

Global Innovation Index 2023

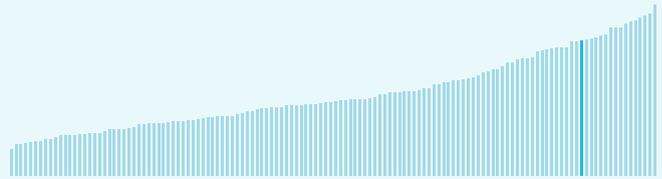


The Global Innovation Index (GII) **ranks world economies according to their innovation capabilities.**

Consisting of **roughly 80 indicators**, grouped into innovation inputs and outputs, the GII **aims to capture the multi-dimensional facets of innovation.**

Estonia ranking in the Global Innovation Index 2023

> Estonia ranks **16th** among the 132 economies featured in the GII 2023.



> Estonia ranks **15th** among the 50 high-income group economies.



> Estonia ranks **9th** among the 39 economies in Europe.



> Estonia GII Ranking (2020-2023)

The table shows the rankings of Estonia over the past four years. 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 2023 is between ranks 15 and 18.

	GII Position	Innovation Inputs	Innovation Outputs
2020	25th	25th	20th
2021	21st	24th	20th
2022	18th	15th	22nd
2023	16th	14th	16th

Estonia performs worse in innovation outputs than innovation inputs in 2023.

This year Estonia ranks 14th in innovation inputs. This position is higher than last year.

Estonia ranks 16th in innovation outputs. This position is higher than last year.

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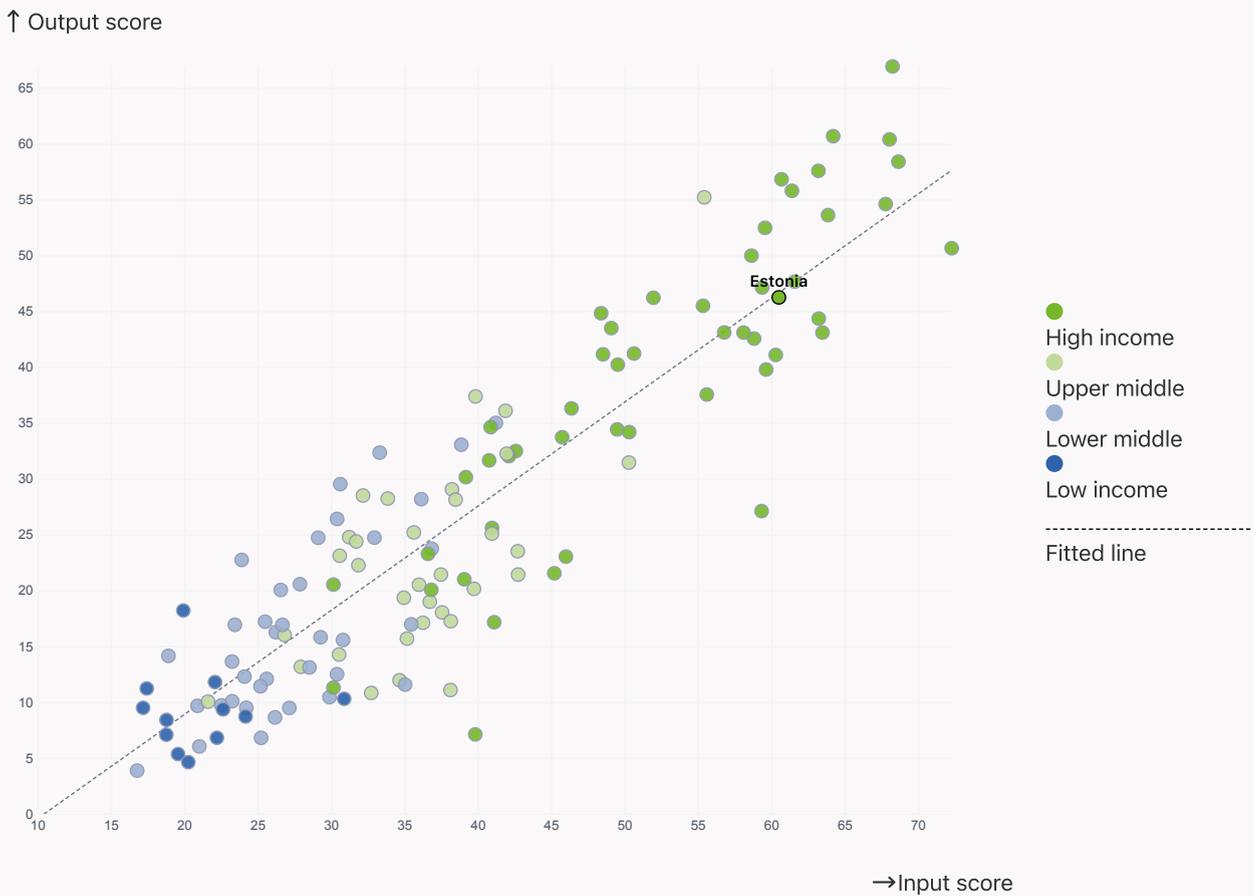
→ Effectively translating innovation investments into innovation outputs

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.

