Global Innovation Index 2022

# UNITED KINGDOM

**4th** The United Kingdom ranks 4th 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 the United Kingdom 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 the United Kingdom in the GII 2022 is between ranks 4 and 4.

## Rankings for the United Kingdom (2020–2022)

| GIIYR | GII | Innovation inputs | Innovation outputs |
|---|---|---|---|
| **2020** | 4 | 6 | 3 |
| **2021** | 4 | 7 | 6 |
| **2022** | 4 | 7 | 3 |

- The United Kingdom performs better in innovation outputs than innovation inputs in 2022.
- This year the United Kingdom ranks 7th in innovation inputs, the same as last year but lower than 2020.
- As for innovation outputs, the United Kingdom ranks 3rd. This position is higher than last year but the same as 2020.

**4th** The United Kingdom ranks 4th among the 48 high-income group economies.

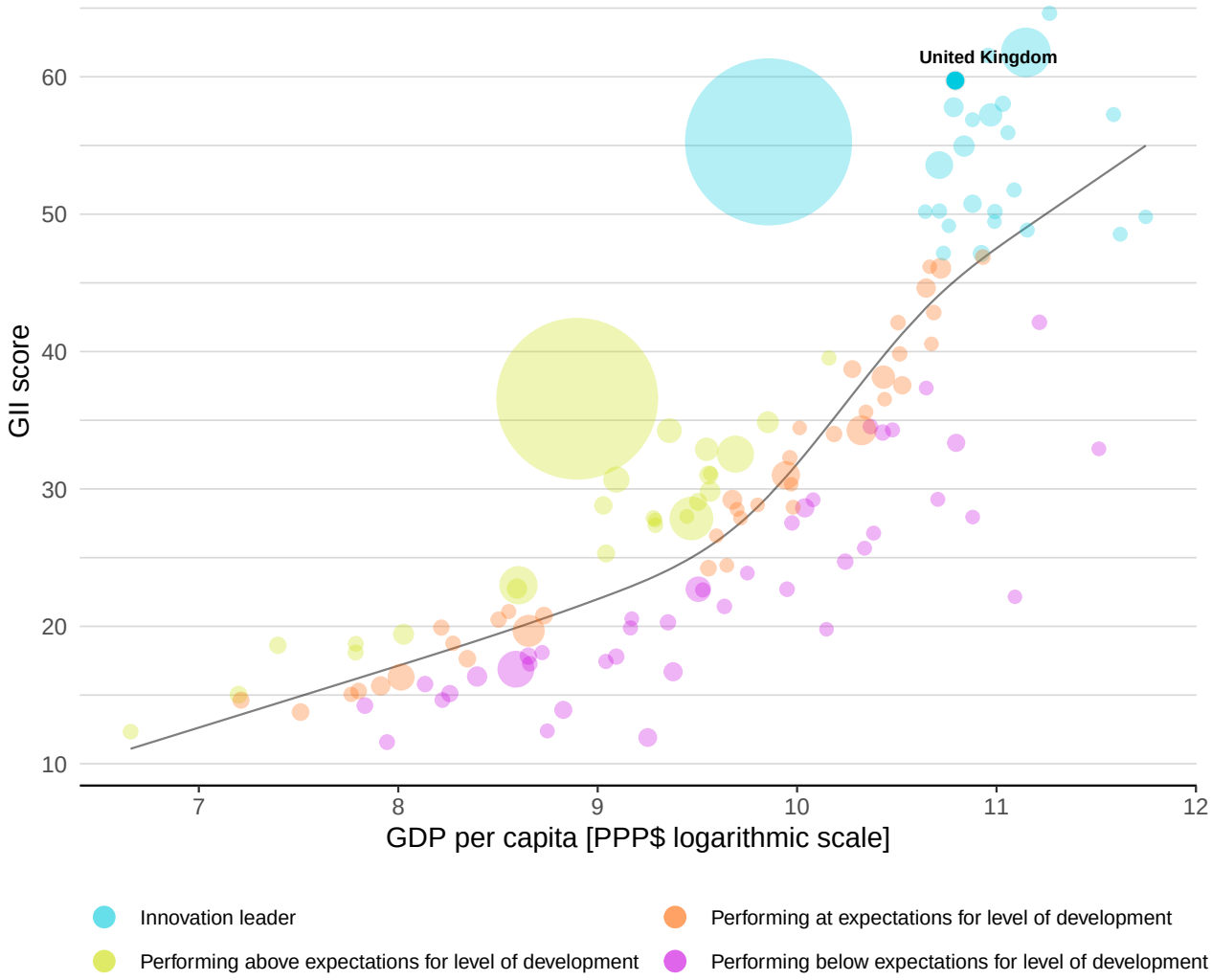
**3rd** The United Kingdom ranks 3rd among the 39 economies in Europe.

# 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, the United Kingdom's performance is above expectations for its level of development.

