



ESTONIA

18th Estonia ranks 18th among the 132 economies featured in the GII 2022.

The Global Innovation Index (GII) ranks world economies according to their innovation capabilities. Consisting of roughly 80 indicators, grouped into innovation inputs and outputs, the GII aims to capture the multi-dimensional facets of innovation.

The following table shows the rankings of Estonia over the past three years, noting that data availability and changes to the GII model framework influence year-on-year comparisons of the GII rankings. The statistical confidence interval for the ranking of Estonia in the GII 2022 is between ranks 15 and 21.

Rankings for Estonia (2020–2022)

GIIYR	GII	Innovation inputs	Innovation outputs
2020	25	25	20
2021	21	24	20
2022	18	15	22

- Estonia performs better in innovation inputs than innovation outputs in 2022.
- This year Estonia ranks 15th in innovation inputs, higher than both 2021 and 2020.
- As for innovation outputs, Estonia ranks 22nd. This position is lower than both 2021 and 2020.

17th Estonia ranks 17th among the 48 high-income group economies.

10th Estonia ranks 10th among the 39 economies in Europe.

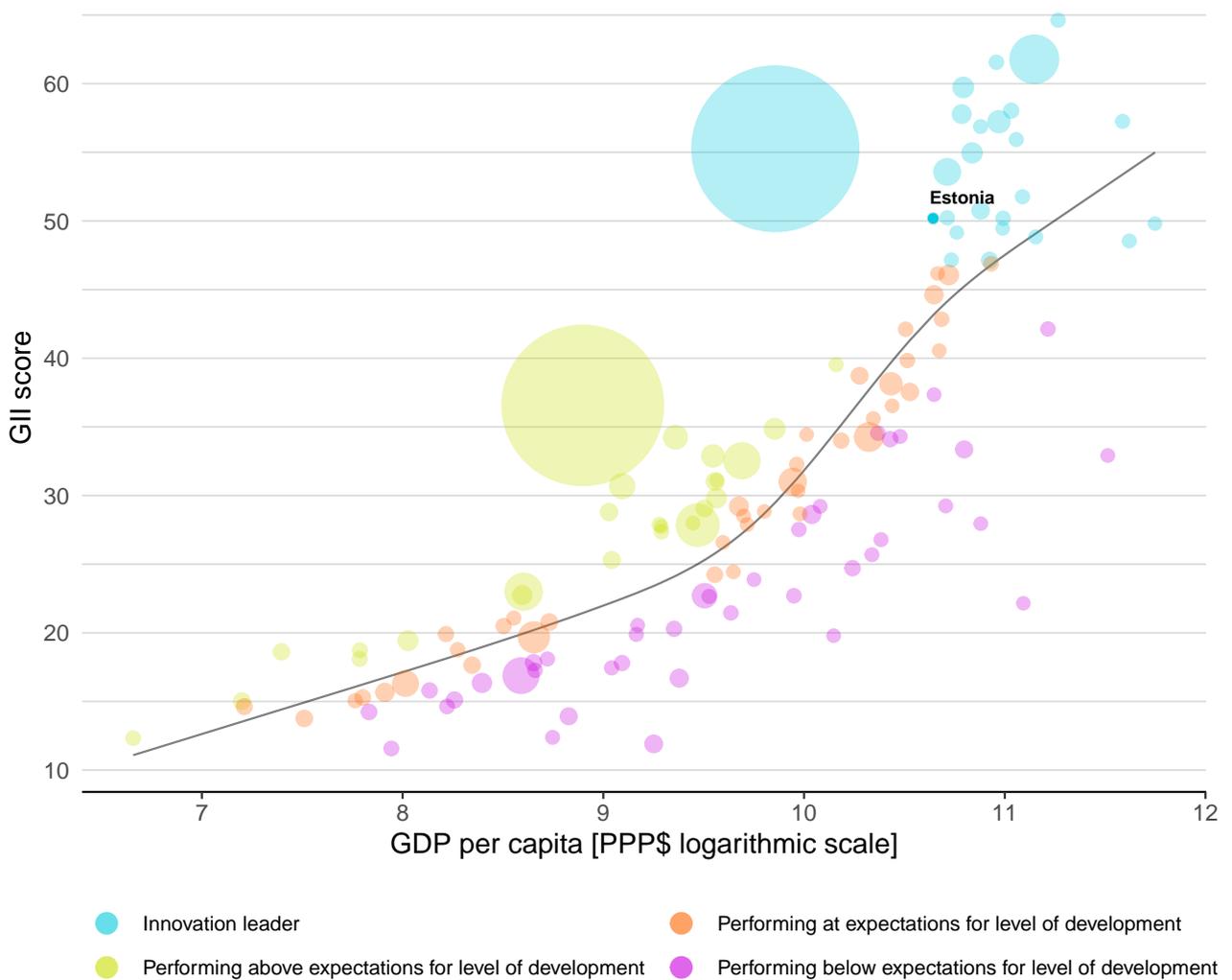


EXPECTED VS. OBSERVED INNOVATION PERFORMANCE

The bubble chart below shows the relationship between income levels (GDP per capita) and innovation performance (GII score). The trend line gives an indication of the expected innovation performance according to income level. Economies appearing above the trend line are performing better than expected and those below are performing below expectations.

