

GLOBAL INNOVATION INDEX 2019

NORTH MACEDONIA

59th

North Macedonia ranks 59th among the 129 economies featured in the GII 2019.

The Global Innovation Index (GII) is a ranking of world economies based on 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 North Macedonia over the past three years, noting that data availability and the GII model influence year-on-year comparisons of the GII ranks. The confidence interval for North Macedonia's ranking in the GII 2019 is between 58 and 65.

North Macedonia's Rankings, 2017 - 2019

	GII	Innovation Inputs	Innovation Outputs
2019	59	52	63
2018	84	71	93
2017	61	53	63

- North Macedonia performs better in Innovation Inputs than Outputs.
- This year North Macedonia ranks 52nd in Innovation Inputs, better than 2018 and compared to 2017.
- As for Innovation Outputs, North Macedonia ranks 63rd. This position is better than 2018 and the same as 2017.

12th

North Macedonia ranks 12th among the 34 upper middle-income economies.

36th

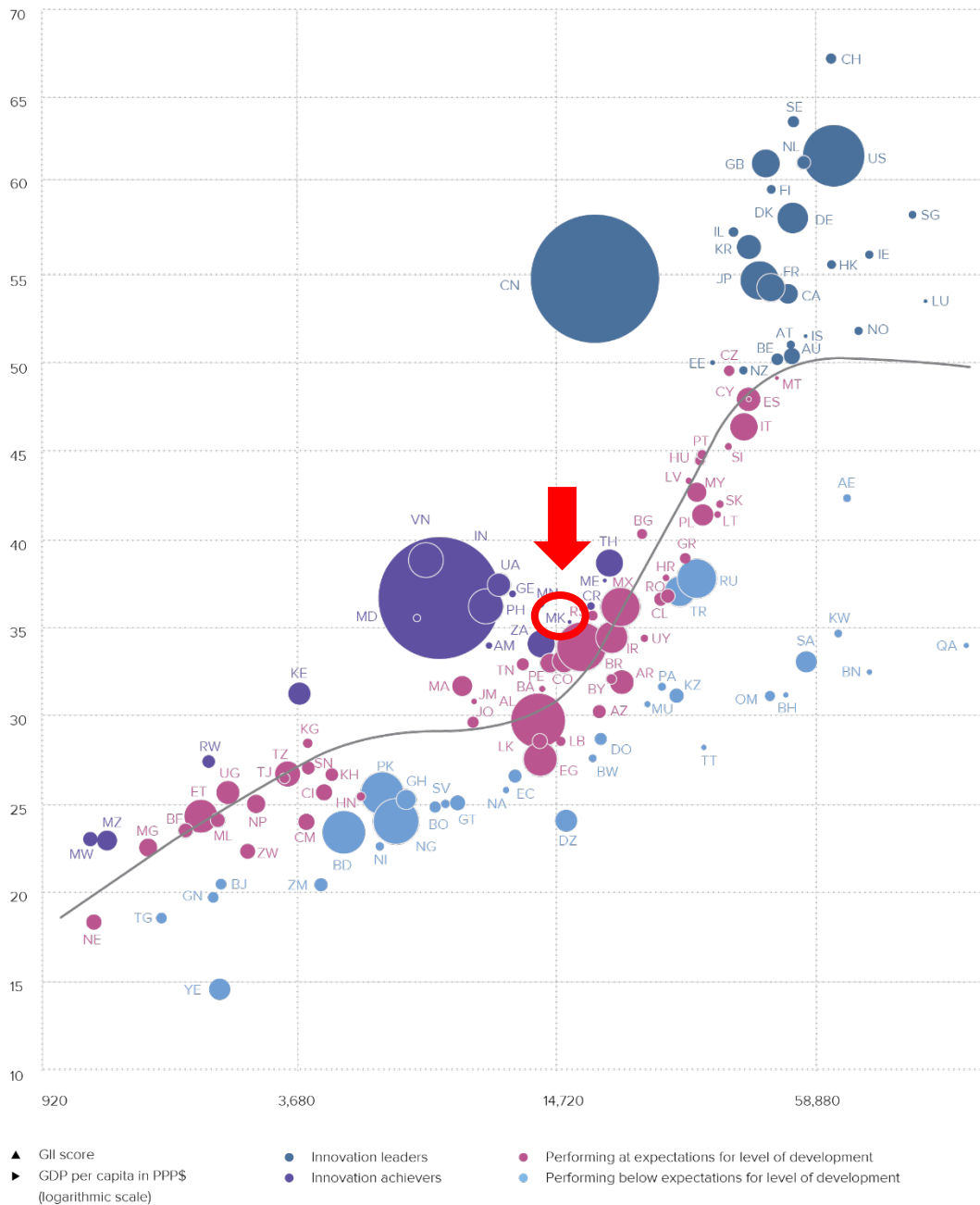
North Macedonia ranks 36th among the 39 economies in Europe.