> Relationship between innovation inputs and outputs

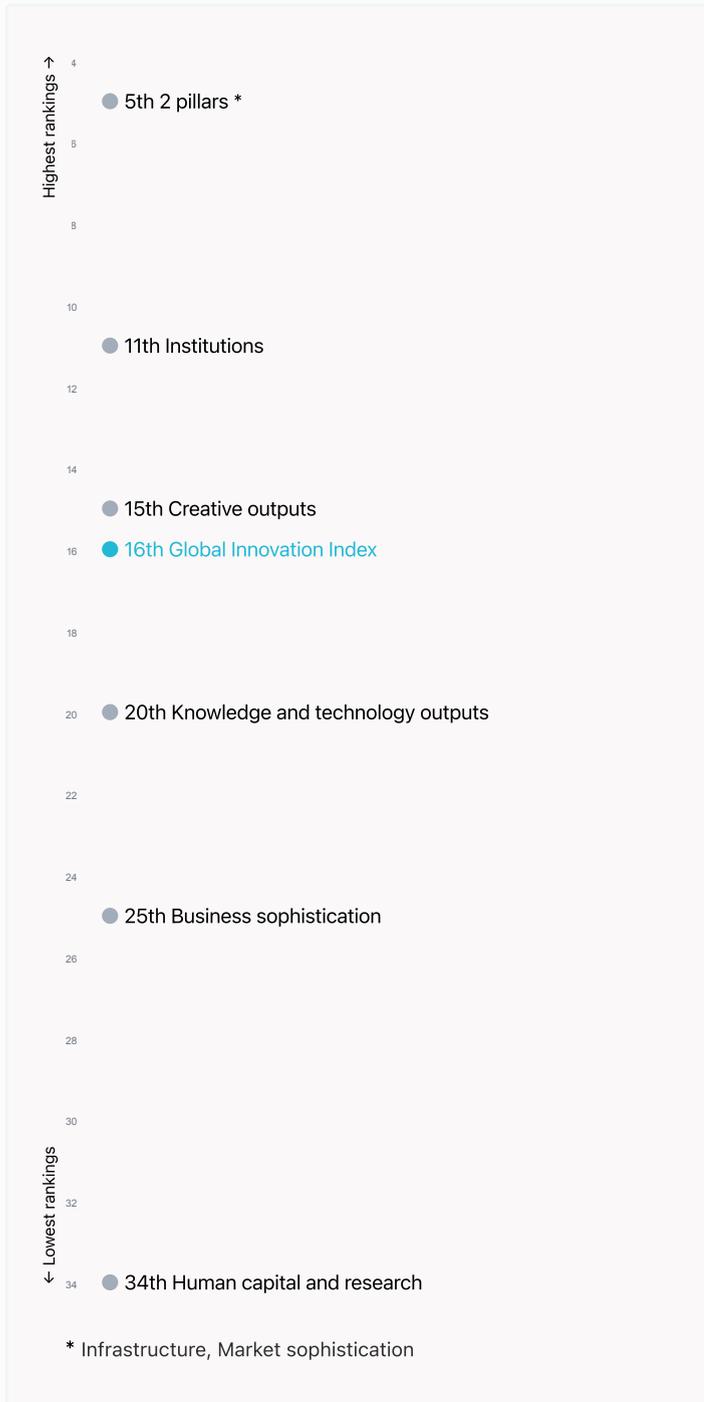


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→ Overview of Estonia's rankings in the seven areas of the GII in 2023

The chart shows the ranking for each of the seven areas that the GII comprises. The strongest areas for Estonia are those that rank above the GII (shown in blue) and the weakest are those that rank below.



> Highest rankings



Estonia ranks highest in Infrastructure, Market sophistication (5th), Institutions (11th) and Creative outputs (15th).

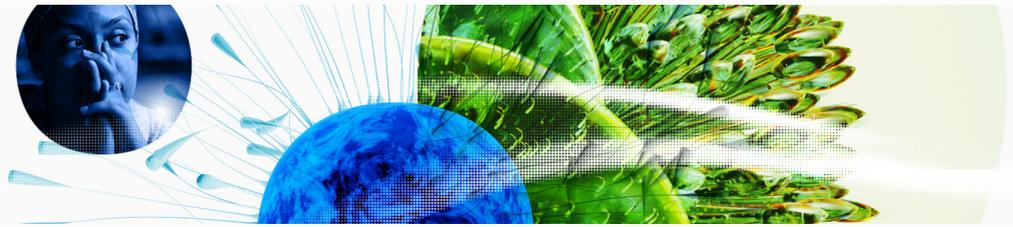
> Lowest rankings



Estonia ranks lowest in Human capital and research (34th), Business sophistication (25th) and Knowledge and technology outputs (20th).

The full WIPO Intellectual Property Statistics profile for Estonia can be found on [this link](#).

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→ Benchmark of Estonia against other country groupings for each of the seven areas of the GII Index

The charts show the relative position of Estonia (blue bar) against other country groupings (grey bars), for each of the seven areas of the GII Index.

> High-Income economies

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

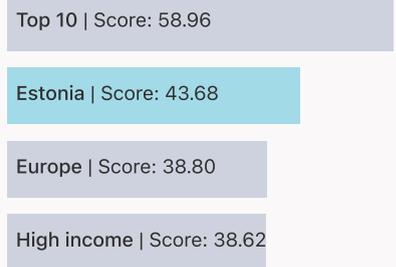


> Europe

Estonia performs above the regional average in Knowledge and technology outputs, Creative outputs, Business sophistication, Market sophistication, Infrastructure, Institutions.



Knowledge and technology outputs



Creative outputs



Business sophistication



Market sophistication



Human capital and research



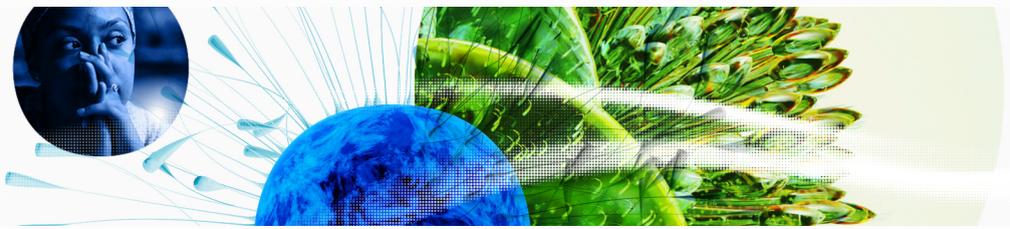
Infrastructure



Institutions



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→ Innovation strengths and weaknesses in Estonia

The table below gives an overview of the indicator strengths and weaknesses of Estonia in the GII 2023.



