21.54**	**97**
3.1	Digital Usage	37.85	93
3.1.1	Internet users	47.65	95
3.1.2	Active mobile-broadband subscriptions	4.84	123
3.1.3	Gender parity in internet usage	84.38	84
3.1.4	Firms with website	54.07	54
3.1.5	Internet shopping	9.22	92
3.1.6	Government online services	39.46	89
3.1.7	E-Participation	25.31	100
3.2	Digital Content Creation	22.11	98
3.2.1	Software development	2.03	81
3.2.2	Wikipedia edits	27.80	96
3.2.3	Internet domain registrations	1.78	75
3.2.4	Mobile apps development	56.84	93
3.3	Industry 4.0	4.66	115
3.3.1	Cloud computing	—	—
3.3.2	AI software development	2.74	97
3.3.3	AI research	0.27	108
3.3.4	ICT patent applications	0.10	71
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**25.33**	**103**
4.1	Digital Policies	37.04	107
4.1.1	ICT regulation	50.95	114
4.1.2	Cybersecurity	75.00	44
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	0.00	114
4.1.7	Data transfer	33.33	112
4.2	Market Environment	25.14	92
4.2.1	Extent of market dominance	34.16	79
4.2.2	Labour productivity per employee	11.21	87
4.2.3	Urbanisation	41.43	89
4.2.4	Domestic credit to private sector	13.78	80
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	13.84	94
4.3.1	R&D spending	0.86	103
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	54.28	57
4.3.4	Scientific journal articles	0.23	117
4.4	Innovation	25.28	74
4.4.1	Medium- and high-tech industry	27.07	70
4.4.2	High-tech exports	7.90	75
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	69.24	15
4.4.5	New business density	2.31	83
4.4.6	Patent applications	19.89	114

Guinea

Key Indicators

Rank (out of 124)	**120**	GDP per capita (PPP US$)	**3,187.02**
Income group	**Lower-middle income**	GDP (US$ billions)	**21.23**
Regional group	**Sub-Saharan Africa**	FREI score	**18.31**
Population (millions)	**13.86**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**34.19**	**107**
1.1	Digital Infrastructure	29.26	111
1.1.1	Internet access	11.09	107
1.1.2	International internet bandwidth	26.90	111
1.1.3	Fixed-broadband subscriptions	n/a	n/a
1.1.4	4G-mobile network coverage	23.66	119
1.1.5	Fixed broadband affordability	52.13	98
1.1.6	Mobile broadband affordability	52.72	110
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	13.67	114
1.2.1	Quality of infrastructure	21.43	87
1.2.2	Rural access	32.73	106
1.2.3	Air connectivity	0.04	121
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	59.63	96
1.3.1	Access to electricity	38.02	115
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	66.17	73
1.3.4	Energy intensity	74.71	94
2	**HUMAN CAPITAL**	**19.71**	**121**
2.1	Attract	33.25	110
2.1.1	Brain gain	66.16	22
2.1.2	International students	2.32	86
2.1.3	Tolerance of minorities	0.00	124
2.1.4	Tolerance of immigrants	75.38	33
2.1.5	Gender parity in high-skilled jobs	22.39	109
2.2	Grow	19.42	121
2.2.1	Tertiary enrolment	3.55	114
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	2.27	113
2.2.4	Youth inclusion	52.44	109
2.3	Retain	12.90	122
2.3.1	Pension coverage	0.00	120
2.3.2	Environmental performance	21.53	99
2.3.3	Physician density	2.99	105
2.3.4	Sanitation	22.91	115
2.3.5	Personal safety	17.09	119
2.4	Skills	13.27	105
2.4.1	Workforce with tertiary education	12.15	91
2.4.2	High-skilled workforce	6.86	106
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	20.81	98
2.4.5	Digital skills	n/a	n/a

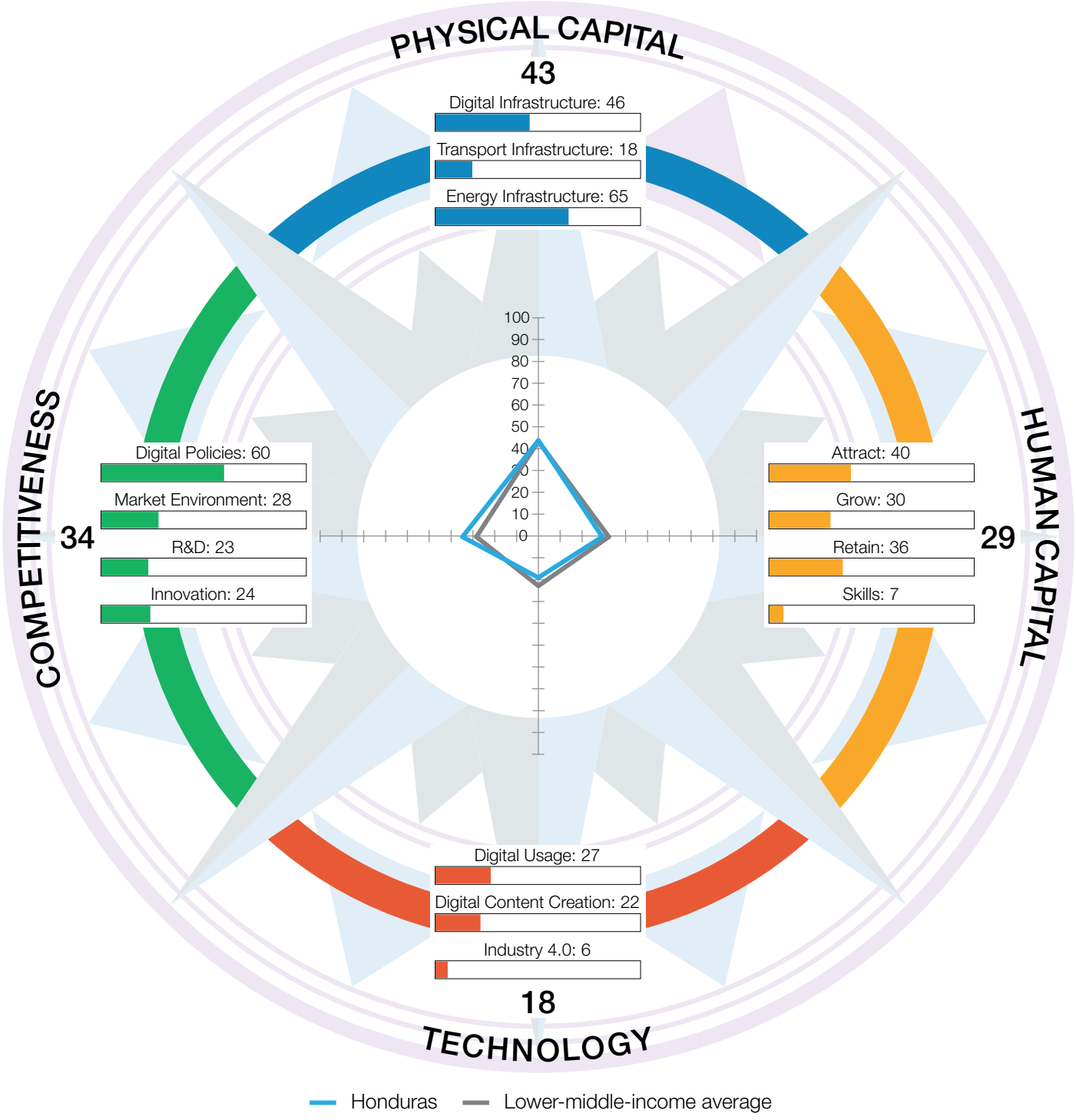
		Score	Rank
3	**TECHNOLOGY**	**7.78**	**123**
3.1	Digital Usage	14.90	121
3.1.1	Internet users	21.19	110
3.1.2	Active mobile-broadband subscriptions	7.79	117
3.1.3	Gender parity in internet usage	17.75	106
3.1.4	Firms with website	7.00	102
3.1.5	Internet shopping	3.88	109
3.1.6	Government online services	26.43	105
3.1.7	E-Participation	20.25	104
3.2	Digital Content Creation	6.98	123
3.2.1	Software development	0.04	121
3.2.2	Wikipedia edits	27.85	95
3.2.3	Internet domain registrations	0.02	119
3.2.4	Mobile apps development	0.00	124
3.3	Industry 4.0	1.47	122
3.3.1	Cloud computing	—	—
3.3.2	AI software development	0.90	109
3.3.3	AI research	0.00	121
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**11.54**	**124**
4.1	Digital Policies	7.20	124
4.1.1	ICT regulation	50.41	115
4.1.2	Cybersecurity	0.00	106
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	0.00	114
4.1.7	Data transfer	0.00	119
4.2	Market Environment	24.47	96
4.2.1	Extent of market dominance	49.32	46
4.2.2	Labour productivity per employee	n/a	n/a
4.2.3	Urbanisation	23.59	107
4.2.4	Domestic credit to private sector	0.51	119
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	0.02	124
4.3.1	R&D spending	n/a	n/a
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	0.00	105
4.3.4	Scientific journal articles	0.06	121
4.4	Innovation	14.46	113
4.4.1	Medium- and high-tech industry	n/a	n/a
4.4.2	High-tech exports	1.24	113
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	30.50	66
4.4.5	New business density	1.69	89
4.4.6	Patent applications	24.39	109

Honduras

Key Indicators

Rank (out of 124)	**95**	GDP per capita (PPP US$)	**6,741.10**
Income group	**Lower-middle income**	GDP (US$ billions)	**31.72**
Regional group	**Latin America and the Caribbean**	FREI score	**30.89**
Population (millions)	**10.43**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**43.00**	**98**
1.1	Digital Infrastructure	46.03	100
1.1.1	Internet access	n/a	n/a
1.1.2	International internet bandwidth	50.68	43
1.1.3	Fixed-broadband subscriptions	60.51	86
1.1.4	4G-mobile network coverage	73.38	100
1.1.5	Fixed broadband affordability	45.99	103
1.1.6	Mobile broadband affordability	27.47	116
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	18.33	100
1.2.1	Quality of infrastructure	32.14	70
1.2.2	Rural access	33.94	104
1.2.3	Air connectivity	1.72	94
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	64.62	88
1.3.1	Access to electricity	93.16	97
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	81.95	67
1.3.4	Energy intensity	80.72	79
2	**HUMAN CAPITAL**	**28.50**	**98**
2.1	Attract	40.23	88
2.1.1	Brain gain	26.43	101
2.1.2	International students	2.07	90
2.1.3	Tolerance of minorities	52.13	49
2.1.4	Tolerance of immigrants	38.46	96
2.1.5	Gender parity in high-skilled jobs	82.06	42
2.2	Grow	30.09	96
2.2.1	Tertiary enrolment	16.09	86
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	10.31	88
2.2.4	Youth inclusion	63.89	93
2.3	Retain	36.28	95
2.3.1	Pension coverage	8.88	106
2.3.2	Environmental performance	29.83	82
2.3.3	Physician density	7.25	99
2.3.4	Sanitation	82.19	86
2.3.5	Personal safety	53.23	79
2.4	Skills	7.41	118
2.4.1	Workforce with tertiary education	7.94	103
2.4.2	High-skilled workforce	14.82	92
2.4.3	Researchers	2.02	79
2.4.4	Relevance of education system to the economy	4.87	119
2.4.5	Digital skills	n/a	n/a

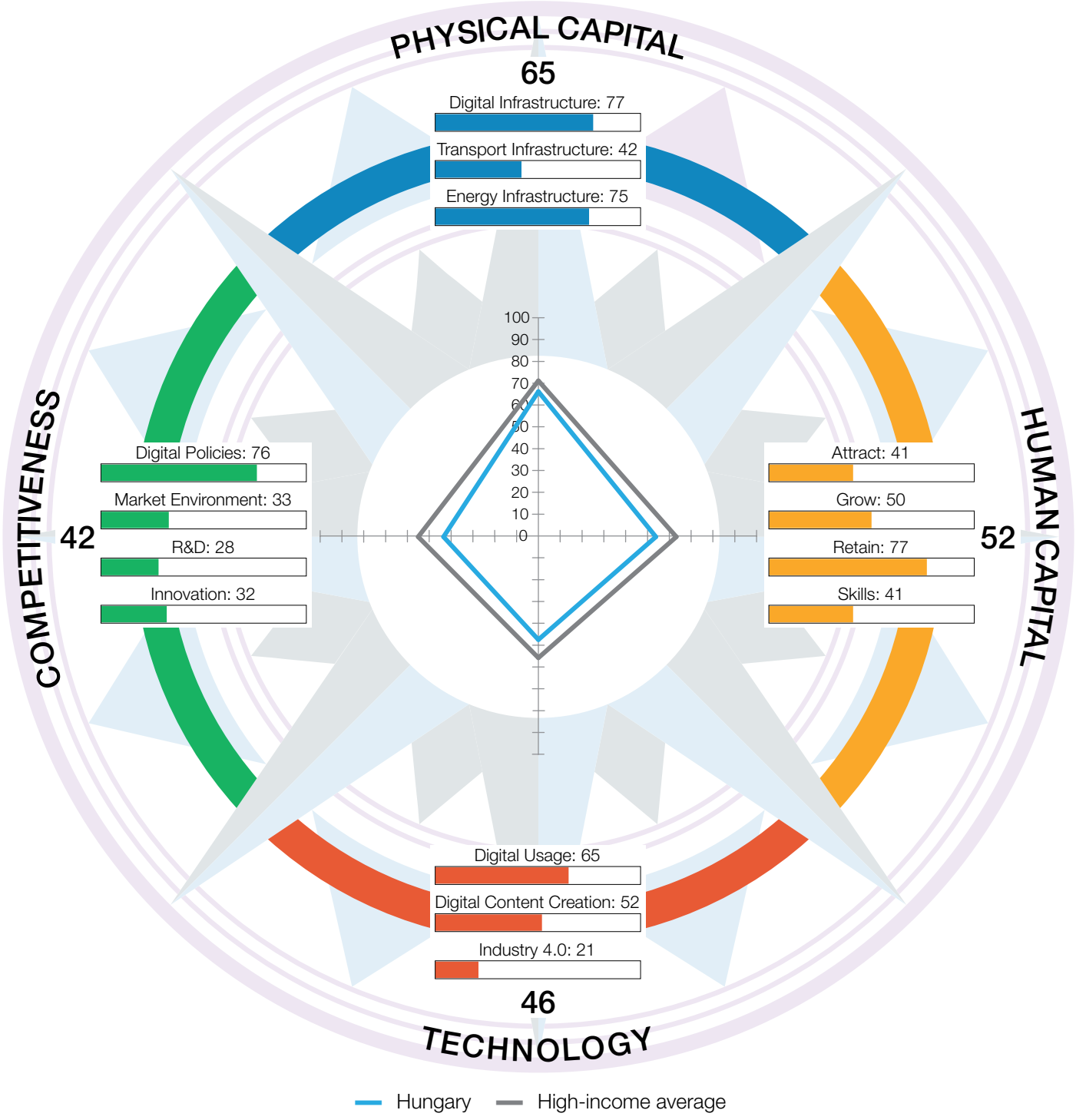
		Score	Rank
3	**TECHNOLOGY**	**18.20**	**102**
3.1	Digital Usage	27.09	106
3.1.1	Internet users	38.29	99
3.1.2	Active mobile-broadband subscriptions	17.79	107
3.1.3	Gender parity in internet usage	88.39	74
3.1.4	Firms with website	36.57	75
3.1.5	Internet shopping	8.58	96
3.1.6	Government online services	0.00	124
3.1.7	E-Participation	0.00	124
3.2	Digital Content Creation	21.64	99
3.2.1	Software development	1.03	99
3.2.2	Wikipedia edits	29.43	91
3.2.3	Internet domain registrations	0.37	99
3.2.4	Mobile apps development	55.73	94
3.3	Industry 4.0	5.86	104
3.3.1	Cloud computing	—	—
3.3.2	AI software development	0.93	107
3.3.3	AI research	0.19	114
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**33.88**	**72**
4.1	Digital Policies	60.42	72
4.1.1	ICT regulation	72.97	79
4.1.2	Cybersecurity	0.00	106
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	28.27	83
4.2.1	Extent of market dominance	6.67	119
4.2.2	Labour productivity per employee	n/a	n/a
4.2.3	Urbanisation	48.66	77
4.2.4	Domestic credit to private sector	29.47	47
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	22.99	81
4.3.1	R&D spending	0.87	102
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	90.75	14
4.3.4	Scientific journal articles	0.34	111
4.4	Innovation	23.83	80
4.4.1	Medium- and high-tech industry	8.44	106
4.4.2	High-tech exports	2.90	99
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	53.93	38
4.4.5	New business density	n/a	n/a
4.4.6	Patent applications	30.07	100

Hungary

Key Indicators

Rank (out of 124)	**39**	GDP per capita (PPP US$)	**41,906.66**
Income group	**High income**	GDP (US$ billions)	**178.79**
Regional group	**Europe**	FREI score	**51.39**
Population (millions)	**9.68**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**64.84**	**40**
1.1	Digital Infrastructure	77.18	37
1.1.1	Internet access	90.64	32
1.1.2	International internet bandwidth	43.57	71
1.1.3	Fixed-broadband subscriptions	98.03	22
1.1.4	4G-mobile network coverage	99.14	38
1.1.5	Fixed broadband affordability	87.24	39
1.1.6	Mobile broadband affordability	94.39	50
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	42.33	46
1.2.1	Quality of infrastructure	46.43	50
1.2.2	Rural access	88.83	33
1.2.3	Air connectivity	12.42	47
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	75.02	36
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	95.49	40
1.3.4	Energy intensity	85.45	59
2	**HUMAN CAPITAL**	**52.45**	**39**
2.1	Attract	41.30	80
2.1.1	Brain gain	28.40	94
2.1.2	International students	35.79	15
2.1.3	Tolerance of minorities	64.89	32
2.1.4	Tolerance of immigrants	0.00	123
2.1.5	Gender parity in high-skilled jobs	77.43	52
2.2	Grow	50.41	47
2.2.1	Tertiary enrolment	35.96	60
2.2.2	Reading, maths, and science	59.29	32
2.2.3	Use of virtual professional networks	17.78	69
2.2.4	Youth inclusion	88.60	24
2.3	Retain	77.29	31
2.3.1	Pension coverage	90.31	50
2.3.2	Environmental performance	61.36	31
2.3.3	Physician density	51.92	41
2.3.4	Sanitation	97.79	44
2.3.5	Personal safety	85.09	26
2.4	Skills	40.81	37
2.4.1	Workforce with tertiary education	37.67	42
2.4.2	High-skilled workforce	58.29	31
2.4.3	Researchers	49.93	23
2.4.4	Relevance of education system to the economy	38.92	67
2.4.5	Digital skills	19.25	50

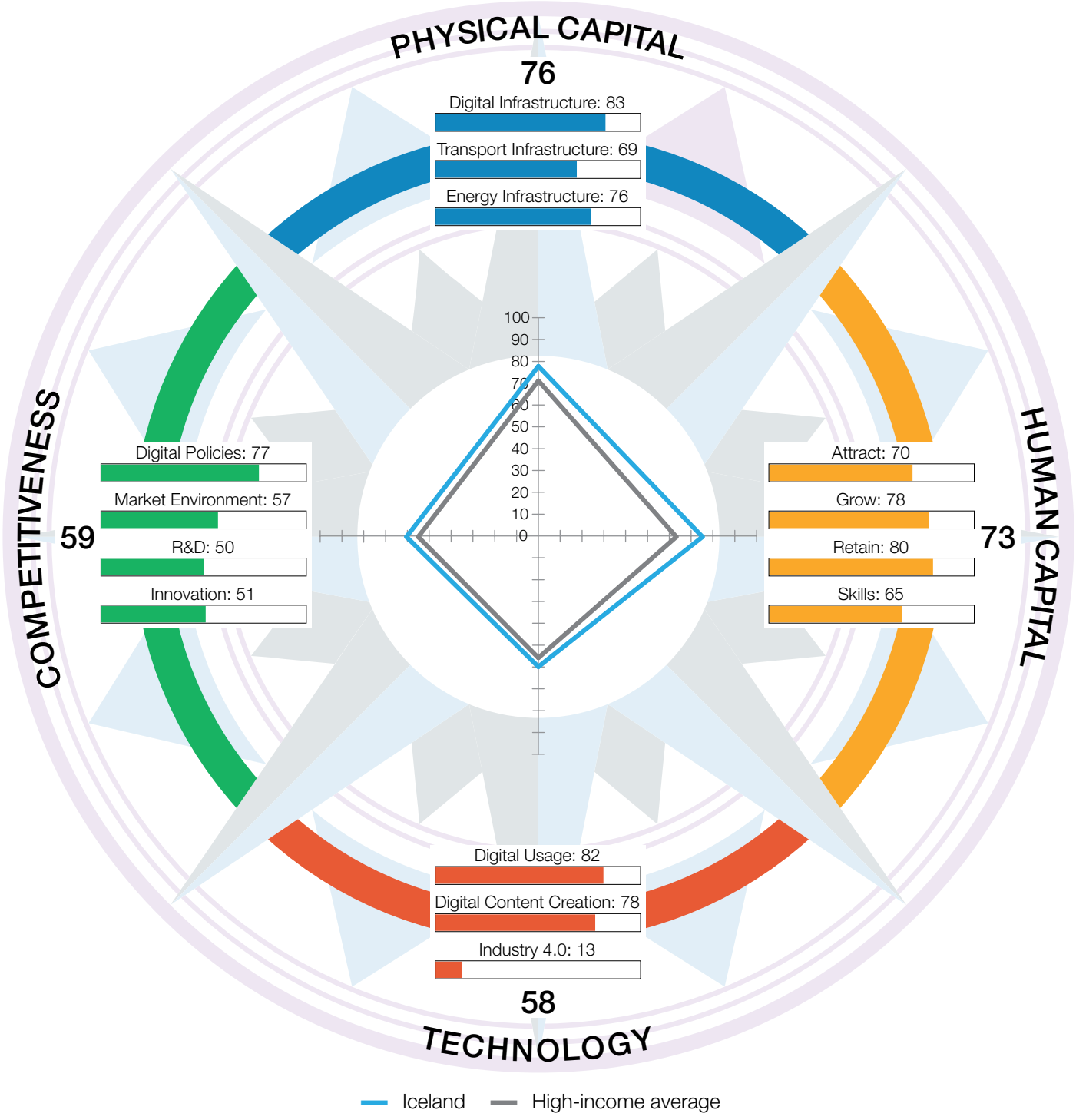
		Score	Rank
3	**TECHNOLOGY**	**45.90**	**35**
3.1	Digital Usage	64.89	49
3.1.1	Internet users	87.90	35
3.1.2	Active mobile-broadband subscriptions	30.10	84
3.1.3	Gender parity in internet usage	98.95	16
3.1.4	Firms with website	60.60	47
3.1.5	Internet shopping	64.52	27
3.1.6	Government online services	66.57	56
3.1.7	E-Participation	45.57	74
3.2	Digital Content Creation	52.03	27
3.2.1	Software development	23.81	26
3.2.2	Wikipedia edits	79.65	18
3.2.3	Internet domain registrations	19.98	26
3.2.4	Mobile apps development	84.70	37
3.3	Industry 4.0	20.79	32
3.3.1	Cloud computing	—	—
3.3.2	AI software development	13.84	47
3.3.3	AI research	21.98	36
3.3.4	ICT patent applications	10.73	24
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**42.34**	**49**
4.1	Digital Policies	75.82	36
4.1.1	ICT regulation	93.24	14
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	50.00	99
4.2	Market Environment	32.77	66
4.2.1	Extent of market dominance	34.55	77
4.2.2	Labour productivity per employee	43.64	43
4.2.3	Urbanisation	65.72	50
4.2.4	Domestic credit to private sector	14.63	77
4.2.5	Market capitalisation	5.32	62
4.3	R&D	28.47	56
4.3.1	R&D spending	29.59	25
4.3.2	University ranking	19.66	57
4.3.3	Gender parity in R&D	35.96	79
4.3.4	Scientific journal articles	28.68	38
4.4	Innovation	32.30	40
4.4.1	Medium- and high-tech industry	64.84	9
4.4.2	High-tech exports	25.19	28
4.4.3	Venture capital recipients, deals	4.79	64
4.4.4	New product entrepreneurial activity	25.48	71
4.4.5	New business density	16.45	31
4.4.6	Patent applications	57.02	44

Iceland

Key Indicators

Rank (out of 124)	**13**	GDP per capita (PPP US$)	**69,081.26**
Income group	**High income**	GDP (US$ billions)	**27.84**
Regional group	**Europe**	FREI score	**66.57**
Population (millions)	**0.38**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**76.14**	**8**
1.1	Digital Infrastructure	82.54	11
1.1.1	Internet access	98.40	9
1.1.2	International internet bandwidth	67.29	9
1.1.3	Fixed-broadband subscriptions	99.93	3
1.1.4	4G-mobile network coverage	99.98	14
1.1.5	Fixed broadband affordability	86.94	40
1.1.6	Mobile broadband affordability	97.96	15
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	69.47	8
1.2.1	Quality of infrastructure	64.29	28
1.2.2	Rural access	66.55	62
1.2.3	Air connectivity	100.00	1
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	76.41	25
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	29.23	122
2	**HUMAN CAPITAL**	**73.26**	**12**
2.1	Attract	70.11	11
2.1.1	Brain gain	60.33	30
2.1.2	International students	22.55	30
2.1.3	Tolerance of minorities	97.87	2
2.1.4	Tolerance of immigrants	83.08	20
2.1.5	Gender parity in high-skilled jobs	86.71	33
2.2	Grow	78.23	2
2.2.1	Tertiary enrolment	55.44	18
2.2.2	Reading, maths, and science	60.14	29
2.2.3	Use of virtual professional networks	100.00	1
2.2.4	Youth inclusion	97.34	3
2.3	Retain	80.08	27
2.3.1	Pension coverage	70.82	63
2.3.2	Environmental performance	74.41	10
2.3.3	Physician density	61.50	27
2.3.4	Sanitation	98.66	37
2.3.5	Personal safety	95.04	5
2.4	Skills	64.61	12
2.4.1	Workforce with tertiary education	47.86	29
2.4.2	High-skilled workforce	80.38	6
2.4.3	Researchers	69.82	7
2.4.4	Relevance of education system to the economy	67.25	24
2.4.5	Digital skills	57.72	10

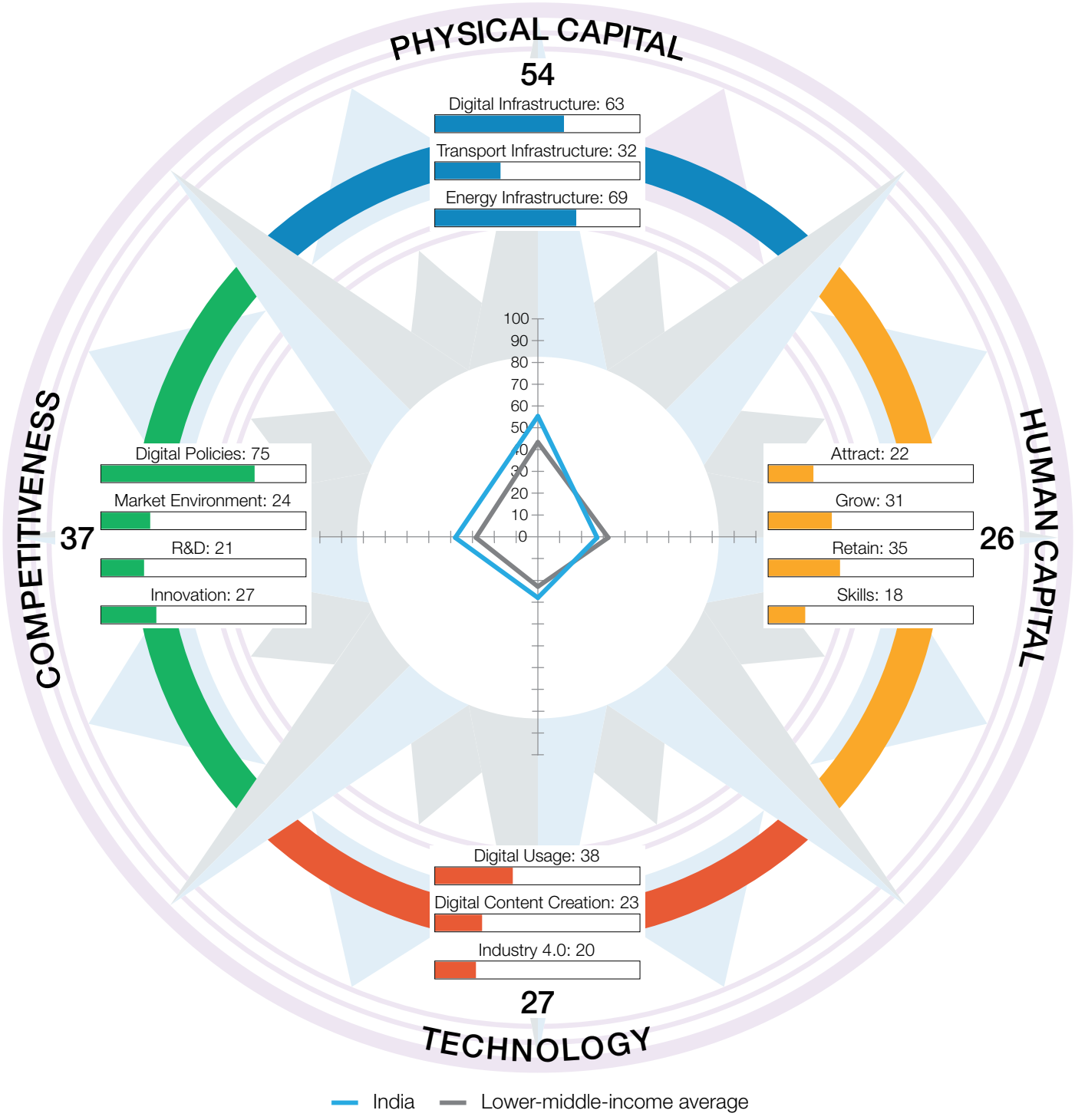
		Score	Rank
3	**TECHNOLOGY**	**57.99**	**21**
3.1	Digital Usage	82.44	12
3.1.1	Internet users	99.67	5
3.1.2	Active mobile-broadband subscriptions	48.32	22
3.1.3	Gender parity in internet usage	99.99	5
3.1.4	Firms with website	83.72	15
3.1.5	Internet shopping	83.12	11
3.1.6	Government online services	85.06	16
3.1.7	E-Participation	77.22	17
3.2	Digital Content Creation	78.13	3
3.2.1	Software development	45.29	8
3.2.2	Wikipedia edits	90.39	4
3.2.3	Internet domain registrations	76.85	3
3.2.4	Mobile apps development	100.00	1
3.3	Industry 4.0	13.39	52
3.3.1	Cloud computing	—	—
3.3.2	AI software development	n/a	n/a
3.3.3	AI research	n/a	n/a
3.3.4	ICT patent applications	8.02	28
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**58.91**	**16**
4.1	Digital Policies	77.04	34
4.1.1	ICT regulation	85.14	45
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	50.00	58
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	57.06	18
4.2.1	Extent of market dominance	30.86	85
4.2.2	Labour productivity per employee	61.86	19
4.2.3	Urbanisation	92.60	7
4.2.4	Domestic credit to private sector	42.91	28
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	50.24	16
4.3.1	R&D spending	46.08	12
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	85.03	24
4.3.4	Scientific journal articles	69.85	9
4.4	Innovation	51.32	11
4.4.1	Medium- and high-tech industry	17.92	87
4.4.2	High-tech exports	52.06	6
4.4.3	Venture capital recipients, deals	74.98	6
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	43.04	10
4.4.6	Patent applications	68.59	19

India

Key Indicators

Rank (out of 124)	**88**	GDP per capita (PPP US$)	**8,379.06**
Income group	**Lower-middle income**	GDP (US$ billions)	**3,385.09**
Regional group	**Asia and Pacific**	FREI score	**36.14**
Population (millions)	**1,417.17**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**54.29**	**74**
1.1	Digital Infrastructure	62.54	82
1.1.1	Internet access	22.13	97
1.1.2	International internet bandwidth	42.55	76
1.1.3	Fixed-broadband subscriptions	90.43	54
1.1.4	4G-mobile network coverage	98.57	51
1.1.5	Fixed broadband affordability	73.77	72
1.1.6	Mobile broadband affordability	92.18	65
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	31.65	66
1.2.1	Quality of infrastructure	50.00	45
1.2.2	Rural access	65.26	65
1.2.3	Air connectivity	1.87	92
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	68.66	74
1.3.1	Access to electricity	99.50	85
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	90.23	58
1.3.4	Energy intensity	81.44	74
2	**HUMAN CAPITAL**	**26.48**	**104**
2.1	Attract	22.06	123
2.1.1	Brain gain	28.19	96
2.1.2	International students	0.20	104
2.1.3	Tolerance of minorities	17.02	102
2.1.4	Tolerance of immigrants	50.77	77
2.1.5	Gender parity in high-skilled jobs	14.15	116
2.2	Grow	30.95	93
2.2.1	Tertiary enrolment	20.51	83
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	10.31	88
2.2.4	Youth inclusion	62.04	97
2.3	Retain	34.70	96
2.3.1	Pension coverage	41.33	75
2.3.2	Environmental performance	0.00	124
2.3.3	Physician density	11.04	94
2.3.4	Sanitation	68.46	96
2.3.5	Personal safety	52.69	81
2.4	Skills	18.19	95
2.4.1	Workforce with tertiary education	17.13	88
2.4.2	High-skilled workforce	15.98	90
2.4.3	Researchers	2.74	78
2.4.4	Relevance of education system to the economy	36.89	74
2.4.5	Digital skills	n/a	n/a

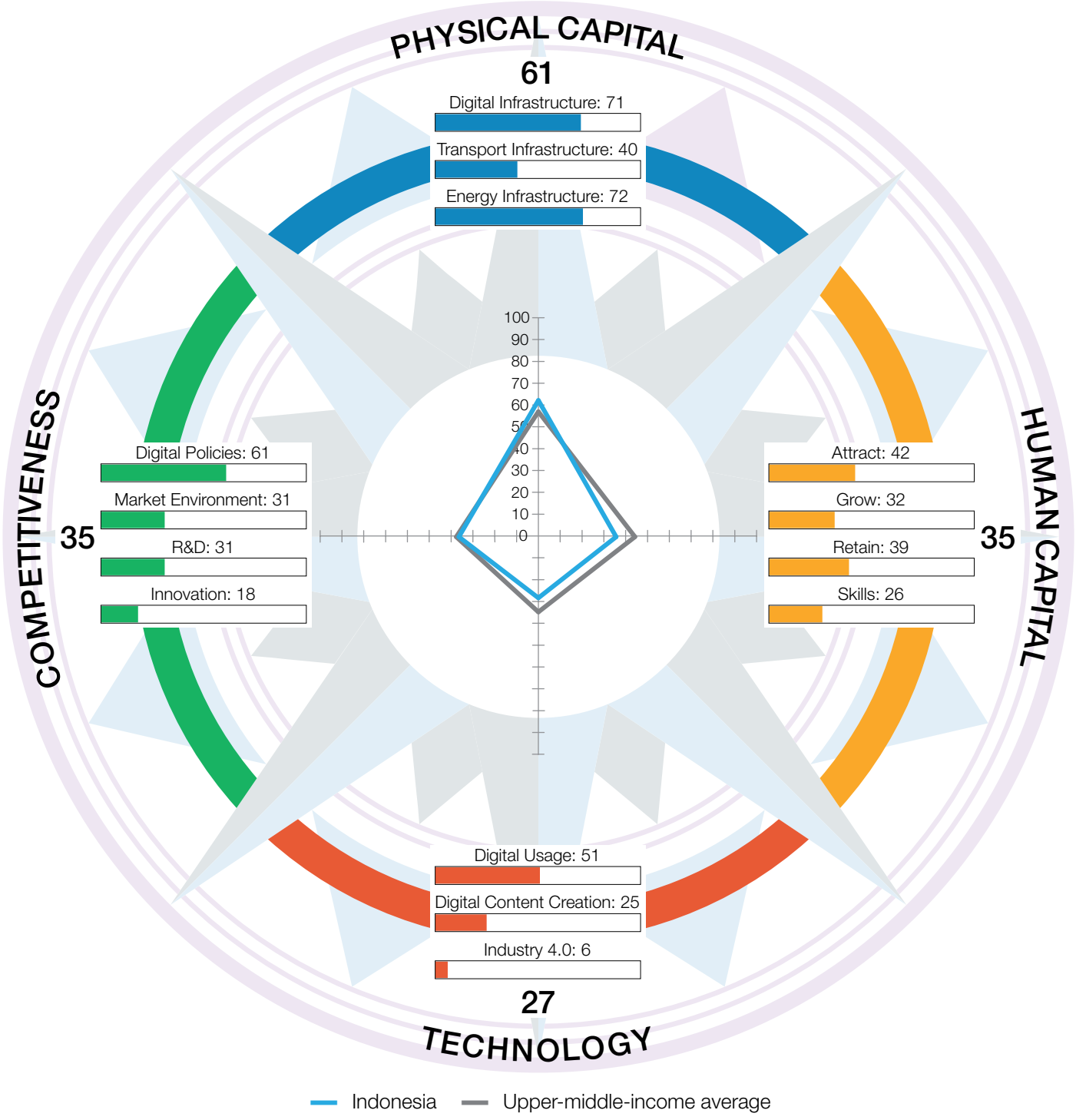
		Score	Rank
3	**TECHNOLOGY**	**26.86**	**83**
3.1	Digital Usage	38.09	92
3.1.1	Internet users	39.30	97
3.1.2	Active mobile-broadband subscriptions	20.70	103
3.1.3	Gender parity in internet usage	30.22	103
3.1.4	Firms with website	40.31	72
3.1.5	Internet shopping	8.89	94
3.1.6	Government online services	72.75	42
3.1.7	E-Participation	54.43	60
3.2	Digital Content Creation	22.59	95
3.2.1	Software development	3.36	64
3.2.2	Wikipedia edits	19.66	110
3.2.3	Internet domain registrations	0.67	91
3.2.4	Mobile apps development	66.67	77
3.3	Industry 4.0	19.91	34
3.3.1	Cloud computing	—	—
3.3.2	AI software development	29.37	27
3.3.3	AI research	3.98	75
3.3.4	ICT patent applications	1.10	46
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**36.93**	**64**
4.1	Digital Policies	75.27	37
4.1.1	ICT regulation	81.08	69
4.1.2	Cybersecurity	62.50	53
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	100.00	1
4.1.5	Online content	100.00	1
4.1.6	Data privacy	0.00	114
4.1.7	Data transfer	83.33	38
4.2	Market Environment	23.74	98
4.2.1	Extent of market dominance	38.20	64
4.2.2	Labour productivity per employee	9.81	90
4.2.3	Urbanisation	21.06	111
4.2.4	Domestic credit to private sector	20.30	65
4.2.5	Market capitalisation	29.32	17
4.3	R&D	21.40	86
4.3.1	R&D spending	12.03	53
4.3.2	University ranking	48.23	21
4.3.3	Gender parity in R&D	n/a	n/a
4.3.4	Scientific journal articles	3.95	79
4.4	Innovation	27.32	59
4.4.1	Medium- and high-tech industry	54.18	24
4.4.2	High-tech exports	15.77	47
4.4.3	Venture capital recipients, deals	23.42	22
4.4.4	New product entrepreneurial activity	7.46	89
4.4.5	New business density	0.46	102
4.4.6	Patent applications	62.64	27

Indonesia

Key Indicators

Rank (out of 124)	**73**	GDP per capita (PPP US$)	**14,652.93**
Income group	**Upper-middle income**	GDP (US$ billions)	**1,319.10**
Regional group	**Asia and Pacific**	FREI score	**39.60**
Population (millions)	**275.50**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**60.90**	**52**
1.1	Digital Infrastructure	71.08	59
1.1.1	Internet access	81.73	58
1.1.2	International internet bandwidth	52.89	35
1.1.3	Fixed-broadband subscriptions	77.28	74
1.1.4	4G-mobile network coverage	95.90	69
1.1.5	Fixed broadband affordability	59.12	93
1.1.6	Mobile broadband affordability	94.30	51
1.1.7	Computer software spending	36.36	21
1.2	Transport Infrastructure	39.70	49
1.2.1	Quality of infrastructure	39.29	57
1.2.2	Rural access	61.57	70
1.2.3	Air connectivity	6.65	66
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	71.92	61
1.3.1	Access to electricity	99.08	87
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	96.24	34
1.3.4	Energy intensity	88.48	35
2	**HUMAN CAPITAL**	**34.72**	**86**
2.1	Attract	42.37	76
2.1.1	Brain gain	65.13	24
2.1.2	International students	0.12	105
2.1.3	Tolerance of minorities	30.85	78
2.1.4	Tolerance of immigrants	30.77	111
2.1.5	Gender parity in high-skilled jobs	84.97	35
2.2	Grow	31.50	88
2.2.1	Tertiary enrolment	23.35	79
2.2.2	Reading, maths, and science	19.51	69
2.2.3	Use of virtual professional networks	12.46	78
2.2.4	Youth inclusion	70.70	80
2.3	Retain	39.42	93
2.3.1	Pension coverage	13.06	99
2.3.2	Environmental performance	15.76	115
2.3.3	Physician density	10.53	96
2.3.4	Sanitation	85.14	81
2.3.5	Personal safety	72.60	49
2.4	Skills	25.59	67
2.4.1	Workforce with tertiary education	15.18	90
2.4.2	High-skilled workforce	12.54	97
2.4.3	Researchers	4.39	72
2.4.4	Relevance of education system to the economy	78.27	12
2.4.5	Digital skills	17.59	52

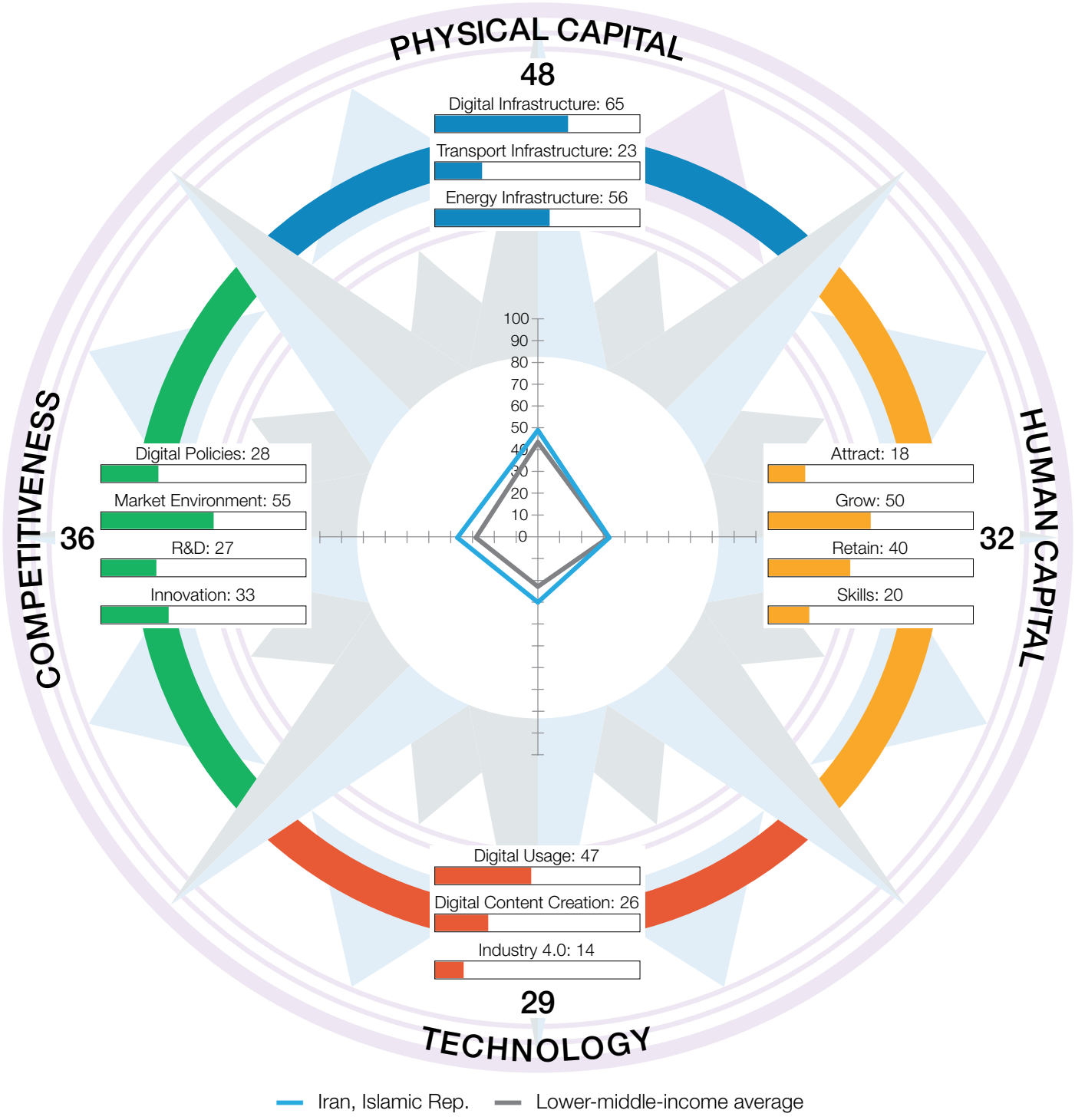
		Score	Rank
3	**TECHNOLOGY**	**27.26**	**82**
3.1	Digital Usage	50.65	79
3.1.1	Internet users	59.64	90
3.1.2	Active mobile-broadband subscriptions	44.02	34
3.1.3	Gender parity in internet usage	84.32	85
3.1.4	Firms with website	8.81	100
3.1.5	Internet shopping	20.45	68
3.1.6	Government online services	68.93	51
3.1.7	E-Participation	68.35	37
3.2	Digital Content Creation	25.41	85
3.2.1	Software development	2.69	70
3.2.2	Wikipedia edits	30.51	90
3.2.3	Internet domain registrations	0.85	88
3.2.4	Mobile apps development	67.60	75
3.3	Industry 4.0	5.73	106
3.3.1	Cloud computing	—	—
3.3.2	AI software development	5.87	77
3.3.3	AI research	5.57	61
3.3.4	ICT patent applications	0.03	75
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**35.50**	**70**
4.1	Digital Policies	61.31	69
4.1.1	ICT regulation	50.00	116
4.1.2	Cybersecurity	12.50	105
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	31.21	72
4.2.1	Extent of market dominance	68.53	20
4.2.2	Labour productivity per employee	13.87	83
4.2.3	Urbanisation	46.54	84
4.2.4	Domestic credit to private sector	13.03	82
4.2.5	Market capitalisation	14.10	36
4.3	R&D	30.99	49
4.3.1	R&D spending	5.02	76
4.3.2	University ranking	40.02	32
4.3.3	Gender parity in R&D	74.47	34
4.3.4	Scientific journal articles	4.43	78
4.4	Innovation	18.48	102
4.4.1	Medium- and high-tech industry	42.47	42
4.4.2	High-tech exports	11.07	61
4.4.3	Venture capital recipients, deals	6.39	58
4.4.4	New product entrepreneurial activity	7.98	87
4.4.5	New business density	1.20	95
4.4.6	Patent applications	41.76	81

Iran, Islamic Rep.

Key Indicators

Rank (out of 124)	**87**	GDP per capita (PPP US$)	**18,075.05**
Income group	**Lower-middle income**	GDP (US$ billions)	**388.54**
Regional group	**Asia and Pacific**	FREI score	**36.19**
Population (millions)	**88.55**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**48.01**	**88**
1.1	Digital Infrastructure	65.10	74
1.1.1	Internet access	79.07	65
1.1.2	International internet bandwidth	44.64	68
1.1.3	Fixed-broadband subscriptions	37.13	95
1.1.4	4G-mobile network coverage	79.57	95
1.1.5	Fixed broadband affordability	93.99	15
1.1.6	Mobile broadband affordability	94.05	54
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	22.94	87
1.2.1	Quality of infrastructure	21.43	87
1.2.2	Rural access	47.90	90
1.2.3	Air connectivity	1.49	98
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	55.98	98
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	54.15	117
2	**HUMAN CAPITAL**	**31.89**	**93**
2.1	Attract	17.65	124
2.1.1	Brain gain	9.30	117
2.1.2	International students	1.91	91
2.1.3	Tolerance of minorities	5.32	116
2.1.4	Tolerance of immigrants	41.54	91
2.1.5	Gender parity in high-skilled jobs	30.19	106
2.2	Grow	50.44	46
2.2.1	Tertiary enrolment	38.01	54
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	n/a	n/a
2.2.4	Youth inclusion	62.87	96
2.3	Retain	39.67	92
2.3.1	Pension coverage	19.69	89
2.3.2	Environmental performance	26.44	89
2.3.3	Physician density	23.59	79
2.3.4	Sanitation	89.31	73
2.3.5	Personal safety	39.33	103
2.4	Skills	19.79	89
2.4.1	Workforce with tertiary education	35.48	46
2.4.2	High-skilled workforce	27.42	70
2.4.3	Researchers	18.91	43
2.4.4	Relevance of education system to the economy	12.57	112
2.4.5	Digital skills	4.58	72

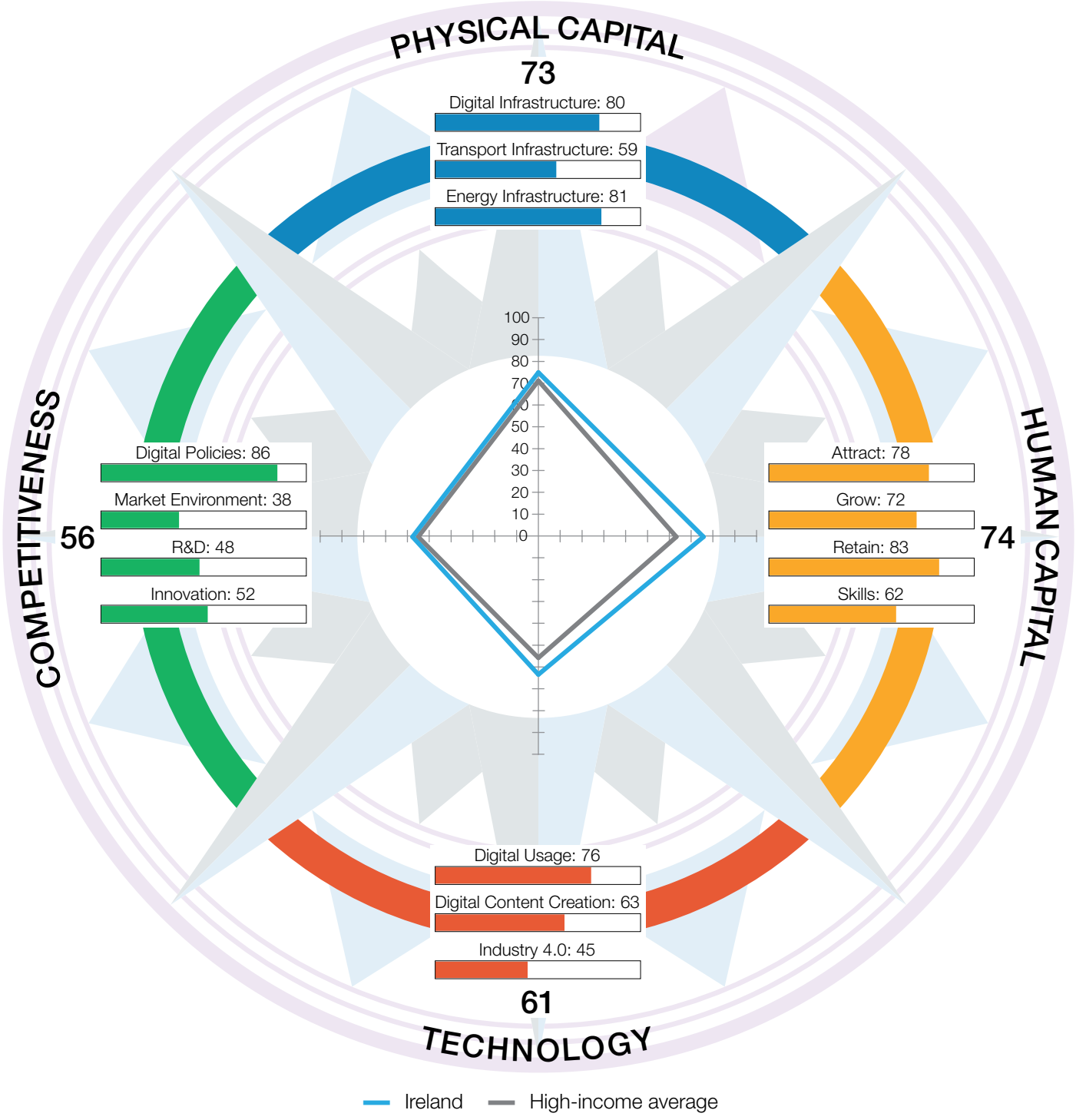
		Score	Rank
3	**TECHNOLOGY**	**28.90**	**78**
3.1	Digital Usage	47.20	82
3.1.1	Internet users	77.21	61
3.1.2	Active mobile-broadband subscriptions	41.95	43
3.1.3	Gender parity in internet usage	96.05	48
3.1.4	Firms with website	n/a	n/a
3.1.5	Internet shopping	35.68	55
3.1.6	Government online services	23.46	109
3.1.7	E-Participation	8.86	121
3.2	Digital Content Creation	25.67	82
3.2.1	Software development	0.85	101
3.2.2	Wikipedia edits	50.77	59
3.2.3	Internet domain registrations	3.54	60
3.2.4	Mobile apps development	47.53	106
3.3	Industry 4.0	13.83	49
3.3.1	Cloud computing	—	—
3.3.2	AI software development	7.27	71
3.3.3	AI research	13.86	47
3.3.4	ICT patent applications	0.40	56
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**35.96**	**67**
4.1	Digital Policies	28.44	115
4.1.1	ICT regulation	82.43	58
4.1.2	Cybersecurity	0.00	106
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	33.33	104
4.1.7	Data transfer	83.33	38
4.2	Market Environment	55.10	22
4.2.1	Extent of market dominance	50.12	42
4.2.2	Labour productivity per employee	30.37	58
4.2.3	Urbanisation	69.96	44
4.2.4	Domestic credit to private sector	25.04	51
4.2.5	Market capitalisation	100.00	1
4.3	R&D	26.95	62
4.3.1	R&D spending	14.52	46
4.3.2	University ranking	27.05	45
4.3.3	Gender parity in R&D	41.49	72
4.3.4	Scientific journal articles	24.73	40
4.4	Innovation	33.33	38
4.4.1	Medium- and high-tech industry	54.34	23
4.4.2	High-tech exports	0.97	115
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	2.42	81
4.4.6	Patent applications	75.60	10

Ireland

Key Indicators

Rank (out of 124)	**15**	GDP per capita (PPP US$)	**126,905.20**
Income group	**High income**	GDP (US$ billions)	**529.24**
Regional group	**Europe**	FREI score	**66.17**
Population (millions)	**5.09**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**73.36**	**15**
1.1	Digital Infrastructure	80.41	23
1.1.1	Internet access	91.89	27
1.1.2	International internet bandwidth	46.54	58
1.1.3	Fixed-broadband subscriptions	94.29	41
1.1.4	4G-mobile network coverage	89.25	85
1.1.5	Fixed broadband affordability	88.50	37
1.1.6	Mobile broadband affordability	97.87	16
1.1.7	Computer software spending	54.55	4
1.2	Transport Infrastructure	58.53	15
1.2.1	Quality of infrastructure	60.71	37
1.2.2	Rural access	92.39	23
1.2.3	Air connectivity	59.92	11
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	81.15	5
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	99.25	6
1.3.4	Energy intensity	100.00	1
2	**HUMAN CAPITAL**	**73.70**	**8**
2.1	Attract	77.56	4
2.1.1	Brain gain	74.03	16
2.1.2	International students	27.05	27
2.1.3	Tolerance of minorities	96.81	3
2.1.4	Tolerance of immigrants	93.85	6
2.1.5	Gender parity in high-skilled jobs	96.07	9
2.2	Grow	72.47	6
2.2.1	Tertiary enrolment	49.02	27
2.2.2	Reading, maths, and science	69.61	9
2.2.3	Use of virtual professional networks	78.26	5
2.2.4	Youth inclusion	92.99	16
2.3	Retain	82.58	20
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	65.25	24
2.3.3	Physician density	64.22	23
2.3.4	Sanitation	90.49	72
2.3.5	Personal safety	92.92	9
2.4	Skills	62.20	15
2.4.1	Workforce with tertiary education	63.59	7
2.4.2	High-skilled workforce	72.19	16
2.4.3	Researchers	54.66	20
2.4.4	Relevance of education system to the economy	87.19	4
2.4.5	Digital skills	33.36	30

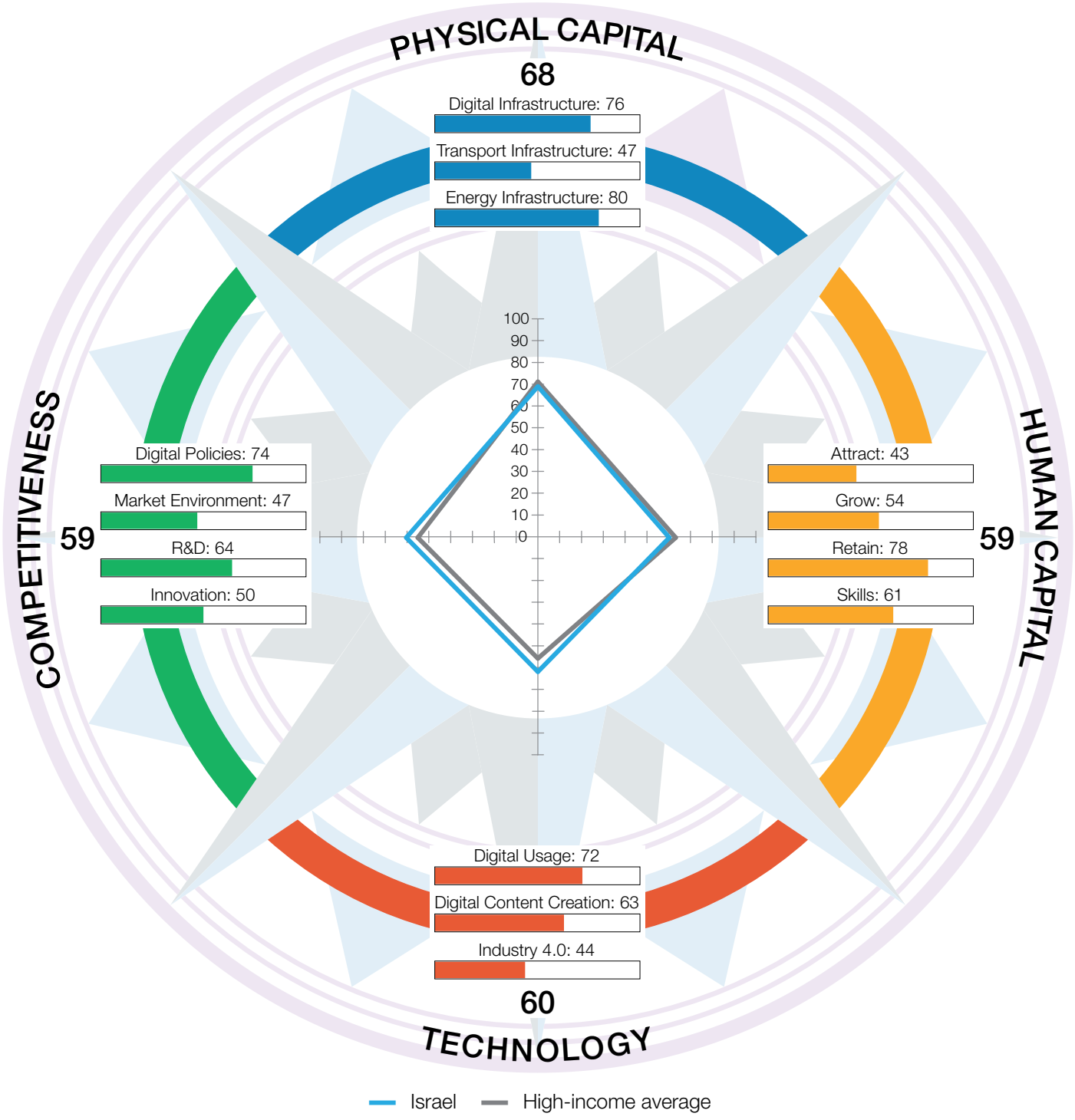
		Score	Rank
3	**TECHNOLOGY**	**61.46**	**16**
3.1	Digital Usage	76.14	21
3.1.1	Internet users	91.48	22
3.1.2	Active mobile-broadband subscriptions	43.72	37
3.1.3	Gender parity in internet usage	96.25	45
3.1.4	Firms with website	83.47	16
3.1.5	Internet shopping	82.53	12
3.1.6	Government online services	70.93	45
3.1.7	E-Participation	64.55	47
3.2	Digital Content Creation	63.48	14
3.2.1	Software development	39.62	12
3.2.2	Wikipedia edits	79.43	19
3.2.3	Internet domain registrations	34.86	17
3.2.4	Mobile apps development	100.00	1
3.3	Industry 4.0	44.76	16
3.3.1	Cloud computing	—	—
3.3.2	AI software development	100.00	1
3.3.3	AI research	55.08	10
3.3.4	ICT patent applications	30.64	15
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**56.17**	**20**
4.1	Digital Policies	85.92	14
4.1.1	ICT regulation	97.30	3
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	38.32	51
4.2.1	Extent of market dominance	60.62	36
4.2.2	Labour productivity per employee	56.99	25
4.2.3	Urbanisation	55.93	66
4.2.4	Domestic credit to private sector	9.46	93
4.2.5	Market capitalisation	8.57	48
4.3	R&D	48.03	19
4.3.1	R&D spending	22.83	34
4.3.2	University ranking	47.92	22
4.3.3	Gender parity in R&D	57.09	53
4.3.4	Scientific journal articles	64.28	13
4.4	Innovation	52.40	10
4.4.1	Medium- and high-tech industry	66.67	8
4.4.2	High-tech exports	39.64	13
4.4.3	Venture capital recipients, deals	36.46	13
4.4.4	New product entrepreneurial activity	84.94	6
4.4.5	New business density	27.90	19
4.4.6	Patent applications	58.77	36

Israel

Key Indicators

Rank (out of 124)	**24**	GDP per capita (PPP US$)	**49,509.13**
Income group	**High income**	GDP (US$ billions)	**522.03**
Regional group	**Middle East and North Africa**	FREI score	**61.26**
Population (millions)	**9.55**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**67.58**	**32**
1.1	Digital Infrastructure	76.03	47
1.1.1	Internet access	82.14	57
1.1.2	International internet bandwidth	42.83	74
1.1.3	Fixed-broadband subscriptions	98.50	18
1.1.4	4G-mobile network coverage	96.77	67
1.1.5	Fixed broadband affordability	94.28	13
1.1.6	Mobile broadband affordability	99.49	3
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	46.70	36
1.2.1	Quality of infrastructure	67.86	23
1.2.2	Rural access	80.85	42
1.2.3	Air connectivity	22.00	34
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	80.00	8
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	99.25	6
1.3.4	Energy intensity	92.54	15
2	**HUMAN CAPITAL**	**58.73**	**29**
2.1	Attract	42.78	71
2.1.1	Brain gain	55.96	40
2.1.2	International students	9.04	59
2.1.3	Tolerance of minorities	30.85	78
2.1.4	Tolerance of immigrants	27.69	114
2.1.5	Gender parity in high-skilled jobs	90.34	21
2.2	Grow	53.55	41
2.2.1	Tertiary enrolment	39.91	51
2.2.2	Reading, maths, and science	53.53	38
2.2.3	Use of virtual professional networks	41.56	28
2.2.4	Youth inclusion	79.21	57
2.3	Retain	77.94	30
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	49.66	45
2.3.3	Physician density	57.71	34
2.3.4	Sanitation	99.94	12
2.3.5	Personal safety	82.38	34
2.4	Skills	60.66	17
2.4.1	Workforce with tertiary education	46.55	30
2.4.2	High-skilled workforce	79.89	7
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	55.54	39
2.4.5	Digital skills	n/a	n/a

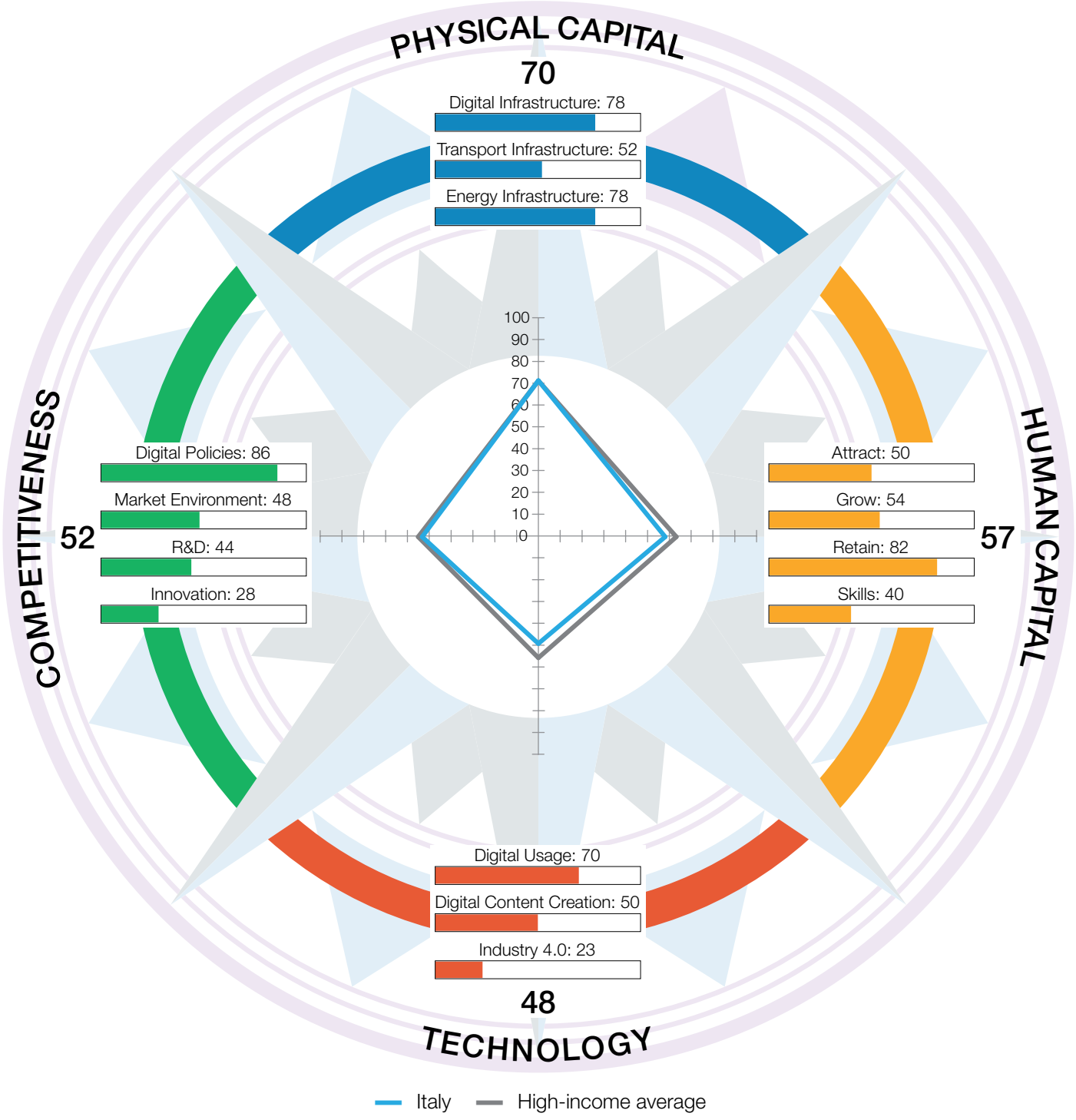
		Score	Rank
3	**TECHNOLOGY**	**59.94**	**18**
3.1	Digital Usage	72.46	29
3.1.1	Internet users	89.49	31
3.1.2	Active mobile-broadband subscriptions	50.07	16
3.1.3	Gender parity in internet usage	98.39	26
3.1.4	Firms with website	59.19	48
3.1.5	Internet shopping	58.28	36
3.1.6	Government online services	83.45	21
3.1.7	E-Participation	68.35	37
3.2	Digital Content Creation	63.28	15
3.2.1	Software development	41.87	10
3.2.2	Wikipedia edits	100.00	1
3.2.3	Internet domain registrations	13.06	35
3.2.4	Mobile apps development	98.20	10
3.3	Industry 4.0	44.08	17
3.3.1	Cloud computing	—	—
3.3.2	AI software development	48.43	15
3.3.3	AI research	37.87	19
3.3.4	ICT patent applications	100.00	1
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**58.80**	**17**
4.1	Digital Policies	74.24	42
4.1.1	ICT regulation	65.54	90
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	100.00	1
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	47.14	32
4.2.1	Extent of market dominance	38.12	65
4.2.2	Labour productivity per employee	57.55	24
4.2.3	Urbanisation	90.93	8
4.2.4	Domestic credit to private sector	29.98	46
4.2.5	Market capitalisation	19.12	28
4.3	R&D	64.31	5
4.3.1	R&D spending	100.00	1
4.3.2	University ranking	36.27	36
4.3.3	Gender parity in R&D	n/a	n/a
4.3.4	Scientific journal articles	56.67	17
4.4	Innovation	49.52	14
4.4.1	Medium- and high-tech industry	49.80	33
4.4.2	High-tech exports	45.99	10
4.4.3	Venture capital recipients, deals	100.00	1
4.4.4	New product entrepreneurial activity	22.01	75
4.4.5	New business density	12.53	39
4.4.6	Patent applications	66.77	22

Italy

Key Indicators

Rank (out of 124)	**29**	GDP per capita (PPP US$)	**51,864.98**
Income group	**High income**	GDP (US$ billions)	**2,010.43**
Regional group	**Europe**	FREI score	**56.47**
Population (millions)	**58.86**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**69.75**	**26**
1.1	Digital Infrastructure	78.47	30
1.1.1	Internet access	81.13	60
1.1.2	International internet bandwidth	37.06	92
1.1.3	Fixed-broadband subscriptions	89.96	58
1.1.4	4G-mobile network coverage	100.00	1
1.1.5	Fixed broadband affordability	88.72	33
1.1.6	Mobile broadband affordability	97.87	16
1.1.7	Computer software spending	54.55	4
1.2	Transport Infrastructure	52.28	28
1.2.1	Quality of infrastructure	71.43	18
1.2.2	Rural access	98.84	6
1.2.3	Air connectivity	21.57	37
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	78.50	14
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	100.00	1
1.3.4	Energy intensity	92.36	18
2	**HUMAN CAPITAL**	**56.60**	**33**
2.1	Attract	50.11	41
2.1.1	Brain gain	34.29	90
2.1.2	International students	7.55	66
2.1.3	Tolerance of minorities	60.64	38
2.1.4	Tolerance of immigrants	73.85	36
2.1.5	Gender parity in high-skilled jobs	74.20	58
2.2	Grow	53.99	38
2.2.1	Tertiary enrolment	45.53	38
2.2.2	Reading, maths, and science	58.33	33
2.2.3	Use of virtual professional networks	37.49	33
2.2.4	Youth inclusion	74.63	73
2.3	Retain	82.42	22
2.3.1	Pension coverage	94.29	41
2.3.2	Environmental performance	65.76	23
2.3.3	Physician density	65.25	21
2.3.4	Sanitation	99.87	17
2.3.5	Personal safety	86.91	23
2.4	Skills	39.89	40
2.4.1	Workforce with tertiary education	28.37	60
2.4.2	High-skilled workforce	53.28	38
2.4.3	Researchers	30.55	32
2.4.4	Relevance of education system to the economy	57.07	37
2.4.5	Digital skills	30.19	32

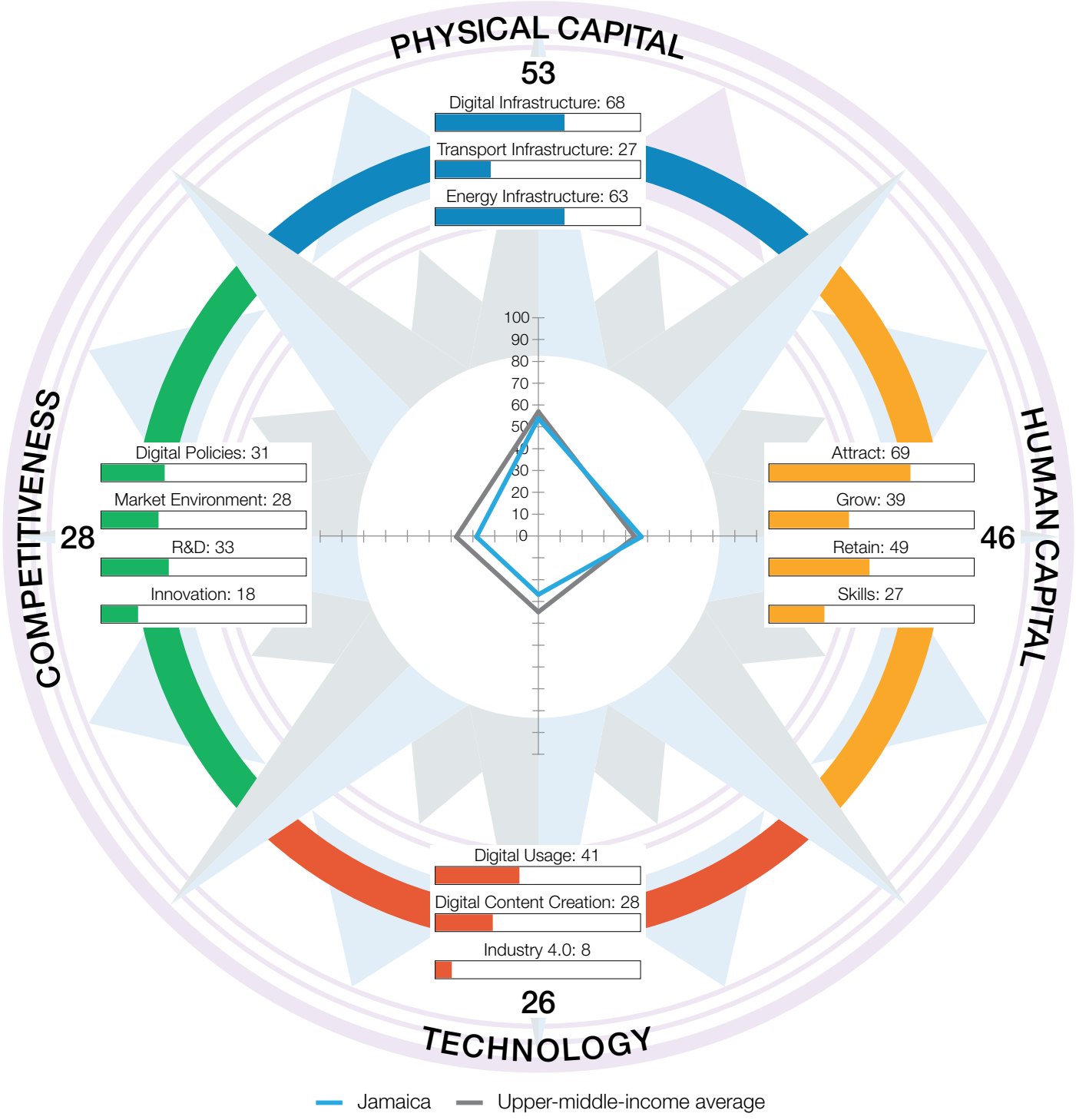
		Score	Rank
3	**TECHNOLOGY**	**47.64**	**32**
3.1	Digital Usage	69.78	36
3.1.1	Internet users	73.23	71
3.1.2	Active mobile-broadband subscriptions	38.71	49
3.1.3	Gender parity in internet usage	86.12	77
3.1.4	Firms with website	74.30	27
3.1.5	Internet shopping	64.19	28
3.1.6	Government online services	82.32	23
3.1.7	E-Participation	69.62	32
3.2	Digital Content Creation	49.64	32
3.2.1	Software development	11.25	39
3.2.2	Wikipedia edits	77.97	22
3.2.3	Internet domain registrations	19.91	27
3.2.4	Mobile apps development	89.44	30
3.3	Industry 4.0	23.49	28
3.3.1	Cloud computing	—	—
3.3.2	AI software development	24.27	29
3.3.3	AI research	34.81	22
3.3.4	ICT patent applications	8.23	27
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**51.88**	**26**
4.1	Digital Policies	86.31	13
4.1.1	ICT regulation	100.00	1
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	48.29	31
4.2.1	Extent of market dominance	72.76	13
4.2.2	Labour productivity per employee	62.19	18
4.2.3	Urbanisation	64.63	51
4.2.4	Domestic credit to private sector	33.71	39
4.2.5	Market capitalisation	8.15	49
4.3	R&D	44.43	26
4.3.1	R&D spending	28.35	26
4.3.2	University ranking	49.54	18
4.3.3	Gender parity in R&D	46.06	63
4.3.4	Scientific journal articles	53.77	20
4.4	Innovation	28.47	52
4.4.1	Medium- and high-tech industry	52.11	28
4.4.2	High-tech exports	12.63	58
4.4.3	Venture capital recipients, deals	7.13	55
4.4.4	New product entrepreneurial activity	15.57	82
4.4.5	New business density	12.09	41
4.4.6	Patent applications	71.28	15

Jamaica

Key Indicators

Rank (out of 124)	**83**	GDP per capita (PPP US$)	**11,821.58**
Income group	**Upper-middle income**	GDP (US$ billions)	**17.10**
Regional group	**Latin America and the Caribbean**	FREI score	**38.05**
Population (millions)	**2.83**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**52.81**	**77**
1.1	Digital Infrastructure	67.79	66
1.1.1	Internet access	73.04	71
1.1.2	International internet bandwidth	45.12	64
1.1.3	Fixed-broadband subscriptions	92.75	45
1.1.4	4G-mobile network coverage	97.85	57
1.1.5	Fixed broadband affordability	58.33	94
1.1.6	Mobile broadband affordability	71.09	104
1.1.7	Computer software spending	36.36	21
1.2	Transport Infrastructure	27.34	76
1.2.1	Quality of infrastructure	21.43	87
1.2.2	Rural access	60.23	73
1.2.3	Air connectivity	24.02	31
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	63.29	91
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	85.57	58
2	**HUMAN CAPITAL**	**46.03**	**57**
2.1	Attract	68.71	14
2.1.1	Brain gain	51.39	55
2.1.2	International students	n/a	n/a
2.1.3	Tolerance of minorities	82.98	6
2.1.4	Tolerance of immigrants	84.62	15
2.1.5	Gender parity in high-skilled jobs	55.84	90
2.2	Grow	38.93	72
2.2.1	Tertiary enrolment	17.20	85
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	34.54	36
2.2.4	Youth inclusion	65.03	92
2.3	Retain	49.42	77
2.3.1	Pension coverage	39.08	77
2.3.2	Environmental performance	45.25	53
2.3.3	Physician density	8.22	98
2.3.4	Sanitation	85.30	80
2.3.5	Personal safety	69.27	51
2.4	Skills	27.07	64
2.4.1	Workforce with tertiary education	18.81	82
2.4.2	High-skilled workforce	31.96	63
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	52.25	40
2.4.5	Digital skills	5.26	67