## The positive relationship between innovation and development

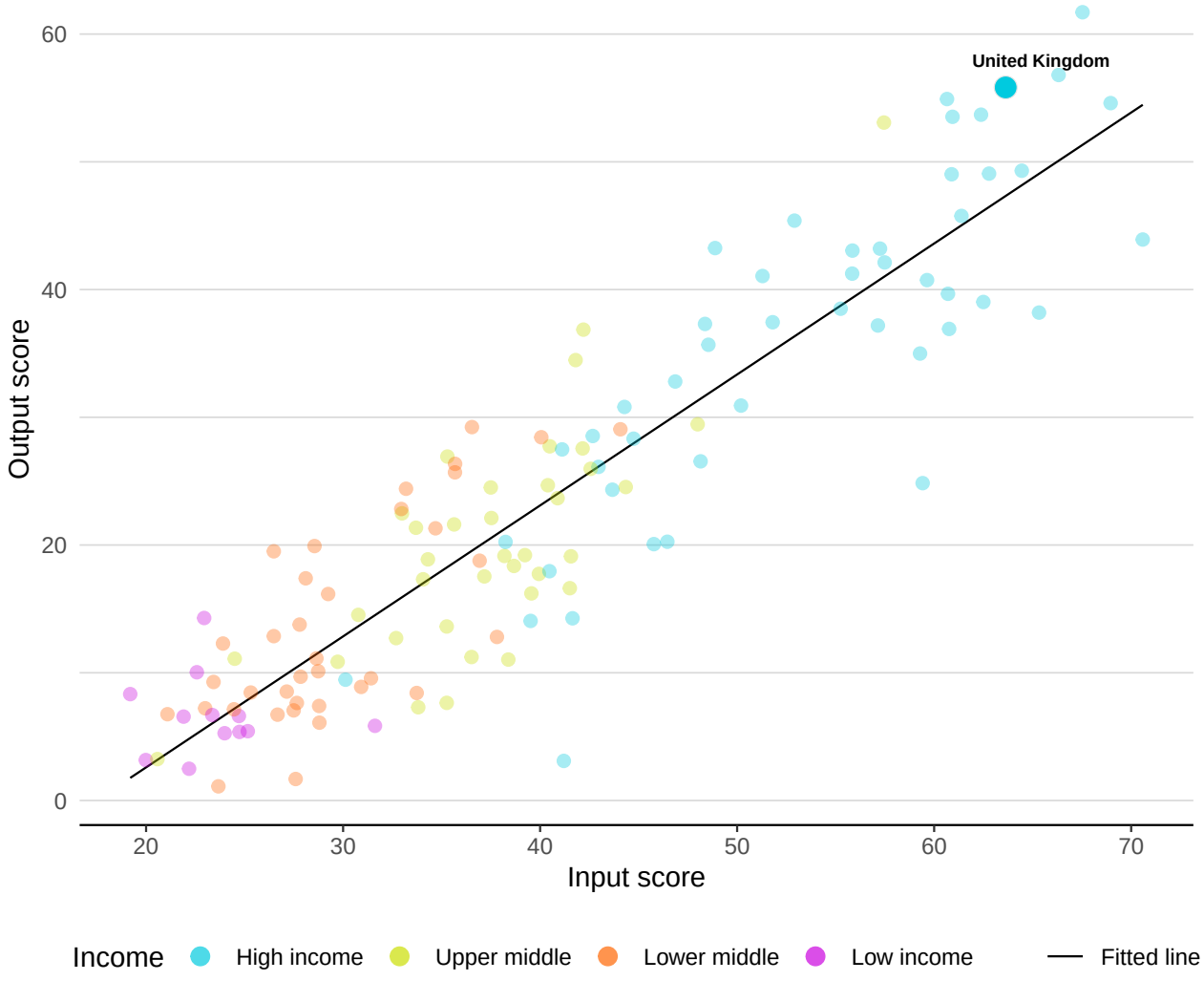


# EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

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.

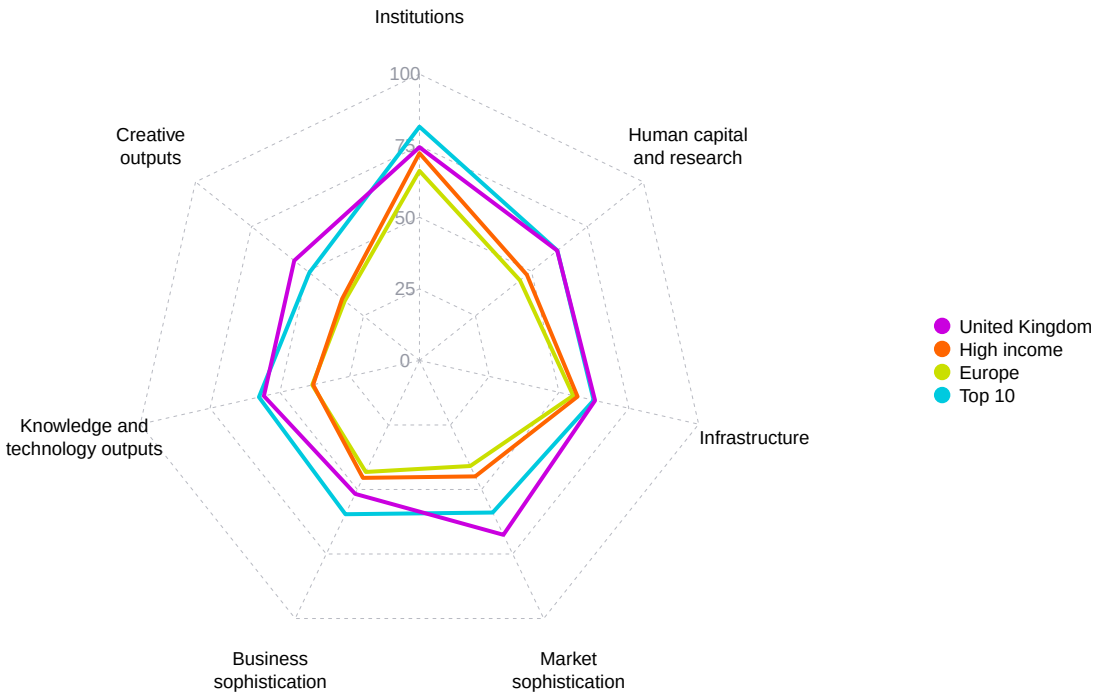
The United Kingdom produces more innovation outputs relative to its level of innovation investments.