Relative to GDP, Estonia's performance is above expectations for its level of development.

The positive relationship between innovation and development



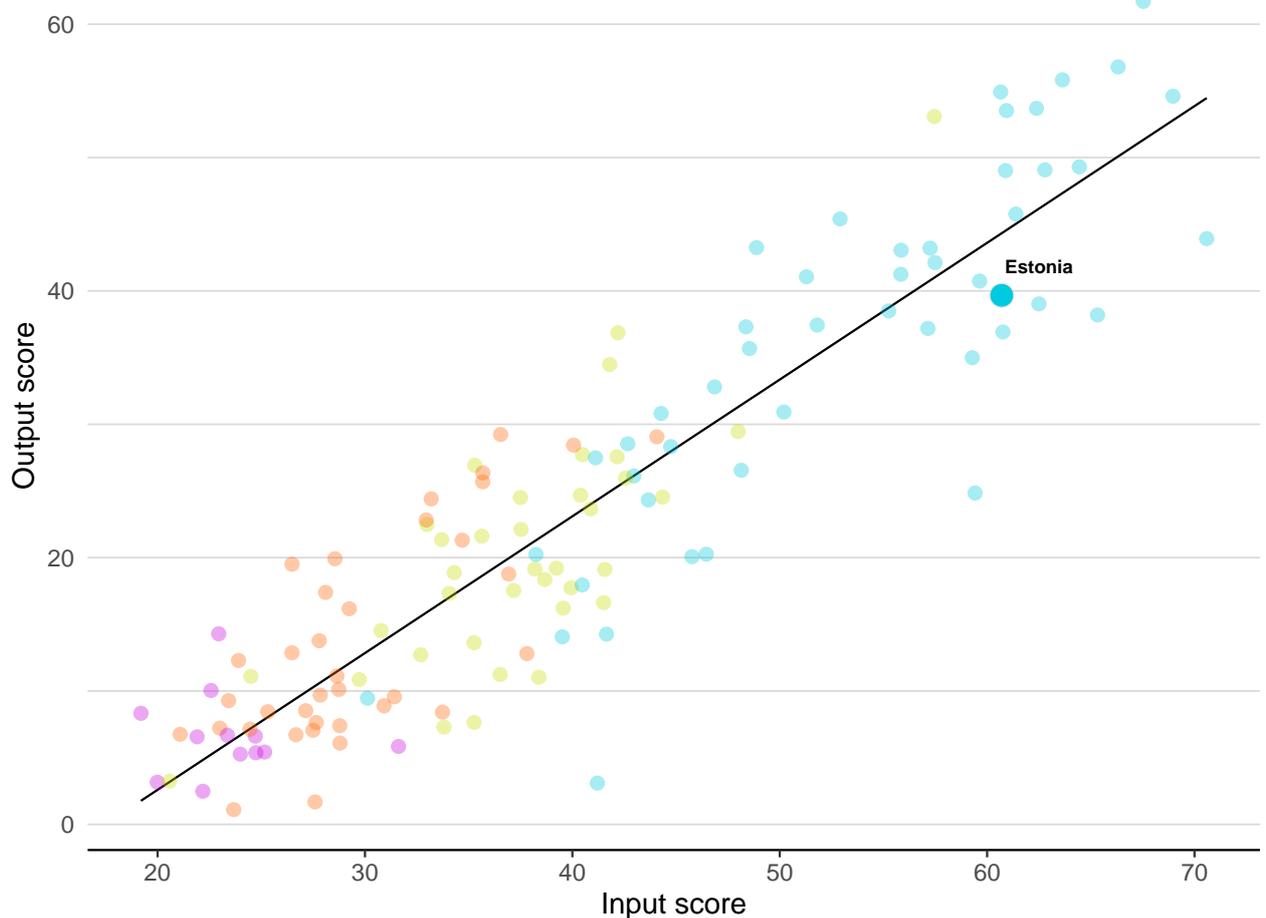


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

The chart below shows the relationship between innovation inputs and innovation outputs. Economies above the line are effectively translating costly innovation investments into more and higher-quality outputs.