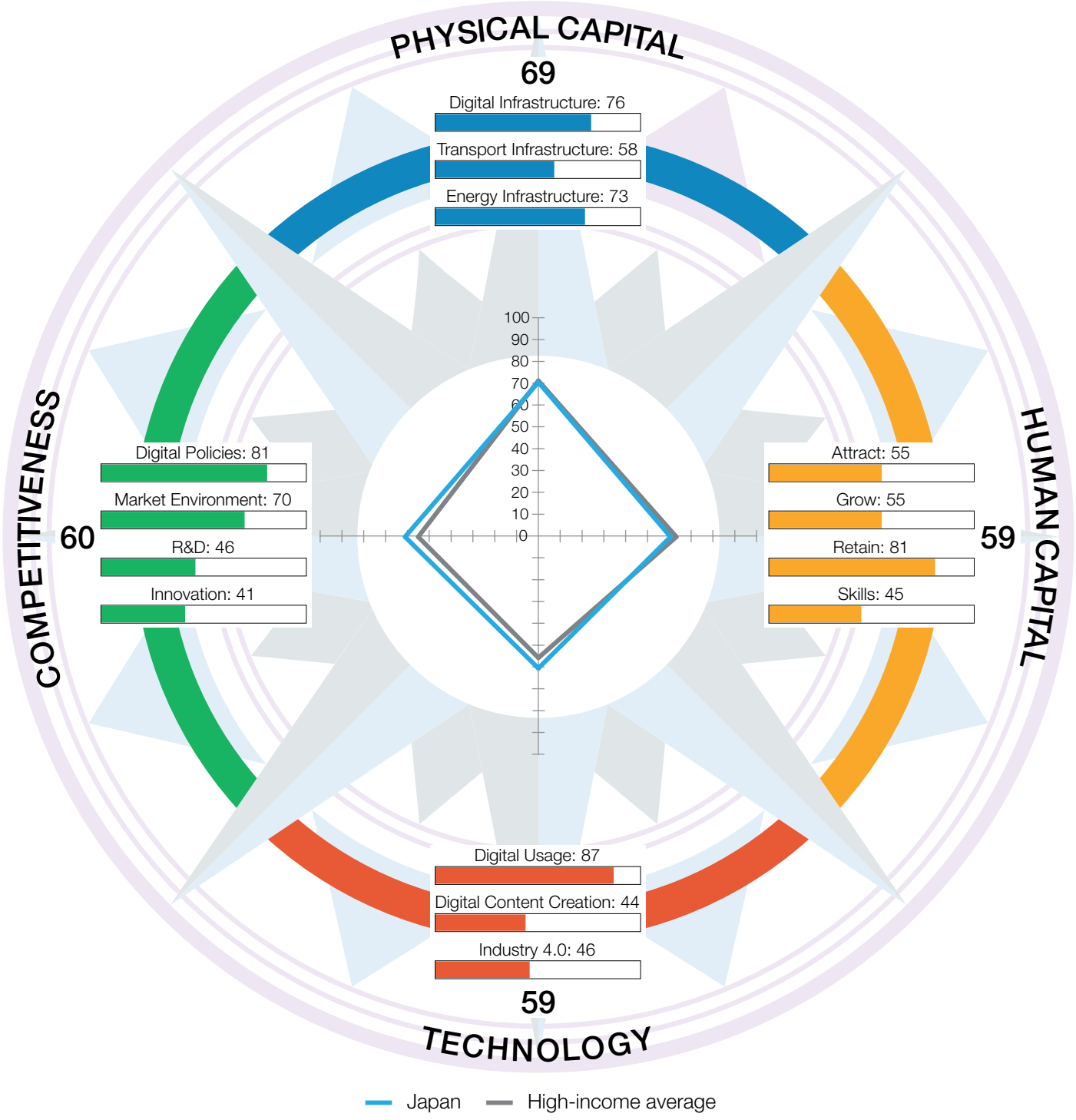
		Score	Rank
3	**TECHNOLOGY**	**25.76**	**87**
3.1	Digital Usage	41.01	88
3.1.1	Internet users	66.15	84
3.1.2	Active mobile-broadband subscriptions	23.70	95
3.1.3	Gender parity in internet usage	85.09	80
3.1.4	Firms with website	n/a	n/a
3.1.5	Internet shopping	17.93	74
3.1.6	Government online services	32.93	97
3.1.7	E-Participation	20.25	104
3.2	Digital Content Creation	28.38	74
3.2.1	Software development	1.73	86
3.2.2	Wikipedia edits	47.95	64
3.2.3	Internet domain registrations	1.17	83
3.2.4	Mobile apps development	62.68	84
3.3	Industry 4.0	7.88	88
3.3.1	Cloud computing	—	—
3.3.2	AI software development	4.11	89
3.3.3	AI research	1.50	88
3.3.4	ICT patent applications	0.00	76
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**27.62**	**95**
4.1	Digital Policies	31.37	111
4.1.1	ICT regulation	69.59	86
4.1.2	Cybersecurity	50.00	72
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	0.00	114
4.1.7	Data transfer	0.00	119
4.2	Market Environment	27.86	84
4.2.1	Extent of market dominance	36.03	74
4.2.2	Labour productivity per employee	10.22	89
4.2.3	Urbanisation	46.96	83
4.2.4	Domestic credit to private sector	20.51	63
4.2.5	Market capitalisation	25.56	19
4.3	R&D	32.96	44
4.3.1	R&D spending	n/a	n/a
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	96.27	6
4.3.4	Scientific journal articles	2.62	86
4.4	Innovation	18.29	104
4.4.1	Medium- and high-tech industry	22.63	79
4.4.2	High-tech exports	3.51	92
4.4.3	Venture capital recipients, deals	12.01	37
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	8.03	55
4.4.6	Patent applications	45.27	74

Japan

Key Indicators

Rank (out of 124)	**22**	GDP per capita (PPP US$)	**45,572.72**
Income group	**High income**	GDP (US$ billions)	**4,231.14**
Regional group	**Asia and Pacific**	FREI score	**61.56**
Population (millions)	**125.12**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**69.02**	**28**
1.1	Digital Infrastructure	76.11	46
1.1.1	Internet access	97.33	10
1.1.2	International internet bandwidth	33.39	104
1.1.3	Fixed-broadband subscriptions	93.07	44
1.1.4	4G-mobile network coverage	99.89	17
1.1.5	Fixed broadband affordability	90.93	26
1.1.6	Mobile broadband affordability	90.90	69
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	57.75	16
1.2.1	Quality of infrastructure	85.71	5
1.2.2	Rural access	92.95	22
1.2.3	Air connectivity	27.55	29
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	73.19	45
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	88.05	40
2	**HUMAN CAPITAL**	**59.03**	**28**
2.1	Attract	54.88	34
2.1.1	Brain gain	50.15	59
2.1.2	International students	15.15	44
2.1.3	Tolerance of minorities	79.79	8
2.1.4	Tolerance of immigrants	56.92	69
2.1.5	Gender parity in high-skilled jobs	72.38	61
2.2	Grow	55.31	35
2.2.1	Tertiary enrolment	42.73	47
2.2.2	Reading, maths, and science	75.89	4
2.2.3	Use of virtual professional networks	2.60	112
2.2.4	Youth inclusion	100.00	1
2.3	Retain	80.66	25
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	64.92	25
2.3.3	Physician density	41.13	58
2.3.4	Sanitation	99.91	14
2.3.5	Personal safety	97.35	2
2.4	Skills	45.29	30
2.4.1	Workforce with tertiary education	62.43	8
2.4.2	High-skilled workforce	n/a	n/a
2.4.3	Researchers	62.54	13
2.4.4	Relevance of education system to the economy	45.21	53
2.4.5	Digital skills	10.98	60

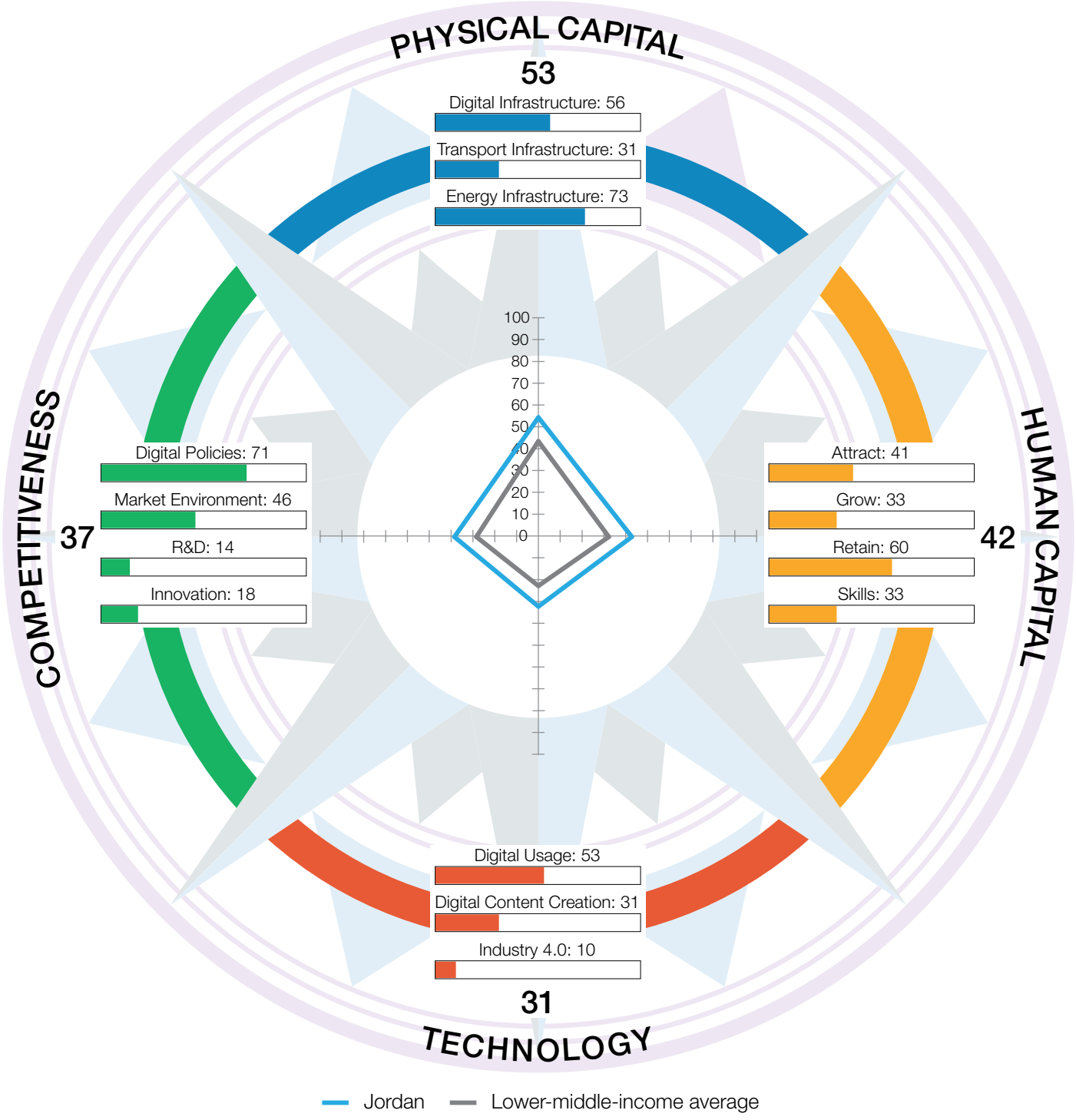
		Score	Rank
3	**TECHNOLOGY**	**58.66**	**20**
3.1	Digital Usage	86.83	3
3.1.1	Internet users	89.58	30
3.1.2	Active mobile-broadband subscriptions	92.53	2
3.1.3	Gender parity in internet usage	90.50	69
3.1.4	Firms with website	n/a	n/a
3.1.5	Internet shopping	60.33	31
3.1.6	Government online services	88.05	10
3.1.7	E-Participation	100.00	1
3.2	Digital Content Creation	43.55	39
3.2.1	Software development	13.23	36
3.2.2	Wikipedia edits	65.32	42
3.2.3	Internet domain registrations	8.26	41
3.2.4	Mobile apps development	87.39	32
3.3	Industry 4.0	45.61	15
3.3.1	Cloud computing	—	—
3.3.2	AI software development	17.97	37
3.3.3	AI research	16.31	41
3.3.4	ICT patent applications	100.00	1
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**59.53**	**15**
4.1	Digital Policies	81.39	25
4.1.1	ICT regulation	65.54	90
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	69.84	7
4.2.1	Extent of market dominance	82.78	5
4.2.2	Labour productivity per employee	46.19	37
4.2.3	Urbanisation	89.97	10
4.2.4	Domestic credit to private sector	90.06	3
4.2.5	Market capitalisation	40.18	8
4.3	R&D	45.82	24
4.3.1	R&D spending	61.06	6
4.3.2	University ranking	80.75	7
4.3.3	Gender parity in R&D	11.57	98
4.3.4	Scientific journal articles	29.91	36
4.4	Innovation	41.07	25
4.4.1	Medium- and high-tech industry	69.25	7
4.4.2	High-tech exports	27.87	26
4.4.3	Venture capital recipients, deals	13.56	35
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	1.69	90
4.4.6	Patent applications	92.99	3

Jordan

Key Indicators

Rank (out of 124)	**70**	GDP per capita (PPP US$)	**11,003.12**
Income group	**Lower-middle income**	GDP (US$ billions)	**47.45**
Regional group	**Middle East and North Africa**	FREI score	**40.90**
Population (millions)	**11.29**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**53.29**	**76**
1.1	Digital Infrastructure	55.82	91
1.1.1	Internet access	36.08	91
1.1.2	International internet bandwidth	42.17	79
1.1.3	Fixed-broadband subscriptions	63.85	83
1.1.4	4G-mobile network coverage	98.92	40
1.1.5	Fixed broadband affordability	52.14	97
1.1.6	Mobile broadband affordability	70.32	105
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	31.08	68
1.2.1	Quality of infrastructure	32.86	67
1.2.2	Rural access	80.70	43
1.2.3	Air connectivity	8.89	56
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	72.98	47
1.3.1	Access to electricity	99.88	79
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	98.50	15
1.3.4	Energy intensity	85.93	53
2	**HUMAN CAPITAL**	**41.72**	**72**
2.1	Attract	40.86	84
2.1.1	Brain gain	49.48	61
2.1.2	International students	32.75	19
2.1.3	Tolerance of minorities	14.89	107
2.1.4	Tolerance of immigrants	56.92	69
2.1.5	Gender parity in high-skilled jobs	50.26	93
2.2	Grow	32.87	84
2.2.1	Tertiary enrolment	21.87	82
2.2.2	Reading, maths, and science	33.44	55
2.2.3	Use of virtual professional networks	21.52	60
2.2.4	Youth inclusion	54.66	106
2.3	Retain	60.27	64
2.3.1	Pension coverage	56.43	70
2.3.2	Environmental performance	41.86	57
2.3.3	Physician density	39.52	59
2.3.4	Sanitation	96.80	56
2.3.5	Personal safety	66.75	56
2.4	Skills	32.89	54
2.4.1	Workforce with tertiary education	29.84	58
2.4.2	High-skilled workforce	32.40	61
2.4.3	Researchers	6.69	63
2.4.4	Relevance of education system to the economy	62.65	28
2.4.5	Digital skills	n/a	n/a

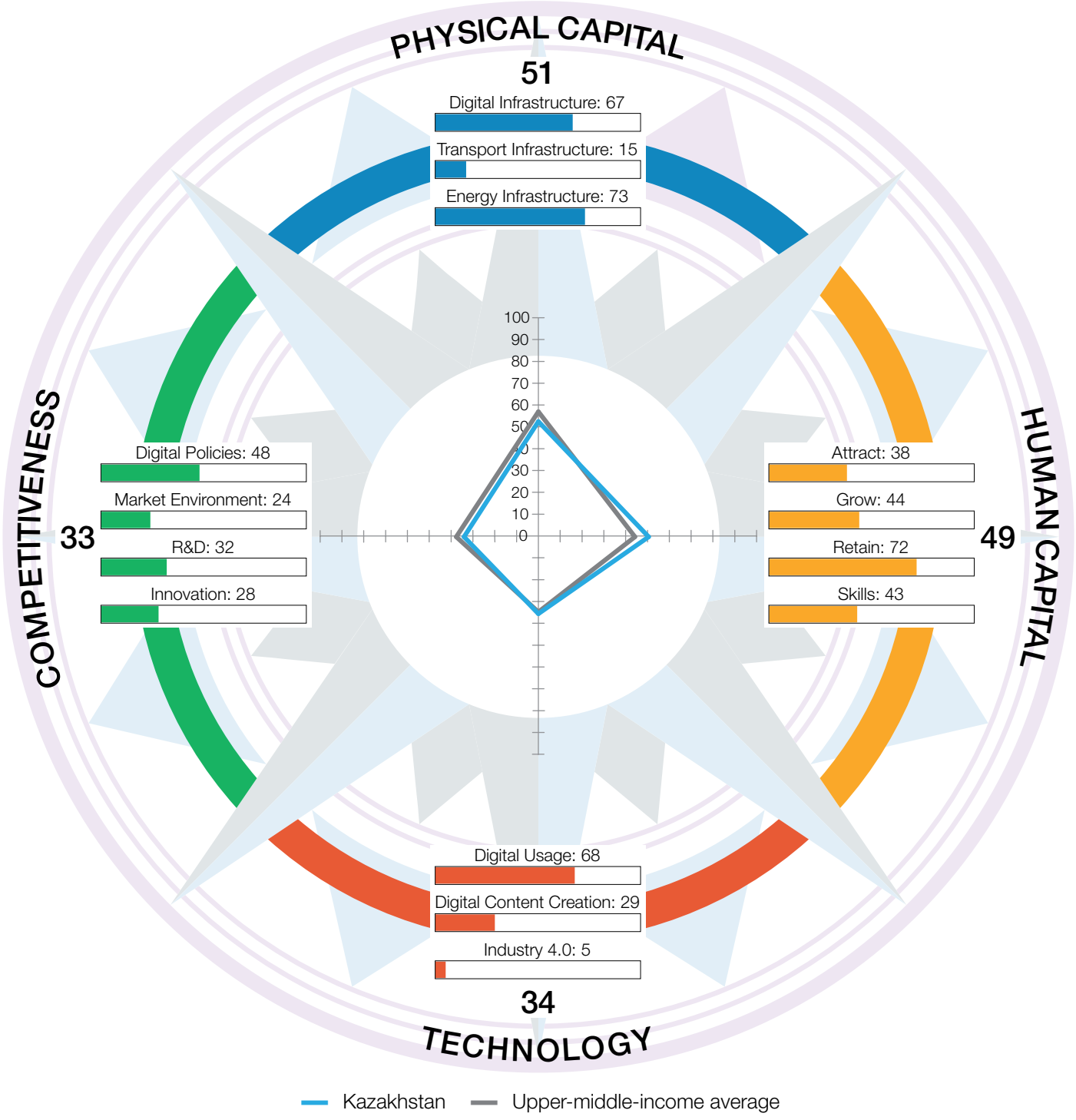
		Score	Rank
3	**TECHNOLOGY**	**31.09**	**75**
3.1	Digital Usage	52.89	70
3.1.1	Internet users	62.94	85
3.1.2	Active mobile-broadband subscriptions	25.31	93
3.1.3	Gender parity in internet usage	84.53	83
3.1.4	Firms with website	77.12	24
3.1.5	Internet shopping	15.85	78
3.1.6	Government online services	55.08	72
3.1.7	E-Participation	49.37	66
3.2	Digital Content Creation	30.78	70
3.2.1	Software development	3.57	63
3.2.2	Wikipedia edits	44.90	69
3.2.3	Internet domain registrations	1.89	72
3.2.4	Mobile apps development	72.75	64
3.3	Industry 4.0	9.59	71
3.3.1	Cloud computing	—	—
3.3.2	AI software development	5.60	79
3.3.3	AI research	15.94	42
3.3.4	ICT patent applications	0.47	55
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**37.48**	**62**
4.1	Digital Policies	71.20	54
4.1.1	ICT regulation	81.76	64
4.1.2	Cybersecurity	50.00	72
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	100.00	1
4.1.5	Online content	100.00	1
4.1.6	Data privacy	0.00	114
4.1.7	Data transfer	66.67	51
4.2	Market Environment	46.31	33
4.2.1	Extent of market dominance	67.26	21
4.2.2	Labour productivity per employee	24.85	67
4.2.3	Urbanisation	89.21	13
4.2.4	Domestic credit to private sector	37.66	33
4.2.5	Market capitalisation	12.57	39
4.3	R&D	14.04	93
4.3.1	R&D spending	12.78	49
4.3.2	University ranking	16.31	60
4.3.3	Gender parity in R&D	15.03	97
4.3.4	Scientific journal articles	12.06	54
4.4	Innovation	18.37	103
4.4.1	Medium- and high-tech industry	29.27	64
4.4.2	High-tech exports	2.25	104
4.4.3	Venture capital recipients, deals	17.88	30
4.4.4	New product entrepreneurial activity	23.94	74
4.4.5	New business density	1.61	91
4.4.6	Patent applications	35.28	89

Kazakhstan

Key Indicators

Rank (out of 124)	**66**	GDP per capita (PPP US$)	**30,809.88**
Income group	**Upper-middle income**	GDP (US$ billions)	**220.62**
Regional group	**Asia and Pacific**	FREI score	**42.06**
Population (millions)	**19.62**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**51.47**	**83**
1.1	Digital Infrastructure	66.74	70
1.1.1	Internet access	94.39	19
1.1.2	International internet bandwidth	48.96	46
1.1.3	Fixed-broadband subscriptions	55.41	88
1.1.4	4G-mobile network coverage	79.89	93
1.1.5	Fixed broadband affordability	94.72	10
1.1.6	Mobile broadband affordability	93.79	58
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	14.91	111
1.2.1	Quality of infrastructure	25.00	81
1.2.2	Rural access	19.32	117
1.2.3	Air connectivity	3.62	84
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	72.76	50
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	96.24	34
1.3.4	Energy intensity	72.35	99
2	**HUMAN CAPITAL**	**49.23**	**49**
2.1	Attract	38.41	92
2.1.1	Brain gain	50.97	56
2.1.2	International students	14.55	45
2.1.3	Tolerance of minorities	21.28	96
2.1.4	Tolerance of immigrants	43.08	88
2.1.5	Gender parity in high-skilled jobs	62.15	80
2.2	Grow	43.54	62
2.2.1	Tertiary enrolment	46.34	34
2.2.2	Reading, maths, and science	27.87	61
2.2.3	Use of virtual professional networks	9.63	90
2.2.4	Youth inclusion	90.31	21
2.3	Retain	72.10	43
2.3.1	Pension coverage	99.59	35
2.3.2	Environmental performance	37.29	65
2.3.3	Physician density	63.67	25
2.3.4	Sanitation	97.66	49
2.3.5	Personal safety	62.30	61
2.4	Skills	42.89	33
2.4.1	Workforce with tertiary education	100.00	1
2.4.2	High-skilled workforce	55.31	36
2.4.3	Researchers	7.08	62
2.4.4	Relevance of education system to the economy	21.59	96
2.4.5	Digital skills	30.47	31

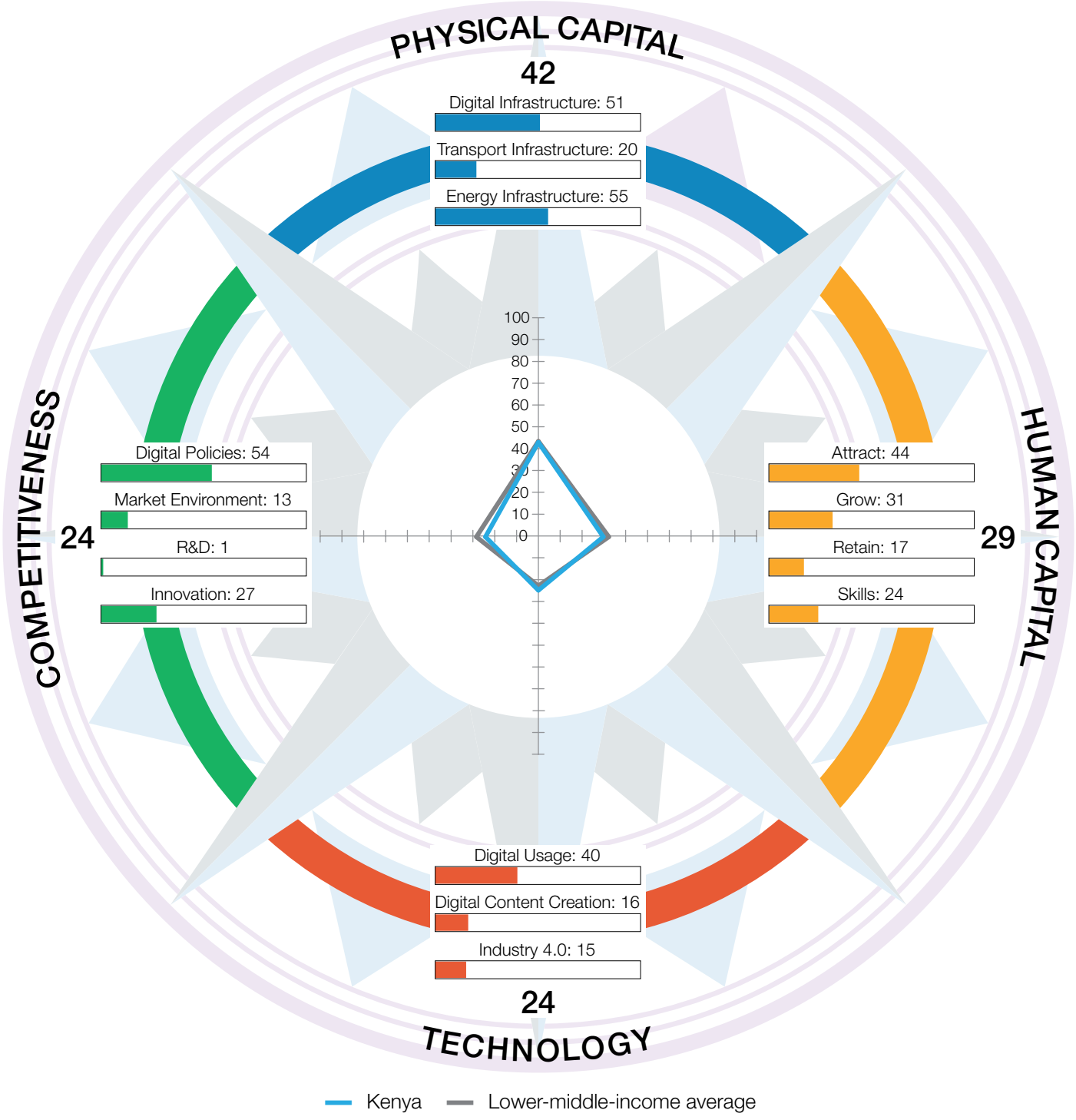
		Score	Rank
3	**TECHNOLOGY**	**34.33**	**61**
3.1	Digital Usage	68.49	39
3.1.1	Internet users	90.33	27
3.1.2	Active mobile-broadband subscriptions	34.44	68
3.1.3	Gender parity in internet usage	96.39	44
3.1.4	Firms with website	44.90	64
3.1.5	Internet shopping	43.53	48
3.1.6	Government online services	91.35	8
3.1.7	E-Participation	78.48	15
3.2	Digital Content Creation	29.21	72
3.2.1	Software development	2.04	79
3.2.2	Wikipedia edits	44.09	72
3.2.3	Internet domain registrations	1.76	76
3.2.4	Mobile apps development	68.96	72
3.3	Industry 4.0	5.30	111
3.3.1	Cloud computing	—	—
3.3.2	AI software development	3.97	91
3.3.3	AI research	4.83	65
3.3.4	ICT patent applications	0.22	61
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**33.19**	**76**
4.1	Digital Policies	48.26	96
4.1.1	ICT regulation	37.84	120
4.1.2	Cybersecurity	50.00	72
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	50.00	99
4.2	Market Environment	24.35	97
4.2.1	Extent of market dominance	22.28	97
4.2.2	Labour productivity per employee	34.10	50
4.2.3	Urbanisation	49.06	76
4.2.4	Domestic credit to private sector	8.36	98
4.2.5	Market capitalisation	7.93	51
4.3	R&D	32.19	45
4.3.1	R&D spending	2.20	95
4.3.2	University ranking	39.11	33
4.3.3	Gender parity in R&D	81.58	29
4.3.4	Scientific journal articles	5.88	71
4.4	Innovation	27.96	55
4.4.1	Medium- and high-tech industry	20.35	83
4.4.2	High-tech exports	50.93	8
4.4.3	Venture capital recipients, deals	0.00	93
4.4.4	New product entrepreneurial activity	24.07	73
4.4.5	New business density	14.28	35
4.4.6	Patent applications	58.14	39

Kenya

Key Indicators

Rank (out of 124)	**96**	GDP per capita (PPP US$)	**5,763.91**
Income group	**Lower-middle income**	GDP (US$ billions)	**113.42**
Regional group	**Sub-Saharan Africa**	FREI score	**29.67**
Population (millions)	**54.03**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**42.19**	**100**
1.1	Digital Infrastructure	51.31	96
1.1.1	Internet access	16.15	100
1.1.2	International internet bandwidth	74.71	4
1.1.3	Fixed-broadband subscriptions	47.93	90
1.1.4	4G-mobile network coverage	93.55	77
1.1.5	Fixed broadband affordability	42.73	108
1.1.6	Mobile broadband affordability	75.00	101
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	20.02	92
1.2.1	Quality of infrastructure	26.79	80
1.2.2	Rural access	48.11	89
1.2.3	Air connectivity	1.18	100
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	55.23	99
1.3.1	Access to electricity	72.66	102
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	71.43	71
1.3.4	Energy intensity	76.35	90
2	**HUMAN CAPITAL**	**28.99**	**97**
2.1	Attract	43.82	62
2.1.1	Brain gain	58.49	34
2.1.2	International students	3.32	80
2.1.3	Tolerance of minorities	18.09	98
2.1.4	Tolerance of immigrants	67.69	45
2.1.5	Gender parity in high-skilled jobs	71.50	64
2.2	Grow	30.89	94
2.2.1	Tertiary enrolment	5.77	107
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	12.12	81
2.2.4	Youth inclusion	74.77	72
2.3	Retain	16.85	116
2.3.1	Pension coverage	11.43	101
2.3.2	Environmental performance	20.17	100
2.3.3	Physician density	3.06	104
2.3.4	Sanitation	26.12	112
2.3.5	Personal safety	23.48	118
2.4	Skills	24.39	75
2.4.1	Workforce with tertiary education	5.15	112
2.4.2	High-skilled workforce	17.36	87
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	50.66	42
2.4.5	Digital skills	n/a	n/a

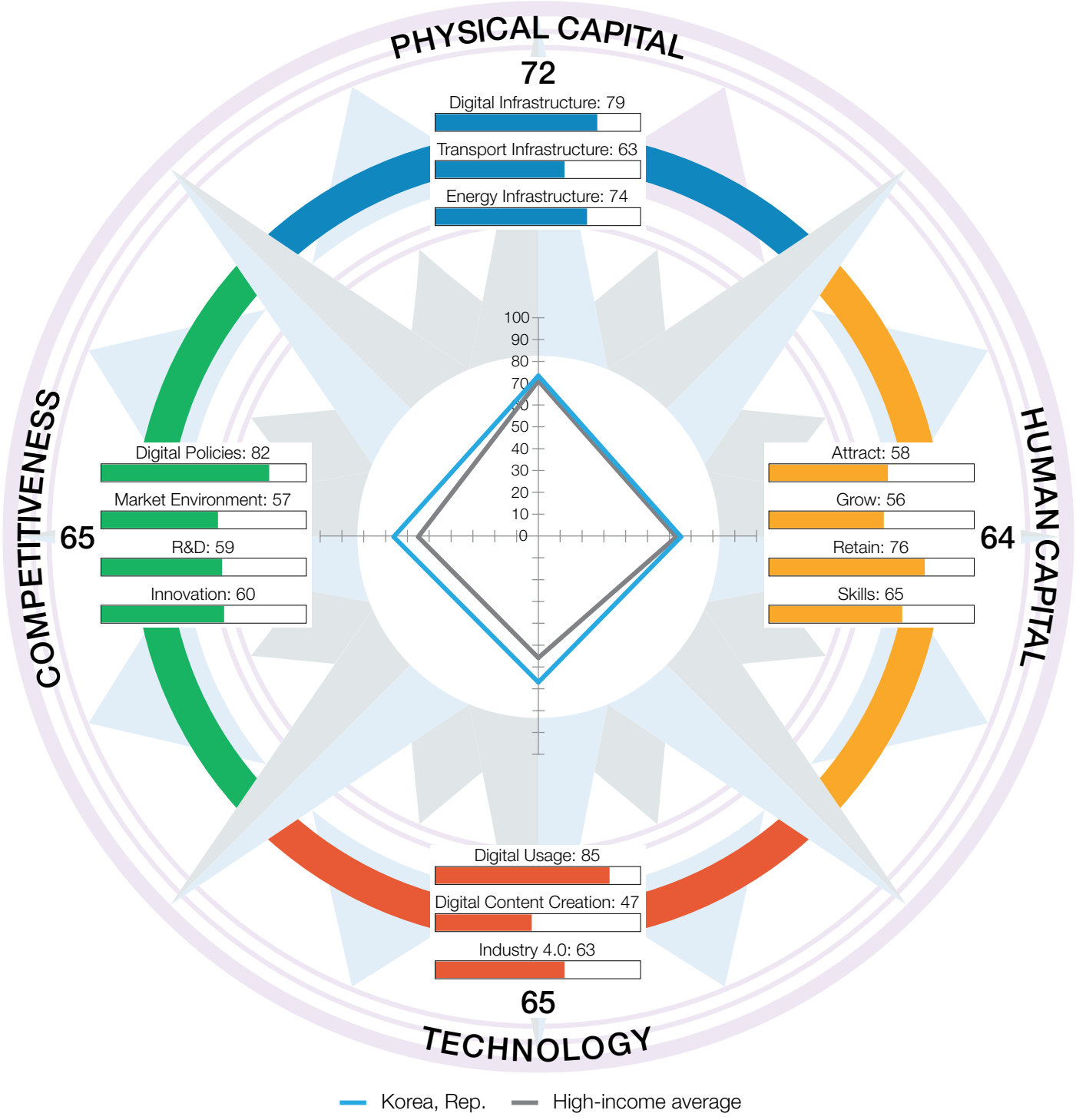
		Score	Rank
3	**TECHNOLOGY**	**23.85**	**91**
3.1	Digital Usage	40.28	89
3.1.1	Internet users	24.92	107
3.1.2	Active mobile-broadband subscriptions	20.31	104
3.1.3	Gender parity in internet usage	66.08	94
3.1.4	Firms with website	41.15	71
3.1.5	Internet shopping	18.23	73
3.1.6	Government online services	58.08	67
3.1.7	E-Participation	53.16	63
3.2	Digital Content Creation	16.39	109
3.2.1	Software development	2.56	71
3.2.2	Wikipedia edits	7.29	121
3.2.3	Internet domain registrations	0.69	90
3.2.4	Mobile apps development	55.00	96
3.3	Industry 4.0	14.89	45
3.3.1	Cloud computing	—	—
3.3.2	AI software development	17.66	39
3.3.3	AI research	0.93	97
3.3.4	ICT patent applications	0.04	74
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**23.64**	**106**
4.1	Digital Policies	54.21	84
4.1.1	ICT regulation	87.84	33
4.1.2	Cybersecurity	25.00	100
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	12.71	115
4.2.1	Extent of market dominance	27.22	92
4.2.2	Labour productivity per employee	6.25	99
4.2.3	Urbanisation	12.69	116
4.2.4	Domestic credit to private sector	11.03	88
4.2.5	Market capitalisation	6.37	57
4.3	R&D	0.61	118
4.3.1	R&D spending	n/a	n/a
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	n/a	n/a
4.3.4	Scientific journal articles	1.21	95
4.4	Innovation	27.05	60
4.4.1	Medium- and high-tech industry	15.71	91
4.4.2	High-tech exports	4.72	87
4.4.3	Venture capital recipients, deals	22.66	23
4.4.4	New product entrepreneurial activity	66.80	20
4.4.5	New business density	6.24	62
4.4.6	Patent applications	46.17	70

Korea, Rep.

Key Indicators

Rank (out of 124)	**14**	GDP per capita (PPP US$)	**50,069.82**
Income group	**High income**	GDP (US$ billions)	**1,665.25**
Regional group	**Asia and Pacific**	FREI score	**66.27**
Population (millions)	**51.63**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**71.89**	**20**
1.1	Digital Infrastructure	79.08	29
1.1.1	Internet access	100.00	1
1.1.2	International internet bandwidth	47.78	51
1.1.3	Fixed-broadband subscriptions	100.00	1
1.1.4	4G-mobile network coverage	99.89	17
1.1.5	Fixed broadband affordability	90.69	27
1.1.6	Mobile broadband affordability	97.02	30
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	62.64	11
1.2.1	Quality of infrastructure	82.14	9
1.2.2	Rural access	95.71	16
1.2.3	Air connectivity	20.68	38
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	73.94	40
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	75.44	92
2	**HUMAN CAPITAL**	**63.68**	**22**
2.1	Attract	57.92	32
2.1.1	Brain gain	50.79	58
2.1.2	International students	9.80	57
2.1.3	Tolerance of minorities	75.53	18
2.1.4	Tolerance of immigrants	58.46	64
2.1.5	Gender parity in high-skilled jobs	95.04	11
2.2	Grow	56.07	33
2.2.1	Tertiary enrolment	67.61	4
2.2.2	Reading, maths, and science	75.76	5
2.2.3	Use of virtual professional networks	7.93	93
2.2.4	Youth inclusion	72.99	74
2.3	Retain	76.03	35
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	47.46	48
2.3.3	Physician density	39.44	60
2.3.4	Sanitation	99.93	13
2.3.5	Personal safety	93.31	8
2.4	Skills	64.71	11
2.4.1	Workforce with tertiary education	66.96	4
2.4.2	High-skilled workforce	59.70	30
2.4.3	Researchers	100.00	1
2.4.4	Relevance of education system to the economy	58.28	33
2.4.5	Digital skills	38.64	23

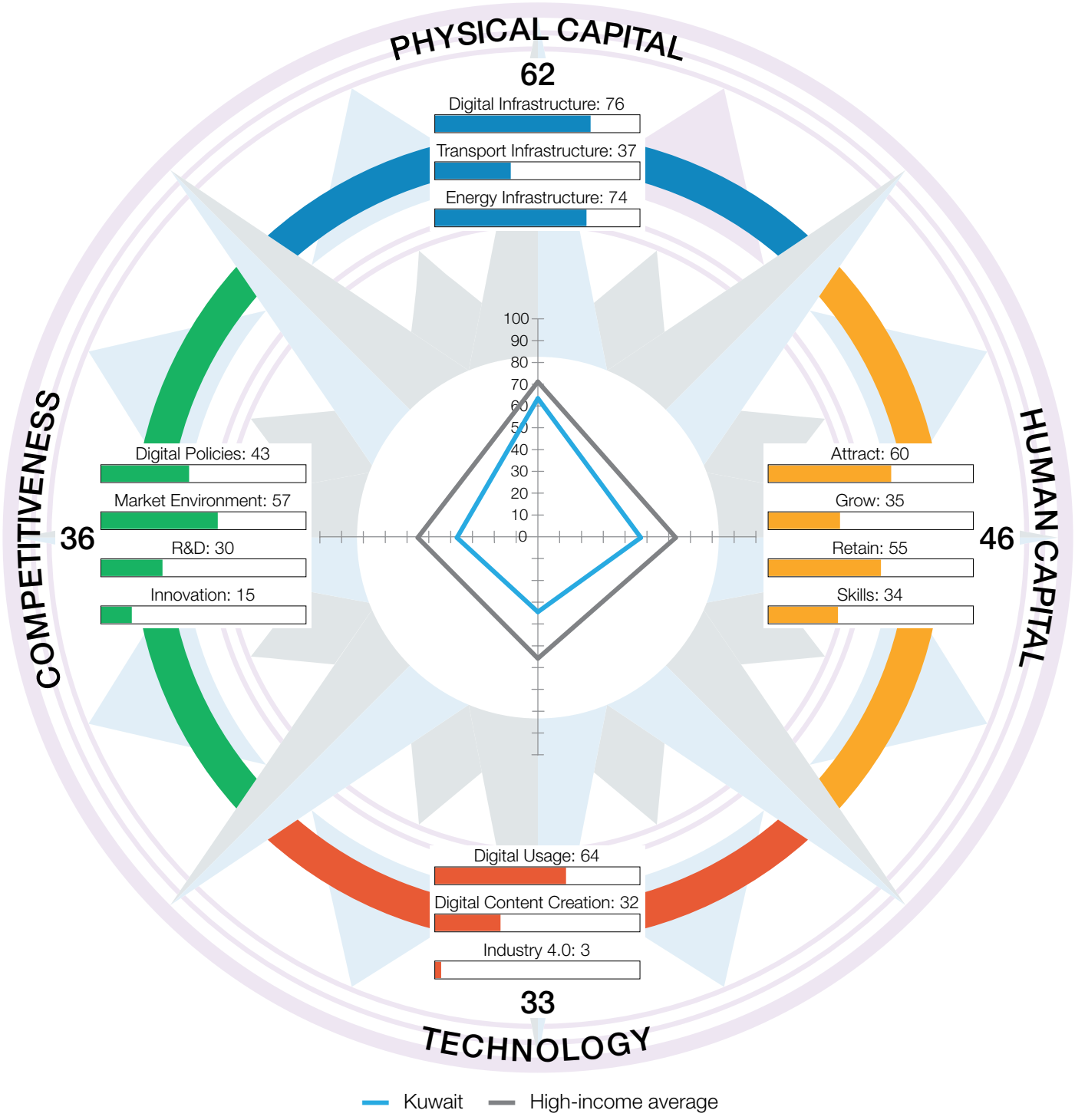
		Score	Rank
3	**TECHNOLOGY**	**64.90**	**14**
3.1	Digital Usage	84.61	8
3.1.1	Internet users	97.41	10
3.1.2	Active mobile-broadband subscriptions	47.34	24
3.1.3	Gender parity in internet usage	97.76	32
3.1.4	Firms with website	68.45	34
3.1.5	Internet shopping	89.92	5
3.1.6	Government online services	97.71	3
3.1.7	E-Participation	93.67	9
3.2	Digital Content Creation	46.86	36
3.2.1	Software development	23.27	27
3.2.2	Wikipedia edits	63.38	44
3.2.3	Internet domain registrations	7.84	43
3.2.4	Mobile apps development	92.93	24
3.3	Industry 4.0	63.22	7
3.3.1	Cloud computing	—	—
3.3.2	AI software development	49.01	14
3.3.3	AI research	33.37	24
3.3.4	ICT patent applications	100.00	1
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**64.61**	**9**
4.1	Digital Policies	81.94	24
4.1.1	ICT regulation	61.08	99
4.1.2	Cybersecurity	62.50	53
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	100.00	1
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	50.00	99
4.2	Market Environment	57.47	17
4.2.1	Extent of market dominance	38.04	66
4.2.2	Labour productivity per employee	50.98	30
4.2.3	Urbanisation	77.82	29
4.2.4	Domestic credit to private sector	80.57	6
4.2.5	Market capitalisation	39.97	9
4.3	R&D	59.42	9
4.3.1	R&D spending	89.54	2
4.3.2	University ranking	77.41	9
4.3.3	Gender parity in R&D	18.41	96
4.3.4	Scientific journal articles	52.33	22
4.4	Innovation	59.60	5
4.4.1	Medium- and high-tech industry	77.71	3
4.4.2	High-tech exports	55.53	5
4.4.3	Venture capital recipients, deals	5.15	62
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	n/a	n/a
4.4.6	Patent applications	100.00	1

Kuwait

Key Indicators

Rank (out of 124)	**58**	GDP per capita (PPP US$)	**58,056.23**
Income group	**High income**	GDP (US$ billions)	**184.56**
Regional group	**Middle East and North Africa**	FREI score	**44.39**
Population (millions)	**4.27**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**62.23**	**49**
1.1	Digital Infrastructure	76.16	45
1.1.1	Internet access	99.45	5
1.1.2	International internet bandwidth	57.79	22
1.1.3	Fixed-broadband subscriptions	57.16	87
1.1.4	4G-mobile network coverage	100.00	1
1.1.5	Fixed broadband affordability	85.39	45
1.1.6	Mobile broadband affordability	96.94	31
1.1.7	Computer software spending	36.36	21
1.2	Transport Infrastructure	36.59	52
1.2.1	Quality of infrastructure	64.29	28
1.2.2	Rural access	38.85	102
1.2.3	Air connectivity	35.75	20
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	73.93	41
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	56.03	115
2	**HUMAN CAPITAL**	**45.99**	**58**
2.1	Attract	59.74	28
2.1.1	Brain gain	52.61	49
2.1.2	International students	n/a	n/a
2.1.3	Tolerance of minorities	56.38	43
2.1.4	Tolerance of immigrants	69.23	44
2.1.5	Gender parity in high-skilled jobs	60.72	84
2.2	Grow	34.88	80
2.2.1	Tertiary enrolment	38.40	53
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	31.37	41
2.2.4	Youth inclusion	n/a	n/a
2.3	Retain	54.91	71
2.3.1	Pension coverage	24.90	86
2.3.2	Environmental performance	39.83	60
2.3.3	Physician density	36.02	67
2.3.4	Sanitation	100.00	1
2.3.5	Personal safety	73.78	47
2.4	Skills	34.42	50
2.4.1	Workforce with tertiary education	27.86	63
2.4.2	High-skilled workforce	31.89	64
2.4.3	Researchers	1.83	82
2.4.4	Relevance of education system to the economy	37.22	72
2.4.5	Digital skills	73.28	5

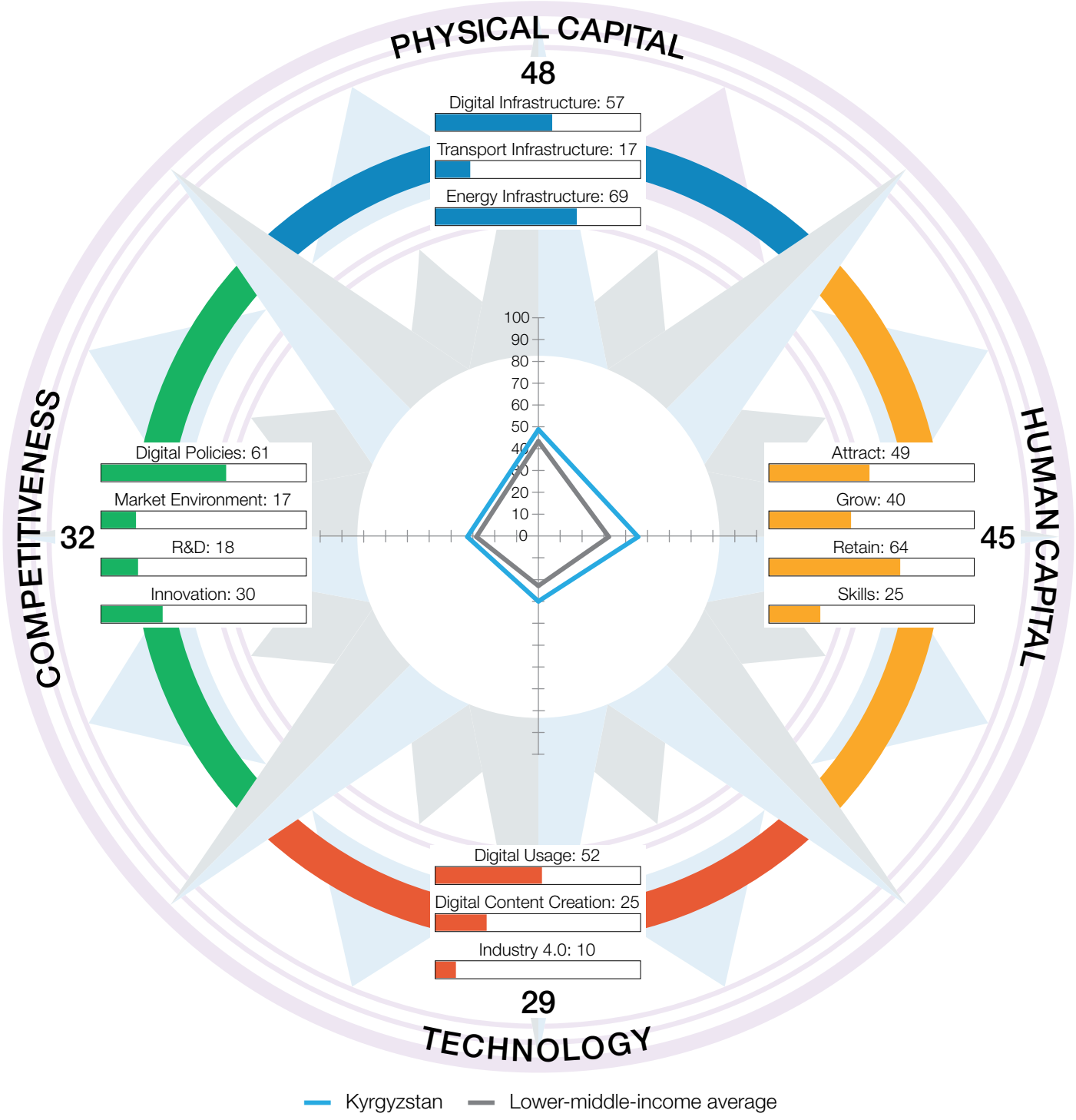
		Score	Rank
3	**TECHNOLOGY**	**33.20**	**66**
3.1	Digital Usage	64.49	52
3.1.1	Internet users	99.68	4
3.1.2	Active mobile-broadband subscriptions	55.62	12
3.1.3	Gender parity in internet usage	99.45	9
3.1.4	Firms with website	n/a	n/a
3.1.5	Internet shopping	22.76	65
3.1.6	Government online services	60.08	65
3.1.7	E-Participation	49.37	66
3.2	Digital Content Creation	31.99	63
3.2.1	Software development	1.08	96
3.2.2	Wikipedia edits	45.71	67
3.2.3	Internet domain registrations	3.60	57
3.2.4	Mobile apps development	77.58	54
3.3	Industry 4.0	3.11	117
3.3.1	Cloud computing	—	—
3.3.2	AI software development	1.37	103
3.3.3	AI research	11.23	49
3.3.4	ICT patent applications	0.00	76
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**36.16**	**66**
4.1	Digital Policies	42.60	100
4.1.1	ICT regulation	64.86	93
4.1.2	Cybersecurity	50.00	72
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	0.00	85
4.1.6	Data privacy	66.67	87
4.1.7	Data transfer	66.67	51
4.2	Market Environment	56.54	20
4.2.1	Extent of market dominance	36.79	71
4.2.2	Labour productivity per employee	79.74	4
4.2.3	Urbanisation	100.00	1
4.2.4	Domestic credit to private sector	35.95	36
4.2.5	Market capitalisation	30.19	16
4.3	R&D	30.01	51
4.3.1	R&D spending	3.25	85
4.3.2	University ranking	13.58	62
4.3.3	Gender parity in R&D	93.39	11
4.3.4	Scientific journal articles	9.83	59
4.4	Innovation	15.47	110
4.4.1	Medium- and high-tech industry	38.70	49
4.4.2	High-tech exports	1.94	107
4.4.3	Venture capital recipients, deals	1.67	83
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	13.44	36
4.4.6	Patent applications	21.60	111

Kyrgyzstan

Key Indicators

Rank (out of 124)	**81**	GDP per capita (PPP US$)	**6,132.51**
Income group	**Lower-middle income**	GDP (US$ billions)	**10.93**
Regional group	**Asia and Pacific**	FREI score	**38.23**
Population (millions)	**6.80**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**47.90**	**89**
1.1	Digital Infrastructure	57.08	89
1.1.1	Internet access	87.59	40
1.1.2	International internet bandwidth	41.40	82
1.1.3	Fixed-broadband subscriptions	27.29	100
1.1.4	4G-mobile network coverage	83.87	90
1.1.5	Fixed broadband affordability	72.29	80
1.1.6	Mobile broadband affordability	78.06	98
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	17.38	102
1.2.1	Quality of infrastructure	21.43	87
1.2.2	Rural access	38.95	101
1.2.3	Air connectivity	2.41	88
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	69.25	73
1.3.1	Access to electricity	99.62	83
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	93.23	52
1.3.4	Energy intensity	76.53	88
2	**HUMAN CAPITAL**	**44.51**	**60**
2.1	Attract	48.72	46
2.1.1	Brain gain	37.07	86
2.1.2	International students	61.30	6
2.1.3	Tolerance of minorities	15.96	105
2.1.4	Tolerance of immigrants	66.15	48
2.1.5	Gender parity in high-skilled jobs	63.14	77
2.2	Grow	39.89	69
2.2.1	Tertiary enrolment	34.82	63
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	4.30	107
2.2.4	Youth inclusion	80.54	53
2.3	Retain	64.44	57
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	28.47	84
2.3.3	Physician density	34.02	70
2.3.4	Sanitation	97.68	48
2.3.5	Personal safety	62.04	62
2.4	Skills	25.00	70
2.4.1	Workforce with tertiary education	27.19	66
2.4.2	High-skilled workforce	24.35	74
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	23.45	93
2.4.5	Digital skills	n/a	n/a

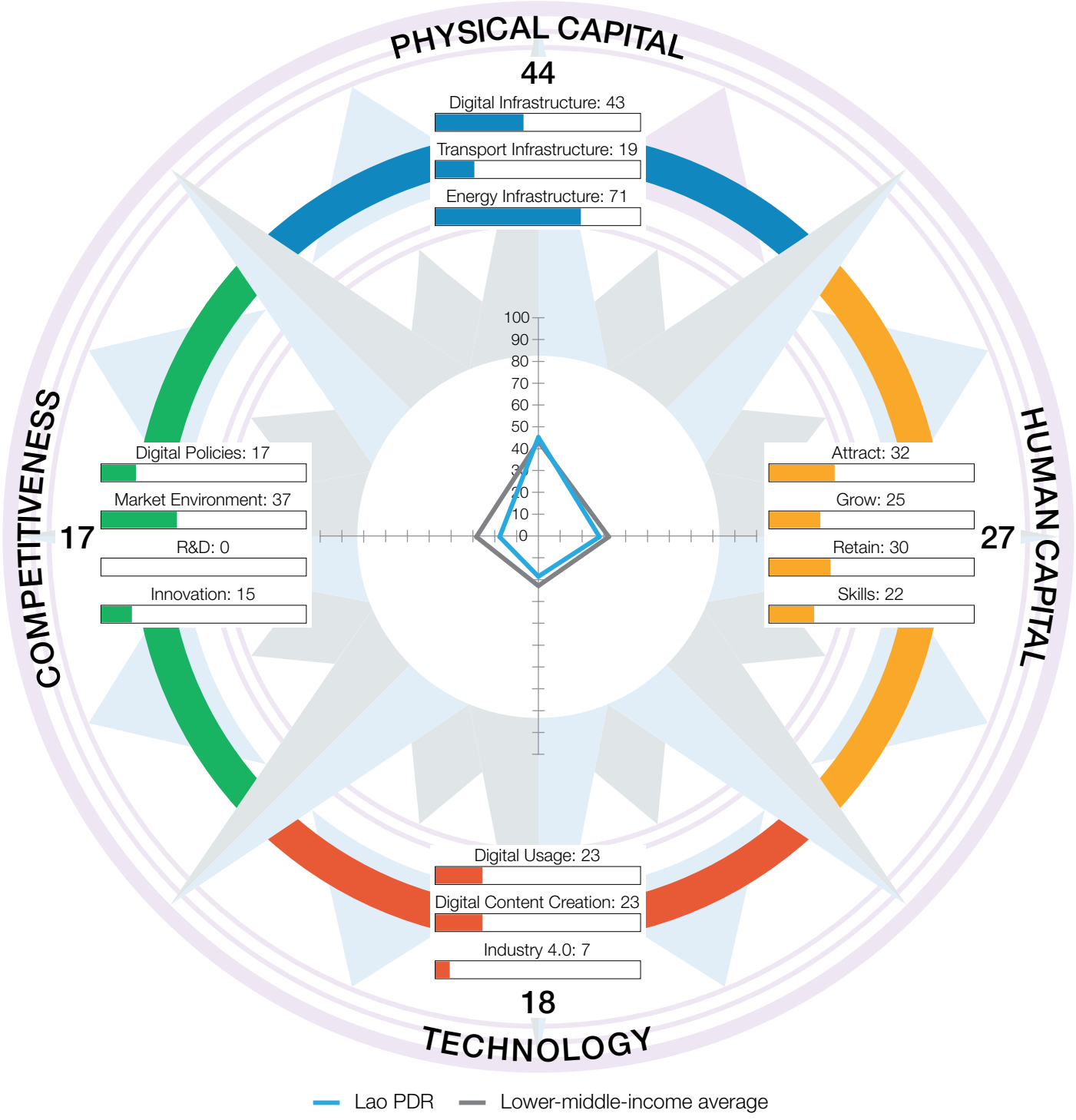
		Score	Rank
3	**TECHNOLOGY**	**28.78**	**80**
3.1	Digital Usage	51.66	75
3.1.1	Internet users	70.18	74
3.1.2	Active mobile-broadband subscriptions	49.04	20
3.1.3	Gender parity in internet usage	84.54	82
3.1.4	Firms with website	53.10	56
3.1.5	Internet shopping	10.87	85
3.1.6	Government online services	49.57	79
3.1.7	E-Participation	44.30	77
3.2	Digital Content Creation	25.10	87
3.2.1	Software development	2.72	69
3.2.2	Wikipedia edits	36.41	82
3.2.3	Internet domain registrations	0.43	97
3.2.4	Mobile apps development	60.84	88
3.3	Industry 4.0	9.59	72
3.3.1	Cloud computing	—	—
3.3.2	AI software development	0.16	116
3.3.3	AI research	2.32	85
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**31.71**	**80**
4.1	Digital Policies	61.07	70
4.1.1	ICT regulation	60.81	100
4.1.2	Cybersecurity	50.00	72
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	66.67	87
4.1.7	Data transfer	100.00	1
4.2	Market Environment	17.05	108
4.2.1	Extent of market dominance	30.68	86
4.2.2	Labour productivity per employee	6.49	97
4.2.3	Urbanisation	23.84	106
4.2.4	Domestic credit to private sector	7.17	101
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	18.28	89
4.3.1	R&D spending	1.42	99
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	70.65	38
4.3.4	Scientific journal articles	1.05	98
4.4	Innovation	30.44	44
4.4.1	Medium- and high-tech industry	2.40	117
4.4.2	High-tech exports	24.37	31
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	58.30	31
4.4.5	New business density	5.10	70
4.4.6	Patent applications	62.03	29

Lao PDR

Key Indicators

Rank (out of 124)	**103**	GDP per capita (PPP US$)	**9,384.27**
Income group	**Lower-middle income**	GDP (US$ billions)	**15.72**
Regional group	**Asia and Pacific**	FREI score	**26.68**
Population (millions)	**7.53**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**44.45**	**94**
1.1	Digital Infrastructure	43.30	101
1.1.1	Internet access	71.43	74
1.1.2	International internet bandwidth	34.02	102
1.1.3	Fixed-broadband subscriptions	11.10	111
1.1.4	4G-mobile network coverage	48.39	109
1.1.5	Fixed broadband affordability	59.36	92
1.1.6	Mobile broadband affordability	78.83	97
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	19.05	95
1.2.1	Quality of infrastructure	17.86	100
1.2.2	Rural access	42.01	96
1.2.3	Air connectivity	5.06	74
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	70.99	66
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	98.50	15
1.3.4	Energy intensity	81.14	76
2	**HUMAN CAPITAL**	**27.28**	**102**
2.1	Attract	32.10	113
2.1.1	Brain gain	47.24	64
2.1.2	International students	1.41	93
2.1.3	Tolerance of minorities	26.60	91
2.1.4	Tolerance of immigrants	7.69	122
2.1.5	Gender parity in high-skilled jobs	77.57	51
2.2	Grow	25.14	109
2.2.1	Tertiary enrolment	7.73	101
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	2.27	113
2.2.4	Youth inclusion	65.42	90
2.3	Retain	29.55	102
2.3.1	Pension coverage	4.39	112
2.3.2	Environmental performance	20.00	101
2.3.3	Physician density	4.66	102
2.3.4	Sanitation	77.47	90
2.3.5	Personal safety	41.25	101
2.4	Skills	22.35	80
2.4.1	Workforce with tertiary education	11.50	93
2.4.2	High-skilled workforce	9.40	101
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	46.14	51
2.4.5	Digital skills	n/a	n/a

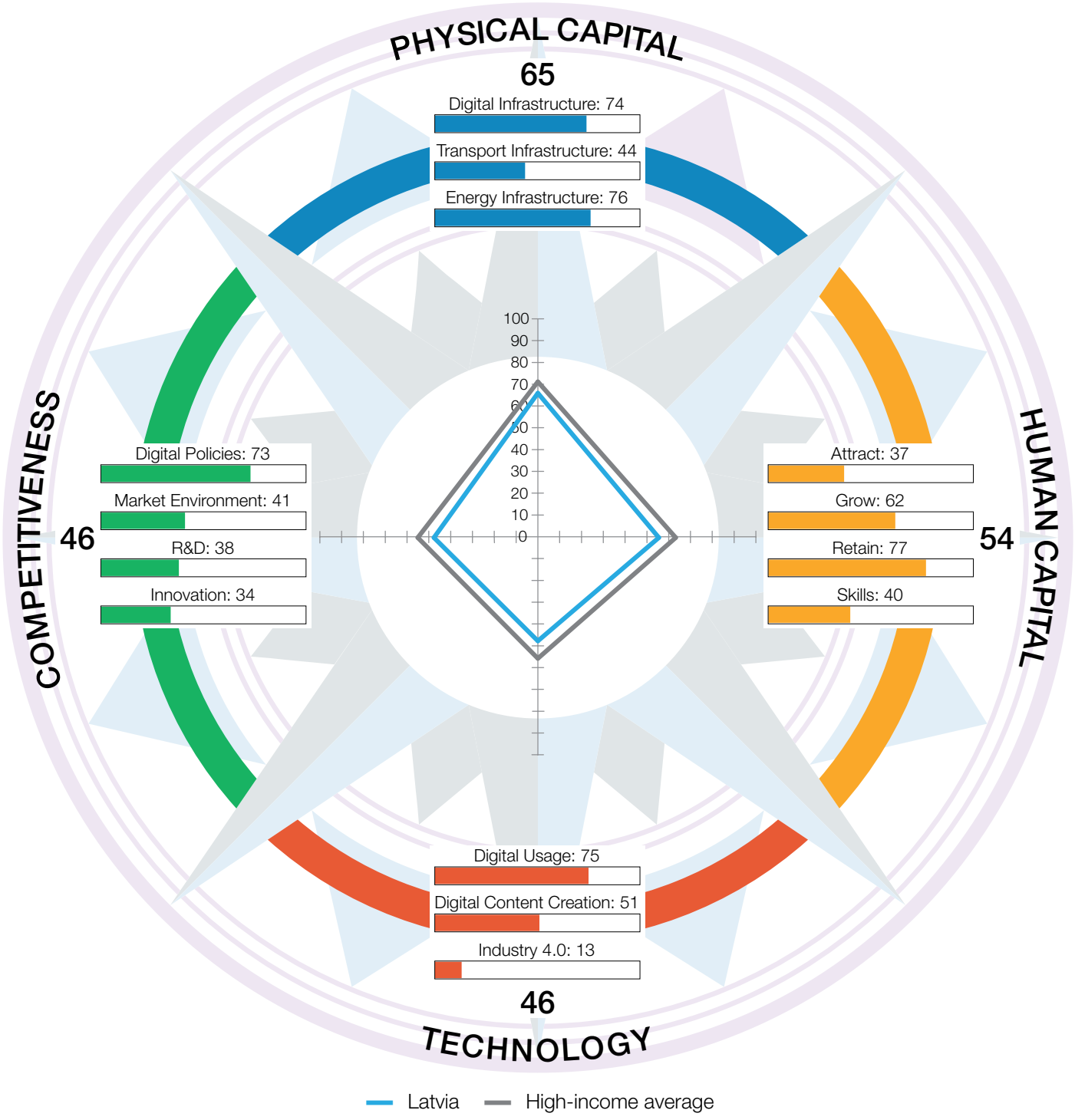
		Score	Rank
3	**TECHNOLOGY**	**17.70**	**104**
3.1	Digital Usage	23.07	109
3.1.1	Internet users	59.53	91
3.1.2	Active mobile-broadband subscriptions	21.55	101
3.1.3	Gender parity in internet usage	n/a	n/a
3.1.4	Firms with website	21.36	90
3.1.5	Internet shopping	10.48	87
3.1.6	Government online services	7.75	122
3.1.7	E-Participation	17.72	112
3.2	Digital Content Creation	22.93	94
3.2.1	Software development	0.27	110
3.2.2	Wikipedia edits	34.46	85
3.2.3	Internet domain registrations	1.87	73
3.2.4	Mobile apps development	55.11	95
3.3	Industry 4.0	7.10	97
3.3.1	Cloud computing	—	—
3.3.2	AI software development	0.07	119
3.3.3	AI research	0.23	111
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**17.30**	**115**
4.1	Digital Policies	16.54	122
4.1.1	ICT regulation	15.81	122
4.1.2	Cybersecurity	0.00	106
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	0.00	114
4.1.7	Data transfer	0.00	119
4.2	Market Environment	37.11	56
4.2.1	Extent of market dominance	51.98	40
4.2.2	Labour productivity per employee	n/a	n/a
4.2.3	Urbanisation	22.23	110
4.2.4	Domestic credit to private sector	n/a	n/a
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	0.20	122
4.3.1	R&D spending	n/a	n/a
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	n/a	n/a
4.3.4	Scientific journal articles	0.41	109
4.4	Innovation	15.34	111
4.4.1	Medium- and high-tech industry	4.29	113
4.4.2	High-tech exports	35.95	15
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	28.31	70
4.4.5	New business density	0.45	103
4.4.6	Patent applications	7.70	119

Latvia

Key Indicators

Rank (out of 124)	**36**	GDP per capita (PPP US$)	**39,956.19**
Income group	**High income**	GDP (US$ billions)	**41.15**
Regional group	**Europe**	FREI score	**52.81**
Population (millions)	**1.88**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**64.59**	**41**
1.1	Digital Infrastructure	73.69	53
1.1.1	Internet access	91.02	31
1.1.2	International internet bandwidth	52.69	37
1.1.3	Fixed-broadband subscriptions	84.76	65
1.1.4	4G-mobile network coverage	94.62	74
1.1.5	Fixed broadband affordability	86.15	43
1.1.6	Mobile broadband affordability	97.53	21
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	44.40	41
1.2.1	Quality of infrastructure	53.57	42
1.2.2	Rural access	89.13	32
1.2.3	Air connectivity	25.46	30
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	75.68	33
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	98.50	15
1.3.4	Energy intensity	88.36	37
2	**HUMAN CAPITAL**	**54.04**	**35**
2.1	Attract	37.17	98
2.1.1	Brain gain	41.57	76
2.1.2	International students	33.93	17
2.1.3	Tolerance of minorities	18.09	98
2.1.4	Tolerance of immigrants	30.77	111
2.1.5	Gender parity in high-skilled jobs	61.49	82
2.2	Grow	62.19	23
2.2.1	Tertiary enrolment	62.29	8
2.2.2	Reading, maths, and science	62.57	28
2.2.3	Use of virtual professional networks	32.28	39
2.2.4	Youth inclusion	91.62	18
2.3	Retain	76.88	33
2.3.1	Pension coverage	91.84	44
2.3.2	Environmental performance	71.53	15
2.3.3	Physician density	52.79	39
2.3.4	Sanitation	91.68	68
2.3.5	Personal safety	76.56	42
2.4	Skills	39.94	39
2.4.1	Workforce with tertiary education	49.41	26
2.4.2	High-skilled workforce	68.15	23
2.4.3	Researchers	24.66	38
2.4.4	Relevance of education system to the economy	42.05	59
2.4.5	Digital skills	15.45	56

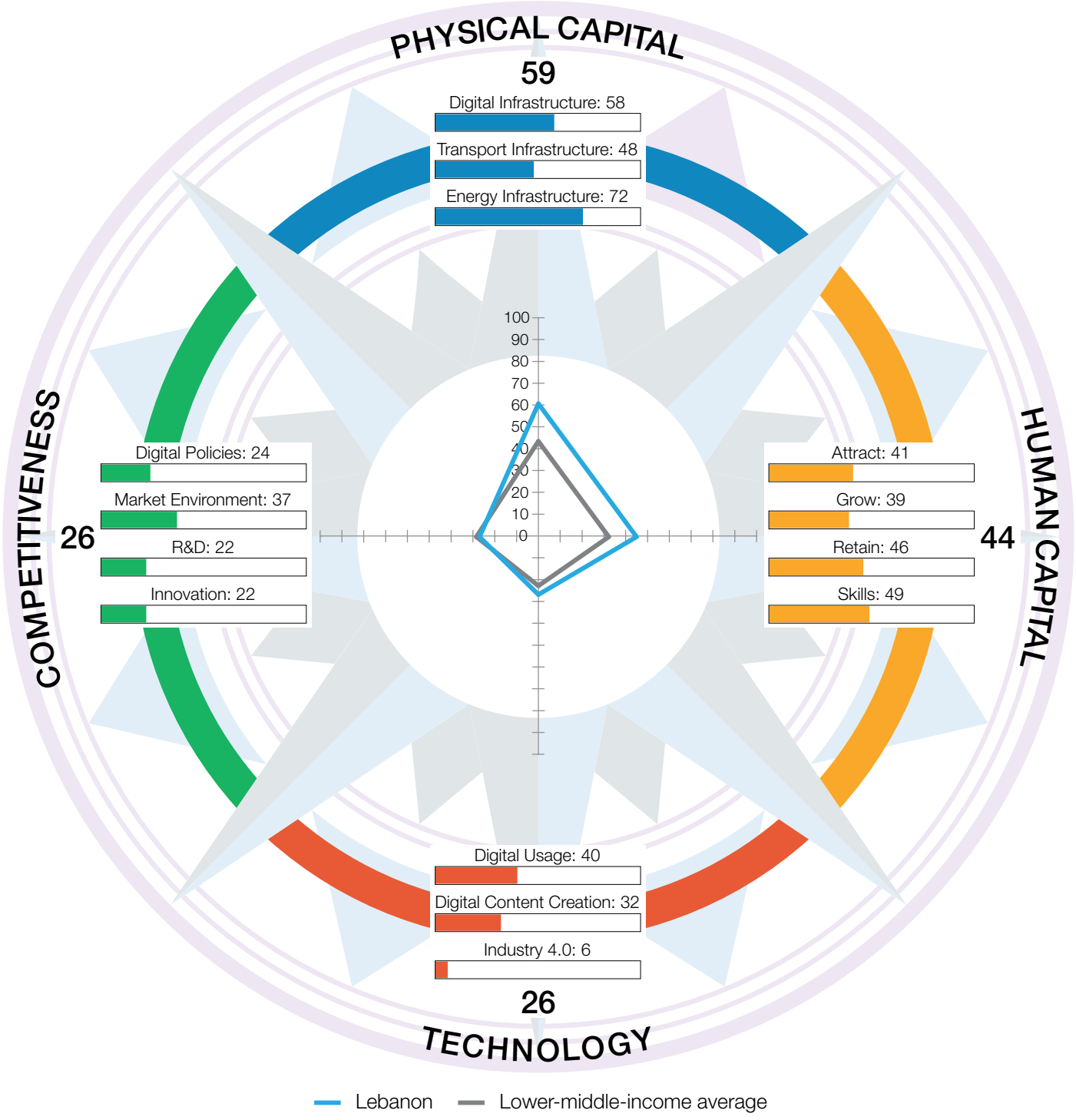
		Score	Rank
3	**TECHNOLOGY**	**46.18**	**34**
3.1	Digital Usage	74.99	25
3.1.1	Internet users	90.61	25
3.1.2	Active mobile-broadband subscriptions	57.99	9
3.1.3	Gender parity in internet usage	97.73	33
3.1.4	Firms with website	65.95	40
3.1.5	Internet shopping	66.34	26
3.1.6	Government online services	75.41	35
3.1.7	E-Participation	70.88	29
3.2	Digital Content Creation	50.59	31
3.2.1	Software development	20.16	29
3.2.2	Wikipedia edits	77.27	23
3.2.3	Internet domain registrations	16.99	31
3.2.4	Mobile apps development	87.94	31
3.3	Industry 4.0	12.96	55
3.3.1	Cloud computing	—	—
3.3.2	AI software development	13.37	50
3.3.3	AI research	19.56	37
3.3.4	ICT patent applications	0.00	76
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**46.44**	**38**
4.1	Digital Policies	73.47	46
4.1.1	ICT regulation	85.14	45
4.1.2	Cybersecurity	62.50	53
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	40.53	43
4.2.1	Extent of market dominance	46.65	50
4.2.2	Labour productivity per employee	42.51	44
4.2.3	Urbanisation	61.88	58
4.2.4	Domestic credit to private sector	11.06	87
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	38.05	33
4.3.1	R&D spending	12.63	50
4.3.2	University ranking	13.17	65
4.3.3	Gender parity in R&D	97.51	4
4.3.4	Scientific journal articles	28.91	37
4.4	Innovation	33.71	37
4.4.1	Medium- and high-tech industry	25.90	74
4.4.2	High-tech exports	26.28	27
4.4.3	Venture capital recipients, deals	9.91	42
4.4.4	New product entrepreneurial activity	52.38	39
4.4.5	New business density	28.34	18
4.4.6	Patent applications	59.42	35

Lebanon

Key Indicators

Rank (out of 124)	**77**	GDP per capita (PPP US$)	**14,330.52**
Income group	**Lower-middle income**	GDP (US$ billions)	**23.13**
Regional group	**Middle East and North Africa**	FREI score	**38.83**
Population (millions)	**5.49**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**59.44**	**56**
1.1	Digital Infrastructure	58.41	87
1.1.1	Internet access	n/a	n/a
1.1.2	International internet bandwidth	44.76	67
1.1.3	Fixed-broadband subscriptions	17.09	108
1.1.4	4G-mobile network coverage	99.14	38
1.1.5	Fixed broadband affordability	83.04	53
1.1.6	Mobile broadband affordability	48.04	111
1.1.7	Computer software spending	n/a	n/a
1.2	Transport Infrastructure	47.80	34
1.2.1	Quality of infrastructure	30.00	77
1.2.2	Rural access	97.61	10
1.2.3	Air connectivity	15.78	43
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	72.10	58
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	95.49	40
1.3.4	Energy intensity	83.26	65
2	**HUMAN CAPITAL**	**43.82**	**63**
2.1	Attract	41.24	82
2.1.1	Brain gain	27.25	99
2.1.2	International students	32.91	18
2.1.3	Tolerance of minorities	18.09	98
2.1.4	Tolerance of immigrants	47.69	82
2.1.5	Gender parity in high-skilled jobs	80.25	44
2.2	Grow	38.82	73
2.2.1	Tertiary enrolment	n/a	n/a
2.2.2	Reading, maths, and science	17.44	70
2.2.3	Use of virtual professional networks	30.12	45
2.2.4	Youth inclusion	68.89	85
2.3	Retain	45.88	84
2.3.1	Pension coverage	7.96	107
2.3.2	Environmental performance	22.54	96
2.3.3	Physician density	41.18	57
2.3.4	Sanitation	99.12	31
2.3.5	Personal safety	58.62	70
2.4	Skills	49.35	27
2.4.1	Workforce with tertiary education	40.78	38
2.4.2	High-skilled workforce	39.86	49
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	67.41	23
2.4.5	Digital skills	n/a	n/a

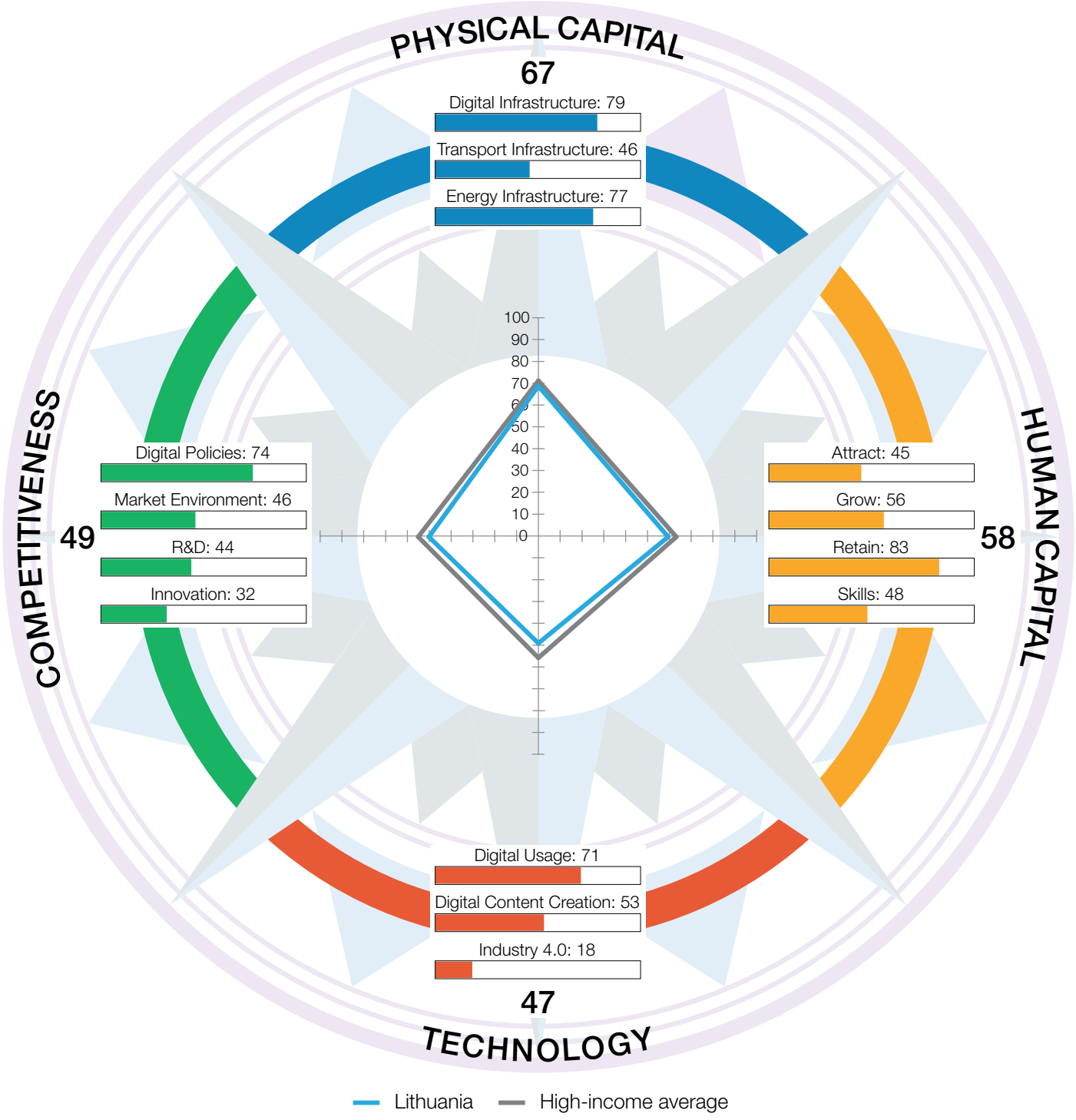
		Score	Rank
3	**TECHNOLOGY**	**25.79**	**86**
3.1	Digital Usage	39.81	90
3.1.1	Internet users	83.07	50
3.1.2	Active mobile-broadband subscriptions	30.20	83
3.1.3	Gender parity in internet usage	n/a	n/a
3.1.4	Firms with website	60.71	45
3.1.5	Internet shopping	7.69	98
3.1.6	Government online services	24.26	108
3.1.7	E-Participation	32.91	87
3.2	Digital Content Creation	31.98	64
3.2.1	Software development	6.02	51
3.2.2	Wikipedia edits	43.59	73
3.2.3	Internet domain registrations	2.52	67
3.2.4	Mobile apps development	75.78	61
3.3	Industry 4.0	5.60	107
3.3.1	Cloud computing	—	—
3.3.2	AI software development	5.10	85
3.3.3	AI research	10.02	52
3.3.4	ICT patent applications	1.19	44
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**26.27**	**99**
4.1	Digital Policies	23.81	118
4.1.1	ICT regulation	0.00	124
4.1.2	Cybersecurity	33.33	98
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	33.33	104
4.1.7	Data transfer	0.00	119
4.2	Market Environment	37.28	55
4.2.1	Extent of market dominance	20.92	101
4.2.2	Labour productivity per employee	25.52	65
4.2.3	Urbanisation	86.35	15
4.2.4	Domestic credit to private sector	47.27	20
4.2.5	Market capitalisation	6.33	58
4.3	R&D	21.71	85
4.3.1	R&D spending	n/a	n/a
4.3.2	University ranking	28.47	44
4.3.3	Gender parity in R&D	n/a	n/a
4.3.4	Scientific journal articles	14.95	51
4.4	Innovation	22.28	87
4.4.1	Medium- and high-tech industry	24.07	77
4.4.2	High-tech exports	3.20	96
4.4.3	Venture capital recipients, deals	22.41	25
4.4.4	New product entrepreneurial activity	10.17	85
4.4.5	New business density	n/a	n/a
4.4.6	Patent applications	51.56	57

