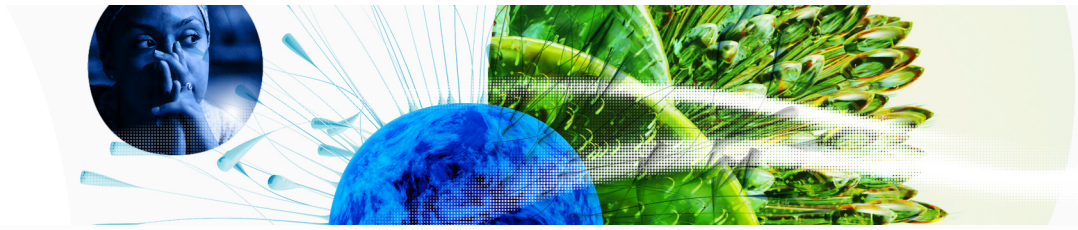
Global Innovation Index 2023



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

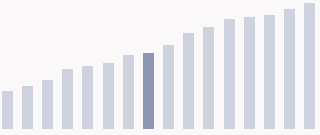
Consisting of **roughly 80 indicators**, grouped into innovation inputs and outputs, the GII **aims to capture the multi-dimensional facets of innovation**.

Thailand ranking in the Global Innovation Index 2023

> Thailand ranks 43rd among the 132 economies featured in the GII 2023.

> Thailand ranks 5th among the 33 upper-middle-income group economies.

> Thailand ranks 9th among the 16 economies in South East Asia, East Asia, and Oceania.



> Thailand GII Ranking (2020-2023)

The table shows the rankings of Thailand 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 Thailand in the GII 2023 is between ranks 41 and 45.

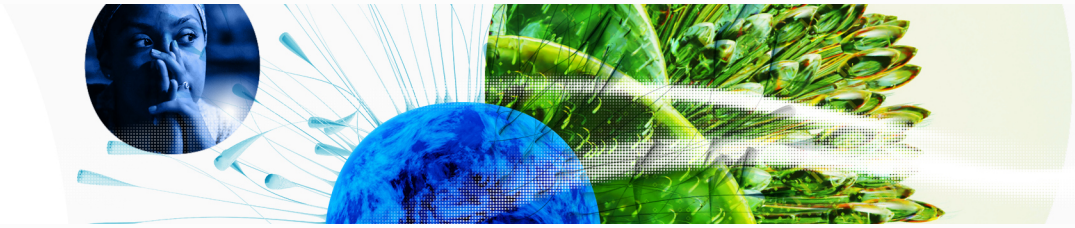
	GII Position	Innovation Inputs	Innovation Outputs
2020	44th	48th	44th
2021	43rd	47th	46th
2022	43rd	48th	44th
2023	43rd	44th	43rd

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

This year Thailand ranks 44th in innovation inputs. This position is higher than last year.

Thailand ranks 43rd in innovation outputs. This position is higher than last year.

Global Innovation Index 2023

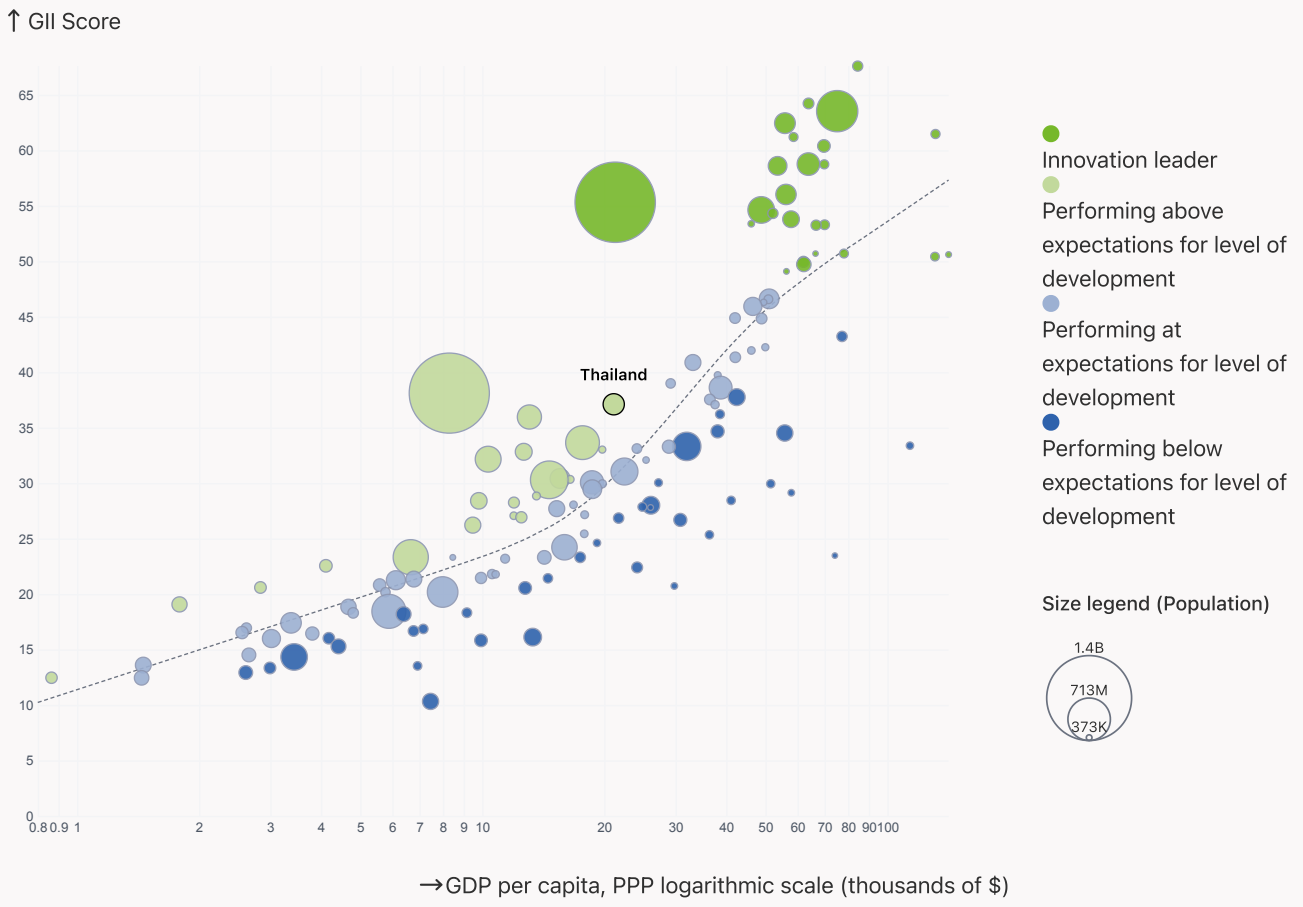


→ Expected vs. observed innovation performance

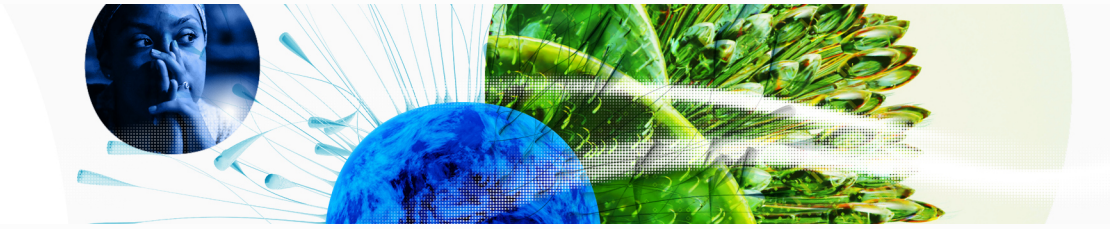
The bubble chart below shows the relationship between income levels (GDP per capita) and innovation performance (GII score). The trend line gives an indication of the expected innovation performance according to income level. Economies appearing above the trend line are performing better than expected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

> Relative to GDP, Thailand is performing above expectations for its level of development.