Estonia produces less innovation outputs relative to its level of innovation investments.

Innovation input to output performance

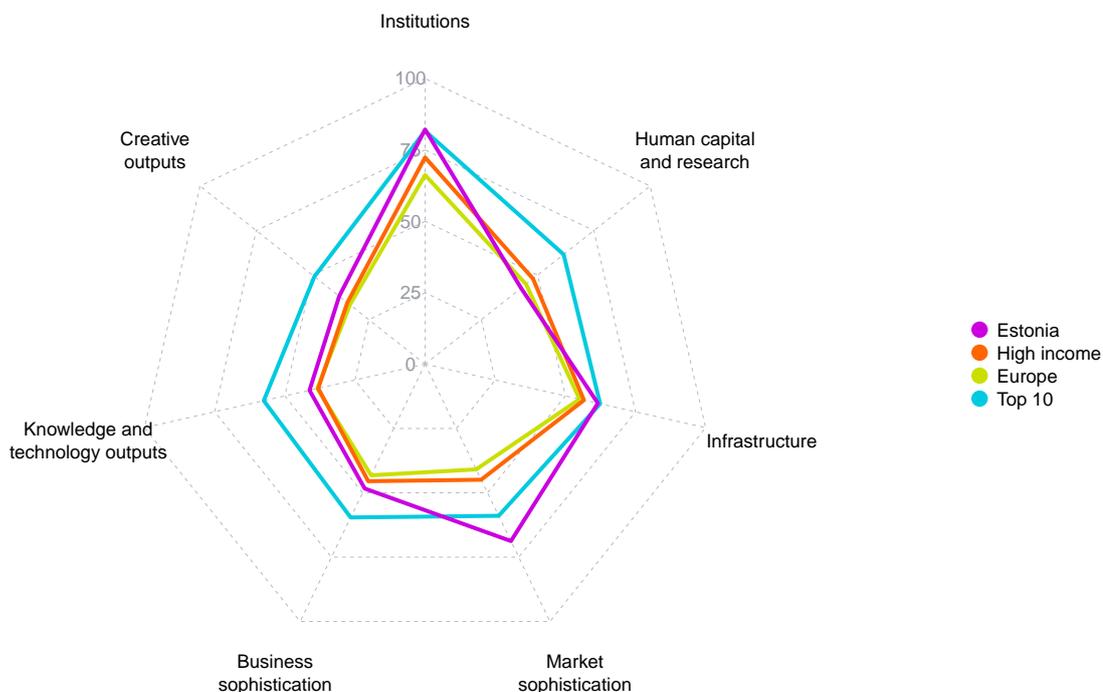


Income ● High income ● Upper middle ● Lower middle ● Low income — Fitted line



BENCHMARKING AGAINST OTHER HIGH-INCOME GROUP ECONOMIES AND EUROPE

The seven GII pillar scores for Estonia



High-income group economies

Estonia performs above the high-income group average in six pillars, namely: Institutions; Infrastructure; Market sophistication; Business sophistication; Knowledge and technology outputs; and, Creative outputs.

Europe

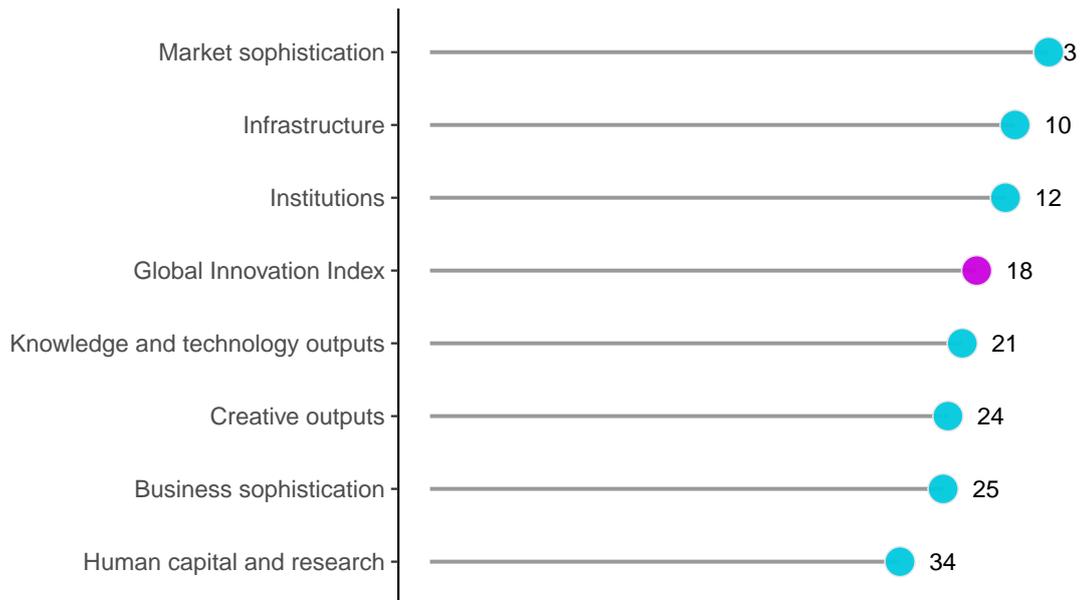
Estonia performs above the regional average in six pillars, namely: Institutions; Infrastructure; Market sophistication; Business sophistication; Knowledge and technology outputs; and, Creative outputs.