Lithuania

Key Indicators

Rank (out of 124)	**32**	GDP per capita (PPP US$)	**48,396.69**
Income group	**High income**	GDP (US$ billions)	**70.33**
Regional group	**Europe**	FREI score	**55.41**
Population (millions)	**2.83**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**67.28**	**34**
1.1	Digital Infrastructure	79.45	25
1.1.1	Internet access	86.32	46
1.1.2	International internet bandwidth	71.55	7
1.1.3	Fixed-broadband subscriptions	96.49	30
1.1.4	4G-mobile network coverage	99.99	11
1.1.5	Fixed broadband affordability	93.28	17
1.1.6	Mobile broadband affordability	99.40	6
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	45.87	37
1.2.1	Quality of infrastructure	60.71	37
1.2.2	Rural access	90.49	29
1.2.3	Air connectivity	11.58	50
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	76.51	24
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	97.74	28
1.3.4	Energy intensity	89.14	33
2	**HUMAN CAPITAL**	**57.96**	**32**
2.1	Attract	45.37	57
2.1.1	Brain gain	44.59	69
2.1.2	International students	16.29	41
2.1.3	Tolerance of minorities	71.28	21
2.1.4	Tolerance of immigrants	33.85	106
2.1.5	Gender parity in high-skilled jobs	60.85	83
2.2	Grow	56.07	32
2.2.1	Tertiary enrolment	46.41	32
2.2.2	Reading, maths, and science	59.45	31
2.2.3	Use of virtual professional networks	30.92	43
2.2.4	Youth inclusion	87.52	32
2.3	Retain	82.78	19
2.3.1	Pension coverage	97.04	38
2.3.2	Environmental performance	62.71	30
2.3.3	Physician density	78.38	9
2.3.4	Sanitation	93.34	62
2.3.5	Personal safety	82.40	33
2.4	Skills	47.61	29
2.4.1	Workforce with tertiary education	59.69	13
2.4.2	High-skilled workforce	71.20	19
2.4.3	Researchers	42.70	27
2.4.4	Relevance of education system to the economy	40.63	62
2.4.5	Digital skills	23.83	45

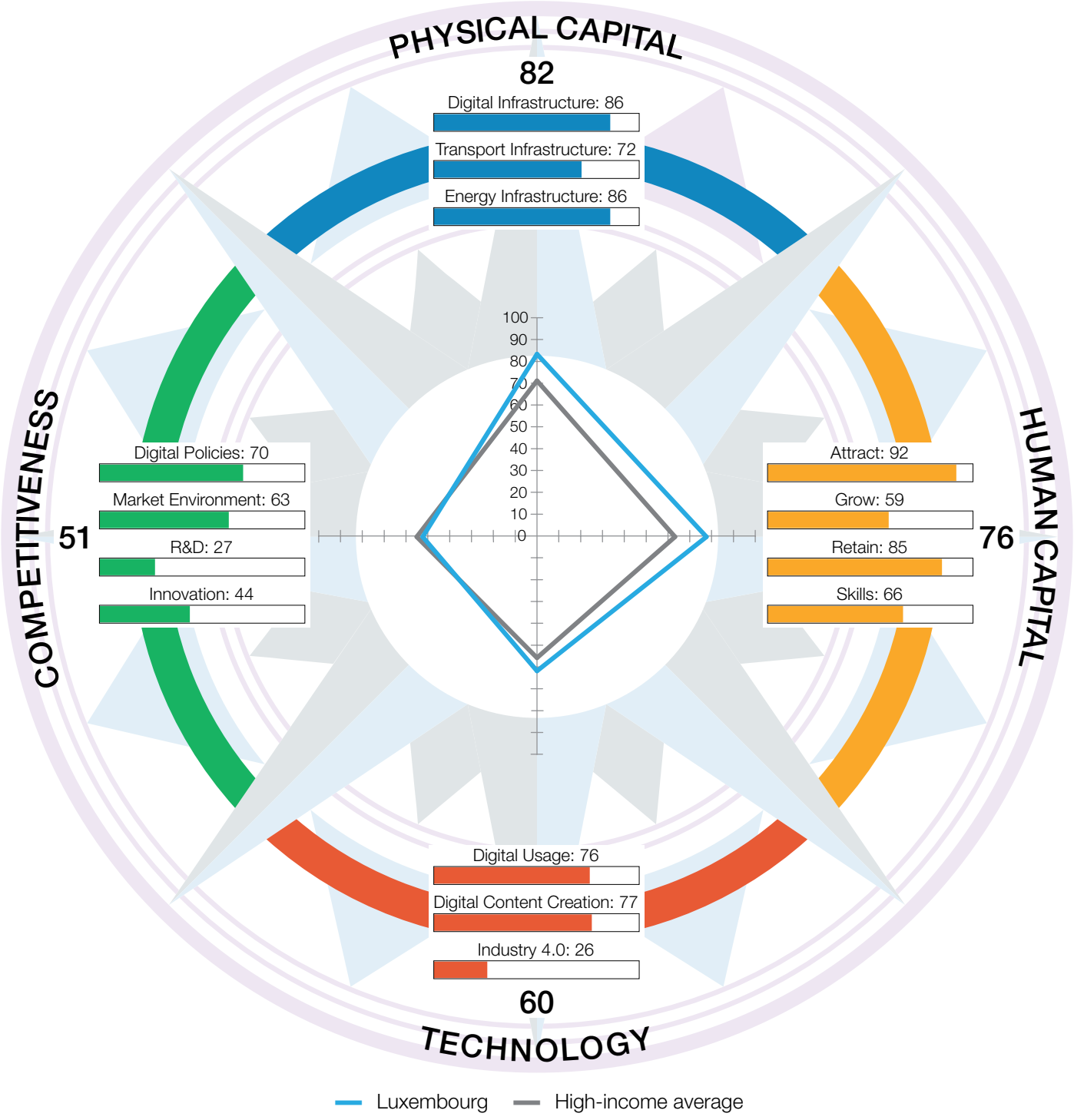
		Score	Rank
3	**TECHNOLOGY**	**47.49**	**33**
3.1	Digital Usage	71.44	31
3.1.1	Internet users	86.08	42
3.1.2	Active mobile-broadband subscriptions	49.59	18
3.1.3	Gender parity in internet usage	98.45	23
3.1.4	Firms with website	78.05	23
3.1.5	Internet shopping	60.32	32
3.1.6	Government online services	78.20	28
3.1.7	E-Participation	49.37	66
3.2	Digital Content Creation	53.24	26
3.2.1	Software development	21.31	28
3.2.2	Wikipedia edits	76.92	25
3.2.3	Internet domain registrations	19.88	28
3.2.4	Mobile apps development	94.84	18
3.3	Industry 4.0	17.80	37
3.3.1	Cloud computing	—	—
3.3.2	AI software development	23.28	32
3.3.3	AI research	25.34	31
3.3.4	ICT patent applications	3.17	38
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**48.90**	**33**
4.1	Digital Policies	73.71	45
4.1.1	ICT regulation	99.32	2
4.1.2	Cybersecurity	100.00	1
4.1.3	AI regulation	50.00	58
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	46.00	34
4.2.1	Extent of market dominance	61.57	33
4.2.2	Labour productivity per employee	46.99	35
4.2.3	Urbanisation	61.33	60
4.2.4	Domestic credit to private sector	14.12	79
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	43.57	27
4.3.1	R&D spending	21.27	36
4.3.2	University ranking	20.26	54
4.3.3	Gender parity in R&D	96.11	7
4.3.4	Scientific journal articles	36.65	33
4.4	Innovation	32.31	39
4.4.1	Medium- and high-tech industry	35.45	54
4.4.2	High-tech exports	17.79	42
4.4.3	Venture capital recipients, deals	36.46	12
4.4.4	New product entrepreneurial activity	37.07	61
4.4.5	New business density	12.13	40
4.4.6	Patent applications	54.94	48

Luxembourg

Key Indicators

Rank (out of 124)	**12**	GDP per capita (PPP US$)	**142,213.85**
Income group	**High income**	GDP (US$ billions)	**82.27**
Regional group	**Europe**	FREI score	**67.01**
Population (millions)	**0.65**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**81.55**	**3**
1.1	Digital Infrastructure	86.19	3
1.1.1	Internet access	99.23	7
1.1.2	International internet bandwidth	100.00	1
1.1.3	Fixed-broadband subscriptions	92.60	46
1.1.4	4G-mobile network coverage	97.85	57
1.1.5	Fixed broadband affordability	95.48	6
1.1.6	Mobile broadband affordability	100.00	1
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	72.22	5
1.2.1	Quality of infrastructure	64.29	28
1.2.2	Rural access	99.98	2
1.2.3	Air connectivity	67.20	8
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	86.22	2
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	99.25	6
1.3.4	Energy intensity	95.15	10
2	**HUMAN CAPITAL**	**75.62**	**3**
2.1	Attract	92.41	1
2.1.1	Brain gain	93.04	3
2.1.2	International students	100.00	1
2.1.3	Tolerance of minorities	84.04	5
2.1.4	Tolerance of immigrants	95.38	3
2.1.5	Gender parity in high-skilled jobs	89.58	23
2.2	Grow	58.91	27
2.2.1	Tertiary enrolment	11.90	94
2.2.2	Reading, maths, and science	58.23	34
2.2.3	Use of virtual professional networks	73.95	9
2.2.4	Youth inclusion	91.56	19
2.3	Retain	84.87	14
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	90.51	6
2.3.3	Physician density	47.05	48
2.3.4	Sanitation	97.36	52
2.3.5	Personal safety	89.46	16
2.4	Skills	66.28	10
2.4.1	Workforce with tertiary education	66.49	6
2.4.2	High-skilled workforce	100.00	1
2.4.3	Researchers	56.40	18
2.4.4	Relevance of education system to the economy	65.21	25
2.4.5	Digital skills	43.29	17

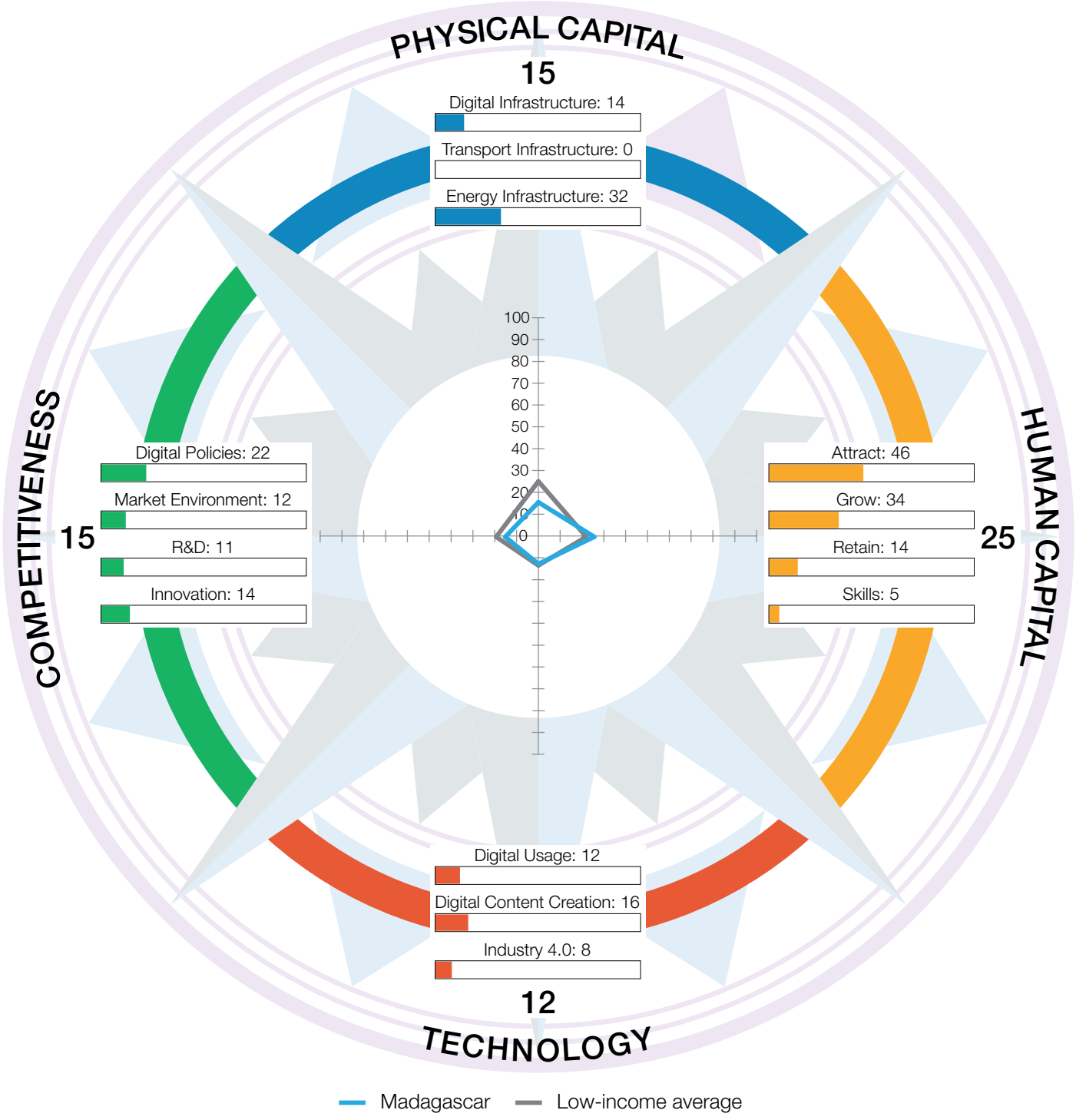
		Score	Rank
3	**TECHNOLOGY**	**59.86**	**19**
3.1	Digital Usage	76.49	19
3.1.1	Internet users	98.75	9
3.1.2	Active mobile-broadband subscriptions	47.27	25
3.1.3	Gender parity in internet usage	99.20	11
3.1.4	Firms with website	81.54	17
3.1.5	Internet shopping	58.71	34
3.1.6	Government online services	77.83	29
3.1.7	E-Participation	72.15	25
3.2	Digital Content Creation	77.21	4
3.2.1	Software development	57.16	3
3.2.2	Wikipedia edits	82.78	12
3.2.3	Internet domain registrations	69.44	4
3.2.4	Mobile apps development	99.48	9
3.3	Industry 4.0	25.89	25
3.3.1	Cloud computing	—	—
3.3.2	AI software development	n/a	n/a
3.3.3	AI research	n/a	n/a
3.3.4	ICT patent applications	29.61	16
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**51.01**	**28**
4.1	Digital Policies	70.19	56
4.1.1	ICT regulation	87.16	37
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	50.00	58
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	62.71	11
4.2.1	Extent of market dominance	63.94	26
4.2.2	Labour productivity per employee	93.08	2
4.2.3	Urbanisation	89.21	12
4.2.4	Domestic credit to private sector	46.31	21
4.2.5	Market capitalisation	21.02	26
4.3	R&D	26.76	64
4.3.1	R&D spending	20.71	37
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	30.14	90
4.3.4	Scientific journal articles	56.21	18
4.4	Innovation	44.37	20
4.4.1	Medium- and high-tech industry	25.75	75
4.4.2	High-tech exports	9.31	69
4.4.3	Venture capital recipients, deals	15.33	34
4.4.4	New product entrepreneurial activity	71.81	14
4.4.5	New business density	71.00	5
4.4.6	Patent applications	73.00	14

Madagascar

Key Indicators

Rank (out of 124)	**122**	GDP per capita (PPP US$)	**1,774.07**
Income group	**Low income**	GDP (US$ billions)	**14.95**
Regional group	**Sub-Saharan Africa**	FREI score	**16.82**
Population (millions)	**29.61**	FREI score (income group average)	**19.43**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**15.44**	**123**
1.1	Digital Infrastructure	14.39	123
1.1.1	Internet access	1.58	114
1.1.2	International internet bandwidth	11.42	121
1.1.3	Fixed-broadband subscriptions	66.10	81
1.1.4	4G-mobile network coverage	21.62	120
1.1.5	Fixed broadband affordability	0.00	124
1.1.6	Mobile broadband affordability	0.00	121
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	0.09	124
1.2.1	Quality of infrastructure	0.00	124
1.2.2	Rural access	0.00	124
1.2.3	Air connectivity	0.11	118
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	31.86	119
1.3.1	Access to electricity	24.39	120
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	52.63	77
1.3.4	Energy intensity	50.39	118
2	**HUMAN CAPITAL**	**24.95**	**110**
2.1	Attract	46.06	52
2.1.1	Brain gain	45.20	67
2.1.2	International students	4.97	74
2.1.3	Tolerance of minorities	64.89	32
2.1.4	Tolerance of immigrants	35.38	101
2.1.5	Gender parity in high-skilled jobs	79.84	45
2.2	Grow	34.30	81
2.2.1	Tertiary enrolment	2.75	115
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	1.13	120
2.2.4	Youth inclusion	99.01	2
2.3	Retain	13.99	121
2.3.1	Pension coverage	n/a	n/a
2.3.2	Environmental performance	15.42	116
2.3.3	Physician density	2.56	108
2.3.4	Sanitation	3.73	123
2.3.5	Personal safety	34.26	107
2.4	Skills	5.45	121
2.4.1	Workforce with tertiary education	5.64	110
2.4.2	High-skilled workforce	1.57	115
2.4.3	Researchers	0.23	94
2.4.4	Relevance of education system to the economy	14.37	109
2.4.5	Digital skills	n/a	n/a

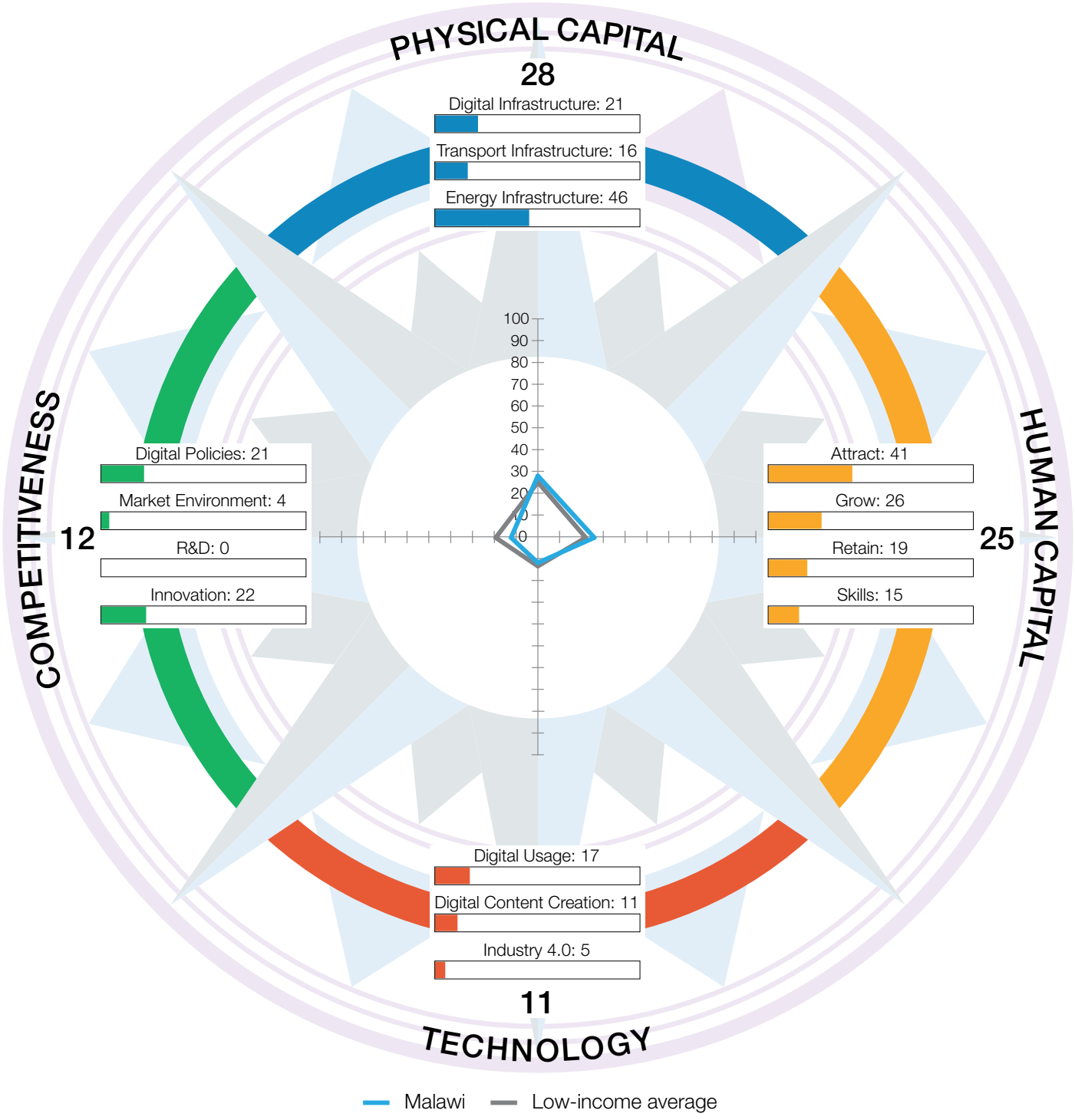
		Score	Rank
3	**TECHNOLOGY**	**12.08**	**118**
3.1	Digital Usage	11.50	123
3.1.1	Internet users	9.48	121
3.1.2	Active mobile-broadband subscriptions	5.17	122
3.1.3	Gender parity in internet usage	n/a	n/a
3.1.4	Firms with website	14.60	95
3.1.5	Internet shopping	5.02	103
3.1.6	Government online services	14.48	120
3.1.7	E-Participation	20.25	104
3.2	Digital Content Creation	16.48	108
3.2.1	Software development	0.24	112
3.2.2	Wikipedia edits	16.14	114
3.2.3	Internet domain registrations	0.07	115
3.2.4	Mobile apps development	49.49	102
3.3	Industry 4.0	8.27	84
3.3.1	Cloud computing	—	—
3.3.2	AI software development	0.77	112
3.3.3	AI research	0.02	119
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**14.79**	**119**
4.1	Digital Policies	22.30	119
4.1.1	ICT regulation	56.08	108
4.1.2	Cybersecurity	0.00	106
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	33.33	104
4.1.7	Data transfer	66.67	51
4.2	Market Environment	12.44	116
4.2.1	Extent of market dominance	19.64	104
4.2.2	Labour productivity per employee	0.00	115
4.2.3	Urbanisation	24.85	103
4.2.4	Domestic credit to private sector	5.26	106
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	10.85	99
4.3.1	R&D spending	0.00	105
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	43.22	70
4.3.4	Scientific journal articles	0.17	118
4.4	Innovation	13.57	116
4.4.1	Medium- and high-tech industry	3.69	115
4.4.2	High-tech exports	1.06	114
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	33.46	63
4.4.5	New business density	0.36	105
4.4.6	Patent applications	29.30	102

Malawi

Key Indicators

Rank (out of 124)	**119**	GDP per capita (PPP US$)	**1,732.03**
Income group	**Low income**	GDP (US$ billions)	**13.16**
Regional group	**Sub-Saharan Africa**	FREI score	**19.02**
Population (millions)	**20.41**	FREI score (income group average)	**19.43**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**27.61**	**114**
1.1	Digital Infrastructure	20.85	119
1.1.1	Internet access	8.50	108
1.1.2	International internet bandwidth	15.27	120
1.1.3	Fixed-broadband subscriptions	3.50	115
1.1.4	4G-mobile network coverage	66.24	104
1.1.5	Fixed broadband affordability	18.59	122
1.1.6	Mobile broadband affordability	13.01	118
1.1.7	Computer software spending	n/a	n/a
1.2	Transport Infrastructure	16.03	107
1.2.1	Quality of infrastructure	13.57	113
1.2.2	Rural access	50.54	84
1.2.3	Air connectivity	0.00	124
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	45.95	108
1.3.1	Access to electricity	0.00	124
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	49.62	79
1.3.4	Energy intensity	88.24	39
2	**HUMAN CAPITAL**	**25.21**	**109**
2.1	Attract	41.19	83
2.1.1	Brain gain	49.80	60
2.1.2	International students	n/a	n/a
2.1.3	Tolerance of minorities	56.38	43
2.1.4	Tolerance of immigrants	26.15	115
2.1.5	Gender parity in high-skilled jobs	32.41	105
2.2	Grow	25.85	108
2.2.1	Tertiary enrolment	0.92	120
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	1.47	118
2.2.4	Youth inclusion	75.17	71
2.3	Retain	18.64	112
2.3.1	Pension coverage	0.31	119
2.3.2	Environmental performance	36.78	69
2.3.3	Physician density	0.24	123
2.3.4	Sanitation	19.37	116
2.3.5	Personal safety	36.53	106
2.4	Skills	15.16	102
2.4.1	Workforce with tertiary education	1.74	119
2.4.2	High-skilled workforce	0.80	117
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	42.94	57
2.4.5	Digital skills	n/a	n/a

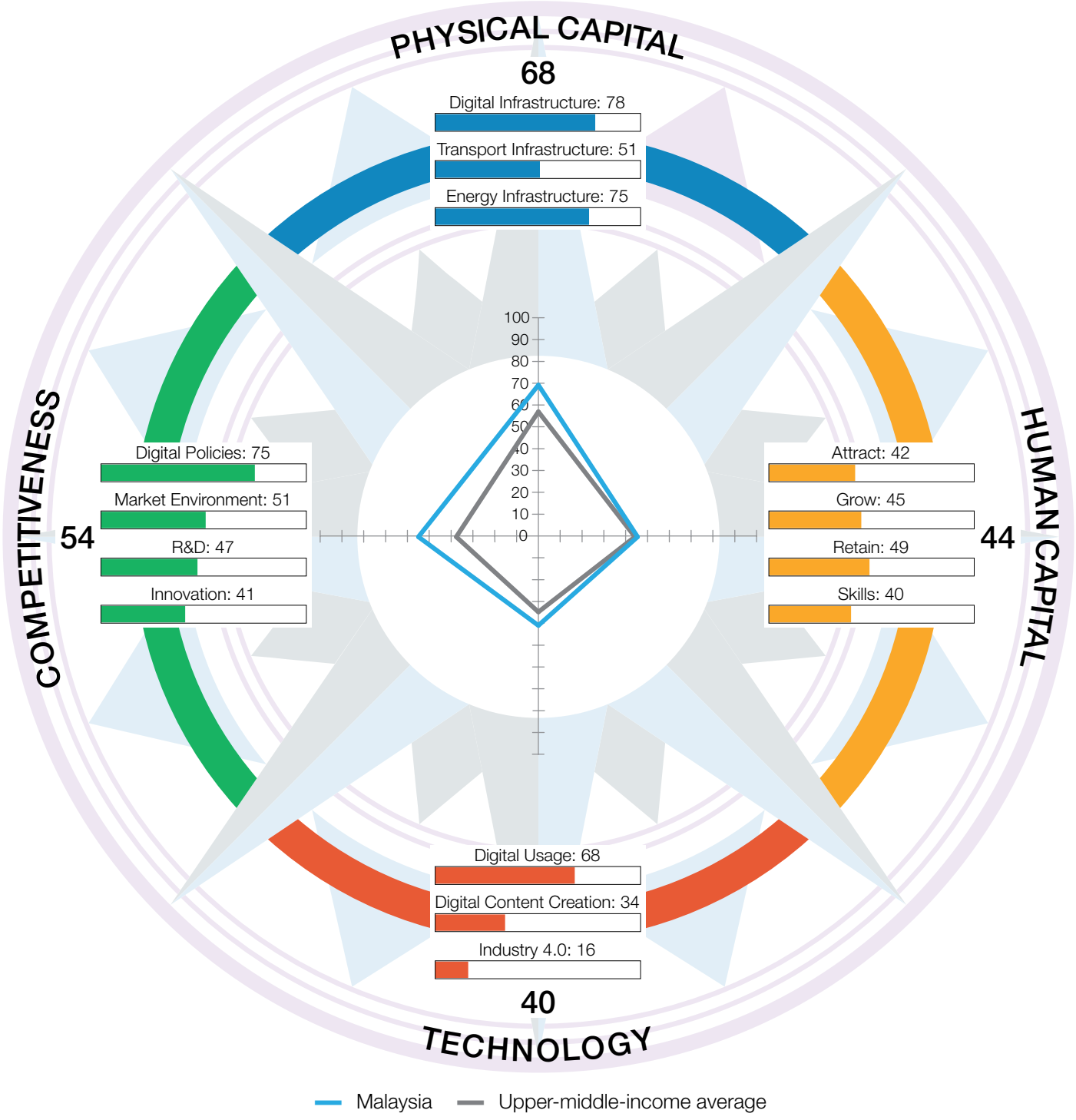
		Score	Rank
3	**TECHNOLOGY**	**11.26**	**119**
3.1	Digital Usage	17.32	117
3.1.1	Internet users	4.05	123
3.1.2	Active mobile-broadband subscriptions	14.28	112
3.1.3	Gender parity in internet usage	n/a	n/a
3.1.4	Firms with website	38.26	74
3.1.5	Internet shopping	1.29	117
3.1.6	Government online services	15.69	118
3.1.7	E-Participation	30.38	90
3.2	Digital Content Creation	11.10	119
3.2.1	Software development	0.12	119
3.2.2	Wikipedia edits	22.14	106
3.2.3	Internet domain registrations	0.07	116
3.2.4	Mobile apps development	22.09	122
3.3	Industry 4.0	5.36	109
3.3.1	Cloud computing	—	—
3.3.2	AI software development	1.15	105
3.3.3	AI research	0.27	109
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**11.98**	**123**
4.1	Digital Policies	21.30	120
4.1.1	ICT regulation	82.43	58
4.1.2	Cybersecurity	0.00	106
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	0.00	114
4.1.7	Data transfer	66.67	51
4.2	Market Environment	4.29	123
4.2.1	Extent of market dominance	15.31	110
4.2.2	Labour productivity per employee	1.25	112
4.2.3	Urbanisation	0.61	123
4.2.4	Domestic credit to private sector	0.00	121
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	0.26	120
4.3.1	R&D spending	n/a	n/a
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	n/a	n/a
4.3.4	Scientific journal articles	0.51	105
4.4	Innovation	22.07	88
4.4.1	Medium- and high-tech industry	13.55	94
4.4.2	High-tech exports	4.29	88
4.4.3	Venture capital recipients, deals	17.72	31
4.4.4	New product entrepreneurial activity	69.11	17
4.4.5	New business density	0.19	107
4.4.6	Patent applications	27.59	105

Malaysia

Key Indicators

Rank (out of 124)	**40**	GDP per capita (PPP US$)	**33,433.62**
Income group	**Upper-middle income**	GDP (US$ billions)	**406.31**
Regional group	**Asia and Pacific**	FREI score	**51.29**
Population (millions)	**33.94**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**67.75**	**29**
1.1	Digital Infrastructure	78.14	32
1.1.1	Internet access	95.46	15
1.1.2	International internet bandwidth	59.68	19
1.1.3	Fixed-broadband subscriptions	96.75	29
1.1.4	4G-mobile network coverage	95.05	73
1.1.5	Fixed broadband affordability	79.58	60
1.1.6	Mobile broadband affordability	93.20	60
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	50.53	33
1.2.1	Quality of infrastructure	64.29	28
1.2.2	Rural access	62.97	68
1.2.3	Air connectivity	28.15	28
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	74.56	38
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	96.99	33
1.3.4	Energy intensity	80.05	81
2	**HUMAN CAPITAL**	**44.29**	**62**
2.1	Attract	42.38	75
2.1.1	Brain gain	68.33	20
2.1.2	International students	21.37	31
2.1.3	Tolerance of minorities	48.94	51
2.1.4	Tolerance of immigrants	9.23	120
2.1.5	Gender parity in high-skilled jobs	64.03	75
2.2	Grow	45.30	56
2.2.1	Tertiary enrolment	26.74	75
2.2.2	Reading, maths, and science	39.53	47
2.2.3	Use of virtual professional networks	30.92	43
2.2.4	Youth inclusion	83.99	43
2.3	Retain	49.15	80
2.3.1	Pension coverage	16.94	95
2.3.2	Environmental performance	27.29	87
2.3.3	Physician density	34.98	69
2.3.4	Sanitation	99.54	21
2.3.5	Personal safety	67.02	54
2.4	Skills	40.35	38
2.4.1	Workforce with tertiary education	35.03	47
2.4.2	High-skilled workforce	41.06	48
2.4.3	Researchers	8.35	59
2.4.4	Relevance of education system to the economy	58.25	34
2.4.5	Digital skills	59.06	7

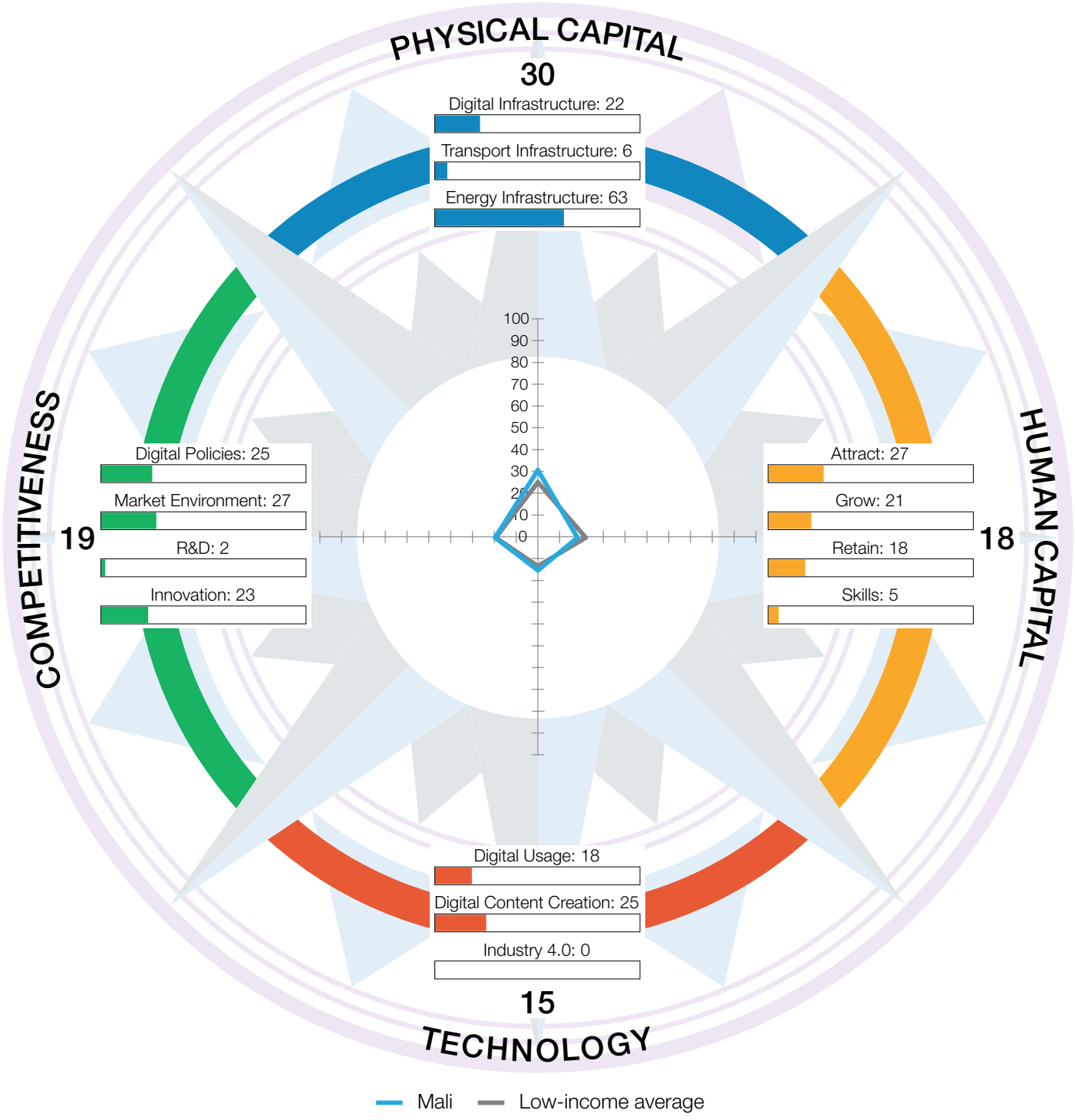
		Score	Rank
3	**TECHNOLOGY**	**39.56**	**44**
3.1	Digital Usage	68.46	41
3.1.1	Internet users	96.54	11
3.1.2	Active mobile-broadband subscriptions	50.73	15
3.1.3	Gender parity in internet usage	98.52	21
3.1.4	Firms with website	42.24	69
3.1.5	Internet shopping	57.86	38
3.1.6	Government online services	68.75	53
3.1.7	E-Participation	64.55	47
3.2	Digital Content Creation	33.95	58
3.2.1	Software development	4.02	62
3.2.2	Wikipedia edits	49.64	60
3.2.3	Internet domain registrations	4.56	51
3.2.4	Mobile apps development	77.58	55
3.3	Industry 4.0	16.26	40
3.3.1	Cloud computing	—	—
3.3.2	AI software development	14.24	45
3.3.3	AI research	22.61	34
3.3.4	ICT patent applications	4.00	33
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**53.55**	**24**
4.1	Digital Policies	75.27	37
4.1.1	ICT regulation	81.08	69
4.1.2	Cybersecurity	62.50	53
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	66.67	87
4.1.7	Data transfer	66.67	51
4.2	Market Environment	50.84	28
4.2.1	Extent of market dominance	49.81	44
4.2.2	Labour productivity per employee	36.65	48
4.2.3	Urbanisation	71.33	41
4.2.4	Domestic credit to private sector	57.35	15
4.2.5	Market capitalisation	39.08	12
4.3	R&D	47.04	22
4.3.1	R&D spending	17.56	42
4.3.2	University ranking	59.68	13
4.3.3	Gender parity in R&D	86.28	20
4.3.4	Scientific journal articles	24.64	41
4.4	Innovation	41.03	26
4.4.1	Medium- and high-tech industry	52.64	27
4.4.2	High-tech exports	80.43	3
4.4.3	Venture capital recipients, deals	6.48	57
4.4.4	New product entrepreneurial activity	46.85	50
4.4.5	New business density	8.65	52
4.4.6	Patent applications	51.13	60

Mali

Key Indicators

Rank (out of 124)	**117**	GDP per capita (PPP US$)	**2,517.15**
Income group	**Low income**	GDP (US$ billions)	**18.83**
Regional group	**Sub-Saharan Africa**	FREI score	**20.40**
Population (millions)	**22.59**	FREI score (income group average)	**19.43**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**30.19**	**110**
1.1	Digital Infrastructure	22.01	118
1.1.1	Internet access	19.92	99
1.1.2	International internet bandwidth	18.47	118
1.1.3	Fixed-broadband subscriptions	20.26	104
1.1.4	4G-mobile network coverage	43.01	111
1.1.5	Fixed broadband affordability	36.61	115
1.1.6	Mobile broadband affordability	15.82	117
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	5.67	122
1.2.1	Quality of infrastructure	7.14	120
1.2.2	Rural access	14.35	119
1.2.3	Air connectivity	0.19	117
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	62.87	92
1.3.1	Access to electricity	45.67	111
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	68.42	72
1.3.4	Energy intensity	74.53	95
2	**HUMAN CAPITAL**	**17.69**	**122**
2.1	Attract	27.27	119
2.1.1	Brain gain	48.39	62
2.1.2	International students	2.15	89
2.1.3	Tolerance of minorities	15.96	105
2.1.4	Tolerance of immigrants	66.15	48
2.1.5	Gender parity in high-skilled jobs	3.70	119
2.2	Grow	20.73	118
2.2.1	Tertiary enrolment	2.33	117
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	2.15	116
2.2.4	Youth inclusion	57.69	102
2.3	Retain	17.63	114
2.3.1	Pension coverage	5.41	110
2.3.2	Environmental performance	16.27	110
2.3.3	Physician density	1.42	114
2.3.4	Sanitation	40.05	106
2.3.5	Personal safety	25.02	116
2.4	Skills	5.13	122
2.4.1	Workforce with tertiary education	2.51	117
2.4.2	High-skilled workforce	0.54	118
2.4.3	Researchers	0.19	96
2.4.4	Relevance of education system to the economy	17.29	107
2.4.5	Digital skills	n/a	n/a

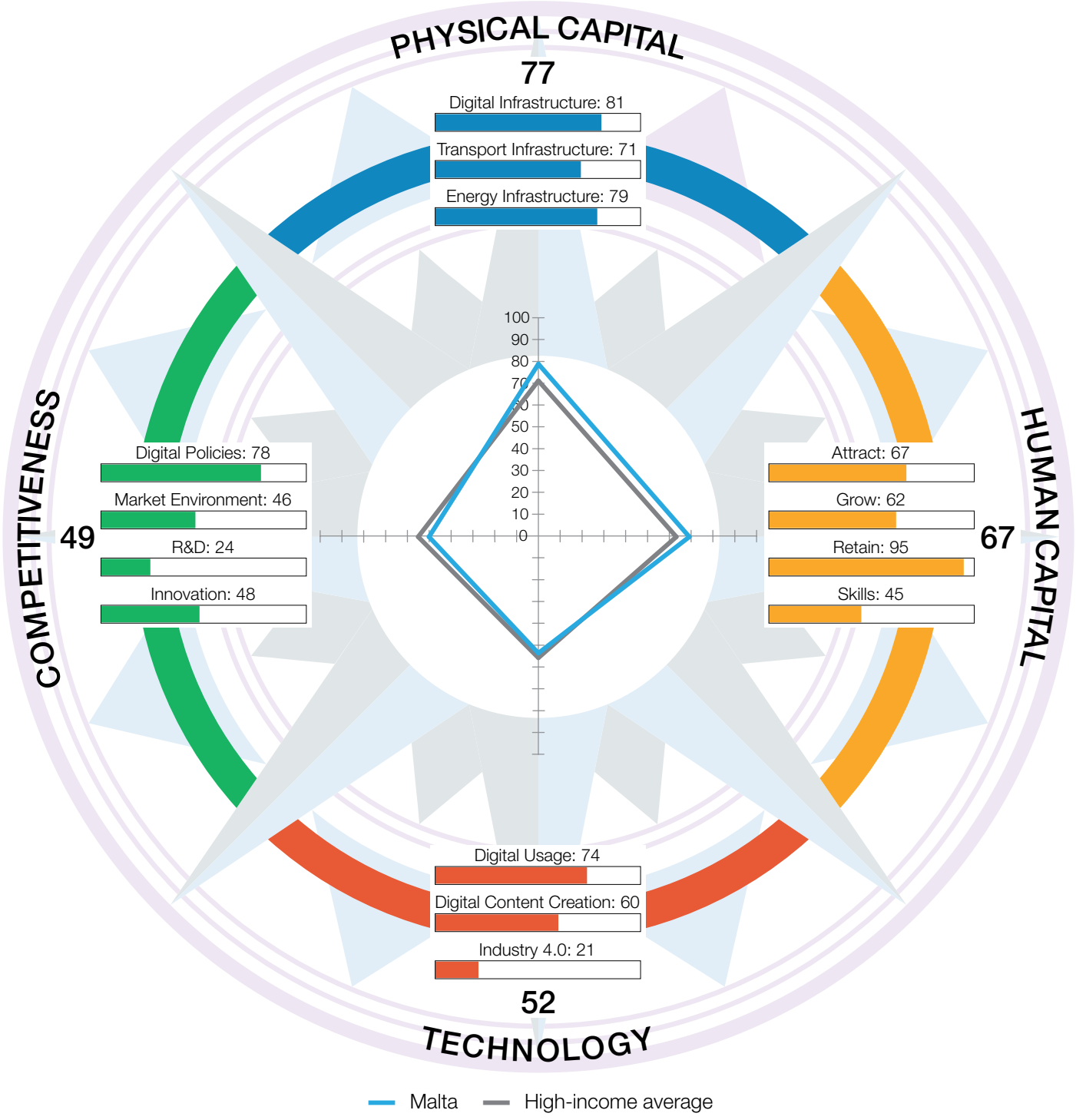
		Score	Rank
3	**TECHNOLOGY**	**14.62**	**114**
3.1	Digital Usage	18.46	115
3.1.1	Internet users	22.68	109
3.1.2	Active mobile-broadband subscriptions	14.59	111
3.1.3	Gender parity in internet usage	n/a	n/a
3.1.4	Firms with website	35.00	79
3.1.5	Internet shopping	3.21	111
3.1.6	Government online services	16.29	117
3.1.7	E-Participation	18.98	109
3.2	Digital Content Creation	25.30	86
3.2.1	Software development	0.03	123
3.2.2	Wikipedia edits	22.35	105
3.2.3	Internet domain registrations	n/a	n/a
3.2.4	Mobile apps development	53.53	98
3.3	Industry 4.0	0.08	124
3.3.1	Cloud computing	—	—
3.3.2	AI software development	0.09	118
3.3.3	AI research	0.07	117
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**19.12**	**114**
4.1	Digital Policies	24.71	116
4.1.1	ICT regulation	72.97	79
4.1.2	Cybersecurity	0.00	106
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	0.00	119
4.2	Market Environment	26.79	89
4.2.1	Extent of market dominance	63.79	28
4.2.2	Labour productivity per employee	2.02	110
4.2.3	Urbanisation	31.03	100
4.2.4	Domestic credit to private sector	10.31	90
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	1.51	113
4.3.1	R&D spending	3.04	86
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	2.89	102
4.3.4	Scientific journal articles	0.12	120
4.4	Innovation	23.48	81
4.4.1	Medium- and high-tech industry	n/a	n/a
4.4.2	High-tech exports	8.39	73
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	49.29	45
4.4.5	New business density	0.94	97
4.4.6	Patent applications	35.28	89

Malta

Key Indicators

Rank (out of 124)	**23**	GDP per capita (PPP US$)	**55,927.86**
Income group	**High income**	GDP (US$ billions)	**17.77**
Regional group	**Europe**	FREI score	**61.32**
Population (millions)	**0.52**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**77.15**	**6**
1.1	Digital Infrastructure	81.20	19
1.1.1	Internet access	90.40	33
1.1.2	International internet bandwidth	62.83	13
1.1.3	Fixed-broadband subscriptions	99.88	4
1.1.4	4G-mobile network coverage	100.00	1
1.1.5	Fixed broadband affordability	91.05	25
1.1.6	Mobile broadband affordability	96.94	31
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	71.20	6
1.2.1	Quality of infrastructure	67.86	23
1.2.2	Rural access	97.55	11
1.2.3	Air connectivity	100.00	1
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	79.07	10
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	98.50	15
1.3.4	Energy intensity	99.03	2
2	**HUMAN CAPITAL**	**67.39**	**19**
2.1	Attract	67.18	19
2.1.1	Brain gain	78.74	12
2.1.2	International students	37.60	14
2.1.3	Tolerance of minorities	77.66	12
2.1.4	Tolerance of immigrants	75.38	33
2.1.5	Gender parity in high-skilled jobs	66.49	73
2.2	Grow	62.21	22
2.2.1	Tertiary enrolment	46.89	30
2.2.2	Reading, maths, and science	50.93	41
2.2.3	Use of virtual professional networks	66.82	13
2.2.4	Youth inclusion	84.19	42
2.3	Retain	95.03	1
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	95.42	4
2.3.3	Physician density	86.91	3
2.3.4	Sanitation	99.96	11
2.3.5	Personal safety	92.88	10
2.4	Skills	45.14	31
2.4.1	Workforce with tertiary education	41.12	37
2.4.2	High-skilled workforce	69.46	21
2.4.3	Researchers	26.24	35
2.4.4	Relevance of education system to the economy	51.64	41
2.4.5	Digital skills	37.23	24

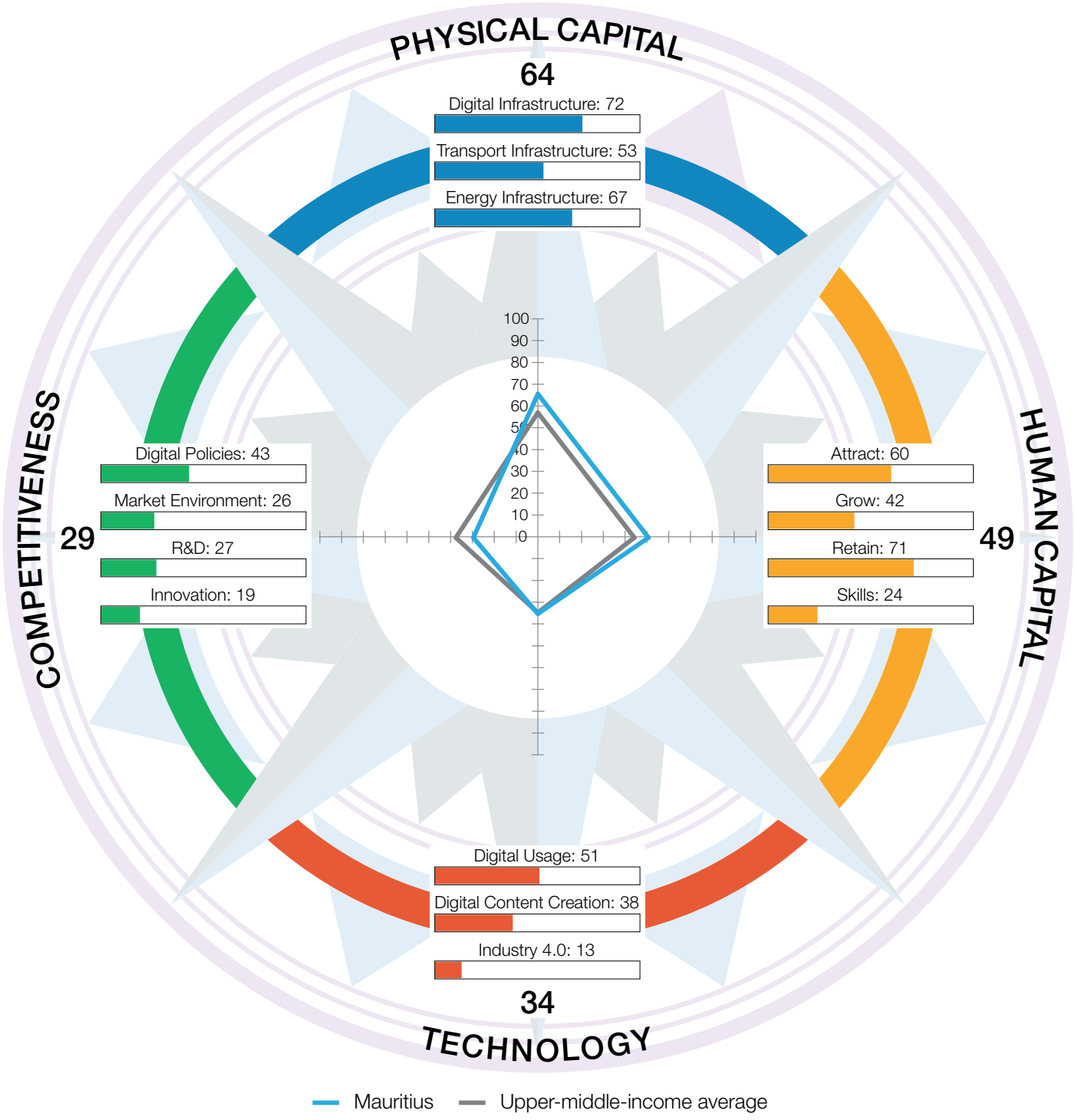
		Score	Rank
3	**TECHNOLOGY**	**51.91**	**24**
3.1	Digital Usage	74.20	26
3.1.1	Internet users	86.66	40
3.1.2	Active mobile-broadband subscriptions	31.02	78
3.1.3	Gender parity in internet usage	98.80	19
3.1.4	Firms with website	84.60	11
3.1.5	Internet shopping	60.06	33
3.1.6	Government online services	84.82	18
3.1.7	E-Participation	73.42	22
3.2	Digital Content Creation	60.45	21
3.2.1	Software development	23.99	25
3.2.2	Wikipedia edits	80.13	16
3.2.3	Internet domain registrations	41.17	15
3.2.4	Mobile apps development	96.51	14
3.3	Industry 4.0	21.09	31
3.3.1	Cloud computing	—	—
3.3.2	AI software development	n/a	n/a
3.3.3	AI research	n/a	n/a
3.3.4	ICT patent applications	24.59	19
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**48.84**	**34**
4.1	Digital Policies	78.39	31
4.1.1	ICT regulation	94.59	9
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	50.00	58
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	45.78	36
4.2.1	Extent of market dominance	37.21	70
4.2.2	Labour productivity per employee	55.33	28
4.2.3	Urbanisation	93.55	6
4.2.4	Domestic credit to private sector	32.64	41
4.2.5	Market capitalisation	10.15	43
4.3	R&D	23.63	77
4.3.1	R&D spending	12.25	52
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	44.02	67
4.3.4	Scientific journal articles	38.24	30
4.4	Innovation	47.54	15
4.4.1	Medium- and high-tech industry	38.17	50
4.4.2	High-tech exports	51.54	7
4.4.3	Venture capital recipients, deals	34.07	16
4.4.4	New product entrepreneurial activity	58.04	32
4.4.5	New business density	41.46	11
4.4.6	Patent applications	61.99	30

Mauritius

Key Indicators

Rank (out of 124)	**59**	GDP per capita (PPP US$)	**26,905.92**
Income group	**Upper-middle income**	GDP (US$ billions)	**12.90**
Regional group	**Sub-Saharan Africa**	FREI score	**44.12**
Population (millions)	**1.26**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**64.21**	**44**
1.1	Digital Infrastructure	71.93	56
1.1.1	Internet access	72.09	73
1.1.2	International internet bandwidth	55.56	30
1.1.3	Fixed-broadband subscriptions	79.53	71
1.1.4	4G-mobile network coverage	98.92	40
1.1.5	Fixed broadband affordability	85.30	46
1.1.6	Mobile broadband affordability	93.96	56
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	53.23	27
1.2.1	Quality of infrastructure	25.00	81
1.2.2	Rural access	95.62	17
1.2.3	Air connectivity	30.52	25
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	67.46	83
1.3.1	Access to electricity	99.53	84
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	94.00	11
2	**HUMAN CAPITAL**	**49.42**	**48**
2.1	Attract	60.41	26
2.1.1	Brain gain	62.68	27
2.1.2	International students	17.76	36
2.1.3	Tolerance of minorities	53.19	47
2.1.4	Tolerance of immigrants	84.62	15
2.1.5	Gender parity in high-skilled jobs	83.79	38
2.2	Grow	42.07	64
2.2.1	Tertiary enrolment	29.35	68
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	41.56	28
2.2.4	Youth inclusion	55.31	105
2.3	Retain	71.44	44
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	43.90	55
2.3.3	Physician density	41.84	56
2.3.4	Sanitation	95.07	59
2.3.5	Personal safety	76.41	43
2.4	Skills	23.75	76
2.4.1	Workforce with tertiary education	24.45	72
2.4.2	High-skilled workforce	32.79	60
2.4.3	Researchers	6.37	65
2.4.4	Relevance of education system to the economy	39.93	65
2.4.5	Digital skills	15.21	57

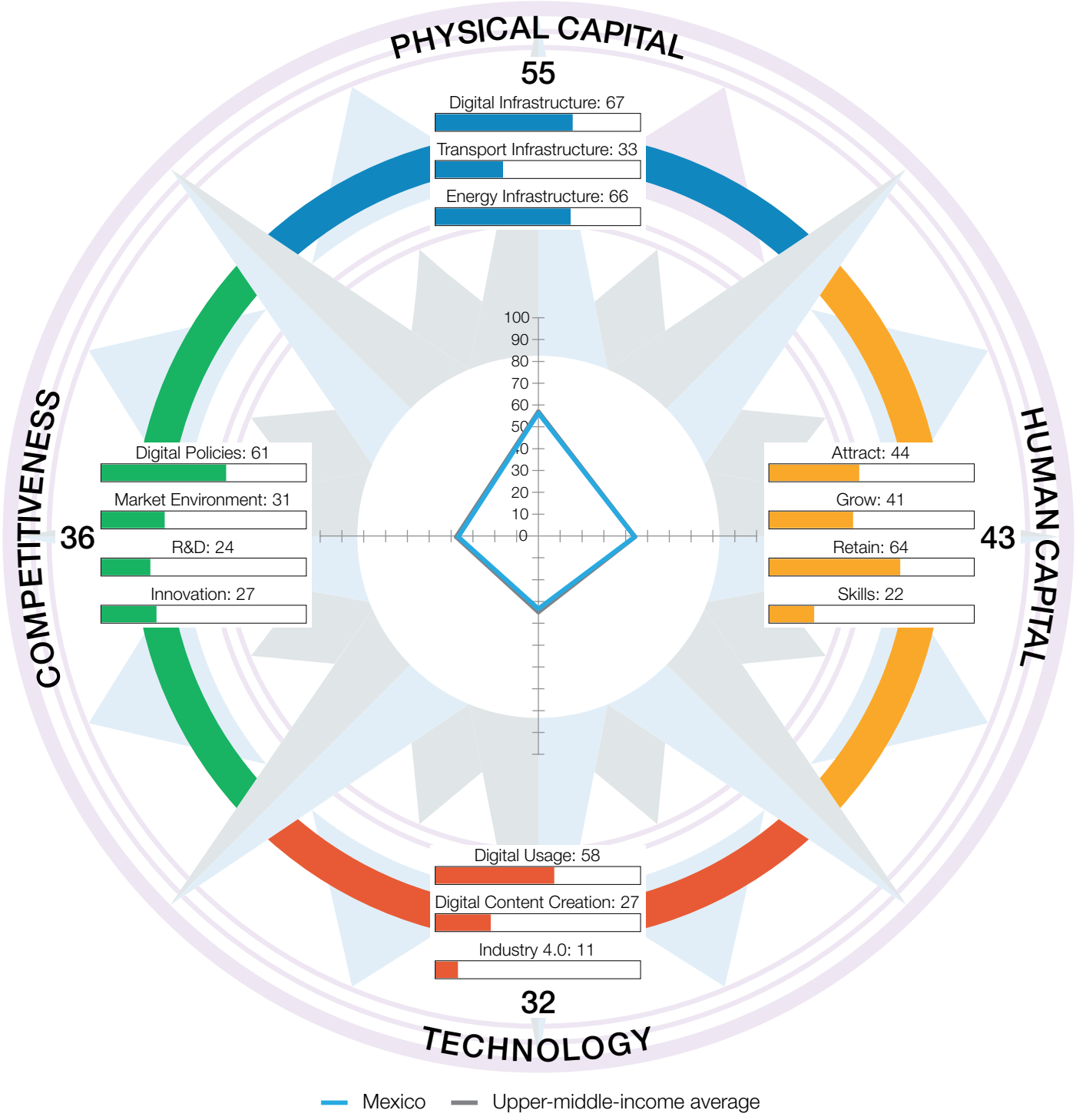
		Score	Rank
3	**TECHNOLOGY**	**34.03**	**63**
3.1	Digital Usage	51.50	77
3.1.1	Internet users	62.60	86
3.1.2	Active mobile-broadband subscriptions	43.74	36
3.1.3	Gender parity in internet usage	94.60	59
3.1.4	Firms with website	n/a	n/a
3.1.5	Internet shopping	21.64	67
3.1.6	Government online services	50.97	76
3.1.7	E-Participation	35.45	85
3.2	Digital Content Creation	37.79	50
3.2.1	Software development	4.57	58
3.2.2	Wikipedia edits	60.97	48
3.2.3	Internet domain registrations	6.86	46
3.2.4	Mobile apps development	78.74	51
3.3	Industry 4.0	12.79	57
3.3.1	Cloud computing	—	—
3.3.2	AI software development	13.01	51
3.3.3	AI research	7.48	55
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**28.82**	**90**
4.1	Digital Policies	43.26	98
4.1.1	ICT regulation	73.65	77
4.1.2	Cybersecurity	62.50	53
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	26.31	90
4.2.1	Extent of market dominance	21.25	99
4.2.2	Labour productivity per employee	30.63	57
4.2.3	Urbanisation	29.16	102
4.2.4	Domestic credit to private sector	34.25	38
4.2.5	Market capitalisation	16.28	34
4.3	R&D	26.56	67
4.3.1	R&D spending	6.62	68
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	93.80	10
4.3.4	Scientific journal articles	5.83	72
4.4	Innovation	19.15	101
4.4.1	Medium- and high-tech industry	6.16	110
4.4.2	High-tech exports	0.44	117
4.4.3	Venture capital recipients, deals	25.30	20
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	29.04	17
4.4.6	Patent applications	34.81	92

Mexico

Key Indicators

Rank (out of 124)	**68**	GDP per capita (PPP US$)	**21,512.27**
Income group	**Upper-middle income**	GDP (US$ billions)	**1,414.19**
Regional group	**Latin America and the Caribbean**	FREI score	**41.54**
Population (millions)	**127.50**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**55.24**	**68**
1.1	Digital Infrastructure	67.25	68
1.1.1	Internet access	59.72	80
1.1.2	International internet bandwidth	38.29	89
1.1.3	Fixed-broadband subscriptions	91.71	50
1.1.4	4G-mobile network coverage	94.13	75
1.1.5	Fixed broadband affordability	79.03	61
1.1.6	Mobile broadband affordability	89.71	73
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	32.73	62
1.2.1	Quality of infrastructure	35.71	63
1.2.2	Rural access	74.57	52
1.2.3	Air connectivity	8.65	58
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	65.73	87
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	87.93	42
2	**HUMAN CAPITAL**	**42.98**	**66**
2.1	Attract	44.44	60
2.1.1	Brain gain	38.97	80
2.1.2	International students	2.22	88
2.1.3	Tolerance of minorities	35.11	76
2.1.4	Tolerance of immigrants	58.46	64
2.1.5	Gender parity in high-skilled jobs	87.43	31
2.2	Grow	40.91	66
2.2.1	Tertiary enrolment	29.03	69
2.2.2	Reading, maths, and science	33.50	54
2.2.3	Use of virtual professional networks	22.76	56
2.2.4	Youth inclusion	78.36	61
2.3	Retain	64.47	56
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	45.08	54
2.3.3	Physician density	38.37	63
2.3.4	Sanitation	91.68	69
2.3.5	Personal safety	47.24	88
2.4	Skills	22.11	82
2.4.1	Workforce with tertiary education	24.55	71
2.4.2	High-skilled workforce	27.16	71
2.4.3	Researchers	3.85	74
2.4.4	Relevance of education system to the economy	19.05	102
2.4.5	Digital skills	35.95	26

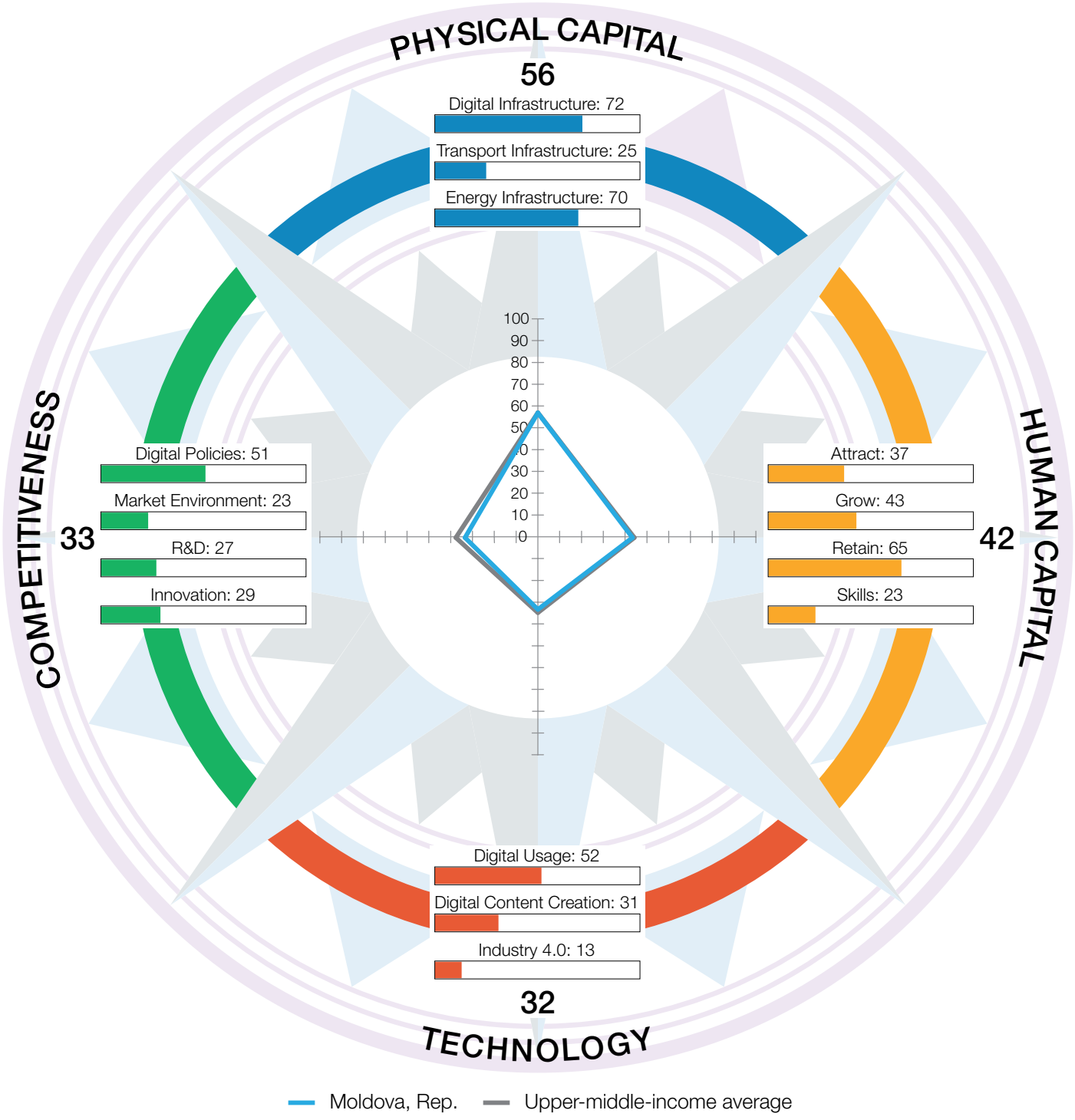
		Score	Rank
3	**TECHNOLOGY**	**32.13**	**70**
3.1	Digital Usage	57.78	65
3.1.1	Internet users	70.15	75
3.1.2	Active mobile-broadband subscriptions	32.63	72
3.1.3	Gender parity in internet usage	96.47	43
3.1.4	Firms with website	34.09	81
3.1.5	Internet shopping	24.64	64
3.1.6	Government online services	76.86	31
3.1.7	E-Participation	69.62	32
3.2	Digital Content Creation	27.28	77
3.2.1	Software development	2.33	74
3.2.2	Wikipedia edits	38.20	78
3.2.3	Internet domain registrations	2.89	63
3.2.4	Mobile apps development	65.72	79
3.3	Industry 4.0	11.33	64
3.3.1	Cloud computing	—	—
3.3.2	AI software development	7.27	72
3.3.3	AI research	3.24	80
3.3.4	ICT patent applications	0.26	60
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**35.79**	**68**
4.1	Digital Policies	60.94	71
4.1.1	ICT regulation	93.24	14
4.1.2	Cybersecurity	50.00	72
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	83.33	38
4.2	Market Environment	31.02	73
4.2.1	Extent of market dominance	28.91	90
4.2.2	Labour productivity per employee	25.72	64
4.2.3	Urbanisation	76.26	35
4.2.4	Domestic credit to private sector	13.20	81
4.2.5	Market capitalisation	11.02	42
4.3	R&D	24.44	74
4.3.1	R&D spending	5.31	72
4.3.2	University ranking	45.09	24
4.3.3	Gender parity in R&D	41.45	73
4.3.4	Scientific journal articles	5.92	70
4.4	Innovation	26.77	62
4.4.1	Medium- and high-tech industry	55.43	19
4.4.2	High-tech exports	30.72	24
4.4.3	Venture capital recipients, deals	2.07	78
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	3.12	78
4.4.6	Patent applications	42.51	80

Moldova, Rep.