> Innovation overperformers relative to their economic development



Global Innovation Index 2023

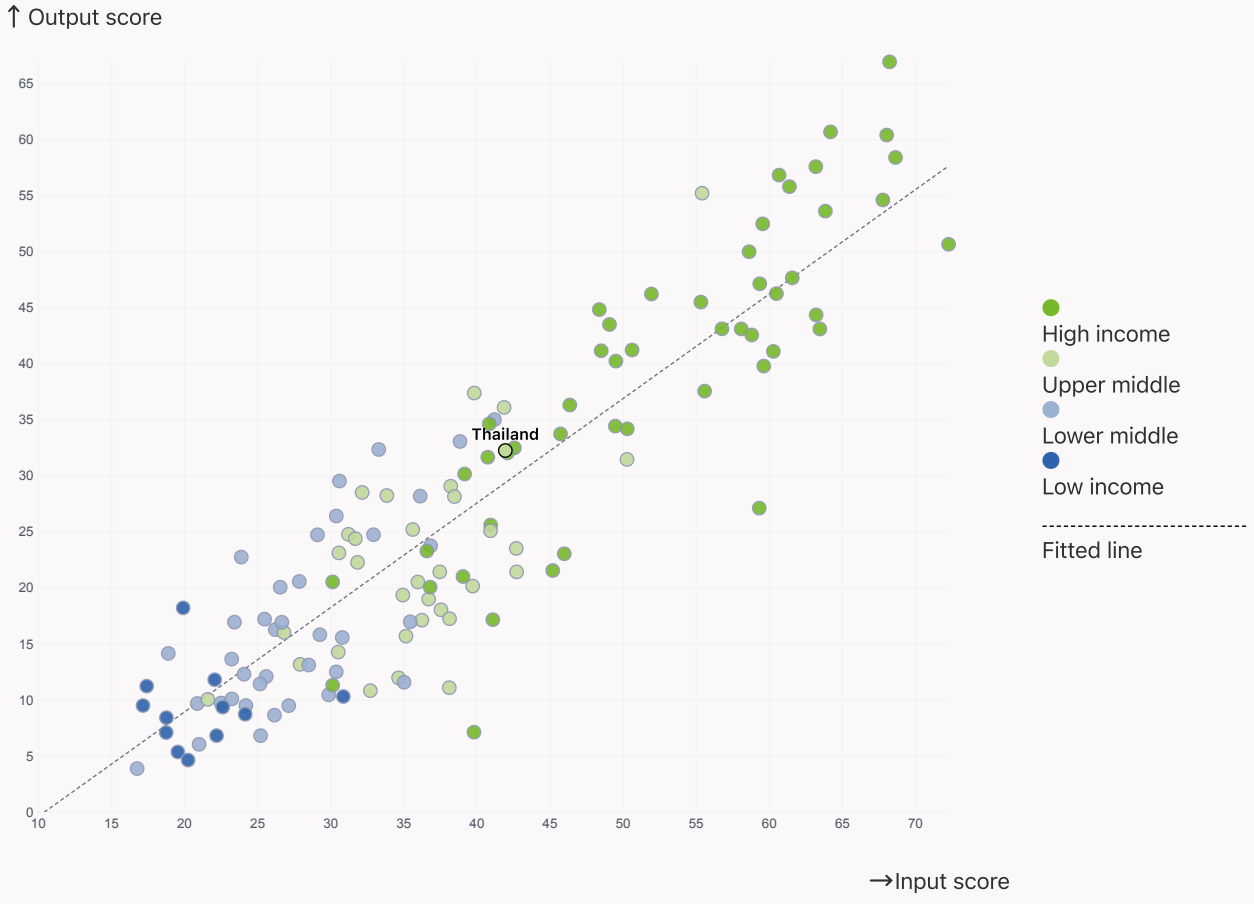


→ Effectively translating innovation investments into innovation outputs

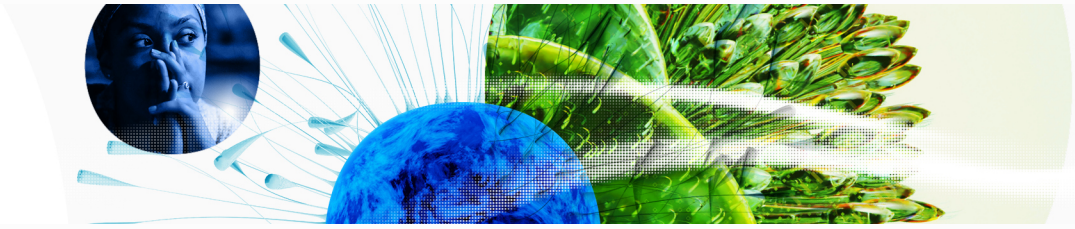
The chart below shows the relationship between innovation inputs and innovation outputs. Economies above the line are effectively translating costly innovation investments into more and higher-quality outputs.