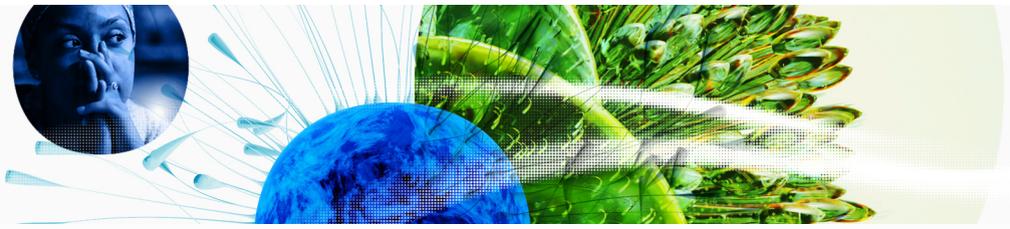
> Estonia's main innovation strengths are **Government's online service (rank 1)**, **ICT services imports, % total trade (rank 1)** and **Unicorn valuation, % GDP (rank 1)**.

Strengths

Weaknesses

Rank	Code	Indicator name	Rank	Code	Indicator name
1	3.1.3	Government's online service	101	4.3.3	Domestic market scale, bn PPP\$
1	5.3.3	ICT services imports, % total trade	89	6.2.3	Software spending, % GDP
1	6.2.2	Unicorn valuation, % GDP	87	5.3.1	Intellectual property payments, % total trade
1	4.2.4	VC received, value, % GDP	76	3.3.1	GDP/unit of energy use
1	4.2.3	VC recipients, deals/bn PPP\$ GDP	74	7.1.3	Global brand value, top 5,000
3	1.3.2	Entrepreneurship policies and culture	62	5.2.2	State of cluster development
3	3.1.4	E-participation	60	5.3.2	High-tech imports, % total trade
3	7.2.2	National feature films/mn pop. 15-69	53	7.1.1	Intangible asset intensity, top 15, %
4	3.3.3	ISO 14001 environment/bn PPP\$ GDP	51	2.1.2	Government funding/pupil, secondary, % GDP/cap
4	2.1.4	PISA scales in reading, maths and science	40	2.3.3	Global corporate R&D investors, top 3, mn US\$

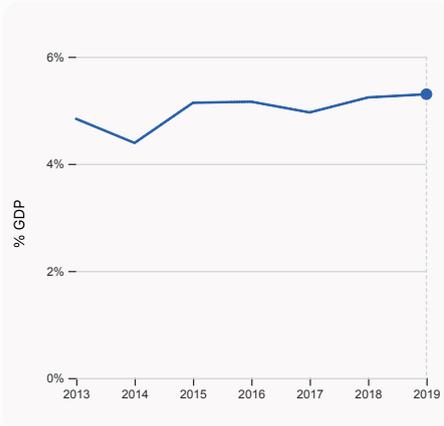
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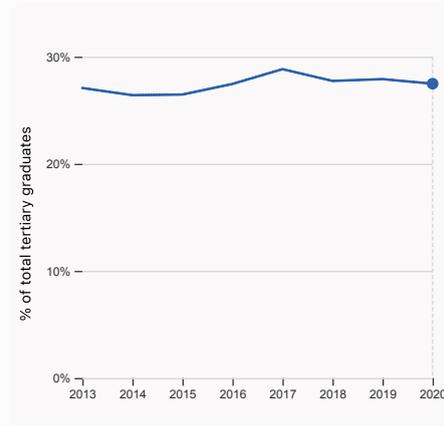
→ Estonia's innovation system

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

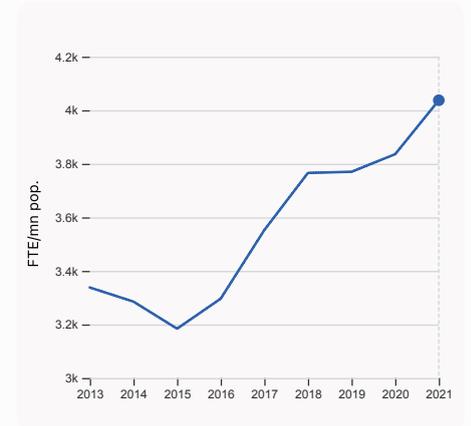
> Innovation inputs in Estonia



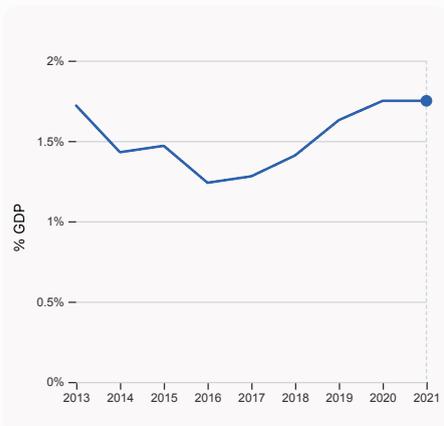
2.1.1 Expenditure on education, % GDP was equal to 5.3% GDP in 2019, up by 0.06 percentage points from the year prior – and equivalent to an indicator rank of 26.



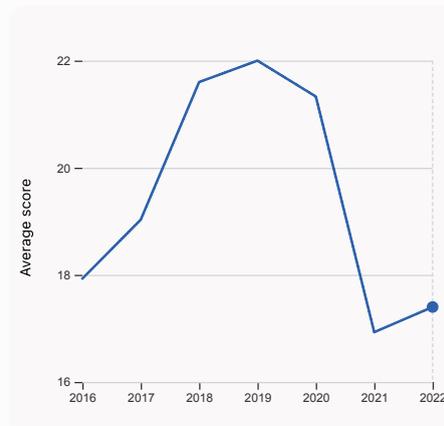
2.2.2 Graduates in science and engineering, % was equal to 27.48% of total tertiary graduates in 2020, down by 0.43 percentage points from the year prior – and equivalent to an indicator rank of 31.