Key Indicators

Rank (out of 124)	**71**	GDP per capita (PPP US$)	**15,238.15**
Income group	**Upper-middle income**	GDP (US$ billions)	**14.42**
Regional group	**Europe**	FREI score	**40.68**
Population (millions)	**2.59**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**55.77**	**66**
1.1	Digital Infrastructure	71.85	57
1.1.1	Internet access	66.06	77
1.1.2	International internet bandwidth	53.76	34
1.1.3	Fixed-broadband subscriptions	98.12	21
1.1.4	4G-mobile network coverage	98.92	40
1.1.5	Fixed broadband affordability	81.69	57
1.1.6	Mobile broadband affordability	95.32	46
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	25.23	85
1.2.1	Quality of infrastructure	3.57	123
1.2.2	Rural access	90.04	31
1.2.3	Air connectivity	5.23	73
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	70.23	70
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	95.49	40
1.3.4	Energy intensity	76.59	87
2	**HUMAN CAPITAL**	**42.27**	**70**
2.1	Attract	37.49	96
2.1.1	Brain gain	n/a	n/a
2.1.2	International students	17.11	39
2.1.3	Tolerance of minorities	38.30	71
2.1.4	Tolerance of immigrants	41.54	91
2.1.5	Gender parity in high-skilled jobs	53.01	92
2.2	Grow	43.04	63
2.2.1	Tertiary enrolment	41.00	50
2.2.2	Reading, maths, and science	36.85	50
2.2.3	Use of virtual professional networks	12.34	79
2.2.4	Youth inclusion	81.96	50
2.3	Retain	65.34	51
2.3.1	Pension coverage	74.69	59
2.3.2	Environmental performance	40.34	59
2.3.3	Physician density	64.15	24
2.3.4	Sanitation	76.65	91
2.3.5	Personal safety	70.89	50
2.4	Skills	23.19	77
2.4.1	Workforce with tertiary education	22.80	75
2.4.2	High-skilled workforce	23.77	76
2.4.3	Researchers	8.90	56
2.4.4	Relevance of education system to the economy	37.30	71
2.4.5	Digital skills	n/a	n/a

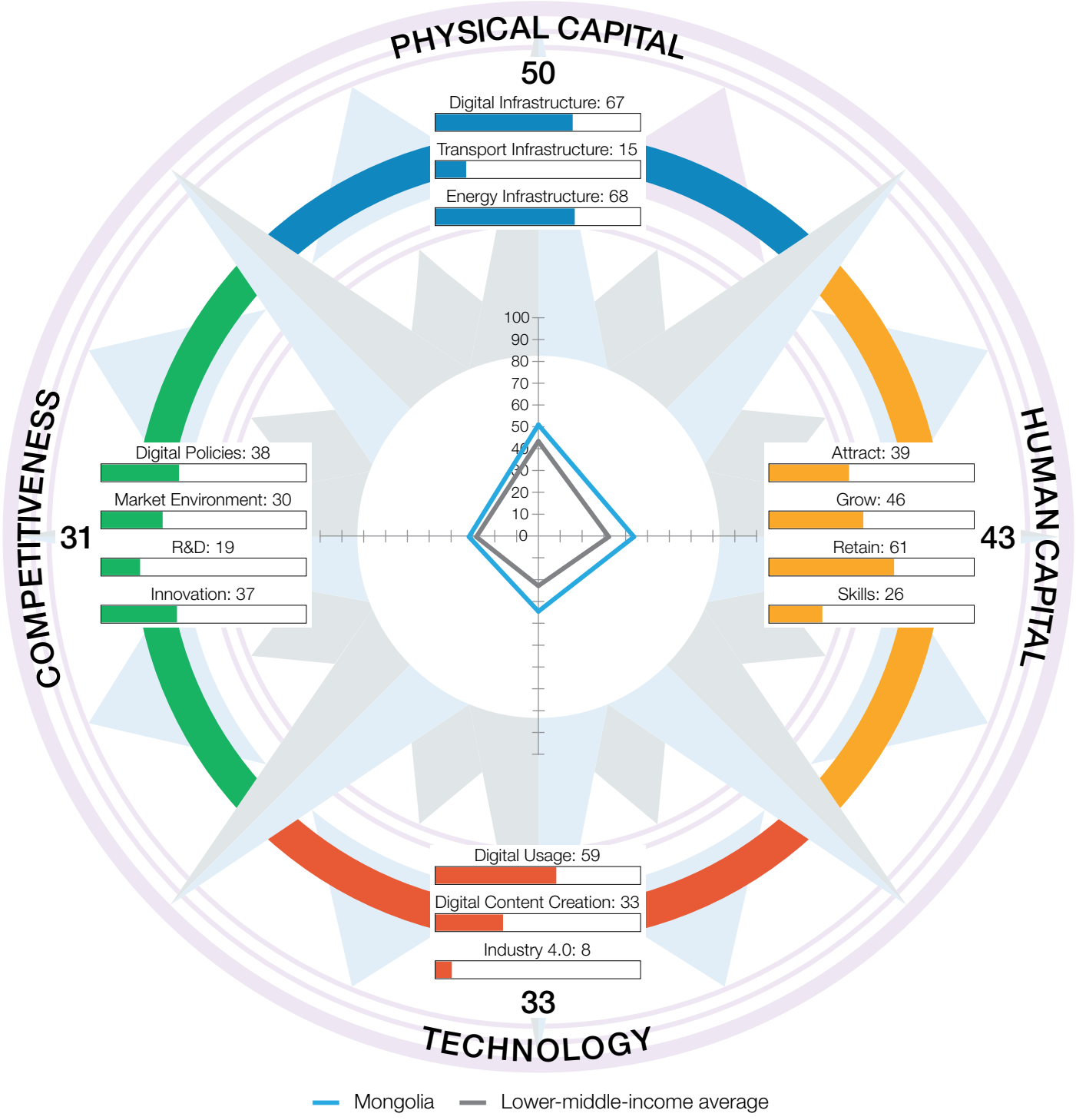
		Score	Rank
3	**TECHNOLOGY**	**32.10**	**71**
3.1	Digital Usage	51.67	74
3.1.1	Internet users	74.57	67
3.1.2	Active mobile-broadband subscriptions	34.89	64
3.1.3	Gender parity in internet usage	n/a	n/a
3.1.4	Firms with website	42.12	70
3.1.5	Internet shopping	28.43	61
3.1.6	Government online services	65.45	59
3.1.7	E-Participation	64.55	47
3.2	Digital Content Creation	31.27	67
3.2.1	Software development	8.46	46
3.2.2	Wikipedia edits	44.52	70
3.2.3	Internet domain registrations	3.11	62
3.2.4	Mobile apps development	69.02	71
3.3	Industry 4.0	13.36	53
3.3.1	Cloud computing	—	—
3.3.2	AI software development	1.62	102
3.3.3	AI research	6.14	59
3.3.4	ICT patent applications	1.86	41
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**32.56**	**79**
4.1	Digital Policies	51.24	90
4.1.1	ICT regulation	87.84	33
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	0.00	85
4.1.6	Data privacy	66.67	87
4.1.7	Data transfer	66.67	51
4.2	Market Environment	22.83	100
4.2.1	Extent of market dominance	34.28	78
4.2.2	Labour productivity per employee	16.31	80
4.2.3	Urbanisation	31.35	99
4.2.4	Domestic credit to private sector	9.39	96
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	26.98	61
4.3.1	R&D spending	4.10	81
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	100.00	1
4.3.4	Scientific journal articles	3.81	80
4.4	Innovation	29.21	51
4.4.1	Medium- and high-tech industry	27.79	67
4.4.2	High-tech exports	3.33	95
4.4.3	Venture capital recipients, deals	10.23	41
4.4.4	New product entrepreneurial activity	47.36	48
4.4.5	New business density	n/a	n/a
4.4.6	Patent applications	57.34	42

Mongolia

Key Indicators

Rank (out of 124)	**75**	GDP per capita (PPP US$)	**14,230.23**
Income group	**Lower-middle income**	GDP (US$ billions)	**16.81**
Regional group	**Asia and Pacific**	FREI score	**39.23**
Population (millions)	**3.40**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**50.02**	**86**
1.1	Digital Infrastructure	67.15	69
1.1.1	Internet access	79.60	63
1.1.2	International internet bandwidth	48.20	48
1.1.3	Fixed-broadband subscriptions	66.06	82
1.1.4	4G-mobile network coverage	98.92	40
1.1.5	Fixed broadband affordability	83.12	52
1.1.6	Mobile broadband affordability	85.03	82
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	14.85	112
1.2.1	Quality of infrastructure	17.86	100
1.2.2	Rural access	28.68	108
1.2.3	Air connectivity	5.45	71
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	68.05	79
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	96.24	34
1.3.4	Energy intensity	67.13	106
2	**HUMAN CAPITAL**	**42.66**	**68**
2.1	Attract	38.99	90
2.1.1	Brain gain	27.74	98
2.1.2	International students	2.64	83
2.1.3	Tolerance of minorities	77.66	12
2.1.4	Tolerance of immigrants	30.77	111
2.1.5	Gender parity in high-skilled jobs	56.14	89
2.2	Grow	45.58	55
2.2.1	Tertiary enrolment	45.50	39
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	12.68	77
2.2.4	Youth inclusion	78.57	59
2.3	Retain	60.54	61
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	18.14	106
2.3.3	Physician density	60.99	29
2.3.4	Sanitation	64.59	101
2.3.5	Personal safety	58.98	67
2.4	Skills	25.53	68
2.4.1	Workforce with tertiary education	49.96	25
2.4.2	High-skilled workforce	38.65	50
2.4.3	Researchers	3.64	76
2.4.4	Relevance of education system to the economy	19.15	101
2.4.5	Digital skills	16.26	55

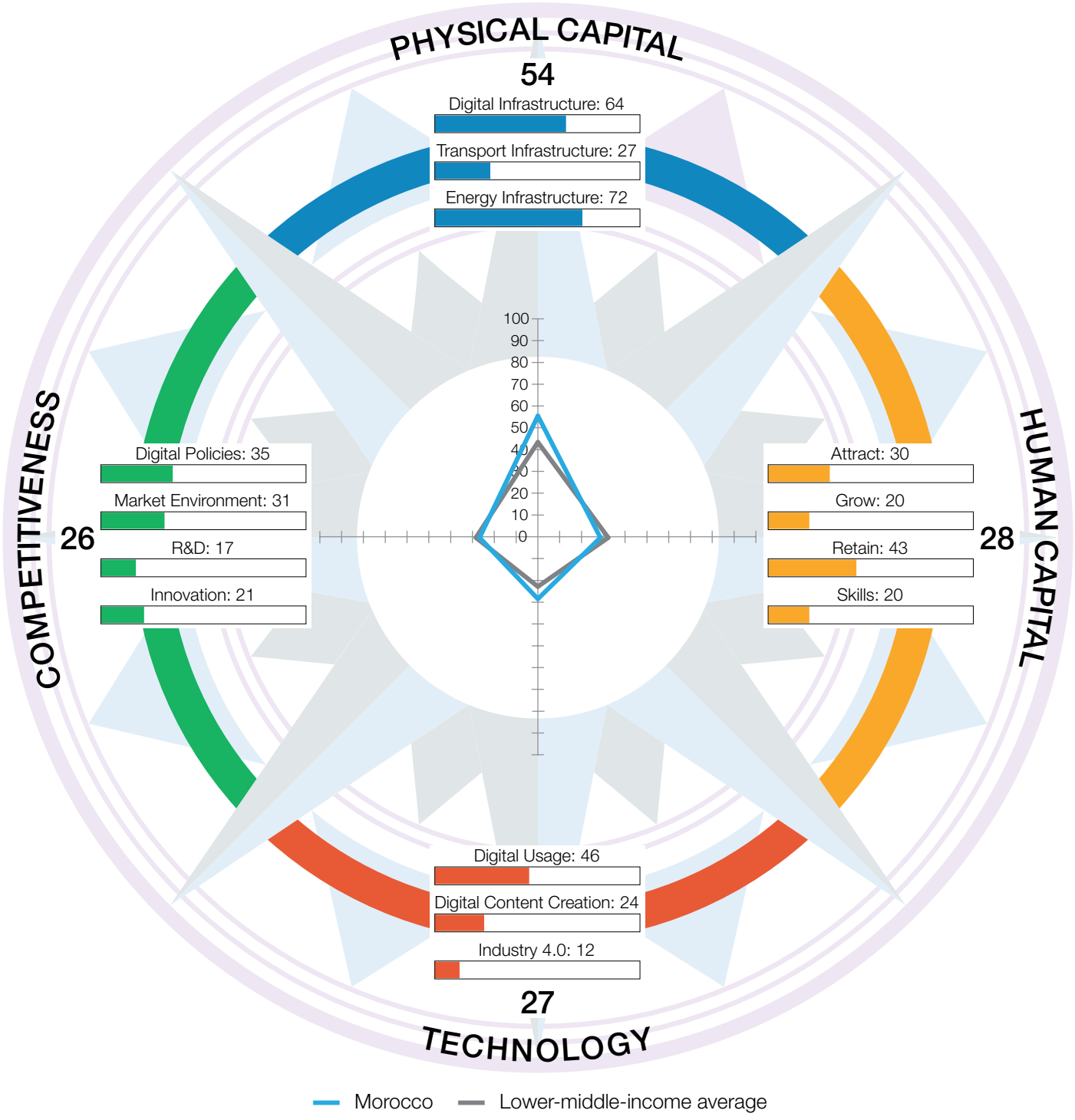
		Score	Rank
3	**TECHNOLOGY**	**33.27**	**65**
3.1	Digital Usage	58.79	62
3.1.1	Internet users	83.31	49
3.1.2	Active mobile-broadband subscriptions	46.92	26
3.1.3	Gender parity in internet usage	96.96	40
3.1.4	Firms with website	29.33	85
3.1.5	Internet shopping	48.61	43
3.1.6	Government online services	50.72	77
3.1.7	E-Participation	55.70	56
3.2	Digital Content Creation	32.83	60
3.2.1	Software development	2.93	68
3.2.2	Wikipedia edits	47.27	65
3.2.3	Internet domain registrations	1.29	79
3.2.4	Mobile apps development	79.83	49
3.3	Industry 4.0	8.18	85
3.3.1	Cloud computing	—	—
3.3.2	AI software development	4.41	88
3.3.3	AI research	2.74	82
3.3.4	ICT patent applications	0.00	76
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**30.99**	**83**
4.1	Digital Policies	38.29	106
4.1.1	ICT regulation	76.35	75
4.1.2	Cybersecurity	25.00	100
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	29.78	77
4.2.1	Extent of market dominance	8.19	118
4.2.2	Labour productivity per employee	n/a	n/a
4.2.3	Urbanisation	62.24	57
4.2.4	Domestic credit to private sector	18.89	70
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	19.34	87
4.3.1	R&D spending	2.25	94
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	72.76	35
4.3.4	Scientific journal articles	2.33	88
4.4	Innovation	36.56	31
4.4.1	Medium- and high-tech industry	4.47	112
4.4.2	High-tech exports	34.18	17
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	57.27	33
4.4.5	New business density	24.33	22
4.4.6	Patent applications	62.56	28

Morocco

Key Indicators

Rank (out of 124)	**92**	GDP per capita (PPP US$)	**9,518.71**
Income group	**Lower-middle income**	GDP (US$ billions)	**134.18**
Regional group	**Middle East and North Africa**	FREI score	**33.94**
Population (millions)	**37.46**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**54.41**	**72**
1.1	Digital Infrastructure	64.50	76
1.1.1	Internet access	85.97	47
1.1.2	International internet bandwidth	46.87	56
1.1.3	Fixed-broadband subscriptions	41.55	93
1.1.4	4G-mobile network coverage	98.66	50
1.1.5	Fixed broadband affordability	69.63	82
1.1.6	Mobile broadband affordability	90.65	70
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	26.67	81
1.2.1	Quality of infrastructure	22.50	86
1.2.2	Rural access	64.92	66
1.2.3	Air connectivity	4.48	77
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	72.06	59
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	97.74	28
1.3.4	Energy intensity	87.02	45
2	**HUMAN CAPITAL**	**27.93**	**99**
2.1	Attract	29.69	116
2.1.1	Brain gain	n/a	n/a
2.1.2	International students	4.85	76
2.1.3	Tolerance of minorities	11.70	111
2.1.4	Tolerance of immigrants	38.46	96
2.1.5	Gender parity in high-skilled jobs	63.75	76
2.2	Grow	19.63	120
2.2.1	Tertiary enrolment	28.12	72
2.2.2	Reading, maths, and science	13.80	72
2.2.3	Use of virtual professional networks	16.99	71
2.2.4	Youth inclusion	n/a	n/a
2.3	Retain	42.68	89
2.3.1	Pension coverage	n/a	n/a
2.3.2	Environmental performance	16.10	111
2.3.3	Physician density	11.12	93
2.3.4	Sanitation	86.00	77
2.3.5	Personal safety	57.51	72
2.4	Skills	19.72	90
2.4.1	Workforce with tertiary education	11.07	95
2.4.2	High-skilled workforce	8.07	103
2.4.3	Researchers	12.18	49
2.4.4	Relevance of education system to the economy	18.73	104
2.4.5	Digital skills	48.54	12

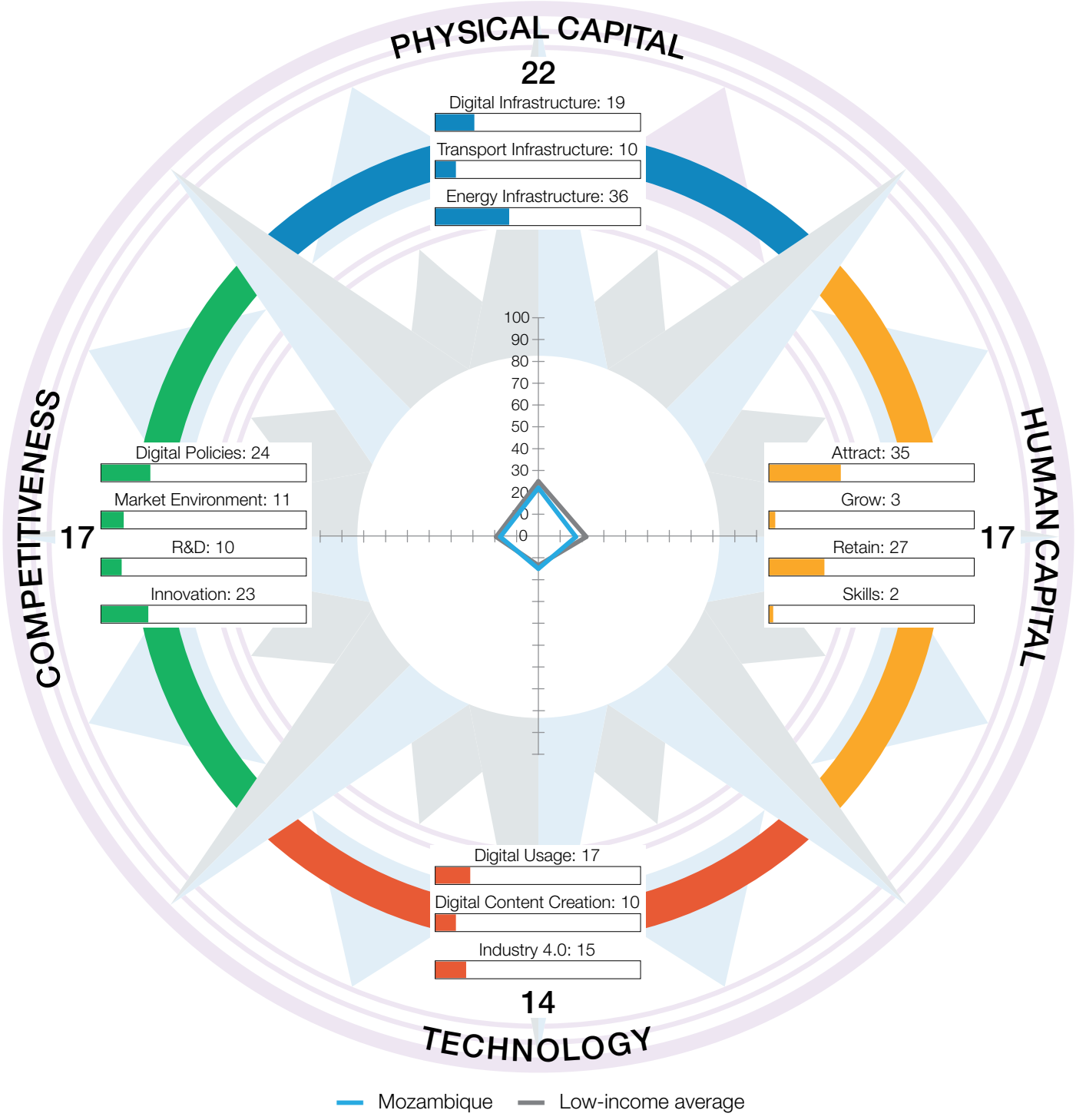
		Score	Rank
3	**TECHNOLOGY**	**27.37**	**81**
3.1	Digital Usage	46.42	83
3.1.1	Internet users	87.36	39
3.1.2	Active mobile-broadband subscriptions	33.63	70
3.1.3	Gender parity in internet usage	93.17	66
3.1.4	Firms with website	50.93	59
3.1.5	Internet shopping	10.50	86
3.1.6	Government online services	30.38	100
3.1.7	E-Participation	18.98	109
3.2	Digital Content Creation	23.52	92
3.2.1	Software development	1.49	90
3.2.2	Wikipedia edits	29.24	92
3.2.3	Internet domain registrations	1.04	85
3.2.4	Mobile apps development	62.31	85
3.3	Industry 4.0	12.18	59
3.3.1	Cloud computing	—	—
3.3.2	AI software development	7.77	65
3.3.3	AI research	7.45	56
3.3.4	ICT patent applications	0.14	66
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**26.06**	**100**
4.1	Digital Policies	35.09	108
4.1.1	ICT regulation	83.11	57
4.1.2	Cybersecurity	62.50	53
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	33.33	104
4.1.7	Data transfer	66.67	51
4.2	Market Environment	30.79	74
4.2.1	Extent of market dominance	29.64	87
4.2.2	Labour productivity per employee	15.63	81
4.2.3	Urbanisation	55.07	68
4.2.4	Domestic credit to private sector	37.34	34
4.2.5	Market capitalisation	16.28	33
4.3	R&D	17.19	90
4.3.1	R&D spending	n/a	n/a
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	45.03	64
4.3.4	Scientific journal articles	6.54	66
4.4	Innovation	21.17	94
4.4.1	Medium- and high-tech industry	50.09	31
4.4.2	High-tech exports	6.68	84
4.4.3	Venture capital recipients, deals	3.32	69
4.4.4	New product entrepreneurial activity	7.85	88
4.4.5	New business density	9.10	50
4.4.6	Patent applications	49.96	64

Mozambique

Key Indicators

Rank (out of 124)	**121**	GDP per capita (PPP US$)	**1,467.77**
Income group	**Low income**	GDP (US$ billions)	**17.85**
Regional group	**Sub-Saharan Africa**	FREI score	**17.46**
Population (millions)	**32.97**	FREI score (income group average)	**19.43**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**21.86**	**120**
1.1	Digital Infrastructure	19.26	120
1.1.1	Internet access	0.00	116
1.1.2	International internet bandwidth	27.74	110
1.1.3	Fixed-broadband subscriptions	31.20	96
1.1.4	4G-mobile network coverage	46.24	110
1.1.5	Fixed broadband affordability	29.64	118
1.1.6	Mobile broadband affordability	0.00	121
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	9.96	118
1.2.1	Quality of infrastructure	15.64	107
1.2.2	Rural access	21.38	115
1.2.3	Air connectivity	0.06	119
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	36.36	116
1.3.1	Access to electricity	20.17	121
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	87.97	63
1.3.4	Energy intensity	35.90	120
2	**HUMAN CAPITAL**	**16.74**	**123**
2.1	Attract	34.86	105
2.1.1	Brain gain	43.31	72
2.1.2	International students	0.83	98
2.1.3	Tolerance of minorities	29.79	83
2.1.4	Tolerance of immigrants	63.08	55
2.1.5	Gender parity in high-skilled jobs	37.29	103
2.2	Grow	3.10	123
2.2.1	Tertiary enrolment	3.94	112
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	2.27	113
2.2.4	Youth inclusion	n/a	n/a
2.3	Retain	26.82	104
2.3.1	Pension coverage	51.53	72
2.3.2	Environmental performance	21.69	98
2.3.3	Physician density	0.75	119
2.3.4	Sanitation	31.06	109
2.3.5	Personal safety	29.06	114
2.4	Skills	2.16	124
2.4.1	Workforce with tertiary education	2.28	118
2.4.2	High-skilled workforce	1.03	116
2.4.3	Researchers	0.33	92
2.4.4	Relevance of education system to the economy	4.98	118
2.4.5	Digital skills	n/a	n/a

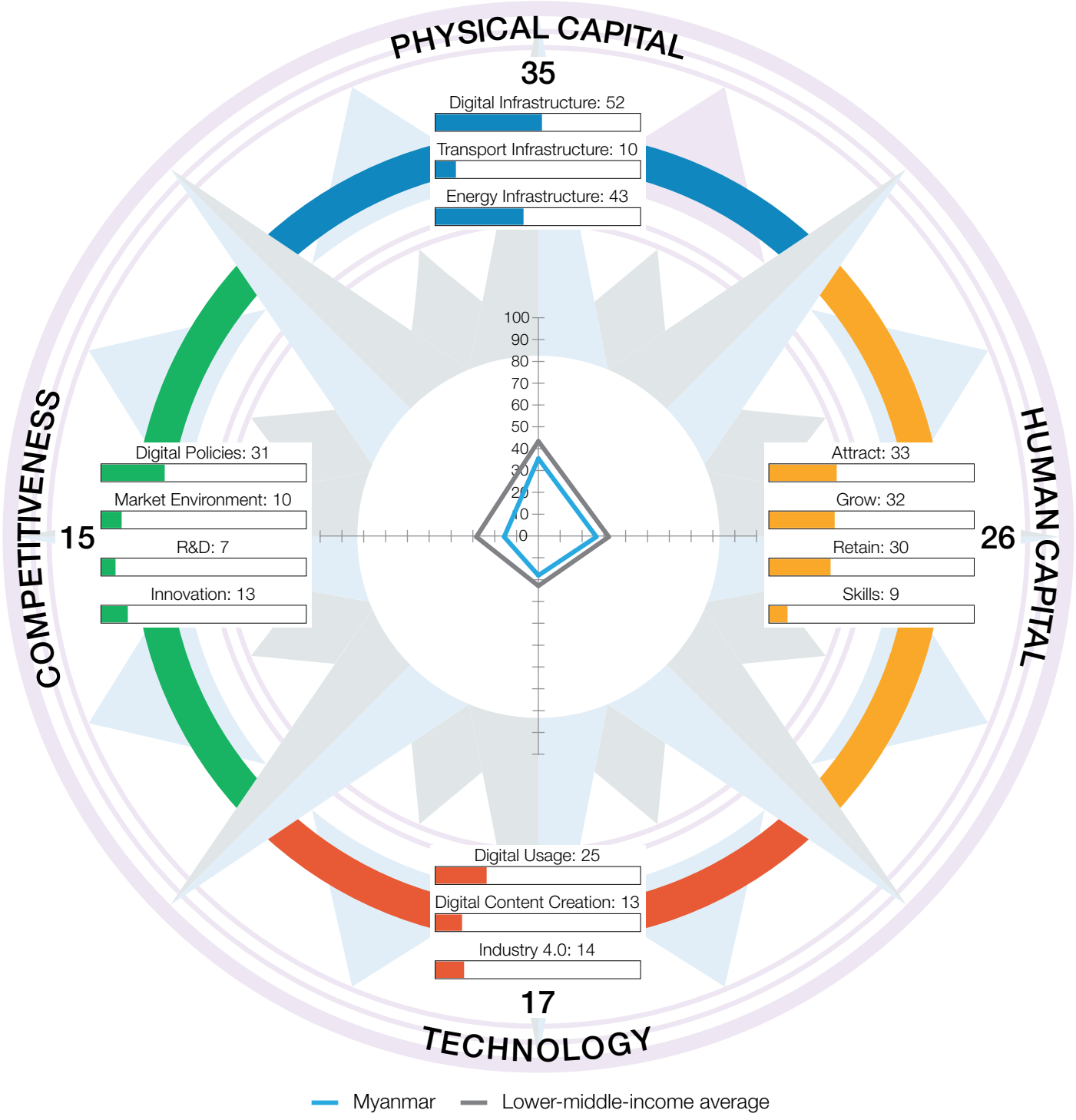
		Score	Rank
3	**TECHNOLOGY**	**14.22**	**115**
3.1	Digital Usage	16.73	119
3.1.1	Internet users	11.08	120
3.1.2	Active mobile-broadband subscriptions	5.81	120
3.1.3	Gender parity in internet usage	37.30	100
3.1.4	Firms with website	32.71	82
3.1.5	Internet shopping	5.00	104
3.1.6	Government online services	15.11	119
3.1.7	E-Participation	10.13	119
3.2	Digital Content Creation	10.45	121
3.2.1	Software development	0.10	120
3.2.2	Wikipedia edits	15.45	115
3.2.3	Internet domain registrations	0.08	113
3.2.4	Mobile apps development	26.17	119
3.3	Industry 4.0	15.48	42
3.3.1	Cloud computing	—	—
3.3.2	AI software development	0.36	115
3.3.3	AI research	0.14	116
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**17.02**	**117**
4.1	Digital Policies	24.16	117
4.1.1	ICT regulation	60.81	100
4.1.2	Cybersecurity	25.00	100
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	0.00	85
4.1.6	Data privacy	0.00	114
4.1.7	Data transfer	33.33	112
4.2	Market Environment	10.77	118
4.2.1	Extent of market dominance	12.77	113
4.2.2	Labour productivity per employee	0.30	113
4.2.3	Urbanisation	23.41	108
4.2.4	Domestic credit to private sector	6.61	103
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	9.82	101
4.3.1	R&D spending	5.62	71
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	33.50	84
4.3.4	Scientific journal articles	0.16	119
4.4	Innovation	23.34	82
4.4.1	Medium- and high-tech industry	13.00	96
4.4.2	High-tech exports	1.43	111
4.4.3	Venture capital recipients, deals	8.62	49
4.4.4	New product entrepreneurial activity	45.56	52
4.4.5	New business density	n/a	n/a
4.4.6	Patent applications	48.08	67

Myanmar

Key Indicators

Rank (out of 124)	**110**	GDP per capita (PPP US$)	**4,870.02**
Income group	**Lower-middle income**	GDP (US$ billions)	**59.36**
Regional group	**Asia and Pacific**	FREI score	**23.33**
Population (millions)	**54.18**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**34.94**	**106**
1.1	Digital Infrastructure	52.28	94
1.1.1	Internet access	n/a	n/a
1.1.2	International internet bandwidth	40.80	84
1.1.3	Fixed-broadband subscriptions	41.66	92
1.1.4	4G-mobile network coverage	93.88	76
1.1.5	Fixed broadband affordability	49.99	101
1.1.6	Mobile broadband affordability	87.33	78
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	9.58	119
1.2.1	Quality of infrastructure	6.79	122
1.2.2	Rural access	24.65	112
1.2.3	Air connectivity	1.55	96
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	42.96	112
1.3.1	Access to electricity	67.91	104
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	17.29	87
1.3.4	Energy intensity	85.63	57
2	**HUMAN CAPITAL**	**25.89**	**107**
2.1	Attract	33.23	111
2.1.1	Brain gain	n/a	n/a
2.1.2	International students	0.00	106
2.1.3	Tolerance of minorities	1.06	122
2.1.4	Tolerance of immigrants	60.00	61
2.1.5	Gender parity in high-skilled jobs	71.84	62
2.2	Grow	31.58	87
2.2.1	Tertiary enrolment	11.64	95
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	1.25	119
2.2.4	Youth inclusion	81.87	51
2.3	Retain	29.83	101
2.3.1	Pension coverage	13.16	98
2.3.2	Environmental performance	0.85	123
2.3.3	Physician density	11.43	92
2.3.4	Sanitation	71.06	95
2.3.5	Personal safety	52.67	82
2.4	Skills	8.93	116
2.4.1	Workforce with tertiary education	23.56	73
2.4.2	High-skilled workforce	3.17	111
2.4.3	Researchers	0.05	101
2.4.4	Relevance of education system to the economy	n/a	n/a
2.4.5	Digital skills	n/a	n/a

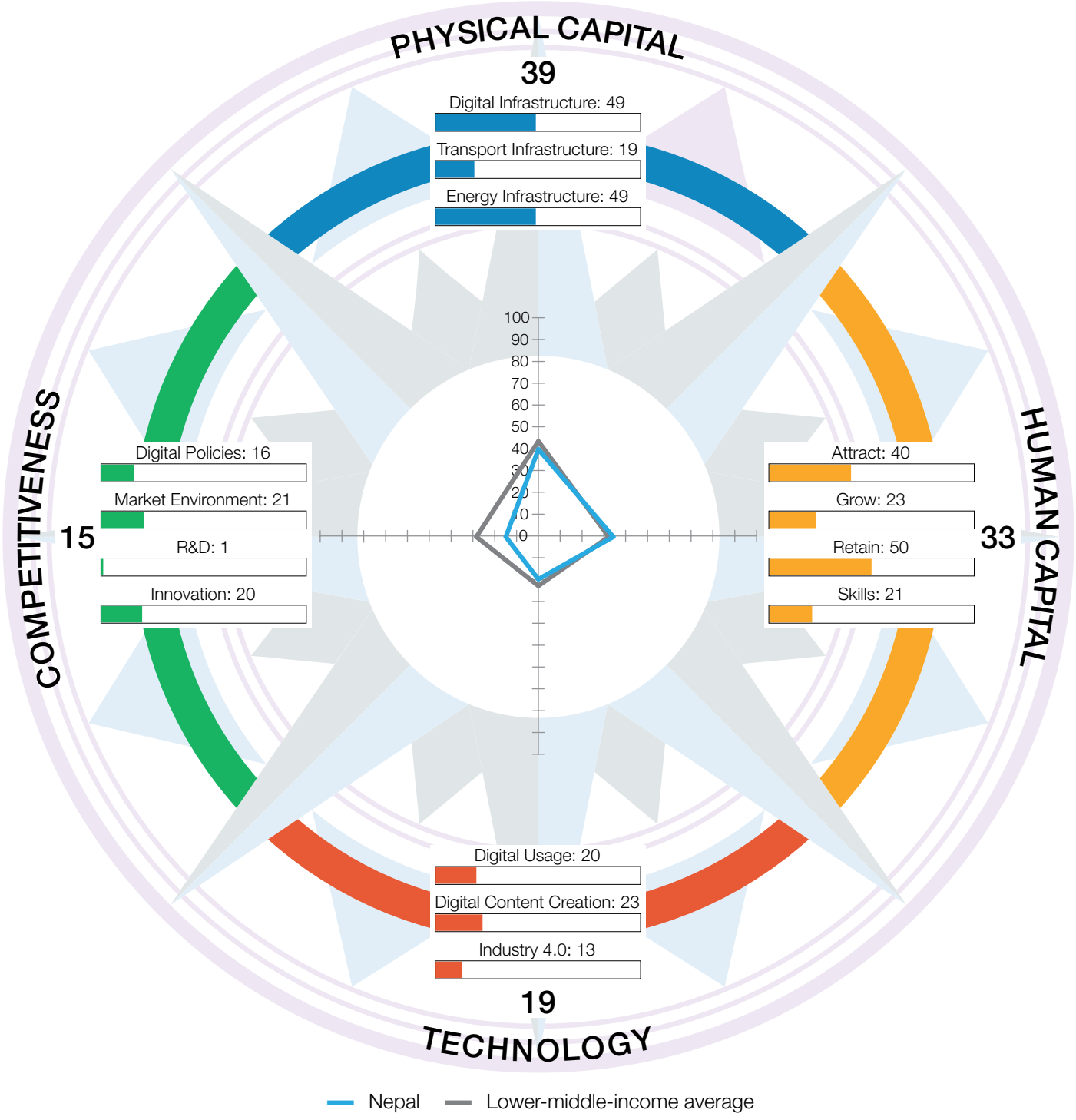
		Score	Rank
3	**TECHNOLOGY**	**17.21**	**105**
3.1	Digital Usage	24.72	108
3.1.1	Internet users	30.88	105
3.1.2	Active mobile-broadband subscriptions	44.11	33
3.1.3	Gender parity in internet usage	44.47	98
3.1.4	Firms with website	0.00	104
3.1.5	Internet shopping	22.15	66
3.1.6	Government online services	8.65	121
3.1.7	E-Participation	22.78	102
3.2	Digital Content Creation	12.57	116
3.2.1	Software development	0.19	115
3.2.2	Wikipedia edits	11.81	119
3.2.3	Internet domain registrations	0.03	117
3.2.4	Mobile apps development	38.24	113
3.3	Industry 4.0	14.34	47
3.3.1	Cloud computing	—	—
3.3.2	AI software development	0.88	110
3.3.3	AI research	0.21	112
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**15.29**	**118**
4.1	Digital Policies	31.24	112
4.1.1	ICT regulation	52.03	112
4.1.2	Cybersecurity	0.00	106
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	33.33	104
4.1.7	Data transfer	33.33	112
4.2	Market Environment	10.13	119
4.2.1	Extent of market dominance	n/a	n/a
4.2.2	Labour productivity per employee	4.04	103
4.2.3	Urbanisation	16.94	114
4.2.4	Domestic credit to private sector	9.40	95
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	6.95	106
4.3.1	R&D spending	2.48	92
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	25.08	94
4.3.4	Scientific journal articles	0.24	115
4.4	Innovation	12.85	118
4.4.1	Medium- and high-tech industry	28.61	66
4.4.2	High-tech exports	7.66	77
4.4.3	Venture capital recipients, deals	6.51	56
4.4.4	New product entrepreneurial activity	20.08	77
4.4.5	New business density	1.43	93
4.4.6	Patent applications	n/a	n/a

Nepal

Key Indicators

Rank (out of 124)	**105**	GDP per capita (PPP US$)	**4,725.04**
Income group	**Lower-middle income**	GDP (US$ billions)	**40.83**
Regional group	**Asia and Pacific**	FREI score	**26.50**
Population (millions)	**30.55**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**39.06**	**102**
1.1	Digital Infrastructure	48.64	98
1.1.1	Internet access	n/a	n/a
1.1.2	International internet bandwidth	37.85	90
1.1.3	Fixed-broadband subscriptions	n/a	n/a
1.1.4	4G-mobile network coverage	40.86	113
1.1.5	Fixed broadband affordability	83.96	50
1.1.6	Mobile broadband affordability	80.53	93
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	19.41	93
1.2.1	Quality of infrastructure	13.93	111
1.2.2	Rural access	57.91	78
1.2.3	Air connectivity	2.15	89
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	49.14	105
1.3.1	Access to electricity	88.23	98
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	34.59	85
1.3.4	Energy intensity	72.89	97
2	**HUMAN CAPITAL**	**33.47**	**91**
2.1	Attract	39.83	89
2.1.1	Brain gain	27.01	100
2.1.2	International students	n/a	n/a
2.1.3	Tolerance of minorities	6.38	115
2.1.4	Tolerance of immigrants	84.62	15
2.1.5	Gender parity in high-skilled jobs	41.31	98
2.2	Grow	22.73	112
2.2.1	Tertiary enrolment	10.67	96
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	5.78	101
2.2.4	Youth inclusion	51.74	111
2.3	Retain	50.38	75
2.3.1	Pension coverage	79.80	58
2.3.2	Environmental performance	15.93	113
2.3.3	Physician density	13.28	87
2.3.4	Sanitation	74.32	94
2.3.5	Personal safety	68.58	52
2.4	Skills	20.93	85
2.4.1	Workforce with tertiary education	10.91	96
2.4.2	High-skilled workforce	16.43	89
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	35.46	78
2.4.5	Digital skills	n/a	n/a

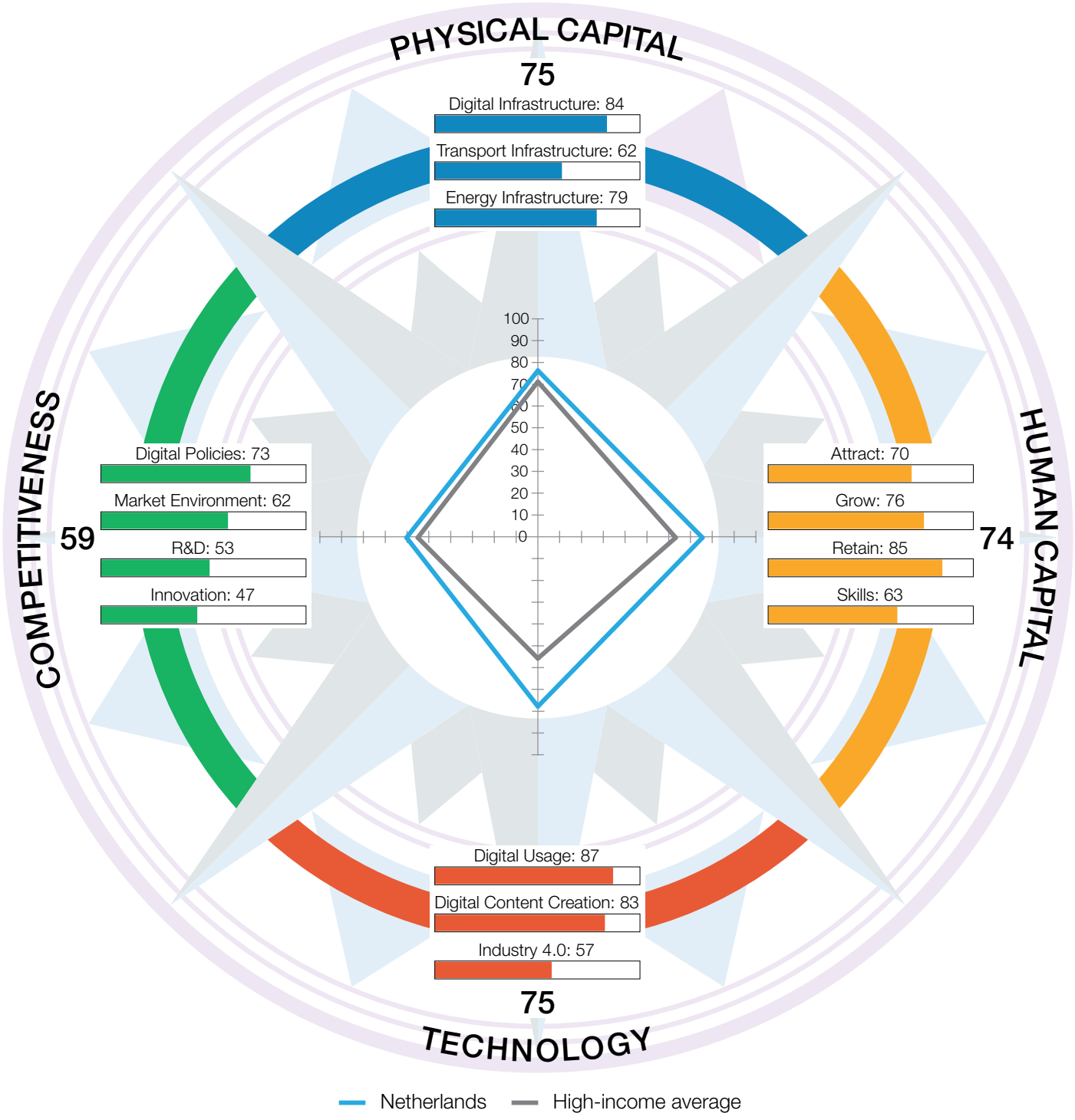
		Score	Rank
3	**TECHNOLOGY**	**18.92**	**101**
3.1	Digital Usage	20.16	113
3.1.1	Internet users	33.65	101
3.1.2	Active mobile-broadband subscriptions	23.48	96
3.1.3	Gender parity in internet usage	n/a	n/a
3.1.4	Firms with website	15.57	93
3.1.5	Internet shopping	4.38	106
3.1.6	Government online services	28.68	104
3.1.7	E-Participation	15.18	114
3.2	Digital Content Creation	23.41	93
3.2.1	Software development	2.03	80
3.2.2	Wikipedia edits	26.78	100
3.2.3	Internet domain registrations	0.64	92
3.2.4	Mobile apps development	64.18	83
3.3	Industry 4.0	13.19	54
3.3.1	Cloud computing	—	—
3.3.2	AI software development	21.87	33
3.3.3	AI research	1.46	91
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**14.54**	**120**
4.1	Digital Policies	16.28	123
4.1.1	ICT regulation	47.30	119
4.1.2	Cybersecurity	0.00	106
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	0.00	114
4.1.7	Data transfer	66.67	51
4.2	Market Environment	21.16	104
4.2.1	Extent of market dominance	17.67	106
4.2.2	Labour productivity per employee	n/a	n/a
4.2.3	Urbanisation	3.97	120
4.2.4	Domestic credit to private sector	41.85	29
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	0.91	115
4.3.1	R&D spending	n/a	n/a
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	n/a	n/a
4.3.4	Scientific journal articles	1.82	91
4.4	Innovation	19.79	98
4.4.1	Medium- and high-tech industry	10.20	100
4.4.2	High-tech exports	1.52	109
4.4.3	Venture capital recipients, deals	2.95	74
4.4.4	New product entrepreneurial activity	65.38	22
4.4.5	New business density	5.45	67
4.4.6	Patent applications	33.26	96

Netherlands

Key Indicators

Rank (out of 124)	**8**	GDP per capita (PPP US$)	**69,577.40**
Income group	**High income**	GDP (US$ billions)	**991.11**
Regional group	**Europe**	FREI score	**70.58**
Population (millions)	**17.70**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**74.67**	**11**
1.1	Digital Infrastructure	83.59	8
1.1.1	Internet access	95.97	13
1.1.2	International internet bandwidth	51.27	42
1.1.3	Fixed-broadband subscriptions	99.86	5
1.1.4	4G-mobile network coverage	98.92	40
1.1.5	Fixed broadband affordability	87.34	38
1.1.6	Mobile broadband affordability	97.19	26
1.1.7	Computer software spending	54.55	4
1.2	Transport Infrastructure	61.56	13
1.2.1	Quality of infrastructure	85.71	5
1.2.2	Rural access	98.13	9
1.2.3	Air connectivity	31.04	23
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	78.87	12
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	99.25	6
1.3.4	Energy intensity	88.84	34
2	**HUMAN CAPITAL**	**73.54**	**10**
2.1	Attract	69.63	12
2.1.1	Brain gain	80.15	10
2.1.2	International students	35.38	16
2.1.3	Tolerance of minorities	68.09	24
2.1.4	Tolerance of immigrants	76.92	28
2.1.5	Gender parity in high-skilled jobs	87.59	29
2.2	Grow	76.12	4
2.2.1	Tertiary enrolment	60.62	11
2.2.2	Reading, maths, and science	68.74	14
2.2.3	Use of virtual professional networks	78.14	6
2.2.4	Youth inclusion	96.99	5
2.3	Retain	84.94	13
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	74.07	11
2.3.3	Physician density	60.61	30
2.3.4	Sanitation	97.46	51
2.3.5	Personal safety	92.58	12
2.4	Skills	63.46	13
2.4.1	Workforce with tertiary education	50.60	23
2.4.2	High-skilled workforce	82.78	4
2.4.3	Researchers	67.79	8
2.4.4	Relevance of education system to the economy	75.55	13
2.4.5	Digital skills	40.56	19

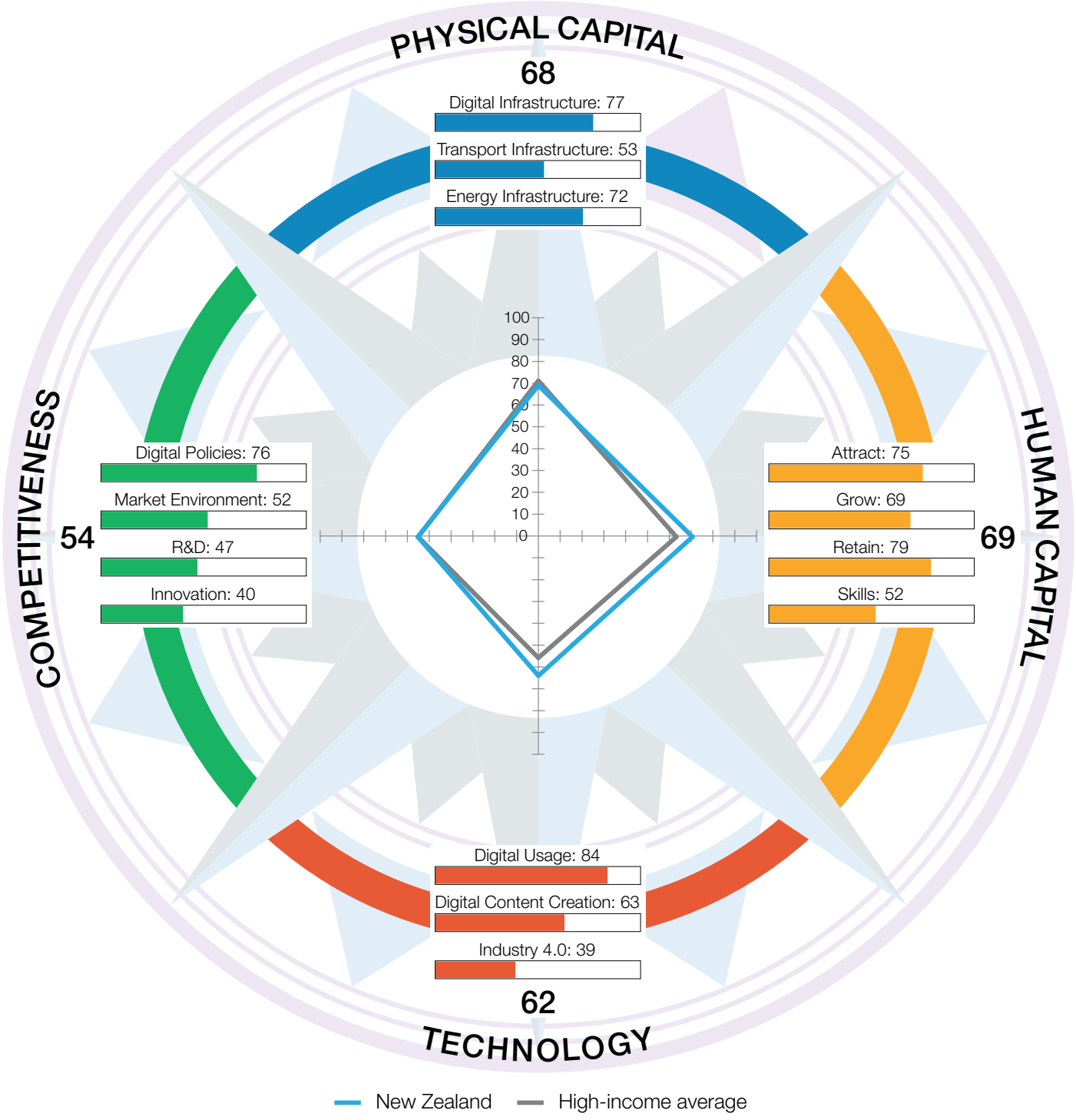
		Score	Rank
3	**TECHNOLOGY**	**75.45**	**4**
3.1	Digital Usage	86.75	4
3.1.1	Internet users	91.54	20
3.1.2	Active mobile-broadband subscriptions	49.87	17
3.1.3	Gender parity in internet usage	99.80	7
3.1.4	Firms with website	95.48	3
3.1.5	Internet shopping	87.19	8
3.1.6	Government online services	87.16	11
3.1.7	E-Participation	96.20	5
3.2	Digital Content Creation	82.58	1
3.2.1	Software development	44.98	9
3.2.2	Wikipedia edits	85.33	8
3.2.3	Internet domain registrations	100.00	1
3.2.4	Mobile apps development	100.00	1
3.3	Industry 4.0	57.03	9
3.3.1	Cloud computing	—	—
3.3.2	AI software development	66.48	11
3.3.3	AI research	58.01	9
3.3.4	ICT patent applications	48.96	11
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**58.68**	**18**
4.1	Digital Policies	72.75	50
4.1.1	ICT regulation	92.57	21
4.1.2	Cybersecurity	100.00	1
4.1.3	AI regulation	50.00	58
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	61.72	13
4.2.1	Extent of market dominance	72.84	12
4.2.2	Labour productivity per employee	63.01	16
4.2.3	Urbanisation	89.82	11
4.2.4	Domestic credit to private sector	43.08	27
4.2.5	Market capitalisation	39.84	10
4.3	R&D	53.09	14
4.3.1	R&D spending	42.90	15
4.3.2	University ranking	66.67	12
4.3.3	Gender parity in R&D	31.16	88
4.3.4	Scientific journal articles	71.62	8
4.4	Innovation	47.15	16
4.4.1	Medium- and high-tech industry	62.26	15
4.4.2	High-tech exports	34.07	18
4.4.3	Venture capital recipients, deals	17.94	29
4.4.4	New product entrepreneurial activity	80.82	8
4.4.5	New business density	12.68	38
4.4.6	Patent applications	75.14	11

New Zealand

Key Indicators

Rank (out of 124)	**20**	GDP per capita (PPP US$)	**51,966.86**
Income group	**High income**	GDP (US$ billions)	**247.23**
Regional group	**Asia and Pacific**	FREI score	**63.05**
Population (millions)	**5.12**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**67.61**	**31**
1.1	Digital Infrastructure	77.40	35
1.1.1	Internet access	76.34	68
1.1.2	International internet bandwidth	55.45	31
1.1.3	Fixed-broadband subscriptions	98.99	15
1.1.4	4G-mobile network coverage	97.31	65
1.1.5	Fixed broadband affordability	88.72	33
1.1.6	Mobile broadband affordability	97.70	19
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	53.37	26
1.2.1	Quality of infrastructure	71.43	18
1.2.2	Rural access	75.94	49
1.2.3	Air connectivity	42.68	15
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	72.05	60
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	83.81	63
2	**HUMAN CAPITAL**	**68.82**	**15**
2.1	Attract	74.53	8
2.1.1	Brain gain	77.52	13
2.1.2	International students	46.48	12
2.1.3	Tolerance of minorities	78.72	9
2.1.4	Tolerance of immigrants	95.38	3
2.1.5	Gender parity in high-skilled jobs	n/a	n/a
2.2	Grow	69.39	11
2.2.1	Tertiary enrolment	52.52	24
2.2.2	Reading, maths, and science	68.92	12
2.2.3	Use of virtual professional networks	68.97	12
2.2.4	Youth inclusion	87.15	36
2.3	Retain	79.19	29
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	64.07	26
2.3.3	Physician density	55.52	36
2.3.4	Sanitation	100.00	1
2.3.5	Personal safety	76.37	44
2.4	Skills	52.16	24
2.4.1	Workforce with tertiary education	45.89	32
2.4.2	High-skilled workforce	n/a	n/a
2.4.3	Researchers	67.13	9
2.4.4	Relevance of education system to the economy	43.47	54
2.4.5	Digital skills	n/a	n/a

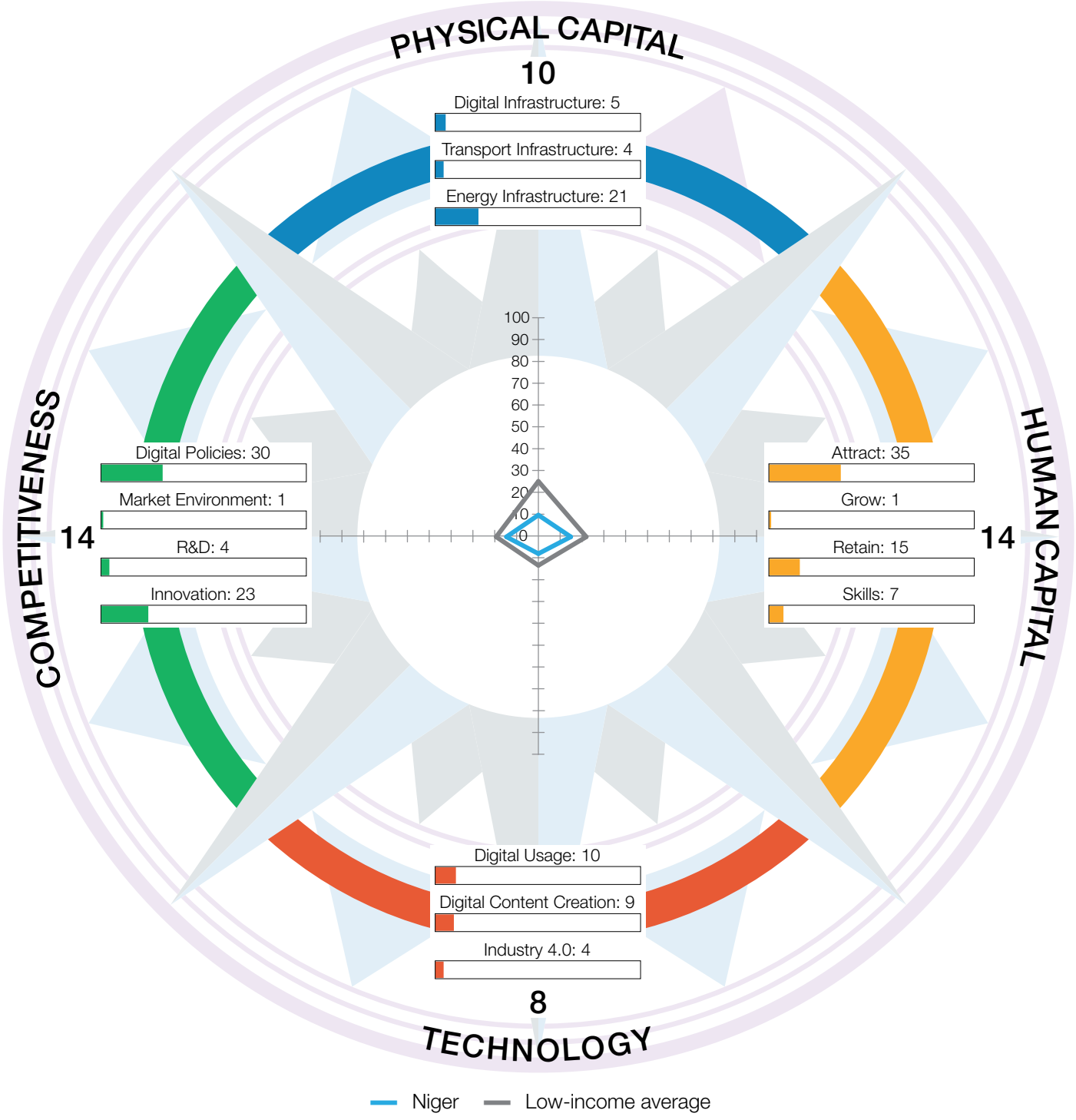
		Score	Rank
3	**TECHNOLOGY**	**61.98**	**15**
3.1	Digital Usage	84.13	10
3.1.1	Internet users	90.95	23
3.1.2	Active mobile-broadband subscriptions	38.12	53
3.1.3	Gender parity in internet usage	97.91	30
3.1.4	Firms with website	83.95	14
3.1.5	Internet shopping	88.60	7
3.1.6	Government online services	94.45	6
3.1.7	E-Participation	94.93	6
3.2	Digital Content Creation	62.85	18
3.2.1	Software development	31.76	19
3.2.2	Wikipedia edits	85.03	9
3.2.3	Internet domain registrations	41.56	14
3.2.4	Mobile apps development	93.05	23
3.3	Industry 4.0	38.96	19
3.3.1	Cloud computing	—	—
3.3.2	AI software development	45.99	16
3.3.3	AI research	47.73	14
3.3.4	ICT patent applications	9.45	25
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**53.81**	**23**
4.1	Digital Policies	76.14	35
4.1.1	ICT regulation	87.16	37
4.1.2	Cybersecurity	62.50	53
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	100.00	1
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	83.33	38
4.2	Market Environment	52.43	25
4.2.1	Extent of market dominance	43.38	57
4.2.2	Labour productivity per employee	49.23	33
4.2.3	Urbanisation	83.89	20
4.2.4	Domestic credit to private sector	66.92	10
4.2.5	Market capitalisation	18.75	29
4.3	R&D	46.64	23
4.3.1	R&D spending	26.05	30
4.3.2	University ranking	47.82	23
4.3.3	Gender parity in R&D	n/a	n/a
4.3.4	Scientific journal articles	66.05	11
4.4	Innovation	40.03	28
4.4.1	Medium- and high-tech industry	26.23	73
4.4.2	High-tech exports	25.19	29
4.4.3	Venture capital recipients, deals	19.30	27
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	73.88	4
4.4.6	Patent applications	55.56	46

Niger

Key Indicators

Rank (out of 124)	**124**	GDP per capita (PPP US$)	**1,505.24**
Income group	**Low income**	GDP (US$ billions)	**13.97**
Regional group	**Sub-Saharan Africa**	FREI score	**11.49**
Population (millions)	**26.21**	FREI score (income group average)	**19.43**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**9.72**	**124**
1.1	Digital Infrastructure	4.94	124
1.1.1	Internet access	7.77	109
1.1.2	International internet bandwidth	10.27	123
1.1.3	Fixed-broadband subscriptions	0.39	118
1.1.4	4G-mobile network coverage	8.60	121
1.1.5	Fixed broadband affordability	7.55	123
1.1.6	Mobile broadband affordability	0.00	121
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	3.63	123
1.2.1	Quality of infrastructure	7.14	120
1.2.2	Rural access	6.81	123
1.2.3	Air connectivity	0.02	123
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	20.60	124
1.3.1	Access to electricity	5.14	123
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	0.00	88
1.3.4	Energy intensity	77.26	85
2	**HUMAN CAPITAL**	**14.47**	**124**
2.1	Attract	35.49	104
2.1.1	Brain gain	n/a	n/a
2.1.2	International students	14.28	46
2.1.3	Tolerance of minorities	22.34	94
2.1.4	Tolerance of immigrants	66.15	48
2.1.5	Gender parity in high-skilled jobs	39.17	100
2.2	Grow	0.66	124
2.2.1	Tertiary enrolment	1.98	118
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	0.00	122
2.2.4	Youth inclusion	0.00	116
2.3	Retain	14.69	120
2.3.1	Pension coverage	3.88	113
2.3.2	Environmental performance	31.86	78
2.3.3	Physician density	0.00	124
2.3.4	Sanitation	6.41	122
2.3.5	Personal safety	31.31	109
2.4	Skills	7.06	119
2.4.1	Workforce with tertiary education	3.65	115
2.4.2	High-skilled workforce	19.78	80
2.4.3	Researchers	0.14	98
2.4.4	Relevance of education system to the economy	n/a	n/a
2.4.5	Digital skills	4.66	71

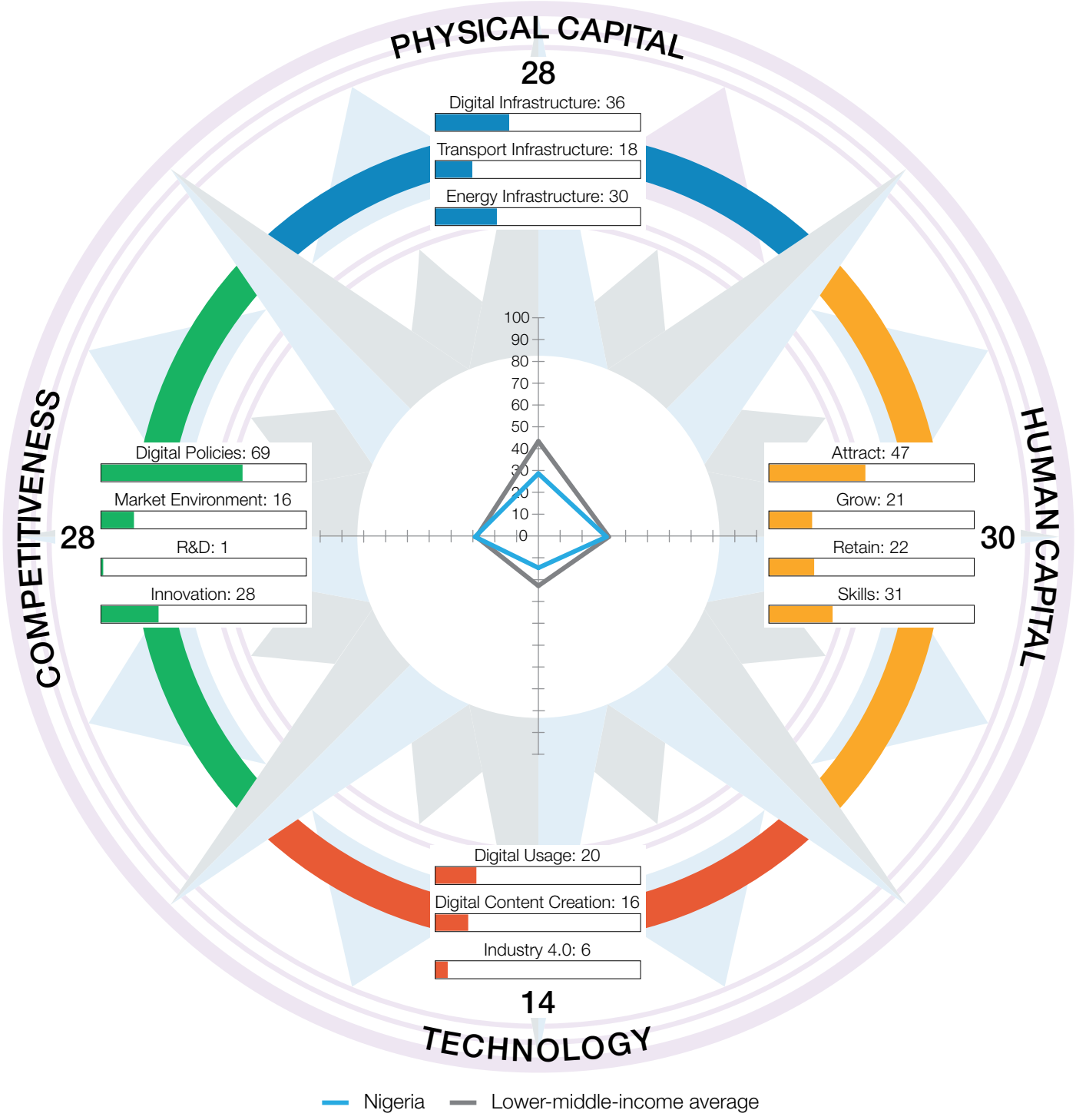
		Score	Rank
3	**TECHNOLOGY**	**7.52**	**124**
3.1	Digital Usage	9.50	124
3.1.1	Internet users	4.39	122
3.1.2	Active mobile-broadband subscriptions	0.00	124
3.1.3	Gender parity in internet usage	0.00	107
3.1.4	Firms with website	23.90	89
3.1.5	Internet shopping	2.15	114
3.1.6	Government online services	19.61	112
3.1.7	E-Participation	16.45	113
3.2	Digital Content Creation	8.94	122
3.2.1	Software development	0.00	124
3.2.2	Wikipedia edits	20.53	109
3.2.3	Internet domain registrations	0.26	103
3.2.4	Mobile apps development	14.97	123
3.3	Industry 4.0	4.13	116
3.3.1	Cloud computing	—	—
3.3.2	AI software development	0.00	121
3.3.3	AI research	0.02	118
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**14.26**	**121**
4.1	Digital Policies	29.67	114
4.1.1	ICT regulation	74.32	76
4.1.2	Cybersecurity	0.00	106
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	66.67	87
4.1.7	Data transfer	66.67	51
4.2	Market Environment	1.00	124
4.2.1	Extent of market dominance	n/a	n/a
4.2.2	Labour productivity per employee	0.29	114
4.2.3	Urbanisation	0.00	124
4.2.4	Domestic credit to private sector	2.71	113
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	3.63	109
4.3.1	R&D spending	n/a	n/a
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	10.84	100
4.3.4	Scientific journal articles	0.05	123
4.4	Innovation	22.74	85
4.4.1	Medium- and high-tech industry	21.33	82
4.4.2	High-tech exports	18.91	41
4.4.3	Venture capital recipients, deals	24.56	21
4.4.4	New product entrepreneurial activity	42.99	54
4.4.5	New business density	0.19	106
4.4.6	Patent applications	28.48	104

Nigeria

Key Indicators

Rank (out of 124)	**107**	GDP per capita (PPP US$)	**5,860.29**
Income group	**Lower-middle income**	GDP (US$ billions)	**477.39**
Regional group	**Sub-Saharan Africa**	FREI score	**25.20**
Population (millions)	**218.54**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**28.27**	**112**
1.1	Digital Infrastructure	36.48	106
1.1.1	Internet access	13.36	106
1.1.2	International internet bandwidth	21.11	115
1.1.3	Fixed-broadband subscriptions	28.74	98
1.1.4	4G-mobile network coverage	59.08	108
1.1.5	Fixed broadband affordability	39.49	113
1.1.6	Mobile broadband affordability	84.52	84
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	18.13	101
1.2.1	Quality of infrastructure	21.43	87
1.2.2	Rural access	50.09	85
1.2.3	Air connectivity	0.22	116
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	30.19	121
1.3.1	Access to electricity	52.80	108
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	0.00	88
1.3.4	Energy intensity	67.62	105
2	**HUMAN CAPITAL**	**30.42**	**94**
2.1	Attract	46.94	51
2.1.1	Brain gain	51.88	52
2.1.2	International students	n/a	n/a
2.1.3	Tolerance of minorities	8.51	113
2.1.4	Tolerance of immigrants	61.54	58
2.1.5	Gender parity in high-skilled jobs	65.83	74
2.2	Grow	20.86	117
2.2.1	Tertiary enrolment	7.15	103
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	6.57	98
2.2.4	Youth inclusion	48.86	113
2.3	Retain	22.49	105
2.3.1	Pension coverage	9.18	104
2.3.2	Environmental performance	15.93	113
2.3.3	Physician density	5.75	100
2.3.4	Sanitation	37.12	108
2.3.5	Personal safety	44.46	95
2.4	Skills	31.41	58
2.4.1	Workforce with tertiary education	19.57	81
2.4.2	High-skilled workforce	57.32	34
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	17.32	106
2.4.5	Digital skills	n/a	n/a

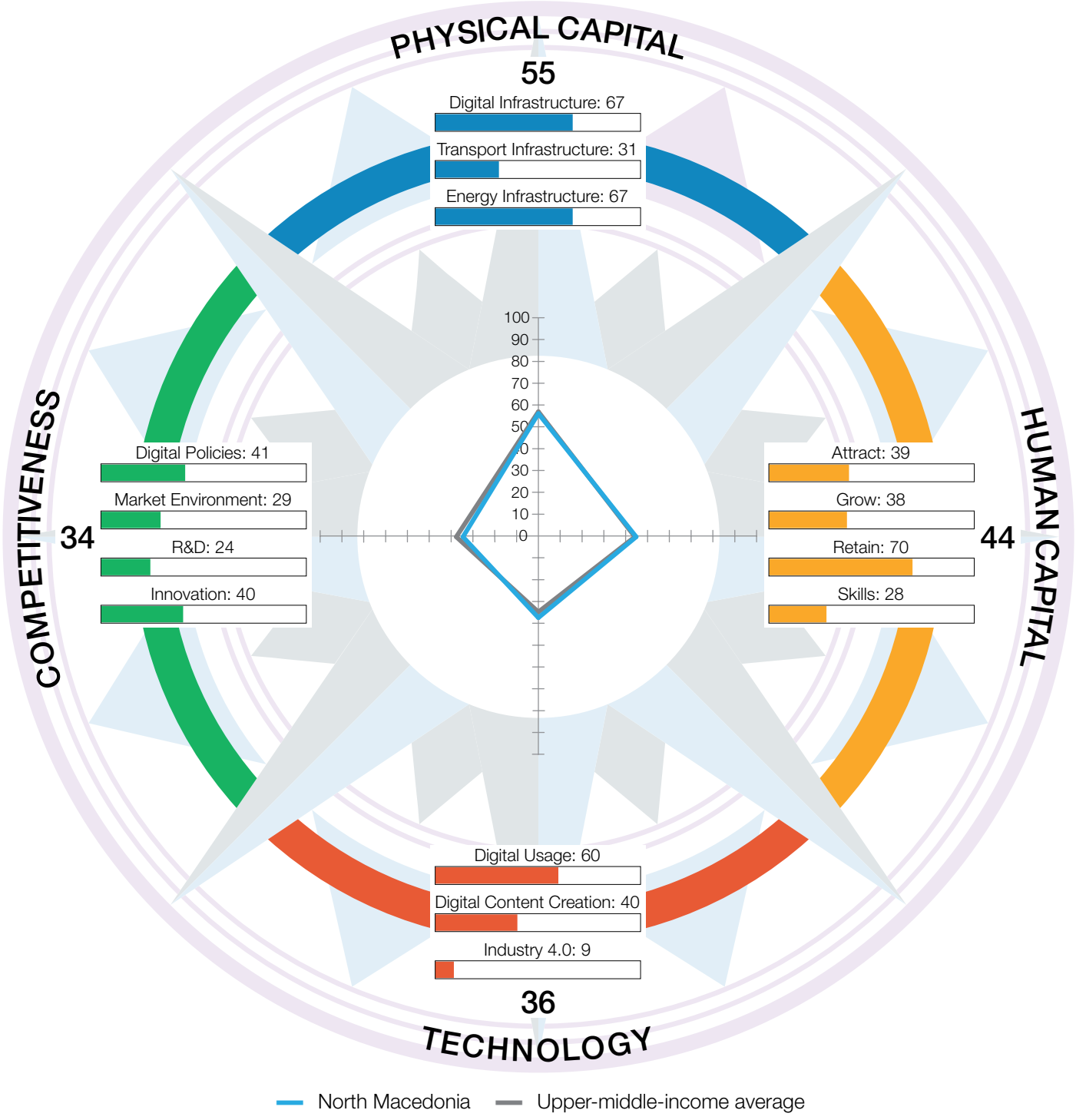
		Score	Rank
3	**TECHNOLOGY**	**13.83**	**117**
3.1	Digital Usage	19.80	114
3.1.1	Internet users	31.31	104
3.1.2	Active mobile-broadband subscriptions	13.12	113
3.1.3	Gender parity in internet usage	n/a	n/a
3.1.4	Firms with website	10.98	99
3.1.5	Internet shopping	3.23	110
3.1.6	Government online services	37.36	92
3.1.7	E-Participation	22.78	102
3.2	Digital Content Creation	15.68	112
3.2.1	Software development	1.05	97
3.2.2	Wikipedia edits	13.66	118
3.2.3	Internet domain registrations	0.30	101
3.2.4	Mobile apps development	47.70	105
3.3	Industry 4.0	6.02	102
3.3.1	Cloud computing	—	—
3.3.2	AI software development	8.50	63
3.3.3	AI research	0.96	96
3.3.4	ICT patent applications	0.00	76
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**28.29**	**92**
4.1	Digital Policies	68.71	58
4.1.1	ICT regulation	85.14	45
4.1.2	Cybersecurity	62.50	53
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	83.33	38
4.2	Market Environment	15.60	110
4.2.1	Extent of market dominance	24.20	94
4.2.2	Labour productivity per employee	6.72	96
4.2.3	Urbanisation	40.58	91
4.2.4	Domestic credit to private sector	2.59	114
4.2.5	Market capitalisation	3.89	65
4.3	R&D	0.68	117
4.3.1	R&D spending	n/a	n/a
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	n/a	n/a
4.3.4	Scientific journal articles	1.37	93
4.4	Innovation	28.16	54
4.4.1	Medium- and high-tech industry	40.56	45
4.4.2	High-tech exports	9.96	66
4.4.3	Venture capital recipients, deals	5.92	60
4.4.4	New product entrepreneurial activity	67.82	18
4.4.5	New business density	3.49	75
4.4.6	Patent applications	41.23	82

North Macedonia

Key Indicators

Rank (out of 124)	**64**	GDP per capita (PPP US$)	**20,161.75**
Income group	**Upper-middle income**	GDP (US$ billions)	**13.56**
Regional group	**Europe**	FREI score	**42.11**
Population (millions)	**2.06**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**55.02**	**69**
1.1	Digital Infrastructure	67.43	67
1.1.1	Internet access	79.53	64
1.1.2	International internet bandwidth	33.94	103
1.1.3	Fixed-broadband subscriptions	92.21	48
1.1.4	4G-mobile network coverage	99.55	33
1.1.5	Fixed broadband affordability	72.77	76
1.1.6	Mobile broadband affordability	84.95	83
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	30.86	69
1.2.1	Quality of infrastructure	42.86	53
1.2.2	Rural access	65.88	63
1.2.3	Air connectivity	5.04	75
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	66.76	85
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	87.33	43
2	**HUMAN CAPITAL**	**43.66**	**65**
2.1	Attract	38.83	91
2.1.1	Brain gain	7.66	118
2.1.2	International students	13.22	48
2.1.3	Tolerance of minorities	42.55	62
2.1.4	Tolerance of immigrants	35.38	101
2.1.5	Gender parity in high-skilled jobs	95.36	10
2.2	Grow	37.97	74
2.2.1	Tertiary enrolment	27.83	73
2.2.2	Reading, maths, and science	26.92	64
2.2.3	Use of virtual professional networks	20.50	65
2.2.4	Youth inclusion	76.63	69
2.3	Retain	70.19	45
2.3.1	Pension coverage	67.96	65
2.3.2	Environmental performance	60.00	32
2.3.3	Physician density	44.65	53
2.3.4	Sanitation	98.16	40
2.3.5	Personal safety	80.20	38
2.4	Skills	27.63	63
2.4.1	Workforce with tertiary education	34.89	49
2.4.2	High-skilled workforce	49.14	41
2.4.3	Researchers	8.49	58
2.4.4	Relevance of education system to the economy	20.87	97
2.4.5	Digital skills	24.74	41

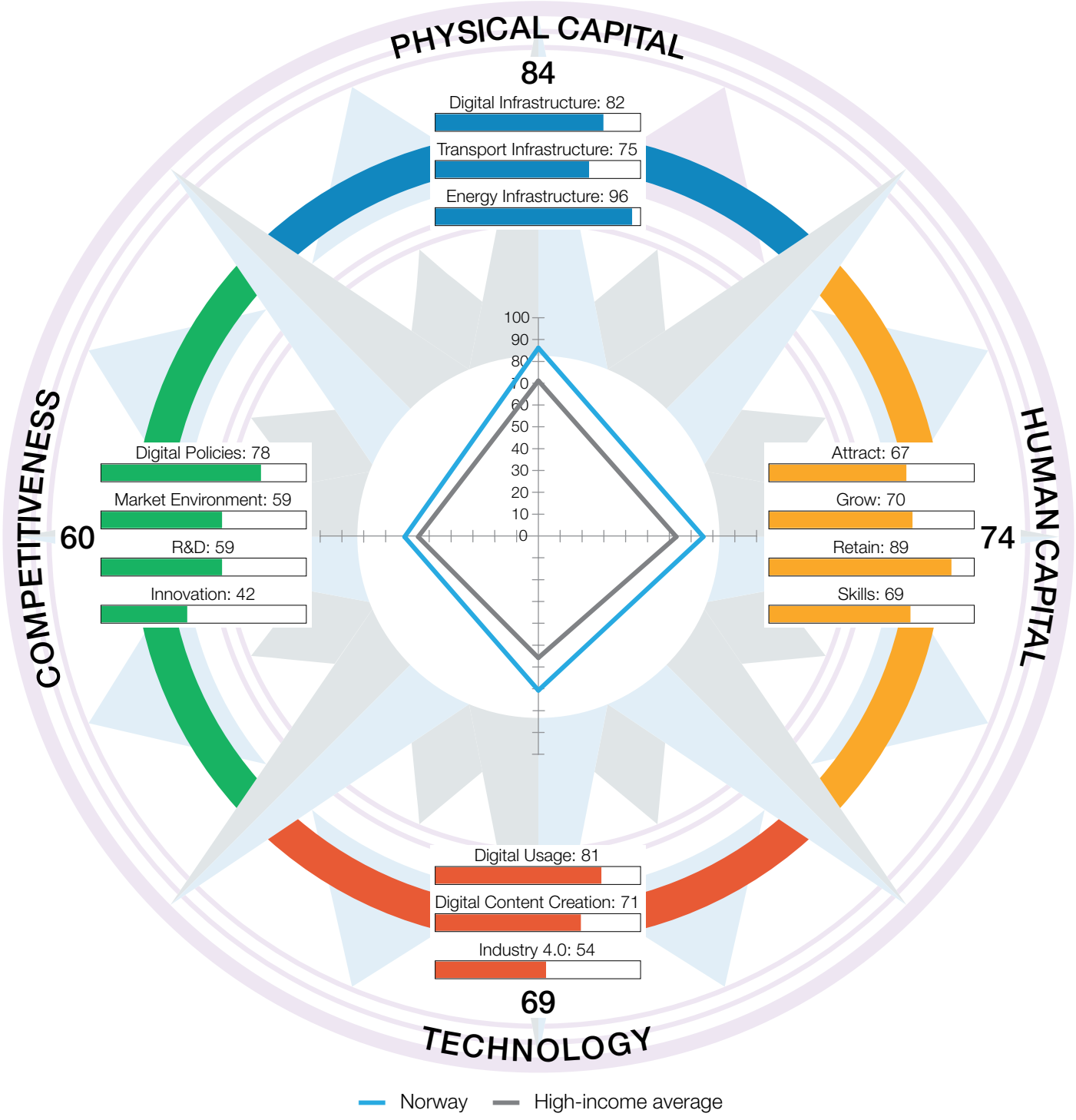
		Score	Rank
3	**TECHNOLOGY**	**36.09**	**54**
3.1	Digital Usage	59.93	60
3.1.1	Internet users	80.20	56
3.1.2	Active mobile-broadband subscriptions	26.20	91
3.1.3	Gender parity in internet usage	91.12	68
3.1.4	Firms with website	60.71	45
3.1.5	Internet shopping	34.75	57
3.1.6	Government online services	60.70	64
3.1.7	E-Participation	65.82	43
3.2	Digital Content Creation	39.71	46
3.2.1	Software development	5.76	52
3.2.2	Wikipedia edits	71.12	37
3.2.3	Internet domain registrations	5.73	47
3.2.4	Mobile apps development	76.23	59
3.3	Industry 4.0	8.64	81
3.3.1	Cloud computing	—	—
3.3.2	AI software development	7.34	69
3.3.3	AI research	15.88	43
3.3.4	ICT patent applications	0.00	76
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**33.67**	**74**
4.1	Digital Policies	41.33	103
4.1.1	ICT regulation	85.14	45
4.1.2	Cybersecurity	37.50	87
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	28.84	80
4.2.1	Extent of market dominance	11.75	115
4.2.2	Labour productivity per employee	31.07	54
4.2.3	Urbanisation	49.70	75
4.2.4	Domestic credit to private sector	22.86	54
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	24.33	75
4.3.1	R&D spending	6.82	66
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	82.81	28
4.3.4	Scientific journal articles	7.67	63
4.4	Innovation	40.17	27
4.4.1	Medium- and high-tech industry	40.92	44
4.4.2	High-tech exports	6.36	85
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	58.69	30
4.4.5	New business density	n/a	n/a
4.4.6	Patent applications	54.71	49

Norway

Key Indicators

Rank (out of 124)	**7**	GDP per capita (PPP US$)	**114,898.76**
Income group	**High income**	GDP (US$ billions)	**579.27**
Regional group	**Europe**	FREI score	**71.55**
Population (millions)	**5.46**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**84.32**	**1**
1.1	Digital Infrastructure	82.40	13
1.1.1	Internet access	99.05	8
1.1.2	International internet bandwidth	48.85	47
1.1.3	Fixed-broadband subscriptions	96.87	28
1.1.4	4G-mobile network coverage	99.89	17
1.1.5	Fixed broadband affordability	89.74	30
1.1.6	Mobile broadband affordability	96.94	31
1.1.7	Computer software spending	45.45	13
1.2	Transport Infrastructure	74.90	4
1.2.1	Quality of infrastructure	75.00	15
1.2.2	Rural access	68.55	61
1.2.3	Air connectivity	60.25	10
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	95.67	1
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	87.02	45
2	**HUMAN CAPITAL**	**73.63**	**9**
2.1	Attract	67.38	18
2.1.1	Brain gain	64.29	26
2.1.2	International students	11.55	53
2.1.3	Tolerance of minorities	67.02	28
2.1.4	Tolerance of immigrants	95.38	3
2.1.5	Gender parity in high-skilled jobs	98.65	2
2.2	Grow	69.64	10
2.2.1	Tertiary enrolment	55.55	17
2.2.2	Reading, maths, and science	66.48	21
2.2.3	Use of virtual professional networks	61.38	15
2.2.4	Youth inclusion	95.15	7
2.3	Retain	88.60	7
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	68.47	20
2.3.3	Physician density	81.86	7
2.3.4	Sanitation	97.86	43
2.3.5	Personal safety	94.78	6
2.4	Skills	68.90	8
2.4.1	Workforce with tertiary education	56.14	15
2.4.2	High-skilled workforce	80.51	5
2.4.3	Researchers	76.84	6
2.4.4	Relevance of education system to the economy	72.74	17
2.4.5	Digital skills	58.25	8