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

> Relationship between innovation inputs and outputs

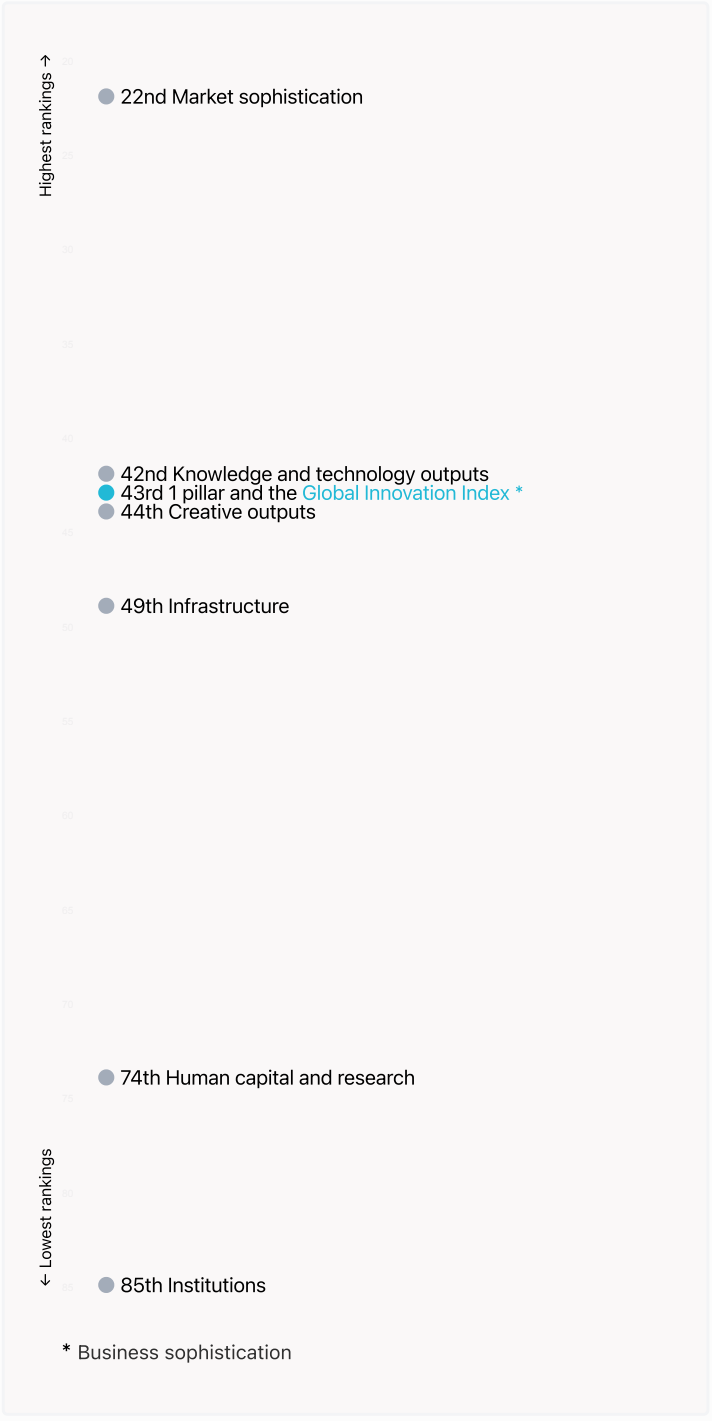


Global Innovation Index 2023



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



> Highest rankings

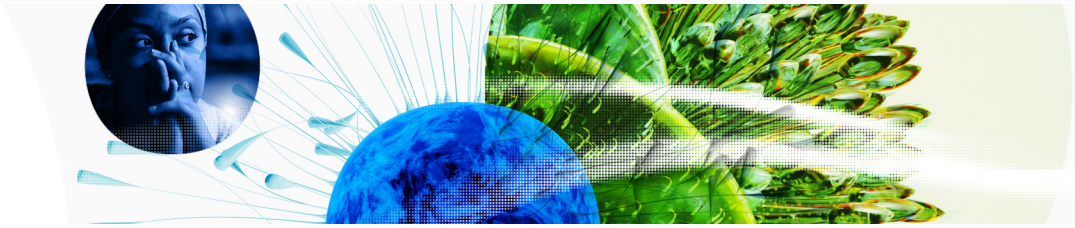
Thailand ranks highest in Market sophistication (22nd), Knowledge and technology outputs (42nd) and Business sophistication (43rd).

> Lowest rankings

Thailand ranks lowest in Institutions (85th), Human capital and research (74th) and Infrastructure (49th).

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

Global Innovation Index 2023



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

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

> Upper-Middle-Income economies

Thailand performs above the upper-middle-income group average in Knowledge and technology outputs, Creative outputs, Business sophistication, Market sophistication, Infrastructure.

> South East Asia, East Asia, And Oceania

Thailand performs below the regional average in Knowledge and technology outputs, Creative outputs, Business sophistication, Human capital and research, Institutions.

Knowledge and technology outputs

- Top 10 | Score: 58.96
- SEAO | Score: 32.16
- Thailand | Score: 31.32
- Upper middle income | Score: 22.36

* South East Asia, East Asia, and Oceania

Creative outputs

- Top 10 | 56.09
- SEAO | 34.40
- Thailand | 33.13
- Upper middle income | 23.16

Business sophistication

- Top 10 | 64.39
- SEAO | 40.54
- Thailand | 35.85
- Upper middle income | 29.27

Market sophistication

- Top 10 | 61.93
- Thailand | 52.71
- SEAO | 47.18
- Upper middle income | 35.45

Human capital and research

- Top 10 | 60.28
- SEAO | 40.81
- Upper middle income | 29.68
- Thailand | 29.21

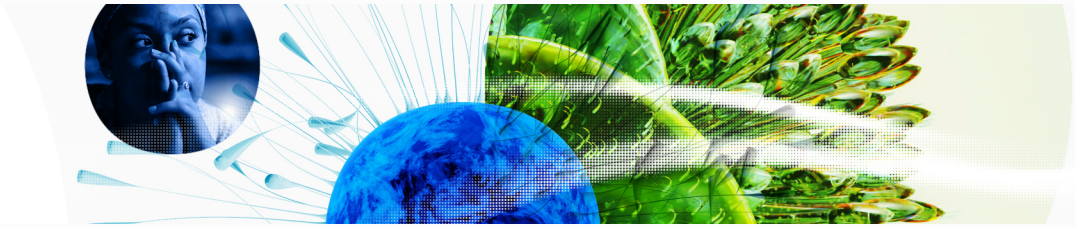
Infrastructure

- Top 10 | 62.83
- Thailand | 47.43
- SEAO | 47.13
- Upper middle income | 40.40

Institutions

- Top 10 | 79.85
- SEAO | 62.54
- Upper middle income | 47.71
- Thailand | 44.72

Global Innovation Index 2023



→ Innovation strengths and weaknesses in Thailand

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

> Thailand's main innovation strengths are **Creative goods exports, % total trade** (rank 1), **GERD financed by business, %** (rank 1) and **Utility models by origin/bn PPP$ GDP** (rank 6).

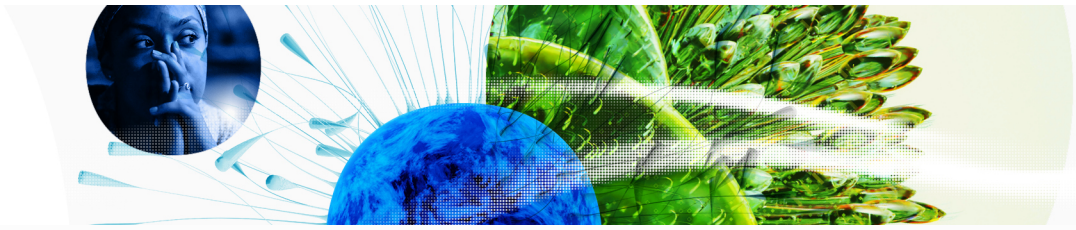
Strengths

Rank	Code	Indicator name
1	7.2.4	Creative goods exports, % total trade
1	5.1.4	GERD financed by business, %
6	6.1.3	Utility models by origin/bn PPP$ GDP
8	6.3.3	High-tech exports, % total trade
10	4.1.2	Domestic credit to private sector, % GDP
10	5.3.2	High-tech imports, % total trade
12	5.3.5	Research talent, % in businesses
15	4.3.2	Domestic industry diversification
16	5.3.1	Intellectual property payments, % total trade
18	3.1.4	E-participation

Weaknesses

Rank	Code	Indicator name
128	6.3.4	ICT services exports, % total trade
124	1.2.3	Cost of redundancy dismissal
116	5.3.3	ICT services imports, % total trade
107	2.1.1	Expenditure on education, % GDP
104	2.1.5	Pupil-teacher ratio, secondary
96	7.2.1	Cultural and creative services exports, % total trade
85	5.1.2	Firms offering formal training, %
79	5.2.3	GERD financed by abroad, % GDP
72	7.2.2	National feature films/mn pop. 15-69
40	2.3.3	Global corporate R&D investors, top 3, mn US$