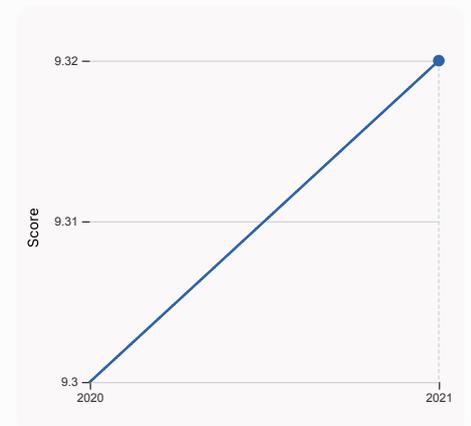
2.3.1 Researchers, FTE/mn pop. was equal to 4,037.39 FTE/mn pop. in 2021, up by 5.25% from the year prior – and equivalent to an indicator rank of 27.



2.3.2 Gross expenditure on R&D, % GDP was equal to 1.75% GDP in 2021, with no change from the year prior – and equivalent to an indicator rank of 22.

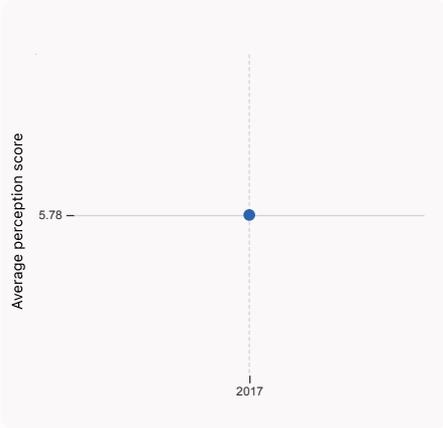


2.3.4 QS university ranking, top 3 was equal to an average score of 17.4 for the top 3 universities in 2022, up by 2.78% from the year prior – and equivalent to an indicator rank of 56.

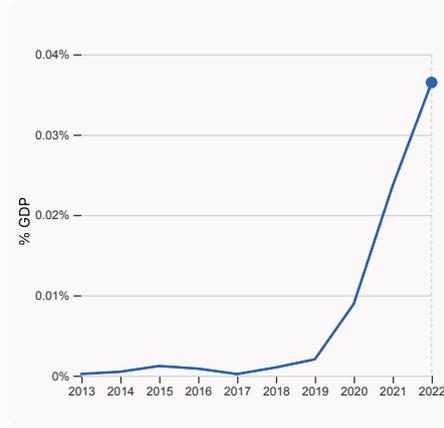


3.1.1 ICT access was equal to a score of 9.32 in 2021, up by 0.22% from the year prior – and equivalent to an indicator rank of 23.

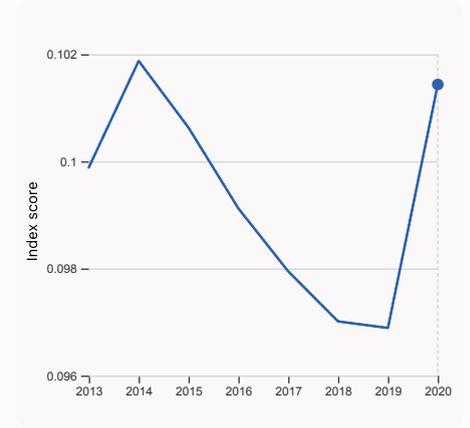
Global Innovation Index 2023



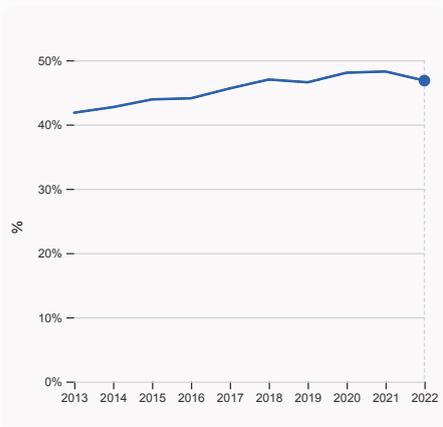
4.1.1 Finance for startups and scaleups was equal to an average perception score of 5.78 in 2017, equivalent to an indicator rank of 11.



4.2.4 VC received, value, % GDP was equal to 0.03649% GDP in 2022, up by 0.013 percentage points from the year prior – and equivalent to an indicator rank of 1.



4.3.2 Domestic industry diversification was equal to an index score of 0.101 in 2020, up by 4.69% from the year prior – and equivalent to an indicator rank of 17.



5.1.1 Knowledge-intensive employment, % was equal to 46.83% in 2022, down by 1.42 percentage points from the year prior – and equivalent to an indicator rank of 17.

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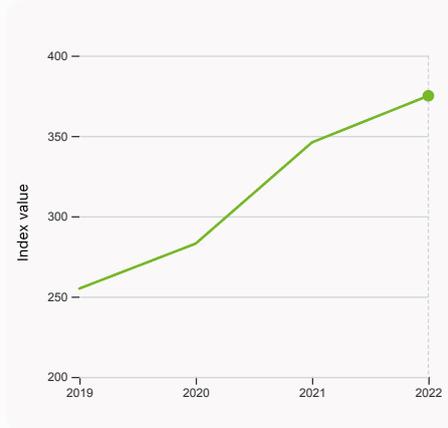


> Innovation outputs in Estonia



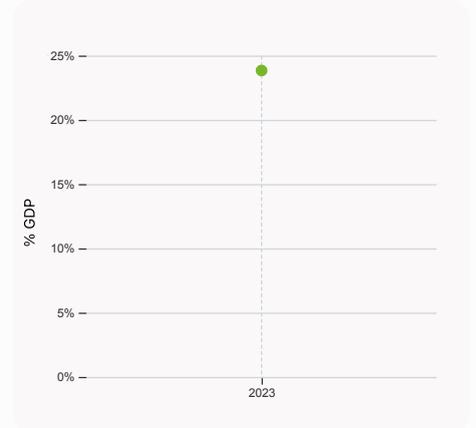
6.1.1 Patents by origin

was equal to 0.094 Thousands in 2021, up by 18.99% from the year prior – and equivalent to an indicator rank of 41.