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 considered Innovation under-performers relative to GDP.

Relative to GDP, North Macedonia performs above its expected level of development.

GII scores and GDP per capita in PPP US\$ (bubbles sized by population)

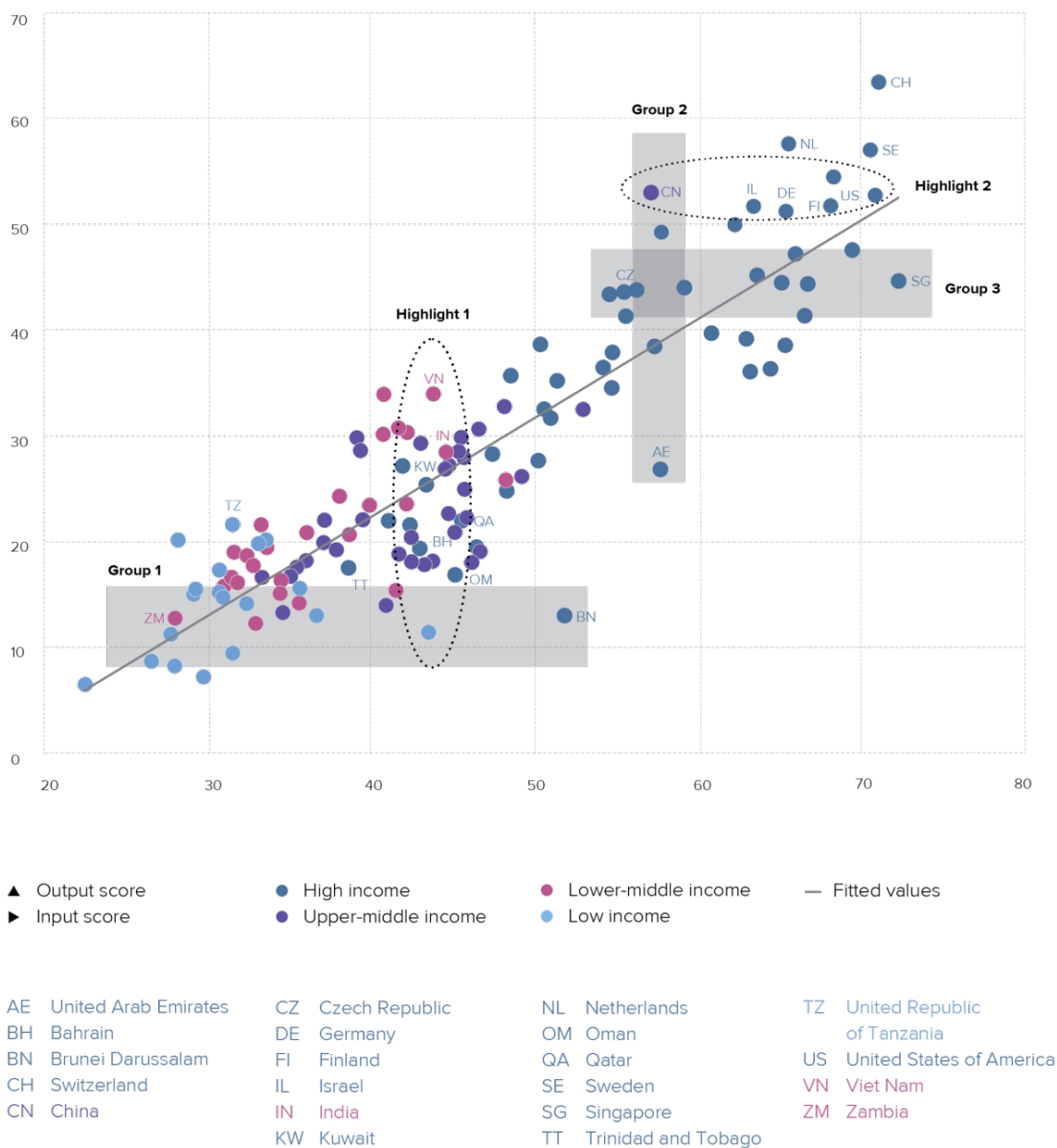


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

The chart below shows the relationship between innovation inputs and innovation outputs, indicating which economies best translate innovation inputs into innovation outputs. Economies appearing above the line are effectively translating their costly innovation investments into more and higher-quality outputs. In contrast, those below the line are not effectively translating innovation inputs into outputs.