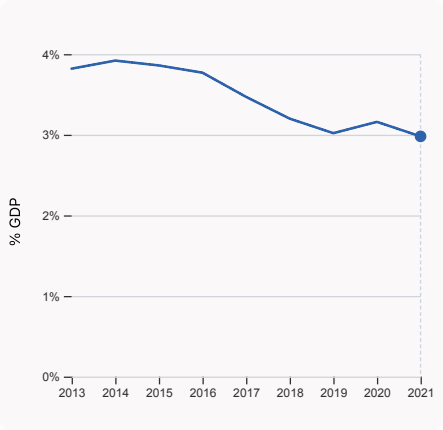
Global Innovation Index 2023



→ Thailand's innovation system

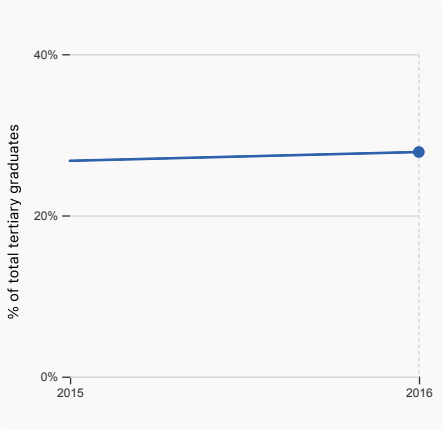
As far as practicable, the plots below present unscaled indicator data.

> Innovation inputs in Thailand



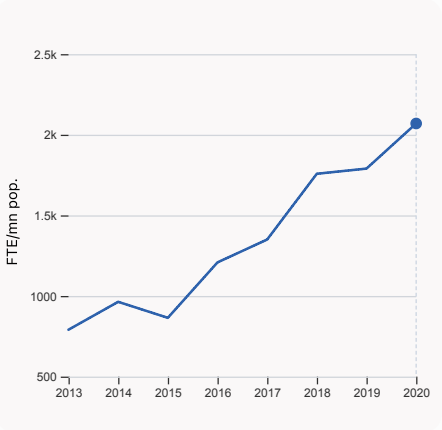
2.1.1 Expenditure on education, % GDP

was equal to 2.98% GDP in 2021, down by 0.18 percentage points from the year prior – and equivalent to an indicator rank of 107.



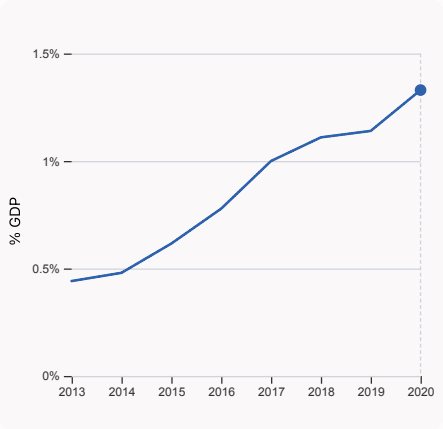
2.2.2 Graduates in science and engineering, %

was equal to 27.86% of total tertiary graduates in 2016, up by 1.09 percentage points from the year prior – and equivalent to an indicator rank of 29.



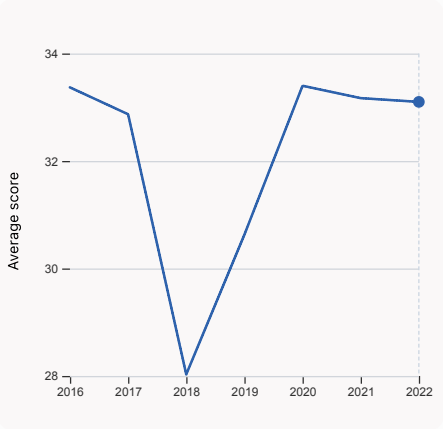
2.3.1 Researchers, FTE/mn pop.

was equal to 2,069.91 FTE/mn pop. in 2020, up by 15.63% from the year prior – and equivalent to an indicator rank of 40.



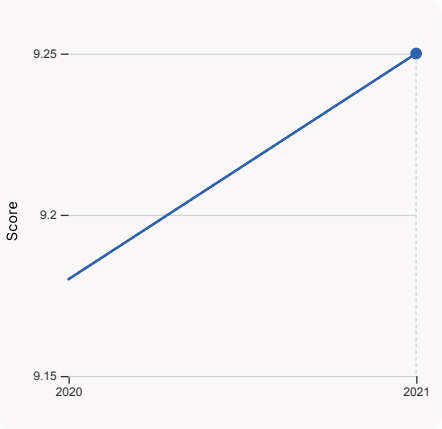
2.3.2 Gross expenditure on R&D, % GDP

was equal to 1.33% GDP in 2020, up by 0.19 percentage points from the year prior – and equivalent to an indicator rank of 32.



2.3.4 QS university ranking, top 3

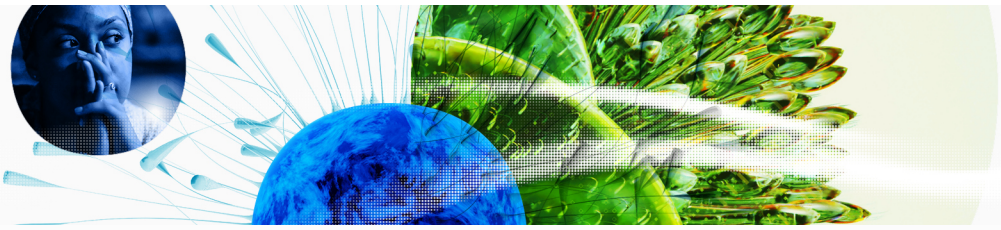
was equal to an average score of 33.1 for the top 3 universities in 2022, down by 0.21% from the year prior – and equivalent to an indicator rank of 37.

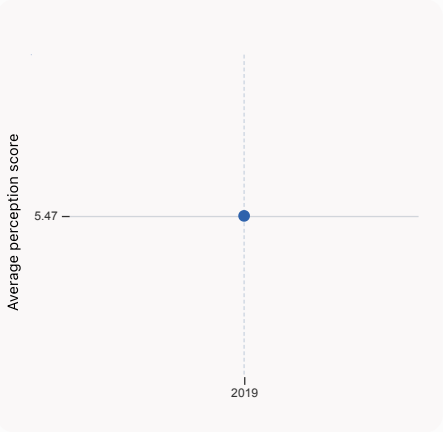


3.1.1 ICT access

was equal to a score of 9.25 in 2021, up by 0.76% from the year prior – and equivalent to an indicator rank of 29.

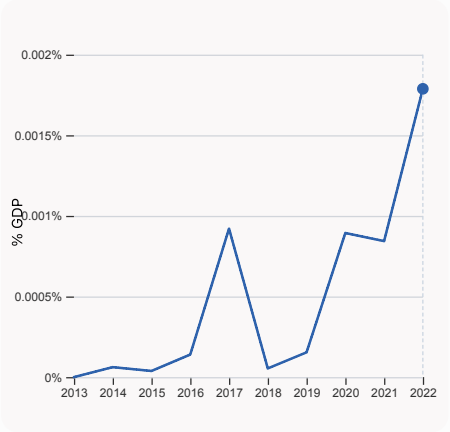
Global Innovation Index 2023





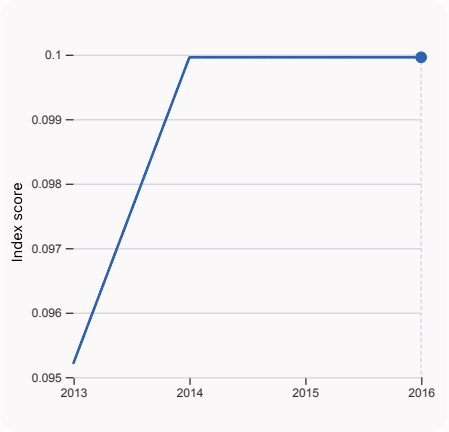
4.1.1 Finance for startups and scaleups

was equal to an average perception score of 5.47 in 2019, equivalent to an indicator rank of 19.