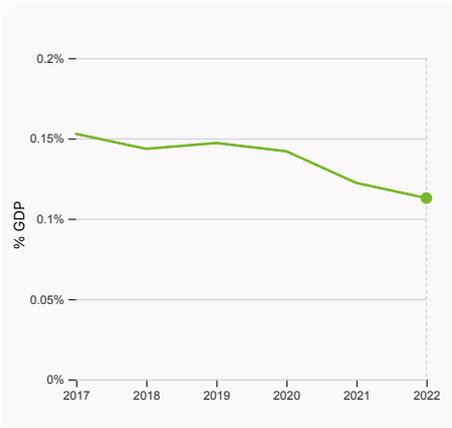
6.1.5 Citable documents H-index

was equal to an index value of 375 in 2022, up by 8.38% from the year prior – and equivalent to an indicator rank of 48.



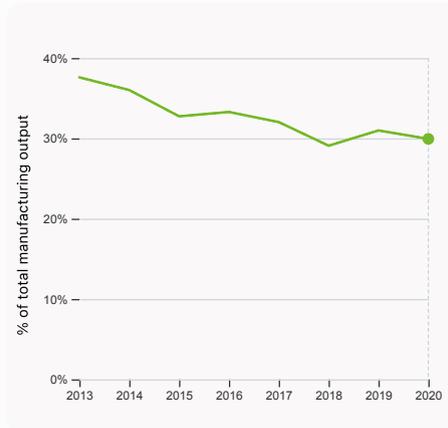
6.2.2 Unicorn valuation, % GDP

was equal to 23.84 % GDP in 2023 – and equivalent to an indicator rank of 1.



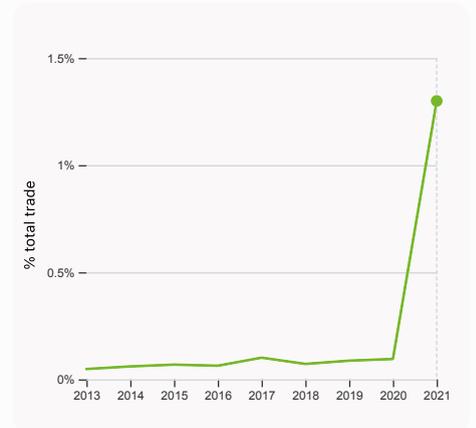
6.2.3 Software spending, % GDP

was equal to 0.113% GDP in 2022, down by 0.0094 percentage points from the year prior – and equivalent to an indicator rank of 89.



6.2.4 High-tech manufacturing, %

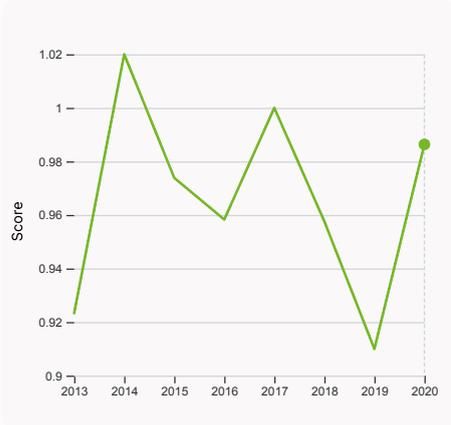
was equal to 29.94% of total manufacturing output in 2020, down by 1.05 percentage points from the year prior – and equivalent to an indicator rank of 37.



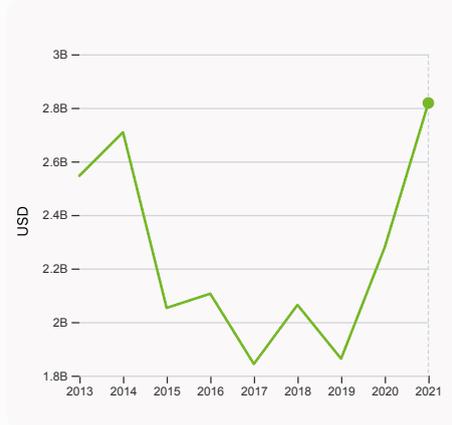
6.3.1 Intellectual property receipts, % total trade

was equal to 1.3% total trade in 2021, up by 1.2 percentage points from the year prior – and equivalent to an indicator rank of 27.

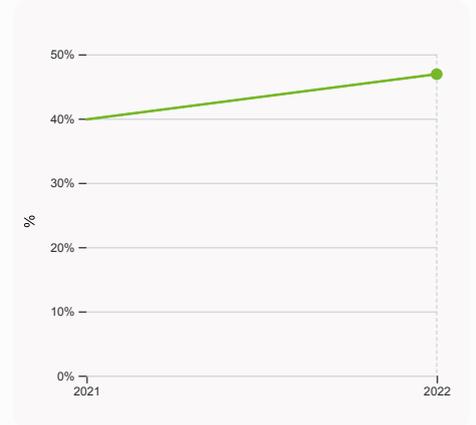
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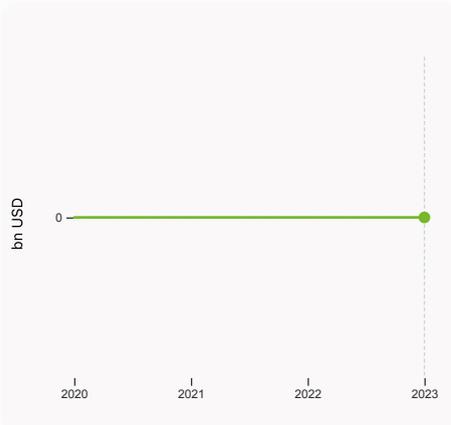
6.3.2 Production and export complexity was equal to a score of 0.986 in 2020, up by 8.4% from the year prior – and equivalent to an indicator rank of 27.