OVERVIEW OF RANKINGS IN THE SEVEN GII 2022 AREAS

Estonia performs best in Market sophistication and its weakest performance is in Human capital and research.

The seven GII pillar ranks for Estonia



Note: The highest possible ranking in each pillar is 1.

The full WIPO Intellectual Property Statistics profile for Estonia can be found at:

https://www.wipo.int/ipstats/en/statistics/country_profile/profile.jsp?code=EE.



INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of the indicator strengths and weaknesses of Estonia in the GII 2022.

Strengths and weaknesses for Estonia

Strengths			Weaknesses		
Code	Indicator name	Rank	Code	Indicator name	Rank
1.3.2	Entrepreneurship policies and culture	3	2.1.2	Government funding/pupil, secondary, % GDP/cap	50
2.1.4	PISA scales in reading, maths and science	4	2.3.3	Global corporate R&D investors, top 3, mn USD	38
3.1.3	Government's online service	2	3.3.1	GDP/unit of energy use	83
3.1.4	E-participation	1	4.3.3	Domestic market scale, bn PPP\$	101
3.3.3	ISO 14001 environmental certificates/bn PPP\$ GDP	6	5.2.2	State of cluster development and depth	61
4.2.3	Venture capital recipients, deals/bn PPP\$ GDP	1	5.3.1	Intellectual property payments, % total trade	82
4.2.4	Venture capital received, value, % GDP	1	6.2.3	Software spending, % GDP	77
5.3.3	ICT services imports, % total trade	1	6.3.1	Intellectual property receipts, % total trade	62
6.2.2	New businesses/th pop. 15–64	1	7.1.1	Intangible asset intensity, top 15, %	62
7.2.2	National feature films/mn pop. 15–69	2	7.1.3	Global brand value, top 5,000, % GDP	77

Estonia

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Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP\$ (bn)	GDP per capita, PPP\$
22	15	High	EUR	1.3	55.7	41,892