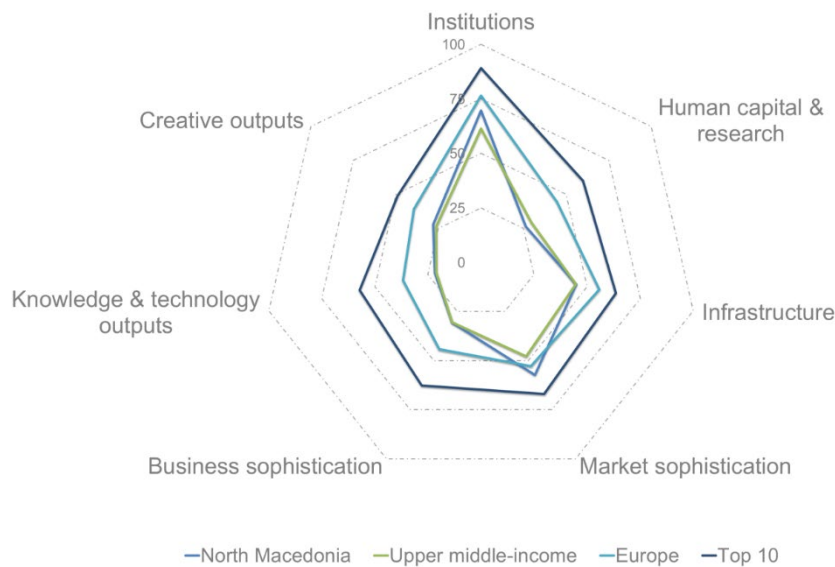
North Macedonia produces less innovation outputs relative to its level of innovation investments.

Innovation input/output performance by income group, 2019



BENCHMARKING NORTH MACEDONIA TO OTHER UPPER MIDDLE-INCOME ECONOMIES AND THE EUROPE REGION

North Macedonia's scores in the seven GII pillars



Upper middle-income economies

North Macedonia has high scores in 5 out of the 7 GII pillars: Institutions, Infrastructure, Market sophistication, Knowledge & technology outputs, and Creative outputs, which are above the average of the upper middle-income group.