## Innovation input to output performance



# BENCHMARKING AGAINST OTHER HIGH-INCOME GROUP ECONOMIES AND EUROPE

## The seven GII pillar scores for the United Kingdom




### High-income group economies

The United Kingdom performs above the high-income group average in all GII pillars.

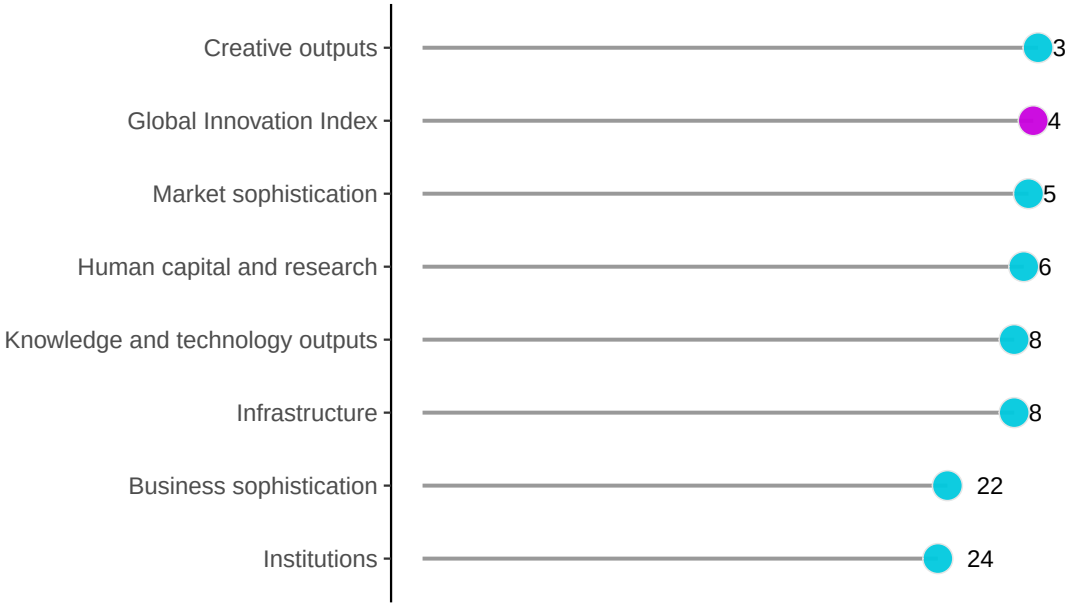
### Europe

The United Kingdom performs above the regional average in all GII pillars.

# OVERVIEW OF RANKINGS IN THE SEVEN GII 2022 AREAS

The United Kingdom performs best in Creative outputs and its weakest performance is in Institutions.

## The seven GII pillar ranks for the United Kingdom




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

**The full WIPO Intellectual Property Statistics profile for the United Kingdom can be found at:**

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

# INNOVATION STRENGTHS AND WEAKNESSES

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

## Strengths and weaknesses for the United Kingdom

| Strengths | | | Weaknesses | | |
|---|---|---|---|---|---|
| **Code** | **Indicator name** | **Rank** | **Code** | **Indicator name** | **Rank** |
| 2.3.4 | QS university ranking, top 3 | 2 | 1.3.2 | Entrepreneurship policies and culture | 30 |
| 3.1.2 | ICT use | 5 | 2.1.2 | Government funding/pupil, secondary, % GDP/cap | 40 |
| 3.1.3 | Government's online service | 6 | 2.1.5 | Pupil-teacher ratio, secondary | 82 |
| 3.3.2 | Environmental performance | 2 | 3.2.1 | Electricity output, GWh/mn pop. | 47 |
| 4.2.3 | Venture capital recipients, deals/bn PPP$ GDP | 6 | 3.2.3 | Gross capital formation, % GDP | 109 |
| 6.1.5 | Citable documents H-index | 1 | 5.3.3 | ICT services imports, % total trade | 54 |
| 6.2.2 | New businesses/th pop. 15–64 | 3 | 5.3.4 | FDI net inflows, % GDP | 119 |
| 7.1.1 | Intangible asset intensity, top 15, % | 4 | 5.3.5 | Research talent, % in businesses | 32 |
| 7.1.3 | Global brand value, top 5,000, % GDP | 7 | 6.2.1 | Labor productivity growth, % | 83 |
| 7.2.1 | Cultural and creative services exports, % total trade | 6 | 7.2.2 | National feature films/mn pop. 15–69 | 31 |

GII 2022 rank

# United Kingdom

4

| Output rank | Input rank | Income | Region | Population (mn) | GDP, PPP$ (bn) | GDP per capita, PPP$ |
|---|---|---|---|---|---|---|
| 3 | 7 | High | EUR | 68.2 | 3,276.1 | 48,693 |