	Score/ Value	Rank		Score/ Value	Rank
 Institutions	82.2	12	 Business sophistication	48.3	25
1.1 Political environment	82.0	17	5.1 Knowledge workers	58.7	22
1.1.1 Political and operational stability*	85.5	10	5.1.1 Knowledge-intensive employment, %	48.2	12
1.1.2 Government effectiveness*	78.6	21	5.1.2 Firms offering formal training, %	40.7	30
1.2 Regulatory environment	86.4	16	5.1.3 GERD performed by business, % GDP	1.0	22
1.2.1 Regulatory quality*	83.3	14	5.1.4 GERD financed by business, %	49.1	32
1.2.2 Rule of law*	81.9	19	5.1.5 Females employed w/advanced degrees, %	27.4	10
1.2.3 Cost of redundancy dismissal	12.9	40	5.2 Innovation linkages	37.7	29
1.3 Business environment	78.0	8	5.2.1 University-industry R&D collaboration†	50.0	47
1.3.1 Policies for doing business†	57.9	44	5.2.2 State of cluster development and depth†	48.7	61
1.3.2 Entrepreneurship policies and culture*	98.1	3	5.2.3 GERD financed by abroad, % GDP	0.2	18
			5.2.4 Joint venture/strategic alliance deals/bn PPP\$ GDP	0.1	19
			5.2.5 Patent families/bn PPP\$ GDP	0.6	29
 Human capital and research	42.7	34	5.3 Knowledge absorption	48.5	18
2.1 Education	63.3	19	5.3.1 Intellectual property payments, % total trade	0.3	82
2.1.1 Expenditure on education, % GDP	5.3	33	5.3.2 High-tech imports, % total trade	8.9	56
2.1.2 Government funding/pupil, secondary, % GDP/cap	20.7	50	5.3.3 ICT services imports, % total trade	11.7	1
2.1.3 School life expectancy, years	15.9	38	5.3.4 FDI net inflows, % GDP	8.5	11
2.1.4 PISA scales in reading, maths and science	525.5	4	5.3.5 Research talent, % in businesses	41.3	34
2.1.5 Pupil-teacher ratio, secondary	9.7	28			
2.2 Tertiary education	46.3	22	 Knowledge and technology outputs	41.2	21
2.2.1 Tertiary enrolment, % gross	74.2	28	6.1 Knowledge creation	26.7	34
2.2.2 Graduates in science and engineering, %	27.5	29	6.1.1 Patents by origin/bn PPP\$ GDP	1.6	48
2.2.3 Tertiary inbound mobility, %	11.1	20	6.1.2 PCT patents by origin/bn PPP\$ GDP	1.0	28
2.3 Research and development (R&D)	18.5	42	6.1.3 Utility models by origin/bn PPP\$ GDP	0.7	28
2.3.1 Researchers, FTE/mn pop.	3,846.1	27	6.1.4 Scientific and technical articles/bn PPP\$ GDP	46.9	13
2.3.2 Gross expenditure on R&D, % GDP	1.8	21	6.1.5 Citable documents H-index	17.9	48
2.3.3 Global corporate R&D investors, top 3, mn USD	0.0	38	6.2 Knowledge impact	55.5	1
2.3.4 QS university ranking, top 3*	16.9	54	6.2.1 Labor productivity growth, %	3.4	13
			6.2.2 New businesses/th pop. 15-64	24.2	1
			6.2.3 Software spending, % GDP	0.2	77
 Infrastructure	61.6	10	6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP	19.1	14
3.1 Information and communication technologies (ICTs)	93.6	4	6.2.5 High-tech manufacturing, %	30.6	41
3.1.1 ICT access*	93.0	24	6.3 Knowledge diffusion	41.4	26
3.1.2 ICT use*	82.1	16	6.3.1 Intellectual property receipts, % total trade	0.1	62
3.1.3 Government's online service*	99.4	2	6.3.2 Production and export complexity	63.1	29
3.1.4 E-participation*	100.0	1	6.3.3 High-tech exports, % total trade	10.5	17
3.2 General infrastructure	41.9	35	6.3.4 ICT services exports, % total trade	5.0	18
3.2.1 Electricity output, GWh/mn pop.	4,233.1	49			
3.2.2 Logistics performance*	58.6	34	 Creative outputs	38.2	24
3.2.3 Gross capital formation, % GDP	31.3	21	7.1 Intangible assets	39.6	37
3.3 Ecological sustainability	49.2	14	7.1.1 Intangible asset intensity, top 15, %	39.9	62
3.3.1 GDP/unit of energy use	8.9	83	7.1.2 Trademarks by origin/bn PPP\$ GDP	93.5	16
3.3.2 Environmental performance*	61.4	14	7.1.3 Global brand value, top 5,000, % GDP	0.0	77
3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP	10.4	6	7.1.4 Industrial designs by origin/bn PPP\$ GDP	4.6	26
 Market sophistication	68.8	3	7.2 Creative goods and services	40.0	9
4.1 Credit	47.4	23	7.2.1 Cultural and creative services exports, % total trade	2.2	9
4.1.1 Finance for startups and scaleups*	55.5	7	7.2.2 National feature films/mn pop. 15-69	10.8	2
4.1.2 Domestic credit to private sector, % GDP	64.8	54	7.2.3 Entertainment and media market/th pop. 15-69	n/a	n/a
4.1.3 Loans from microfinance institutions, % GDP	4.4	6	7.2.4 Printing and other media, % manufacturing	1.8	16
4.2 Investment	96.2	2	7.2.5 Creative goods exports, % total trade	1.1	41
4.2.1 Market capitalization, % GDP	n/a	n/a	7.3 Online creativity	33.4	21
4.2.2 Venture capital investors, deals/bn PPP\$ GDP	0.7	7	7.3.1 Generic top-level domains (TLDs)/th pop. 15-69	11.1	39
4.2.3 Venture capital recipients, deals/bn PPP\$ GDP	0.4	1	7.3.2 Country-code TLDs/th pop. 15-69	46.3	17
4.2.4 Venture capital received, value, % GDP	0.0	1	7.3.3 GitHub commit pushes received/mn pop. 15-69	40.2	14
4.3 Trade, diversification, and market scale	62.7	39	7.3.4 Mobile app creation/bn PPP\$ GDP	36.1	6
4.3.1 Applied tariff rate, weighted avg., %	1.5	20			
4.3.2 Domestic industry diversification	96.6	22			
4.3.3 Domestic market scale, bn PPP\$	55.7	101			

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⊙ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at https://www.wipo.int/global_innovation_index/en/2022. Square brackets [] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

DATA AVAILABILITY

The following tables list indicators that are either missing or outdated for Estonia.