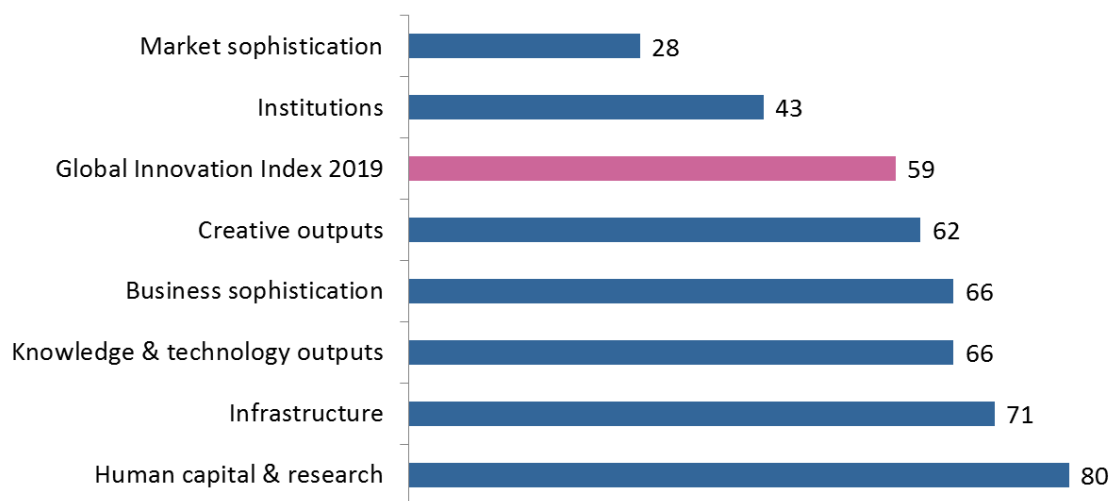
Europe Region

Compared to other economies in Europe, North Macedonia performs above average in 1 out of the 7 GII pillars: Market sophistication.

Top ranks are found in Business environment, Ecological sustainability, Investment, Knowledge workers, and Online creativity where the country ranks in the top 50 worldwide.

OVERVIEW OF NORTH MACEDONIA'S RANKINGS IN THE 7 GII AREAS

North Macedonia performs the best in Market sophistication and its weakest performance is in Human capital & research.



*The highest possible ranking in each pillar is 1.

NORTH MACEDONIA'S INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of North Macedonia's strengths and weaknesses in the GII 2019.

Strengths		
Code	Indicator name	Rank
1.3	Business environment	27
1.3.2	Ease of resolving insolvency*	28
2.1.5	Pupil-teacher ratio, secondary	22
3.3.3	ISO 14001 environmental certificates/bn PPP\$ GDP	12
4	Market sophistication	28
4.1.1	Ease of getting credit*	11
4.2.1	Ease of protecting minority investors*	6
5.1.2	Firms offering formal training, % firms	25
6.2.4	ISO 9001 quality certificates/bn PPP\$ GDP	24
6.2.5	High- & medium-high-tech manufactures, %	20
7.2.4	Printing & other media, % manufacturing	18
7.3.3	Wikipedia edits/mn pop. 15–69	29

Weaknesses		
Code	Indicator name	Rank
2.1.4	PISA scales in reading, maths & science	68
2.3.3	Global R&D companies, top 3, in mn US\$	43
2.3.4	QS university ranking, average score top 3*	78
3.2	General infrastructure	120
4.3.3	Domestic market scale, bn PPP\$	112
5.2	Innovation linkages	107
5.2.1	University/industry research collaboration†	108
5.2.5	Patent families 2+ offices/bn PPP\$ GDP	93
5.3.2	High-tech imports, % total trade	102
6.2.1	Growth rate of PPP\$ GDP/worker, %, 3-year average	90
7.1.3	ICTs & business model creation†	112
7.1.4	ICTs & organizational model creation†	111

STRENGTHS

- GII strengths for North Macedonia are found in all of the seven GII pillars.
- Pillar Market sophistication (28) is a notable strength for the country. Here additional strengths are indicators Ease of getting credit (11) and Ease of protecting minority investors (6).
- In Institutions (43), North Macedonia's strengths are sub-pillar Business environment (27) as well as one of its indicators - Ease of resolving insolvency (28).
- In Human capital & research (80), indicator Pupil-teacher ratio (22) is a relative strength for the country.
- In Infrastructure (71), one relative strength is found in indicator ISO 14001 environmental certificates (12).
- In Business sophistication (66), indicator Firms offering formal training (25) is a GII strength for North Macedonia.
- In Knowledge & technology outputs (66), North Macedonia's strengths are indicators ISO 9001 quality certificates (24) and High- & medium-high-tech manufactures (20).
- In Creative outputs (62), GII strengths for the country are indicators Printing & other media (18) and Wikipedia edits (29).

WEAKNESSES

- North Macedonia's weaknesses in the GII are found in six of the seven GII pillars.
- In Human capital & research (80), North Macedonia's weaknesses are indicators PISA results (68), Global R&D companies (43), and Quality of universities (78).
- Sub-pillar General infrastructure (120) is a relative weakness in Infrastructure (71).
- In Business sophistication (66), GII weaknesses are sub-pillar Innovation linkages (107) and indicators University-industry research collaboration (108), Patent families in two or more offices (93), and High-tech imports (102).
- In Creative outputs (62), two indicators – ICTs & business model creation (112) and ICTs & organizational model creation (111) – are relative weaknesses for North Macedonia.
- Other relative weaknesses for this economy are indicators Domestic market scale (112) in Market sophistication (28) and Labor productivity growth (90) in Knowledge & technology outputs (66).