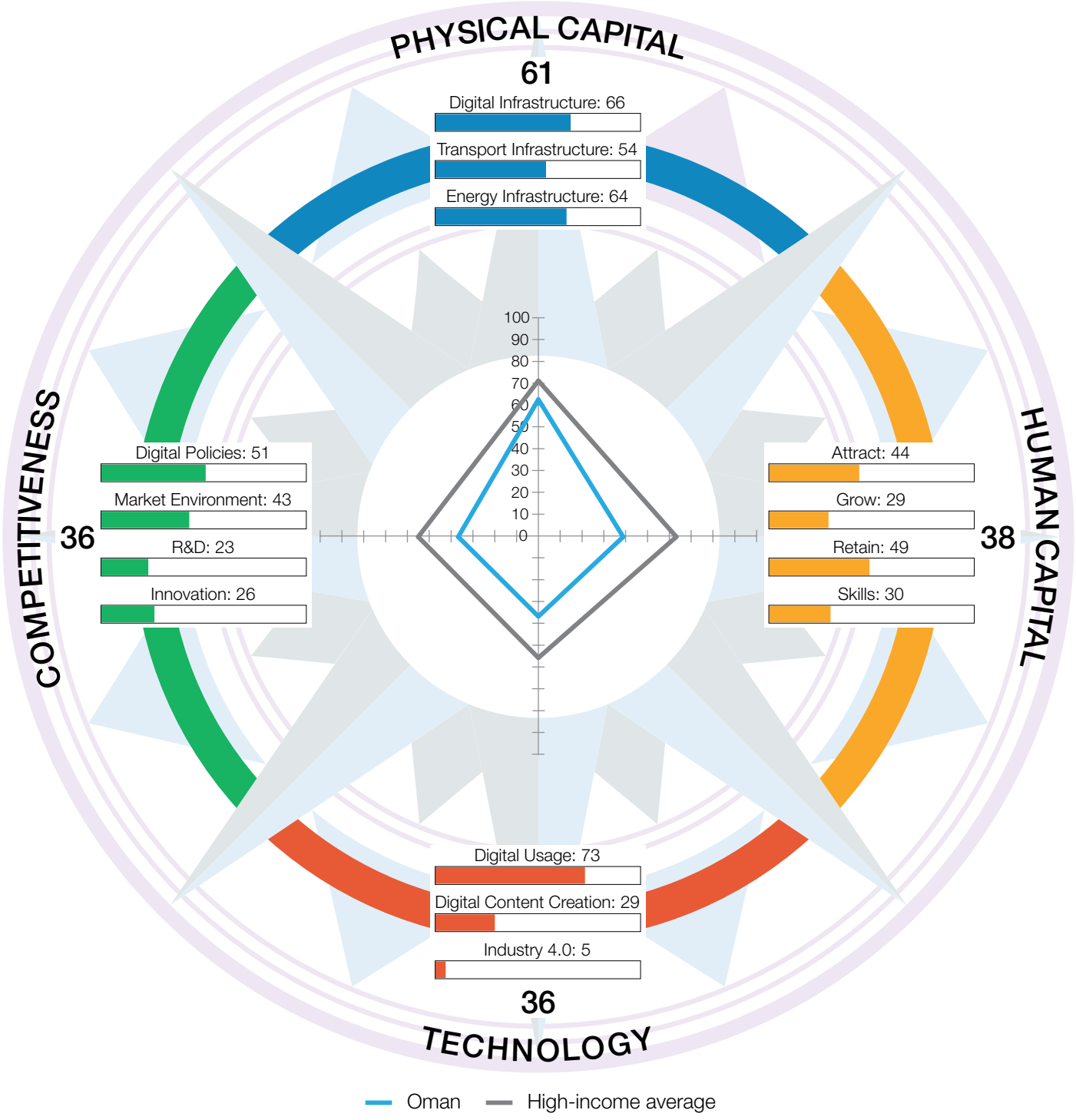
		Score	Rank
3	**TECHNOLOGY**	**68.53**	**9**
3.1	Digital Usage	80.75	15
3.1.1	Internet users	98.94	7
3.1.2	Active mobile-broadband subscriptions	41.97	42
3.1.3	Gender parity in internet usage	100.00	4
3.1.4	Firms with website	84.79	9
3.1.5	Internet shopping	100.00	1
3.1.6	Government online services	73.72	39
3.1.7	E-Participation	65.82	43
3.2	Digital Content Creation	70.91	6
3.2.1	Software development	50.68	4
3.2.2	Wikipedia edits	89.05	5
3.2.3	Internet domain registrations	49.65	9
3.2.4	Mobile apps development	94.24	19
3.3	Industry 4.0	53.93	11
3.3.1	Cloud computing	—	—
3.3.2	AI software development	88.65	5
3.3.3	AI research	82.05	3
3.3.4	ICT patent applications	23.27	20
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**59.73**	**14**
4.1	Digital Policies	78.30	32
4.1.1	ICT regulation	93.92	11
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	50.00	58
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	59.26	15
4.2.1	Extent of market dominance	69.17	18
4.2.2	Labour productivity per employee	75.94	6
4.2.3	Urbanisation	78.76	28
4.2.4	Domestic credit to private sector	50.64	18
4.2.5	Market capitalisation	21.81	24
4.3	R&D	59.44	8
4.3.1	R&D spending	42.41	16
4.3.2	University ranking	44.68	26
4.3.3	Gender parity in R&D	58.40	51
4.3.4	Scientific journal articles	92.29	3
4.4	Innovation	41.92	23
4.4.1	Medium- and high-tech industry	54.89	20
4.4.2	High-tech exports	32.03	20
4.4.3	Venture capital recipients, deals	16.04	33
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	38.93	14
4.4.6	Patent applications	67.73	21

Oman

Key Indicators

Rank (out of 124)	**63**	GDP per capita (PPP US$)	**41,724.34**
Income group	**High income**	GDP (US$ billions)	**114.67**
Regional group	**Middle East and North Africa**	FREI score	**42.61**
Population (millions)	**4.58**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**61.30**	**50**
1.1	Digital Infrastructure	66.35	71
1.1.1	Internet access	94.35	20
1.1.2	International internet bandwidth	54.67	32
1.1.3	Fixed-broadband subscriptions	44.06	91
1.1.4	4G-mobile network coverage	97.63	62
1.1.5	Fixed broadband affordability	72.97	73
1.1.6	Mobile broadband affordability	91.67	66
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	53.78	25
1.2.1	Quality of infrastructure	50.00	45
1.2.2	Rural access	26.70	110
1.2.3	Air connectivity	38.42	16
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	63.77	90
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	63.92	110
2	**HUMAN CAPITAL**	**37.86**	**81**
2.1	Attract	43.54	65
2.1.1	Brain gain	69.24	19
2.1.2	International students	8.09	60
2.1.3	Tolerance of minorities	75.53	18
2.1.4	Tolerance of immigrants	n/a	n/a
2.1.5	Gender parity in high-skilled jobs	21.31	111
2.2	Grow	28.86	100
2.2.1	Tertiary enrolment	30.78	67
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	26.95	50
2.2.4	Youth inclusion	n/a	n/a
2.3	Retain	49.36	78
2.3.1	Pension coverage	45.82	74
2.3.2	Environmental performance	20.00	101
2.3.3	Physician density	31.24	74
2.3.4	Sanitation	99.25	25
2.3.5	Personal safety	50.49	85
2.4	Skills	29.66	61
2.4.1	Workforce with tertiary education	22.75	76
2.4.2	High-skilled workforce	20.80	78
2.4.3	Researchers	3.11	77
2.4.4	Relevance of education system to the economy	61.45	30
2.4.5	Digital skills	40.19	21

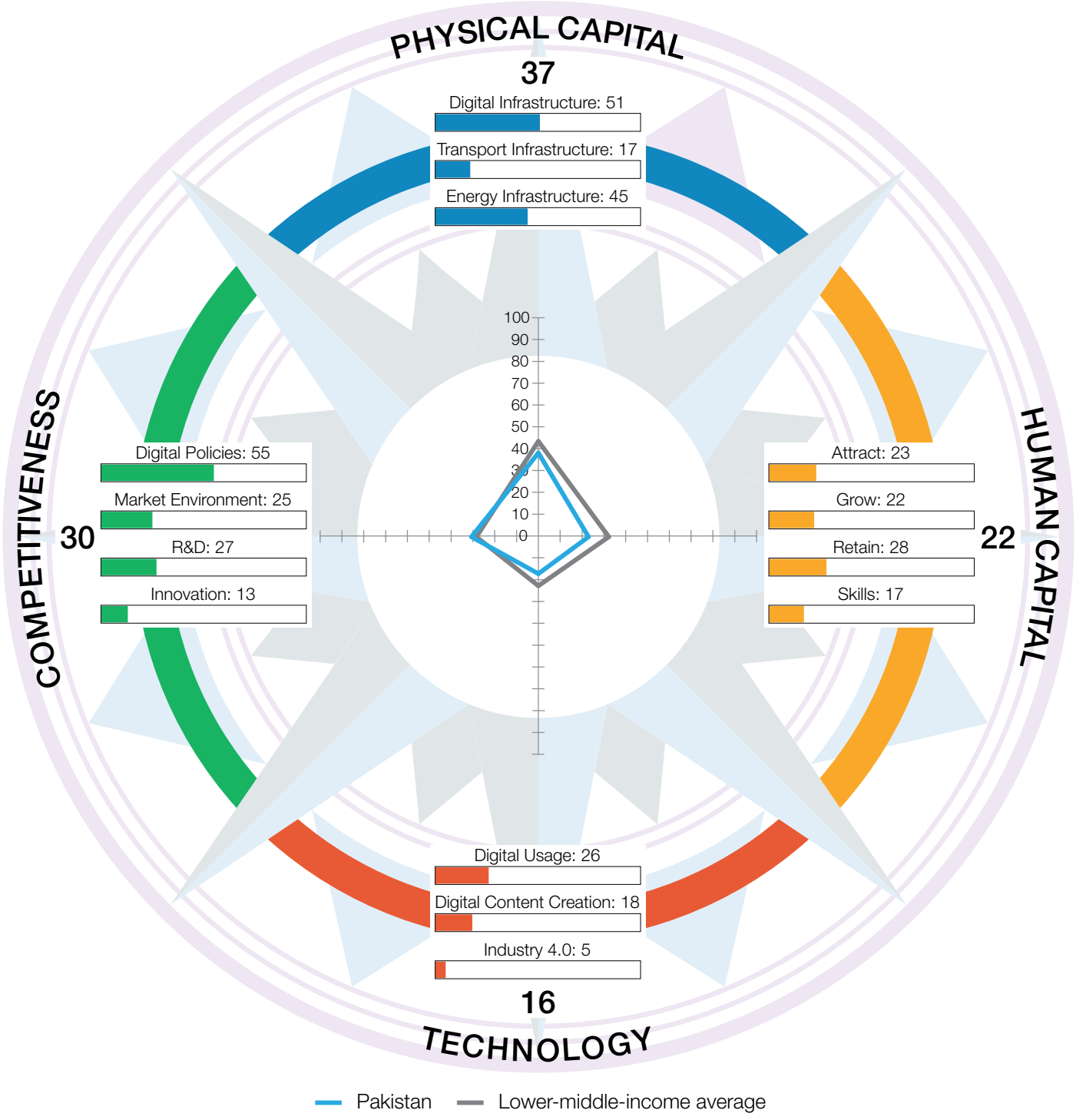
		Score	Rank
3	**TECHNOLOGY**	**35.51**	**57**
3.1	Digital Usage	72.70	28
3.1.1	Internet users	94.92	13
3.1.2	Active mobile-broadband subscriptions	45.40	29
3.1.3	Gender parity in internet usage	95.11	57
3.1.4	Firms with website	n/a	n/a
3.1.5	Internet shopping	n/a	n/a
3.1.6	Government online services	66.02	57
3.1.7	E-Participation	62.03	50
3.2	Digital Content Creation	29.13	73
3.2.1	Software development	0.80	103
3.2.2	Wikipedia edits	37.79	79
3.2.3	Internet domain registrations	0.88	87
3.2.4	Mobile apps development	77.06	56
3.3	Industry 4.0	4.69	113
3.3.1	Cloud computing	—	—
3.3.2	AI software development	1.99	99
3.3.3	AI research	10.35	50
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**35.78**	**69**
4.1	Digital Policies	50.64	92
4.1.1	ICT regulation	87.84	33
4.1.2	Cybersecurity	0.00	106
4.1.3	AI regulation	50.00	58
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	43.32	40
4.2.1	Extent of market dominance	62.11	32
4.2.2	Labour productivity per employee	44.76	40
4.2.3	Urbanisation	81.50	24
4.2.4	Domestic credit to private sector	21.75	58
4.2.5	Market capitalisation	6.50	56
4.3	R&D	22.95	82
4.3.1	R&D spending	5.19	74
4.3.2	University ranking	29.69	43
4.3.3	Gender parity in R&D	48.06	61
4.3.4	Scientific journal articles	8.88	60
4.4	Innovation	26.19	67
4.4.1	Medium- and high-tech industry	54.72	22
4.4.2	High-tech exports	10.15	64
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	6.10	64
4.4.6	Patent applications	33.80	95

Pakistan

Key Indicators

Rank (out of 124)	**104**	GDP per capita (PPP US$)	**6,437.16**
Income group	**Lower-middle income**	GDP (US$ billions)	**376.53**
Regional group	**Asia and Pacific**	FREI score	**26.54**
Population (millions)	**235.82**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**37.46**	**103**
1.1	Digital Infrastructure	50.83	97
1.1.1	Internet access	32.70	92
1.1.2	International internet bandwidth	42.62	75
1.1.3	Fixed-broadband subscriptions	37.58	94
1.1.4	4G-mobile network coverage	73.55	99
1.1.5	Fixed broadband affordability	45.46	105
1.1.6	Mobile broadband affordability	96.60	35
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	16.74	106
1.2.1	Quality of infrastructure	14.29	109
1.2.2	Rural access	49.28	86
1.2.3	Air connectivity	0.82	104
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	44.81	109
1.3.1	Access to electricity	94.08	96
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	0.00	88
1.3.4	Energy intensity	83.32	64
2	**HUMAN CAPITAL**	**22.38**	**117**
2.1	Attract	22.99	122
2.1.1	Brain gain	40.01	79
2.1.2	International students	n/a	n/a
2.1.3	Tolerance of minorities	8.51	113
2.1.4	Tolerance of immigrants	36.92	100
2.1.5	Gender parity in high-skilled jobs	6.51	118
2.2	Grow	21.99	114
2.2.1	Tertiary enrolment	7.23	102
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	6.68	97
2.2.4	Youth inclusion	52.05	110
2.3	Retain	27.51	103
2.3.1	Pension coverage	3.88	113
2.3.2	Environmental performance	9.66	120
2.3.3	Physician density	16.74	84
2.3.4	Sanitation	65.31	99
2.3.5	Personal safety	41.96	100
2.4	Skills	17.05	99
2.4.1	Workforce with tertiary education	11.20	94
2.4.2	High-skilled workforce	13.49	93
2.4.3	Researchers	4.70	70
2.4.4	Relevance of education system to the economy	48.53	47
2.4.5	Digital skills	7.34	63

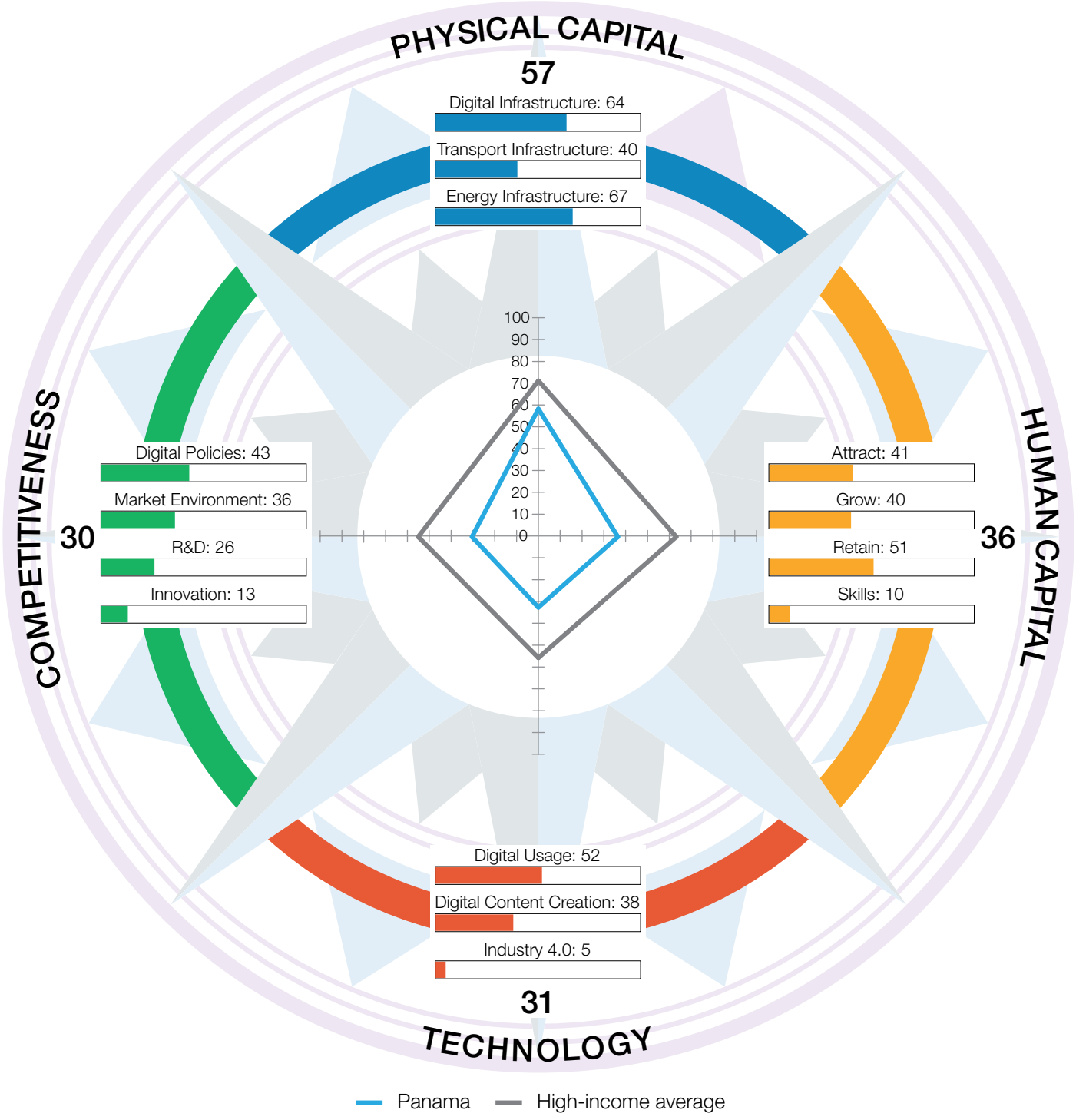
		Score	Rank
3	**TECHNOLOGY**	**16.45**	**110**
3.1	Digital Usage	26.31	107
3.1.1	Internet users	20.13	112
3.1.2	Active mobile-broadband subscriptions	17.35	109
3.1.3	Gender parity in internet usage	31.91	102
3.1.4	Firms with website	42.96	67
3.1.5	Internet shopping	0.00	121
3.1.6	Government online services	42.74	86
3.1.7	E-Participation	29.11	94
3.2	Digital Content Creation	18.35	103
3.2.1	Software development	0.82	102
3.2.2	Wikipedia edits	15.40	116
3.2.3	Internet domain registrations	0.27	102
3.2.4	Mobile apps development	56.91	92
3.3	Industry 4.0	4.69	114
3.3.1	Cloud computing	—	—
3.3.2	AI software development	10.82	58
3.3.3	AI research	2.91	81
3.3.4	ICT patent applications	0.14	67
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**29.87**	**87**
4.1	Digital Policies	55.12	82
4.1.1	ICT regulation	85.81	42
4.1.2	Cybersecurity	0.00	106
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	100.00	1
4.1.5	Online content	100.00	1
4.1.6	Data privacy	33.33	104
4.1.7	Data transfer	66.67	51
4.2	Market Environment	25.05	93
4.2.1	Extent of market dominance	63.91	27
4.2.2	Labour productivity per employee	8.89	92
4.2.3	Urbanisation	24.22	104
4.2.4	Domestic credit to private sector	3.18	111
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	26.63	65
4.3.1	R&D spending	2.84	90
4.3.2	University ranking	30.80	42
4.3.3	Gender parity in R&D	70.11	39
4.3.4	Scientific journal articles	2.76	85
4.4	Innovation	12.69	120
4.4.1	Medium- and high-tech industry	27.68	68
4.4.2	High-tech exports	2.16	105
4.4.3	Venture capital recipients, deals	2.12	77
4.4.4	New product entrepreneurial activity	4.25	92
4.4.5	New business density	0.44	104
4.4.6	Patent applications	39.47	84

Panama

Key Indicators

Rank (out of 124)	**78**	GDP per capita (PPP US$)	**39,279.68**
Income group	**High income**	GDP (US$ billions)	**76.52**
Regional group	**Latin America and the Caribbean**	FREI score	**38.43**
Population (millions)	**4.41**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**57.11**	**61**
1.1	Digital Infrastructure	64.30	78
1.1.1	Internet access	70.12	75
1.1.2	International internet bandwidth	47.14	55
1.1.3	Fixed-broadband subscriptions	83.83	66
1.1.4	4G-mobile network coverage	82.80	91
1.1.5	Fixed broadband affordability	64.25	89
1.1.6	Mobile broadband affordability	83.76	86
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	39.87	48
1.2.1	Quality of infrastructure	53.57	42
1.2.2	Rural access	20.93	116
1.2.3	Air connectivity	23.18	33
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	67.16	84
1.3.1	Access to electricity	94.47	95
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	98.18	3
2	**HUMAN CAPITAL**	**35.51**	**84**
2.1	Attract	40.57	86
2.1.1	Brain gain	52.47	51
2.1.2	International students	8.08	61
2.1.3	Tolerance of minorities	40.43	69
2.1.4	Tolerance of immigrants	43.08	88
2.1.5	Gender parity in high-skilled jobs	58.78	88
2.2	Grow	39.73	70
2.2.1	Tertiary enrolment	28.75	70
2.2.2	Reading, maths, and science	12.53	73
2.2.3	Use of virtual professional networks	39.64	32
2.2.4	Youth inclusion	77.99	64
2.3	Retain	51.37	74
2.3.1	Pension coverage	27.86	85
2.3.2	Environmental performance	53.56	39
2.3.3	Physician density	25.43	78
2.3.4	Sanitation	83.06	85
2.3.5	Personal safety	66.96	55
2.4	Skills	10.36	113
2.4.1	Workforce with tertiary education	21.31	79
2.4.2	High-skilled workforce	12.60	95
2.4.3	Researchers	0.29	93
2.4.4	Relevance of education system to the economy	7.23	116
2.4.5	Digital skills	n/a	n/a

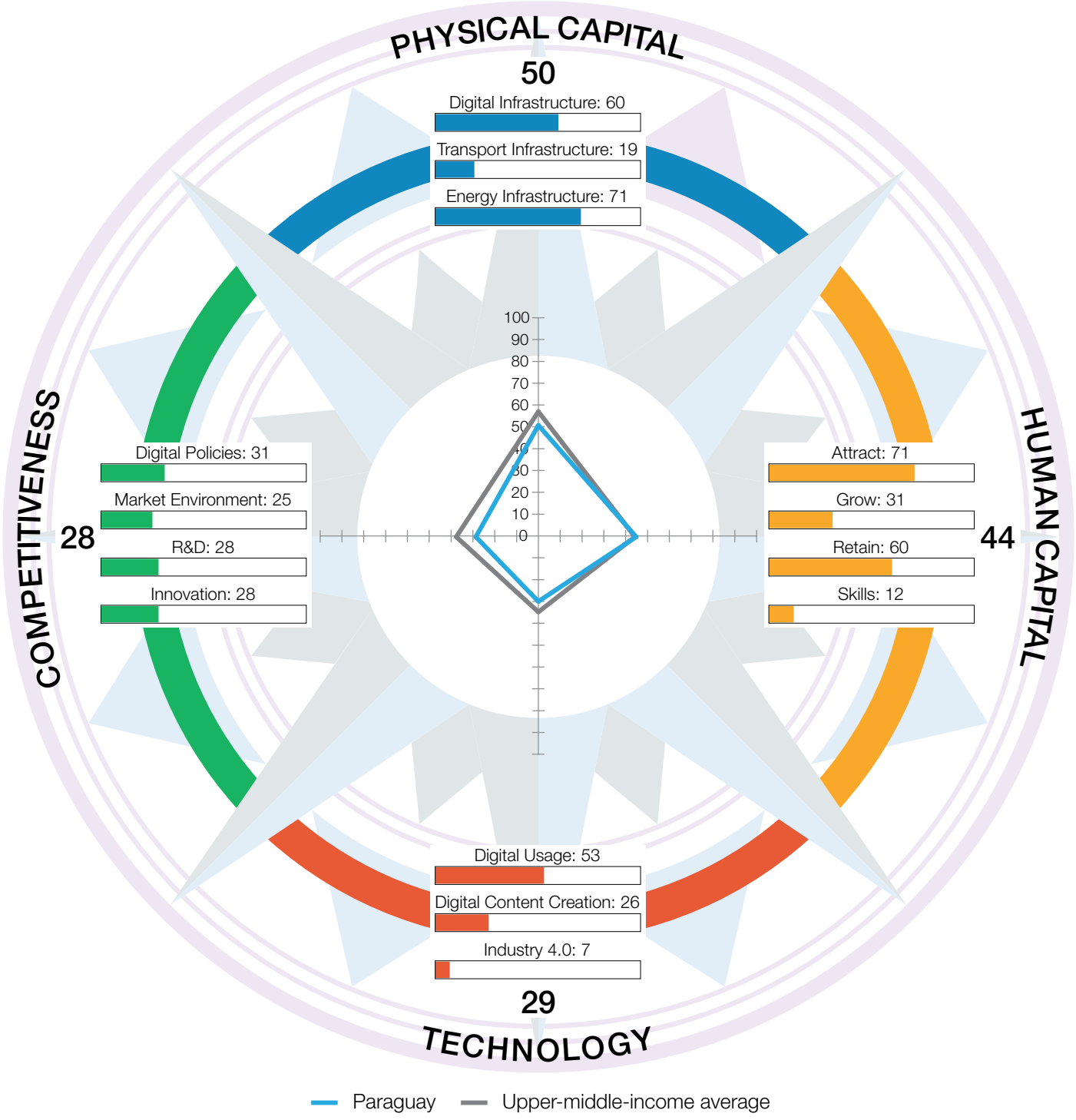
		Score	Rank
3	**TECHNOLOGY**	**31.48**	**74**
3.1	Digital Usage	51.61	76
3.1.1	Internet users	61.93	87
3.1.2	Active mobile-broadband subscriptions	30.88	79
3.1.3	Gender parity in internet usage	98.98	15
3.1.4	Firms with website	n/a	n/a
3.1.5	Internet shopping	15.26	80
3.1.6	Government online services	57.02	70
3.1.7	E-Participation	45.57	74
3.2	Digital Content Creation	37.51	51
3.2.1	Software development	1.66	87
3.2.2	Wikipedia edits	48.38	63
3.2.3	Internet domain registrations	27.52	22
3.2.4	Mobile apps development	72.46	66
3.3	Industry 4.0	5.33	110
3.3.1	Cloud computing	—	—
3.3.2	AI software development	5.73	78
3.3.3	AI research	1.48	89
3.3.4	ICT patent applications	0.00	76
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**29.63**	**89**
4.1	Digital Policies	43.26	98
4.1.1	ICT regulation	73.65	77
4.1.2	Cybersecurity	62.50	53
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	36.08	57
4.2.1	Extent of market dominance	31.47	84
4.2.2	Labour productivity per employee	n/a	n/a
4.2.3	Urbanisation	61.36	59
4.2.4	Domestic credit to private sector	44.17	24
4.2.5	Market capitalisation	7.32	54
4.3	R&D	26.39	68
4.3.1	R&D spending	2.86	88
4.3.2	University ranking	8.00	72
4.3.3	Gender parity in R&D	92.48	12
4.3.4	Scientific journal articles	2.21	89
4.4	Innovation	12.81	119
4.4.1	Medium- and high-tech industry	7.27	109
4.4.2	High-tech exports	0.25	122
4.4.3	Venture capital recipients, deals	2.22	76
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	17.31	30
4.4.6	Patent applications	37.00	86

Paraguay

Key Indicators

Rank (out of 124)	**85**	GDP per capita (PPP US$)	**15,977.31**
Income group	**Upper-middle income**	GDP (US$ billions)	**41.72**
Regional group	**Latin America and the Caribbean**	FREI score	**37.55**
Population (millions)	**6.78**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**49.77**	**87**
1.1	Digital Infrastructure	59.66	86
1.1.1	Internet access	44.21	89
1.1.2	International internet bandwidth	31.19	106
1.1.3	Fixed-broadband subscriptions	91.98	49
1.1.4	4G-mobile network coverage	93.01	79
1.1.5	Fixed broadband affordability	66.00	88
1.1.6	Mobile broadband affordability	82.14	89
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	19.04	96
1.2.1	Quality of infrastructure	25.00	81
1.2.2	Rural access	39.53	98
1.2.3	Air connectivity	1.18	100
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	70.63	69
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	87.22	64
1.3.4	Energy intensity	87.27	44
2	**HUMAN CAPITAL**	**43.66**	**64**
2.1	Attract	71.02	10
2.1.1	Brain gain	44.99	68
2.1.2	International students	n/a	n/a
2.1.3	Tolerance of minorities	53.19	47
2.1.4	Tolerance of immigrants	87.69	12
2.1.5	Gender parity in high-skilled jobs	98.21	4
2.2	Grow	31.10	91
2.2.1	Tertiary enrolment	0.00	121
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	16.87	72
2.2.4	Youth inclusion	76.42	70
2.3	Retain	60.49	62
2.3.1	Pension coverage	63.88	67
2.3.2	Environmental performance	37.29	65
2.3.3	Physician density	51.15	43
2.3.4	Sanitation	92.01	67
2.3.5	Personal safety	58.11	71
2.4	Skills	12.04	108
2.4.1	Workforce with tertiary education	17.71	85
2.4.2	High-skilled workforce	28.51	69
2.4.3	Researchers	1.33	83
2.4.4	Relevance of education system to the economy	0.59	120
2.4.5	Digital skills	n/a	n/a

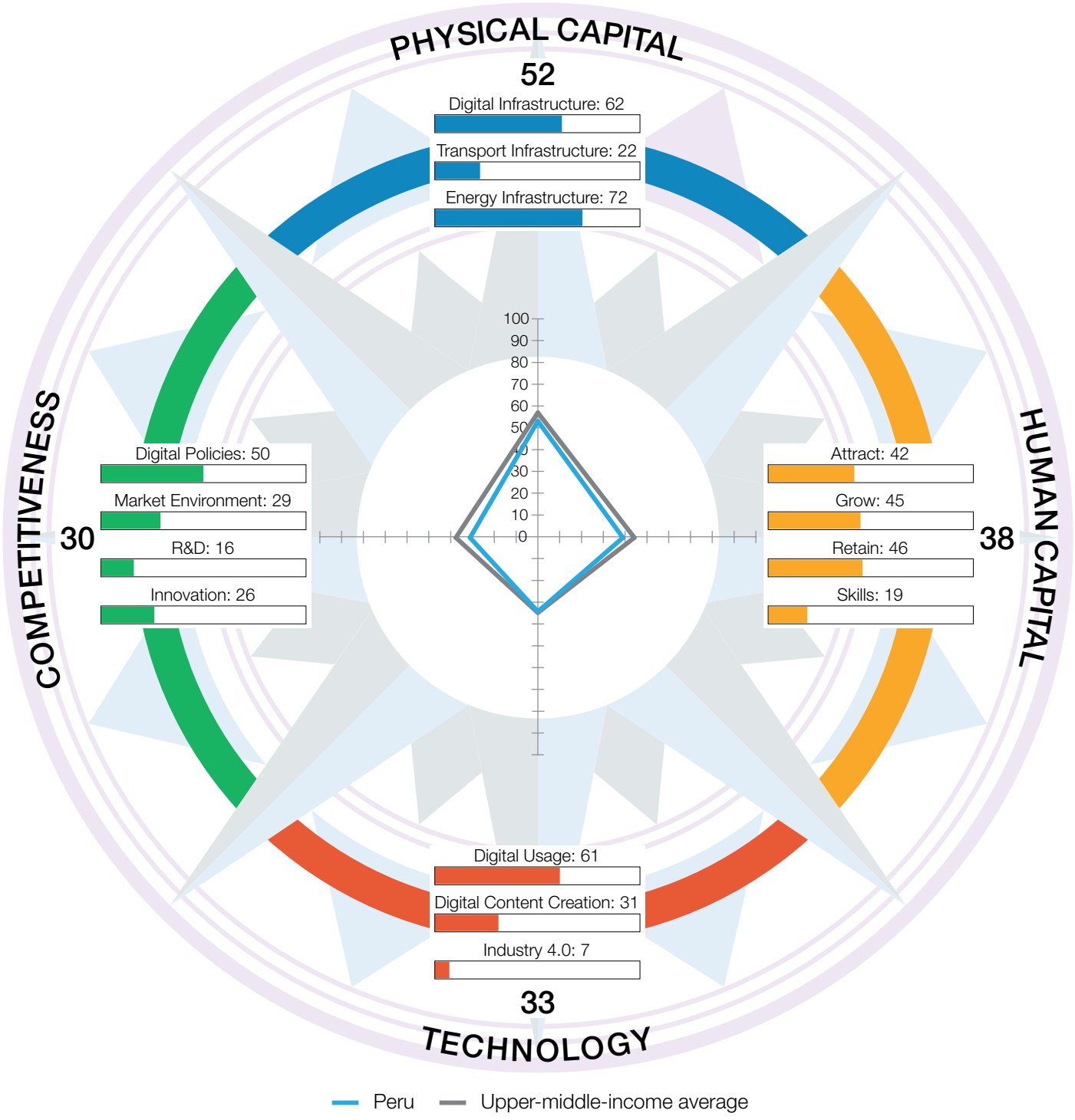
		Score	Rank
3	**TECHNOLOGY**	**28.84**	**79**
3.1	Digital Usage	52.81	71
3.1.1	Internet users	75.53	63
3.1.2	Active mobile-broadband subscriptions	27.19	88
3.1.3	Gender parity in internet usage	96.00	49
3.1.4	Firms with website	70.48	30
3.1.5	Internet shopping	6.91	99
3.1.6	Government online services	48.03	83
3.1.7	E-Participation	45.57	74
3.2	Digital Content Creation	26.46	80
3.2.1	Software development	1.24	91
3.2.2	Wikipedia edits	34.80	84
3.2.3	Internet domain registrations	1.25	81
3.2.4	Mobile apps development	68.55	73
3.3	Industry 4.0	7.25	94
3.3.1	Cloud computing	—	—
3.3.2	AI software development	1.71	101
3.3.3	AI research	0.83	98
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**27.92**	**94**
4.1	Digital Policies	30.78	113
4.1.1	ICT regulation	52.97	111
4.1.2	Cybersecurity	62.50	53
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	33.33	104
4.1.7	Data transfer	66.67	51
4.2	Market Environment	25.45	91
4.2.1	Extent of market dominance	11.04	116
4.2.2	Labour productivity per employee	16.32	79
4.2.3	Urbanisation	54.03	69
4.2.4	Domestic credit to private sector	20.40	64
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	27.90	58
4.3.1	R&D spending	2.70	91
4.3.2	University ranking	9.32	69
4.3.3	Gender parity in R&D	98.76	2
4.3.4	Scientific journal articles	0.82	101
4.4	Innovation	27.57	57
4.4.1	Medium- and high-tech industry	26.37	71
4.4.2	High-tech exports	11.41	59
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	69.24	15
4.4.5	New business density	0.03	108
4.4.6	Patent applications	30.78	99

Peru

Key Indicators

Rank (out of 124)	**79**	GDP per capita (PPP US$)	**15,047.52**
Income group	**Upper-middle income**	GDP (US$ billions)	**242.63**
Regional group	**Latin America and the Caribbean**	FREI score	**38.37**
Population (millions)	**34.05**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**52.09**	**78**
1.1	Digital Infrastructure	62.22	83
1.1.1	Internet access	47.55	88
1.1.2	International internet bandwidth	36.89	93
1.1.3	Fixed-broadband subscriptions	94.14	43
1.1.4	4G-mobile network coverage	79.85	94
1.1.5	Fixed broadband affordability	72.19	81
1.1.6	Mobile broadband affordability	86.73	80
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	21.76	89
1.2.1	Quality of infrastructure	25.00	81
1.2.2	Rural access	44.47	93
1.2.3	Air connectivity	5.40	72
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	72.28	56
1.3.1	Access to electricity	94.87	94
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	96.24	34
1.3.4	Energy intensity	92.48	16
2	**HUMAN CAPITAL**	**38.01**	**80**
2.1	Attract	42.30	77
2.1.1	Brain gain	36.30	88
2.1.2	International students	n/a	n/a
2.1.3	Tolerance of minorities	14.89	107
2.1.4	Tolerance of immigrants	50.77	77
2.1.5	Gender parity in high-skilled jobs	67.25	70
2.2	Grow	44.99	58
2.2.1	Tertiary enrolment	46.38	33
2.2.2	Reading, maths, and science	27.52	63
2.2.3	Use of virtual professional networks	36.01	35
2.2.4	Youth inclusion	70.02	81
2.3	Retain	45.85	85
2.3.1	Pension coverage	34.39	80
2.3.2	Environmental performance	35.42	71
2.3.3	Physician density	25.69	77
2.3.4	Sanitation	76.48	92
2.3.5	Personal safety	57.25	73
2.4	Skills	18.90	93
2.4.1	Workforce with tertiary education	27.37	65
2.4.2	High-skilled workforce	19.22	82
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	12.71	110
2.4.5	Digital skills	16.29	54

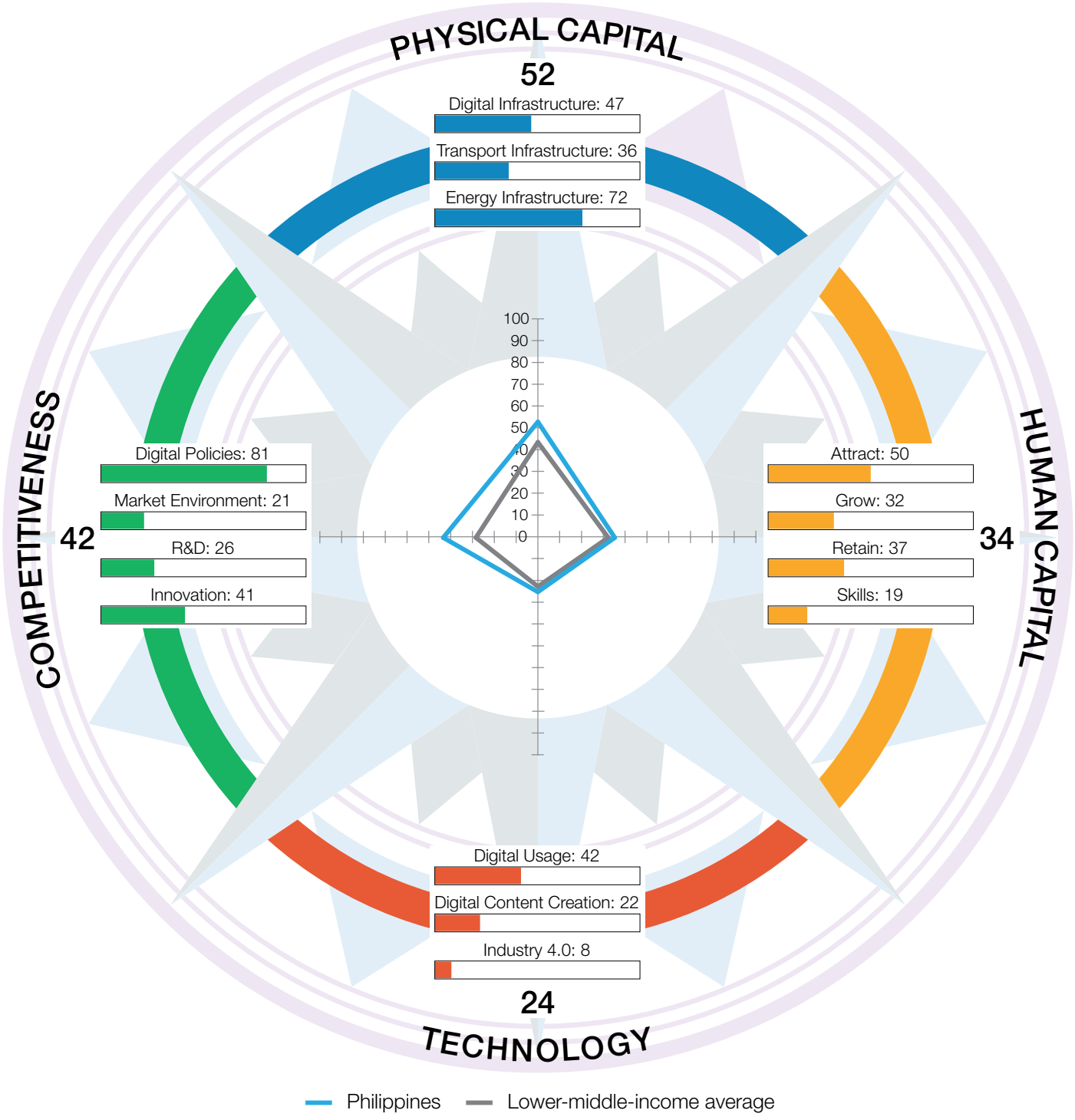
		Score	Rank
3	**TECHNOLOGY**	**33.06**	**67**
3.1	Digital Usage	60.81	58
3.1.1	Internet users	69.23	78
3.1.2	Active mobile-broadband subscriptions	31.82	74
3.1.3	Gender parity in internet usage	90.28	71
3.1.4	Firms with website	67.58	37
3.1.5	Internet shopping	18.38	72
3.1.6	Government online services	74.93	37
3.1.7	E-Participation	73.42	22
3.2	Digital Content Creation	31.16	69
3.2.1	Software development	3.32	66
3.2.2	Wikipedia edits	49.14	62
3.2.3	Internet domain registrations	2.75	64
3.2.4	Mobile apps development	69.42	68
3.3	Industry 4.0	7.21	95
3.3.1	Cloud computing	—	—
3.3.2	AI software development	4.53	87
3.3.3	AI research	2.25	86
3.3.4	ICT patent applications	0.14	65
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**30.31**	**85**
4.1	Digital Policies	50.47	93
4.1.1	ICT regulation	82.43	58
4.1.2	Cybersecurity	37.50	87
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	66.67	87
4.1.7	Data transfer	66.67	51
4.2	Market Environment	28.65	82
4.2.1	Extent of market dominance	24.08	95
4.2.2	Labour productivity per employee	13.63	84
4.2.3	Urbanisation	73.56	39
4.2.4	Domestic credit to private sector	18.98	69
4.2.5	Market capitalisation	12.98	38
4.3	R&D	16.42	91
4.3.1	R&D spending	2.98	87
4.3.2	University ranking	21.07	51
4.3.3	Gender parity in R&D	38.62	75
4.3.4	Scientific journal articles	2.99	84
4.4	Innovation	25.70	69
4.4.1	Medium- and high-tech industry	17.51	89
4.4.2	High-tech exports	7.32	79
4.4.3	Venture capital recipients, deals	0.64	89
4.4.4	New product entrepreneurial activity	78.89	10
4.4.5	New business density	15.55	32
4.4.6	Patent applications	34.32	94

Philippines

Key Indicators

Rank (out of 124)	**82**	GDP per capita (PPP US$)	**10,133.20**
Income group	**Lower-middle income**	GDP (US$ billions)	**404.28**
Regional group	**Asia and Pacific**	FREI score	**38.15**
Population (millions)	**115.56**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**51.71**	**82**
1.1	Digital Infrastructure	47.03	99
1.1.1	Internet access	15.85	102
1.1.2	International internet bandwidth	34.21	101
1.1.3	Fixed-broadband subscriptions	n/a	n/a
1.1.4	4G-mobile network coverage	78.49	96
1.1.5	Fixed broadband affordability	51.24	99
1.1.6	Mobile broadband affordability	84.18	85
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	35.63	54
1.2.1	Quality of infrastructure	50.00	45
1.2.2	Rural access	79.07	44
1.2.3	Air connectivity	6.80	63
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	72.47	52
1.3.1	Access to electricity	97.07	93
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	99.25	6
1.3.4	Energy intensity	90.48	26
2	**HUMAN CAPITAL**	**34.36**	**87**
2.1	Attract	50.44	39
2.1.1	Brain gain	36.78	87
2.1.2	International students	n/a	n/a
2.1.3	Tolerance of minorities	28.72	85
2.1.4	Tolerance of immigrants	63.08	55
2.1.5	Gender parity in high-skilled jobs	73.17	60
2.2	Grow	31.50	89
2.2.1	Tertiary enrolment	22.82	80
2.2.2	Reading, maths, and science	6.37	75
2.2.3	Use of virtual professional networks	18.69	66
2.2.4	Youth inclusion	78.13	62
2.3	Retain	36.64	94
2.3.1	Pension coverage	18.88	90
2.3.2	Environmental performance	16.95	109
2.3.3	Physician density	11.99	91
2.3.4	Sanitation	80.52	88
2.3.5	Personal safety	54.85	77
2.4	Skills	18.87	94
2.4.1	Workforce with tertiary education	31.87	54
2.4.2	High-skilled workforce	23.46	77
2.4.3	Researchers	1.84	81
2.4.4	Relevance of education system to the economy	37.16	73
2.4.5	Digital skills	0.00	79

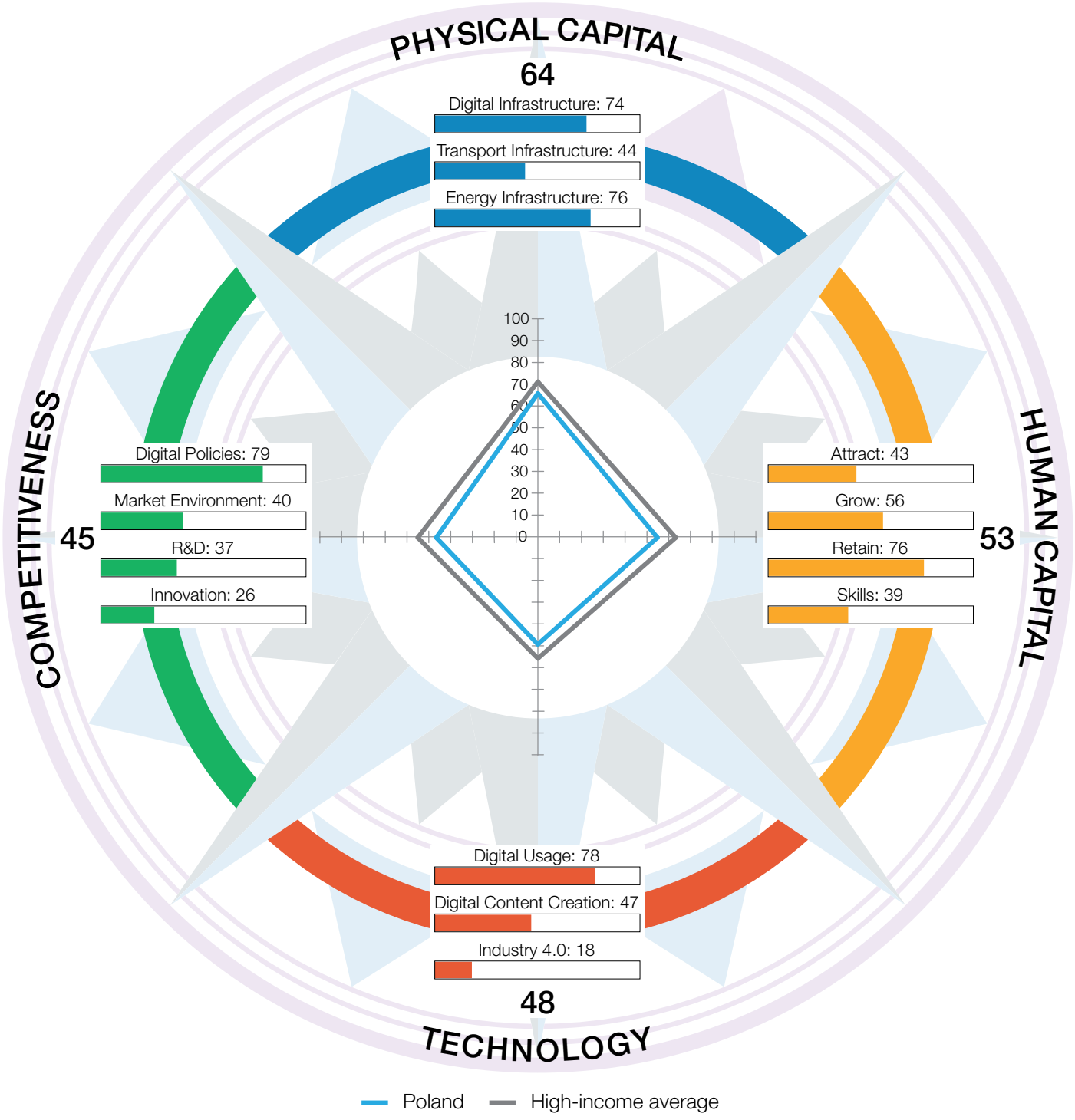
		Score	Rank
3	**TECHNOLOGY**	**24.25**	**89**
3.1	Digital Usage	42.24	86
3.1.1	Internet users	46.54	96
3.1.2	Active mobile-broadband subscriptions	24.28	94
3.1.3	Gender parity in internet usage	n/a	n/a
3.1.4	Firms with website	47.31	60
3.1.5	Internet shopping	41.03	50
3.1.6	Government online services	51.25	75
3.1.7	E-Participation	43.03	78
3.2	Digital Content Creation	22.47	96
3.2.1	Software development	1.82	84
3.2.2	Wikipedia edits	35.70	83
3.2.3	Internet domain registrations	0.57	94
3.2.4	Mobile apps development	51.78	99
3.3	Industry 4.0	8.05	87
3.3.1	Cloud computing	—	—
3.3.2	AI software development	7.53	68
3.3.3	AI research	1.33	93
3.3.4	ICT patent applications	0.14	68
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**42.28**	**50**
4.1	Digital Policies	80.56	27
4.1.1	ICT regulation	59.73	103
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	21.19	103
4.2.1	Extent of market dominance	15.40	109
4.2.2	Labour productivity per employee	11.80	86
4.2.3	Urbanisation	36.47	96
4.2.4	Domestic credit to private sector	19.54	66
4.2.5	Market capitalisation	22.74	22
4.3	R&D	26.12	69
4.3.1	R&D spending	5.79	70
4.3.2	University ranking	20.36	53
4.3.3	Gender parity in R&D	77.34	33
4.3.4	Scientific journal articles	0.97	99
4.4	Innovation	41.26	24
4.4.1	Medium- and high-tech industry	57.44	17
4.4.2	High-tech exports	100.00	1
4.4.3	Venture capital recipients, deals	2.95	73
4.4.4	New product entrepreneurial activity	42.34	56
4.4.5	New business density	0.72	99
4.4.6	Patent applications	44.08	78

Poland

Key Indicators

Rank (out of 124)	**37**	GDP per capita (PPP US$)	**43,268.54**
Income group	**High income**	GDP (US$ billions)	**688.18**
Regional group	**Europe**	FREI score	**52.74**
Population (millions)	**37.56**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**64.45**	**42**
1.1	Digital Infrastructure	73.74	52
1.1.1	Internet access	92.32	25
1.1.2	International internet bandwidth	32.22	105
1.1.3	Fixed-broadband subscriptions	77.76	73
1.1.4	4G-mobile network coverage	100.00	1
1.1.5	Fixed broadband affordability	89.39	31
1.1.6	Mobile broadband affordability	97.19	26
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	43.82	43
1.2.1	Quality of infrastructure	60.71	37
1.2.2	Rural access	92.03	25
1.2.3	Air connectivity	6.74	65
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	75.80	29
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	98.50	15
1.3.4	Energy intensity	86.36	51
2	**HUMAN CAPITAL**	**53.40**	**37**
2.1	Attract	42.60	74
2.1.1	Brain gain	28.29	95
2.1.2	International students	11.78	52
2.1.3	Tolerance of minorities	46.81	54
2.1.4	Tolerance of immigrants	50.77	77
2.1.5	Gender parity in high-skilled jobs	75.36	54
2.2	Grow	56.05	34
2.2.1	Tertiary enrolment	46.21	35
2.2.2	Reading, maths, and science	72.98	8
2.2.3	Use of virtual professional networks	17.33	70
2.2.4	Youth inclusion	87.70	30
2.3	Retain	76.11	34
2.3.1	Pension coverage	83.27	56
2.3.2	Environmental performance	53.73	38
2.3.3	Physician density	58.67	32
2.3.4	Sanitation	100.00	1
2.3.5	Personal safety	84.88	29
2.4	Skills	38.83	41
2.4.1	Workforce with tertiary education	45.06	33
2.4.2	High-skilled workforce	62.86	28
2.4.3	Researchers	37.64	28
2.4.4	Relevance of education system to the economy	25.14	90
2.4.5	Digital skills	23.43	46

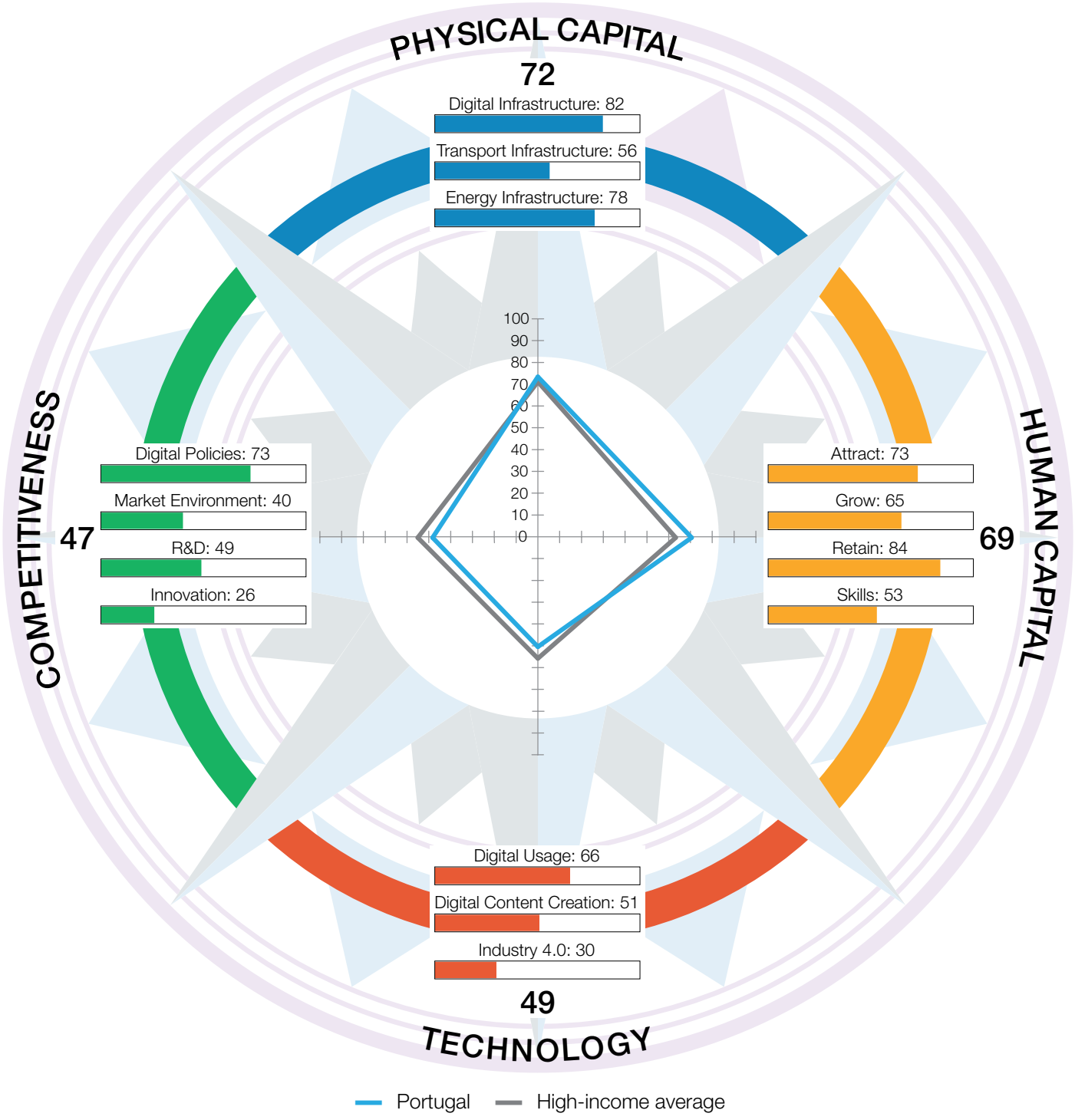
		Score	Rank
3	**TECHNOLOGY**	**47.70**	**31**
3.1	Digital Usage	78.09	17
3.1.1	Internet users	84.42	46
3.1.2	Active mobile-broadband subscriptions	81.40	3
3.1.3	Gender parity in internet usage	98.98	14
3.1.4	Firms with website	70.25	32
3.1.5	Internet shopping	78.11	18
3.1.6	Government online services	72.69	43
3.1.7	E-Participation	60.76	51
3.2	Digital Content Creation	47.47	35
3.2.1	Software development	19.05	31
3.2.2	Wikipedia edits	70.99	38
3.2.3	Internet domain registrations	16.22	32
3.2.4	Mobile apps development	83.61	38
3.3	Industry 4.0	17.55	38
3.3.1	Cloud computing	—	—
3.3.2	AI software development	31.44	25
3.3.3	AI research	17.11	40
3.3.4	ICT patent applications	3.52	37
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**45.39**	**44**
4.1	Digital Policies	78.93	29
4.1.1	ICT regulation	85.81	42
4.1.2	Cybersecurity	100.00	1
4.1.3	AI regulation	50.00	58
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	39.68	47
4.2.1	Extent of market dominance	68.93	19
4.2.2	Labour productivity per employee	50.02	32
4.2.3	Urbanisation	52.21	71
4.2.4	Domestic credit to private sector	18.36	72
4.2.5	Market capitalisation	8.89	47
4.3	R&D	37.40	35
4.3.1	R&D spending	25.70	31
4.3.2	University ranking	32.12	40
4.3.3	Gender parity in R&D	55.49	55
4.3.4	Scientific journal articles	36.28	34
4.4	Innovation	25.56	71
4.4.1	Medium- and high-tech industry	40.33	46
4.4.2	High-tech exports	14.57	51
4.4.3	Venture capital recipients, deals	3.33	67
4.4.4	New product entrepreneurial activity	25.10	72
4.4.5	New business density	6.63	61
4.4.6	Patent applications	63.40	25

Portugal

Key Indicators

Rank (out of 124)	**26**	GDP per capita (PPP US$)	**41,451.61**
Income group	**High income**	GDP (US$ billions)	**251.95**
Regional group	**Europe**	FREI score	**59.10**
Population (millions)	**10.38**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**71.88**	**21**
1.1	Digital Infrastructure	82.03	14
1.1.1	Internet access	87.12	42
1.1.2	International internet bandwidth	52.35	39
1.1.3	Fixed-broadband subscriptions	99.55	10
1.1.4	4G-mobile network coverage	99.78	27
1.1.5	Fixed broadband affordability	85.96	44
1.1.6	Mobile broadband affordability	94.90	48
1.1.7	Computer software spending	54.55	4
1.2	Transport Infrastructure	56.11	18
1.2.1	Quality of infrastructure	64.29	28
1.2.2	Rural access	98.41	7
1.2.3	Air connectivity	37.54	17
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	77.50	21
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	97.74	28
1.3.4	Energy intensity	91.87	20
2	**HUMAN CAPITAL**	**68.70**	**16**
2.1	Attract	72.57	9
2.1.1	Brain gain	53.53	46
2.1.2	International students	30.72	22
2.1.3	Tolerance of minorities	92.55	4
2.1.4	Tolerance of immigrants	92.31	8
2.1.5	Gender parity in high-skilled jobs	93.76	15
2.2	Grow	64.85	20
2.2.1	Tertiary enrolment	46.14	36
2.2.2	Reading, maths, and science	64.46	25
2.2.3	Use of virtual professional networks	55.61	20
2.2.4	Youth inclusion	93.18	14
2.3	Retain	84.01	17
2.3.1	Pension coverage	90.20	51
2.3.2	Environmental performance	53.39	40
2.3.3	Physician density	88.99	2
2.3.4	Sanitation	99.57	19
2.3.5	Personal safety	87.92	19
2.4	Skills	53.37	21
2.4.1	Workforce with tertiary education	41.61	34
2.4.2	High-skilled workforce	63.53	26
2.4.3	Researchers	59.78	15
2.4.4	Relevance of education system to the economy	62.92	27
2.4.5	Digital skills	38.99	22

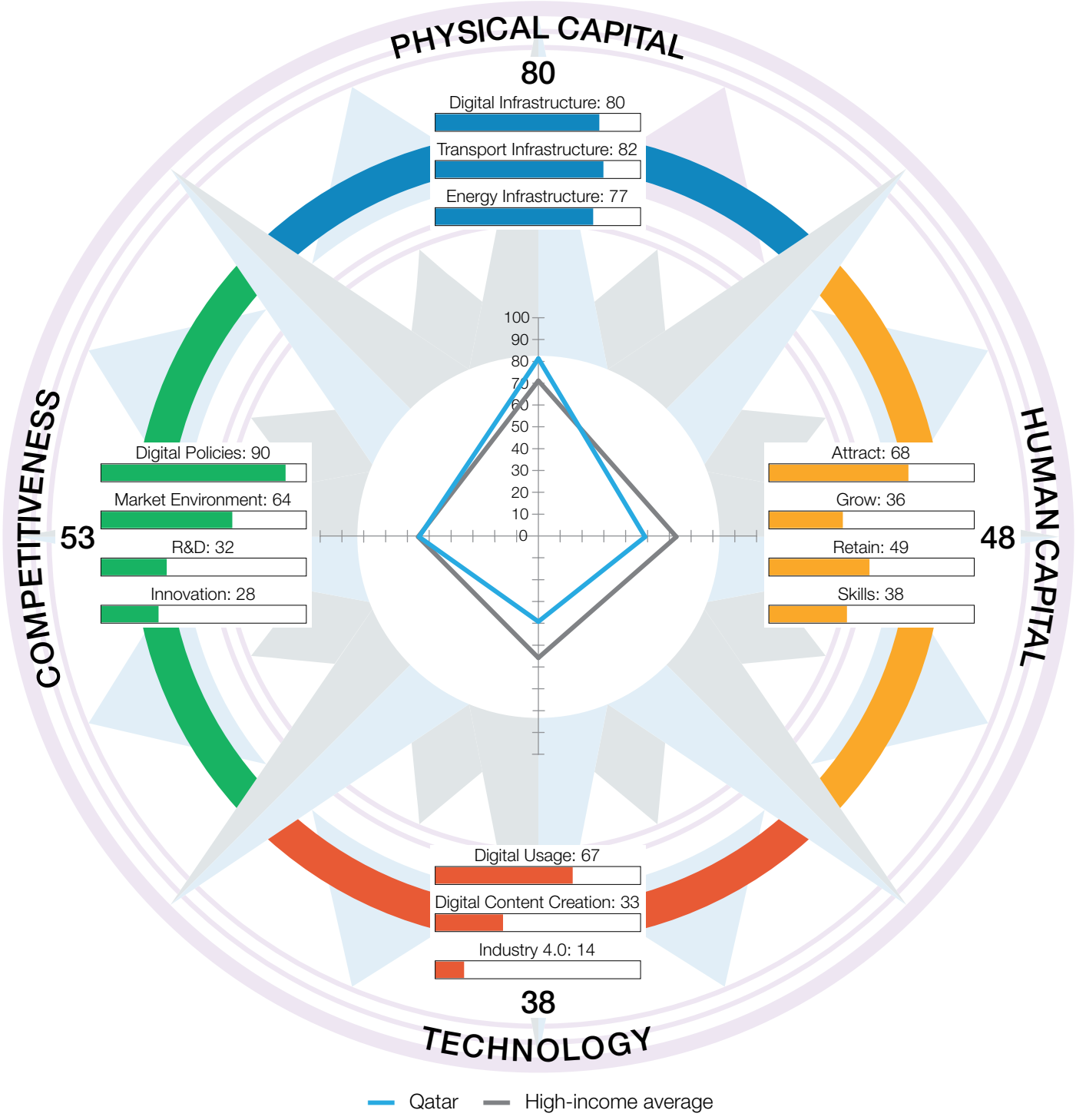
		Score	Rank
3	**TECHNOLOGY**	**48.78**	**29**
3.1	Digital Usage	65.65	47
3.1.1	Internet users	81.16	54
3.1.2	Active mobile-broadband subscriptions	34.71	65
3.1.3	Gender parity in internet usage	95.08	58
3.1.4	Firms with website	58.94	49
3.1.5	Internet shopping	47.00	45
3.1.6	Government online services	73.02	40
3.1.7	E-Participation	69.62	32
3.2	Digital Content Creation	50.70	30
3.2.1	Software development	17.75	33
3.2.2	Wikipedia edits	66.94	41
3.2.3	Internet domain registrations	31.52	20
3.2.4	Mobile apps development	86.57	34
3.3	Industry 4.0	30.00	23
3.3.1	Cloud computing	—	—
3.3.2	AI software development	36.30	21
3.3.3	AI research	46.56	16
3.3.4	ICT patent applications	6.87	29
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**47.04**	**36**
4.1	Digital Policies	72.84	48
4.1.1	ICT regulation	93.24	14
4.1.2	Cybersecurity	100.00	1
4.1.3	AI regulation	50.00	58
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	39.79	46
4.2.1	Extent of market dominance	44.42	55
4.2.2	Labour productivity per employee	44.52	41
4.2.3	Urbanisation	58.37	64
4.2.4	Domestic credit to private sector	43.95	25
4.2.5	Market capitalisation	7.67	52
4.3	R&D	49.08	18
4.3.1	R&D spending	29.97	24
4.3.2	University ranking	33.43	38
4.3.3	Gender parity in R&D	70.76	36
4.3.4	Scientific journal articles	62.14	14
4.4	Innovation	26.44	63
4.4.1	Medium- and high-tech industry	32.85	57
4.4.2	High-tech exports	9.59	67
4.4.3	Venture capital recipients, deals	11.64	38
4.4.4	New product entrepreneurial activity	19.18	79
4.4.5	New business density	22.41	24
4.4.6	Patent applications	62.95	26

Qatar

Key Indicators

Rank (out of 124)	**34**	GDP per capita (PPP US$)	**114,648.03**
Income group	**High income**	GDP (US$ billions)	**237.30**
Regional group	**Middle East and North Africa**	FREI score	**54.58**
Population (millions)	**2.70**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**79.59**	**5**
1.1	Digital Infrastructure	79.60	24
1.1.1	Internet access	94.97	17
1.1.2	International internet bandwidth	56.84	27
1.1.3	Fixed-broadband subscriptions	99.59	7
1.1.4	4G-mobile network coverage	99.78	27
1.1.5	Fixed broadband affordability	80.64	58
1.1.6	Mobile broadband affordability	98.13	14
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	82.47	2
1.2.1	Quality of infrastructure	71.43	18
1.2.2	Rural access	58.46	77
1.2.3	Air connectivity	100.00	1
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	76.70	23
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	63.92	110
2	**HUMAN CAPITAL**	**47.62**	**53**
2.1	Attract	67.53	17
2.1.1	Brain gain	84.36	8
2.1.2	International students	100.00	1
2.1.3	Tolerance of minorities	70.21	22
2.1.4	Tolerance of immigrants	83.08	20
2.1.5	Gender parity in high-skilled jobs	0.00	121
2.2	Grow	36.15	77
2.2.1	Tertiary enrolment	15.81	88
2.2.2	Reading, maths, and science	32.41	57
2.2.3	Use of virtual professional networks	60.25	17
2.2.4	Youth inclusion	n/a	n/a
2.3	Retain	49.18	79
2.3.1	Pension coverage	17.76	92
2.3.2	Environmental performance	23.90	93
2.3.3	Physician density	39.29	61
2.3.4	Sanitation	100.00	1
2.3.5	Personal safety	64.97	57
2.4	Skills	37.60	43
2.4.1	Workforce with tertiary education	33.71	52
2.4.2	High-skilled workforce	n/a	n/a
2.4.3	Researchers	10.21	51
2.4.4	Relevance of education system to the economy	80.08	9
2.4.5	Digital skills	26.40	36

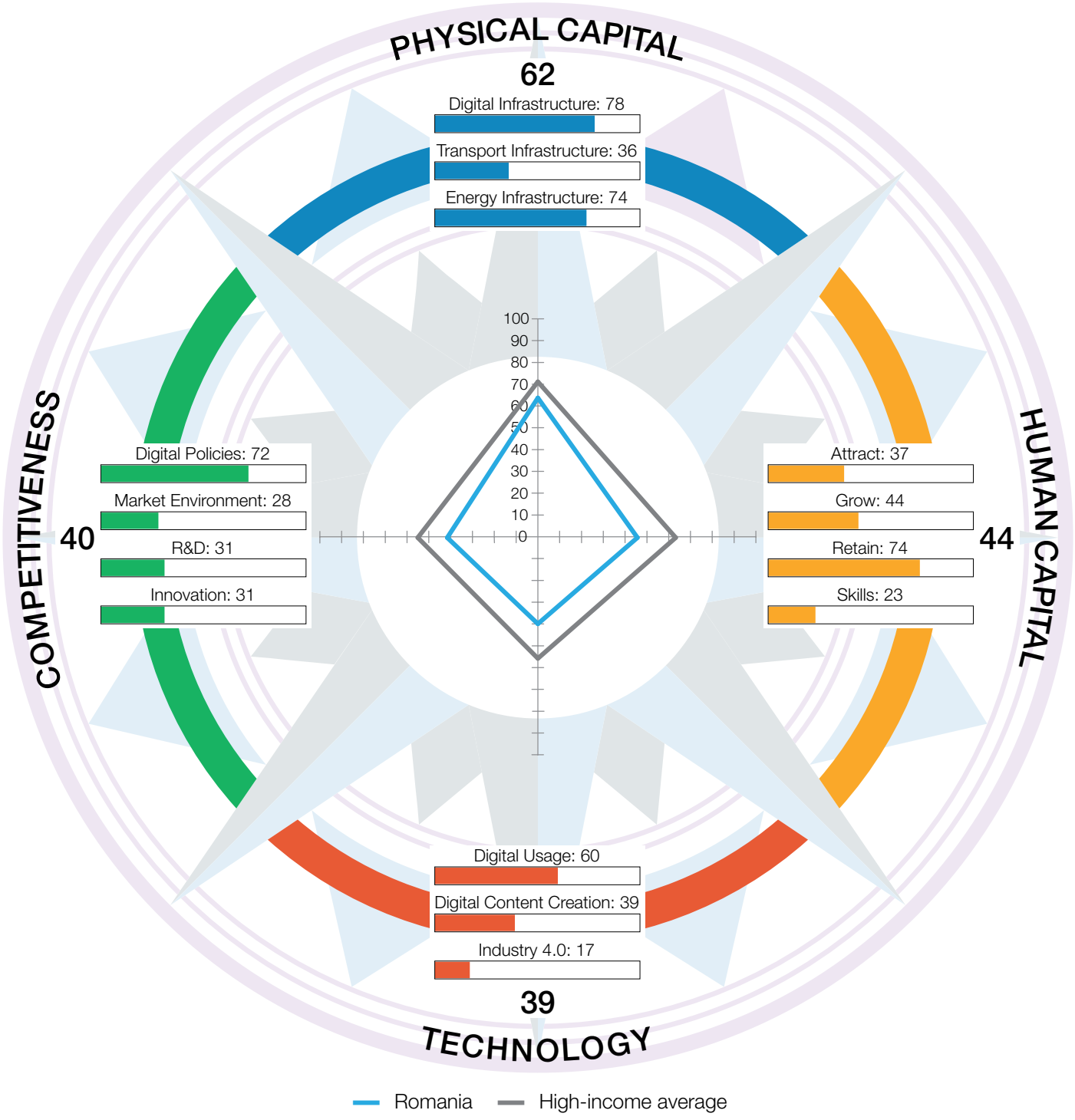
		Score	Rank
3	**TECHNOLOGY**	**37.84**	**50**
3.1	Digital Usage	67.21	42
3.1.1	Internet users	99.63	6
3.1.2	Active mobile-broadband subscriptions	58.75	8
3.1.3	Gender parity in internet usage	98.82	17
3.1.4	Firms with website	n/a	n/a
3.1.5	Internet shopping	n/a	n/a
3.1.6	Government online services	48.49	82
3.1.7	E-Participation	30.38	90
3.2	Digital Content Creation	32.54	61
3.2.1	Software development	1.63	89
3.2.2	Wikipedia edits	45.21	68
3.2.3	Internet domain registrations	3.28	61
3.2.4	Mobile apps development	80.05	48
3.3	Industry 4.0	13.76	50
3.3.1	Cloud computing	—	—
3.3.2	AI software development	7.27	70
3.3.3	AI research	37.66	20
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**53.28**	**25**
4.1	Digital Policies	89.57	8
4.1.1	ICT regulation	64.46	94
4.1.2	Cybersecurity	62.50	53
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	100.00	1
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	63.83	8
4.2.1	Extent of market dominance	65.05	24
4.2.2	Labour productivity per employee	76.26	5
4.2.3	Urbanisation	98.97	3
4.2.4	Domestic credit to private sector	44.31	23
4.2.5	Market capitalisation	34.58	14
4.3	R&D	31.95	47
4.3.1	R&D spending	12.51	51
4.3.2	University ranking	43.16	30
4.3.3	Gender parity in R&D	40.34	74
4.3.4	Scientific journal articles	31.79	35
4.4	Innovation	27.78	56
4.4.1	Medium- and high-tech industry	77.27	4
4.4.2	High-tech exports	2.51	101
4.4.3	Venture capital recipients, deals	0.68	88
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	25.76	20
4.4.6	Patent applications	32.69	97

Romania

Key Indicators

Rank (out of 124)	**50**	GDP per capita (PPP US$)	**41,887.92**
Income group	**High income**	GDP (US$ billions)	**301.26**
Regional group	**Europe**	FREI score	**46.49**
Population (millions)	**18.96**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**62.45**	**47**
1.1	Digital Infrastructure	78.18	31
1.1.1	Internet access	88.56	36
1.1.2	International internet bandwidth	41.31	83
1.1.3	Fixed-broadband subscriptions	97.79	24
1.1.4	4G-mobile network coverage	98.53	53
1.1.5	Fixed broadband affordability	96.93	5
1.1.6	Mobile broadband affordability	96.85	34
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	35.52	55
1.2.1	Quality of infrastructure	39.29	57
1.2.2	Rural access	73.97	54
1.2.3	Air connectivity	6.61	67
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	73.65	43
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	90.98	55
1.3.4	Energy intensity	92.72	14
2	**HUMAN CAPITAL**	**44.48**	**61**
2.1	Attract	37.45	97
2.1.1	Brain gain	15.22	112
2.1.2	International students	15.84	42
2.1.3	Tolerance of minorities	42.55	62
2.1.4	Tolerance of immigrants	35.38	101
2.1.5	Gender parity in high-skilled jobs	78.27	50
2.2	Grow	43.58	61
2.2.1	Tertiary enrolment	34.67	64
2.2.2	Reading, maths, and science	38.25	48
2.2.3	Use of virtual professional networks	24.12	54
2.2.4	Youth inclusion	77.29	67
2.3	Retain	74.15	40
2.3.1	Pension coverage	93.37	43
2.3.2	Environmental performance	62.88	29
2.3.3	Physician density	46.87	49
2.3.4	Sanitation	85.80	79
2.3.5	Personal safety	81.84	35
2.4	Skills	22.73	79
2.4.1	Workforce with tertiary education	28.21	61
2.4.2	High-skilled workforce	41.07	47
2.4.3	Researchers	10.79	50
2.4.4	Relevance of education system to the economy	27.37	88
2.4.5	Digital skills	6.18	64

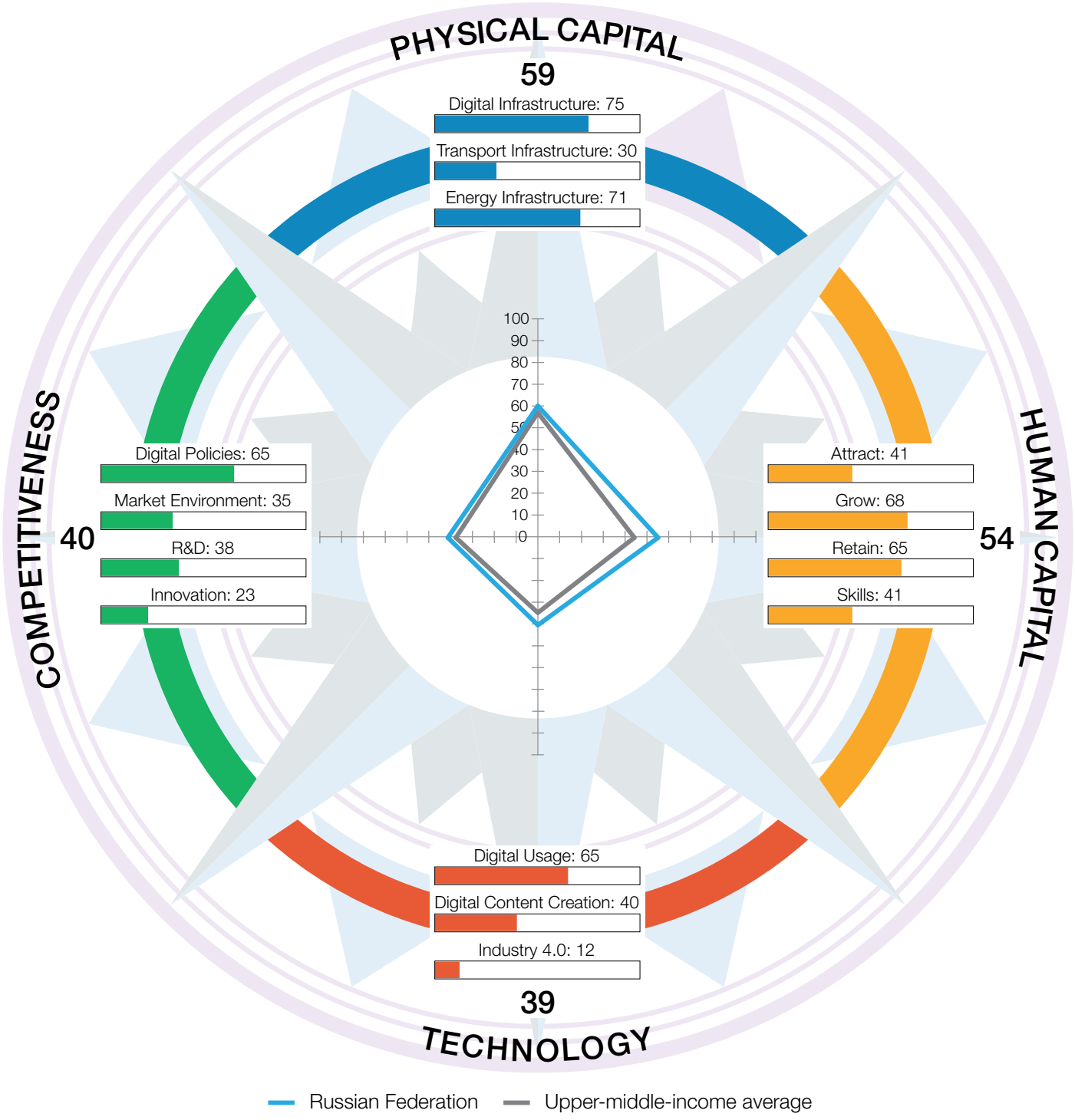
		Score	Rank
3	**TECHNOLOGY**	**38.53**	**48**
3.1	Digital Usage	60.24	59
3.1.1	Internet users	82.52	51
3.1.2	Active mobile-broadband subscriptions	38.24	52
3.1.3	Gender parity in internet usage	96.20	46
3.1.4	Firms with website	45.88	62
3.1.5	Internet shopping	42.63	49
3.1.6	Government online services	57.98	68
3.1.7	E-Participation	58.23	54
3.2	Digital Content Creation	38.58	47
3.2.1	Software development	9.33	42
3.2.2	Wikipedia edits	54.88	55
3.2.3	Internet domain registrations	8.10	42
3.2.4	Mobile apps development	82.02	43
3.3	Industry 4.0	16.78	39
3.3.1	Cloud computing	—	—
3.3.2	AI software development	21.77	34
3.3.3	AI research	15.59	44
3.3.4	ICT patent applications	1.38	43
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**40.49**	**54**
4.1	Digital Policies	72.27	52
4.1.1	ICT regulation	89.19	27
4.1.2	Cybersecurity	100.00	1
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	27.71	86
4.2.1	Extent of market dominance	38.84	62
4.2.2	Labour productivity per employee	43.79	42
4.2.3	Urbanisation	44.96	86
4.2.4	Domestic credit to private sector	7.96	99
4.2.5	Market capitalisation	3.01	69
4.3	R&D	30.77	50
4.3.1	R&D spending	8.47	61
4.3.2	University ranking	8.71	71
4.3.3	Gender parity in R&D	87.08	18
4.3.4	Scientific journal articles	18.83	45
4.4	Innovation	31.20	43
4.4.1	Medium- and high-tech industry	53.91	25
4.4.2	High-tech exports	17.76	43
4.4.3	Venture capital recipients, deals	2.68	75
4.4.4	New product entrepreneurial activity	32.69	65
4.4.5	New business density	25.63	21
4.4.6	Patent applications	54.54	51

