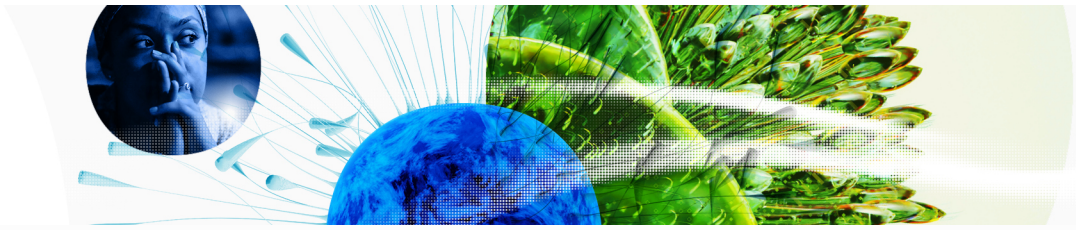
Global Innovation Index 2023



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**.

Ireland ranking in the Global Innovation Index 2023

> Ireland ranks 22nd among the 132 economies featured in the GII 2023.

> Ireland ranks 21st among the 50 high-income group economies.

> Ireland ranks 14th among the 39 economies in Europe.

> Ireland GII Ranking (2020-2023)

The table shows the rankings of Ireland 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 Ireland in the GII 2023 is between ranks 18 and 24.

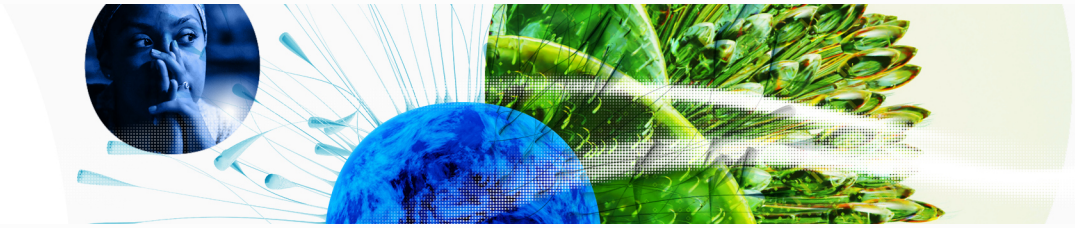
	GII Position	Innovation Inputs	Innovation Outputs
2020	15th	20th	11th
2021	19th	22nd	19th
2022	23rd	25th	19th
2023	22nd	26th	18th

Ireland performs better in innovation outputs than innovation inputs in 2023.

This year **Ireland ranks 26th in innovation inputs.** This position is lower than last year.

Ireland ranks 18th in innovation outputs. This position is higher than last year.

Global Innovation Index 2023

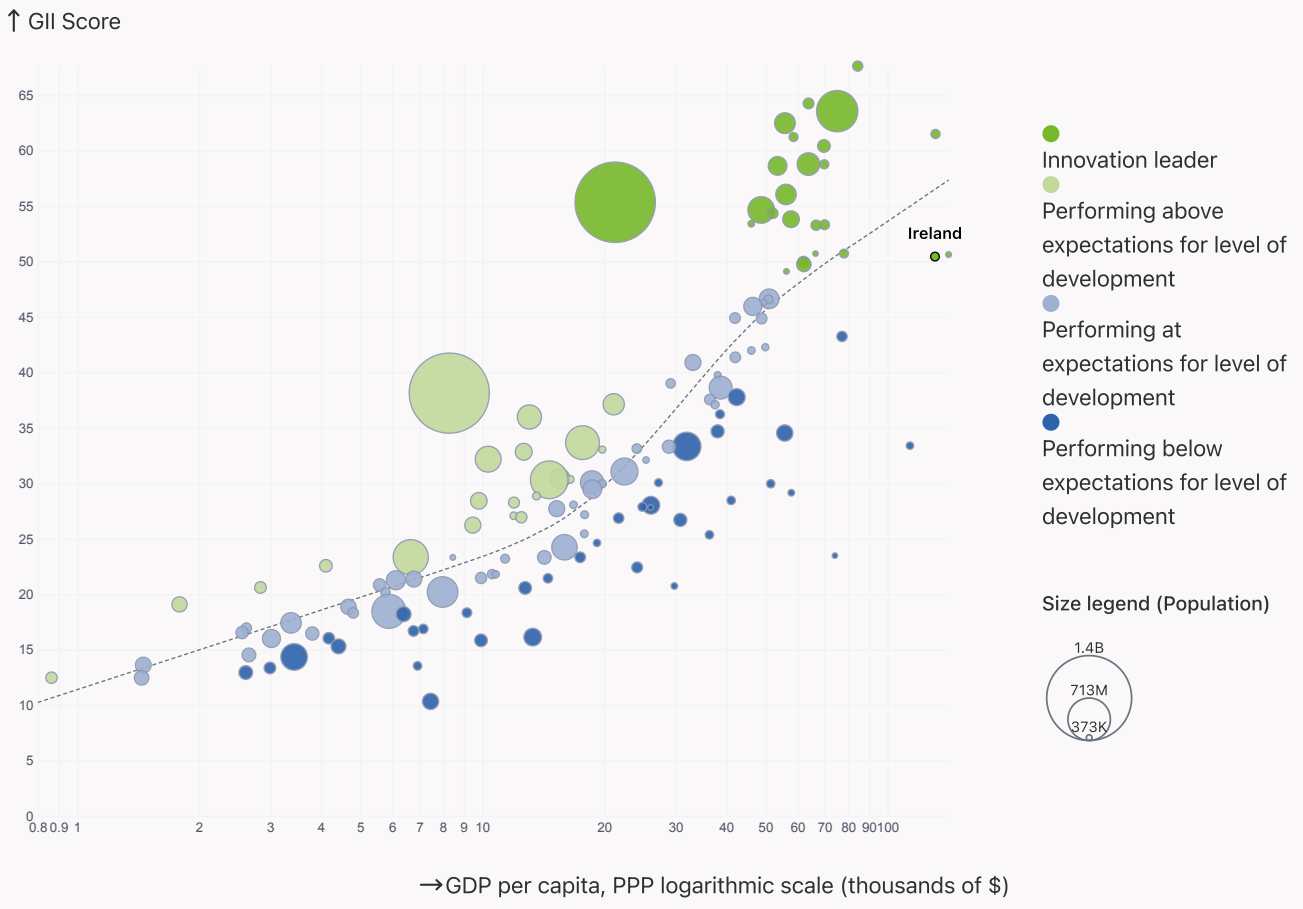


→ Expected vs. observed innovation performance

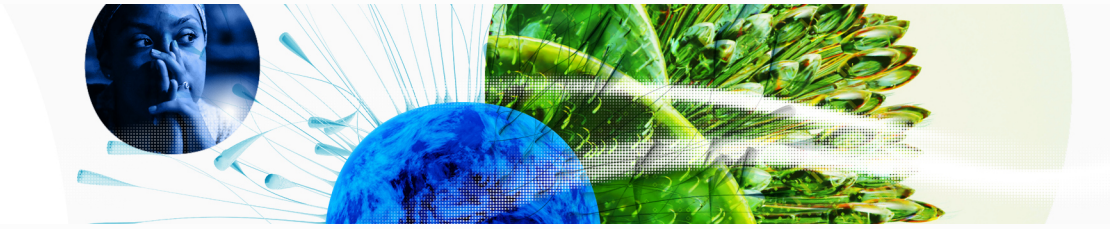
The bubble chart below shows the relationship between income levels (GDP per capita) and innovation performance (GII score). The trend line gives an indication of the expected innovation performance according to income level. Economies appearing above the trend line are performing better than expected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

> Ireland is an innovation leader, ranking in the top 25 of the GII.