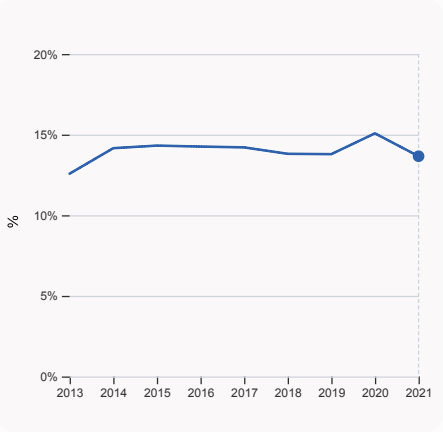
4.2.4 VC received, value, % GDP

was equal to 0.00179% GDP in 2022, up by 0.00094 percentage points from the year prior – and equivalent to an indicator rank of 45.



4.3.2 Domestic industry diversification

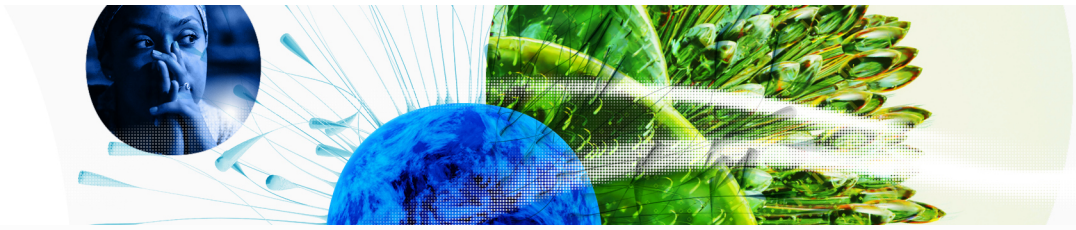
was equal to an index score of 0.1 in 2016, with no change from the year prior – and equivalent to an indicator rank of 15.



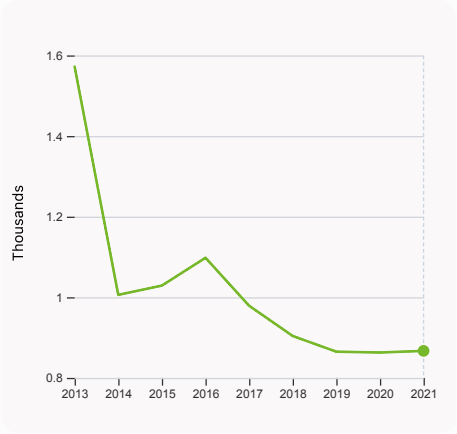
5.1.1 Knowledge-intensive employment, %

was equal to 13.66% in 2021, down by 1.42 percentage points from the year prior – and equivalent to an indicator rank of 95.

Global Innovation Index 2023

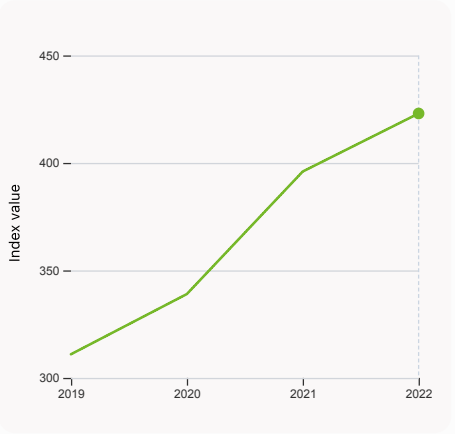


> Innovation outputs in Thailand



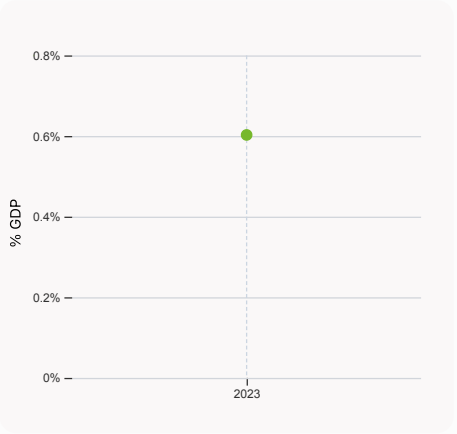
6.1.1 Patents by origin

was equal to 0.87 Thousands in 2021, up by 0.46% from the year prior – and equivalent to an indicator rank of 71.



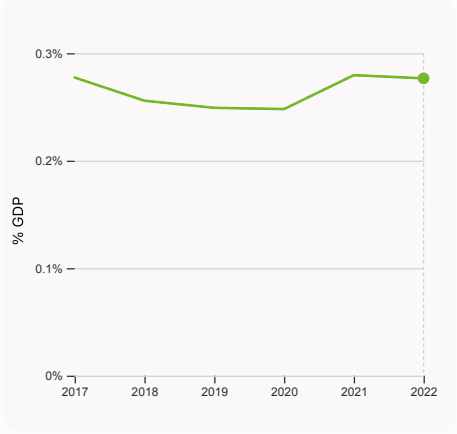
6.1.5 Citable documents H-index

was equal to an index value of 423 in 2022, up by 6.82% from the year prior – and equivalent to an indicator rank of 41.



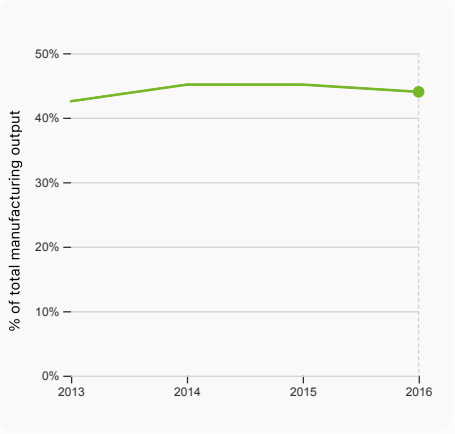
6.2.2 Unicorn valuation, % GDP

was equal to 0.603 % GDP in 2023 – and equivalent to an indicator rank of 38.



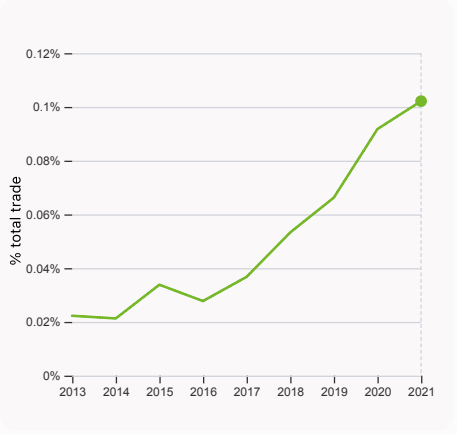
6.2.3 Software spending, % GDP

was equal to 0.277% GDP in 2022, down by 0.003 percentage points from the year prior – and equivalent to an indicator rank of 52.