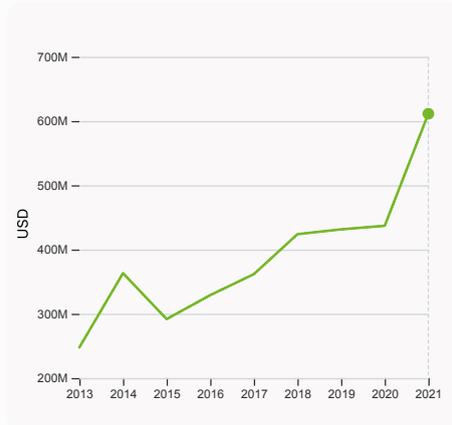
6.3.3 High-tech exports was equal to 2,818,161,795 USD in 2021, up by 23.64% from the year prior – and equivalent to an indicator rank of 18.



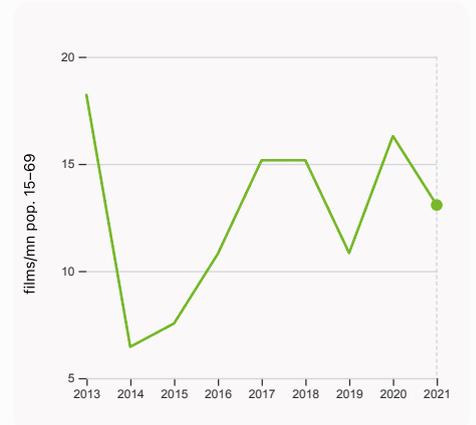
7.1.1 Intangible asset intensity, top 15, % was equal to 46.91% in 2022, up by 7.04 percentage points from the year prior – and equivalent to an indicator rank of 53.



7.1.3 Global brand value, top 5,000 was equal to 0 bn USD in 2023 – and equivalent to an indicator rank of 74.

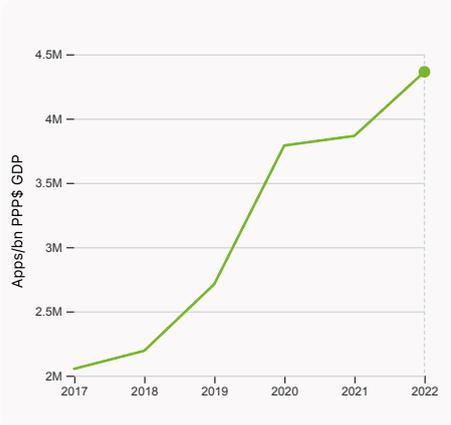
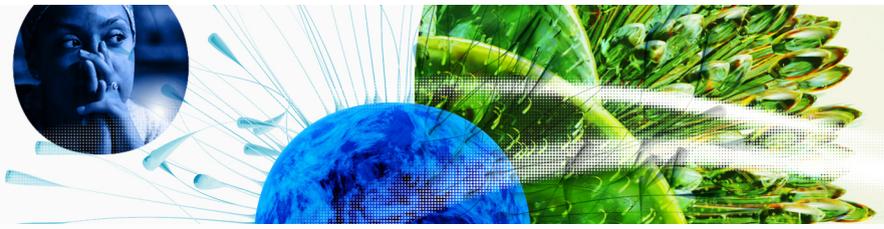


7.2.1 Cultural and creative services exports was equal to 611,368,000 USD in 2021, up by 39.9% from the year prior – and equivalent to an indicator rank of 11.



7.2.2 National feature films/mn pop. 15-69 was equal to 13.08 films/mn pop. 15-69 in 2021, down by 19.75% from the year prior – and equivalent to an indicator rank of 3.

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7.3.4 Mobile app creation/bn PPP\$ GDP

was equal to 4,363,930.98 Apps/bn PPP\$ GDP in 2022, up by 12.9% from the year prior – and equivalent to an indicator rank of 6.



→ Estonia's innovation top performers

> 2.3.4 QS university ranking of Estonia's top universities

Rank	University	Score
296	UNIVERSITY OF TARTU	35.40
701-750	TALLINN UNIVERSITY OF TECHNOLOGY (TALTECH)	16.80
1001-1200	TALLINN UNIVERSITY	10.30

Source: QS Quacquarelli Symonds Ltd (<https://www.topuniversities.com/university-rankings/world-university-rankings/2023>).

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".

> 6.2.2 Top Unicorn Companies in Estonia

Rank	Unicorn Company	Industry	City	Valuation, bn USD
1	BOLT	Auto & transportation	Tallinn	8
2	VERIFF	Artificial intelligence	Tallinn	2

Source: CBInsights, Tracker – The Complete List of Unicorn Companies: <https://www.cbinsights.com/research-unicorn-companies>

> 7.1.1 Top 15 intangible-asset intensive companies in Estonia

Rank	Firm	Intensity, %
1	LHV GROUP AS	55.14
2	ENEFIT GREEN AS	38.85
3	TALLINNA KAUBAMAJA GRUPP AS	19.29

Source: Brand Finance (<https://brandirectory.com/reports/gif-2022>).