> Innovation overperformers relative to their economic development



Global Innovation Index 2023

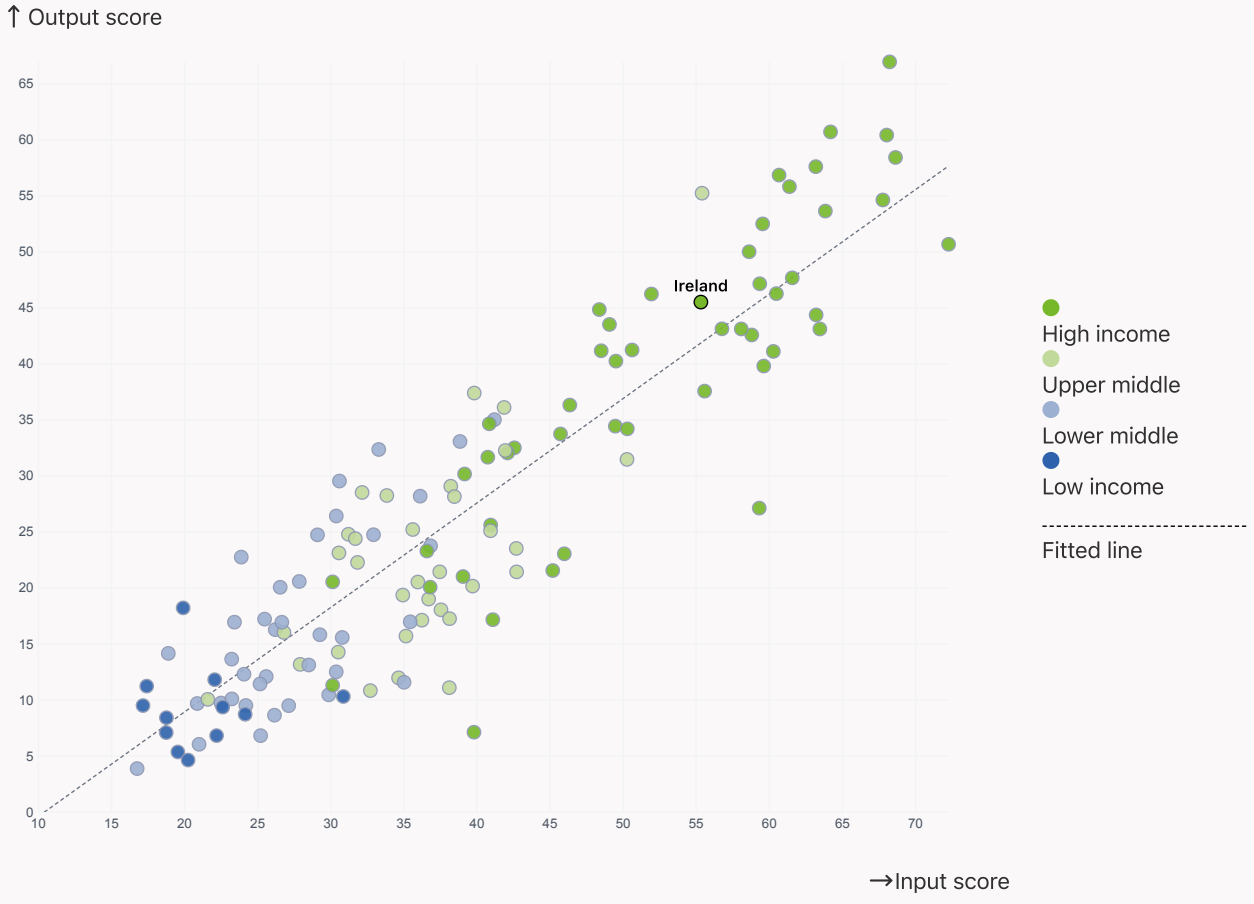


→ Effectively translating innovation investments into innovation outputs

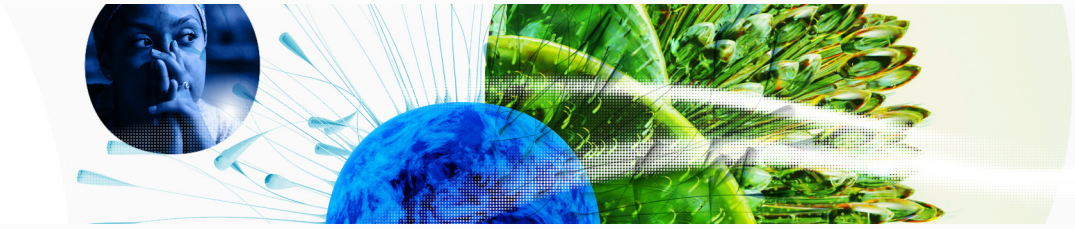
The chart below shows the relationship between innovation inputs and innovation outputs. Economies above the line are effectively translating costly innovation investments into more and higher-quality outputs.

> Ireland produces more innovation outputs relative to its level of innovation investments.