Missing data for Estonia

Code	Indicator name	Economy year	Model year	Source
4.2.1	Market capitalization, % GDP	n/a	2020	World Federation of Exchanges
7.2.3	Entertainment and media market/th pop. 15–69	n/a	2021	PwC, GEMO

Outdated data for Estonia

Code	Indicator name	Economy year	Model year	Source
1.3.2	Entrepreneurship policies and culture	2017	2021	Global Entrepreneurship Monitor
2.1.1	Expenditure on education, % GDP	2018	2020	UNESCO Institute for Statistics
4.1.1	Finance for startups and scaleups	2017	2021	Global Entrepreneurship Monitor

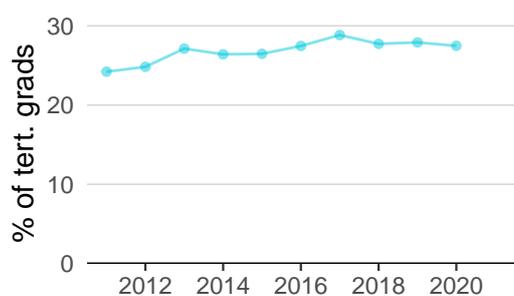
ESTONIA'S INNOVATION SYSTEM

As far as practicable, the plots below present unscaled indicator data.

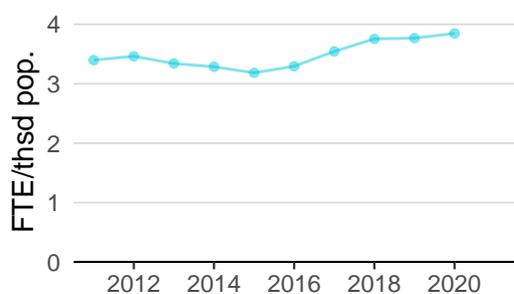
Innovation inputs



2.1.1 Expenditure on education was equal to 5.3% GDP in 2018—up by 6 percentage points from the year prior—and equivalent to an indicator rank of 33.



2.2.2 Graduates in science and engineering was equal to 27.5% of tert. grads in 2020—down by 2 percentage points from the year prior—and equivalent to an indicator rank of 29.



2.3.1 Researchers was equal to 3.8 FTE/thsd pop. in 2020—up by 2 percentage points from the year prior—and equivalent to an indicator rank of 27.



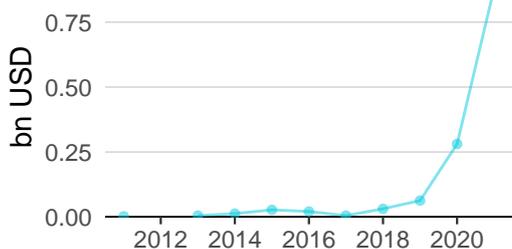
2.3.2 Gross expenditure on R&D was equal to 1.8% GDP in 2020—up by 10 percentage points from the year prior—and equivalent to an indicator rank of 21.



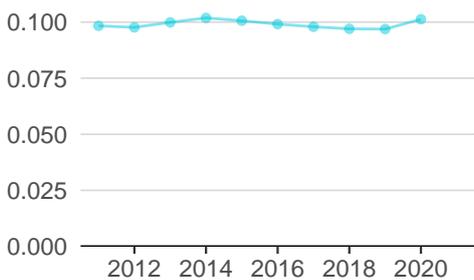
2.3.4 QS university ranking was equal to 16.9 in 2021—down by 21 percentage points from the year prior—and equivalent to an indicator rank of 54.



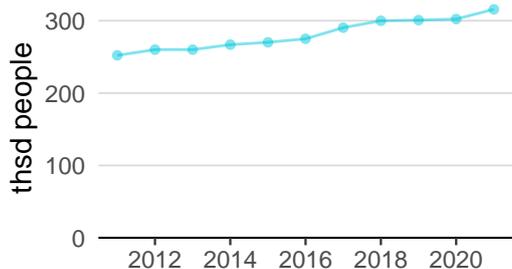
3.1.1 ICT access was equal to 9.3 in 2020 and equivalent to an indicator rank of 24.



4.2.4 Venture capital received was equal to 0.9 bn USD in 2021—up by 213 percentage points from the year prior—and equivalent to an indicator rank of 1.

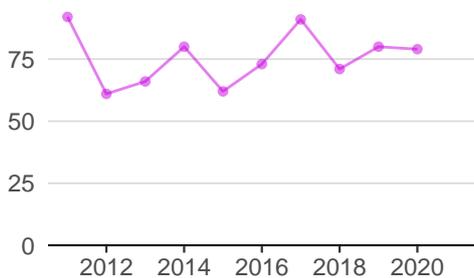


4.3.2 Domestic industry diversification was equal to 0.1 in 2020—up by 5 percentage points from the year prior—and equivalent to an indicator rank of 22.