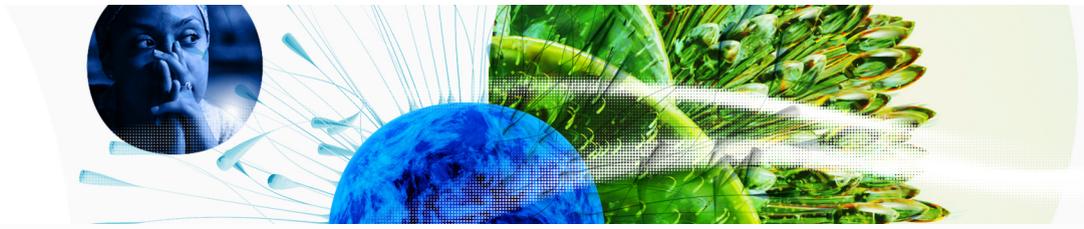
Note: Brand Finance only provides within economy ranks.



Estonia

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP\$ (bn)	GDP per capita, PPP\$
16	14	High	EUR	1.3	61.4	46,126.0
Score / Value Rank				Score / Value Rank		
Institutions 78.6 11				Business sophistication 49.2 25		
1.1 Institutional environment 75.3 17				5.1 Knowledge workers 58.8 22		
1.1.1 Operational stability for businesses* 75.7 15				5.1.1 Knowledge-intensive employment, % 46.8 17		
1.1.2 Government effectiveness* 74.9 19				5.1.2 Firms offering formal training, % 40.7 31		
1.2 Regulatory environment 86.2 16				5.1.3 GERD performed by business, % GDP 1.0 23		
1.2.1 Regulatory quality* 82.6 15				5.1.4 GERD financed by business, % 50.1 29		
1.2.2 Rule of law* 81.5 18				5.1.5 Females employed w/advanced degrees, % 28.1 8		
1.2.3 Cost of redundancy dismissal 12.9 40				5.2 Innovation linkages 37.3 30		
1.3 Business environment 74.3 16				5.2.1 University-industry R&D collaboration+ 54.1 44		
1.3.1 Policies for doing business* 60.7 37				5.2.2 State of cluster development+ 41.9 62		
1.3.2 Entrepreneurship policies and culture* 88.0 3				5.2.3 GERD financed by abroad, % GDP 0.2 19		
Human capital and research 42.9 34				5.2.4 Joint venture/strategic alliance deals/bn PPP\$ GDP 0.1 18		
2.1 Education 62.5 21				5.2.5 Patent families/bn PPP\$ GDP 0.9 28		
2.1.1 Expenditure on education, % GDP 5.3 26				5.3 Knowledge absorption 51.5 17		
2.1.2 Government funding/pupil, secondary, % GDP/cap 20.3 51				5.3.1 Intellectual property payments, % total trade 0.3 87		
2.1.3 School life expectancy, years 16.0 39				5.3.2 High-tech imports, % total trade 8.4 60		
2.1.4 PISA scales in reading, maths and science 525.5 4				5.3.3 ICT services imports, % total trade 10.0 1		
2.1.5 Pupil-teacher ratio, secondary 9.8 29				5.3.4 FDI net inflows, % GDP 13.7 8		
2.2 Tertiary education 43.4 24				5.3.5 Research talent, % in businesses 43.2 33		
2.2.1 Tertiary enrolment, % gross 69.0 43				Knowledge and technology outputs 43.7 20		
2.2.2 Graduates in science and engineering, % 27.5 31				6.1 Knowledge creation 28.4 34		
2.2.3 Tertiary inbound mobility, % 12.3 20				6.1.1 Patents by origin/bn PPP\$ GDP 1.7 41		
2.3 Research and development (R&D) 22.7 42				6.1.2 PCT patents by origin/bn PPP\$ GDP 0.6 30		
2.3.1 Researchers, FTE/mn pop. 4,037.4 27				6.1.3 Utility models by origin/bn PPP\$ GDP 0.6 30		
2.3.2 Gross expenditure on R&D, % GDP 1.8 22				6.1.4 Scientific and technical articles/bn PPP\$ GDP n/a n/a		
2.3.3 Global corporate R&D investors, top 3, mn US\$ 0.0 40				6.1.5 Citable documents H-index 18.5 48		
2.3.4 QS university ranking, top 3* 17.6 56				6.2 Knowledge impact 52.4 10		
Infrastructure 64.3 5				6.2.1 Labor productivity growth, % 1.9 35		
3.1 Information and communication technologies (ICTs) 95.6 2				6.2.2 Unicorn valuation, % GDP 23.8 1		
3.1.1 ICT access* 90.0 23				6.2.3 Software spending, % GDP 0.1 89		
3.1.2 ICT use* 94.8 12				6.2.4 High-tech manufacturing, % 29.9 37		
3.1.3 Government's online service* 100.0 1				6.3 Knowledge diffusion 50.3 17		
3.1.4 E-participation* 97.7 3				6.3.1 Intellectual property receipts, % total trade 0.5 27		
3.2 General infrastructure 40.1 33				6.3.2 Production and export complexity 73.2 27		
3.2.1 Electricity output, GWh/mn pop. 5,500.4 40				6.3.3 High-tech exports, % total trade 9.7 18		
3.2.2 Logistics performance* 68.2 25				6.3.4 ICT services exports, % total trade 7.2 8		
3.2.3 Gross capital formation, % GDP 26.6 41				6.3.5 ISO 9001 quality/bn PPP\$ GDP 17.9 16		
3.3 Ecological sustainability 57.2 9				Creative outputs 48.8 15		
3.3.1 GDP/unit of energy use 9.5 76				7.1 Intangible assets 48.3 29		
3.3.2 Environmental performance* 72.0 14				7.1.1 Intangible asset intensity, top 15, % 46.9 53		
3.3.3 ISO 14001 environment/bn PPP\$ GDP 10.0 4				7.1.2 Trademarks by origin/bn PPP\$ GDP 104.1 9		
Market sophistication 67.6 5				7.1.3 Global brand value, top 5,000 0.0 74		
4.1 Credit 50.8 27				7.1.4 Industrial designs by origin/bn PPP\$ GDP 4.2 24		
4.1.1 Finance for startups and scaleups+ 76.0 11				7.2 Creative goods and services 47.2 7		
4.1.2 Domestic credit to private sector, % GDP 63.4 57				7.2.1 Cultural and creative services exports, % total trade 2.1 11		
4.1.3 Loans from microfinance institutions, % GDP 4.6 8				7.2.2 National feature films/mn pop. 15-69 13.1 3		
4.2 Investment 89.2 2				7.2.3 Entertainment and media market/th pop. 15-69 n/a n/a		
4.2.1 Market capitalization, % GDP n/a n/a				7.2.4 Creative goods exports, % total trade 1.3 40		
4.2.2 Venture capital (VC) investors, deals/bn PPP\$ GDP 1.3 5				7.3 Online creativity 51.3 23		
4.2.3 VC recipients, deals/bn PPP\$ GDP 0.7 1				7.3.1 Generic top-level domains (TLDs)/th pop. 15-69 13.1 37		
4.2.4 VC received, value, % GDP 0.0 1				7.3.2 Country-code TLDs/th pop. 15-69 50.1 17		
4.3 Trade, diversification, and market scale 62.9 46				7.3.3 GitHub commits/mn pop. 15-69 58.1 13		
4.3.1 Applied tariff rate, weighted avg., % 1.5 20				7.3.4 Mobile app creation/bn PPP\$ GDP 83.9 6		
4.3.2 Domestic industry diversification 97.0 17						
4.3.3 Domestic market scale, bn PPP\$ 61.4 101						