| | | Score/ Value | Rank | |
|---|---|---|---|---|
| **Institutions** | | **74.5** | **24** | |
| **1.1** | **Political environment** | 76.9 | 28 | ◇ |
| 1.1.1 | Political and operational stability* | 74.5 | 42 | ◇ |
| 1.1.2 | Government effectiveness* | 79.4 | 19 | |
| **1.2** | **Regulatory environment** | 90.4 | 11 | |
| 1.2.1 | Regulatory quality* | 81.9 | 15 | |
| 1.2.2 | Rule of law* | 84.9 | 18 | |
| 1.2.3 | Cost of redundancy dismissal | 9.3 | 24 | |
| **1.3** | **Business environment** | 56.0 | 43 | ◇ |
| 1.3.1 | Policies for doing business† | 59.3 | 41 | ◇ |
| 1.3.2 | Entrepreneurship policies and culture* | 52.7 | 30 ○ | |
| **Human capital and research** | | **61.5** | **6 ●** | |
| **2.1** | **Education** | 59.7 | 40 | |
| 2.1.1 | Expenditure on education, % GDP | 5.2 | 36 | |
| 2.1.2 | Government funding/pupil, secondary, % GDP/cap | 21.7 | 40 ○ | |
| 2.1.3 | School life expectancy, years | 17.3 | 16 | |
| 2.1.4 | PISA scales in reading, maths and science | 503.5 | 12 | |
| 2.1.5 | Pupil-teacher ratio, secondary | 16.9 | 82 ○ ◇ | |
| **2.2** | **Tertiary education** | 49.7 | 11 | |
| 2.2.1 | Tertiary enrolment, % gross | 65.8 | 43 | |
| 2.2.2 | Graduates in science and engineering, % | 26.2 | 33 | |
| 2.2.3 | Tertiary inbound mobility, % | 18.7 | 8 | |
| **2.3** | **Research and development (R&D)** | 75.1 | 6 ● | |
| 2.3.1 | Researchers, FTE/mn pop. | 4,683.8 | 21 | |
| 2.3.2 | Gross expenditure on R&D, % GDP | 1.7 | 22 | |
| 2.3.3 | Global corporate R&D investors, top 3, mn USD | 84.3 | 8 | |
| 2.3.4 | QS university ranking, top 3* | 98.5 | 2 ● ◆ | |
| **Infrastructure** | | **62.9** | **8** | |
| **3.1** | **Information and communication technologies (ICTs)** | 94.2 | 2 ● ◆ | |
| 3.1.1 | ICT access* | 95.9 | 9 | |
| 3.1.2 | ICT use* | 87.3 | 5 ● ◆ | |
| 3.1.3 | Government's online service* | 95.9 | 6 ● | |
| 3.1.4 | E-participation* | 97.6 | 6 | |
| **3.2** | **General infrastructure** | 44.2 | 29 | |
| 3.2.1 | Electricity output, GWh/mn pop. | 4,633.0 | 47 ○ | |
| 3.2.2 | Logistics performance* | 90.2 | 8 | |
| 3.2.3 | Gross capital formation, % GDP | 17.1 | 109 ○ ◇ | |
| **3.3** | **Ecological sustainability** | 50.3 | 12 | |
| 3.3.1 | GDP/unit of energy use | 17.0 | 14 | |
| 3.3.2 | Environmental performance* | 77.7 | 2 ● ◆ | |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP$ GDP | 4.0 | 24 | |
| **Market sophistication** | | **67.6** | **5 ● ◆** | |
| **4.1** | **Credit** | 51.4 | 16 | |
| 4.1.1 | Finance for startups and scaleups* | 48.3 | 19 | |
| 4.1.2 | Domestic credit to private sector, % GDP | 143.7 | 12 | |
| 4.1.3 | Loans from microfinance institutions, % GDP | n/a | n/a | |
| **4.2** | **Investment** | 63.2 | 9 | |
| 4.2.1 | Market capitalization, % GDP | 125.8 | 9 | |
| 4.2.2 | Venture capital investors, deals/bn PPP$ GDP | 0.5 | 10 | |
| 4.2.3 | Venture capital recipients, deals/bn PPP$ GDP | 0.2 | 6 ● ◆ | |
| 4.2.4 | Venture capital received, value, % GDP | 0.0 | 9 | |
| **4.3** | **Trade, diversification, and market scale** | 88.1 | 6 ● ◆ | |
| 4.3.1 | Applied tariff rate, weighted avg., % | 1.3 | 16 | |
| 4.3.2 | Domestic industry diversification | 98.9 | 7 | |
| 4.3.3 | Domestic market scale, bn PPP$ | 3,276.1 | 10 | ◆ |