6.2.4 High-tech manufacturing, %

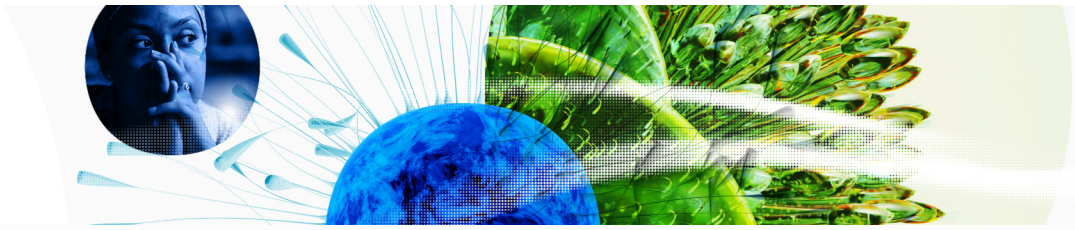
was equal to 44.01% of total manufacturing output in 2016, down by 1.12 percentage points from the year prior – and equivalent to an indicator rank of 20.



6.3.1 Intellectual property receipts, % total trade

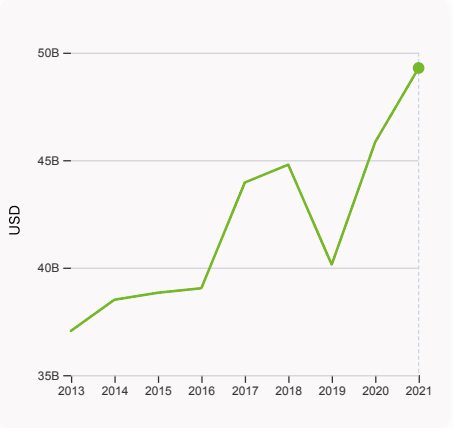
was equal to 0.102% total trade in 2021, up by 0.01 percentage points from the year prior – and equivalent to an indicator rank of 61.

Global Innovation Index 2023



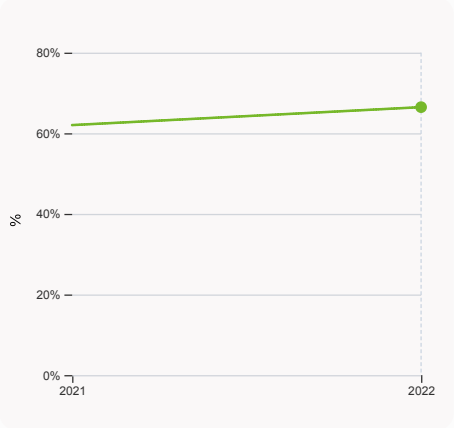
6.3.2 Production and export complexity

was equal to a score of 1.11 in 2020, down by 1.77% from the year prior – and equivalent to an indicator rank of 25.



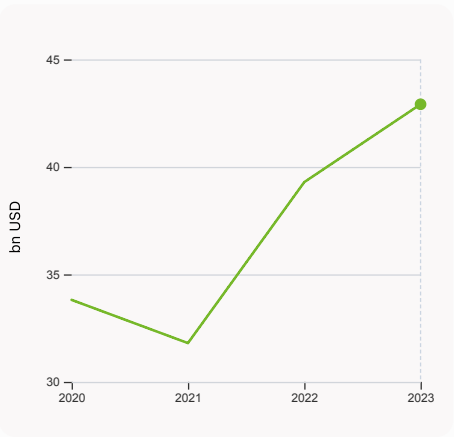
6.3.3 High-tech exports

was equal to 49,287,591,074 USD in 2021, up by 7.53% from the year prior – and equivalent to an indicator rank of 8.



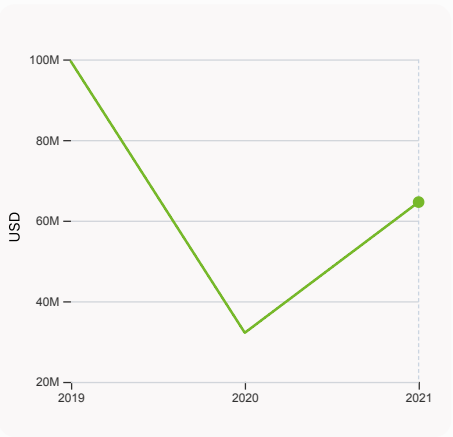
7.1.1 Intangible asset intensity, top 15, %

was equal to 66.48% in 2022, up by 4.45 percentage points from the year prior – and equivalent to an indicator rank of 26.



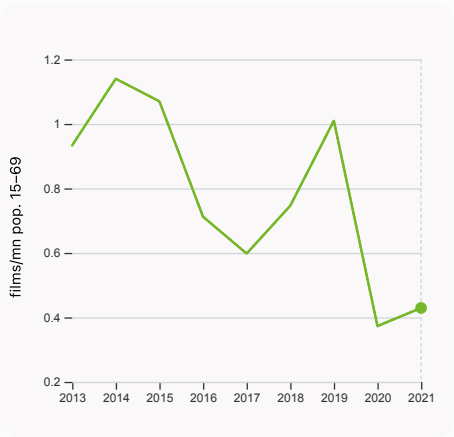
7.1.3 Global brand value, top 5,000

was equal to 42.914 bn USD in 2023, up by 9.22% from the year prior – and equivalent to an indicator rank of 30.



7.2.1 Cultural and creative services exports

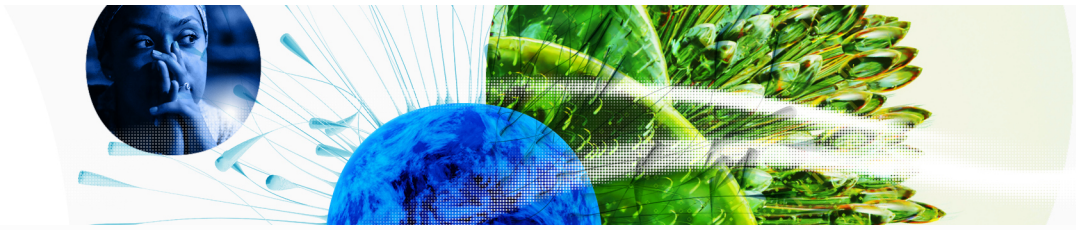
was equal to 64,607,000 USD in 2021, up by 100.73% from the year prior – and equivalent to an indicator rank of 96.

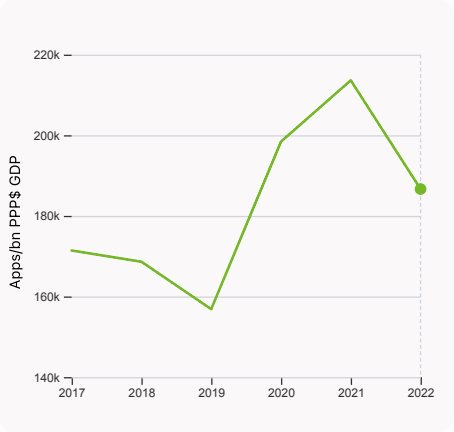


7.2.2 National feature films/mn pop. 15-69

was equal to 0.429 films/mn pop. 15–69 in 2021, up by 15.074% from the year prior – and equivalent to an indicator rank of 72.