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP\$	GDP per capita, PPP\$	GII 2018 rank	
63	52	Upper middle	EUR	2.1	32.3	15,709.5	84	
				Score/Value	Rank			
INSTITUTIONS				69.7	43			
1.1	Political environment		56.7	64	5.1	Knowledge workers 42.2 50		
1.1.1	Political and operational stability*		70.2	61	5.1.1	Knowledge-intensive employment, %..... 29.0 47		
1.1.2	Government effectiveness*		49.9	63	5.1.2	Firms offering formal training, % firms..... 46.9 25 ●		
1.2	Regulatory environment		70.1	52	5.1.3	GERD performed by business, % GDP..... 0.1 62		
1.2.1	Regulatory quality*		55.5	45	5.1.4	GERD financed by business, %..... 27.4 63		
1.2.2	Rule of law*		40.0	74	5.1.5	Females employed w/advanced degrees, %..... 13.8 47		
1.2.3	Cost of redundancy dismissal, salary weeks.....		13.0	42	5.2	Innovation linkages 18.0 107 ○		
1.3	Business environment		82.4	27 ● ◆	5.2.1	University/industry research collaboration*..... 29.2 108 ○ ◇		
1.3.1	Ease of starting a business*		92.1	42	5.2.2	State of cluster development*..... 37.0 99		
1.3.2	Ease of resolving insolvency*		72.7	28 ● ◆	5.2.3	GERD financed by abroad, %..... 5.9 59		
				Score/Value	Rank			
HUMAN CAPITAL & RESEARCH				26.4	80			
2.1	Education		48.7	[65]	5.2.4	JV-strategic alliance deals/bn PPP\$ GDP..... n/a n/a		
2.1.1	Expenditure on education, % GDP.....		n/a	n/a	5.2.5	Patent families 2+ offices/bn PPP\$ GDP..... 0.0 93 ○ ◇		
2.1.2	Government funding/pupil, secondary, % GDP/cap... n/a		n/a	n/a	5.3	Knowledge absorption 31.2 79		
2.1.3	School life expectancy, years.Ⓞ		13.3	79	5.3.1	Intellectual property payments, % total trade..... 0.9 41		
2.1.4	PISA scales in reading, maths, & science.....		368.9	68 ○	5.3.2	High-tech imports, % total trade..... 5.4 102 ○		
2.1.5	Pupil-teacher ratio, secondary.Ⓞ		9.4	22 ●	5.3.3	ICT services imports, % total trade..... 1.4 52		
2.2	Tertiary education		26.5	77	5.3.4	FDI net inflows, % GDP..... 3.8 43		
2.2.1	Tertiary enrolment, % gross.Ⓞ		41.1	69	5.3.5	Research talent, % in business enterprise..... 21.5 55		
2.2.2	Graduates in science & engineering, %Ⓞ		20.0	66	KNOWLEDGE & TECHNOLOGY OUTPUTS 21.6 66			
2.2.3	Tertiary inbound mobility, %Ⓞ		3.5	58	6.1	Knowledge creation 8.8 74		
2.3	Research & development (R&D)		4.0	80	6.1.1	Patents by origin/bn PPP\$ GDP.Ⓞ..... 1.6 51		
2.3.1	Researchers, FTE/mn pop.....		729.2	55	6.1.2	PCT patents by origin/bn PPP\$ GDP..... 0.2 52		
2.3.2	Gross expenditure on R&D, % GDP.....		0.4	72	6.1.3	Utility models by origin/bn PPP\$ GDP..... n/a n/a		
2.3.3	Global R&D companies, avg. exp. top 3, mn US\$.....		0.0	43 ○ ◇	6.1.4	Scientific & technical articles/bn PPP\$ GDP..... 8.1 57		
2.3.4	QS university ranking, average score top 3*.....		0.0	78 ○ ◇	6.1.5	Citable documents H-index..... 4.7 96		
				Score/Value	Rank			
INFRASTRUCTURE				44.9	71			
3.1	Information & communication technologies (ICTs)		66.6	65	6.2	Knowledge impact 39.3 52		
3.1.1	ICT access*.....		68.3	63	6.2.1	Growth rate of PPP\$ GDP/worker, %..... 0.0 90 ○		
3.1.2	ICT use*.....		56.3	62	6.2.2	New businesses/th pop. 15-64..... 3.9 33		