| | | Score/ Value | Rank | |
|---|---|---|---|---|
| **Business sophistication** | | **51.7** | **22** | |
| **5.1** | **Knowledge workers** | 62.6 | 18 | |
| 5.1.1 | Knowledge-intensive employment, % | 50.6 | 8 | |
| 5.1.2 | Firms offering formal training, % | n/a | n/a | |
| 5.1.3 | GERD performed by business, % GDP | 1.3 | 17 | |
| 5.1.4 | GERD financed by business, % | 53.6 | 23 | |
| 5.1.5 | Females employed w/advanced degrees, % | 24.1 | 22 | |
| **5.2** | **Innovation linkages** | 52.0 | 14 | |
| 5.2.1 | University-industry R&D collaboration† | 61.4 | 22 | |
| 5.2.2 | State of cluster development and depth† | 59.4 | 28 | |
| 5.2.3 | GERD financed by abroad, % GDP | 0.2 | 13 | |
| 5.2.4 | Joint venture/strategic alliance deals/bn PPP$ GDP | 0.2 | 13 | |
| 5.2.5 | Patent families/bn PPP$ GDP | 2.0 | 18 | |
| **5.3** | **Knowledge absorption** | 40.6 | 34 | ◇ |
| 5.3.1 | Intellectual property payments, % total trade | 1.9 | 15 | |
| 5.3.2 | High-tech imports, % total trade | 10.9 | 28 | |
| 5.3.3 | ICT services imports, % total trade | 1.7 | 54 ○ | |
| 5.3.4 | FDI net inflows, % GDP | 0.1 | 119 ○ | |
| 5.3.5 | Research talent, % in businesses | 41.8 | 32 ○ ◇ | |
| **Knowledge and technology outputs** | | **55.7** | **8** | |
| **6.1** | **Knowledge creation** | 61.9 | 11 | |
| 6.1.1 | Patents by origin/bn PPP$ GDP | 6.0 | 15 | |
| 6.1.2 | PCT patents by origin/bn PPP$ GDP | 1.8 | 19 | |
| 6.1.3 | Utility models by origin/bn PPP$ GDP | n/a | n/a | |
| 6.1.4 | Scientific and technical articles/bn PPP$ GDP | 46.4 | 14 | |
| 6.1.5 | Citable documents H-index | 100.0 | 1 ● ◆ | |
| **6.2** | **Knowledge impact** | 50.8 | 6 ● ◆ | |
| 6.2.1 | Labor productivity growth, % | 0.3 | 83 ○ | |
| 6.2.2 | New businesses/th pop. 15–64 | 18.1 | 3 ● ◆ | |
| 6.2.3 | Software spending, % GDP | 0.6 | 11 | |
| 6.2.4 | ISO 9001 quality certificates/bn PPP$ GDP | 8.9 | 33 | |
| 6.2.5 | High-tech manufacturing, % | 42.6 | 25 | |
| **6.3** | **Knowledge diffusion** | 54.5 | 12 | |
| 6.3.1 | Intellectual property receipts, % total trade | 2.6 | 10 | |
| 6.3.2 | Production and export complexity | 78.0 | 12 | |
| 6.3.3 | High-tech exports, % total trade | 8.0 | 23 | |
| 6.3.4 | ICT services exports, % total trade | 3.5 | 32 | |
| **Creative outputs** | | **55.9** | **3 ● ◆** | |
| **7.1** | **Intangible assets** | 68.3 | 6 ● ◆ | |
| 7.1.1 | Intangible asset intensity, top 15, % | 90.9 | 4 ● ◆ | |
| 7.1.2 | Trademarks by origin/bn PPP$ GDP | 73.9 | 23 | |
| 7.1.3 | Global brand value, top 5,000, % GDP | 169.1 | 7 ● | |
| 7.1.4 | Industrial designs by origin/bn PPP$ GDP | 9.2 | 11 | |
| **7.2** | **Creative goods and services** | 42.3 | 5 ● ◆ | |
| 7.2.1 | Cultural and creative services exports, % total trade | 2.6 | 6 ● | |
| 7.2.2 | National feature films/mn pop. 15–69 | 4.0 | 31 ○ | |
| 7.2.3 | Entertainment and media market/th pop. 15–69 | 62.2 | 6 | |
| 7.2.4 | Printing and other media, % manufacturing | 1.9 | 15 | |
| 7.2.5 | Creative goods exports, % total trade | 2.2 | 26 | |
| **7.3** | **Online creativity** | 44.8 | 11 | |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 61.6 | 9 | |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 68.3 | 8 | |
| 7.3.3 | GitHub commit pushes received/mn pop. 15–69 | 34.4 | 20 | |
| 7.3.4 | Mobile app creation/bn PPP$ GDP | 15.1 | 24 | |

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 the United Kingdom.

## Missing data for the United Kingdom

| Code | Indicator name | Economy year | Model year | Source |
|---|---|---|---|---|
| 4.1.3 | Loans from microfinance institutions, % GDP | n/a | 2020 | International Monetary Fund, Financial Access Survey (FAS) |
| 5.1.2 | Firms offering formal training, % | n/a | 2019 | World Bank Enterprise Surveys |
| 6.1.3 | Utility models by origin/bn PPP$ GDP | n/a | 2020 | World Intellectual Property Organization |

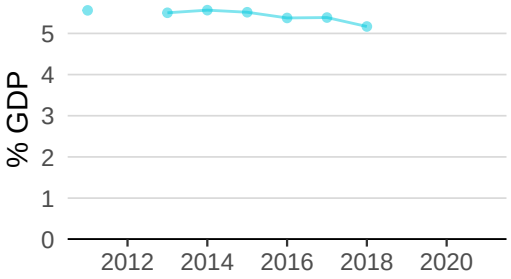
## Outdated data for the United Kingdom

| Code | Indicator name | Economy year | Model year | Source |
|---|---|---|---|---|
| 2.1.1 | Expenditure on education, % GDP | 2018 | 2020 | UNESCO Institute for Statistics |
| 2.2.2 | Graduates in science and engineering, % | 2019 | 2020 | UNESCO Institute for Statistics |
| 2.3.1 | Researchers, FTE/mn pop. | 2019 | 2020 | UNESCO Institute for Statistics |
| 2.3.2 | Gross expenditure on R&D, % GDP | 2019 | 2020 | UNESCO Institute for Statistics |
| 4.2.1 | Market capitalization, % GDP | 2014 | 2020 | World Federation of Exchanges |
| 4.3.2 | Domestic industry diversification | 2018 | 2019 | United Nations Industrial Development Organization |
| 5.1.1 | Knowledge-intensive employment, % | 2019 | 2021 | International Labour Organization |
| 5.1.5 | Females employed w/advanced degrees, % | 2019 | 2021 | International Labour Organization |
| 5.3.5 | Research talent, % in businesses | 2019 | 2020 | UNESCO Institute for Statistics |
| 6.2.5 | High-tech manufacturing, % | 2018 | 2019 | United Nations Industrial Development Organization |
| 7.2.4 | Printing and other media, % manufacturing | 2018 | 2019 | United Nations Industrial Development Organization |