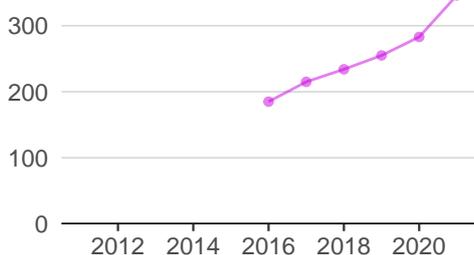


5.1.1 Knowledge-intensive employment was equal to 315.7 thsd people in 2021—up by 4 percentage points from the year prior—and equivalent to an indicator rank of 12.

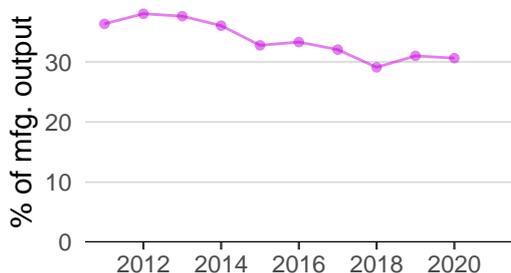
Innovation outputs



6.1.1 Patents by origin was equal to 79.0 in 2020—down by 1 percentage point from the year prior—and equivalent to an indicator rank of 48.



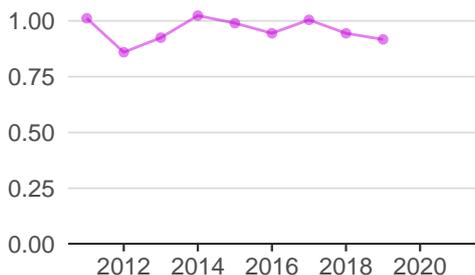
6.1.5 Citable documents H-index was equal to 346.0 in 2021—up by 22 percentage points from the year prior—and equivalent to an indicator rank of 48.



6.2.5 High-tech manufacturing was equal to 30.6% of mfg. output in 2020—down by 1 percentage point from the year prior—and equivalent to an indicator rank of 41.



6.3.1 Intellectual property receipts was equal to 20.6 mn USD in 2020—up by 6 percentage points from the year prior—and equivalent to an indicator rank of 62.



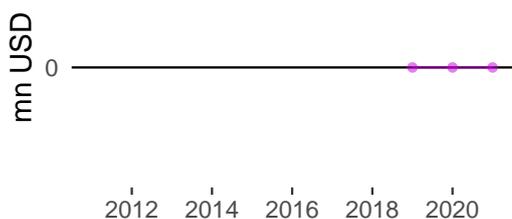
6.3.2 Production and export complexity was equal to 0.9 in 2019—down by 3 percentage points from the year prior—and equivalent to an indicator rank of 29.



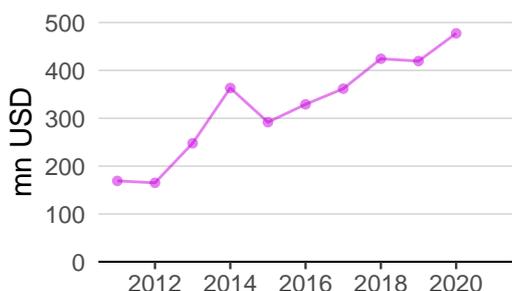
6.3.3 High-tech exports was equal to 2.3 bn USD in 2020—up by 21 percentage points from the year prior—and equivalent to an indicator rank of 17.



7.1.1 Intangible asset intensity was equal to 39.9% of total value in 2021 and equivalent to an indicator rank of 62.



7.1.3 Global brand value was equal to 0.0 mn USD in 2021—effectively unchanged from the year prior—and equivalent to an indicator rank of 77.



7.2.1 Cultural and creative services exports was equal to 477.4 mn USD in 2020—up by 14 percentage points from the year prior—and equivalent to an indicator rank of 9.

ESTONIA'S INNOVATION TOP PERFORMERS

2.3.3 Global corporate R&D investors

Firm	Industry	R&D	R&D Growth	R&D Intensity	Rank
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No observations

Source: European Commission's Joint Research Centre (<https://iri.jrc.ec.europa.eu/scoreboard/2021-eu-industrial-rd-investment-scoreboard>).

2.3.4 QS university ranking

University	Score	Rank
UNIVERSITY OF TARTU	34.7	300=
TALLINN UNIVERSITY OF TECHNOLOGY	16.1	751-800

Source: QS Quacquarelli Symonds Ltd (<https://www.topuniversities.com/university-rankings/world-university-rankings/2022>).