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/gii-ranking>. 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.



> Estonia has missing data for two indicators and outdated data for four indicators.

> 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; World Bank
7.2.3	Entertainment and media market/th pop. 15-69	n/a	2022	PwC, GEMO; United Nations, World Population Prospects; International Monetary Fund

> Outdated data for Estonia

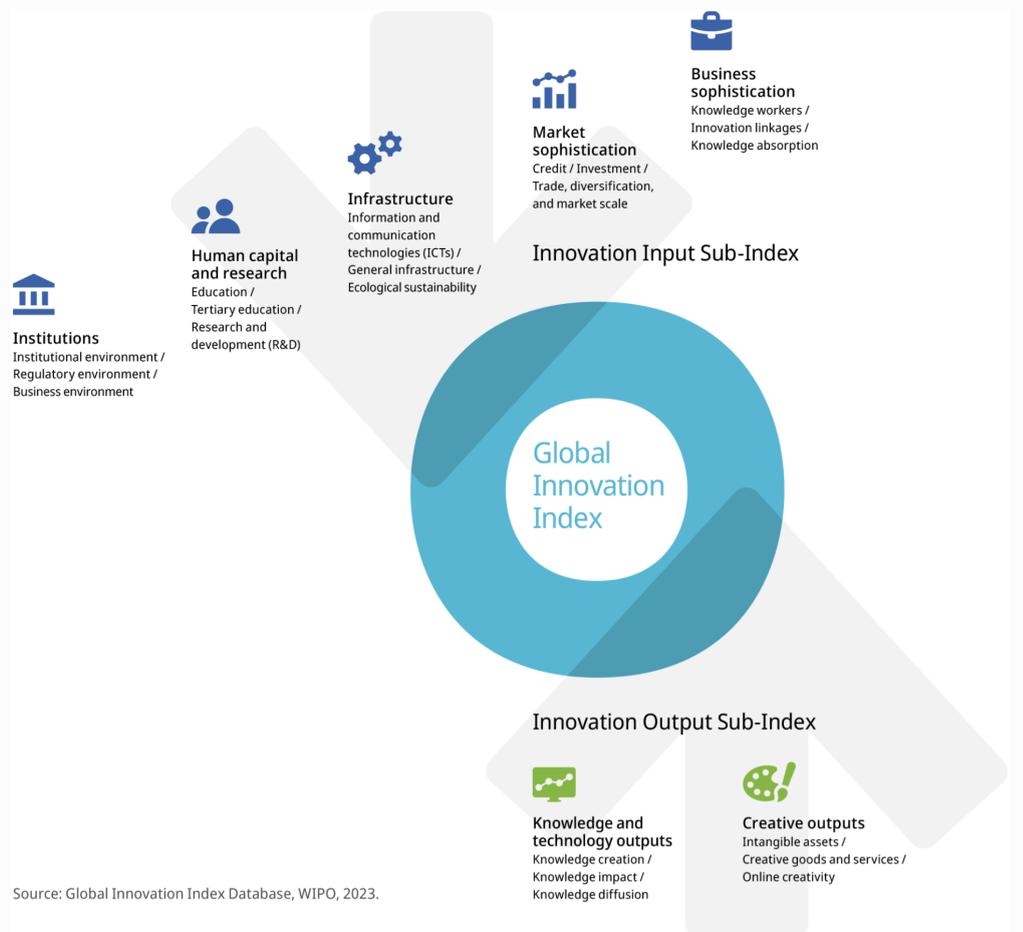
Code	Indicator name	Economy Year	Model Year	Source
1.3.2	Entrepreneurship policies and culture	2017	2022	Global Entrepreneurship Monitor
2.1.1	Expenditure on education, % GDP	2019	2021	UNESCO Institute for Statistics
2.2.1	Tertiary enrolment, % gross	2017	2020	UNESCO Institute for Statistics
4.1.1	Finance for startups and scaleups	2017	2022	Global Entrepreneurship Monitor

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→ 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.