> Relationship between innovation inputs and outputs

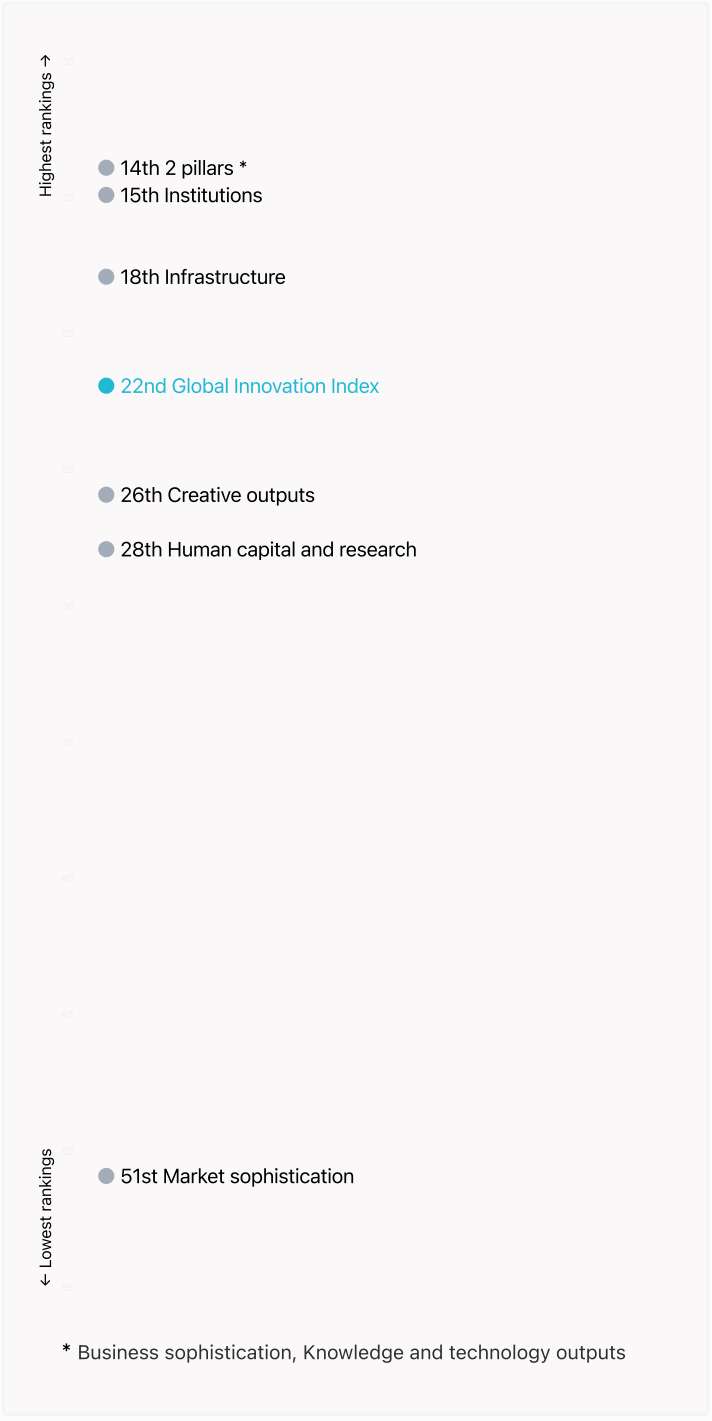


Global Innovation Index 2023



→ Overview of Ireland'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 Ireland are those that rank above the GII (shown in blue) and the weakest are those that rank below.



> Highest rankings

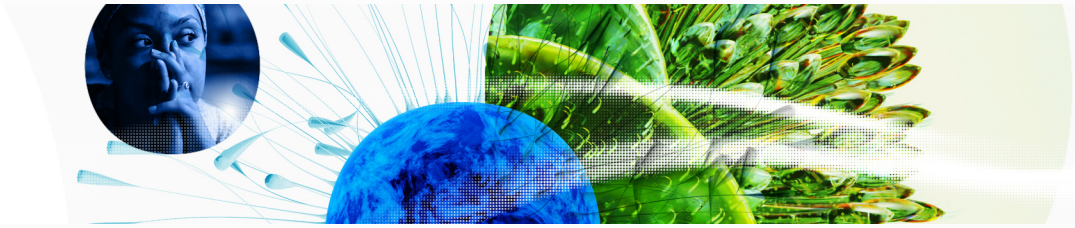
Ireland ranks highest in Business sophistication, Knowledge and technology outputs (14th), Institutions (15th) and Infrastructure (18th).

> Lowest rankings

Ireland ranks lowest in Market sophistication (51st), Human capital and research (28th) and Creative outputs (26th).

The full WIPO Intellectual Property Statistics profile for Ireland can be found on this link.

Global Innovation Index 2023



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

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

> High-Income economies

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

> Europe

Ireland performs above the regional average in Knowledge and technology outputs, Creative outputs, Business sophistication, Human capital and research, Infrastructure, Institutions.

Knowledge and technology outputs

- Top 10 | Score: 58.96
- Ireland | Score: 46.84
- Europe | Score: 38.80
- High income | Score: 38.62

Creative outputs

- Top 10 | 56.09
- Ireland | 44.11
- High income | 40.27
- Europe | 39.87

Business sophistication

- Top 10 | 64.39
- Ireland | 57.01
- High income | 46.38
- Europe | 44.61

Market sophistication

- Top 10 | 61.93
- High income | 46.42
- Europe | 43.65
- Ireland | 37.88

Human capital and research

- Top 10 | 60.28
- High income | 46.30
- Ireland | 45.23
- Europe | 44.05

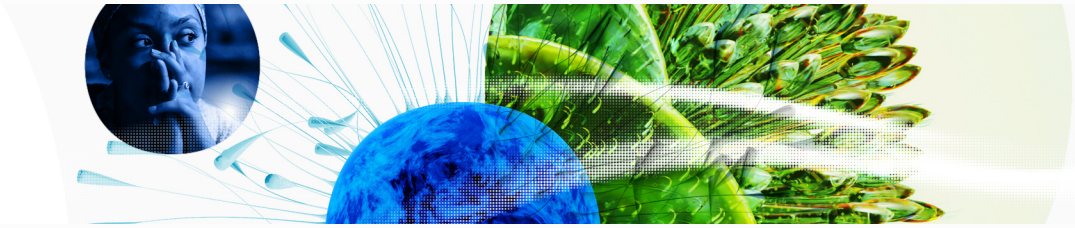
Infrastructure

- Top 10 | 62.83
- Ireland | 59.23
- High income | 55.85
- Europe | 54.69

Institutions

- Top 10 | 79.85
- Ireland | 77.45
- High income | 68.16
- Europe | 61.69

Global Innovation Index 2023



→ Innovation strengths and weaknesses in Ireland

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

> Ireland's main innovation strengths are **GDP/unit of energy use** (rank 1), **ICT services exports, % total trade** (rank 1) and **Intellectual property payments, % total trade** (rank 1).

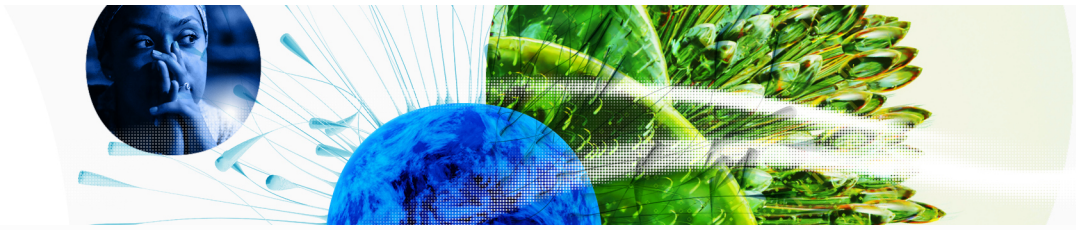
Strengths

Rank	Code	Indicator name
1	3.3.1	GDP/unit of energy use
1	6.3.4	ICT services exports, % total trade
1	5.3.1	Intellectual property payments, % total trade
4	5.1.5	Females employed w/advanced degrees, %
5	7.1.1	Intangible asset intensity, top 15, %
6	7.2.2	National feature films/mn pop. 15-69
8	5.1.2	Firms offering formal training, %
9	2.1.3	School life expectancy, years
10	6.3.1	Intellectual property receipts, % total trade

Weaknesses

Rank	Code	Indicator name
102	6.2.1	Labor productivity growth, %
98	2.1.1	Expenditure on education, % GDP
93	4.1.2	Domestic credit to private sector, % GDP
88	2.1.2	Government funding/pupil, secondary, % GDP/cap
88	5.3.2	High-tech imports, % total trade
65	6.3.5	ISO 9001 quality/bn PPP$ GDP
64	7.1.4	Industrial designs by origin/bn PPP$ GDP
45	6.1.3	Utility models by origin/bn PPP$ GDP
41	4.2.1	Market capitalization, % GDP

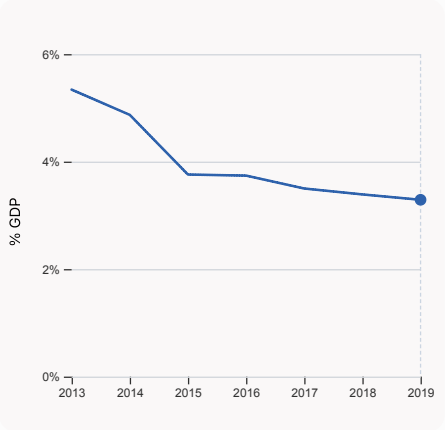
Global Innovation Index 2023



→ Ireland's innovation system

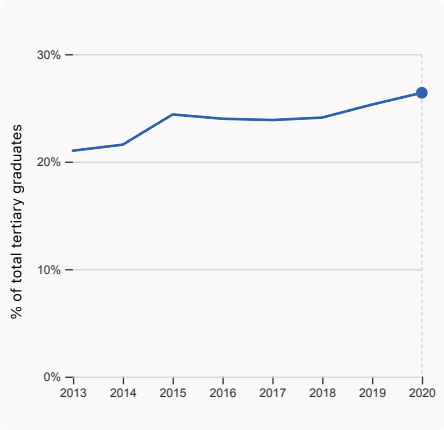
As far as practicable, the plots below present unscaled indicator data.