Global Innovation Index 2023

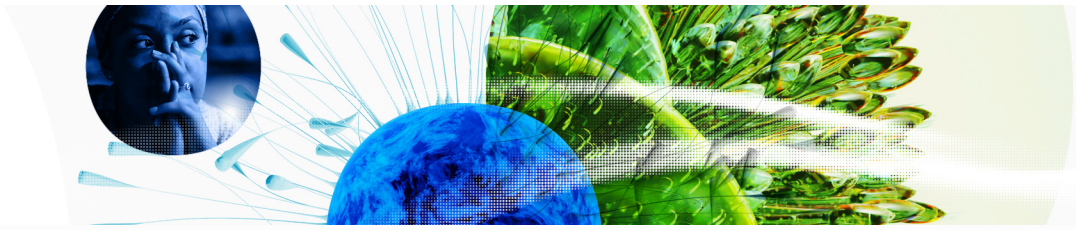




7.3.4 Mobile app creation/bn PPP$ GDP

was equal to 186,656.03 Apps/bn PPP$ GDP in 2022, down by 12.62% from the year prior – and equivalent to an indicator rank of 61.

Global Innovation Index 2023



→ Thailand's innovation top performers

> 2.3.4 QS university ranking of Thailand’s top universities

Rank	University	Score
224	CHULALONGKORN UNIVERSITY	41.40
256	MAHIDOL UNIVERSITY	38.10
601-650	CHIANG MAI UNIVERSITY	19.80

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 Thailand

Rank	Unicorn Company	Industry	City	Valuation, bn USD
1	ASCEND MONEY	Fintech	Bangkok	2
2	LINE MAN WONGNAI	E-commerce & direct-to-consumer	Bangkok	1
2	FLASH EXPRESS	Supply chain, logistics, & delivery	Bangkok	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 Thailand

Rank	Firm	Intensity, %
1	AIRPORTS OF THAILAND PCL	83.73
2	CP ALL PCL	80.43
3	ADVANCED INFO SERVICE PCL	92.63

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 Thailand with highest global brand value

Rank	Brand	Industry	Brand Value, mn USD
1	PTT	Oil & Gas	6,615.5
2	AIS	Telecoms	2,943.9
3	SCG	Engineering & Construction	2,660.0

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

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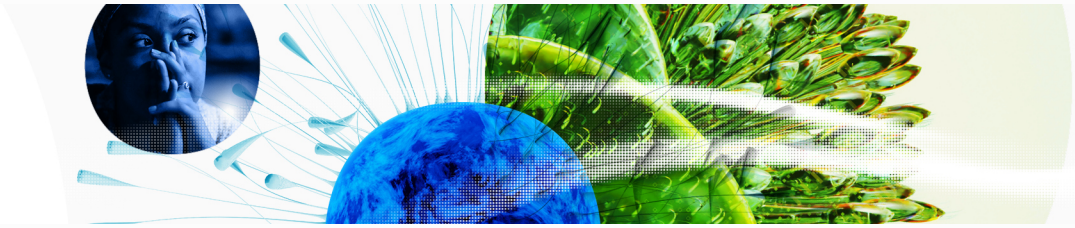

Thailand

GII 2023 rank **43**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
43	44	Upper middle	SEAO	71.7	1,479.6	21,114.2

	Score / Value	Rank
Institutions	**44.7**	**85**
1.1 Institutional environment	**46.9**	**62**
1.1.1 Operational stability for businesses*	50.0	71
1.1.2 Government effectiveness*	43.7	57
1.2 Regulatory environment	**44.2**	**112** ◇
1.2.1 Regulatory quality*	44.5	65
1.2.2 Rule of law*	43.1	59
1.2.3 Cost of redundancy dismissal	36.0	124 ○ ◇
1.3 Business environment	**43.1**	**73**
1.3.1 Policies for doing business†	36.6	97
1.3.2 Entrepreneurship policies and culture†	49.6	36
Human capital and research	**29.2**	**74**
2.1 Education	**39.6**	**100**
2.1.1 Expenditure on education, % GDP	3.0	107 ○ ◇
2.1.2 Government funding/pupil, secondary, % GDP/cap	18.4	60
2.1.3 School life expectancy, years	15.4	45
2.1.4 PISA scales in reading, maths and science	412.4	61
2.1.5 Pupil-teacher ratio, secondary	22.0	104 ○ ◇
2.2 Tertiary education	**28.3**	**72**
2.2.1 Tertiary enrolment, % gross	44.0	73
2.2.2 Graduates in science and engineering, %	27.9	29
2.2.3 Tertiary inbound mobility, %	1.3	84
2.3 Research and development (R&D)	**19.7**	**45**
2.3.1 Researchers, FTE/mn pop.	2,069.9	40
2.3.2 Gross expenditure on R&D, % GDP	1.3	32
2.3.3 Global corporate R&D investors, top 3, mn US$	0.0	40 ○ ◇
2.3.4 QS university ranking, top 3*	33.5	37
Infrastructure	**47.4**	**49**
3.1 Information and communication technologies (ICTs)	**81.5**	**33**
3.1.1 ICT access*	88.9	29
3.1.2 ICT use*	83.7	47
3.1.3 Government's online service*	75.3	47
3.1.4 E-participation*	77.9	18 ●
3.2 General infrastructure	**35.1**	**41**
3.2.1 Electricity output, GWh/mn pop.	2,671.7	68
3.2.2 Logistics performance*	63.6	33
3.2.3 Gross capital formation, % GDP	29.1	27
3.3 Ecological sustainability	**25.7**	**63**
3.3.1 GDP/unit of energy use	8.8	82
3.3.2 Environmental performance*	32.5	80
3.3.3 ISO 14001 environment/bn PPP$ GDP	3.3	30
Market sophistication	**52.7**	**22**
4.1 Credit	**65.2**	**9**
4.1.1 Finance for startups and scaleups†	69.3	19
4.1.2 Domestic credit to private sector, % GDP	160.4	10 ●
4.1.3 Loans from microfinance institutions, % GDP	n/a	n/a
4.2 Investment	**24.2**	**29**
4.2.1 Market capitalization, % GDP	104.0	14
4.2.2 Venture capital (VC) investors, deals/bn PPP$ GDP	0.1	31
4.2.3 VC recipients, deals/bn PPP$ GDP	0.1	19
4.2.4 VC received, value, % GDP	0.0	45
4.3 Trade, diversification, and market scale	**68.7**	**21**
4.3.1 Applied tariff rate, weighted avg., %	3.5	77
4.3.2 Domestic industry diversification	97.2	15 ●
4.3.3 Domestic market scale, bn PPP$	1,479.6	23