Russian Federation

Key Indicators

Rank (out of 124)	**48**	GDP per capita (PPP US$)	**36,484.68**
Income group	**Upper-middle income**	GDP (US$ billions)	**2,240.42**
Regional group	**Europe**	FREI score	**47.96**
Population (millions)	**143.56**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**58.85**	**58**
1.1	Digital Infrastructure	75.08	49
1.1.1	Internet access	83.70	53
1.1.2	International internet bandwidth	43.99	69
1.1.3	Fixed-broadband subscriptions	90.32	55
1.1.4	4G-mobile network coverage	88.98	86
1.1.5	Fixed broadband affordability	97.10	4
1.1.6	Mobile broadband affordability	94.22	53
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	30.38	70
1.2.1	Quality of infrastructure	32.14	70
1.2.2	Rural access	62.57	69
1.2.3	Air connectivity	6.33	69
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	71.07	64
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	98.50	15
1.3.4	Energy intensity	57.97	114
2	**HUMAN CAPITAL**	**53.71**	**36**
2.1	Attract	40.82	85
2.1.1	Brain gain	41.58	75
2.1.2	International students	13.10	49
2.1.3	Tolerance of minorities	17.02	102
2.1.4	Tolerance of immigrants	72.31	38
2.1.5	Gender parity in high-skilled jobs	60.09	86
2.2	Grow	67.61	14
2.2.1	Tertiary enrolment	56.86	15
2.2.2	Reading, maths, and science	60.11	30
2.2.3	Use of virtual professional networks	n/a	n/a
2.2.4	Youth inclusion	85.85	39
2.3	Retain	65.25	52
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	31.53	79
2.3.3	Physician density	60.47	31
2.3.4	Sanitation	88.35	75
2.3.5	Personal safety	45.89	90
2.4	Skills	41.17	36
2.4.1	Workforce with tertiary education	61.91	9
2.4.2	High-skilled workforce	69.36	22
2.4.3	Researchers	31.12	31
2.4.4	Relevance of education system to the economy	38.57	69
2.4.5	Digital skills	4.89	70

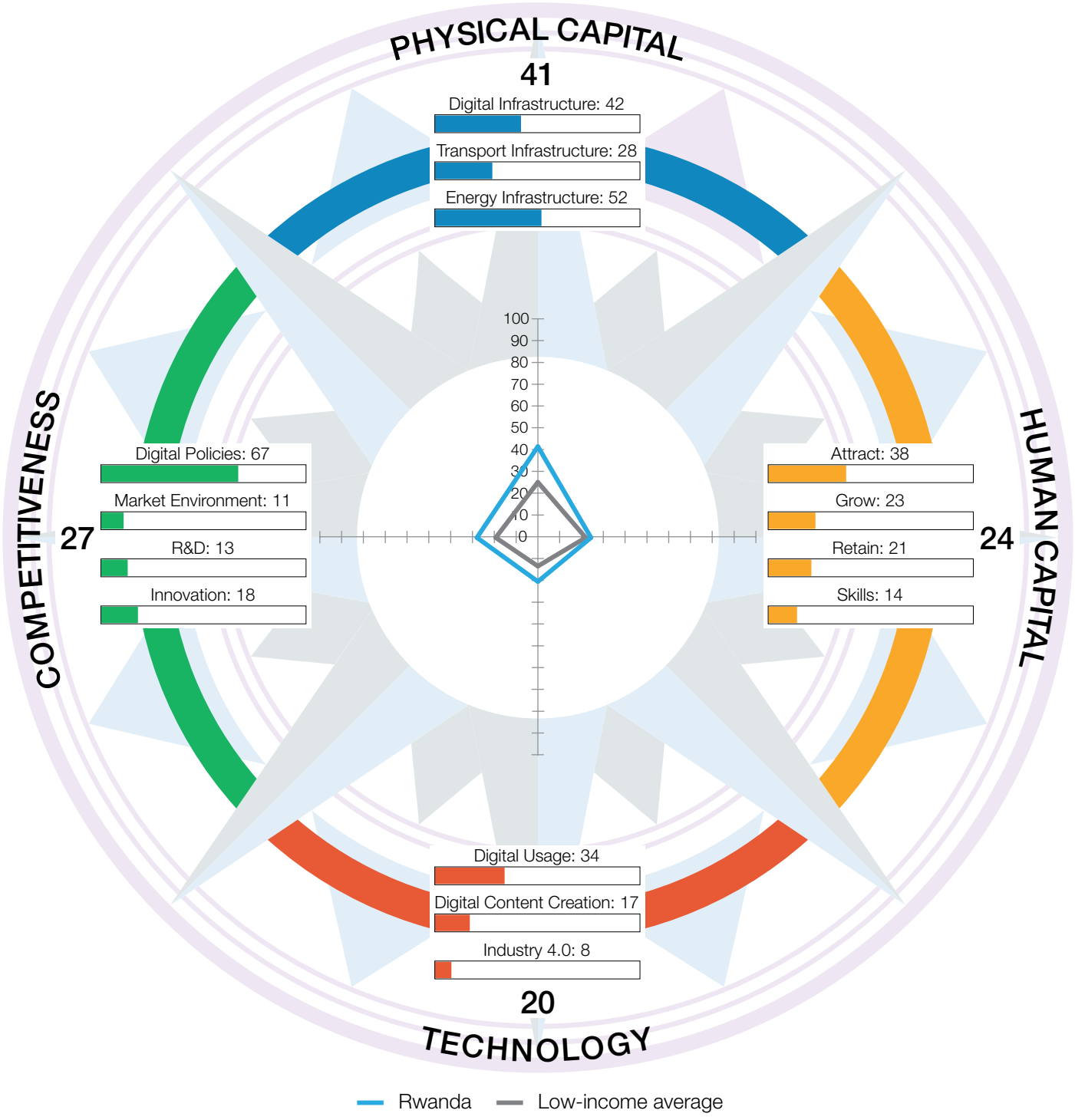
		Score	Rank
3	**TECHNOLOGY**	**39.06**	**46**
3.1	Digital Usage	65.25	48
3.1.1	Internet users	87.45	38
3.1.2	Active mobile-broadband subscriptions	43.30	39
3.1.3	Gender parity in internet usage	97.45	36
3.1.4	Firms with website	54.67	53
3.1.5	Internet shopping	52.91	41
3.1.6	Government online services	65.29	60
3.1.7	E-Participation	55.70	56
3.2	Digital Content Creation	40.38	43
3.2.1	Software development	10.21	40
3.2.2	Wikipedia edits	60.02	50
3.2.3	Internet domain registrations	8.36	40
3.2.4	Mobile apps development	82.91	40
3.3	Industry 4.0	11.56	63
3.3.1	Cloud computing	—	—
3.3.2	AI software development	9.40	61
3.3.3	AI research	10.14	51
3.3.4	ICT patent applications	2.79	39
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**40.23**	**55**
4.1	Digital Policies	64.78	65
4.1.1	ICT regulation	49.32	117
4.1.2	Cybersecurity	37.50	87
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	35.40	59
4.2.1	Extent of market dominance	37.84	67
4.2.2	Labour productivity per employee	33.52	51
4.2.3	Urbanisation	69.41	45
4.2.4	Domestic credit to private sector	22.22	56
4.2.5	Market capitalisation	14.01	37
4.3	R&D	37.87	34
4.3.1	R&D spending	20.24	38
4.3.2	University ranking	48.94	20
4.3.3	Gender parity in R&D	58.98	50
4.3.4	Scientific journal articles	23.34	42
4.4	Innovation	22.85	84
4.4.1	Medium- and high-tech industry	31.21	59
4.4.2	High-tech exports	14.95	49
4.4.3	Venture capital recipients, deals	0.24	91
4.4.4	New product entrepreneurial activity	12.74	83
4.4.5	New business density	9.17	49
4.4.6	Patent applications	68.77	18

Rwanda

Key Indicators

Rank (out of 124)	**100**	GDP per capita (PPP US$)	**2,792.42**
Income group	**Low income**	GDP (US$ billions)	**13.31**
Regional group	**Sub-Saharan Africa**	FREI score	**27.83**
Population (millions)	**13.78**	FREI score (income group average)	**19.43**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**40.71**	**101**
1.1	Digital Infrastructure	42.21	103
1.1.1	Internet access	7.30	110
1.1.2	International internet bandwidth	28.99	109
1.1.3	Fixed-broadband subscriptions	81.23	68
1.1.4	4G-mobile network coverage	97.92	56
1.1.5	Fixed broadband affordability	24.92	120
1.1.6	Mobile broadband affordability	46.00	113
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	28.38	73
1.2.1	Quality of infrastructure	39.29	57
1.2.2	Rural access	73.20	55
1.2.3	Air connectivity	0.45	107
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	51.54	103
1.3.1	Access to electricity	40.22	113
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	81.95	67
1.3.4	Energy intensity	83.99	62
2	**HUMAN CAPITAL**	**23.73**	**114**
2.1	Attract	37.72	93
2.1.1	Brain gain	64.79	25
2.1.2	International students	11.07	54
2.1.3	Tolerance of minorities	4.26	118
2.1.4	Tolerance of immigrants	41.54	91
2.1.5	Gender parity in high-skilled jobs	66.94	71
2.2	Grow	22.55	113
2.2.1	Tertiary enrolment	3.91	113
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	3.28	110
2.2.4	Youth inclusion	60.45	99
2.3	Retain	20.59	108
2.3.1	Pension coverage	1.12	117
2.3.2	Environmental performance	23.56	94
2.3.3	Physician density	1.31	115
2.3.4	Sanitation	65.78	97
2.3.5	Personal safety	11.16	123
2.4	Skills	14.06	103
2.4.1	Workforce with tertiary education	8.35	101
2.4.2	High-skilled workforce	5.42	108
2.4.3	Researchers	0.52	90
2.4.4	Relevance of education system to the economy	41.94	60
2.4.5	Digital skills	n/a	n/a

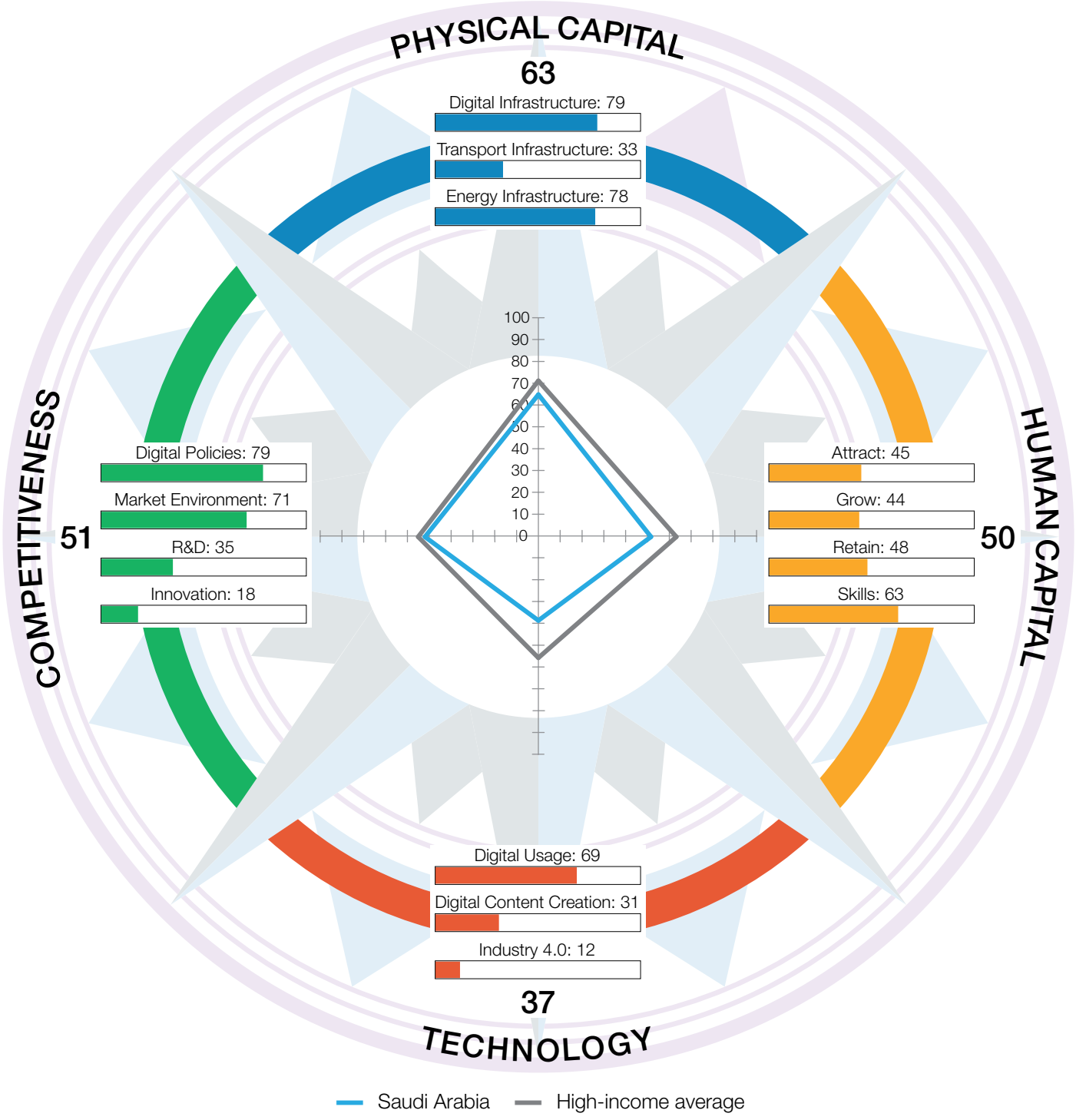
		Score	Rank
3	**TECHNOLOGY**	**19.62**	**98**
3.1	Digital Usage	34.09	95
3.1.1	Internet users	18.85	115
3.1.2	Active mobile-broadband subscriptions	17.57	108
3.1.3	Gender parity in internet usage	n/a	n/a
3.1.4	Firms with website	35.48	76
3.1.5	Internet shopping	0.40	120
3.1.6	Government online services	72.77	41
3.1.7	E-Participation	59.50	53
3.2	Digital Content Creation	16.98	106
3.2.1	Software development	1.04	98
3.2.2	Wikipedia edits	27.12	99
3.2.3	Internet domain registrations	0.10	111
3.2.4	Mobile apps development	39.64	112
3.3	Industry 4.0	7.80	90
3.3.1	Cloud computing	—	—
3.3.2	AI software development	6.59	75
3.3.3	AI research	1.07	95
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**27.24**	**97**
4.1	Digital Policies	66.92	61
4.1.1	ICT regulation	85.14	45
4.1.2	Cybersecurity	50.00	72
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	100.00	1
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	33.33	112
4.2	Market Environment	11.35	117
4.2.1	Extent of market dominance	36.27	73
4.2.2	Labour productivity per employee	3.16	104
4.2.3	Urbanisation	0.94	122
4.2.4	Domestic credit to private sector	7.06	102
4.2.5	Market capitalisation	9.33	45
4.3	R&D	12.88	95
4.3.1	R&D spending	13.95	47
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	36.87	77
4.3.4	Scientific journal articles	0.70	104
4.4	Innovation	17.81	105
4.4.1	Medium- and high-tech industry	8.09	108
4.4.2	High-tech exports	7.78	76
4.4.3	Venture capital recipients, deals	19.20	28
4.4.4	New product entrepreneurial activity	19.56	78
4.4.5	New business density	8.80	51
4.4.6	Patent applications	43.43	79

Saudi Arabia

Key Indicators

Rank (out of 124)	**42**	GDP per capita (PPP US$)	**59,065.00**
Income group	**High income**	GDP (US$ billions)	**1,108.15**
Regional group	**Middle East and North Africa**	FREI score	**50.44**
Population (millions)	**36.41**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**63.50**	**46**
1.1	Digital Infrastructure	79.29	27
1.1.1	Internet access	99.92	3
1.1.2	International internet bandwidth	65.29	12
1.1.3	Fixed-broadband subscriptions	96.20	31
1.1.4	4G-mobile network coverage	99.99	11
1.1.5	Fixed broadband affordability	72.48	79
1.1.6	Mobile broadband affordability	93.88	57
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	33.24	61
1.2.1	Quality of infrastructure	64.29	28
1.2.2	Rural access	14.12	120
1.2.3	Air connectivity	20.34	39
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	77.97	18
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	100.00	1
1.3.4	Energy intensity	69.62	101
2	**HUMAN CAPITAL**	**50.27**	**44**
2.1	Attract	45.49	55
2.1.1	Brain gain	87.11	6
2.1.2	International students	10.61	55
2.1.3	Tolerance of minorities	4.26	118
2.1.4	Tolerance of immigrants	80.00	25
2.1.5	Gender parity in high-skilled jobs	n/a	n/a
2.2	Grow	44.06	59
2.2.1	Tertiary enrolment	46.83	31
2.2.2	Reading, maths, and science	21.27	68
2.2.3	Use of virtual professional networks	31.37	41
2.2.4	Youth inclusion	76.76	68
2.3	Retain	48.38	81
2.3.1	Pension coverage	31.84	82
2.3.2	Environmental performance	32.20	77
2.3.3	Physician density	43.91	54
2.3.4	Sanitation	100.00	1
2.3.5	Personal safety	33.94	108
2.4	Skills	63.16	14
2.4.1	Workforce with tertiary education	n/a	n/a
2.4.2	High-skilled workforce	n/a	n/a
2.4.3	Researchers	7.89	60
2.4.4	Relevance of education system to the economy	81.58	6
2.4.5	Digital skills	100.00	1

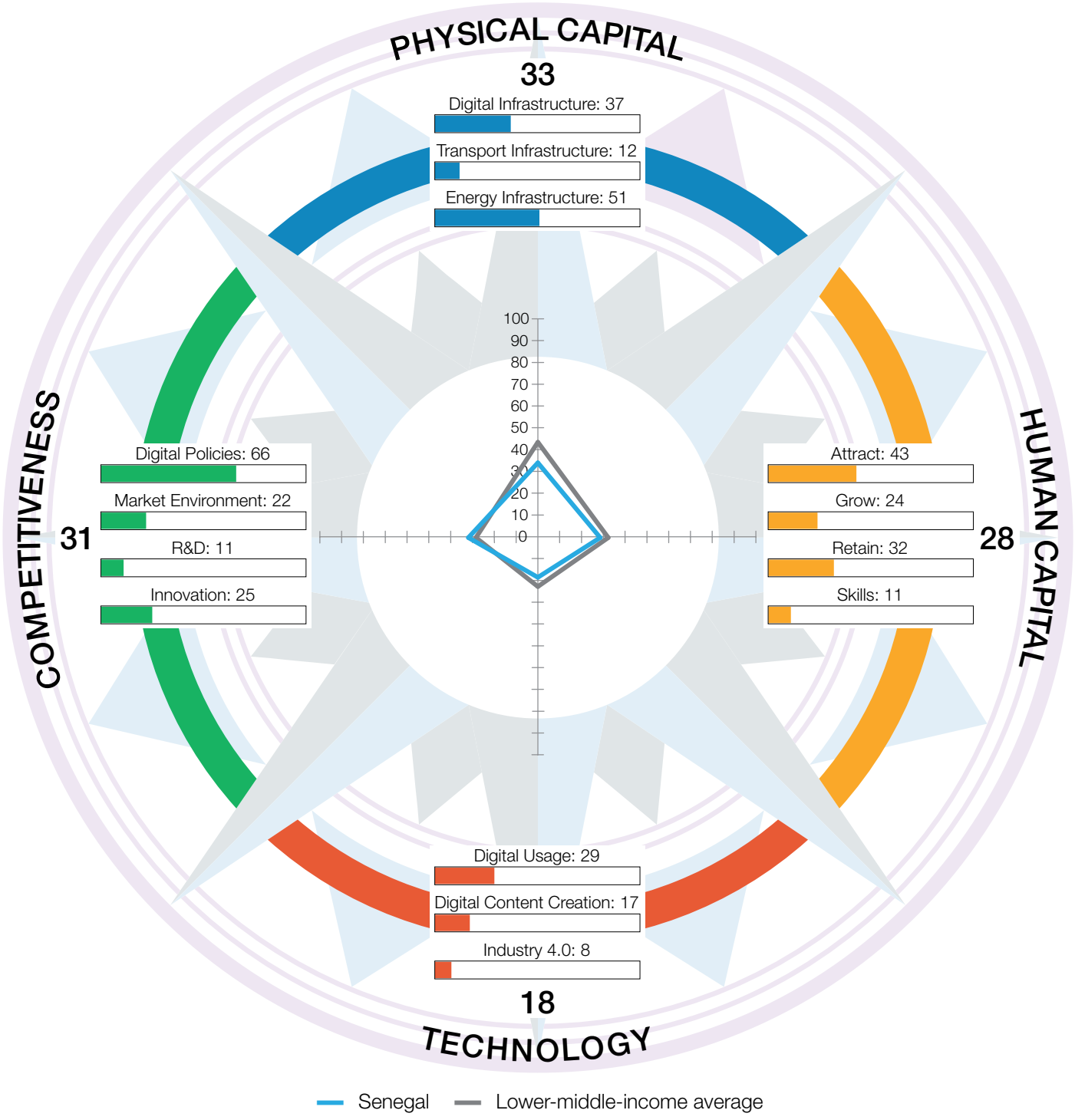
		Score	Rank
3	**TECHNOLOGY**	**37.34**	**51**
3.1	Digital Usage	68.78	38
3.1.1	Internet users	100.00	1
3.1.2	Active mobile-broadband subscriptions	48.35	21
3.1.3	Gender parity in internet usage	100.00	1
3.1.4	Firms with website	19.19	92
3.1.5	Internet shopping	71.59	21
3.1.6	Government online services	76.53	32
3.1.7	E-Participation	65.82	43
3.2	Digital Content Creation	31.16	68
3.2.1	Software development	1.12	93
3.2.2	Wikipedia edits	49.32	61
3.2.3	Internet domain registrations	1.50	78
3.2.4	Mobile apps development	72.69	65
3.3	Industry 4.0	12.07	60
3.3.1	Cloud computing	—	—
3.3.2	AI software development	13.80	48
3.3.3	AI research	24.97	32
3.3.4	ICT patent applications	3.70	36
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**50.64**	**30**
4.1	Digital Policies	78.80	30
4.1.1	ICT regulation	93.24	14
4.1.2	Cybersecurity	75.00	44
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	100.00	1
4.1.5	Online content	100.00	1
4.1.6	Data privacy	33.33	104
4.1.7	Data transfer	50.00	99
4.2	Market Environment	70.80	6
4.2.1	Extent of market dominance	78.39	7
4.2.2	Labour productivity per employee	73.92	9
4.2.3	Urbanisation	80.67	25
4.2.4	Domestic credit to private sector	21.05	62
4.2.5	Market capitalisation	100.00	1
4.3	R&D	35.13	41
4.3.1	R&D spending	8.45	62
4.3.2	University ranking	49.34	19
4.3.3	Gender parity in R&D	64.76	44
4.3.4	Scientific journal articles	17.97	46
4.4	Innovation	17.81	106
4.4.1	Medium- and high-tech industry	44.55	41
4.4.2	High-tech exports	0.79	116
4.4.3	Venture capital recipients, deals	2.05	79
4.4.4	New product entrepreneurial activity	6.69	90
4.4.5	New business density	2.47	80
4.4.6	Patent applications	50.32	62

Senegal

Key Indicators

Rank (out of 124)	**102**	GDP per capita (PPP US$)	**4,208.96**
Income group	**Lower-middle income**	GDP (US$ billions)	**27.68**
Regional group	**Sub-Saharan Africa**	FREI score	**27.53**
Population (millions)	**17.32**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**33.46**	**108**
1.1	Digital Infrastructure	36.92	105
1.1.1	Internet access	4.56	112
1.1.2	International internet bandwidth	18.67	116
1.1.3	Fixed-broadband subscriptions	15.81	109
1.1.4	4G-mobile network coverage	81.77	92
1.1.5	Fixed broadband affordability	42.32	110
1.1.6	Mobile broadband affordability	77.13	100
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	12.26	116
1.2.1	Quality of infrastructure	15.00	108
1.2.2	Rural access	29.80	107
1.2.3	Air connectivity	1.03	102
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	51.20	104
1.3.1	Access to electricity	62.68	106
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	54.89	76
1.3.4	Energy intensity	86.11	52
2	**HUMAN CAPITAL**	**27.85**	**100**
2.1	Attract	43.39	67
2.1.1	Brain gain	58.93	33
2.1.2	International students	16.61	40
2.1.3	Tolerance of minorities	46.81	54
2.1.4	Tolerance of immigrants	73.85	36
2.1.5	Gender parity in high-skilled jobs	20.75	112
2.2	Grow	24.36	110
2.2.1	Tertiary enrolment	9.51	97
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	10.53	87
2.2.4	Youth inclusion	53.05	108
2.3	Retain	32.29	98
2.3.1	Pension coverage	28.47	84
2.3.2	Environmental performance	25.42	92
2.3.3	Physician density	0.80	118
2.3.4	Sanitation	52.55	103
2.3.5	Personal safety	54.19	78
2.4	Skills	11.36	110
2.4.1	Workforce with tertiary education	4.57	113
2.4.2	High-skilled workforce	2.30	112
2.4.3	Researchers	6.33	66
2.4.4	Relevance of education system to the economy	32.24	84
2.4.5	Digital skills	n/a	n/a

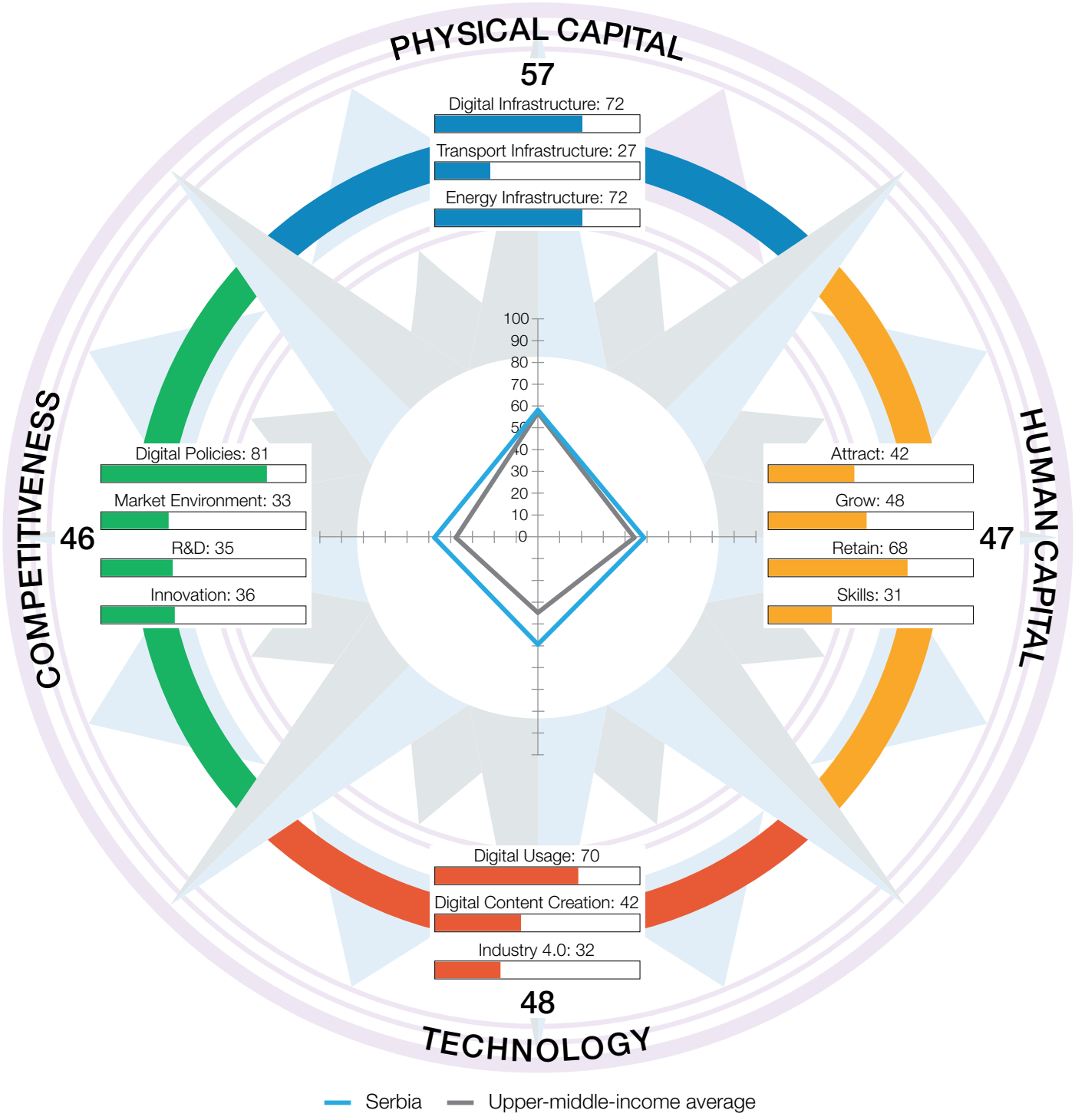
		Score	Rank
3	**TECHNOLOGY**	**17.75**	**103**
3.1	Digital Usage	29.14	103
3.1.1	Internet users	38.87	98
3.1.2	Active mobile-broadband subscriptions	37.55	56
3.1.3	Gender parity in internet usage	n/a	n/a
3.1.4	Firms with website	25.83	87
3.1.5	Internet shopping	12.85	83
3.1.6	Government online services	33.19	96
3.1.7	E-Participation	26.58	98
3.2	Digital Content Creation	16.56	107
3.2.1	Software development	0.48	107
3.2.2	Wikipedia edits	24.07	103
3.2.3	Internet domain registrations	0.37	98
3.2.4	Mobile apps development	41.31	110
3.3	Industry 4.0	7.55	91
3.3.1	Cloud computing	—	—
3.3.2	AI software development	4.76	86
3.3.3	AI research	0.64	100
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**31.05**	**82**
4.1	Digital Policies	65.54	64
4.1.1	ICT regulation	83.78	55
4.1.2	Cybersecurity	75.00	44
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	21.84	102
4.2.1	Extent of market dominance	33.03	82
4.2.2	Labour productivity per employee	5.90	100
4.2.3	Urbanisation	36.81	95
4.2.4	Domestic credit to private sector	11.59	85
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	11.44	97
4.3.1	R&D spending	10.57	55
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	34.36	83
4.3.4	Scientific journal articles	0.85	100
4.4	Innovation	25.37	73
4.4.1	Medium- and high-tech industry	32.46	58
4.4.2	High-tech exports	2.77	100
4.4.3	Venture capital recipients, deals	5.84	61
4.4.4	New product entrepreneurial activity	64.09	24
4.4.5	New business density	1.78	88
4.4.6	Patent applications	45.27	74

Serbia

Key Indicators

Rank (out of 124)	**44**	GDP per capita (PPP US$)	**23,911.20**
Income group	**Upper-middle income**	GDP (US$ billions)	**63.50**
Regional group	**Europe**	FREI score	**49.59**
Population (millions)	**6.76**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**57.02**	**62**
1.1	Digital Infrastructure	71.70	58
1.1.1	Internet access	81.16	59
1.1.2	International internet bandwidth	58.68	21
1.1.3	Fixed-broadband subscriptions	97.13	26
1.1.4	4G-mobile network coverage	98.54	52
1.1.5	Fixed broadband affordability	77.49	65
1.1.6	Mobile broadband affordability	88.95	77
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	26.91	79
1.2.1	Quality of infrastructure	21.43	87
1.2.2	Rural access	65.82	64
1.2.3	Air connectivity	8.82	57
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	72.45	53
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	94.74	45
1.3.4	Energy intensity	75.50	91
2	**HUMAN CAPITAL**	**47.37**	**54**
2.1	Attract	42.25	78
2.1.1	Brain gain	14.38	114
2.1.2	International students	11.90	51
2.1.3	Tolerance of minorities	30.85	78
2.1.4	Tolerance of immigrants	66.15	48
2.1.5	Gender parity in high-skilled jobs	87.94	28
2.2	Grow	47.94	51
2.2.1	Tertiary enrolment	45.34	41
2.2.2	Reading, maths, and science	44.27	43
2.2.3	Use of virtual professional networks	21.86	59
2.2.4	Youth inclusion	80.30	54
2.3	Retain	68.13	48
2.3.1	Pension coverage	62.76	68
2.3.2	Environmental performance	42.37	56
2.3.3	Physician density	58.10	33
2.3.4	Sanitation	97.69	47
2.3.5	Personal safety	79.70	40
2.4	Skills	31.17	59
2.4.1	Workforce with tertiary education	31.69	55
2.4.2	High-skilled workforce	41.12	46
2.4.3	Researchers	25.48	36
2.4.4	Relevance of education system to the economy	40.34	63
2.4.5	Digital skills	17.24	53

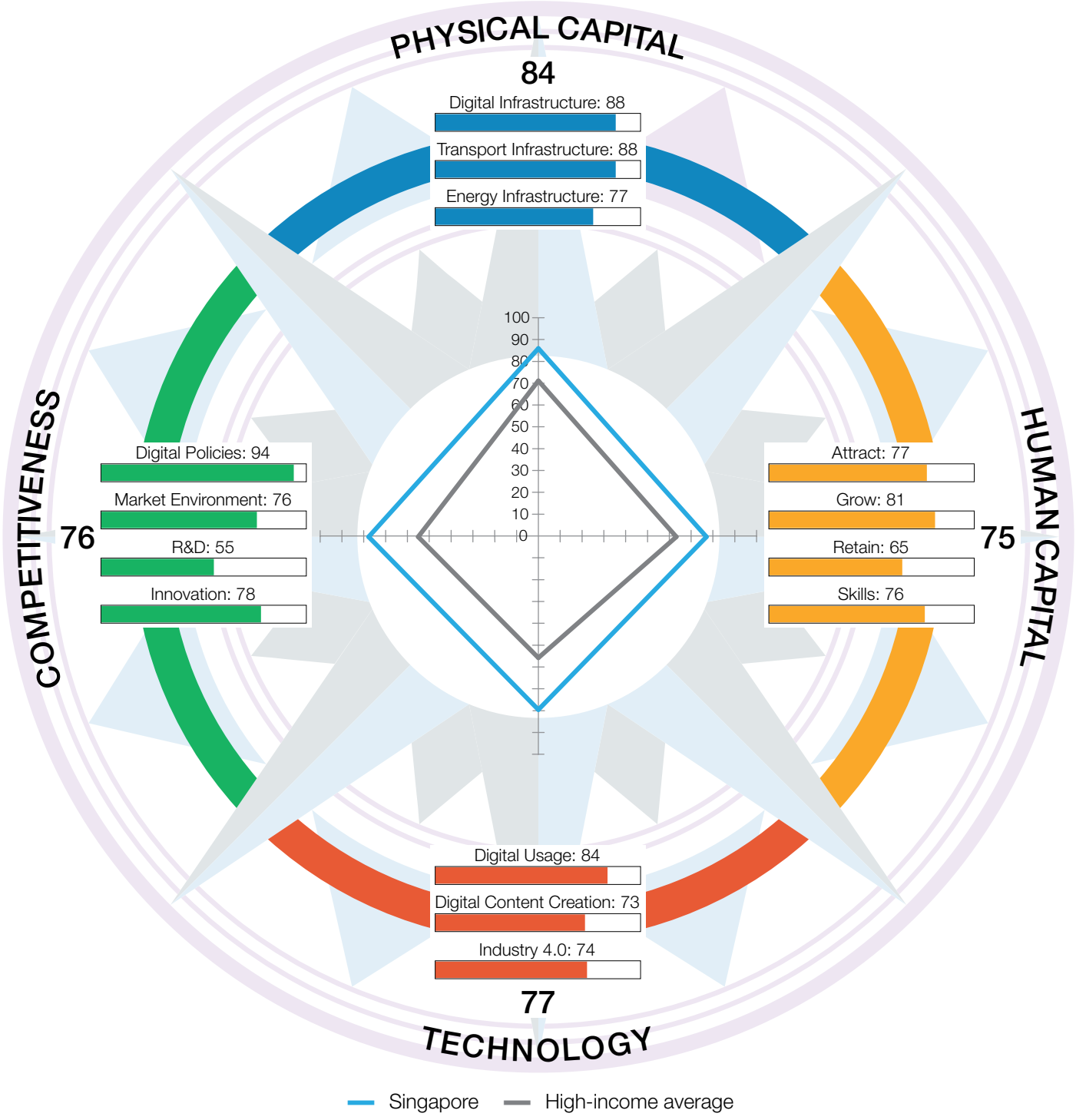
		Score	Rank
3	**TECHNOLOGY**	**47.72**	**30**
3.1	Digital Usage	69.63	37
3.1.1	Internet users	79.94	59
3.1.2	Active mobile-broadband subscriptions	40.86	45
3.1.3	Gender parity in internet usage	90.00	72
3.1.4	Firms with website	79.53	21
3.1.5	Internet shopping	38.17	52
3.1.6	Government online services	80.40	26
3.1.7	E-Participation	78.48	15
3.2	Digital Content Creation	41.68	41
3.2.1	Software development	9.21	44
3.2.2	Wikipedia edits	72.52	32
3.2.3	Internet domain registrations	3.86	56
3.2.4	Mobile apps development	81.11	45
3.3	Industry 4.0	31.86	22
3.3.1	Cloud computing	—	—
3.3.2	AI software development	18.12	36
3.3.3	AI research	18.77	38
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**46.24**	**40**
4.1	Digital Policies	81.27	26
4.1.1	ICT regulation	93.92	11
4.1.2	Cybersecurity	75.00	44
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	32.57	67
4.2.1	Extent of market dominance	38.51	63
4.2.2	Labour productivity per employee	28.82	61
4.2.3	Urbanisation	47.46	80
4.2.4	Domestic credit to private sector	15.48	75
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	35.46	39
4.3.1	R&D spending	18.37	40
4.3.2	University ranking	7.60	73
4.3.3	Gender parity in R&D	90.18	15
4.3.4	Scientific journal articles	25.69	39
4.4	Innovation	35.65	33
4.4.1	Medium- and high-tech industry	30.33	61
4.4.2	High-tech exports	n/a	n/a
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	51.22	42
4.4.5	New business density	8.08	54
4.4.6	Patent applications	52.97	54

Singapore

Key Indicators

Rank (out of 124)	**1**	GDP per capita (PPP US$)	**127,564.56**
Income group	**High income**	GDP (US$ billions)	**466.79**
Regional group	**Asia and Pacific**	FREI score	**78.01**
Population (millions)	**5.64**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**84.10**	**2**
1.1	Digital Infrastructure	87.60	2
1.1.1	Internet access	99.38	6
1.1.2	International internet bandwidth	94.78	2
1.1.3	Fixed-broadband subscriptions	96.93	27
1.1.4	4G-mobile network coverage	100.00	1
1.1.5	Fixed broadband affordability	95.17	7
1.1.6	Mobile broadband affordability	99.66	2
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	87.92	1
1.2.1	Quality of infrastructure	100.00	1
1.2.2	Rural access	100.00	1
1.2.3	Air connectivity	100.00	1
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	76.79	22
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	92.24	19
2	**HUMAN CAPITAL**	**75.04**	**5**
2.1	Attract	77.48	5
2.1.1	Brain gain	100.00	1
2.1.2	International students	50.95	8
2.1.3	Tolerance of minorities	76.60	15
2.1.4	Tolerance of immigrants	84.62	15
2.1.5	Gender parity in high-skilled jobs	75.22	55
2.2	Grow	81.49	1
2.2.1	Tertiary enrolment	61.37	9
2.2.2	Reading, maths, and science	90.79	2
2.2.3	Use of virtual professional networks	80.52	4
2.2.4	Youth inclusion	93.28	13
2.3	Retain	64.85	54
2.3.1	Pension coverage	31.73	83
2.3.2	Environmental performance	54.24	37
2.3.3	Physician density	38.26	64
2.3.4	Sanitation	100.00	1
2.3.5	Personal safety	100.00	1
2.4	Skills	76.33	1
2.4.1	Workforce with tertiary education	75.34	3
2.4.2	High-skilled workforce	93.41	2
2.4.3	Researchers	83.60	5
2.4.4	Relevance of education system to the economy	89.05	3
2.4.5	Digital skills	40.24	20

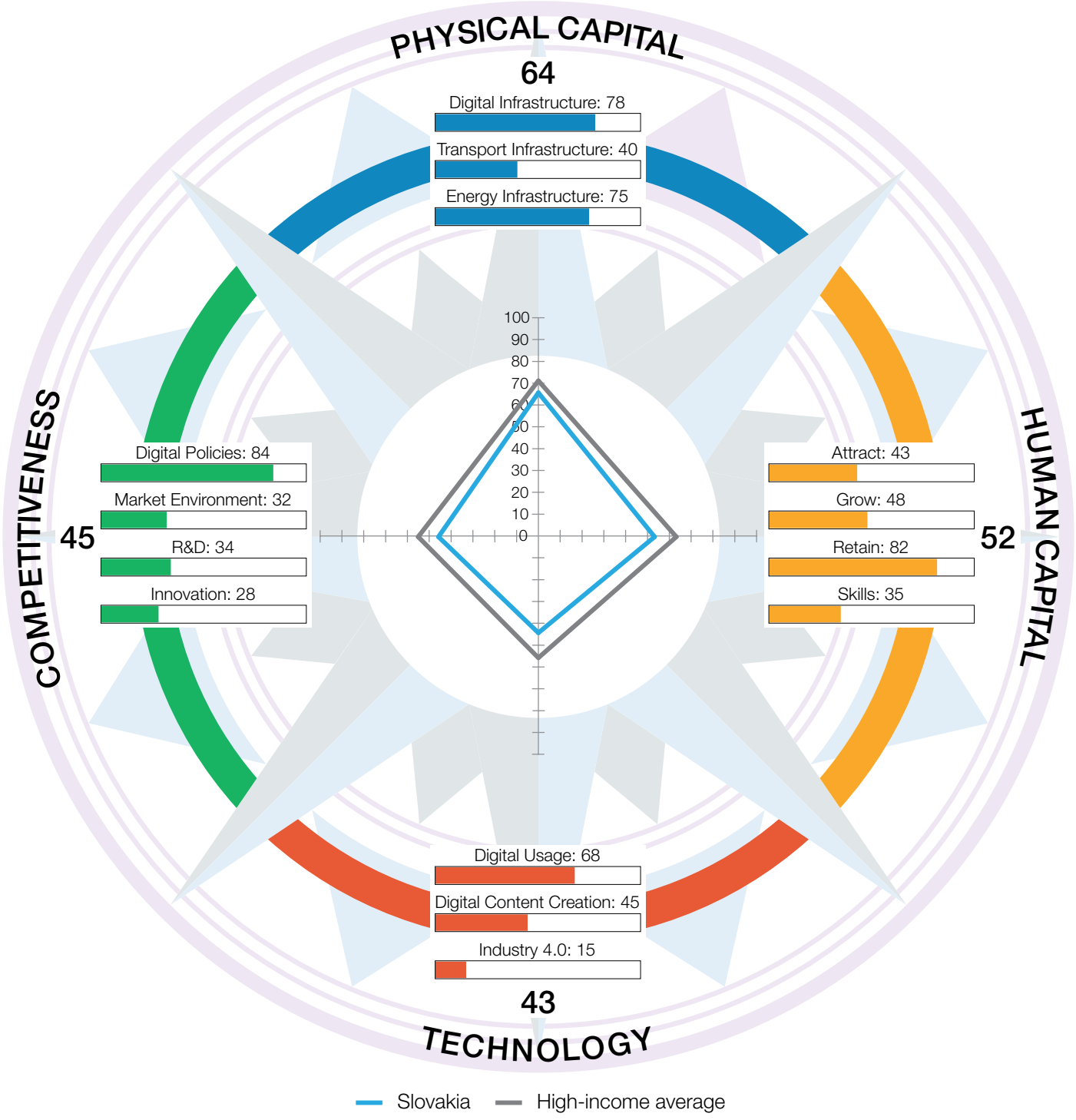
		Score	Rank
3	**TECHNOLOGY**	**77.15**	**1**
3.1	Digital Usage	84.41	9
3.1.1	Internet users	91.48	21
3.1.2	Active mobile-broadband subscriptions	59.49	7
3.1.3	Gender parity in internet usage	95.81	53
3.1.4	Firms with website	n/a	n/a
3.1.5	Internet shopping	67.20	24
3.1.6	Government online services	94.99	5
3.1.7	E-Participation	97.47	3
3.2	Digital Content Creation	72.56	5
3.2.1	Software development	100.00	1
3.2.2	Wikipedia edits	72.32	34
3.2.3	Internet domain registrations	17.93	30
3.2.4	Mobile apps development	100.00	1
3.3	Industry 4.0	74.47	2
3.3.1	Cloud computing	—	—
3.3.2	AI software development	100.00	1
3.3.3	AI research	100.00	1
3.3.4	ICT patent applications	91.90	6
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**75.77**	**1**
4.1	Digital Policies	93.58	4
4.1.1	ICT regulation	92.57	21
4.1.2	Cybersecurity	62.50	53
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	100.00	1
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	75.61	4
4.2.1	Extent of market dominance	63.15	30
4.2.2	Labour productivity per employee	100.00	1
4.2.3	Urbanisation	100.00	1
4.2.4	Domestic credit to private sector	58.28	14
4.2.5	Market capitalisation	56.60	6
4.3	R&D	55.44	12
4.3.1	R&D spending	35.05	19
4.3.2	University ranking	68.59	11
4.3.3	Gender parity in R&D	37.68	76
4.3.4	Scientific journal articles	80.45	5
4.4	Innovation	78.45	1
4.4.1	Medium- and high-tech industry	100.00	1
4.4.2	High-tech exports	86.01	2
4.4.3	Venture capital recipients, deals	100.00	1
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	41.18	13
4.4.6	Patent applications	65.04	23

Slovakia

Key Indicators

Rank (out of 124)	**41**	GDP per capita (PPP US$)	**37,459.47**
Income group	**High income**	GDP (US$ billions)	**115.47**
Regional group	**Europe**	FREI score	**50.91**
Population (millions)	**5.43**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**64.33**	**43**
1.1	Digital Infrastructure	77.80	33
1.1.1	Internet access	89.80	35
1.1.2	International internet bandwidth	45.66	61
1.1.3	Fixed-broadband subscriptions	90.72	52
1.1.4	4G-mobile network coverage	98.92	40
1.1.5	Fixed broadband affordability	95.02	8
1.1.6	Mobile broadband affordability	97.19	26
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	40.19	47
1.2.1	Quality of infrastructure	53.57	42
1.2.2	Rural access	93.30	20
1.2.3	Air connectivity	1.74	93
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	75.01	37
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	96.24	34
1.3.4	Energy intensity	82.17	72
2	**HUMAN CAPITAL**	**51.87**	**40**
2.1	Attract	43.05	69
2.1.1	Brain gain	14.45	113
2.1.2	International students	27.32	25
2.1.3	Tolerance of minorities	45.74	56
2.1.4	Tolerance of immigrants	38.46	96
2.1.5	Gender parity in high-skilled jobs	89.29	25
2.2	Grow	47.61	53
2.2.1	Tertiary enrolment	30.92	66
2.2.2	Reading, maths, and science	55.24	37
2.2.3	Use of virtual professional networks	16.42	73
2.2.4	Youth inclusion	87.88	29
2.3	Retain	82.15	23
2.3.1	Pension coverage	90.41	49
2.3.2	Environmental performance	69.66	18
2.3.3	Physician density	73.26	10
2.3.4	Sanitation	97.29	53
2.3.5	Personal safety	80.11	39
2.4	Skills	34.65	47
2.4.1	Workforce with tertiary education	37.45	43
2.4.2	High-skilled workforce	57.60	33
2.4.3	Researchers	36.21	29
2.4.4	Relevance of education system to the economy	21.63	95
2.4.5	Digital skills	20.34	48

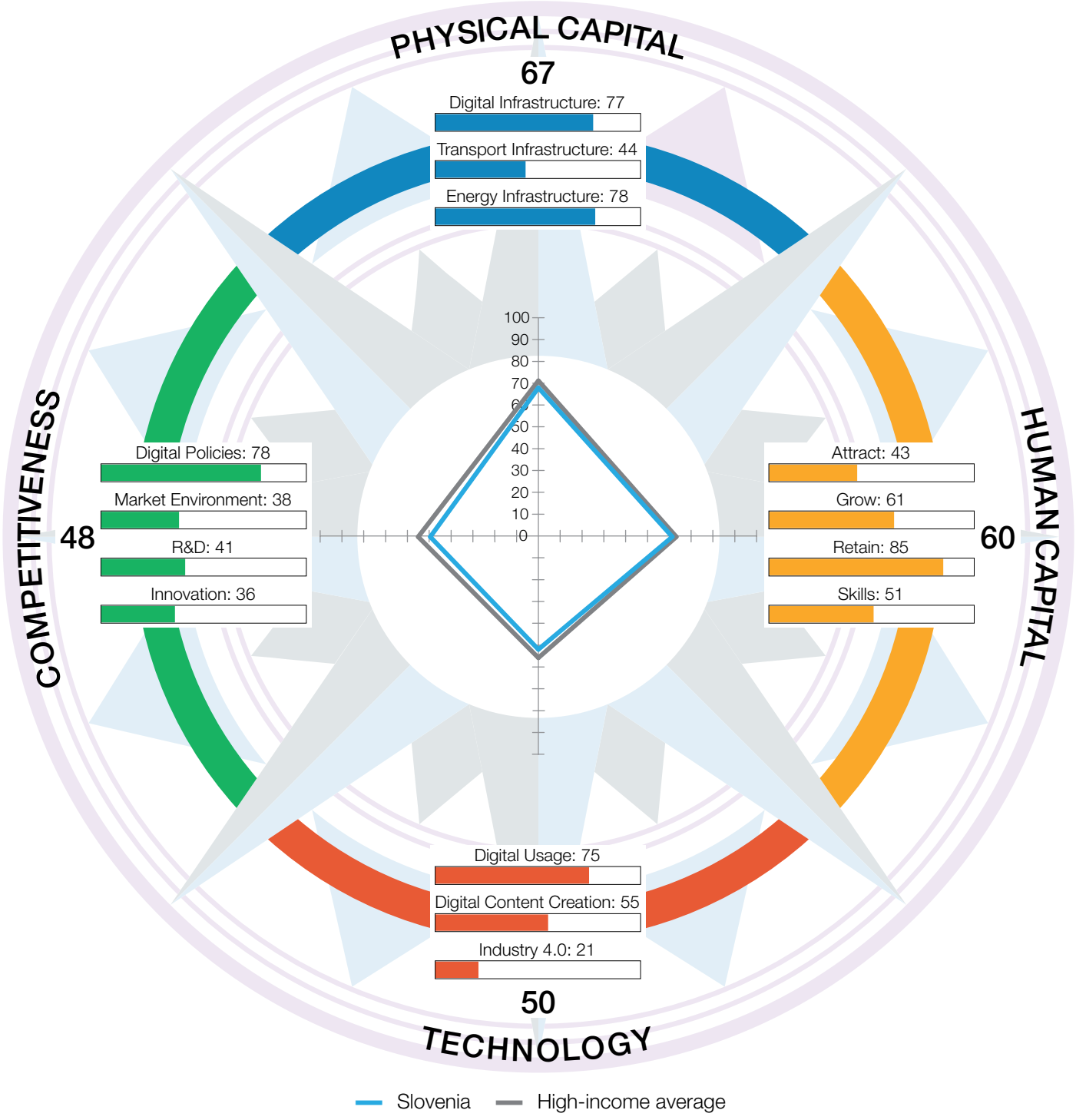
		Score	Rank
3	**TECHNOLOGY**	**42.84**	**39**
3.1	Digital Usage	68.47	40
3.1.1	Internet users	88.21	34
3.1.2	Active mobile-broadband subscriptions	35.27	61
3.1.3	Gender parity in internet usage	97.84	31
3.1.4	Firms with website	75.48	26
3.1.5	Internet shopping	78.15	17
3.1.6	Government online services	63.87	61
3.1.7	E-Participation	40.50	79
3.2	Digital Content Creation	45.38	38
3.2.1	Software development	14.01	35
3.2.2	Wikipedia edits	65.05	43
3.2.3	Internet domain registrations	16.01	33
3.2.4	Mobile apps development	86.47	35
3.3	Industry 4.0	14.65	46
3.3.1	Cloud computing	—	—
3.3.2	AI software development	12.07	54
3.3.3	AI research	21.99	35
3.3.4	ICT patent applications	2.37	40
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**44.60**	**45**
4.1	Digital Policies	83.69	19
4.1.1	ICT regulation	85.81	42
4.1.2	Cybersecurity	100.00	1
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	100.00	1
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	32.20	70
4.2.1	Extent of market dominance	41.56	60
4.2.2	Labour productivity per employee	45.44	39
4.2.3	Urbanisation	44.63	87
4.2.4	Domestic credit to private sector	27.85	48
4.2.5	Market capitalisation	1.54	72
4.3	R&D	34.22	43
4.3.1	R&D spending	16.57	43
4.3.2	University ranking	16.82	59
4.3.3	Gender parity in R&D	66.35	42
4.3.4	Scientific journal articles	37.14	31
4.4	Innovation	28.30	53
4.4.1	Medium- and high-tech industry	64.21	11
4.4.2	High-tech exports	13.88	53
4.4.3	Venture capital recipients, deals	1.37	87
4.4.4	New product entrepreneurial activity	17.12	81
4.4.5	New business density	21.07	26
4.4.6	Patent applications	52.19	55

Slovenia

Key Indicators

Rank (out of 124)	**30**	GDP per capita (PPP US$)	**50,031.66**
Income group	**High income**	GDP (US$ billions)	**62.12**
Regional group	**Europe**	FREI score	**56.22**
Population (millions)	**2.11**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**66.55**	**37**
1.1	Digital Infrastructure	77.27	36
1.1.1	Internet access	92.95	24
1.1.2	International internet bandwidth	65.67	11
1.1.3	Fixed-broadband subscriptions	94.71	38
1.1.4	4G-mobile network coverage	99.99	11
1.1.5	Fixed broadband affordability	82.15	56
1.1.6	Mobile broadband affordability	96.34	36
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	44.17	42
1.2.1	Quality of infrastructure	64.29	28
1.2.2	Rural access	90.96	28
1.2.3	Air connectivity	7.90	60
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	78.20	15
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	97.74	28
1.3.4	Energy intensity	86.42	49
2	**HUMAN CAPITAL**	**59.80**	**27**
2.1	Attract	42.77	72
2.1.1	Brain gain	22.73	106
2.1.2	International students	20.62	33
2.1.3	Tolerance of minorities	68.09	24
2.1.4	Tolerance of immigrants	15.38	117
2.1.5	Gender parity in high-skilled jobs	87.03	32
2.2	Grow	61.04	24
2.2.1	Tertiary enrolment	52.53	23
2.2.2	Reading, maths, and science	69.26	10
2.2.3	Use of virtual professional networks	27.63	49
2.2.4	Youth inclusion	94.72	8
2.3	Retain	84.51	15
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	82.03	7
2.3.3	Physician density	51.74	42
2.3.4	Sanitation	97.91	41
2.3.5	Personal safety	90.85	14
2.4	Skills	50.90	26
2.4.1	Workforce with tertiary education	51.79	20
2.4.2	High-skilled workforce	71.31	18
2.4.3	Researchers	56.54	16
2.4.4	Relevance of education system to the economy	49.72	45
2.4.5	Digital skills	25.16	39

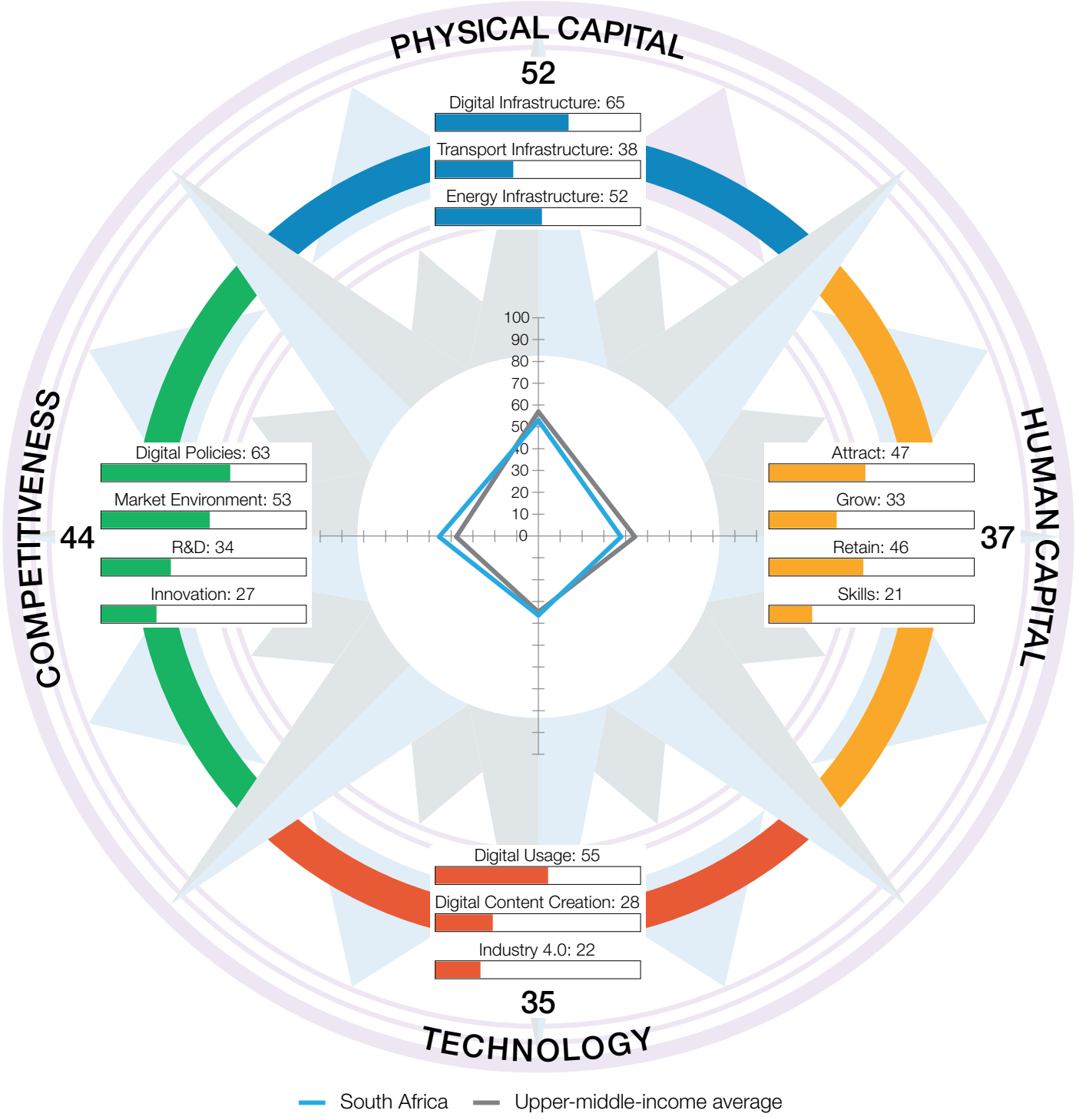
		Score	Rank
3	**TECHNOLOGY**	**50.26**	**27**
3.1	Digital Usage	75.14	24
3.1.1	Internet users	88.29	33
3.1.2	Active mobile-broadband subscriptions	36.14	60
3.1.3	Gender parity in internet usage	99.16	12
3.1.4	Firms with website	84.60	12
3.1.5	Internet shopping	63.26	29
3.1.6	Government online services	82.41	22
3.1.7	E-Participation	72.15	25
3.2	Digital Content Creation	54.92	25
3.2.1	Software development	26.44	22
3.2.2	Wikipedia edits	78.35	21
3.2.3	Internet domain registrations	21.40	25
3.2.4	Mobile apps development	93.50	22
3.3	Industry 4.0	20.72	33
3.3.1	Cloud computing	—	—
3.3.2	AI software development	29.81	26
3.3.3	AI research	46.51	17
3.3.4	ICT patent applications	4.61	31
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**48.26**	**35**
4.1	Digital Policies	77.59	33
4.1.1	ICT regulation	97.30	3
4.1.2	Cybersecurity	62.50	53
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	83.33	38
4.2	Market Environment	37.60	53
4.2.1	Extent of market dominance	71.47	16
4.2.2	Labour productivity per employee	50.46	31
4.2.3	Urbanisation	45.61	85
4.2.4	Domestic credit to private sector	15.76	74
4.2.5	Market capitalisation	4.69	63
4.3	R&D	41.37	30
4.3.1	R&D spending	39.87	17
4.3.2	University ranking	13.58	62
4.3.3	Gender parity in R&D	43.88	68
4.3.4	Scientific journal articles	68.14	10
4.4	Innovation	36.49	32
4.4.1	Medium- and high-tech industry	44.82	39
4.4.2	High-tech exports	10.07	65
4.4.3	Venture capital recipients, deals	8.87	48
4.4.4	New product entrepreneurial activity	77.48	11
4.4.5	New business density	9.87	46
4.4.6	Patent applications	67.85	20

South Africa

Key Indicators

Rank (out of 124)	**65**	GDP per capita (PPP US$)	**15,904.85**
Income group	**Upper-middle income**	GDP (US$ billions)	**405.87**
Regional group	**Sub-Saharan Africa**	FREI score	**42.06**
Population (millions)	**59.89**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**52.00**	**80**
1.1	Digital Infrastructure	65.41	73
1.1.1	Internet access	62.48	79
1.1.2	International internet bandwidth	34.54	99
1.1.3	Fixed-broadband subscriptions	86.60	62
1.1.4	4G-mobile network coverage	97.78	61
1.1.5	Fixed broadband affordability	67.36	85
1.1.6	Mobile broadband affordability	81.80	90
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	38.32	50
1.2.1	Quality of infrastructure	64.29	28
1.2.2	Rural access	63.57	67
1.2.3	Air connectivity	4.02	80
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	52.27	102
1.3.1	Access to electricity	87.53	99
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	42.11	82
1.3.4	Energy intensity	65.25	108
2	**HUMAN CAPITAL**	**36.92**	**83**
2.1	Attract	47.42	48
2.1.1	Brain gain	38.82	81
2.1.2	International students	7.98	62
2.1.3	Tolerance of minorities	40.43	69
2.1.4	Tolerance of immigrants	70.77	42
2.1.5	Gender parity in high-skilled jobs	79.08	48
2.2	Grow	33.31	83
2.2.1	Tertiary enrolment	15.27	90
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	30.12	45
2.2.4	Youth inclusion	54.55	107
2.3	Retain	46.13	83
2.3.1	Pension coverage	81.12	57
2.3.2	Environmental performance	31.02	81
2.3.3	Physician density	12.34	90
2.3.4	Sanitation	76.37	93
2.3.5	Personal safety	29.79	112
2.4	Skills	20.83	87
2.4.1	Workforce with tertiary education	18.67	83
2.4.2	High-skilled workforce	31.27	65
2.4.3	Researchers	5.41	68
2.4.4	Relevance of education system to the economy	23.59	92
2.4.5	Digital skills	25.20	38

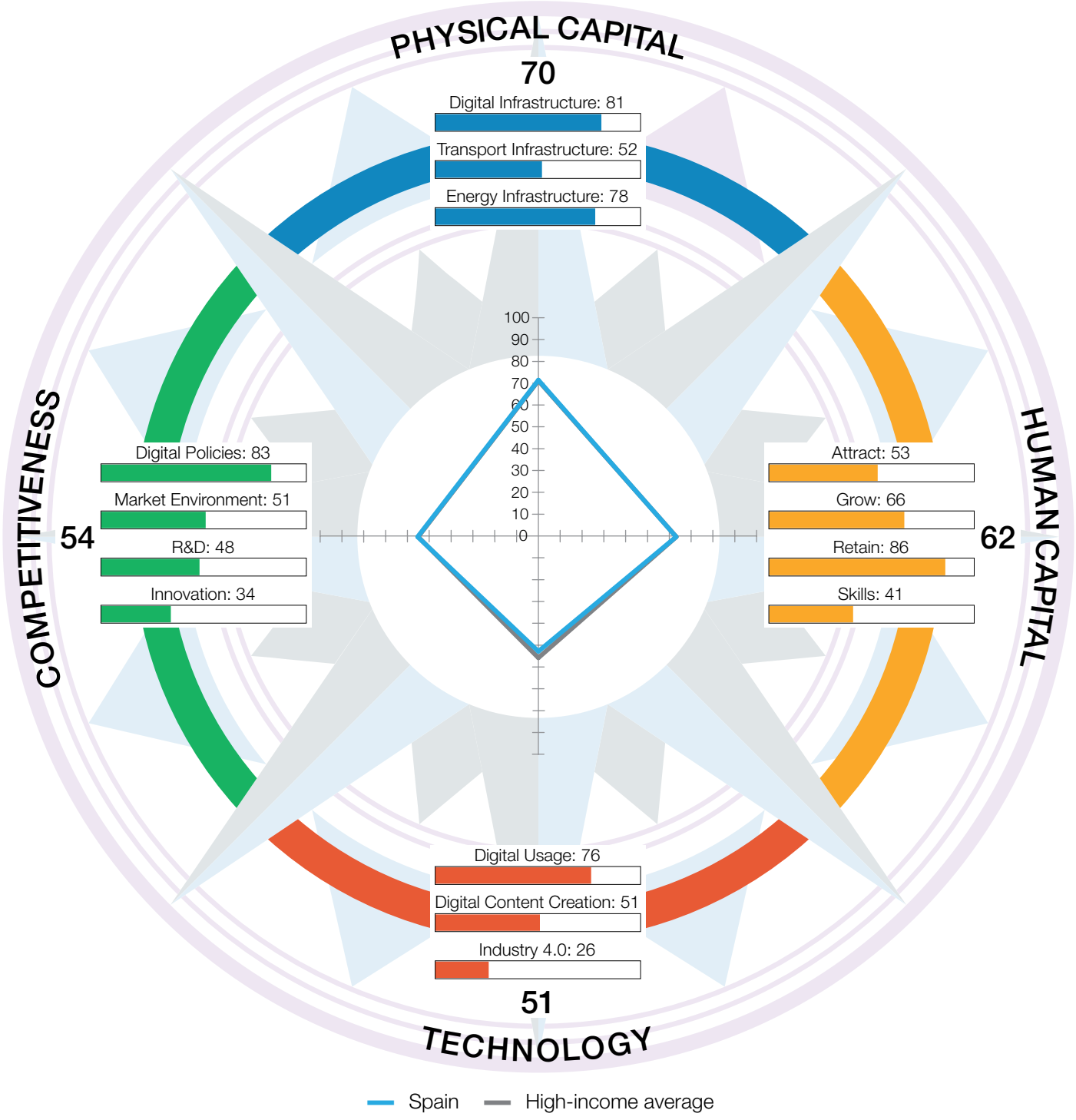
		Score	Rank
3	**TECHNOLOGY**	**35.00**	**58**
3.1	Digital Usage	55.26	68
3.1.1	Internet users	68.05	81
3.1.2	Active mobile-broadband subscriptions	46.71	27
3.1.3	Gender parity in internet usage	n/a	n/a
3.1.4	Firms with website	80.14	20
3.1.5	Internet shopping	15.39	79
3.1.6	Government online services	66.86	55
3.1.7	E-Participation	54.43	60
3.2	Digital Content Creation	27.73	76
3.2.1	Software development	2.54	72
3.2.2	Wikipedia edits	32.04	88
3.2.3	Internet domain registrations	5.41	50
3.2.4	Mobile apps development	70.94	67
3.3	Industry 4.0	21.99	30
3.3.1	Cloud computing	—	—
3.3.2	AI software development	10.71	59
3.3.3	AI research	5.91	60
3.3.4	ICT patent applications	1.06	47
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**44.31**	**46**
4.1	Digital Policies	62.83	67
4.1.1	ICT regulation	81.49	68
4.1.2	Cybersecurity	75.00	44
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	83.33	38
4.2	Market Environment	52.66	24
4.2.1	Extent of market dominance	37.52	68
4.2.2	Labour productivity per employee	30.92	55
4.2.3	Urbanisation	59.74	62
4.2.4	Domestic credit to private sector	40.96	31
4.2.5	Market capitalisation	94.14	3
4.3	R&D	34.32	42
4.3.1	R&D spending	11.26	54
4.3.2	University ranking	31.81	41
4.3.3	Gender parity in R&D	84.14	25
4.3.4	Scientific journal articles	10.07	58
4.4	Innovation	27.45	58
4.4.1	Medium- and high-tech industry	29.55	63
4.4.2	High-tech exports	8.61	71
4.4.3	Venture capital recipients, deals	9.60	43
4.4.4	New product entrepreneurial activity	5.02	91
4.4.5	New business density	51.57	8
4.4.6	Patent applications	60.33	34

Spain

Key Indicators

Rank (out of 124)	**25**	GDP per capita (PPP US$)	**45,825.20**
Income group	**High income**	GDP (US$ billions)	**1,397.51**
Regional group	**Europe**	FREI score	**59.13**
Population (millions)	**47.62**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**69.98**	**24**
1.1	Digital Infrastructure	80.72	20
1.1.1	Internet access	95.89	14
1.1.2	International internet bandwidth	34.25	100
1.1.3	Fixed-broadband subscriptions	99.08	13
1.1.4	4G-mobile network coverage	99.57	32
1.1.5	Fixed broadband affordability	82.71	54
1.1.6	Mobile broadband affordability	98.98	9
1.1.7	Computer software spending	54.55	4
1.2	Transport Infrastructure	51.57	30
1.2.1	Quality of infrastructure	71.43	18
1.2.2	Rural access	85.64	36
1.2.3	Air connectivity	36.48	19
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	77.66	20
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	97.74	28
1.3.4	Energy intensity	91.27	23
2	**HUMAN CAPITAL**	**61.51**	**25**
2.1	Attract	52.69	38
2.1.1	Brain gain	42.73	74
2.1.2	International students	10.09	56
2.1.3	Tolerance of minorities	28.72	85
2.1.4	Tolerance of immigrants	87.69	12
2.1.5	Gender parity in high-skilled jobs	94.22	14
2.2	Grow	65.80	16
2.2.1	Tertiary enrolment	63.26	6
2.2.2	Reading, maths, and science	64.22	26
2.2.3	Use of virtual professional networks	47.68	24
2.2.4	Youth inclusion	88.05	27
2.3	Retain	86.12	12
2.3.1	Pension coverage	98.16	36
2.3.2	Environmental performance	63.90	27
2.3.3	Physician density	72.43	11
2.3.4	Sanitation	99.89	15
2.3.5	Personal safety	96.21	3
2.4	Skills	41.43	34
2.4.1	Workforce with tertiary education	53.47	19
2.4.2	High-skilled workforce	53.33	37
2.4.3	Researchers	35.58	30
2.4.4	Relevance of education system to the economy	28.76	85
2.4.5	Digital skills	36.00	25

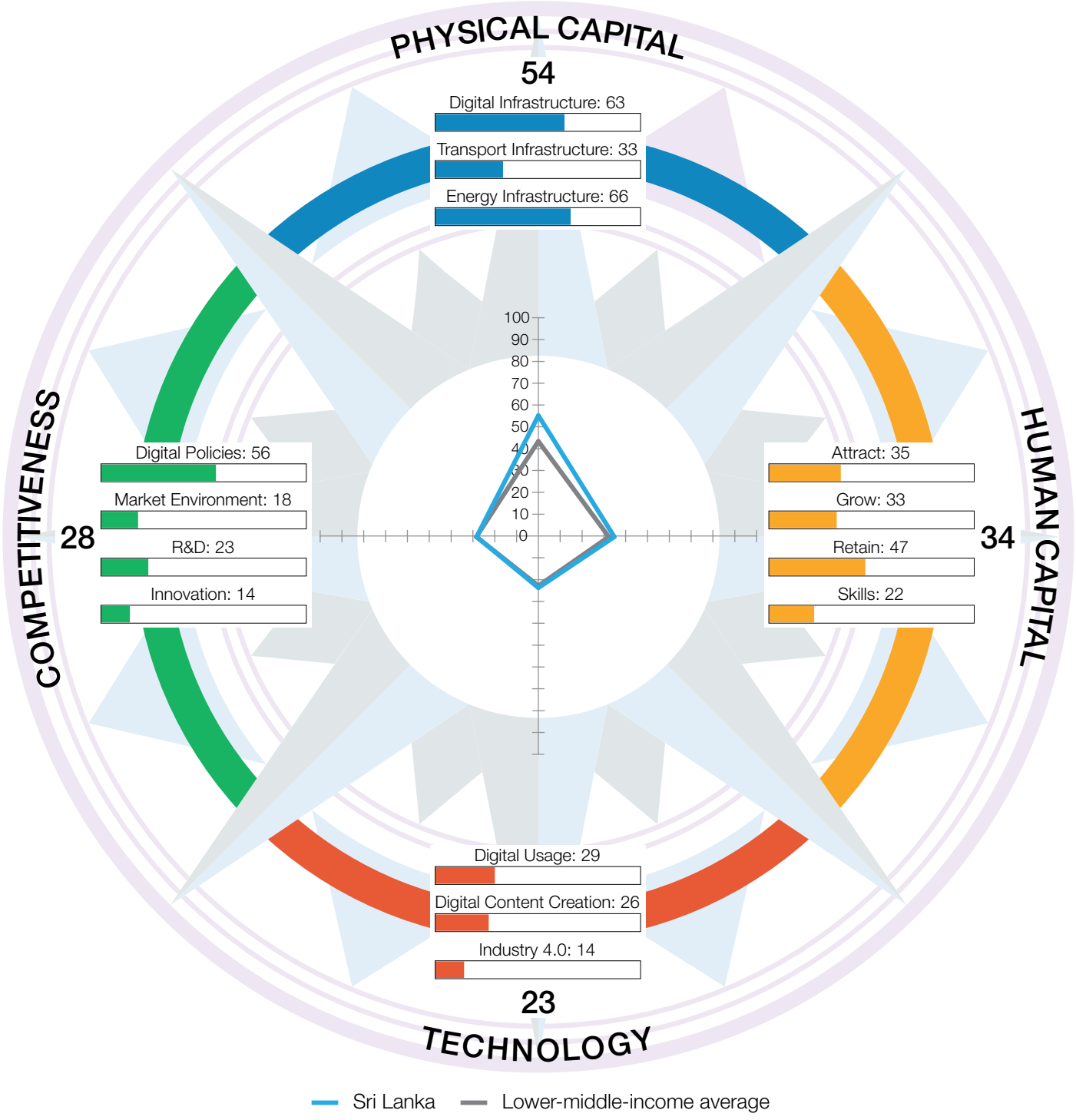
		Score	Rank
3	**TECHNOLOGY**	**51.12**	**25**
3.1	Digital Usage	76.18	20
3.1.1	Internet users	93.50	15
3.1.2	Active mobile-broadband subscriptions	43.45	38
3.1.3	Gender parity in internet usage	99.96	6
3.1.4	Firms with website	76.73	25
3.1.5	Internet shopping	66.48	25
3.1.6	Government online services	81.00	25
3.1.7	E-Participation	72.15	25
3.2	Digital Content Creation	51.45	29
3.2.1	Software development	19.44	30
3.2.2	Wikipedia edits	76.13	28
3.2.3	Internet domain registrations	19.35	29
3.2.4	Mobile apps development	90.90	28
3.3	Industry 4.0	25.72	26
3.3.1	Cloud computing	—	—
3.3.2	AI software development	40.62	19
3.3.3	AI research	29.03	27
3.3.4	ICT patent applications	8.92	26
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**53.91**	**22**
4.1	Digital Policies	83.01	21
4.1.1	ICT regulation	81.08	69
4.1.2	Cybersecurity	100.00	1
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	51.27	27
4.2.1	Extent of market dominance	60.91	35
4.2.2	Labour productivity per employee	56.60	26
4.2.3	Urbanisation	76.45	34
4.2.4	Domestic credit to private sector	44.48	22
4.2.5	Market capitalisation	17.92	30
4.3	R&D	47.51	21
4.3.1	R&D spending	26.16	29
4.3.2	University ranking	45.09	24
4.3.3	Gender parity in R&D	66.96	41
4.3.4	Scientific journal articles	51.85	23
4.4	Innovation	33.83	36
4.4.1	Medium- and high-tech industry	48.07	34
4.4.2	High-tech exports	14.49	52
4.4.3	Venture capital recipients, deals	9.34	46
4.4.4	New product entrepreneurial activity	63.19	26
4.4.5	New business density	10.16	44
4.4.6	Patent applications	57.72	41

Sri Lanka

Key Indicators

Rank (out of 124)	**91**	GDP per capita (PPP US$)	**14,405.42**
Income group	**Lower-middle income**	GDP (US$ billions)	**74.40**
Regional group	**Asia and Pacific**	FREI score	**34.59**
Population (millions)	**22.18**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**54.13**	**75**
1.1	Digital Infrastructure	63.43	80
1.1.1	Internet access	51.79	83
1.1.2	International internet bandwidth	40.66	85
1.1.3	Fixed-broadband subscriptions	28.26	99
1.1.4	4G-mobile network coverage	95.70	70
1.1.5	Fixed broadband affordability	93.42	16
1.1.6	Mobile broadband affordability	97.79	18
1.1.7	Computer software spending	36.36	21
1.2	Transport Infrastructure	32.52	64
1.2.1	Quality of infrastructure	21.43	87
1.2.2	Rural access	92.22	24
1.2.3	Air connectivity	4.86	76
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	66.45	86
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	96.91	5
2	**HUMAN CAPITAL**	**33.90**	**89**
2.1	Attract	34.75	106
2.1.1	Brain gain	45.93	65
2.1.2	International students	0.82	99
2.1.3	Tolerance of minorities	17.02	102
2.1.4	Tolerance of immigrants	47.69	82
2.1.5	Gender parity in high-skilled jobs	62.27	79
2.2	Grow	32.58	86
2.2.1	Tertiary enrolment	13.89	91
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	11.89	82
2.2.4	Youth inclusion	71.96	77
2.3	Retain	46.72	82
2.3.1	Pension coverage	34.39	80
2.3.2	Environmental performance	26.78	88
2.3.3	Physician density	18.47	83
2.3.4	Sanitation	93.03	66
2.3.5	Personal safety	60.95	65
2.4	Skills	21.57	83
2.4.1	Workforce with tertiary education	7.45	106
2.4.2	High-skilled workforce	30.39	68
2.4.3	Researchers	1.05	84
2.4.4	Relevance of education system to the economy	47.38	49
2.4.5	Digital skills	n/a	n/a