> Innovation inputs in Ireland



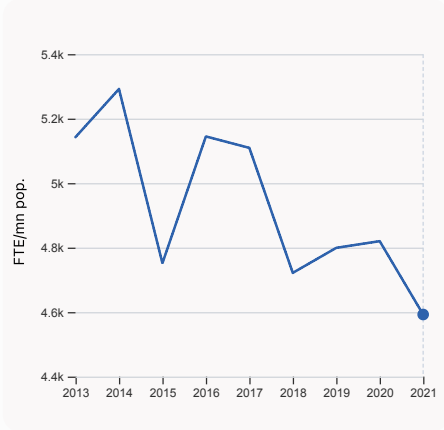
2.1.1 Expenditure on education, % GDP

was equal to 3.29% GDP in 2019, down by 0.1 percentage points from the year prior – and equivalent to an indicator rank of 98.



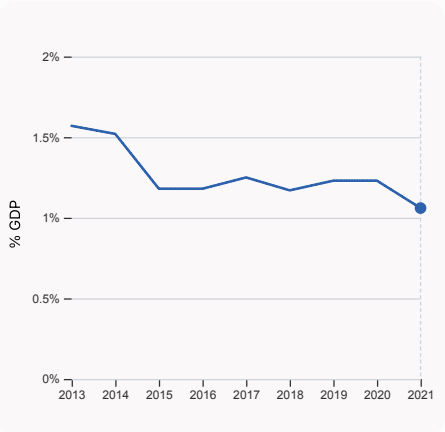
2.2.2 Graduates in science and engineering, %

was equal to 26.41% of total tertiary graduates in 2020, up by 1.1 percentage points from the year prior – and equivalent to an indicator rank of 36.



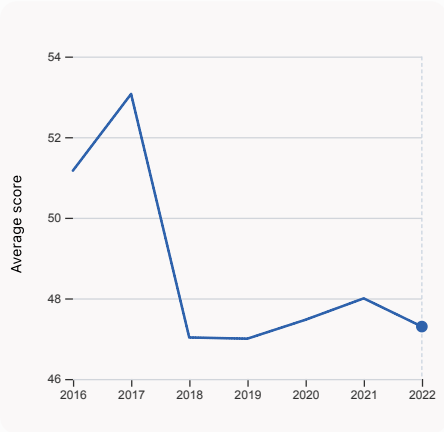
2.3.1 Researchers, FTE/mn pop.

was equal to 4,592.59 FTE/mn pop. in 2021, down by 4.72% from the year prior – and equivalent to an indicator rank of 21.



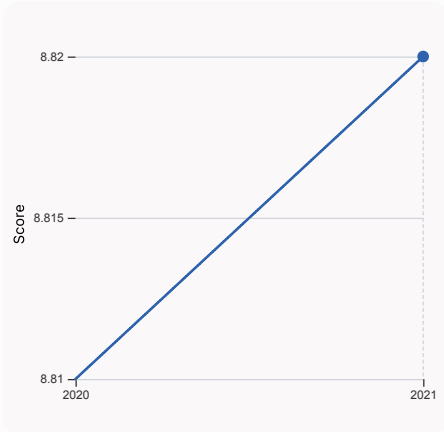
2.3.2 Gross expenditure on R&D, % GDP

was equal to 1.06% GDP in 2021, down by 0.17 percentage points from the year prior – and equivalent to an indicator rank of 38.



2.3.4 QS university ranking, top 3

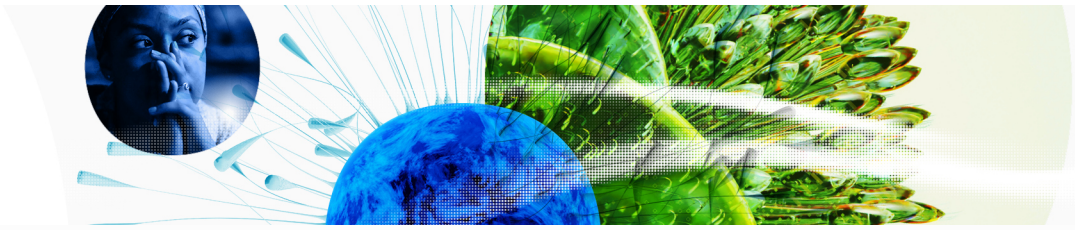
was equal to an average score of 47.3 for the top 3 universities in 2022, down by 1.46% from the year prior – and equivalent to an indicator rank of 23.

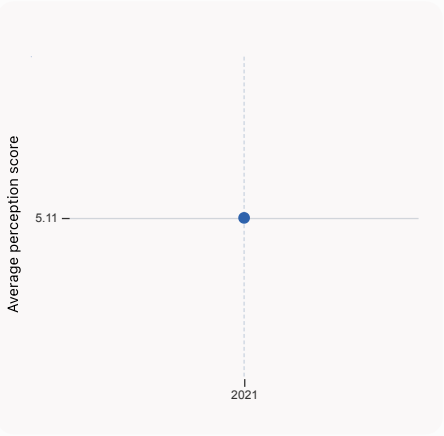


3.1.1 ICT access

was equal to a score of 8.82 in 2021, up by 0.11% from the year prior – and equivalent to an indicator rank of 65.

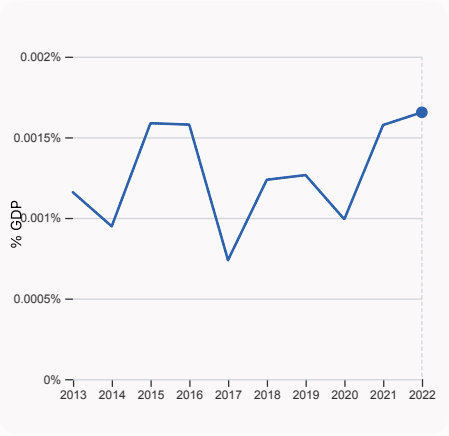
Global Innovation Index 2023





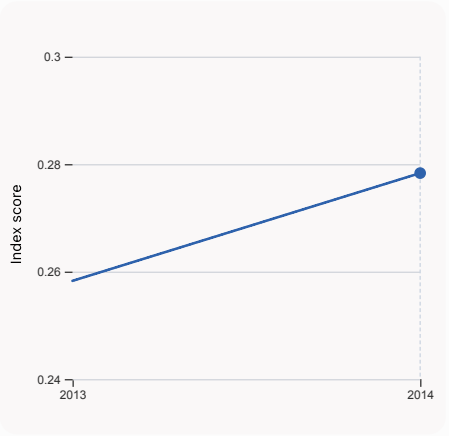
4.1.1 Finance for startups and scaleups

was equal to an average perception score of 5.11 in 2021, equivalent to an indicator rank of 30.