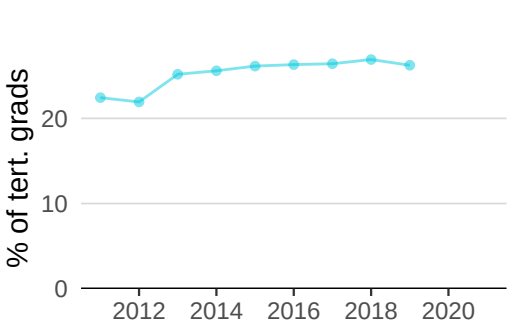
# INNOVATION SYSTEM FOR THE UNITED KINGDOM

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

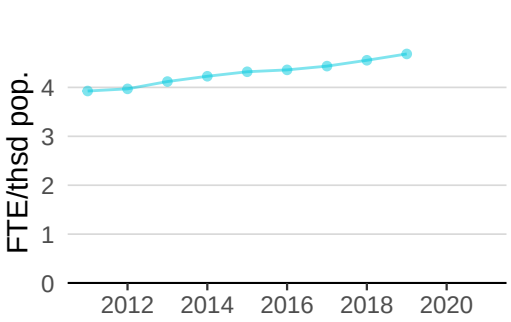
## Innovation inputs



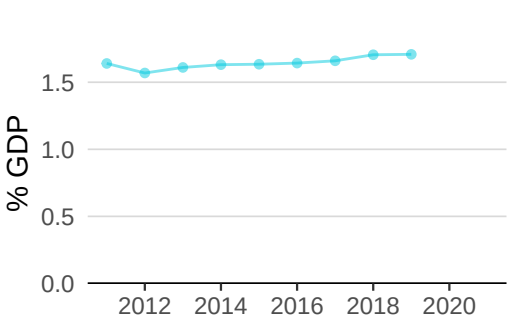

**2.1.1 Expenditure on education** was equal to 5.2% GDP in 2018–down by 4 percentage points from the year prior–and equivalent to an indicator rank of 36.



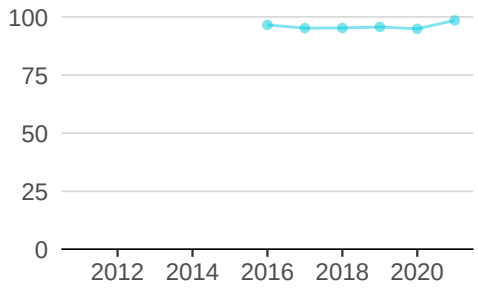

**2.2.2 Graduates in science and engineering** was equal to 26.2% of tert. grads in 2019–down by 2 percentage points from the year prior–and equivalent to an indicator rank of 33.



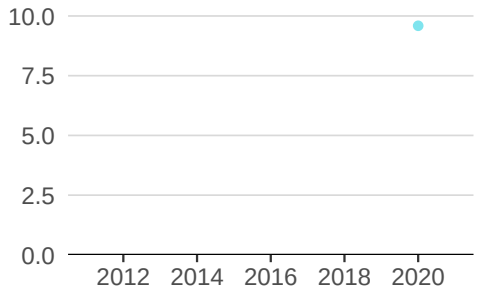

**2.3.1 Researchers** was equal to 4.7 FTE/thsd pop. in 2019–up by 3 percentage points from the year prior–and equivalent to an indicator rank of 21.



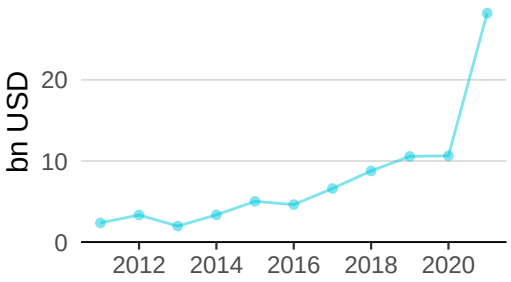

**2.3.2 Gross expenditure on R&D** was equal to 1.7% GDP in 2019–effectively unchanged from the year prior–and equivalent to an indicator rank of 22.



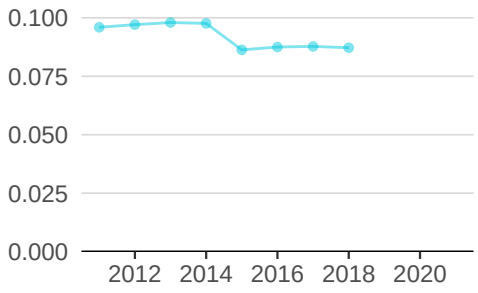

**2.3.4 QS university ranking** was equal to 98.5 in 2021–up by 4 percentage points from the year prior–and equivalent to an indicator rank of 2.



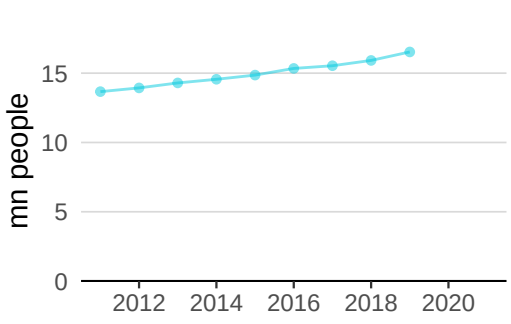

**3.1.1 ICT access** was equal to 9.6 in 2020 and equivalent to an indicator rank of 9.




**4.2.4 Venture capital received** was equal to 28.2 bn USD in 2021–up by 165 percentage points from the year prior–and equivalent to an indicator rank of 9.