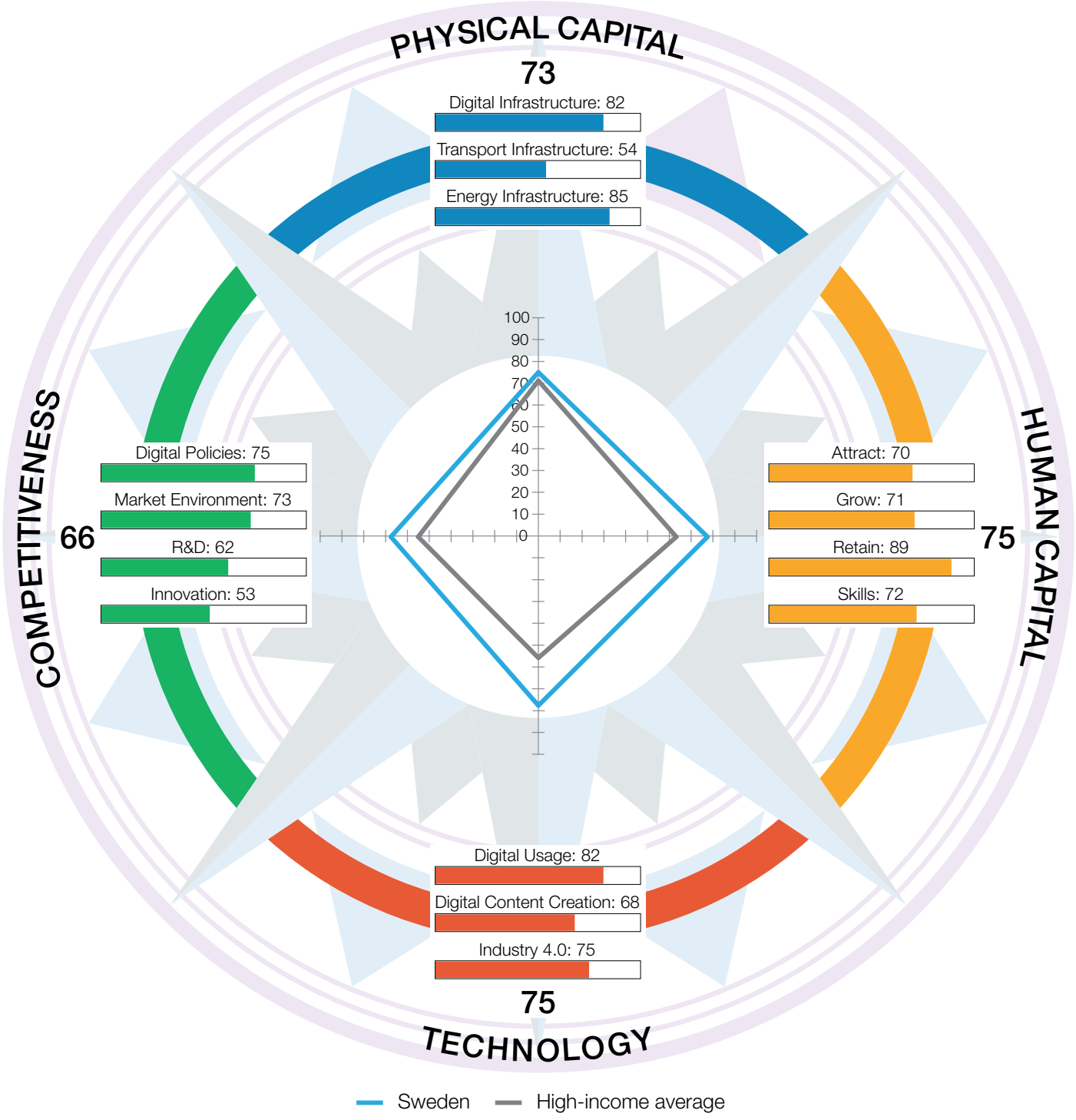
		Score	Rank
3	**TECHNOLOGY**	**22.73**	**93**
3.1	Digital Usage	28.84	104
3.1.1	Internet users	30.78	106
3.1.2	Active mobile-broadband subscriptions	30.82	80
3.1.3	Gender parity in internet usage	n/a	n/a
3.1.4	Firms with website	n/a	n/a
3.1.5	Internet shopping	12.17	84
3.1.6	Government online services	42.56	87
3.1.7	E-Participation	27.85	95
3.2	Digital Content Creation	25.63	83
3.2.1	Software development	9.24	43
3.2.2	Wikipedia edits	27.20	98
3.2.3	Internet domain registrations	0.61	93
3.2.4	Mobile apps development	65.45	81
3.3	Industry 4.0	13.72	51
3.3.1	Cloud computing	—	—
3.3.2	AI software development	13.71	49
3.3.3	AI research	4.02	74
3.3.4	ICT patent applications	0.15	62
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**27.59**	**96**
4.1	Digital Policies	55.82	80
4.1.1	ICT regulation	49.05	118
4.1.2	Cybersecurity	75.00	44
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	66.67	87
4.1.7	Data transfer	100.00	1
4.2	Market Environment	18.45	107
4.2.1	Extent of market dominance	45.69	52
4.2.2	Labour productivity per employee	19.80	74
4.2.3	Urbanisation	2.45	121
4.2.4	Domestic credit to private sector	18.66	71
4.2.5	Market capitalisation	5.66	60
4.3	R&D	22.54	84
4.3.1	R&D spending	2.00	96
4.3.2	University ranking	7.29	74
4.3.3	Gender parity in R&D	77.87	32
4.3.4	Scientific journal articles	2.99	83
4.4	Innovation	13.55	117
4.4.1	Medium- and high-tech industry	9.80	101
4.4.2	High-tech exports	1.47	110
4.4.3	Venture capital recipients, deals	3.27	70
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	2.90	79
4.4.6	Patent applications	50.32	62

Sweden

Key Indicators

Rank (out of 124)	**5**	GDP per capita (PPP US$)	**64,578.40**
Income group	**High income**	GDP (US$ billions)	**585.94**
Regional group	**Europe**	FREI score	**72.51**
Population (millions)	**10.49**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**73.43**	**14**
1.1	Digital Infrastructure	81.53	16
1.1.1	Internet access	93.14	23
1.1.2	International internet bandwidth	44.96	65
1.1.3	Fixed-broadband subscriptions	97.34	25
1.1.4	4G-mobile network coverage	100.00	1
1.1.5	Fixed broadband affordability	91.30	24
1.1.6	Mobile broadband affordability	98.47	11
1.1.7	Computer software spending	45.45	13
1.2	Transport Infrastructure	54.07	23
1.2.1	Quality of infrastructure	85.71	5
1.2.2	Rural access	87.34	34
1.2.3	Air connectivity	29.72	26
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	84.70	4
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	100.00	1
1.3.4	Energy intensity	85.81	55
2	**HUMAN CAPITAL**	**75.50**	**4**
2.1	Attract	69.58	13
2.1.1	Brain gain	58.12	35
2.1.2	International students	18.64	35
2.1.3	Tolerance of minorities	81.91	7
2.1.4	Tolerance of immigrants	92.31	8
2.1.5	Gender parity in high-skilled jobs	96.91	7
2.2	Grow	71.01	9
2.2.1	Tertiary enrolment	55.60	16
2.2.2	Reading, maths, and science	68.77	13
2.2.3	Use of virtual professional networks	62.63	14
2.2.4	Youth inclusion	97.05	4
2.3	Retain	89.41	5
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	91.19	5
2.3.3	Physician density	67.85	17
2.3.4	Sanitation	99.22	27
2.3.5	Personal safety	88.79	18
2.4	Skills	71.98	2
2.4.1	Workforce with tertiary education	55.22	16
2.4.2	High-skilled workforce	88.52	3
2.4.3	Researchers	90.99	2
2.4.4	Relevance of education system to the economy	74.00	16
2.4.5	Digital skills	51.18	11

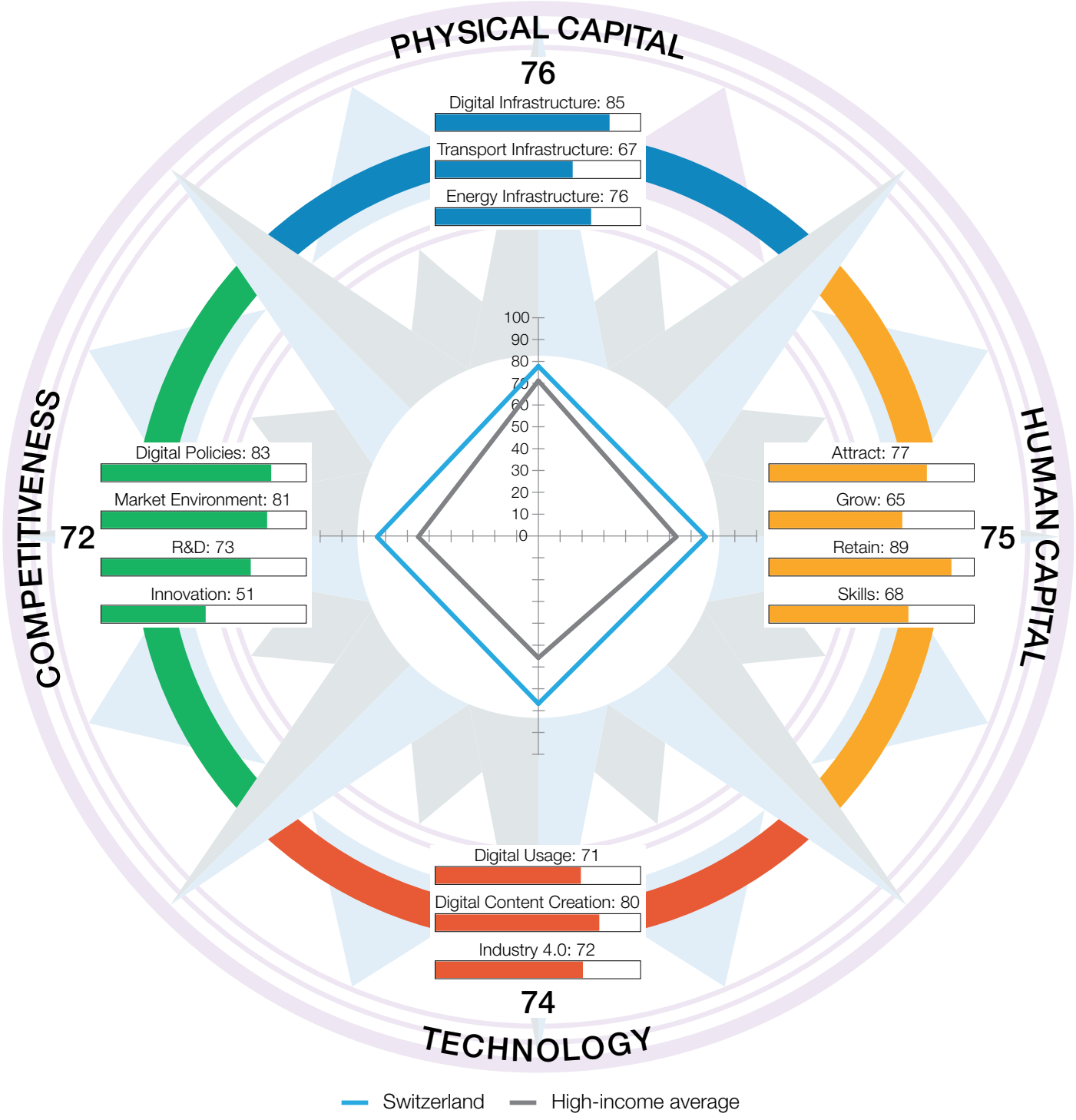
		Score	Rank
3	**TECHNOLOGY**	**75.29**	**5**
3.1	Digital Usage	82.35	13
3.1.1	Internet users	87.55	36
3.1.2	Active mobile-broadband subscriptions	51.02	14
3.1.3	Gender parity in internet usage	97.24	37
3.1.4	Firms with website	93.64	5
3.1.5	Internet shopping	90.56	4
3.1.6	Government online services	86.84	13
3.1.7	E-Participation	69.62	32
3.2	Digital Content Creation	68.49	10
3.2.1	Software development	46.15	6
3.2.2	Wikipedia edits	85.90	7
3.2.3	Internet domain registrations	46.05	12
3.2.4	Mobile apps development	95.84	15
3.3	Industry 4.0	75.04	1
3.3.1	Cloud computing	—	—
3.3.2	AI software development	80.74	6
3.3.3	AI research	61.53	7
3.3.4	ICT patent applications	100.00	1
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**65.83**	**7**
4.1	Digital Policies	75.26	39
4.1.1	ICT regulation	85.14	45
4.1.2	Cybersecurity	75.00	44
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	73.09	5
4.2.1	Extent of market dominance	77.12	8
4.2.2	Labour productivity per employee	69.08	10
4.2.3	Urbanisation	84.96	18
4.2.4	Domestic credit to private sector	61.21	11
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	61.92	7
4.3.1	R&D spending	65.09	3
4.3.2	University ranking	59.68	13
4.3.3	Gender parity in R&D	43.80	69
4.3.4	Scientific journal articles	79.10	6
4.4	Innovation	53.05	8
4.4.1	Medium- and high-tech industry	64.24	10
4.4.2	High-tech exports	21.56	36
4.4.3	Venture capital recipients, deals	35.92	15
4.4.4	New product entrepreneurial activity	80.69	9
4.4.5	New business density	37.01	15
4.4.6	Patent applications	78.87	8

Switzerland

Key Indicators

Rank (out of 124)	**3**	GDP per capita (PPP US$)	**83,598.45**
Income group	**High income**	GDP (US$ billions)	**807.71**
Regional group	**Europe**	FREI score	**74.33**
Population (millions)	**8.77**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**76.18**	**7**
1.1	Digital Infrastructure	85.45	5
1.1.1	Internet access	96.16	11
1.1.2	International internet bandwidth	47.38	53
1.1.3	Fixed-broadband subscriptions	99.56	9
1.1.4	4G-mobile network coverage	99.96	15
1.1.5	Fixed broadband affordability	92.47	19
1.1.6	Mobile broadband affordability	98.98	9
1.1.7	Computer software spending	63.64	2
1.2	Transport Infrastructure	67.31	9
1.2.1	Quality of infrastructure	92.86	2
1.2.2	Rural access	93.75	19
1.2.3	Air connectivity	60.33	9
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	75.78	30
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	97.45	4
2	**HUMAN CAPITAL**	**74.67**	**6**
2.1	Attract	76.87	7
2.1.1	Brain gain	99.66	2
2.1.2	International students	48.23	10
2.1.3	Tolerance of minorities	77.66	12
2.1.4	Tolerance of immigrants	76.92	28
2.1.5	Gender parity in high-skilled jobs	81.88	43
2.2	Grow	65.02	18
2.2.1	Tertiary enrolment	42.77	46
2.2.2	Reading, maths, and science	66.99	20
2.2.3	Use of virtual professional networks	60.36	16
2.2.4	Youth inclusion	89.97	22
2.3	Retain	89.16	6
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	79.66	9
2.3.3	Physician density	70.29	14
2.3.4	Sanitation	99.89	16
2.3.5	Personal safety	95.96	4
2.4	Skills	67.64	9
2.4.1	Workforce with tertiary education	51.61	21
2.4.2	High-skilled workforce	77.96	10
2.4.3	Researchers	63.66	12
2.4.4	Relevance of education system to the economy	100.00	1
2.4.5	Digital skills	44.98	15

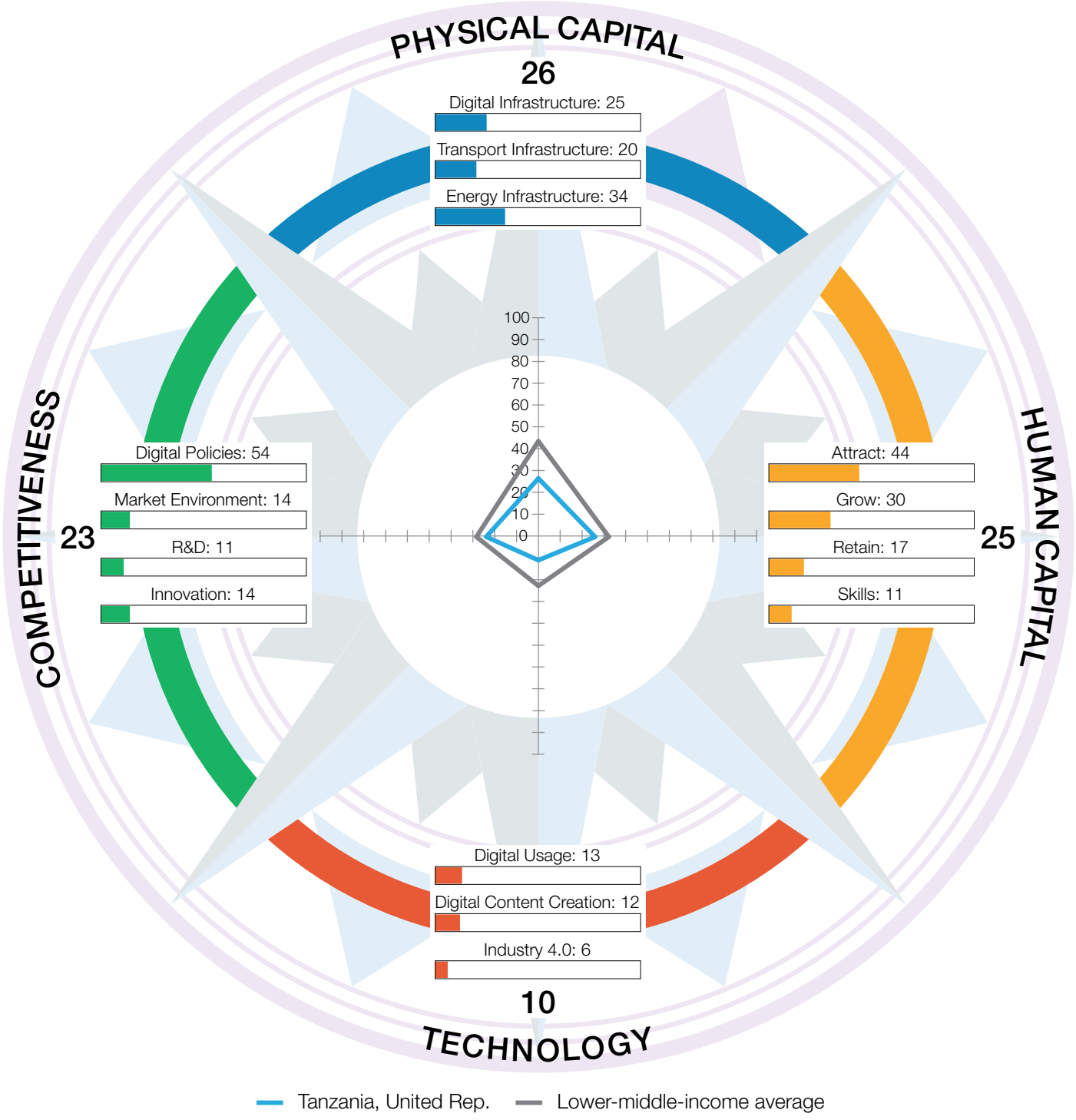
		Score	Rank
3	**TECHNOLOGY**	**74.47**	**6**
3.1	Digital Usage	71.39	32
3.1.1	Internet users	95.28	12
3.1.2	Active mobile-broadband subscriptions	40.93	44
3.1.3	Gender parity in internet usage	97.56	35
3.1.4	Firms with website	n/a	n/a
3.1.5	Internet shopping	58.12	37
3.1.6	Government online services	69.37	49
3.1.7	E-Participation	67.08	41
3.2	Digital Content Creation	80.39	2
3.2.1	Software development	64.01	2
3.2.2	Wikipedia edits	80.23	15
3.2.3	Internet domain registrations	77.33	2
3.2.4	Mobile apps development	100.00	1
3.3	Industry 4.0	71.62	4
3.3.1	Cloud computing	—	—
3.3.2	AI software development	100.00	1
3.3.3	AI research	81.61	4
3.3.4	ICT patent applications	61.48	9
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**72.01**	**3**
4.1	Digital Policies	82.87	22
4.1.1	ICT regulation	92.57	21
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	80.56	2
4.2.1	Extent of market dominance	100.00	1
4.2.2	Labour productivity per employee	74.48	8
4.2.3	Urbanisation	68.65	46
4.2.4	Domestic credit to private sector	77.93	7
4.2.5	Market capitalisation	81.76	4
4.3	R&D	73.32	1
4.3.1	R&D spending	59.52	7
4.3.2	University ranking	83.28	4
4.3.3	Gender parity in R&D	50.47	59
4.3.4	Scientific journal articles	100.00	1
4.4	Innovation	51.30	12
4.4.1	Medium- and high-tech industry	79.82	2
4.4.2	High-tech exports	22.04	35
4.4.3	Venture capital recipients, deals	53.83	8
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	19.04	28
4.4.6	Patent applications	81.78	4

Tanzania, United Rep.

Key Indicators

Rank (out of 124)	**116**	GDP per capita (PPP US$)	**3,096.88**
Income group	**Lower-middle income**	GDP (US$ billions)	**75.71**
Regional group	**Sub-Saharan Africa**	FREI score	**21.28**
Population (millions)	**65.50**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**26.08**	**115**
1.1	Digital Infrastructure	24.58	116
1.1.1	Internet access	n/a	n/a
1.1.2	International internet bandwidth	17.60	119
1.1.3	Fixed-broadband subscriptions	n/a	n/a
1.1.4	4G-mobile network coverage	6.45	122
1.1.5	Fixed broadband affordability	38.99	114
1.1.6	Mobile broadband affordability	59.86	107
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	20.10	91
1.2.1	Quality of infrastructure	36.13	62
1.2.2	Rural access	42.80	95
1.2.3	Air connectivity	0.39	110
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	33.58	117
1.3.1	Access to electricity	33.28	118
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	33.08	86
1.3.4	Energy intensity	67.68	104
2	**HUMAN CAPITAL**	**25.33**	**108**
2.1	Attract	43.71	63
2.1.1	Brain gain	55.95	41
2.1.2	International students	n/a	n/a
2.1.3	Tolerance of minorities	48.94	51
2.1.4	Tolerance of immigrants	41.54	91
2.1.5	Gender parity in high-skilled jobs	28.41	108
2.2	Grow	29.97	98
2.2.1	Tertiary enrolment	4.29	111
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	2.72	111
2.2.4	Youth inclusion	82.89	48
2.3	Retain	16.87	115
2.3.1	Pension coverage	3.57	115
2.3.2	Environmental performance	25.93	90
2.3.3	Physician density	0.25	122
2.3.4	Sanitation	25.09	114
2.3.5	Personal safety	29.49	113
2.4	Skills	10.79	112
2.4.1	Workforce with tertiary education	0.15	121
2.4.2	High-skilled workforce	0.00	119
2.4.3	Researchers	0.06	99
2.4.4	Relevance of education system to the economy	42.94	58
2.4.5	Digital skills	n/a	n/a

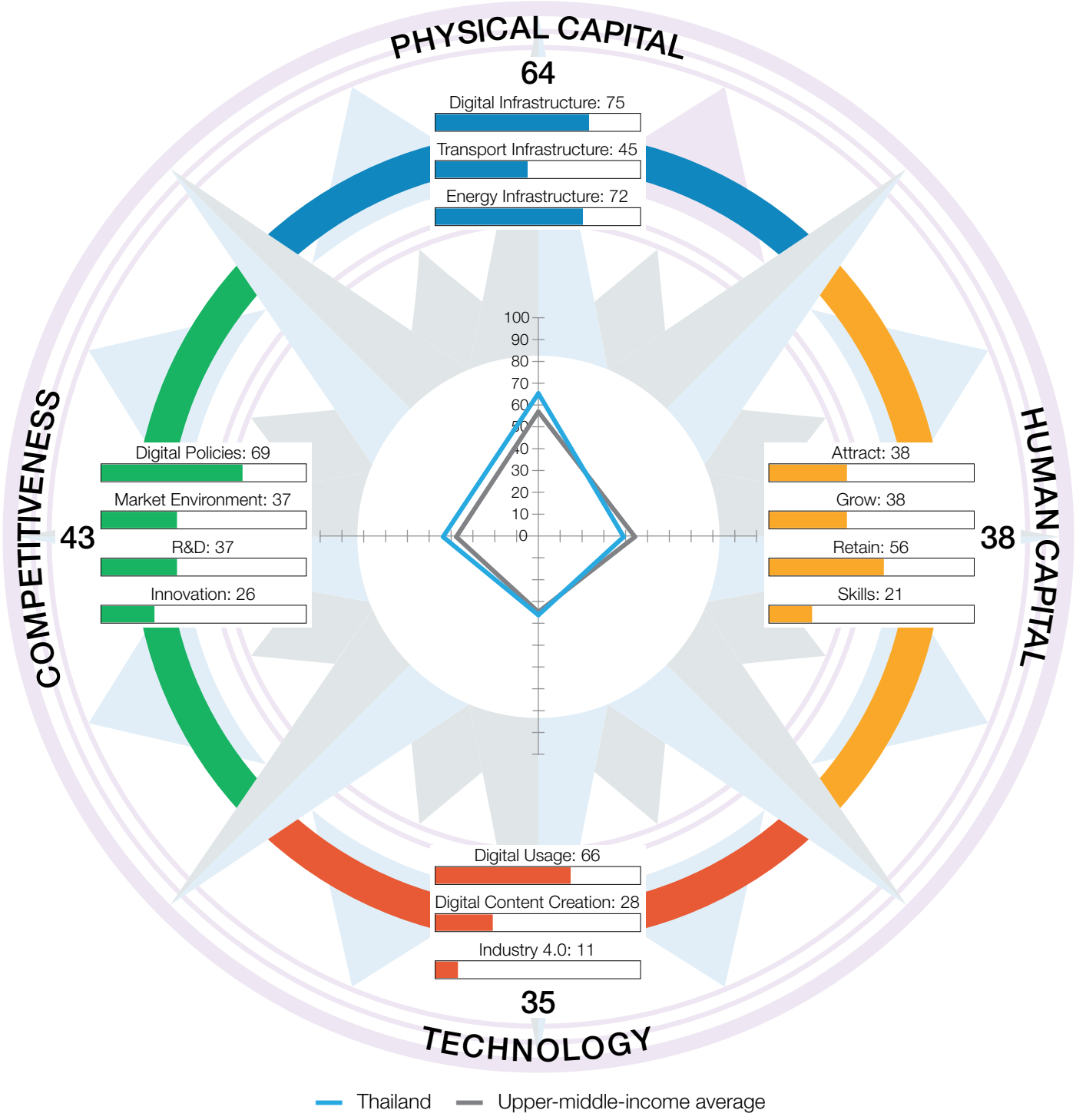
		Score	Rank
3	**TECHNOLOGY**	**10.43**	**121**
3.1	Digital Usage	12.70	122
3.1.1	Internet users	16.93	116
3.1.2	Active mobile-broadband subscriptions	5.36	121
3.1.3	Gender parity in internet usage	0.00	107
3.1.4	Firms with website	11.34	97
3.1.5	Internet shopping	6.16	101
3.1.6	Government online services	30.11	102
3.1.7	E-Participation	18.98	109
3.2	Digital Content Creation	12.39	117
3.2.1	Software development	0.18	117
3.2.2	Wikipedia edits	7.11	122
3.2.3	Internet domain registrations	0.11	110
3.2.4	Mobile apps development	42.16	108
3.3	Industry 4.0	6.21	101
3.3.1	Cloud computing	—	—
3.3.2	AI software development	1.18	104
3.3.3	AI research	0.45	106
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**23.27**	**108**
4.1	Digital Policies	53.86	85
4.1.1	ICT regulation	77.03	73
4.1.2	Cybersecurity	50.00	72
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	66.67	87
4.1.7	Data transfer	83.33	38
4.2	Market Environment	14.26	114
4.2.1	Extent of market dominance	42.81	58
4.2.2	Labour productivity per employee	2.79	106
4.2.3	Urbanisation	20.76	112
4.2.4	Domestic credit to private sector	2.05	115
4.2.5	Market capitalisation	2.90	70
4.3	R&D	11.36	98
4.3.1	R&D spending	9.39	59
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	35.55	80
4.3.4	Scientific journal articles	0.49	106
4.4	Innovation	13.61	115
4.4.1	Medium- and high-tech industry	8.19	107
4.4.2	High-tech exports	2.46	102
4.4.3	Venture capital recipients, deals	4.80	63
4.4.4	New product entrepreneurial activity	65.64	21
4.4.5	New business density	0.56	101
4.4.6	Patent applications	0.00	122

Thailand

Key Indicators

Rank (out of 124)	**55**	GDP per capita (PPP US$)	**20,671.68**
Income group	**Upper-middle income**	GDP (US$ billions)	**495.34**
Regional group	**Asia and Pacific**	FREI score	**44.89**
Population (millions)	**71.70**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**64.00**	**45**
1.1	Digital Infrastructure	74.52	50
1.1.1	Internet access	88.50	37
1.1.2	International internet bandwidth	55.57	29
1.1.3	Fixed-broadband subscriptions	99.01	14
1.1.4	4G-mobile network coverage	97.96	54
1.1.5	Fixed broadband affordability	72.77	76
1.1.6	Mobile broadband affordability	89.63	75
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	45.20	38
1.2.1	Quality of infrastructure	67.86	23
1.2.2	Rural access	70.84	58
1.2.3	Air connectivity	21.95	35
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	72.28	57
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	98.50	15
1.3.4	Energy intensity	79.32	82
2	**HUMAN CAPITAL**	**38.08**	**79**
2.1	Attract	37.64	95
2.1.1	Brain gain	57.63	36
2.1.2	International students	3.36	79
2.1.3	Tolerance of minorities	28.72	85
2.1.4	Tolerance of immigrants	15.38	117
2.1.5	Gender parity in high-skilled jobs	83.08	40
2.2	Grow	37.94	75
2.2.1	Tertiary enrolment	28.48	71
2.2.2	Reading, maths, and science	31.97	58
2.2.3	Use of virtual professional networks	6.91	96
2.2.4	Youth inclusion	84.42	41
2.3	Retain	55.63	68
2.3.1	Pension coverage	88.88	54
2.3.2	Environmental performance	32.54	76
2.3.3	Physician density	14.24	86
2.3.4	Sanitation	98.59	38
2.3.5	Personal safety	43.88	98
2.4	Skills	21.10	84
2.4.1	Workforce with tertiary education	22.66	78
2.4.2	High-skilled workforce	18.01	84
2.4.3	Researchers	23.63	39
2.4.4	Relevance of education system to the economy	36.21	76
2.4.5	Digital skills	5.00	68

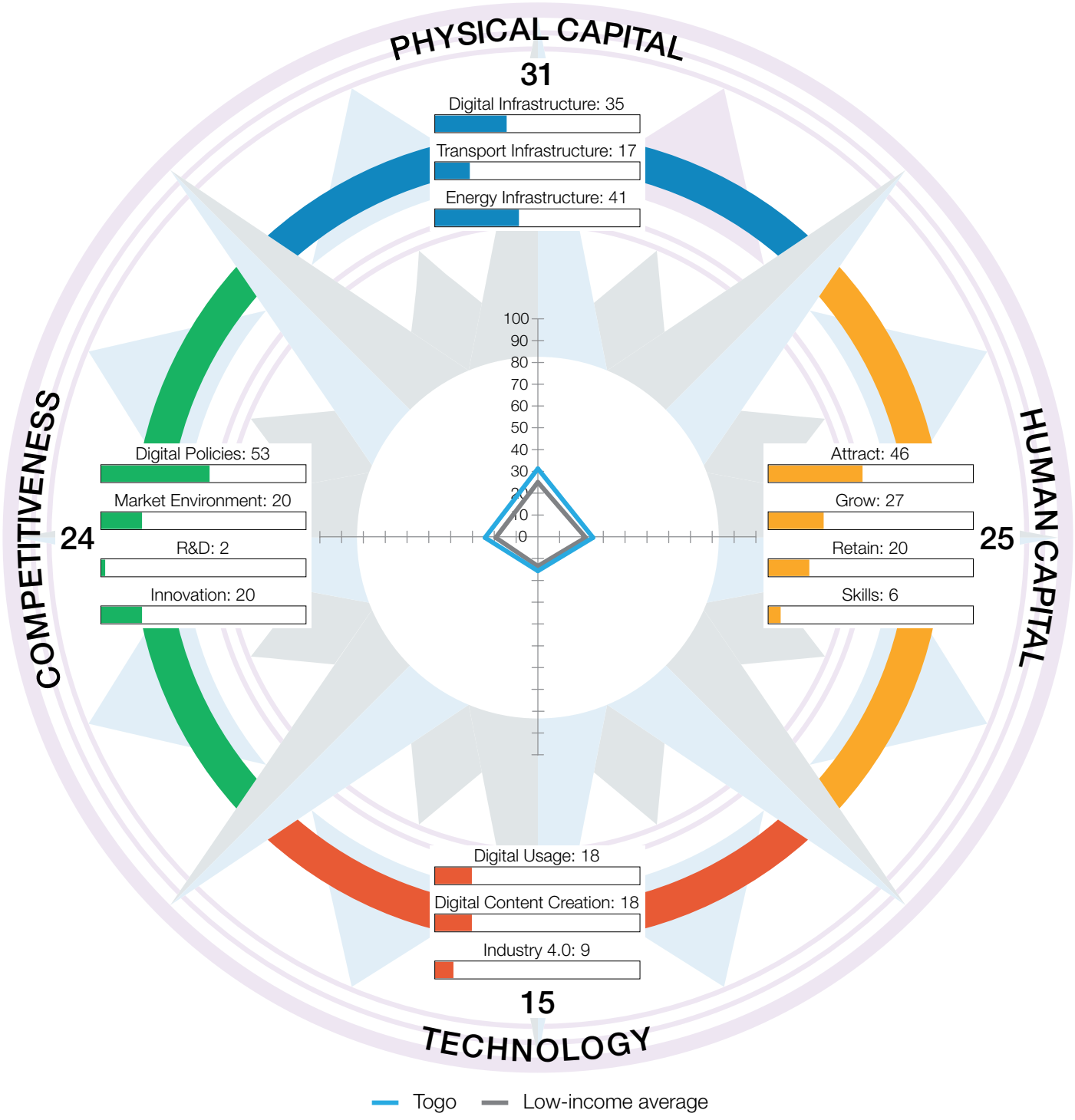
		Score	Rank
3	**TECHNOLOGY**	**34.91**	**59**
3.1	Digital Usage	65.84	46
3.1.1	Internet users	84.31	47
3.1.2	Active mobile-broadband subscriptions	36.72	59
3.1.3	Gender parity in internet usage	95.88	52
3.1.4	Firms with website	38.98	73
3.1.5	Internet shopping	58.54	35
3.1.6	Government online services	70.50	47
3.1.7	E-Participation	75.95	18
3.2	Digital Content Creation	27.94	75
3.2.1	Software development	2.09	78
3.2.2	Wikipedia edits	37.74	80
3.2.3	Internet domain registrations	2.52	68
3.2.4	Mobile apps development	69.40	69
3.3	Industry 4.0	10.95	66
3.3.1	Cloud computing	—	—
3.3.2	AI software development	10.85	57
3.3.3	AI research	4.70	67
3.3.4	ICT patent applications	0.11	69
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**42.56**	**48**
4.1	Digital Policies	69.42	57
4.1.1	ICT regulation	81.76	64
4.1.2	Cybersecurity	37.50	87
4.1.3	AI regulation	50.00	58
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	66.67	51
4.2	Market Environment	37.36	54
4.2.1	Extent of market dominance	24.43	93
4.2.2	Labour productivity per employee	18.36	76
4.2.3	Urbanisation	40.11	92
4.2.4	Domestic credit to private sector	71.13	9
4.2.5	Market capitalisation	32.76	15
4.3	R&D	37.14	36
4.3.1	R&D spending	24.66	32
4.3.2	University ranking	33.54	37
4.3.3	Gender parity in R&D	83.10	27
4.3.4	Scientific journal articles	7.27	64
4.4	Innovation	26.31	65
4.4.1	Medium- and high-tech industry	50.24	30
4.4.2	High-tech exports	42.99	11
4.4.3	Venture capital recipients, deals	1.61	84
4.4.4	New product entrepreneurial activity	10.55	84
4.4.5	New business density	5.16	69
4.4.6	Patent applications	47.33	68

Togo

Key Indicators

Rank (out of 124)	**109**	GDP per capita (PPP US$)	**2,607.93**
Income group	**Low income**	GDP (US$ billions)	**8.13**
Regional group	**Sub-Saharan Africa**	FREI score	**23.49**
Population (millions)	**8.85**	FREI score (income group average)	**19.43**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**30.83**	**109**
1.1	Digital Infrastructure	34.89	109
1.1.1	Internet access	24.87	96
1.1.2	International internet bandwidth	29.66	108
1.1.3	Fixed-broadband subscriptions	90.56	53
1.1.4	4G-mobile network coverage	64.52	106
1.1.5	Fixed broadband affordability	20.68	121
1.1.6	Mobile broadband affordability	4.85	120
1.1.7	Computer software spending	9.09	74
1.2	Transport Infrastructure	17.03	104
1.2.1	Quality of infrastructure	17.86	100
1.2.2	Rural access	48.29	88
1.2.3	Air connectivity	0.28	114
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	40.57	114
1.3.1	Access to electricity	48.42	109
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	58.65	75
1.3.4	Energy intensity	54.76	116
2	**HUMAN CAPITAL**	**24.64**	**111**
2.1	Attract	45.55	54
2.1.1	Brain gain	n/a	n/a
2.1.2	International students	n/a	n/a
2.1.3	Tolerance of minorities	36.17	74
2.1.4	Tolerance of immigrants	63.08	55
2.1.5	Gender parity in high-skilled jobs	37.41	102
2.2	Grow	26.91	107
2.2.1	Tertiary enrolment	9.36	98
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	4.87	104
2.2.4	Youth inclusion	66.51	89
2.3	Retain	19.63	109
2.3.1	Pension coverage	17.35	93
2.3.2	Environmental performance	25.59	91
2.3.3	Physician density	0.39	121
2.3.4	Sanitation	10.64	120
2.3.5	Personal safety	44.20	96
2.4	Skills	6.47	120
2.4.1	Workforce with tertiary education	5.18	111
2.4.2	High-skilled workforce	17.85	85
2.4.3	Researchers	0.36	91
2.4.4	Relevance of education system to the economy	n/a	n/a
2.4.5	Digital skills	2.49	77

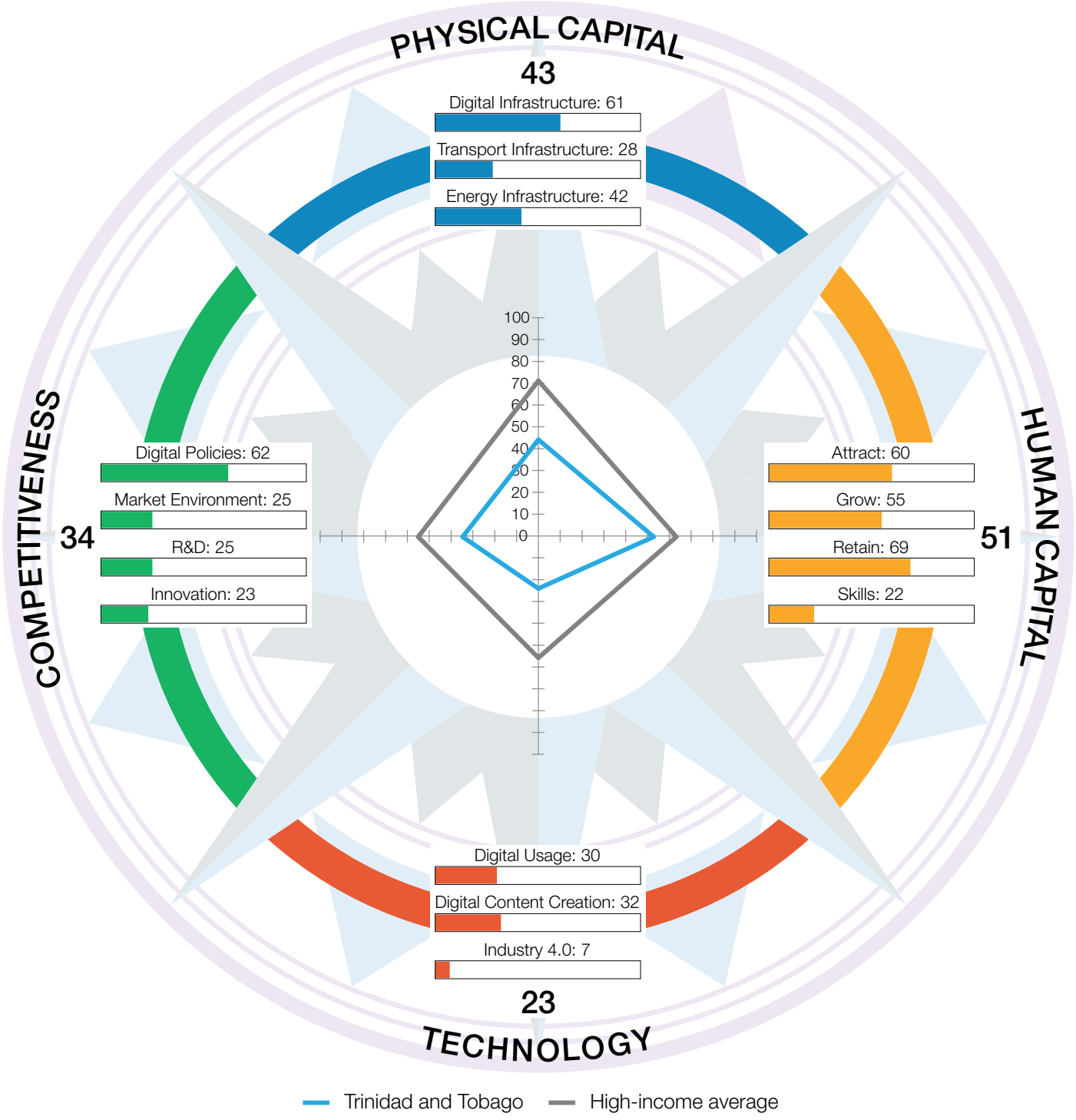
		Score	Rank
3	**TECHNOLOGY**	**14.87**	**113**
3.1	Digital Usage	18.02	116
3.1.1	Internet users	19.06	114
3.1.2	Active mobile-broadband subscriptions	10.63	116
3.1.3	Gender parity in internet usage	18.47	105
3.1.4	Firms with website	20.03	91
3.1.5	Internet shopping	0.95	119
3.1.6	Government online services	25.33	107
3.1.7	E-Participation	31.65	88
3.2	Digital Content Creation	18.00	104
3.2.1	Software development	0.16	118
3.2.2	Wikipedia edits	34.44	86
3.2.3	Internet domain registrations	0.22	106
3.2.4	Mobile apps development	37.19	115
3.3	Industry 4.0	8.60	82
3.3.1	Cloud computing	—	—
3.3.2	AI software development	0.11	117
3.3.3	AI research	0.24	110
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**23.63**	**107**
4.1	Digital Policies	52.84	89
4.1.1	ICT regulation	69.86	85
4.1.2	Cybersecurity	33.33	98
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	66.67	87
4.1.7	Data transfer	100.00	1
4.2	Market Environment	19.95	105
4.2.1	Extent of market dominance	n/a	n/a
4.2.2	Labour productivity per employee	n/a	n/a
4.2.3	Urbanisation	30.24	101
4.2.4	Domestic credit to private sector	9.66	92
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	1.83	112
4.3.1	R&D spending	4.75	78
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	2.22	104
4.3.4	Scientific journal articles	0.33	112
4.4	Innovation	19.90	97
4.4.1	Medium- and high-tech industry	n/a	n/a
4.4.2	High-tech exports	0.35	119
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	48.91	46
4.4.5	New business density	3.74	74
4.4.6	Patent applications	26.62	106

Trinidad and Tobago

Key Indicators

Rank (out of 124)	**84**	GDP per capita (PPP US$)	**27,778.18**
Income group	**High income**	GDP (US$ billions)	**27.90**
Regional group	**Latin America and the Caribbean**	FREI score	**37.93**
Population (millions)	**1.53**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**43.36**	**97**
1.1	Digital Infrastructure	60.59	85
1.1.1	Internet access	n/a	n/a
1.1.2	International internet bandwidth	55.74	28
1.1.3	Fixed-broadband subscriptions	80.99	70
1.1.4	4G-mobile network coverage	73.12	101
1.1.5	Fixed broadband affordability	74.34	71
1.1.6	Mobile broadband affordability	79.34	96
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	27.57	75
1.2.1	Quality of infrastructure	21.43	87
1.2.2	Rural access	69.98	59
1.2.3	Air connectivity	11.64	49
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	41.92	113
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	0.00	124
2	**HUMAN CAPITAL**	**51.49**	**41**
2.1	Attract	59.74	27
2.1.1	Brain gain	42.97	73
2.1.2	International students	n/a	n/a
2.1.3	Tolerance of minorities	68.09	24
2.1.4	Tolerance of immigrants	50.77	77
2.1.5	Gender parity in high-skilled jobs	77.12	53
2.2	Grow	54.80	37
2.2.1	Tertiary enrolment	n/a	n/a
2.2.2	Reading, maths, and science	36.31	52
2.2.3	Use of virtual professional networks	46.89	25
2.2.4	Youth inclusion	81.20	52
2.3	Retain	69.20	46
2.3.1	Pension coverage	90.92	47
2.3.2	Environmental performance	48.98	46
2.3.3	Physician density	53.85	38
2.3.4	Sanitation	93.32	64
2.3.5	Personal safety	58.94	68
2.4	Skills	22.21	81
2.4.1	Workforce with tertiary education	0.00	122
2.4.2	High-skilled workforce	47.06	44
2.4.3	Researchers	7.18	61
2.4.4	Relevance of education system to the economy	34.60	79
2.4.5	Digital skills	n/a	n/a

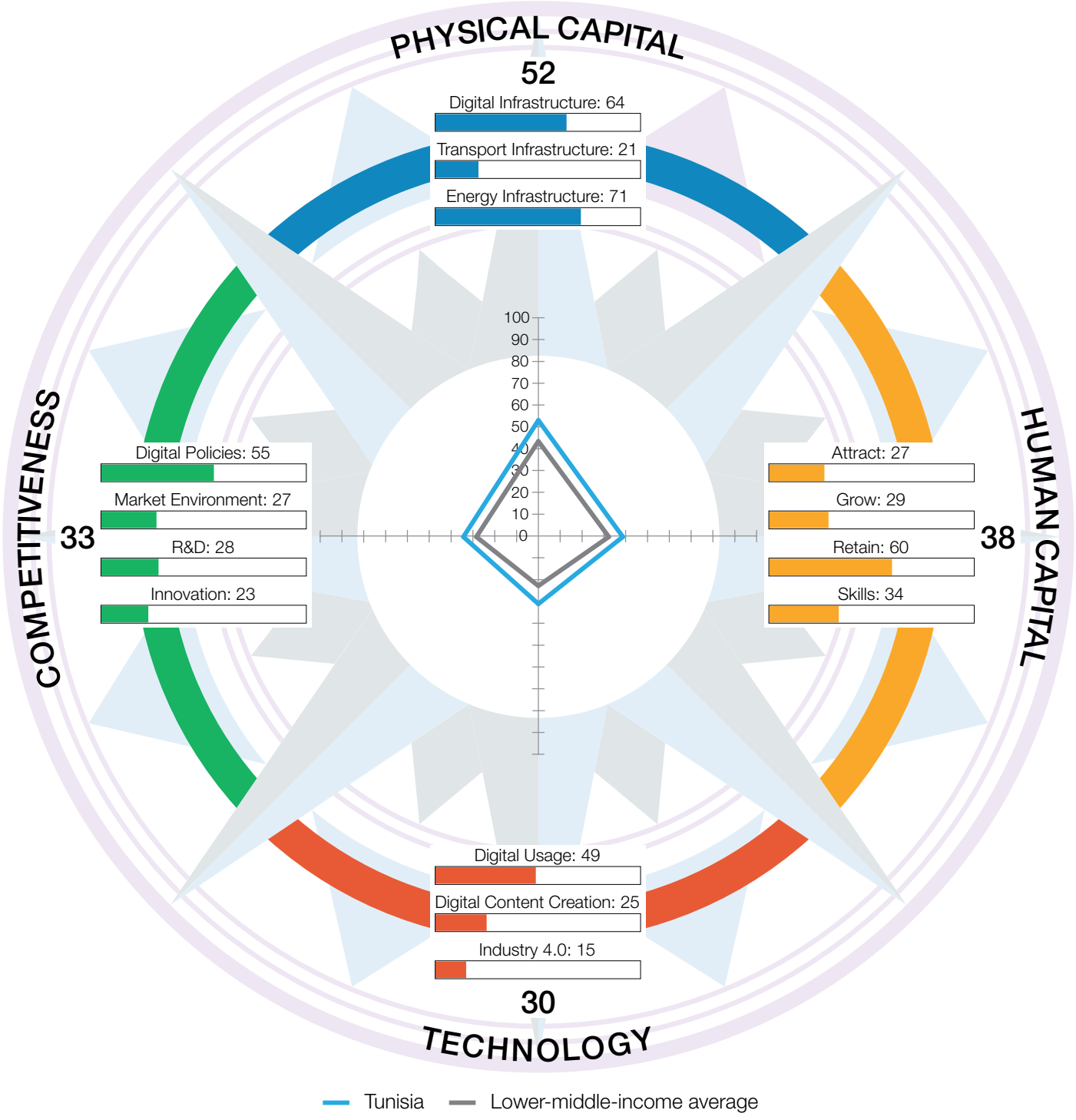
		Score	Rank
3	**TECHNOLOGY**	**23.07**	**92**
3.1	Digital Usage	30.09	101
3.1.1	Internet users	68.69	80
3.1.2	Active mobile-broadband subscriptions	15.50	110
3.1.3	Gender parity in internet usage	n/a	n/a
3.1.4	Firms with website	n/a	n/a
3.1.5	Internet shopping	18.41	71
3.1.6	Government online services	32.64	99
3.1.7	E-Participation	15.18	114
3.2	Digital Content Creation	31.64	65
3.2.1	Software development	2.36	73
3.2.2	Wikipedia edits	60.02	51
3.2.3	Internet domain registrations	2.48	69
3.2.4	Mobile apps development	61.71	86
3.3	Industry 4.0	7.49	92
3.3.1	Cloud computing	—	—
3.3.2	AI software development	17.39	43
3.3.3	AI research	5.07	64
3.3.4	ICT patent applications	0.00	76
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**33.81**	**73**
4.1	Digital Policies	62.36	68
4.1.1	ICT regulation	86.49	40
4.1.2	Cybersecurity	50.00	72
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	24.88	95
4.2.1	Extent of market dominance	3.50	120
4.2.2	Labour productivity per employee	37.85	47
4.2.3	Urbanisation	43.98	88
4.2.4	Domestic credit to private sector	14.20	78
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	25.42	72
4.3.1	R&D spending	0.97	101
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	94.90	9
4.3.4	Scientific journal articles	5.81	73
4.4	Innovation	22.57	86
4.4.1	Medium- and high-tech industry	47.82	35
4.4.2	High-tech exports	0.00	123
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	n/a	n/a
4.4.6	Patent applications	19.89	114

Tunisia

Key Indicators

Rank (out of 124)	**80**	GDP per capita (PPP US$)	**12,489.72**
Income group	**Lower-middle income**	GDP (US$ billions)	**46.66**
Regional group	**Middle East and North Africa**	FREI score	**38.27**
Population (millions)	**12.36**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**52.01**	**79**
1.1	Digital Infrastructure	64.47	77
1.1.1	Internet access	50.43	85
1.1.2	International internet bandwidth	47.89	49
1.1.3	Fixed-broadband subscriptions	63.17	84
1.1.4	4G-mobile network coverage	95.70	70
1.1.5	Fixed broadband affordability	75.15	69
1.1.6	Mobile broadband affordability	91.67	66
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	20.55	90
1.2.1	Quality of infrastructure	10.71	115
1.2.2	Rural access	59.09	75
1.2.3	Air connectivity	5.85	70
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	71.02	65
1.3.1	Access to electricity	99.88	79
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	93.23	52
1.3.4	Energy intensity	85.02	60
2	**HUMAN CAPITAL**	**37.69**	**82**
2.1	Attract	27.42	118
2.1.1	Brain gain	18.61	109
2.1.2	International students	7.58	65
2.1.3	Tolerance of minorities	26.60	91
2.1.4	Tolerance of immigrants	46.15	85
2.1.5	Gender parity in high-skilled jobs	38.18	101
2.2	Grow	29.23	99
2.2.1	Tertiary enrolment	24.12	78
2.2.2	Reading, maths, and science	15.23	71
2.2.3	Use of virtual professional networks	20.84	63
2.2.4	Youth inclusion	56.72	104
2.3	Retain	60.16	65
2.3.1	Pension coverage	85.10	55
2.3.2	Environmental performance	36.95	68
2.3.3	Physician density	19.56	82
2.3.4	Sanitation	97.18	54
2.3.5	Personal safety	62.00	63
2.4	Skills	33.94	52
2.4.1	Workforce with tertiary education	26.84	67
2.4.2	High-skilled workforce	20.72	79
2.4.3	Researchers	18.48	45
2.4.4	Relevance of education system to the economy	28.32	87
2.4.5	Digital skills	75.34	3

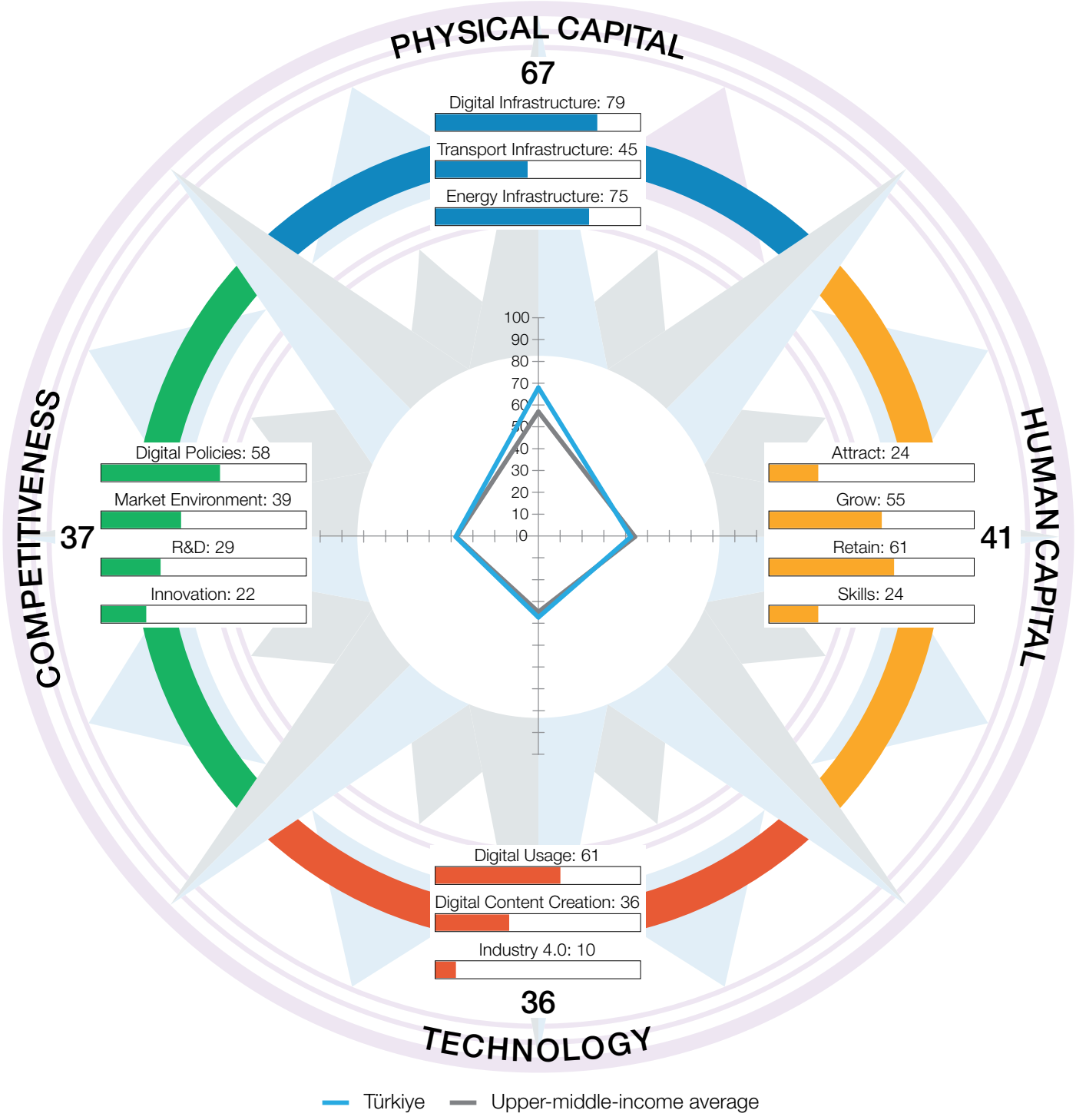
		Score	Rank
3	**TECHNOLOGY**	**29.92**	**77**
3.1	Digital Usage	48.97	80
3.1.1	Internet users	70.07	77
3.1.2	Active mobile-broadband subscriptions	31.64	75
3.1.3	Gender parity in internet usage	72.95	91
3.1.4	Firms with website	52.26	57
3.1.5	Internet shopping	18.86	70
3.1.6	Government online services	47.66	84
3.1.7	E-Participation	49.37	66
3.2	Digital Content Creation	25.45	84
3.2.1	Software development	4.11	60
3.2.2	Wikipedia edits	28.50	94
3.2.3	Internet domain registrations	1.85	74
3.2.4	Mobile apps development	67.32	76
3.3	Industry 4.0	15.35	43
3.3.1	Cloud computing	—	—
3.3.2	AI software development	17.63	40
3.3.3	AI research	17.66	39
3.3.4	ICT patent applications	0.27	59
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**33.48**	**75**
4.1	Digital Policies	55.25	81
4.1.1	ICT regulation	65.95	89
4.1.2	Cybersecurity	37.50	87
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	83.33	38
4.2	Market Environment	27.45	87
4.2.1	Extent of market dominance	11.75	114
4.2.2	Labour productivity per employee	21.31	72
4.2.3	Urbanisation	62.84	55
4.2.4	Domestic credit to private sector	35.33	37
4.2.5	Market capitalisation	6.03	59
4.3	R&D	28.29	57
4.3.1	R&D spending	13.74	48
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	83.56	26
4.3.4	Scientific journal articles	15.86	50
4.4	Innovation	22.91	83
4.4.1	Medium- and high-tech industry	33.39	56
4.4.2	High-tech exports	11.02	62
4.4.3	Venture capital recipients, deals	12.29	36
4.4.4	New product entrepreneurial activity	18.02	80
4.4.5	New business density	8.11	53
4.4.6	Patent applications	54.62	50

Türkiye

Key Indicators

Rank (out of 124)	**53**	GDP per capita (PPP US$)	**37,273.70**
Income group	**Upper-middle income**	GDP (US$ billions)	**905.99**
Regional group	**Middle East and North Africa**	FREI score	**45.18**
Population (millions)	**85.34**	FREI score (income group average)	**42.29**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**66.59**	**36**
1.1	Digital Infrastructure	79.30	26
1.1.1	Internet access	87.96	39
1.1.2	International internet bandwidth	52.24	40
1.1.3	Fixed-broadband subscriptions	90.17	56
1.1.4	4G-mobile network coverage	96.59	68
1.1.5	Fixed broadband affordability	86.84	41
1.1.6	Mobile broadband affordability	95.83	42
1.1.7	Computer software spending	45.45	13
1.2	Transport Infrastructure	45.18	39
1.2.1	Quality of infrastructure	57.14	41
1.2.2	Rural access	90.38	30
1.2.3	Air connectivity	13.37	46
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	75.29	35
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	94.74	45
1.3.4	Energy intensity	91.81	21
2	**HUMAN CAPITAL**	**41.30**	**75**
2.1	Attract	24.44	121
2.1.1	Brain gain	23.40	105
2.1.2	International students	6.05	71
2.1.3	Tolerance of minorities	3.19	121
2.1.4	Tolerance of immigrants	44.62	87
2.1.5	Gender parity in high-skilled jobs	44.96	97
2.2	Grow	54.90	36
2.2.1	Tertiary enrolment	77.41	2
2.2.2	Reading, maths, and science	52.41	40
2.2.3	Use of virtual professional networks	22.76	56
2.2.4	Youth inclusion	67.02	87
2.3	Retain	61.43	60
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	12.54	119
2.3.3	Physician density	31.91	73
2.3.4	Sanitation	99.15	30
2.3.5	Personal safety	63.54	59
2.4	Skills	24.42	74
2.4.1	Workforce with tertiary education	34.10	50
2.4.2	High-skilled workforce	34.02	56
2.4.3	Researchers	20.25	40
2.4.4	Relevance of education system to the economy	19.53	100
2.4.5	Digital skills	14.19	58

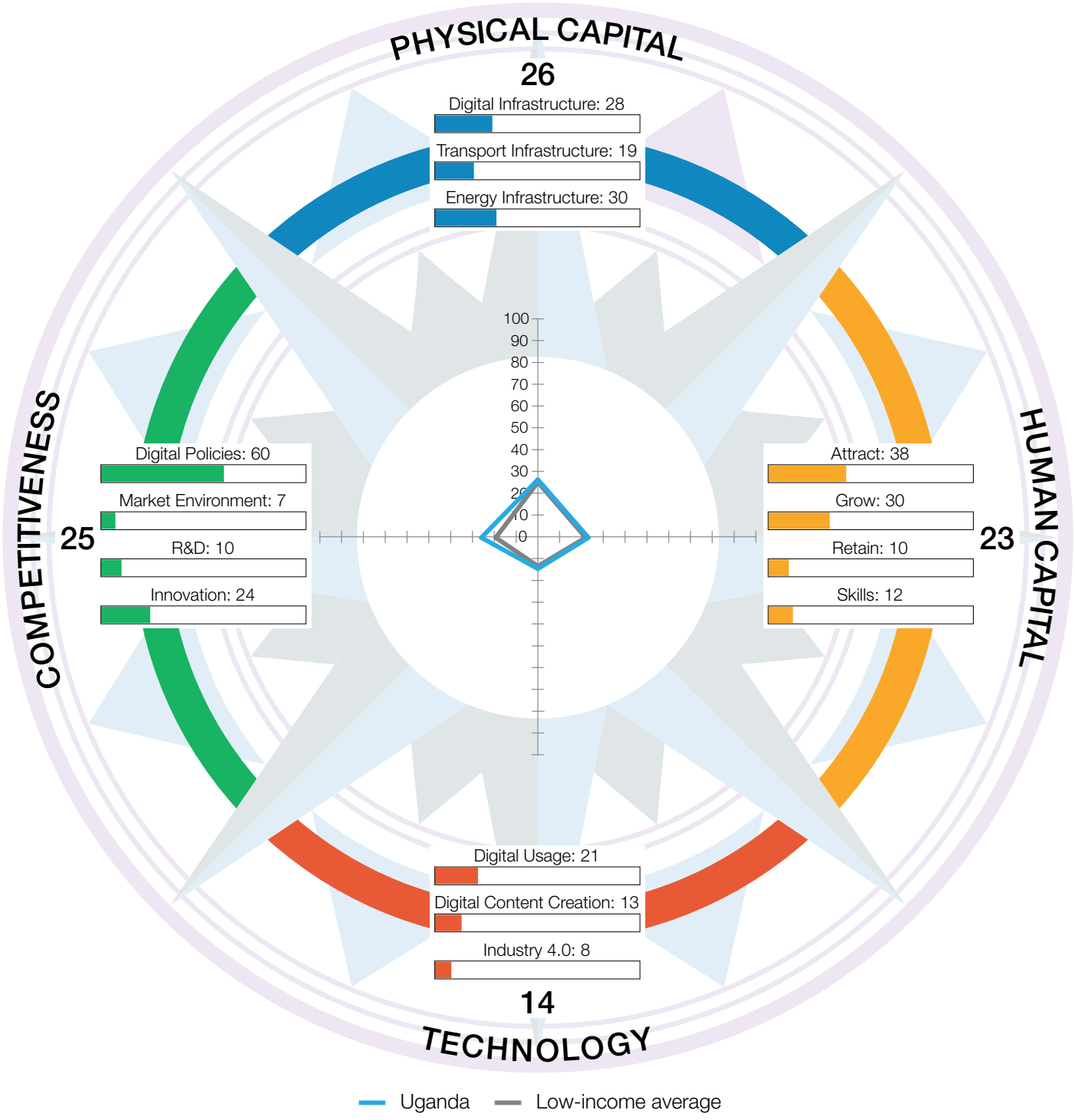
		Score	Rank
3	**TECHNOLOGY**	**35.92**	**55**
3.1	Digital Usage	61.19	56
3.1.1	Internet users	80.20	55
3.1.2	Active mobile-broadband subscriptions	32.67	71
3.1.3	Gender parity in internet usage	79.80	89
3.1.4	Firms with website	43.66	66
3.1.5	Internet shopping	34.54	58
3.1.6	Government online services	81.54	24
3.1.7	E-Participation	75.95	18
3.2	Digital Content Creation	36.10	53
3.2.1	Software development	3.22	67
3.2.2	Wikipedia edits	53.13	57
3.2.3	Internet domain registrations	5.61	48
3.2.4	Mobile apps development	82.44	42
3.3	Industry 4.0	10.48	70
3.3.1	Cloud computing	—	—
3.3.2	AI software development	17.48	42
3.3.3	AI research	12.94	48
3.3.4	ICT patent applications	3.75	35
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**36.91**	**65**
4.1	Digital Policies	57.87	77
4.1.1	ICT regulation	92.57	21
4.1.2	Cybersecurity	62.50	53
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	50.00	99
4.2	Market Environment	38.75	49
4.2.1	Extent of market dominance	34.81	76
4.2.2	Labour productivity per employee	56.49	27
4.2.3	Urbanisation	70.26	42
4.2.4	Domestic credit to private sector	22.27	55
4.2.5	Market capitalisation	9.91	44
4.3	R&D	29.11	52
4.3.1	R&D spending	20.14	39
4.3.2	University ranking	24.42	47
4.3.3	Gender parity in R&D	52.95	58
4.3.4	Scientific journal articles	18.92	44
4.4	Innovation	21.91	90
4.4.1	Medium- and high-tech industry	44.60	40
4.4.2	High-tech exports	4.96	86
4.4.3	Venture capital recipients, deals	1.69	82
4.4.4	New product entrepreneurial activity	8.37	86
4.4.5	New business density	7.18	57
4.4.6	Patent applications	64.65	24

Uganda

Key Indicators

Rank (out of 124)	**114**	GDP per capita (PPP US$)	**2,693.82**
Income group	**Low income**	GDP (US$ billions)	**45.56**
Regional group	**Sub-Saharan Africa**	FREI score	**21.91**
Population (millions)	**47.25**	FREI score (income group average)	**19.43**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**25.92**	**116**
1.1	Digital Infrastructure	28.37	112
1.1.1	Internet access	n/a	n/a
1.1.2	International internet bandwidth	69.54	8
1.1.3	Fixed-broadband subscriptions	14.95	110
1.1.4	4G-mobile network coverage	25.81	118
1.1.5	Fixed broadband affordability	26.77	119
1.1.6	Mobile broadband affordability	33.16	115
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	18.95	97
1.2.1	Quality of infrastructure	13.93	111
1.2.2	Rural access	61.23	72
1.2.3	Air connectivity	0.30	113
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	30.44	120
1.3.1	Access to electricity	36.16	117
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	52.63	77
1.3.4	Energy intensity	32.93	121
2	**HUMAN CAPITAL**	**22.56**	**116**
2.1	Attract	37.65	94
2.1.1	Brain gain	51.55	54
2.1.2	International students	n/a	n/a
2.1.3	Tolerance of minorities	19.15	97
2.1.4	Tolerance of immigrants	33.85	106
2.1.5	Gender parity in high-skilled jobs	46.06	95
2.2	Grow	30.01	97
2.2.1	Tertiary enrolment	2.44	116
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	3.85	108
2.2.4	Youth inclusion	83.73	45
2.3	Retain	10.39	124
2.3.1	Pension coverage	9.39	103
2.3.2	Environmental performance	28.64	83
2.3.3	Physician density	1.98	112
2.3.4	Sanitation	11.94	119
2.3.5	Personal safety	0.00	124
2.4	Skills	12.20	107
2.4.1	Workforce with tertiary education	8.79	100
2.4.2	High-skilled workforce	2.10	113
2.4.3	Researchers	0.16	97
2.4.4	Relevance of education system to the economy	37.73	70
2.4.5	Digital skills	n/a	n/a

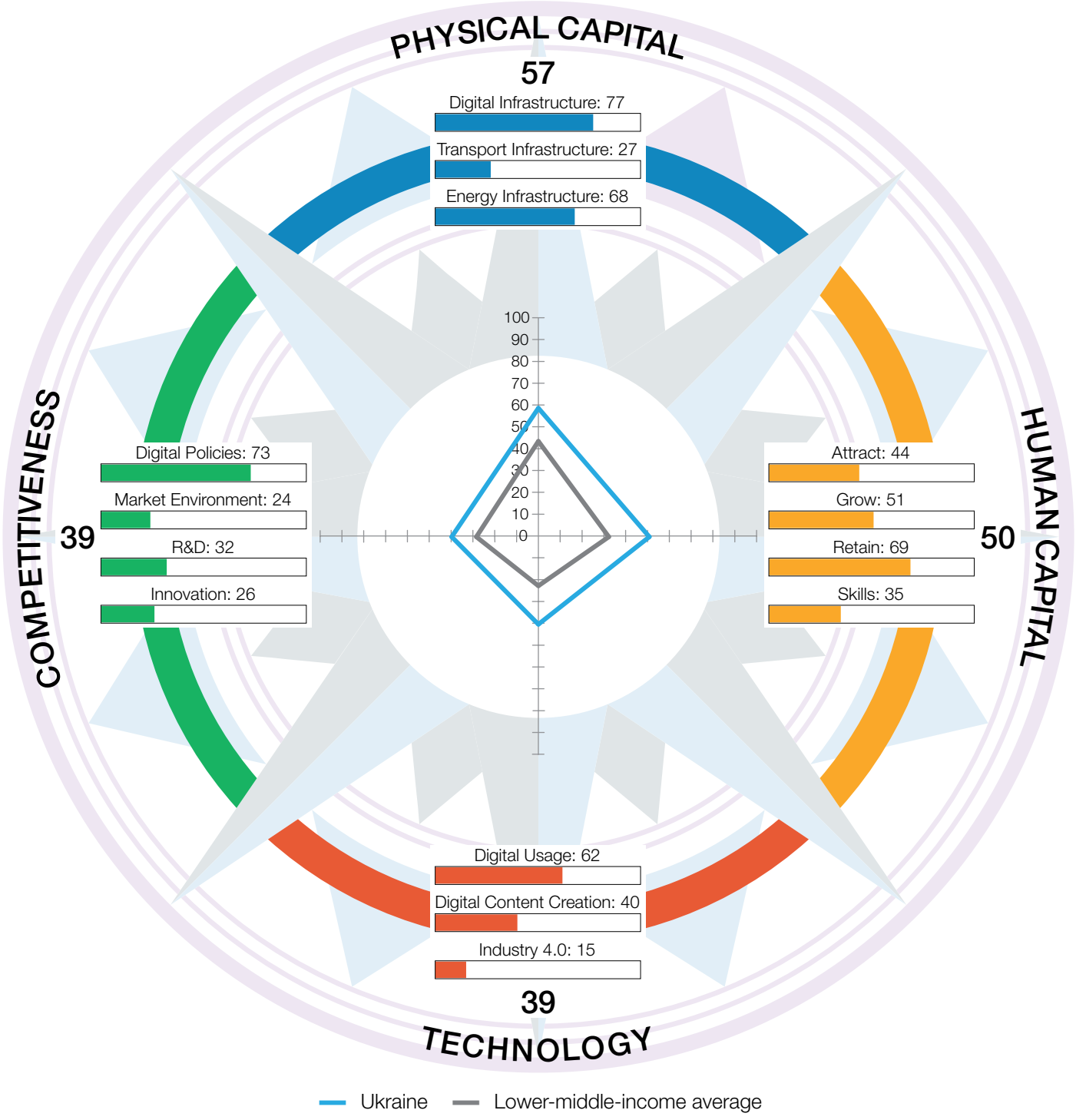
		Score	Rank
3	**TECHNOLOGY**	**13.91**	**116**
3.1	Digital Usage	20.71	112
3.1.1	Internet users	0.00	124
3.1.2	Active mobile-broadband subscriptions	19.74	106
3.1.3	Gender parity in internet usage	37.82	99
3.1.4	Firms with website	7.24	101
3.1.5	Internet shopping	9.67	89
3.1.6	Government online services	36.29	95
3.1.7	E-Participation	34.18	86
3.2	Digital Content Creation	12.87	115
3.2.1	Software development	0.59	105
3.2.2	Wikipedia edits	10.78	120
3.2.3	Internet domain registrations	0.09	112
3.2.4	Mobile apps development	40.00	111
3.3	Industry 4.0	8.16	86
3.3.1	Cloud computing	—	—
3.3.2	AI software development	3.14	95
3.3.3	AI research	0.55	102
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**25.25**	**104**
4.1	Digital Policies	59.99	74
4.1.1	ICT regulation	82.43	58
4.1.2	Cybersecurity	37.50	87
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	7.27	122
4.2.1	Extent of market dominance	14.87	111
4.2.2	Labour productivity per employee	2.24	108
4.2.3	Urbanisation	8.79	117
4.2.4	Domestic credit to private sector	3.18	110
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	9.64	102
4.3.1	R&D spending	2.43	93
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	35.39	81
4.3.4	Scientific journal articles	0.74	103
4.4	Innovation	24.08	78
4.4.1	Medium- and high-tech industry	13.22	95
4.4.2	High-tech exports	3.12	97
4.4.3	Venture capital recipients, deals	8.30	51
4.4.4	New product entrepreneurial activity	86.36	5
4.4.5	New business density	3.40	77
4.4.6	Patent applications	30.07	100

Ukraine

Key Indicators

Rank (out of 124)	**51**	GDP per capita (PPP US$)	**12,671.24**
Income group	**Lower-middle income**	GDP (US$ billions)	**160.50**
Regional group	**Europe**	FREI score	**46.18**
Population (millions)	**38.00**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**57.45**	**60**
1.1	Digital Infrastructure	76.79	39
1.1.1	Internet access	78.85	66
1.1.2	International internet bandwidth	45.81	60
1.1.3	Fixed-broadband subscriptions	94.25	42
1.1.4	4G-mobile network coverage	90.97	84
1.1.5	Fixed broadband affordability	84.05	49
1.1.6	Mobile broadband affordability	89.03	76
1.1.7	Computer software spending	54.55	4
1.2	Transport Infrastructure	27.21	77
1.2.1	Quality of infrastructure	21.43	87
1.2.2	Rural access	77.85	46
1.2.3	Air connectivity	3.64	83
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	68.36	76
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	96.24	34
1.3.4	Energy intensity	65.07	109
2	**HUMAN CAPITAL**	**49.54**	**46**
2.1	Attract	43.52	66
2.1.1	Brain gain	41.03	77
2.1.2	International students	12.94	50
2.1.3	Tolerance of minorities	41.49	64
2.1.4	Tolerance of immigrants	55.38	73
2.1.5	Gender parity in high-skilled jobs	66.74	72
2.2	Grow	50.51	45
2.2.1	Tertiary enrolment	54.37	20
2.2.2	Reading, maths, and science	52.50	39
2.2.3	Use of virtual professional networks	15.52	75
2.2.4	Youth inclusion	79.66	56
2.3	Retain	68.69	47
2.3.1	Pension coverage	96.12	39
2.3.2	Environmental performance	52.03	42
2.3.3	Physician density	47.12	47
2.3.4	Sanitation	97.52	50
2.3.5	Personal safety	50.64	84
2.4	Skills	35.43	46
2.4.1	Workforce with tertiary education	66.81	5
2.4.2	High-skilled workforce	56.90	35
2.4.3	Researchers	6.59	64
2.4.4	Relevance of education system to the economy	43.12	56
2.4.5	Digital skills	3.75	73