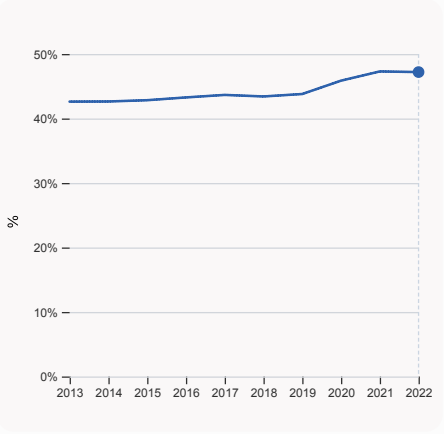
4.2.4 VC received, value, % GDP

was equal to 0.00165% GDP in 2022, up by 0.000079 percentage points from the year prior – and equivalent to an indicator rank of 42.



4.3.2 Domestic industry diversification

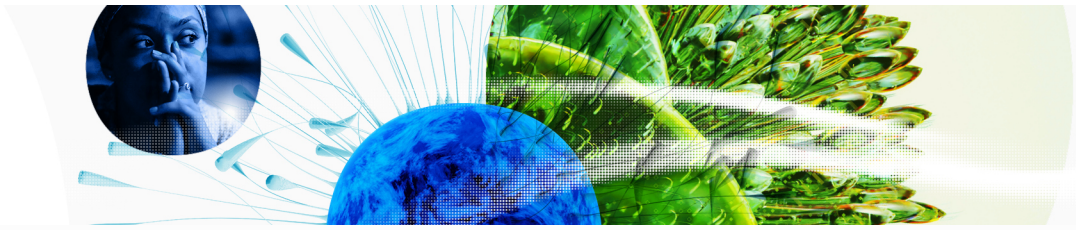
was equal to an index score of 0.278 in 2014, up by 7.76% from the year prior – and equivalent to an indicator rank of 92.



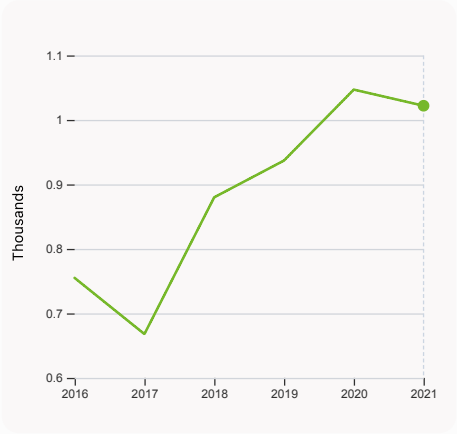
5.1.1 Knowledge-intensive employment, %

was equal to 47.2% in 2022, down by 0.1 percentage points from the year prior – and equivalent to an indicator rank of 16.

Global Innovation Index 2023

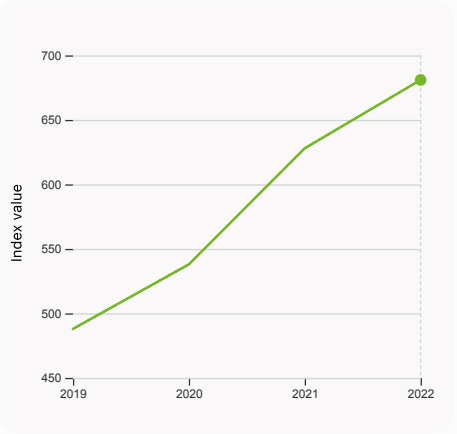


> Innovation outputs in Ireland



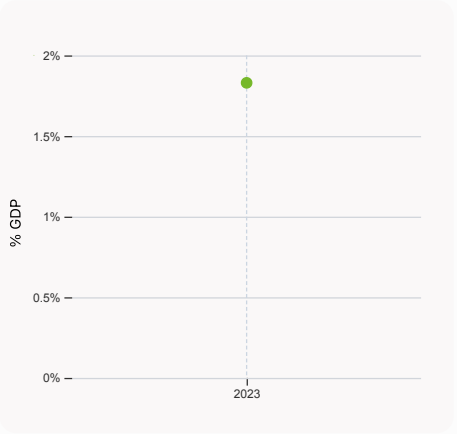
6.1.1 Patents by origin

was equal to 1.022 Thousands in 2021, down by 2.39% from the year prior – and equivalent to an indicator rank of 38.



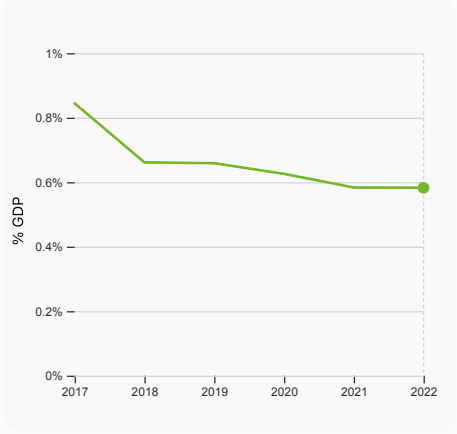
6.1.5 Citable documents H-index

was equal to an index value of 681 in 2022, up by 8.44% from the year prior – and equivalent to an indicator rank of 28.



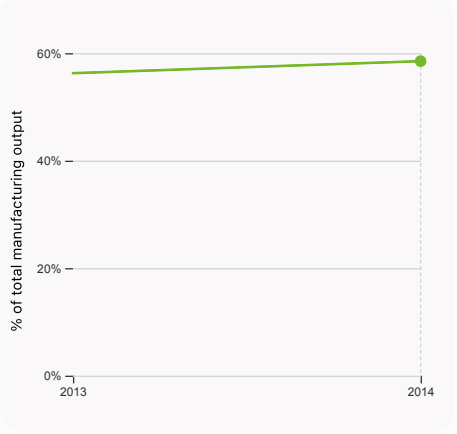
6.2.2 Unicorn valuation, % GDP

was equal to 1.83 % GDP in 2023 – and equivalent to an indicator rank of 23.



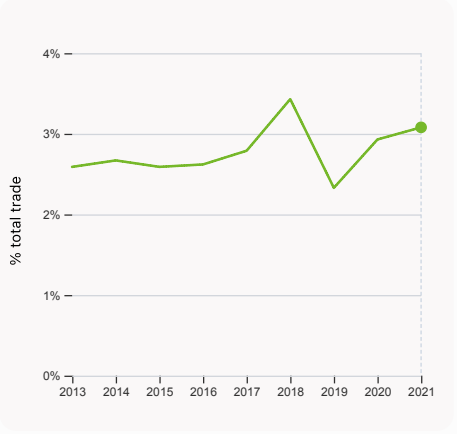
6.2.3 Software spending, % GDP

was equal to 0.583% GDP in 2022, down by 0.00086 percentage points from the year prior – and equivalent to an indicator rank of 17.