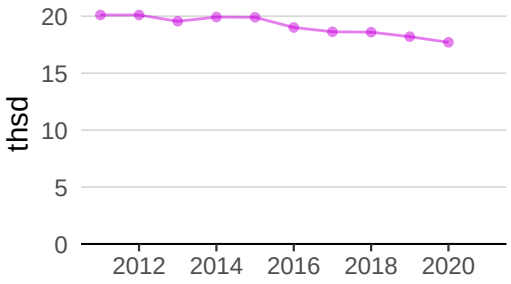



**4.3.2 Domestic industry diversification** was equal to 0.1 in 2018–down by 1 percentage point from the year prior–and equivalent to an indicator rank of 7.

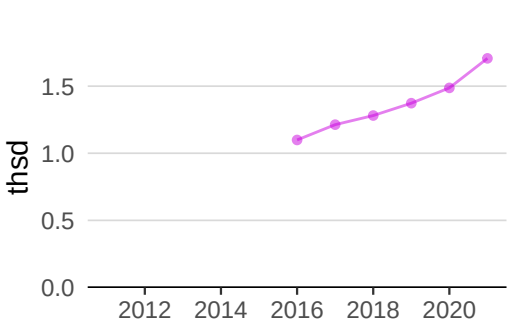



**5.1.1 Knowledge-intensive employment** was equal to 16.5 mn people in 2019–up by 4 percentage points from the year prior–and equivalent to an indicator rank of 8.

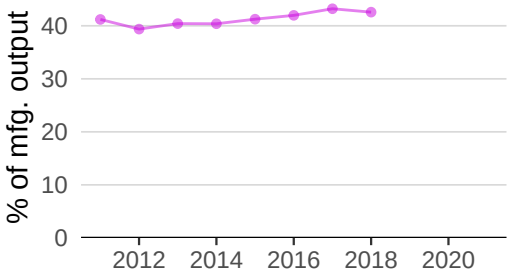
## Innovation outputs



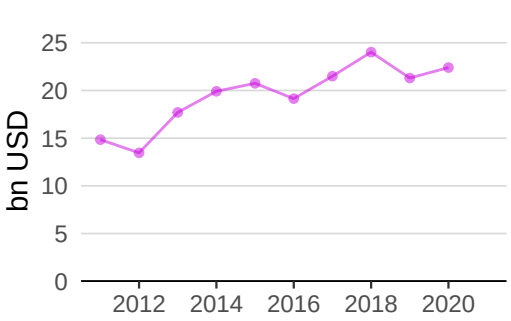

**6.1.1 Patents by origin** was equal to 17.7 thsd in 2020–down by 3 percentage points from the year prior–and equivalent to an indicator rank of 15.



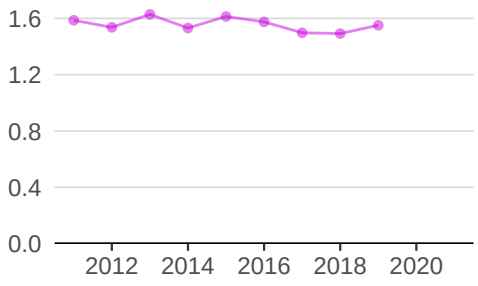

**6.1.5 Citable documents H-index** was equal to 1.7 thsd in 2021–up by 15 percentage points from the year prior–and equivalent to an indicator rank of 1.



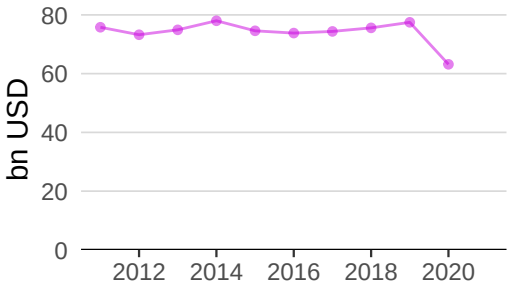

**6.2.5 High-tech manufacturing** was equal to 42.6% of mfg. output in 2018–down by 1 percentage point from the year prior–and equivalent to an indicator rank of 25.



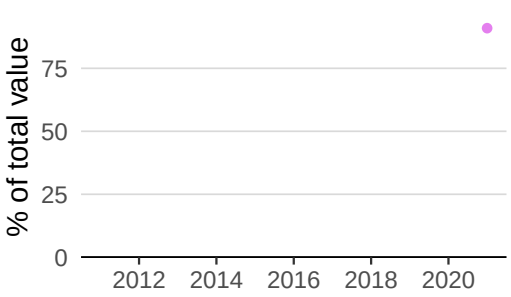

**6.3.1 Intellectual property receipts** was equal to 22.4 bn USD in 2020–up by 5 percentage points from the year prior–and equivalent to an indicator rank of 10.



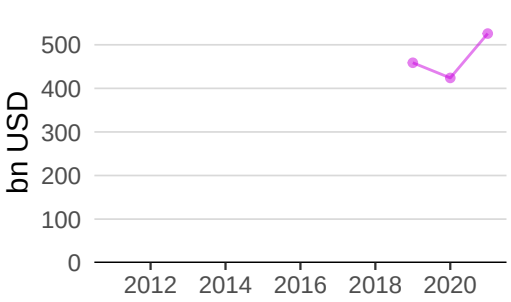

**6.3.2 Production and export complexity** was equal to 1.6 in 2019–up by 4 percentage points from the year prior–and equivalent to an indicator rank of 12.