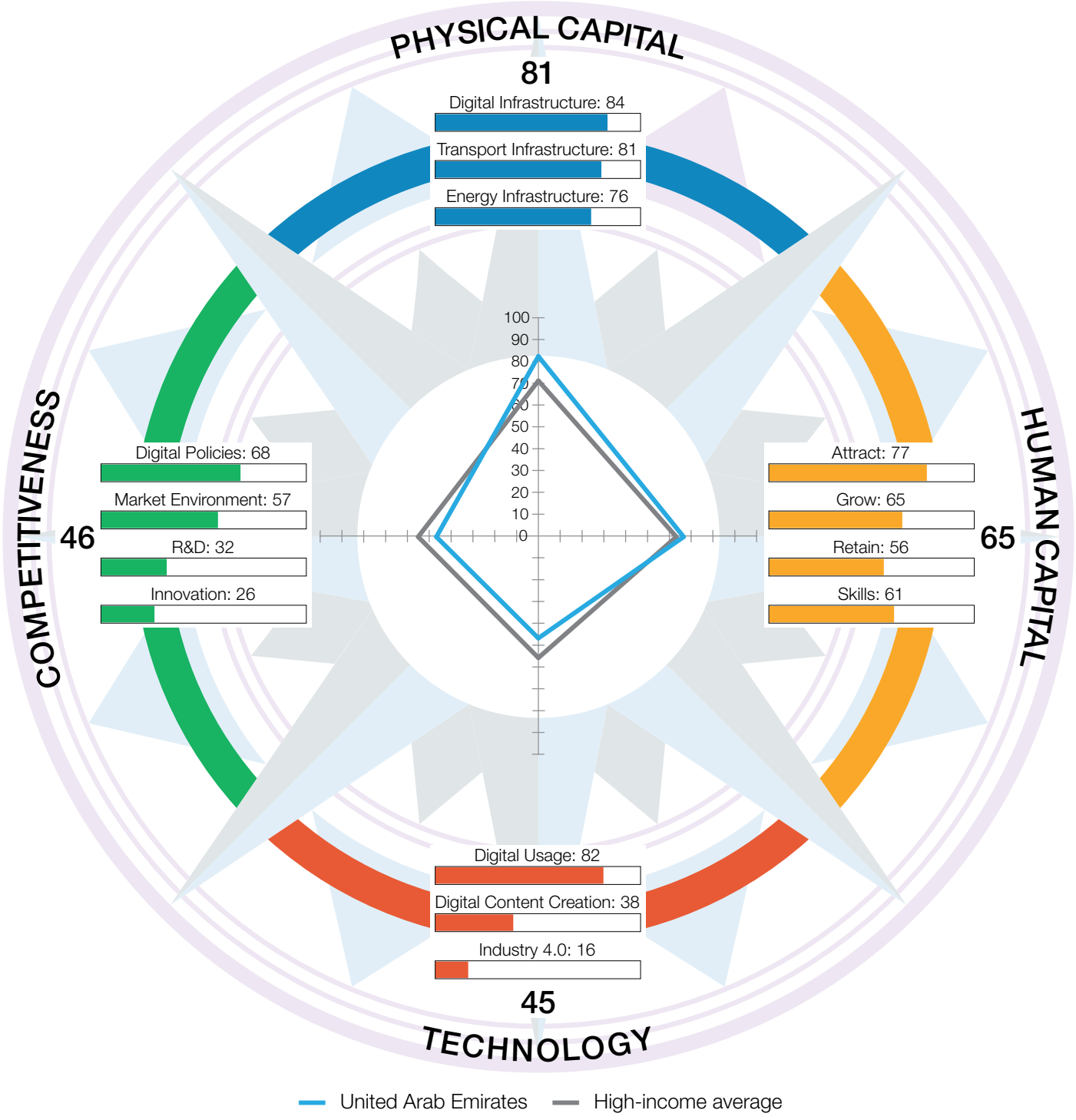
		Score	Rank
3	**TECHNOLOGY**	**39.04**	**47**
3.1	Digital Usage	61.93	55
3.1.1	Internet users	73.42	70
3.1.2	Active mobile-broadband subscriptions	31.61	76
3.1.3	Gender parity in internet usage	88.08	75
3.1.4	Firms with website	61.19	44
3.1.5	Internet shopping	47.97	44
3.1.6	Government online services	75.58	34
3.1.7	E-Participation	55.70	56
3.2	Digital Content Creation	40.02	45
3.2.1	Software development	13.20	37
3.2.2	Wikipedia edits	67.02	40
3.2.3	Internet domain registrations	4.28	54
3.2.4	Mobile apps development	75.59	62
3.3	Industry 4.0	15.16	44
3.3.1	Cloud computing	—	—
3.3.2	AI software development	7.55	67
3.3.3	AI research	6.85	58
3.3.4	ICT patent applications	0.93	50
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**38.70**	**59**
4.1	Digital Policies	72.73	51
4.1.1	ICT regulation	71.62	83
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	50.00	19
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	23.69	99
4.2.1	Extent of market dominance	32.67	83
4.2.2	Labour productivity per employee	14.08	82
4.2.3	Urbanisation	63.33	54
4.2.4	Domestic credit to private sector	7.39	100
4.2.5	Market capitalisation	0.96	73
4.3	R&D	32.14	46
4.3.1	R&D spending	5.27	73
4.3.2	University ranking	20.16	56
4.3.3	Gender parity in R&D	92.34	13
4.3.4	Scientific journal articles	10.79	55
4.4	Innovation	26.24	66
4.4.1	Medium- and high-tech industry	39.63	47
4.4.2	High-tech exports	6.87	81
4.4.3	Venture capital recipients, deals	0.19	92
4.4.4	New product entrepreneurial activity	42.99	54
4.4.5	New business density	6.78	59
4.4.6	Patent applications	60.99	32

United Arab Emirates

Key Indicators

Rank (out of 124)	**27**	GDP per capita (PPP US$)	**87,729.19**
Income group	**High income**	GDP (US$ billions)	**507.53**
Regional group	**Middle East and North Africa**	FREI score	**59.04**
Population (millions)	**9.44**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**80.56**	**4**
1.1	Digital Infrastructure	84.21	7
1.1.1	Internet access	99.97	2
1.1.2	International internet bandwidth	71.91	6
1.1.3	Fixed-broadband subscriptions	95.26	36
1.1.4	4G-mobile network coverage	99.82	25
1.1.5	Fixed broadband affordability	99.05	2
1.1.6	Mobile broadband affordability	96.17	37
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	81.40	3
1.2.1	Quality of infrastructure	82.14	9
1.2.2	Rural access	59.05	76
1.2.3	Air connectivity	84.40	6
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	76.09	27
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	74.04	96
2	**HUMAN CAPITAL**	**64.84**	**21**
2.1	Attract	77.31	6
2.1.1	Brain gain	89.80	4
2.1.2	International students	100.00	1
2.1.3	Tolerance of minorities	76.60	15
2.1.4	Tolerance of immigrants	100.00	1
2.1.5	Gender parity in high-skilled jobs	20.16	113
2.2	Grow	64.87	19
2.2.1	Tertiary enrolment	36.05	59
2.2.2	Reading, maths, and science	40.56	46
2.2.3	Use of virtual professional networks	94.45	2
2.2.4	Youth inclusion	88.43	25
2.3	Retain	55.90	67
2.3.1	Pension coverage	21.02	87
2.3.2	Environmental performance	56.78	34
2.3.3	Physician density	45.35	52
2.3.4	Sanitation	99.15	28
2.3.5	Personal safety	57.19	75
2.4	Skills	61.26	16
2.4.1	Workforce with tertiary education	48.21	28
2.4.2	High-skilled workforce	52.36	40
2.4.3	Researchers	28.45	33
2.4.4	Relevance of education system to the economy	81.03	7
2.4.5	Digital skills	96.26	2

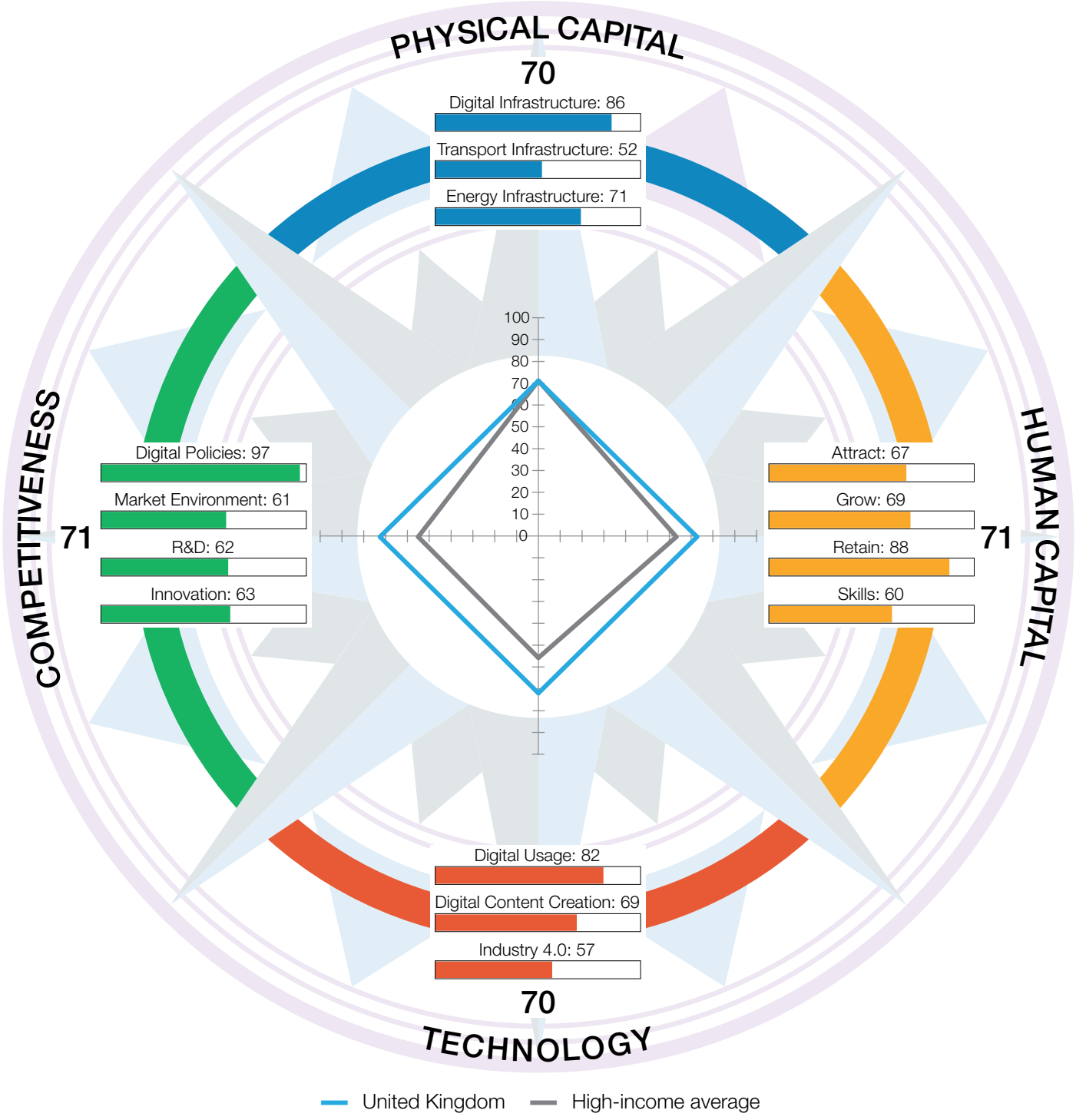
		Score	Rank
3	**TECHNOLOGY**	**45.23**	**36**
3.1	Digital Usage	81.96	14
3.1.1	Internet users	100.00	1
3.1.2	Active mobile-broadband subscriptions	100.00	1
3.1.3	Gender parity in internet usage	100.00	1
3.1.4	Firms with website	n/a	n/a
3.1.5	Internet shopping	28.78	60
3.1.6	Government online services	87.00	12
3.1.7	E-Participation	75.95	18
3.2	Digital Content Creation	37.97	49
3.2.1	Software development	4.76	56
3.2.2	Wikipedia edits	45.89	66
3.2.3	Internet domain registrations	9.63	39
3.2.4	Mobile apps development	91.59	25
3.3	Industry 4.0	15.78	41
3.3.1	Cloud computing	—	—
3.3.2	AI software development	26.84	28
3.3.3	AI research	32.30	25
3.3.4	ICT patent applications	3.83	34
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**45.54**	**42**
4.1	Digital Policies	68.15	59
4.1.1	ICT regulation	77.03	73
4.1.2	Cybersecurity	50.00	72
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	100.00	1
4.1.5	Online content	0.00	85
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	50.00	99
4.2	Market Environment	56.55	19
4.2.1	Extent of market dominance	72.69	14
4.2.2	Labour productivity per employee	67.39	13
4.2.3	Urbanisation	83.87	21
4.2.4	Domestic credit to private sector	33.32	40
4.2.5	Market capitalisation	25.45	20
4.3	R&D	31.92	48
4.3.1	R&D spending	27.75	28
4.3.2	University ranking	37.49	34
4.3.3	Gender parity in R&D	44.59	66
4.3.4	Scientific journal articles	17.87	47
4.4	Innovation	25.55	72
4.4.1	Medium- and high-tech industry	47.62	36
4.4.2	High-tech exports	13.81	55
4.4.3	Venture capital recipients, deals	30.39	18
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	9.33	47
4.4.6	Patent applications	26.62	106

United Kingdom

Key Indicators

Rank (out of 124)	**9**	GDP per capita (PPP US$)	**54,602.54**
Income group	**High income**	GDP (US$ billions)	**3,070.67**
Regional group	**Europe**	FREI score	**70.23**
Population (millions)	**66.97**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**69.61**	**27**
1.1	Digital Infrastructure	85.98	4
1.1.1	Internet access	95.21	16
1.1.2	International internet bandwidth	66.38	10
1.1.3	Fixed-broadband subscriptions	98.91	16
1.1.4	4G-mobile network coverage	99.89	17
1.1.5	Fixed broadband affordability	88.72	33
1.1.6	Mobile broadband affordability	98.21	13
1.1.7	Computer software spending	54.55	4
1.2	Transport Infrastructure	52.01	29
1.2.1	Quality of infrastructure	67.86	23
1.2.2	Rural access	96.39	15
1.2.3	Air connectivity	29.38	27
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	70.85	67
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	93.81	12
2	**HUMAN CAPITAL**	**70.82**	**14**
2.1	Attract	66.76	20
2.1.1	Brain gain	76.01	15
2.1.2	International students	53.57	7
2.1.3	Tolerance of minorities	38.30	71
2.1.4	Tolerance of immigrants	81.54	23
2.1.5	Gender parity in high-skilled jobs	84.37	36
2.2	Grow	69.12	12
2.2.1	Tertiary enrolment	45.54	37
2.2.2	Reading, maths, and science	69.14	11
2.2.3	Use of virtual professional networks	73.05	10
2.2.4	Youth inclusion	88.74	23
2.3	Retain	87.65	8
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	99.66	2
2.3.3	Physician density	50.02	45
2.3.4	Sanitation	99.02	34
2.3.5	Personal safety	89.56	15
2.4	Skills	59.74	18
2.4.1	Workforce with tertiary education	54.35	18
2.4.2	High-skilled workforce	77.71	11
2.4.3	Researchers	53.68	21
2.4.4	Relevance of education system to the economy	68.05	21
2.4.5	Digital skills	44.90	16

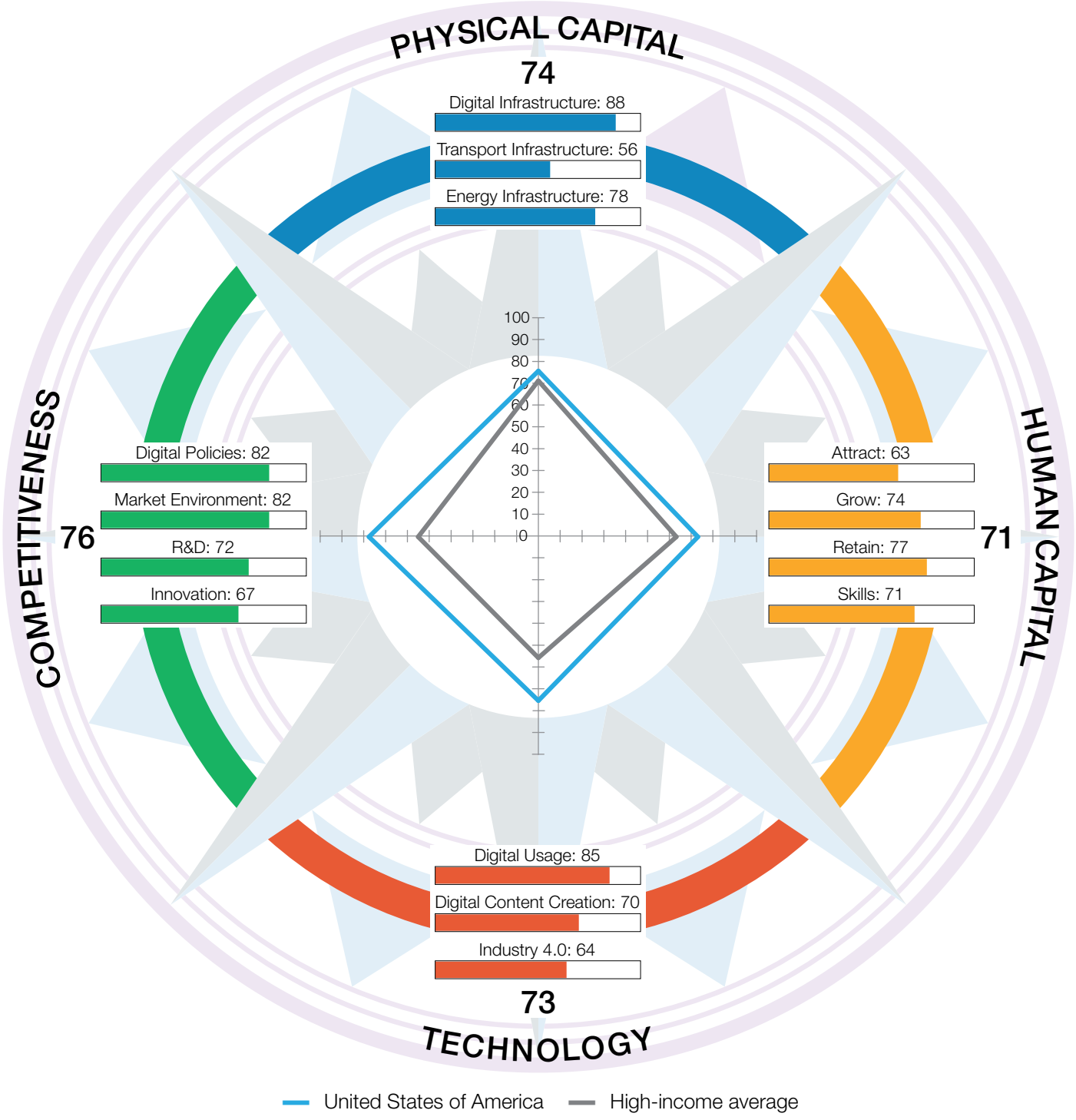
		Score	Rank
3	**TECHNOLOGY**	**69.76**	**8**
3.1	Digital Usage	82.49	11
3.1.1	Internet users	94.48	14
3.1.2	Active mobile-broadband subscriptions	45.70	28
3.1.3	Gender parity in internet usage	98.50	22
3.1.4	Firms with website	84.71	10
3.1.5	Internet shopping	74.18	19
3.1.6	Government online services	84.95	17
3.1.7	E-Participation	94.93	6
3.2	Digital Content Creation	69.31	8
3.2.1	Software development	32.29	18
3.2.2	Wikipedia edits	84.12	10
3.2.3	Internet domain registrations	63.26	6
3.2.4	Mobile apps development	97.58	13
3.3	Industry 4.0	57.48	8
3.3.1	Cloud computing	—	—
3.3.2	AI software development	70.81	10
3.3.3	AI research	50.66	12
3.3.4	ICT patent applications	32.23	14
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**70.72**	**5**
4.1	Digital Policies	96.94	1
4.1.1	ICT regulation	95.27	7
4.1.2	Cybersecurity	100.00	1
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	100.00	1
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	83.33	38
4.2	Market Environment	60.71	14
4.2.1	Extent of market dominance	70.53	17
4.2.2	Labour productivity per employee	58.86	23
4.2.3	Urbanisation	80.14	26
4.2.4	Domestic credit to private sector	58.85	13
4.2.5	Market capitalisation	35.17	13
4.3	R&D	62.46	6
4.3.1	R&D spending	31.98	22
4.3.2	University ranking	99.39	2
4.3.3	Gender parity in R&D	59.59	47
4.3.4	Scientific journal articles	58.89	15
4.4	Innovation	62.75	3
4.4.1	Medium- and high-tech industry	58.57	16
4.4.2	High-tech exports	37.04	14
4.4.3	Venture capital recipients, deals	73.14	7
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	74.80	2
4.4.6	Patent applications	70.22	16

United States of America

Key Indicators

Rank (out of 124)	**4**	GDP per capita (PPP US$)	**76,398.59**
Income group	**High income**	GDP (US$ billions)	**25,462.70**
Regional group	**Northern America**	FREI score	**73.50**
Population (millions)	**333.29**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**74.02**	**13**
1.1	Digital Infrastructure	88.38	1
1.1.1	Internet access	86.38	45
1.1.2	International internet bandwidth	50.02	45
1.1.3	Fixed-broadband subscriptions	94.88	37
1.1.4	4G-mobile network coverage	99.89	17
1.1.5	Fixed broadband affordability	91.94	22
1.1.6	Mobile broadband affordability	95.58	43
1.1.7	Computer software spending	100.00	1
1.2	Transport Infrastructure	55.87	19
1.2.1	Quality of infrastructure	75.00	15
1.2.2	Rural access	82.45	38
1.2.3	Air connectivity	53.03	12
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	77.80	19
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	n/a	n/a
1.3.4	Energy intensity	81.26	75
2	**HUMAN CAPITAL**	**71.23**	**13**
2.1	Attract	63.11	25
2.1.1	Brain gain	88.41	5
2.1.2	International students	13.47	47
2.1.3	Tolerance of minorities	30.85	78
2.1.4	Tolerance of immigrants	90.77	11
2.1.5	Gender parity in high-skilled jobs	92.03	19
2.2	Grow	73.87	5
2.2.1	Tertiary enrolment	57.64	13
2.2.2	Reading, maths, and science	65.82	23
2.2.3	Use of virtual professional networks	84.37	3
2.2.4	Youth inclusion	87.64	31
2.3	Retain	77.22	32
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	54.58	36
2.3.3	Physician density	56.14	35
2.3.4	Sanitation	99.65	18
2.3.5	Personal safety	75.73	46
2.4	Skills	70.73	4
2.4.1	Workforce with tertiary education	61.63	10
2.4.2	High-skilled workforce	79.18	9
2.4.3	Researchers	55.26	19
2.4.4	Relevance of education system to the economy	86.85	5
2.4.5	Digital skills	n/a	n/a

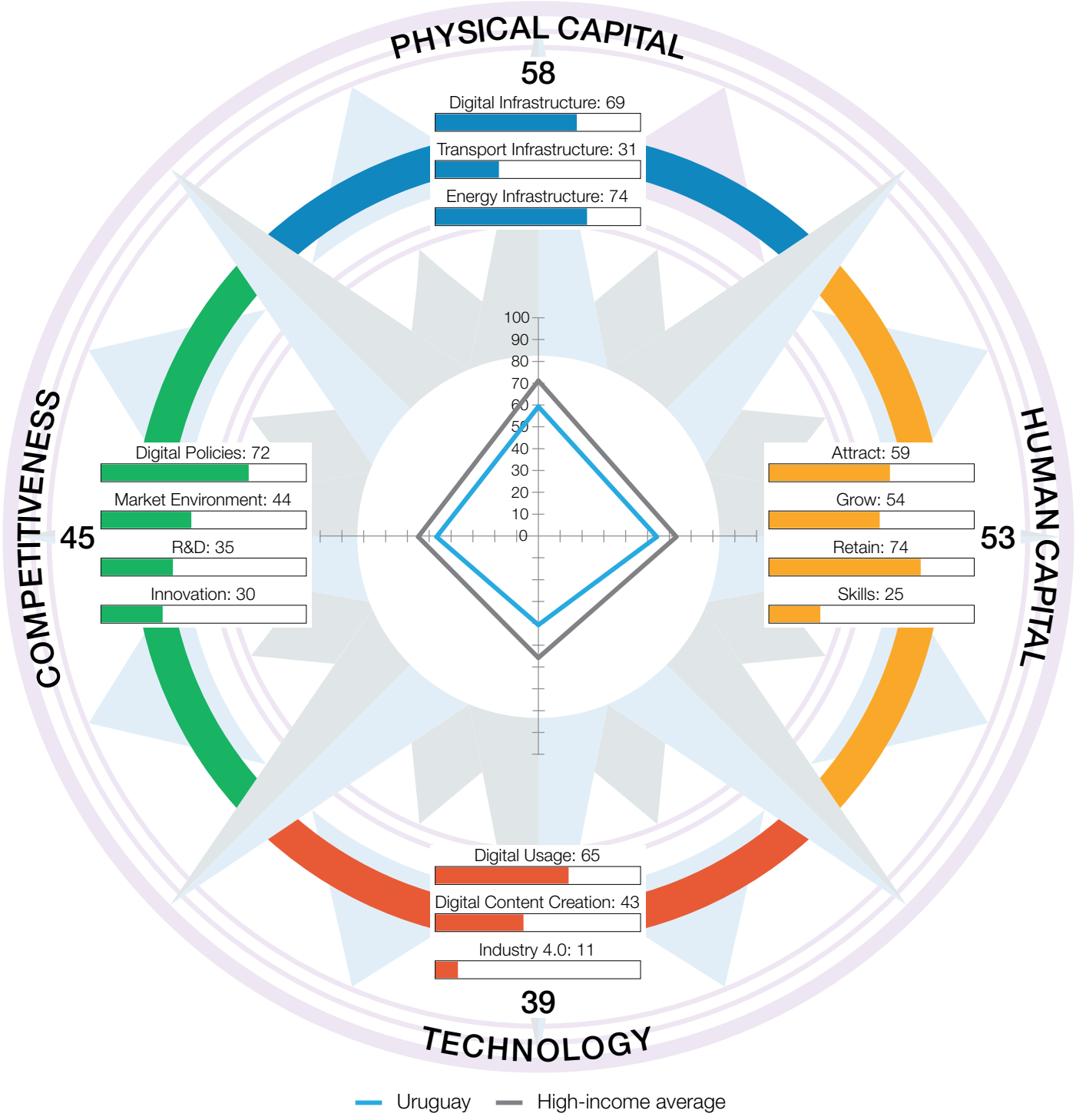
		Score	Rank
3	**TECHNOLOGY**	**73.12**	**7**
3.1	Digital Usage	85.09	7
3.1.1	Internet users	90.31	28
3.1.2	Active mobile-broadband subscriptions	67.99	4
3.1.3	Gender parity in internet usage	98.45	24
3.1.4	Firms with website	71.99	29
3.1.5	Internet shopping	86.19	9
3.1.6	Government online services	90.82	9
3.1.7	E-Participation	89.87	10
3.2	Digital Content Creation	70.04	7
3.2.1	Software development	49.84	5
3.2.2	Wikipedia edits	72.19	36
3.2.3	Internet domain registrations	58.13	8
3.2.4	Mobile apps development	100.00	1
3.3	Industry 4.0	64.23	6
3.3.1	Cloud computing	—	—
3.3.2	AI software development	73.64	8
3.3.3	AI research	31.84	26
3.3.4	ICT patent applications	89.25	7
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**75.63**	**2**
4.1	Digital Policies	82.29	23
4.1.1	ICT regulation	88.51	30
4.1.2	Cybersecurity	87.50	19
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	100.00	1
4.1.5	Online content	100.00	1
4.1.6	Data privacy	33.33	104
4.1.7	Data transfer	66.67	51
4.2	Market Environment	81.95	1
4.2.1	Extent of market dominance	89.89	2
4.2.2	Labour productivity per employee	82.68	3
4.2.3	Urbanisation	78.77	27
4.2.4	Domestic credit to private sector	100.00	1
4.2.5	Market capitalisation	58.42	5
4.3	R&D	71.76	2
4.3.1	R&D spending	63.84	5
4.3.2	University ranking	100.00	1
4.3.3	Gender parity in R&D	n/a	n/a
4.3.4	Scientific journal articles	51.45	24
4.4	Innovation	66.53	2
4.4.1	Medium- and high-tech industry	56.05	18
4.4.2	High-tech exports	30.86	23
4.4.3	Venture capital recipients, deals	100.00	1
4.4.4	New product entrepreneurial activity	n/a	n/a
4.4.5	New business density	n/a	n/a
4.4.6	Patent applications	79.20	7

Uruguay

Key Indicators

Rank (out of 124)	**47**	GDP per capita (PPP US$)	**28,841.99**
Income group	**High income**	GDP (US$ billions)	**71.18**
Regional group	**Latin America and the Caribbean**	FREI score	**48.94**
Population (millions)	**3.42**	FREI score (income group average)	**59.73**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**58.13**	**59**
1.1	Digital Infrastructure	68.77	64
1.1.1	Internet access	68.70	76
1.1.2	International internet bandwidth	50.15	44
1.1.3	Fixed-broadband subscriptions	81.09	69
1.1.4	4G-mobile network coverage	91.72	83
1.1.5	Fixed broadband affordability	78.24	64
1.1.6	Mobile broadband affordability	93.28	59
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	31.24	67
1.2.1	Quality of infrastructure	32.14	70
1.2.2	Rural access	71.59	56
1.2.3	Air connectivity	4.26	78
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	74.38	39
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	93.98	47
1.3.4	Energy intensity	89.75	30
2	**HUMAN CAPITAL**	**52.88**	**38**
2.1	Attract	59.36	30
2.1.1	Brain gain	34.26	91
2.1.2	International students	5.58	73
2.1.3	Tolerance of minorities	78.72	9
2.1.4	Tolerance of immigrants	92.31	8
2.1.5	Gender parity in high-skilled jobs	85.93	34
2.2	Grow	53.66	39
2.2.1	Tertiary enrolment	44.47	45
2.2.2	Reading, maths, and science	36.51	51
2.2.3	Use of virtual professional networks	50.62	21
2.2.4	Youth inclusion	83.03	47
2.3	Retain	73.89	41
2.3.1	Pension coverage	100.00	1
2.3.2	Environmental performance	31.36	80
2.3.3	Physician density	78.55	8
2.3.4	Sanitation	97.86	42
2.3.5	Personal safety	61.68	64
2.4	Skills	24.61	73
2.4.1	Workforce with tertiary education	17.27	87
2.4.2	High-skilled workforce	35.32	53
2.4.3	Researchers	8.98	55
2.4.4	Relevance of education system to the economy	36.87	75
2.4.5	Digital skills	n/a	n/a

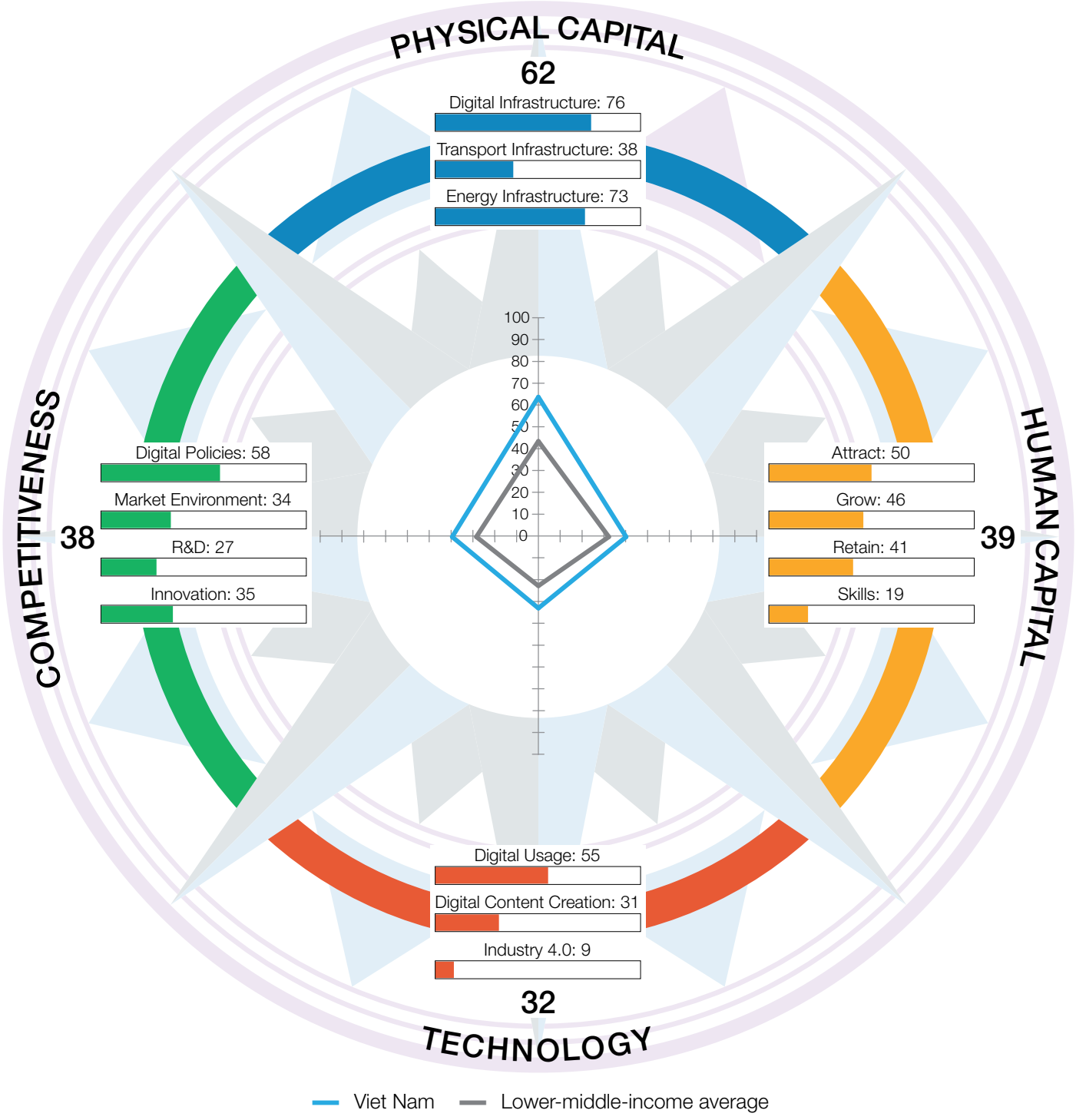
		Score	Rank
3	**TECHNOLOGY**	**39.31**	**45**
3.1	Digital Usage	64.85	50
3.1.1	Internet users	85.20	44
3.1.2	Active mobile-broadband subscriptions	43.92	35
3.1.3	Gender parity in internet usage	97.93	29
3.1.4	Firms with website	67.46	38
3.1.5	Internet shopping	36.09	54
3.1.6	Government online services	68.89	52
3.1.7	E-Participation	54.43	60
3.2	Digital Content Creation	42.52	40
3.2.1	Software development	9.18	45
3.2.2	Wikipedia edits	72.51	33
3.2.3	Internet domain registrations	7.53	44
3.2.4	Mobile apps development	80.85	47
3.3	Industry 4.0	10.58	68
3.3.1	Cloud computing	—	—
3.3.2	AI software development	23.64	31
3.3.3	AI research	4.53	70
3.3.4	ICT patent applications	1.15	45
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**45.45**	**43**
4.1	Digital Policies	71.86	53
4.1.1	ICT regulation	65.54	90
4.1.2	Cybersecurity	37.50	87
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	100.00	1
4.2	Market Environment	44.48	38
4.2.1	Extent of market dominance	44.62	54
4.2.2	Labour productivity per employee	30.11	59
4.2.3	Urbanisation	94.42	5
4.2.4	Domestic credit to private sector	8.76	97
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	35.43	40
4.3.1	R&D spending	8.14	63
4.3.2	University ranking	25.63	46
4.3.3	Gender parity in R&D	97.54	3
4.3.4	Scientific journal articles	10.43	57
4.4	Innovation	30.03	46
4.4.1	Medium- and high-tech industry	22.27	80
4.4.2	High-tech exports	15.06	48
4.4.3	Venture capital recipients, deals	4.25	65
4.4.4	New product entrepreneurial activity	91.89	4
4.4.5	New business density	9.31	48
4.4.6	Patent applications	37.39	85

Viet Nam

Key Indicators

Rank (out of 124)	**61**	GDP per capita (PPP US$)	**13,456.55**
Income group	**Lower-middle income**	GDP (US$ billions)	**408.80**
Regional group	**Asia and Pacific**	FREI score	**42.97**
Population (millions)	**98.19**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**62.39**	**48**
1.1	Digital Infrastructure	76.31	42
1.1.1	Internet access	80.63	62
1.1.2	International internet bandwidth	56.91	26
1.1.3	Fixed-broadband subscriptions	99.59	8
1.1.4	4G-mobile network coverage	99.68	31
1.1.5	Fixed broadband affordability	72.72	78
1.1.6	Mobile broadband affordability	97.36	23
1.1.7	Computer software spending	27.27	26
1.2	Transport Infrastructure	38.20	51
1.2.1	Quality of infrastructure	50.00	45
1.2.2	Rural access	78.99	45
1.2.3	Air connectivity	9.13	54
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	72.65	51
1.3.1	Access to electricity	100.00	1
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	98.50	15
1.3.4	Energy intensity	82.84	70
2	**HUMAN CAPITAL**	**39.17**	**77**
2.1	Attract	49.66	43
2.1.1	Brain gain	60.32	31
2.1.2	International students	0.84	97
2.1.3	Tolerance of minorities	48.94	51
2.1.4	Tolerance of immigrants	53.85	75
2.1.5	Gender parity in high-skilled jobs	84.34	37
2.2	Grow	46.48	54
2.2.1	Tertiary enrolment	22.74	81
2.2.2	Reading, maths, and science	68.54	15
2.2.3	Use of virtual professional networks	7.13	95
2.2.4	Youth inclusion	87.52	32
2.3	Retain	41.13	90
2.3.1	Pension coverage	39.69	76
2.3.2	Environmental performance	2.03	122
2.3.3	Physician density	12.73	89
2.3.4	Sanitation	88.19	76
2.3.5	Personal safety	63.02	60
2.4	Skills	19.41	91
2.4.1	Workforce with tertiary education	17.49	86
2.4.2	High-skilled workforce	7.51	104
2.4.3	Researchers	8.54	57
2.4.4	Relevance of education system to the economy	60.51	31
2.4.5	Digital skills	3.00	76

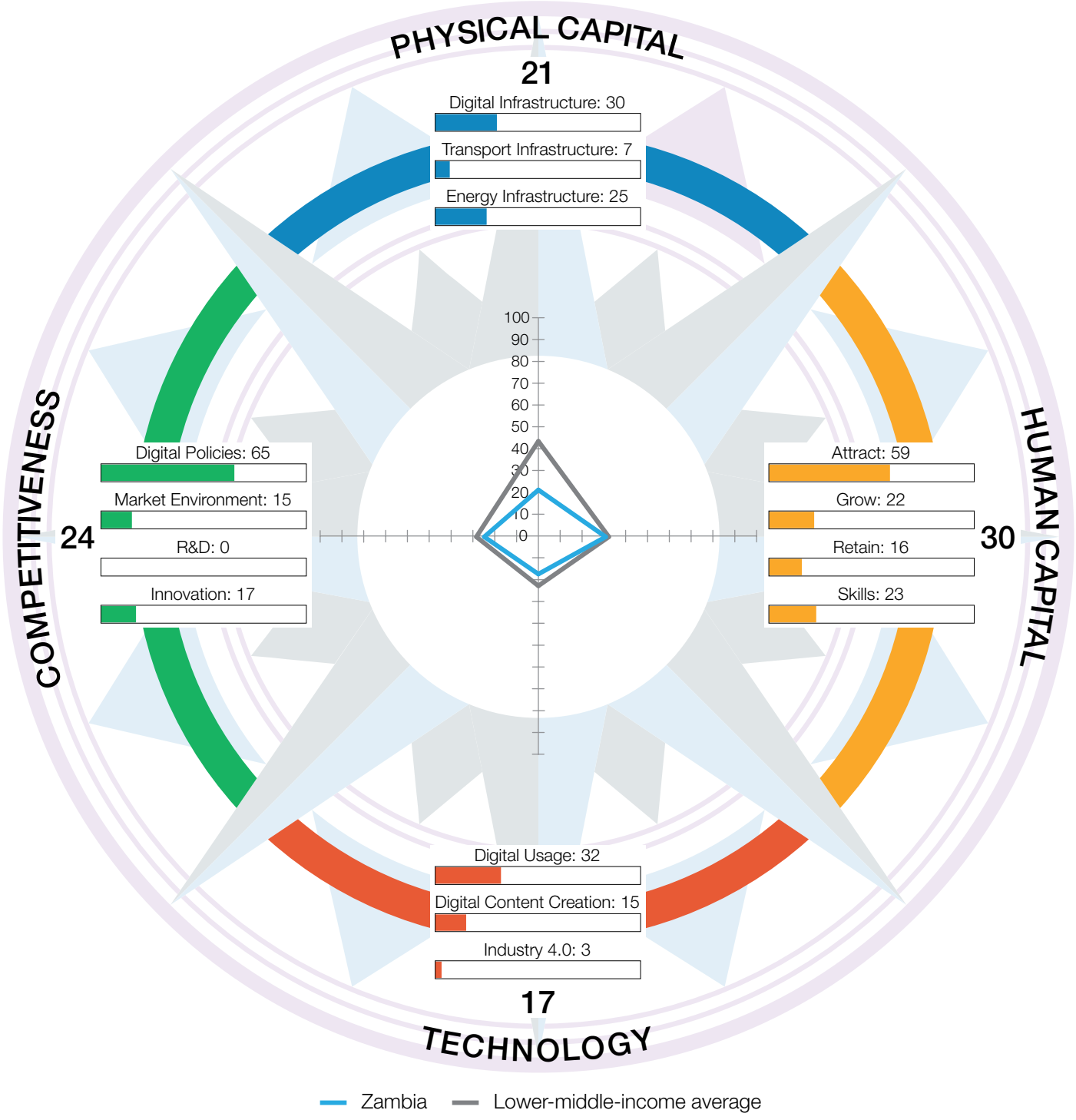
		Score	Rank
3	**TECHNOLOGY**	**31.84**	**72**
3.1	Digital Usage	55.14	69
3.1.1	Internet users	72.53	72
3.1.2	Active mobile-broadband subscriptions	34.90	63
3.1.3	Gender parity in internet usage	87.87	76
3.1.4	Firms with website	42.72	68
3.1.5	Internet shopping	46.19	46
3.1.6	Government online services	53.63	74
3.1.7	E-Participation	48.10	70
3.2	Digital Content Creation	31.36	66
3.2.1	Software development	4.11	61
3.2.2	Wikipedia edits	43.14	74
3.2.3	Internet domain registrations	2.05	71
3.2.4	Mobile apps development	76.16	60
3.3	Industry 4.0	9.02	80
3.3.1	Cloud computing	—	—
3.3.2	AI software development	5.53	80
3.3.3	AI research	3.53	77
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**38.47**	**61**
4.1	Digital Policies	57.65	78
4.1.1	ICT regulation	61.89	97
4.1.2	Cybersecurity	25.00	100
4.1.3	AI regulation	100.00	1
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	66.67	87
4.1.7	Data transfer	50.00	99
4.2	Market Environment	34.36	63
4.2.1	Extent of market dominance	64.42	25
4.2.2	Labour productivity per employee	11.12	88
4.2.3	Urbanisation	23.33	109
4.2.4	Domestic credit to private sector	56.79	16
4.2.5	Market capitalisation	16.17	35
4.3	R&D	27.29	60
4.3.1	R&D spending	7.56	65
4.3.2	University ranking	12.36	67
4.3.3	Gender parity in R&D	86.12	21
4.3.4	Scientific journal articles	3.13	82
4.4	Innovation	34.57	35
4.4.1	Medium- and high-tech industry	46.44	37
4.4.2	High-tech exports	64.93	4
4.4.3	Venture capital recipients, deals	7.99	53
4.4.4	New product entrepreneurial activity	29.86	67
4.4.5	New business density	6.71	60
4.4.6	Patent applications	51.46	59

Zambia

Key Indicators

Rank (out of 124)	**111**	GDP per capita (PPP US$)	**3,894.31**
Income group	**Lower-middle income**	GDP (US$ billions)	**29.78**
Regional group	**Sub-Saharan Africa**	FREI score	**22.94**
Population (millions)	**20.02**	FREI score (income group average)	**30.91**

FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**20.95**	**122**
1.1	Digital Infrastructure	30.45	110
1.1.1	Internet access	15.90	101
1.1.2	International internet bandwidth	35.68	96
1.1.3	Fixed-broadband subscriptions	2.61	117
1.1.4	4G-mobile network coverage	66.77	103
1.1.5	Fixed broadband affordability	45.11	106
1.1.6	Mobile broadband affordability	47.11	112
1.1.7	Computer software spending	0.00	100
1.2	Transport Infrastructure	6.98	121
1.2.1	Quality of infrastructure	17.86	100
1.2.2	Rural access	8.31	122
1.2.3	Air connectivity	0.45	107
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	25.41	123
1.3.1	Access to electricity	37.87	116
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	0.00	88
1.3.4	Energy intensity	61.31	113
2	**HUMAN CAPITAL**	**30.06**	**95**
2.1	Attract	59.45	29
2.1.1	Brain gain	56.12	39
2.1.2	International students	n/a	n/a
2.1.3	Tolerance of minorities	43.62	58
2.1.4	Tolerance of immigrants	70.77	42
2.1.5	Gender parity in high-skilled jobs	67.30	69
2.2	Grow	21.62	115
2.2.1	Tertiary enrolment	1.81	119
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	6.12	100
2.2.4	Youth inclusion	56.93	103
2.3	Retain	16.38	118
2.3.1	Pension coverage	5.92	108
2.3.2	Environmental performance	33.05	75
2.3.3	Physician density	4.18	103
2.3.4	Sanitation	25.24	113
2.3.5	Personal safety	13.52	122
2.4	Skills	22.79	78
2.4.1	Workforce with tertiary education	9.50	98
2.4.2	High-skilled workforce	12.14	98
2.4.3	Researchers	n/a	n/a
2.4.4	Relevance of education system to the economy	46.72	50
2.4.5	Digital skills	n/a	n/a

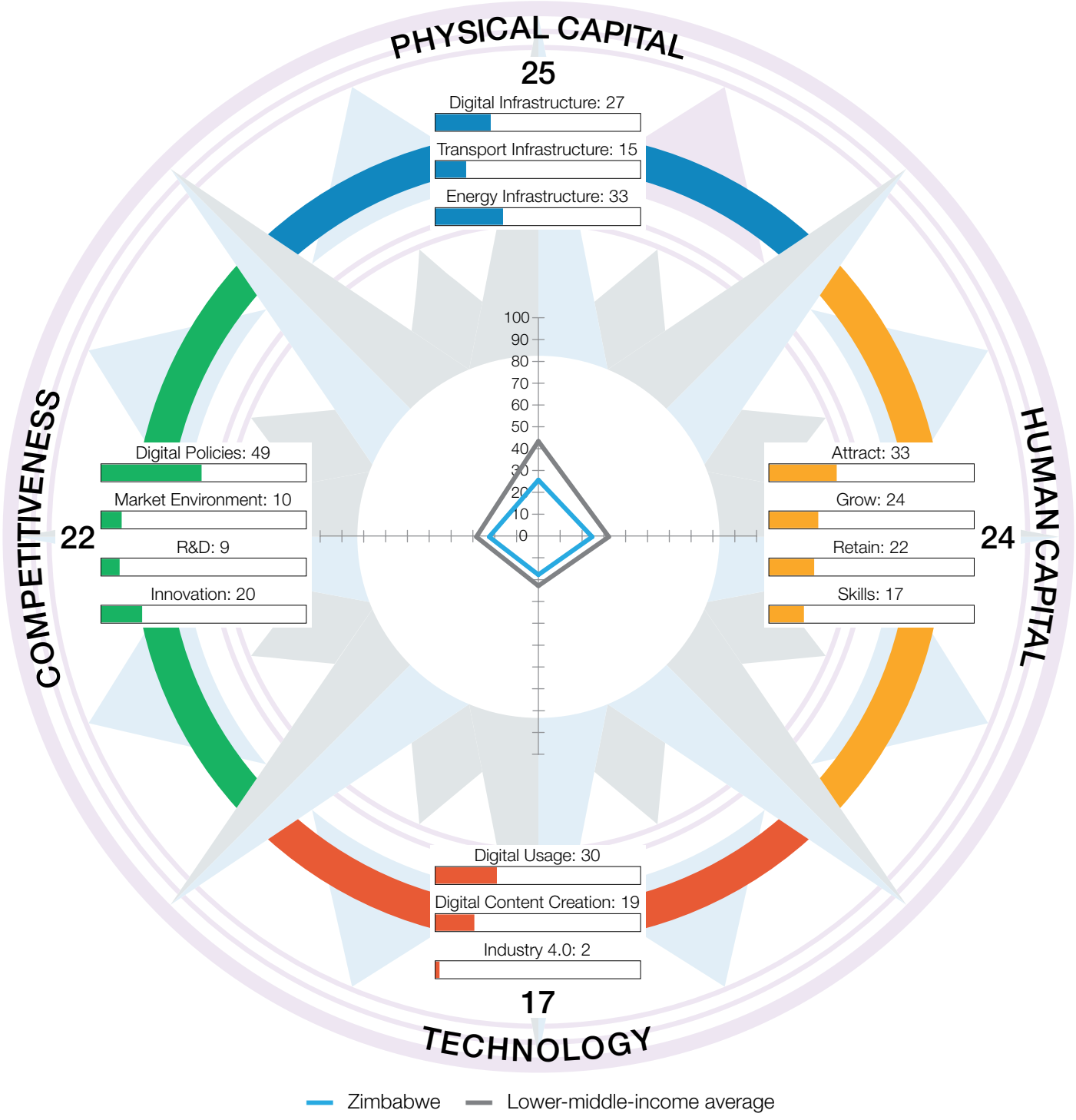
		Score	Rank
3	**TECHNOLOGY**	**16.62**	**108**
3.1	Digital Usage	31.80	99
3.1.1	Internet users	14.59	118
3.1.2	Active mobile-broadband subscriptions	20.18	105
3.1.3	Gender parity in internet usage	73.86	90
3.1.4	Firms with website	55.27	52
3.1.5	Internet shopping	1.97	116
3.1.6	Government online services	26.34	106
3.1.7	E-Participation	30.38	90
3.2	Digital Content Creation	15.26	113
3.2.1	Software development	0.25	111
3.2.2	Wikipedia edits	22.91	104
3.2.3	Internet domain registrations	0.08	114
3.2.4	Mobile apps development	37.81	114
3.3	Industry 4.0	2.79	119
3.3.1	Cloud computing	—	—
3.3.2	AI software development	1.81	100
3.3.3	AI research	0.44	107
3.3.4	ICT patent applications	n/a	n/a
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**24.15**	**105**
4.1	Digital Policies	64.57	66
4.1.1	ICT regulation	64.46	94
4.1.2	Cybersecurity	37.50	87
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	100.00	1
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	50.00	99
4.2	Market Environment	15.00	111
4.2.1	Extent of market dominance	21.00	100
4.2.2	Labour productivity per employee	5.05	101
4.2.3	Urbanisation	32.42	97
4.2.4	Domestic credit to private sector	1.52	118
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	0.23	121
4.3.1	R&D spending	n/a	n/a
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	n/a	n/a
4.3.4	Scientific journal articles	0.47	107
4.4	Innovation	16.79	108
4.4.1	Medium- and high-tech industry	11.58	98
4.4.2	High-tech exports	1.96	106
4.4.3	Venture capital recipients, deals	9.41	45
4.4.4	New product entrepreneurial activity	36.94	62
4.4.5	New business density	4.28	72
4.4.6	Patent applications	36.59	88

Zimbabwe

Key Indicators

Rank (out of 124)	**112**	GDP per capita (PPP US$)	**2,530.65**
Income group	**Lower-middle income**	GDP (US$ billions)	**20.68**
Regional group	**Sub-Saharan Africa**	FREI score	**22.06**
Population (millions)	**16.32**	FREI score (income group average)	**30.91**

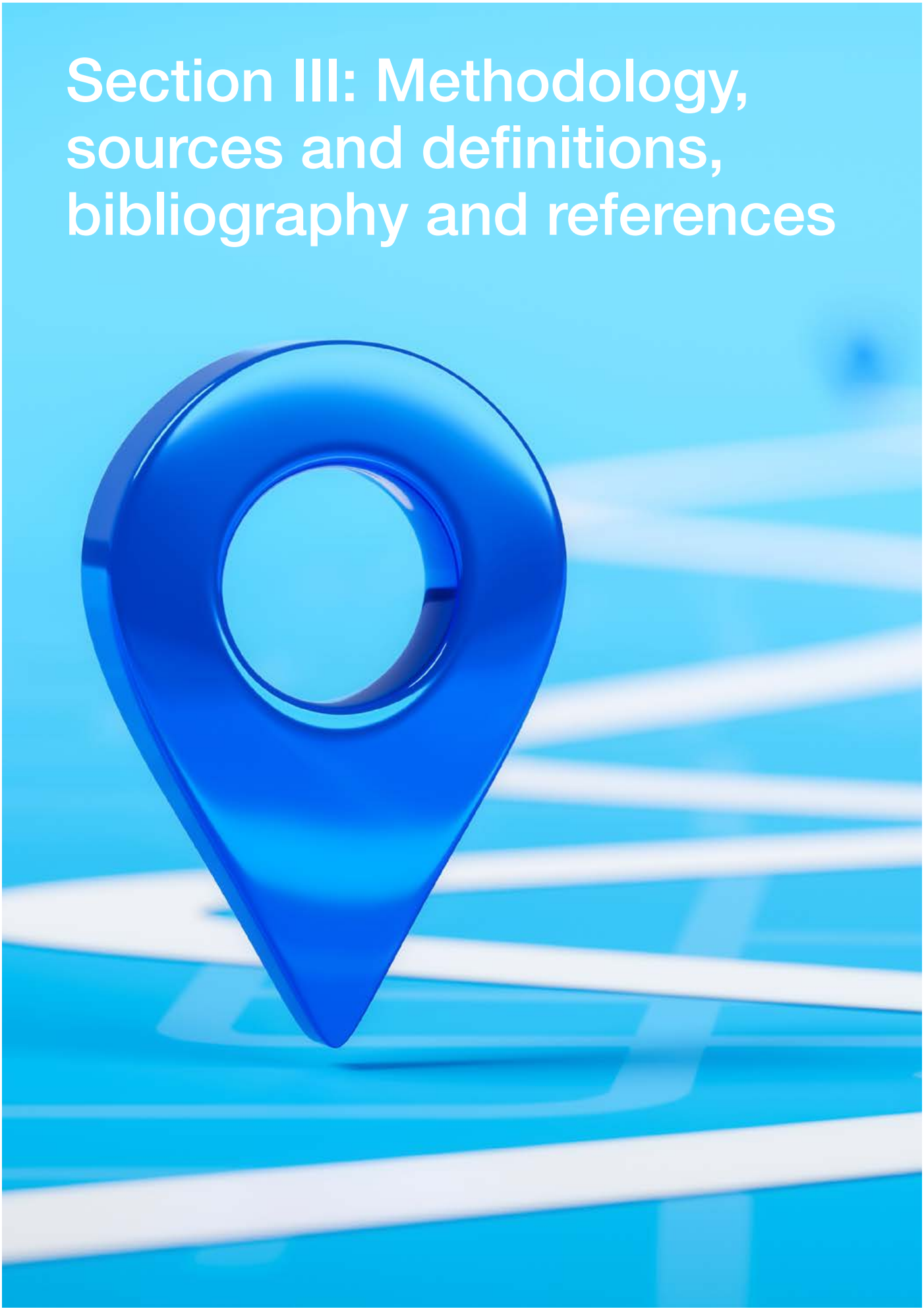
FREI 2023 scores by pillar and sub-pillar (0–100)



		Score	Rank
1	**PHYSICAL CAPITAL**	**25.37**	**117**
1.1	Digital Infrastructure	27.50	113
1.1.1	Internet access	49.02	86
1.1.2	International internet bandwidth	37.20	91
1.1.3	Fixed-broadband subscriptions	10.95	112
1.1.4	4G-mobile network coverage	34.54	115
1.1.5	Fixed broadband affordability	42.60	109
1.1.6	Mobile broadband affordability	0.00	121
1.1.7	Computer software spending	18.18	51
1.2	Transport Infrastructure	15.41	110
1.2.1	Quality of infrastructure	21.43	87
1.2.2	Rural access	39.21	99
1.2.3	Air connectivity	0.39	110
1.2.4	Infrastructure investment	—	—
1.3	Energy Infrastructure	33.20	118
1.3.1	Access to electricity	40.54	112
1.3.2	Electricity consumption	—	—
1.3.3	Electrical outages	66.17	73
1.3.4	Energy intensity	24.26	123
2	**HUMAN CAPITAL**	**24.01**	**113**
2.1	Attract	32.84	112
2.1.1	Brain gain	13.32	115
2.1.2	International students	1.11	94
2.1.3	Tolerance of minorities	41.49	64
2.1.4	Tolerance of immigrants	47.69	82
2.1.5	Gender parity in high-skilled jobs	60.60	85
2.2	Grow	24.06	111
2.2.1	Tertiary enrolment	4.99	110
2.2.2	Reading, maths, and science	n/a	n/a
2.2.3	Use of virtual professional networks	8.83	92
2.2.4	Youth inclusion	58.35	101
2.3	Retain	22.39	106
2.3.1	Pension coverage	20.41	88
2.3.2	Environmental performance	46.27	52
2.3.3	Physician density	2.46	109
2.3.4	Sanitation	28.85	110
2.3.5	Personal safety	13.96	121
2.4	Skills	16.75	100
2.4.1	Workforce with tertiary education	19.72	80
2.4.2	High-skilled workforce	10.17	100
2.4.3	Researchers	0.98	85
2.4.4	Relevance of education system to the economy	47.91	48
2.4.5	Digital skills	4.99	69

		Score	Rank
3	**TECHNOLOGY**	**16.92**	**107**
3.1	Digital Usage	29.71	102
3.1.1	Internet users	24.71	108
3.1.2	Active mobile-broadband subscriptions	22.37	99
3.1.3	Gender parity in internet usage	95.27	55
3.1.4	Firms with website	30.78	83
3.1.5	Internet shopping	2.11	115
3.1.6	Government online services	18.83	113
3.1.7	E-Participation	13.92	116
3.2	Digital Content Creation	18.70	102
3.2.1	Software development	0.32	109
3.2.2	Wikipedia edits	25.69	102
3.2.3	Internet domain registrations	0.47	95
3.2.4	Mobile apps development	48.34	104
3.3	Industry 4.0	2.35	121
3.3.1	Cloud computing	—	—
3.3.2	AI software development	3.58	93
3.3.3	AI research	1.26	94
3.3.4	ICT patent applications	0.00	76
3.3.5	Internet of Things	—	—
4	**COMPETITIVENESS**	**21.95**	**110**
4.1	Digital Policies	49.16	94
4.1.1	ICT regulation	60.81	100
4.1.2	Cybersecurity	0.00	106
4.1.3	AI regulation	0.00	69
4.1.4	Cloud governance	0.00	62
4.1.5	Online content	100.00	1
4.1.6	Data privacy	100.00	1
4.1.7	Data transfer	83.33	38
4.2	Market Environment	10.03	120
4.2.1	Extent of market dominance	16.89	108
4.2.2	Labour productivity per employee	2.68	107
4.2.3	Urbanisation	18.89	113
4.2.4	Domestic credit to private sector	1.66	117
4.2.5	Market capitalisation	n/a	n/a
4.3	R&D	8.95	103
4.3.1	R&D spending	n/a	n/a
4.3.2	University ranking	0.00	75
4.3.3	Gender parity in R&D	25.76	93
4.3.4	Scientific journal articles	1.10	96
4.4	Innovation	19.63	99
4.4.1	Medium- and high-tech industry	11.41	99
4.4.2	High-tech exports	3.56	91
4.4.3	Venture capital recipients, deals	n/a	n/a
4.4.4	New product entrepreneurial activity	37.84	60
4.4.5	New business density	10.08	45
4.4.6	Patent applications	35.28	89

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 indicators. In total, the framework is populated by 72 indicators. Of these indicators, 47 are composed of hard/quantitative data, 15 are composed of index/composite indicator data, and 10 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 itself. 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 data availability of at least 40% at the sub-pillar level. 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, each indicator has been analysed to detect outliers, which—if found—have been treated 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:‡

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

---

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

† Winsorisation was needed for 13 indicators: 1.1.6 Mobile broadband affordability; 1.2.3 Air connectivity; 1.2.4 Infrastructure investment; 1.3.2 Electricity consumption; 1.3.3 Electrical outages; 2.1.2 International students; 3.1.3 Gender parity in internet usage; 3.3.2 AI software development; 3.3.4 ICT patent applications; 3.3.5 Internet of Things; 4.2.4 Domestic credit to private sector; 4.2.5 Market capitalisation; and 4.4.3 Venture capital recipients, deals.

‡ The formula ensures that natural logarithms are positive and start at zero. Two indicators needed to be log transformed: 1.1.5 Fixed broadband affordability; and 4.4.6 Patent applications.

The one exception to the general treatment rule is indicator 1.1.2 International internet bandwidth. Because of the large distribution of the data the decision was made to follow the International Telecommunication Union (ITU) and GSM Association perform log transformation of the indicator, despite it having fewer than five outliers.

Normalisation

The indicators need to be normalised to make them comparable for data aggregation. The 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:*

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

References

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

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

* 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 2.2.4 Youth inclusion.

Sources and definitions

This appendix includes details on the definitions and sources of the 72 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 2012 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 (%) | 2021

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 five years of age and older.

Source: International Telecommunication Union (ITU), World Telecommunication/ICT Indicators Database, August 2022 (https://www.itu.int/itu-d/sites/statistics/)

1.1.2 International internet bandwidth

International bandwidth per internet user (kbit/s) | 2021

International internet bandwidth refers to the use 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 2022 (https://www.itu.int/itu-d/sites/statistics/)

1.1.3 Fixed broadband subscriptions

Fixed broadband subscriptions with speeds equal to or greater than 10 Mbit/s (% of total) | 2021

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 2022 (https://www.itu.int/itu-d/sites/statistics/)

1.1.4 4G mobile network coverage

Population covered by at least a 4G mobile network (%) | 2021

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

Source: International Telecommunication Union (ITU), World Telecommunication/ICT Indicators Database, August 2022 (https://www.itu.int/itu-d/sites/statistics/)

1.1.5 Fixed broadband affordability

Fixed broadband basket (% of GNI per capita) | 2021

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

Source: International Telecommunication Union (ITU), World Telecommunication/ICT Indicators Database, August 2022 (https://www.itu.int/itu-d/sites/statistics/)

1.1.6 Mobile broadband affordability

Mobile broadband basket (% of GNI per capita) | 2021

This indicator refers to the cheapest data-only mobile-broadband plan that provides at least 1.5 GB of monthly high-speed data (≥ 256 Kbit/s) use. 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 2022 (https://www.itu.int/itu-d/sites/statistics/)

1.1.7 Computer software spending

Total computer software spending (% of GDP) | 2021

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 (WIPO), *The Global Innovation Index 2022* (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… 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 (WDI) (http://data.worldbank.org/data-catalog/world-development-indicators)

1.2.2 Rural access

Rural Access Index | 2019

The Rural Access Index measures 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 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, M., Lee, H.I., Mastruzzi, M., Han, S., and Cho, M. (2019) *Hitting the Trillion Mark: A Look at How Much Countries Are Spending on Infrastructure.* Policy Research Working Paper 8730. World Bank Group.

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) | 2021

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 (WDI) (http://data.worldbank.org/data-catalog/world-development-indicators)

1.3.2 Electricity consumption

Electricity consumption (MWh) per capita | 2021

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 | 2022

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 business-level survey of a representative sample of an economy's private sector. The survey covers a broad range of topics related to the business environment, including access to finance, corruption, infrastructure, crime, competition, and performance measures. Since 2005-06, the World Bank's Enterprise Analysis Unit has collected these data, based on over 194,000 interviews with top managers and business owners in 155 economies, under its developed Global Methodology.

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) | 2020

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 (2022), and IEA (2022), World

Energy Balances. Downloaded from United Nations, SDG Global Database (https://unstats.un.org/sdgs/unsdg)

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 non-existent. 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 (%) | 2022

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 | 2022

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 2022* (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 | 2022

Gender parity in high-skilled jobs refers to the ratio of female managers, professionals, or technicians and associate professionals 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 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, ILOSTAT (https://ilostat.ilo.org/)

2.2 Grow

2.2.1 Tertiary enrolment

Tertiary enrolment (%) | 2022

Tertiary enrolment refers to the ratio of total tertiary enrolment to the whole population in the age group that officially corresponds to the tertiary level of education. Tertiary education, whether or not to an advanced research qualification, normally requires the successful completion of education at the

secondary level as a minimum condition of admission. 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 (%) | 2023

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 and above. The data are based on LinkedIn's self-service advertising tools.

Source: We Are Social and Hootsuite (2023) *Digital 2023* report series (https://wearesocial.com/digital-2023)

2.2.4 Youth inclusion

Proportion of youth (aged 15-24) not in education, employment, or training (%) | 2022

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, ILOSTAT (https://ilostat.ilo.org/)

2.3 Retain

2.3.1 Pension coverage

Population above statutory pensionable age receiving a pension (%) | 2022

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 | 2022

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 eleven 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: Wolf, M. J., Emerson, J. W., Esty, D. C., de Sherbinin, A., Wendling, Z. A., et al. (2022). *2022 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) | 2021

Physician density refers to the number of medical doctors (physicians), including

generalist and specialist medical practitioners, per 10,000 people.

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

2.3.4 Sanitation

Population using at least basic sanitation services (%) | 2020

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, Global Health Observatory (https://www.who.int/data/gho)

2.3.5 Personal safety

Personal safety indicator | 2022

Personal safety is a component of the Basic Human Needs dimension of the Social Progress Index. This component is based on the following variables: Interpersonal violence (age-standardized disability-adjusted life years (DALYs) per 100,000 people); Intimate partner violence (percentage of women aged 15+); freedom from political killings and torture (0 = low freedom; 1 = high freedom); transportation-related injuries (age-standardized disability-adjusted life years (DALYs) per 100,000 people); and money stolen (proportion of survey respondents).

Source: Social Progress Imperative, *The Social Progress Index 2022* (https://www.socialprogress.org/)

2.4 Skills

2.4.1 Workforce with tertiary education

Labour force with tertiary education (%) | 2022

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

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

2.4.2 High-skilled workforce

Labour force employed in high-skilled occupations (%) | 2022

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, as these professions correspond to skill levels 3 and 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, ILOSTAT (https://ilostat.ilo.org/)

2.4.3 Researchers

Full-time equivalent researchers (per million population) | 2021

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 equivalent (FTE) research and development (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 their time on R&D and 70% on other activities such as teaching, university administration, or student counselling, is considered as 0.3 FTE. Similarly, if a full-time R&D worker is*

employed at an R&D unit for six months, this is considered 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 Relevance of education system to the economy

Average answer to the question: In your country, how well does the education system meet the needs of a competitive economy? [1 = not well at all; 7 = extremely well] | 2022

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 non-existent. 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 2021–2022 (https://www.weforum.org/reports/)

2.4.5 Digital skills

Individuals with advanced ICT skills (%) | 2021

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 that have undertaken computer-related activities during that period.

Source: International Telecommunication Union (ITU), World Telecommunication/ICT Indicators Database, August 2022 (https://www.itu.int/itu-d/sites/statistics/)

3 Technology

3.1 Digital Usage

3.1.1 Internet users

Individuals using the internet, total (%) | 2021

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 2022 (https://www.itu.int/itu-d/sites/statistics/)

3.1.2 Active mobile broadband subscriptions

Active mobile broadband subscriptions (per 100 inhabitants) | 2021

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 2022 (https://www.itu.int/itu-d/sites/statistics/)

3.1.3 Gender parity in internet use

Adjusted gender parity in internet use | 2021

Gender parity in internet use refers to the ratio of female internet users to male internet users. Possible values range from 0 (total inequality) to 1 (perfect equality). The parity index is adjusted according to the methodology of UNESCO.

Source: International Telecommunication Union (ITU), World Telecommunication/ICT Indicators Database, August 2022 (https://www.itu.int/itu-d/sites/statistics/)

3.1.4 Firms with website

Firms with website (% of total) | 2021

Firms with website refers to the share of businesses that have their own website, expressed as a percentage of all businesses. 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 (%) | 2021

This indicator refers to the percentage of respondents aged 15 and above who have used the internet in the past year to buy something online. The data stem from a triennial survey conducted by Gallup, Inc., that 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 | 2022

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 scale of 0 to 1, where 0 is the worst and 1 the best. 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 | 2022

The E-Participation Index assesses on scale of 0 to 1, where 0 is the worst and 1 the best, 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 programme.

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) | 2021

GitHub is the world's largest host of source code, and a *commit* is 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: GitHub (https://github.com/). Data on population are sourced from World Development Indicators (WDI) (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 the World Intellectual Property Organization (WIPO), *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 have 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 .tv, the Tuvalu domain, by the entertainment industry).

Source: Data on internet domain registrations kindly provided by ZookNIC. Data on population are sourced from World Development Indicators (WDI) (http://data.worldbank.org/data-catalog/world-development-indicators)

3.2.4 Mobile apps development

Number of locally developed apps per person | 2022

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 and Services pillar.

Source: GSM Association, *The GSMA Mobile Connectivity Index 2022* (http://www.mobileconnectivityindex.com), based on data from Appfigures (https://appfigures.com/)

3.3 Industry 4.0

3.3.1 Cloud computing

Public cloud market (weighted by GDP) | 2022

The *Cloud computing* indicator refers to the size of the market for the three standard cloud computing service models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS). The indicator is weighted by national GDP.

Source: Statista, Technology Market Outlook: Public Cloud (https://www.statista.com/outlook/tmo/public-cloud/worldwide); GDP data come from World Development Indicators (WDI) (http://data.worldbank.org/data-catalog/world-development-indicators)

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 artificial intelligence (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 for 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) | 2022

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 increases 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 (2023), visualisations powered by JSI using data from OpenAlex, accessed on 28 June 2023 (www.oecd.ai)

3.3.4 ICT patent applications

Number of applications for ICT-related patents (per million population) | 2019

This indicator refers to the count of applications filed under the Patent Cooperation Treaty (PCT) in the technology domain of information and communication

technology (ICT) by priority date and inventor nationality. The count is divided by million 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 sourced from World Bank World Development Indicators (WDI) (http://data.worldbank.org/data-catalog/world-development-indicators). The IPC classification is discussed in Inaba, T. and Squicciarini, M. (2017), ICT: A New Taxonomy Based on the International Patent Classification, *OECD Science, Technology and Industry Working Papers No. 2017/01*. Paris: Organisation for Economic Co-operation and Development (OECD) Publishing (https://doi.org/10.1787/ab16c396-en)

3.3.5 Internet of Things

Internet of Things (weighted by GDP) | 2022

This indicator refers to spending on *Internet of Things* components to capture market size. It consists of two main segments: smart finance technologies and smart home technologies. The indicator is weighted by GDP.

Source: Statista, Technology Market Outlook: Internet of Things (https://www.statista.com/outlook/tmo/internet-of-things/worldwide); GDP data come from World Development Indicators (http://data.worldbank.org/data-catalog/world-development-indicators)

4 Competitiveness

4.1 Digital Policies

4.1.1 ICT regulation

ICT Regulatory Tracker | 2022

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 scale of 0 to 2, where 0 is the worst and 2 the best.

Source: International Telecommunication Union (ITU), *ICT Regulatory Tracker 2022* (https://app.gen5.digital/tracker/metrics)

4.1.2 Cybersecurity

Cybersecurity composite indicator | 2023

Cybersecurity is a composite indicator based on the following variables: (1) Is there a national cybersecurity strategy? (0 = No; 1 = Yes); (2) Does the cybersecurity strategy or laws encourage businesses and organisations to take voluntary action and improve their cybersecurity? (0 = No; 1 = Yes); (3) Is the country signatory to the Budapest Convention on Cybercrime? (0 = No; 1 = Yes); and (4) Does the country have robust cybersecurity defences? (0 = 0-49; 1 = 50-79; 2 = 80-100). Scores range from 0 (worst) to 1 (best).

Source: Own computation based on desktop research

4.1.3 AI regulation

AI regulation composite indicator | 2023

AI regulation is a composite indicator, based on the following variables: (1) Has the country launched a national AI strategy and/or regulation? (0 = No; 1 = Yes) and (2) Does the AI strategy or regulation call for international coordination or interoperability in AI governance? (0 = No; 1 = Yes). Scores range from 0 (worst) to 1 (best).

Source: Own computation based on desktop research

4.1.4 Cloud governance

Cloud governance composite indicator | 2023

Cloud governance is a composite indicator that is based on the following variables: (1) Is there a 'cloud-first' or smart cloud policy to encourage agencies to seek to adopt

cloud-based IT solutions? (0 = No; 1 = Yes) and (2) Has your country adopted any policy/legislation/regulation related to cloud computing? (0 = No; 2 = Yes). The first is based on own research. The latter is drawn from the International Telecommunication Union (ITU), *G5 Benchmark 2022*. Scores range from 0 (worst) to 1 (best).

Source: Own computation based on desktop research and International Telecommunication Union (ITU), *G5 Benchmark 2022* (https://app.gen5.digital/benchmark/metrics). The ITU variable is based on self-reported information gathered via official surveys to member state administrations.

4.1.5 Online content

Online content indicator | 2023

Online content is based on the following variable: Is there fair use or fair dealing or similar standard that permits limited use of copyrighted material without having to first acquire permission from the copyright holder? (0 = No; 1 = Yes). Scores range from 0 (worst) to 1 (best).

Source: Own computation based on desktop research

4.1.6 Data privacy

Data privacy composite indicator | 2023

Data privacy is a composite indicator that is based on the following variables: (1) Is there a data protection law governing data protection of personal information by private entities? (0 = No; 1 = Yes); (2) Does the law specify data subject's consent as legal basis for data collection and processing (0 = No; 1 = Yes); and (3) Is there an agency, data protection office, or similar that is tasked by law with developing rules/guidance on and enforcing privacy laws? (0 = No; 1 = Yes). Scores range from 0 (worst) to 1 (best).

Source: Own computation based on desktop research

4.1.7 Data transfer

Data transfer composite indicator | 2023

Data transfer is a composite indicator based on the following variables: (1) Are there regulations on cross-border transfer of personal data? (0 = No; 1 = Yes); (2) Are there limits to cross-border transfer for personal data in certain sectors? (0 = Yes, in two or more sectors such as financial services and healthcare; 1 = Yes, in one sector; 2 = No); and (3) Are there laws or regulations requiring localization of data? (0 = Yes; 1 = Yes, in some sectors and circumstances; 2 = No). Scores range from 0 (worst) to 1 (best).

Source: Own computation based on desktop research

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] | 2022

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 non-existent. 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 2021–2022 (http://reports.weforum.org/reports)

4.2.2 Labour productivity

Labour productivity per person employed (in 2022 US$ purchasing power parity) | 2023

Labour productivity estimates are obtained by dividing the total output (GDP in 2022 US$ purchasing power parity) 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) | 2021

This indicator refers to loans, purchases of non-equity 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 (WDI) (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 (WDI) (http://data.worldbank.org/data-catalog/world-development-indicators)

4.3 R&D

4.3.1 R&D expenditure

Gross expenditure on R&D (%) | 2021

R&D expenditure refers to the total domestic intra-mural expenditure on R&D during a given period as a percentage of GDP. Intra-mural R&D expenditure is all expenditure on 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

QS World University Ranking | 2022

The QS World University Ranking is based on the following indicators (with their weights in parentheses): (1) Academic reputation from the QS global survey (40%); (2) Employer reputation from the QS global survey (10%); (3) Citations per faculty from SciVerse Scopus database (20%); (4) Faculty-student ratio (20%); (5) Proportion of international students (5%); and (6) Proportion of international faculty (5%). The value is derived from the average score of the top three universities per country. A country with no university in the ranking is given a score of 0.

Source: Quacquarelli Symonds Ltd (QS), QS World University Ranking 2023, Top Universities (https://www.topuniversities.com/qs-world-university-rankings)

4.3.3 Gender parity in R&D

Adjusted gender parity in R&D | 2021

Gender parity in R&D refers to the ratio of female R&D personnel to male R&D personnel. The values reflect the number of employed individuals involved in intra-mural 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 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) | 2020

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 (%) | 2020

This indicator refers to the percentage of the value added of medium and high-tech industry 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 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. and 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) | 2021

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 R&D relative to the gross output and value added of different types of industries that produce goods for export.

Source: The 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 (GDP per billion US$ purchasing power parity) | 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 (WIPO), *The Global Innovation Index 2021* (https://www.globalinnovationindex.org)

4.4.4 New product entrepreneurial activity

Firms that introduced a new product/service (%) | 2022

New product entrepreneurial activity refers to the percentage of survey respondents who replied 'Yes' to the question: *During the last three years, has this establishment introduced new or significantly improved products or services?* The survey question is included in the World Bank's Enterprise Survey: a business-level survey of a

representative sample of an economy's private sector. The survey covers a broad range of topics related to the business environment, including innovation, access to finance, corruption, infrastructure, crime, competition, and performance measures. Since 2005-06, the World Bank's Enterprise Analysis Unit has collected these data, based on over 194,000 interviews with top managers and business owners in 155 economies, under its developed Global Methodology.

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

4.4.5 New business density

New corporate registrations (per 1,000 working-age population) | 2020

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 business-level survey of a representative sample of an economy's private sector. The survey covers a broad range of topics related to the business environment, including access to finance, corruption, infrastructure, crime, competition, and performance measures.

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

4.4.6 Patent applications

Patents by origin (GDP in 2017 100 billion US$ purchasing power parity) | 2021

This indicator refers to the total number of patent applications filed by applicants residing in the country where the patent office is located. The count is divided by US$ 100 billion GDP (purchasing power parity).

Source: World Intellectual Property Organization (WIPO), Intellectual Property Statistics (www.wipo.int/ipstats).

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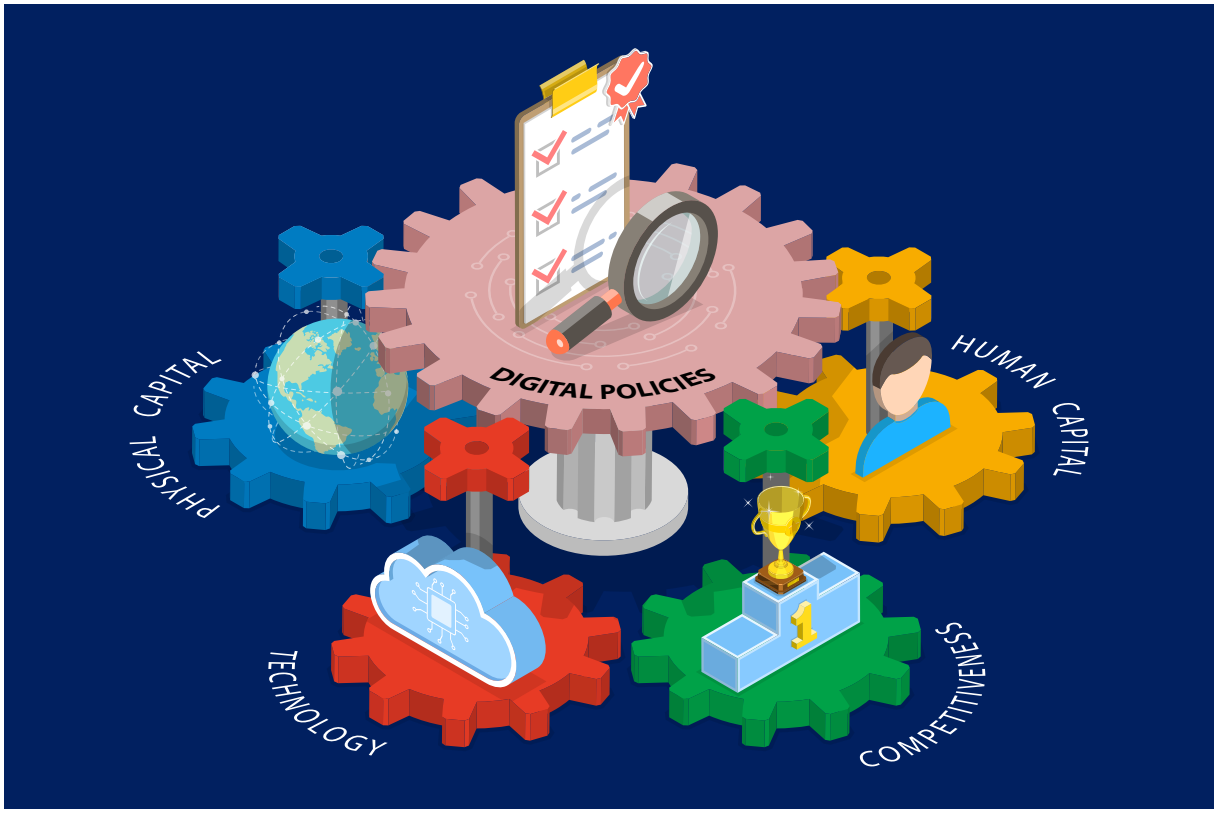

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ISBN: 978-2-8399-4066-5