6.2.4 High-tech manufacturing, %

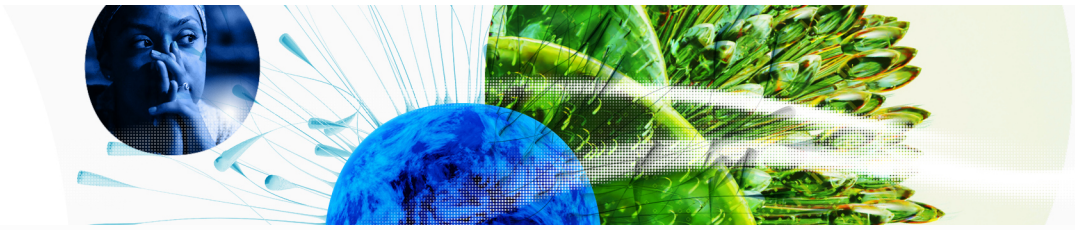
was equal to 58.52% of total manufacturing output in 2014, up by 2.24 percentage points from the year prior – and equivalent to an indicator rank of 6.



6.3.1 Intellectual property receipts, % total trade

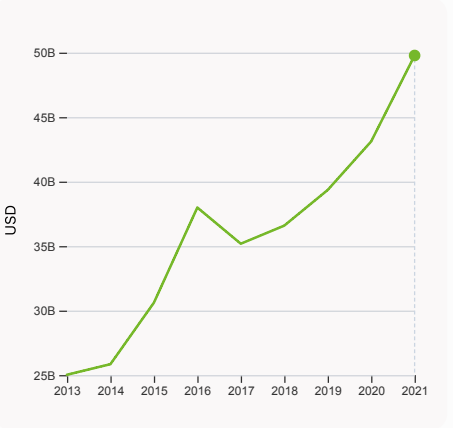
was equal to 3.08% total trade in 2021, up by 0.15 percentage points from the year prior – and equivalent to an indicator rank of 10.

Global Innovation Index 2023



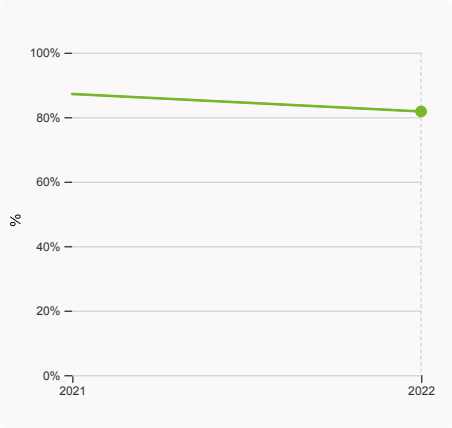
6.3.2 Production and export complexity

was equal to a score of 1.35 in 2020, up by with no change from the year prior – and equivalent to an indicator rank of 15.



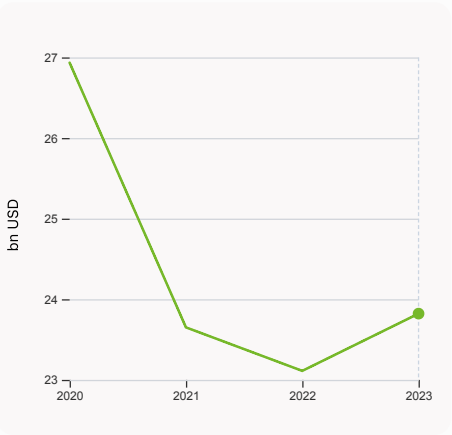
6.3.3 High-tech exports

was equal to 49,779,443,539 USD in 2021, up by 15.45% from the year prior – and equivalent to an indicator rank of 21.



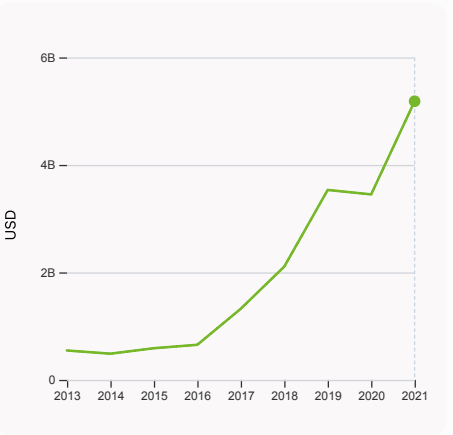
7.1.1 Intangible asset intensity, top 15, %

was equal to 81.76% in 2022, down by 5.42 percentage points from the year prior – and equivalent to an indicator rank of 5.



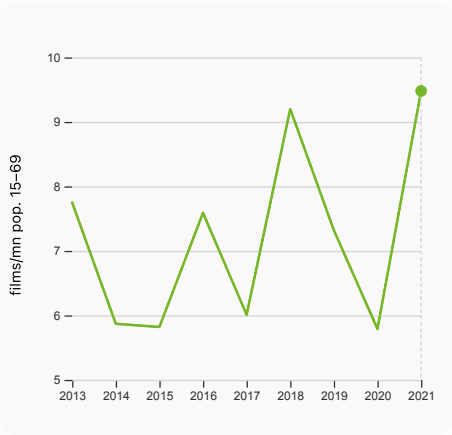
7.1.3 Global brand value, top 5,000

was equal to 23.822 bn USD in 2023, up by 3.072% from the year prior – and equivalent to an indicator rank of 37.



7.2.1 Cultural and creative services exports

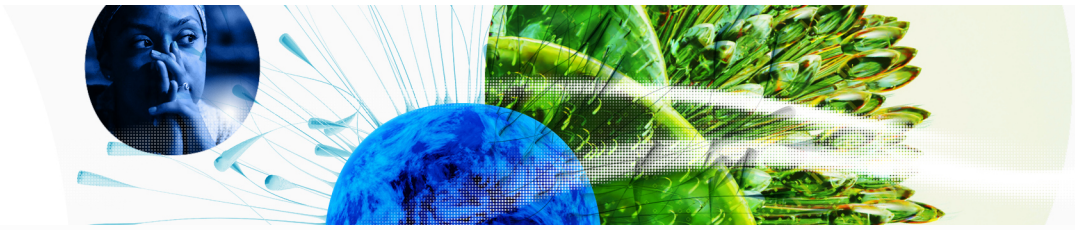
was equal to 5,184,627,000 USD in 2021, up by 50.22% from the year prior – and equivalent to an indicator rank of 35.

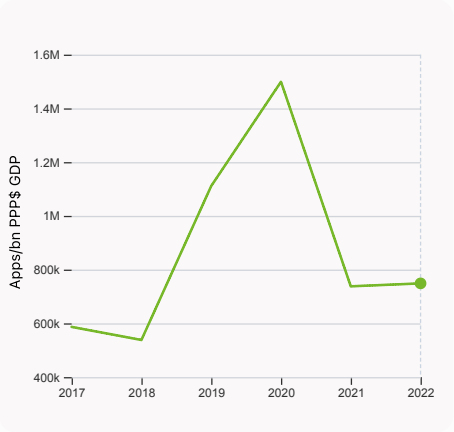


7.2.2 National feature films/mn pop. 15-69

was equal to 9.48 films/mn pop. 15–69 in 2021, up by 63.73% from the year prior – and equivalent to an indicator rank of 6.

Global Innovation Index 2023

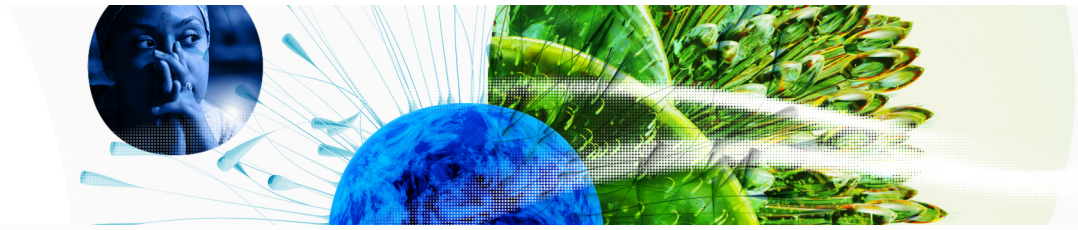




7.3.4 Mobile app creation/bn PPP$ GDP

was equal to 748,809.84 Apps/bn PPP$ GDP in 2022, up by 1.48% from the year prior – and equivalent to an indicator rank of 29.