Note: QS Quacquarelli Symonds Ltd annually assesses over 1,200 universities across the globe and scores them between [0,100]. Ranks can represent a single value "x", a tie "x=" or a range "x-y".

7.1.1 Intangible asset intensity, top 15

Firm	Rank
LHV GROUP	1
TALLINNA KAUBAMAJA GRUPP	2

Source: Brand Finance (<https://brandirectory.com/reports/gif-2021>).

Note: Brand Finance only provides within economy ranks.

7.1.3 Global brand value, top 5,000

Brand	Industry	Rank
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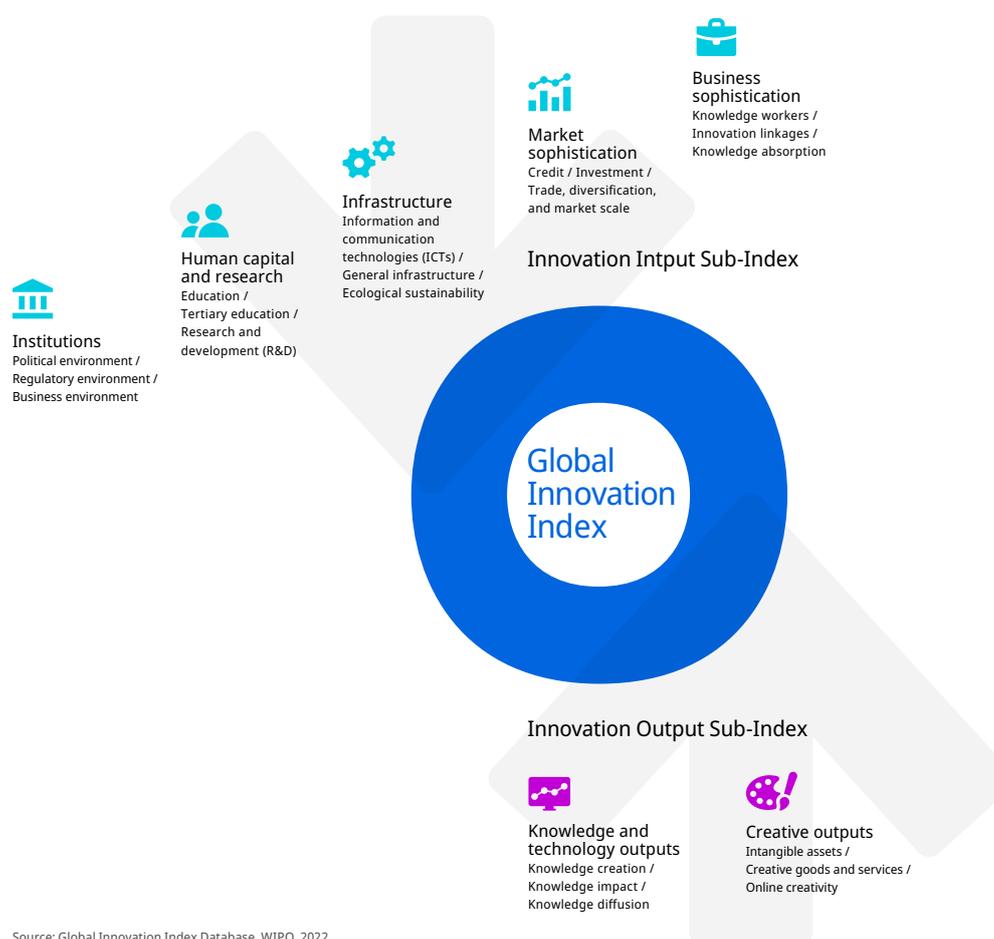
No observations

Source: Brand Finance (<https://brandirectory.com>).

ABOUT THE GLOBAL INNOVATION INDEX

The Global Innovation Index (GII) is published by the World Intellectual Property Organization (WIPO), a specialized agency of the United Nations.

Recognizing that innovation is a key driver of economic development, the GII aims to provide an innovation ranking and rich analysis referencing around 130 economies. Over the last decade, the GII has established itself as both a leading reference on innovation and a “tool for action” for economies that incorporate the GII into their innovation agendas.



The Index is a ranking of the innovation capabilities and results of world economies. It measures innovation based on criteria that include institutions, human capital and research, infrastructure, credit, investment, linkages; the creation, absorption and diffusion of knowledge; and creative outputs.

The GII has two sub-indices: the Innovation Input Sub-Index and the Innovation Output Sub-Index, and seven pillars, each consisting of three sub-pillars.