	Score / Value	Rank
Business sophistication	**35.8**	**43**
5.1 Knowledge workers	**36.7**	**56**
5.1.1 Knowledge-intensive employment, %	13.7	95 ◇
5.1.2 Firms offering formal training, %	18.0	85 ○
5.1.3 GERD performed by business, % GDP	0.8	31
5.1.4 GERD financed by business, %	80.8	1 ●
5.1.5 Females employed w/advanced degrees, %	10.6	72
5.2 Innovation linkages	**22.2**	**64**
5.2.1 University-industry R&D collaboration†	53.7	46
5.2.2 State of cluster development†	44.7	56
5.2.3 GERD financed by abroad, % GDP	0.0	79 ○
5.2.4 Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	51
5.2.5 Patent families/bn PPP$ GDP	0.1	62
5.3 Knowledge absorption	**48.7**	**24**
5.3.1 Intellectual property payments, % total trade	1.8	16 ●
5.3.2 High-tech imports, % total trade	18.0	10 ●
5.3.3 ICT services imports, % total trade	0.4	116 ○ ◇
5.3.4 FDI net inflows, % GDP	1.0	98
5.3.5 Research talent, % in businesses	60.8	12 ●
Knowledge and technology outputs	**31.3**	**42**
6.1 Knowledge creation	**24.2**	**42**
6.1.1 Patents by origin/bn PPP$ GDP	0.6	71
6.1.2 PCT patents by origin/bn PPP$ GDP	0.1	57
6.1.3 Utility models by origin/bn PPP$ GDP	2.7	6 ●
6.1.4 Scientific and technical articles/bn PPP$ GDP	n/a	n/a
6.1.5 Citable documents H-index	21.1	41
6.2 Knowledge impact	**33.9**	**45**
6.2.1 Labor productivity growth, %	-0.1	99
6.2.2 Unicorn valuation, % GDP	0.6	38
6.2.3 Software spending, % GDP	0.3	52
6.2.4 High-tech manufacturing, %	44.0	20
6.3 Knowledge diffusion	**35.8**	**38**
6.3.1 Intellectual property receipts, % total trade	0.1	61
6.3.2 Production and export complexity	75.7	25
6.3.3 High-tech exports, % total trade	16.7	8 ●
6.3.4 ICT services exports, % total trade	0.1	128 ○
6.3.5 ISO 9001 quality/bn PPP$ GDP	9.5	30
Creative outputs	**33.1**	**44**
7.1 Intangible assets	**42.5**	**37**
7.1.1 Intangible asset intensity, top 15, %	66.5	26
7.1.2 Trademarks by origin/bn PPP$ GDP	24.9	84
7.1.3 Global brand value, top 5,000	7.4	30
7.1.4 Industrial designs by origin/bn PPP$ GDP	3.2	32
7.2 Creative goods and services	**28.0**	**33**
7.2.1 Cultural and creative services exports, % total trade	0.0	96 ○
7.2.2 National feature films/mn pop. 15-69	0.4	72 ○
7.2.3 Entertainment and media market/th pop. 15-69	9.2	35
7.2.4 Creative goods exports, % total trade	8.5	1 ●
7.3 Online creativity	**19.4**	**69**
7.3.1 Generic top-level domains (TLDs)/th pop. 15-69	6.1	52
7.3.2 Country-code TLDs/th pop. 15-69	0.4	102
7.3.3 GitHub commits/mn pop. 15-69	4.0	77
7.3.4 Mobile app creation/bn PPP$ GDP	67.2	61

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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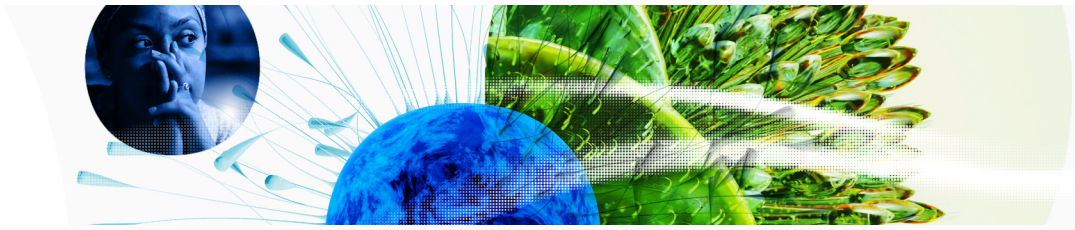

→ Data availability

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

> Thailand has missing data for one indicator and outdated data for eighteen indicators.

> Missing data for Thailand

Code	Indicator name	Economy Year	Model Year	Source
4.1.3	Loans from microfinance institutions, % GDP	n/a	2021	International Monetary Fund, Financial Access Survey (FAS)

> Outdated data for Thailand

Code	Indicator name	Economy Year	Model Year	Source
1.3.2	Entrepreneurship policies and culture	2019	2022	Global Entrepreneurship Monitor
2.1.2	Government funding/pupil, secondary, % GDP/cap	2013	2019	UNESCO Institute for Statistics
2.1.3	School life expectancy, years	2016	2020	UNESCO Institute for Statistics
2.2.2	Graduates in science and engineering, %	2016	2020	UNESCO Institute for Statistics; Eurostat; OECD
2.2.3	Tertiary inbound mobility, %	2016	2020	UNESCO Institute for Statistics
2.3.1	Researchers, FTE/mn pop.	2020	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
2.3.2	Gross expenditure on R&D, % GDP	2020	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
4.1.1	Finance for startups and scaleups	2019	2022	Global Entrepreneurship Monitor
4.3.1	Applied tariff rate, weighted avg., %	2015	2020	World Bank
4.3.2	Domestic industry diversification	2016	2020	United Nations Industrial Development Organization
5.1.1	Knowledge-intensive employment, %	2021	2022	International Labour Organization
5.1.2	Firms offering formal training, %	2016	2019	World Bank Enterprise Surveys
5.1.3	GERD performed by business, % GDP	2017	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT

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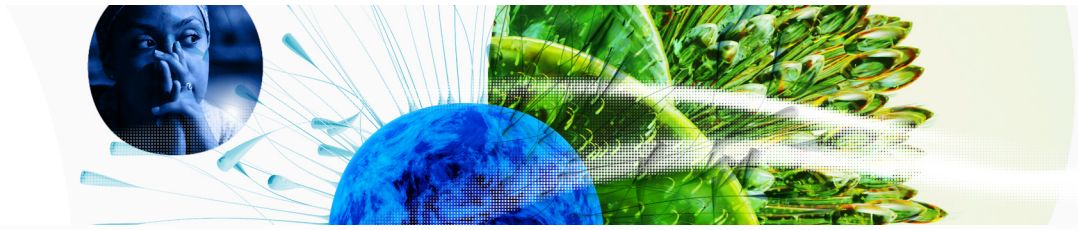

Code	Indicator name	Economy Year	Model Year	Source
5.1.4	GERD financed by business, %	2017	2020	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
5.1.5	Females employed w/advanced degrees, %	2021	2022	International Labour Organization
5.2.3	GERD financed by abroad, % GDP	2017	2020	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
5.3.5	Research talent, % in businesses	2017	2021	UNESCO Institute for Statistics; Eurostat; OECD; RICYT
6.2.4	High-tech manufacturing, %	2016	2020	United Nations Industrial Development Organization

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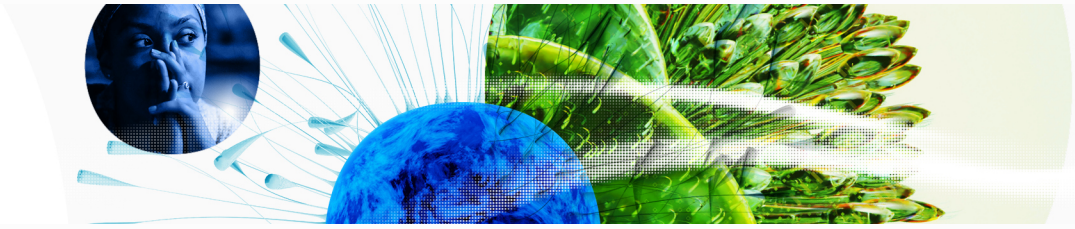

About the Global Innovation Index

- 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.