Global Innovation Index 2023



→ Ireland's innovation top performers

> 2.3.3 Global corporate R&D investors from Ireland

Rank	Firm	Industry	R&D	R&D Growth	R&D Intensity
			[mn EUR]	[%]	[%]
73	MEDTRONIC PUBLIC LIMITED	Health Care Equipment & Services	2,425	10	9
200	ACCENTURE	Support Services	987	28	2
236	SEAGATE TECHNOLOGY	Technology Hardware & Equipment	816	2	9
341	EATON CORPORATION	Electronic & Electrical Equipment	544	12	3

Source: European Commission's Joint Research Centre (https://iri.jrc.ec.europa.eu/scoreboard/2022-eu-industrial-rd-investment-scoreboard).
Note: European Commission's Joint Research Centre ranks the top 2,500 firms by R&D investment annually.

> 2.3.4 QS university ranking of Ireland's top universities

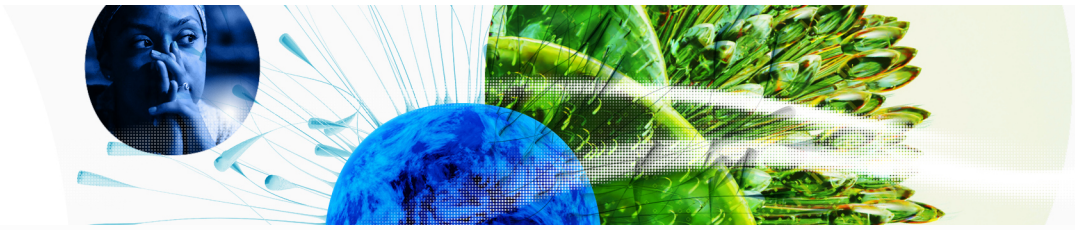
Rank	University	Score
98	TRINITY COLLEGE DUBLIN (TCD)	59.10
181	UNIVERSITY COLLEGE DUBLIN (UCD)	45.60
270	NATIONAL UNIVERSITY OF IRELAND, GALWAY (NUIG)	37.20

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 Ireland

Rank	Unicorn Company	Industry	City	Valuation, bn USD
1	BROWSERSTACK	Internet software & services	Dublin	4
2	WAYFLYER	Fintech	Dublin	2
3	FLIPDISH	Internet software & services	Dublin	1

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 Ireland

Rank	Firm	Intensity, %
1	ACCENTURE PLC	94.02
2	TRANE TECHNOLOGIES PLC	97.04
3	EXPERIAN PLC	100.75

Source: Brand Finance (https://brandirectory.com/reports/gift-2022).
Note: Brand Finance only provides within economy ranks.

> 7.1.3 Top 5,000 companies in Ireland with highest global brand value

Rank	Brand	Industry	Brand Value, mn USD
1	GUINNESS	Beers	2,505.5
2	RYANAIR	Airlines	2,372.0
3	PRIMARK / PENNEY'S	Apparel	2,146.8

Source: Brand Finance (https://brandirectory.com).
Note: Rank corresponds to within economy ranks.

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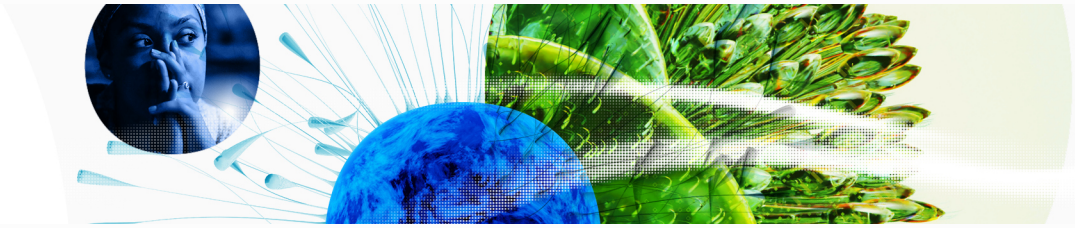

Ireland

GII 2023 rank **22**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
18	26	High	EUR	5.0	666.3	131,034.1

	Score / Value	Rank	
Institutions	**77.4**	**15**	
1.1 Institutional environment	**75.6**	**16**	
1.1.1 Operational stability for businesses*	72.9	20	
1.1.2 Government effectiveness*	78.3	14	
1.2 Regulatory environment	**85.5**	**18**	
1.2.1 Regulatory quality*	82.6	14	
1.2.2 Rule of law*	84.5	16	
1.2.3 Cost of redundancy dismissal	14.3	55	
1.3 Business environment	**71.2**	**22**	
1.3.1 Policies for doing business†	78.5	12	
1.3.2 Entrepreneurship policies and culture†	63.9	19	
Human capital and research	**45.2**	**28**	◇
2.1 Education	**47.2**	**75**	◇
2.1.1 Expenditure on education, % GDP	3.3	98	○ ◇
2.1.2 Government funding/pupil, secondary, % GDP/cap	11.6	88	○ ◇
2.1.3 School life expectancy, years	18.8	9	●
2.1.4 PISA scales in reading, maths and science	504.6	10	
2.1.5 Pupil-teacher ratio, secondary	n/a	n/a	
2.2 Tertiary education	**41.8**	**29**	
2.2.1 Tertiary enrolment, % gross	74.7	28	
2.2.2 Graduates in science and engineering, %	26.4	36	
2.2.3 Tertiary inbound mobility, %	10.2	27	
2.3 Research and development (R&D)	**46.7**	**21**	
2.3.1 Researchers, FTE/mn pop.	4,592.6	21	
2.3.2 Gross expenditure on R&D, % GDP	1.1	38	◇
2.3.3 Global corporate R&D investors, top 3, mn US$	72.4	12	
2.3.4 QS university ranking, top 3*	47.9	23	
Infrastructure	**59.2**	**18**	
3.1 Information and communication technologies (ICTs)	**78.3**	**42**	◇
3.1.1 ICT access*	82.4	65	◇
3.1.2 ICT use*	87.7	27	◇
3.1.3 Government's online service*	75.6	45	◇
3.1.4 E-participation*	67.4	47	◇
3.2 General infrastructure	**40.4**	**31**	
3.2.1 Electricity output, GWh/mn pop.	6,302.1	31	
3.2.2 Logistics performance*	68.2	25	◇
3.2.3 Gross capital formation, % GDP	24.7	59	
3.3 Ecological sustainability	**59.0**	**4**	
3.3.1 GDP/unit of energy use	36.3	1	●
3.3.2 Environmental performance*	65.3	24	
3.3.3 ISO 14001 environment/bn PPP$ GDP	1.5	56	
Market sophistication	**37.9**	**51**	◇
4.1 Credit	**36.1**	**48**	◇
4.1.1 Finance for startups and scaleups†	61.6	30	
4.1.2 Domestic credit to private sector, % GDP	32.4	93	○ ◇
4.1.3 Loans from microfinance institutions, % GDP	n/a	n/a	
4.2 Investment	**18.5**	**38**	◇
4.2.1 Market capitalization, % GDP	37.4	41	○ ◇
4.2.2 Venture capital (VC) investors, deals/bn PPP$ GDP	0.3	22	
4.2.3 VC recipients, deals/bn PPP$ GDP	0.1	28	
4.2.4 VC received, value, % GDP	0.0	42	◇
4.3 Trade, diversification, and market scale	**59.0**	**61**	
4.3.1 Applied tariff rate, weighted avg., %	1.5	20	
4.3.2 Domestic industry diversification	72.4	92	
4.3.3 Domestic market scale, bn PPP$	666.3	39	