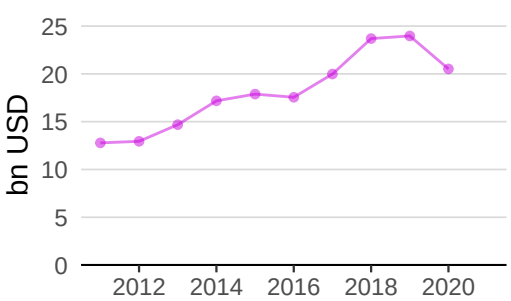

**6.3.3 High-tech exports** was equal to 63.2 bn USD in 2020–down by 18 percentage points from the year prior–and equivalent to an indicator rank of 23.




**7.1.1 Intangible asset intensity** was equal to 90.9% of total value in 2021 and equivalent to an indicator rank of 4.




**7.1.3 Global brand value** was equal to 525.8 bn USD in 2021–up by 24 percentage points from the year prior–and equivalent to an indicator rank of 7.




**7.2.1 Cultural and creative services exports** was equal to 20.5 bn USD in 2020–down by 14 percentage points from the year prior–and equivalent to an indicator rank of 6.

# INNOVATION TOP PERFORMERS FOR THE UNITED KINGDOM

## 2.3.3 Global corporate R&D investors

| Firm | Industry | R&D | R&D Growth | R&D Intensity | Rank |
|---|---|---|---|---|---|
| | | [mn EUR] | [%] | [%] | |
| GLAXOSMITHKLINE | Pharmaceuticals & Biotechnology | 5,034 | 6.1 | 13.5 | 29 |
| ASTRAZENECA | Pharmaceuticals & Biotechnology | 4,896 | 11.5 | 22.6 | 31 |
| HSBC | Banks | 1,576 | -7.3 | 3.7 | 101 |

Source: European Commission's Joint Research Centre (https://iri.jrc.ec.europa.eu/scoreboard/2021-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

| University | Score | Rank |
|---|---|---|
| UNIVERSITY OF OXFORD | 99.5 | 2 |
| UNIVERSITY OF CAMBRIDGE | 98.7 | 3= |
| IMPERIAL COLLEGE LONDON | 97.3 | 7 |

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 |
|---|---|
| UNILEVER | 1 |
| BRITISH AMERICAN TOBACCO | 2 |
| ASTRAZENECA | 3 |

Source: Brand Finance (https://brandirectory.com/reports/gift-2021).
Note: Brand Finance only provides within economy ranks.

## 7.1.3 Global brand value, top 5,000

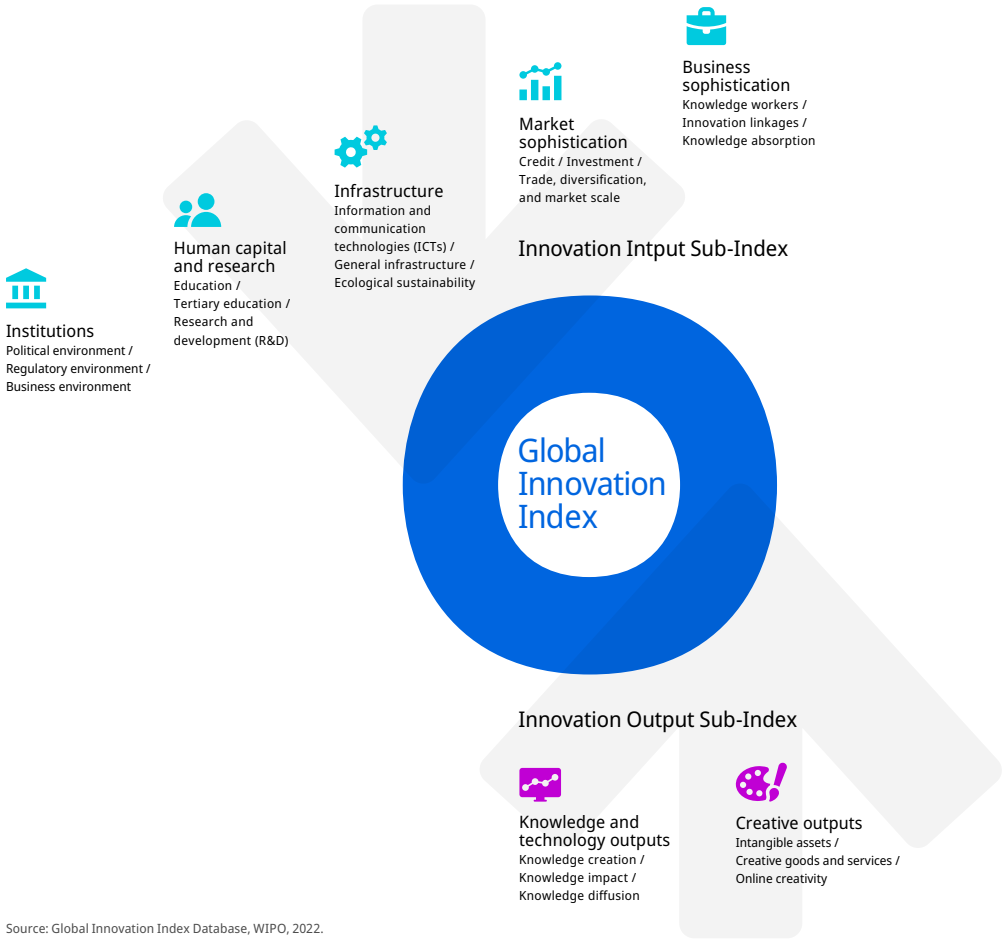
| Brand | Industry | Rank |
|---|---|---|
| SHELL | Oil & Gas | 1 |
| EY | Commercial Services | 2 |
| VODAFONE | Telecoms | 3 |

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

# 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, 2022.

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.