	Score / Value	Rank	
Business sophistication	**57.0**	**14**	
5.1 Knowledge workers	**68.3**	**8**	
5.1.1 Knowledge-intensive employment, %	47.2	16	
5.1.2 Firms offering formal training, %	59.8	8	●
5.1.3 GERD performed by business, % GDP	0.8	29	
5.1.4 GERD financed by business, %	62.8	10	
5.1.5 Females employed w/advanced degrees, %	29.5	4	●
5.2 Innovation linkages	**48.3**	**21**	
5.2.1 University-industry R&D collaboration†	78.6	15	
5.2.2 State of cluster development†	63.6	34	
5.2.3 GERD financed by abroad, % GDP	0.2	26	
5.2.4 Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	23	
5.2.5 Patent families/bn PPP$ GDP	2.3	18	
5.3 Knowledge absorption	**54.5**	**12**	
5.3.1 Intellectual property payments, % total trade	20.4	1	●
5.3.2 High-tech imports, % total trade	6.9	88	○
5.3.3 ICT services imports, % total trade	1.7	52	
5.3.4 FDI net inflows, % GDP	4.2	29	
5.3.5 Research talent, % in businesses	45.5	31	
Knowledge and technology outputs	**46.8**	**14**	
6.1 Knowledge creation	**23.9**	**43**	◇
6.1.1 Patents by origin/bn PPP$ GDP	1.8	38	◇
6.1.2 PCT patents by origin/bn PPP$ GDP	1.2	22	◇
6.1.3 Utility models by origin/bn PPP$ GDP	0.2	45	○
6.1.4 Scientific and technical articles/bn PPP$ GDP	n/a	n/a	
6.1.5 Citable documents H-index	35.5	28	
6.2 Knowledge impact	**51.3**	**11**	
6.2.1 Labor productivity growth, %	-0.1	102	○
6.2.2 Unicorn valuation, % GDP	1.8	23	
6.2.3 Software spending, % GDP	0.6	17	
6.2.4 High-tech manufacturing, %	58.5	6	
6.3 Knowledge diffusion	**65.3**	**3**	
6.3.1 Intellectual property receipts, % total trade	2.8	10	●
6.3.2 Production and export complexity	80.8	15	
6.3.3 High-tech exports, % total trade	8.7	21	
6.3.4 ICT services exports, % total trade	35.2	1	●
6.3.5 ISO 9001 quality/bn PPP$ GDP	3.8	65	○
Creative outputs	**44.1**	**26**	
7.1 Intangible assets	**43.8**	**36**	
7.1.1 Intangible asset intensity, top 15, %	81.8	5	●
7.1.2 Trademarks by origin/bn PPP$ GDP	n/a	n/a	
7.1.3 Global brand value, top 5,000	4.3	37	◇
7.1.4 Industrial designs by origin/bn PPP$ GDP	1.1	64	○
7.2 Creative goods and services	**36.0**	**20**	
7.2.1 Cultural and creative services exports, % total trade	0.9	35	
7.2.2 National feature films/mn pop. 15-69	9.5	6	●
7.2.3 Entertainment and media market/th pop. 15-69	51.8	14	
7.2.4 Creative goods exports, % total trade	1.1	45	
7.3 Online creativity	**52.9**	**21**	
7.3.1 Generic top-level domains (TLDs)/th pop. 15-69	56.0	15	
7.3.2 Country-code TLDs/th pop. 15-69	27.7	25	
7.3.3 GitHub commits/mn pop. 15-69	53.3	18	
7.3.4 Mobile app creation/bn PPP$ GDP	74.4	29	

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.

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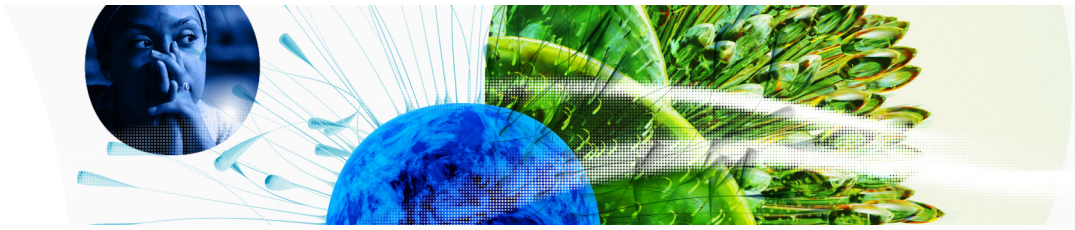

→ Data availability

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

> Ireland has missing data for three indicators and outdated data for eight indicators.

> Missing data for Ireland

Code	Indicator name	Economy Year	Model Year	Source
2.1.5	Pupil-teacher ratio, secondary	n/a	2020	UNESCO Institute for Statistics
4.1.3	Loans from microfinance institutions, % GDP	n/a	2021	International Monetary Fund, Financial Access Survey (FAS)
7.1.2	Trademarks by origin/bn PPP$ GDP	n/a	2021	World Intellectual Property Organization; International Monetary Fund

> Outdated data for Ireland

Code	Indicator name	Economy Year	Model Year	Source
1.3.2	Entrepreneurship policies and culture	2021	2022	Global Entrepreneurship Monitor
2.1.1	Expenditure on education, % GDP	2019	2021	UNESCO Institute for Statistics
4.1.1	Finance for startups and scaleups	2021	2022	Global Entrepreneurship Monitor
4.2.1	Market capitalization, % GDP	2018	2020	World Federation of Exchanges; World Bank
4.3.2	Domestic industry diversification	2014	2020	United Nations Industrial Development Organization
5.1.4	GERD financed by business, %	2019	2020	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
5.2.3	GERD financed by abroad, % GDP	2019	2020	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
6.2.4	High-tech manufacturing, %	2014	2020	United Nations Industrial Development Organization

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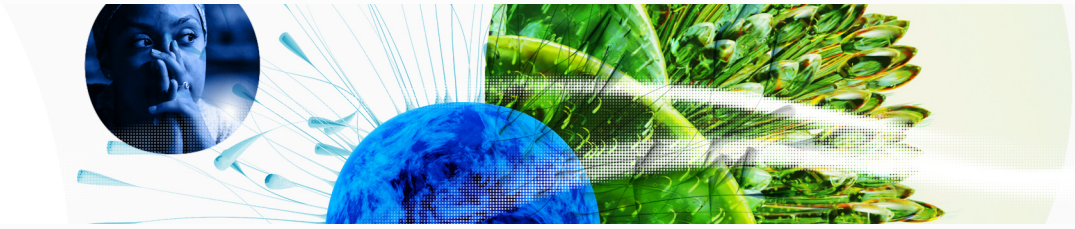

About the Global Innovation Index

- 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.

Source: Global Innovation Index Database, WIPO, 2023.

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.