3.1.3	Government's online service*.....		71.5	69	6.2.3	Computer software spending, % GDP..... 0.1 80		
3.1.4	E-participation*.....		70.2	69	6.2.4	ISO 9001 quality certificates/bn PPP\$ GDP..... 14.3 24 ●		
3.2	General infrastructure		19.8	120 ○ ◇	6.2.5	High- & medium-high-tech manufactures, %.....Ⓞ 0.4 20 ● ◆		
3.2.1	Electricity output, kWh/mn pop.....		2,706.3	66	6.3	Knowledge diffusion 16.8 71		
3.2.2	Logistics performance*.....		30.0	80	6.3.1	Intellectual property receipts, % total trade..... 0.1 46		
3.2.3	Gross capital formation, % GDP.....		n/a	n/a	6.3.2	High-tech net exports, % total trade..... 1.1 67		
3.3	Ecological sustainability		48.2	37 ◆	6.3.3	ICT services exports, % total trade..... 2.5 42		
3.3.1	GDP/unit of energy use.....		10.1	49	6.3.4	FDI net outflows, % GDP..... 1.4 45		
3.3.2	Environmental performance*.....		61.1	61	CREATIVE OUTPUTS 28.1 62			
3.3.3	ISO 14001 environmental certificates/bn PPP\$ GDP..		7.5	12 ● ◆	7.1	Intangible assets 39.3 72		
				Score/Value	Rank			
MARKET SOPHISTICATION				57.1	28 ● ◆			
4.1	Credit		37.6	61	7.1.1	Trademarks by origin/bn PPP\$ GDP..... n/a n/a		
4.1.1	Ease of getting credit*.....		85.0	11 ● ◆	7.1.2	Industrial designs by origin/bn PPP\$ GDP..... 3.2 39		
4.1.2	Domestic credit to private sector, % GDP.....		50.0	68	7.1.3	ICTs & business model creation*..... 48.4 112 ○ ◇		
4.1.3	Microfinance gross loans, % GDP.....		0.3	39	7.1.4	ICTs & organizational model creation*..... 41.1 111 ○ ◇		
4.2	Investment		80.0	[3]	7.2	Creative goods & services 21.0 55		
4.2.1	Ease of protecting minority investors*.....		80.0	6 ● ◆	7.2.1	Cultural & creative services exports, % total trade..... 0.8 35		
4.2.2	Market capitalization, % GDP.....		n/a	n/a	7.2.2	National feature films/mn pop. 15-69..... 5.1 43		
4.2.3	Venture capital deals/bn PPP\$ GDP.....		n/a	n/a	7.2.3	Entertainment & Media market/th pop. 15-69..... n/a n/a		
4.3	Trade, competition, & market scale		53.8	93	7.2.4	Printing & other media, % manufacturing.Ⓞ..... 2.1 18 ●		
4.3.1	Applied tariff rate, weighted avg., %.....		1.9	52	7.2.5	Creative goods exports, % total trade..... 0.2 85		
4.3.2	Intensity of local competition*.....		62.5	95	7.3	Online creativity 12.7 45		
4.3.3	Domestic market scale, bn PPP\$.....		32.3	112 ○ ◇	7.3.1	Generic top-level domains (TLDs)/th pop. 15-69..... 6.7 47		
				Score/Value	Rank			

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 Appendix II for details, including the year of the data, at <http://globalinnovationindex.org>. 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 data that are missing or are outdated for North Macedonia.

Missing data

Code	Indicator name	Country year	Model year	Source
2.1.1	Expenditure on education, % GDP	n/a	2015	UNESCO Institute for Statistics
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	2015	UNESCO Institute for Statistics
3.2.3	Gross capital formation, % GDP	n/a	2018	International Monetary Fund
4.2.2	Market capitalization, % GDP	n/a	2017	World Federation of Exchanges
4.2.3	Venture capital deals/bn PPP\$ GDP	n/a	2018	Thomson Reuters
5.2.4	JV–strategic alliance deals/bn PPP\$ GDP	n/a	2018	Thomson Reuters
6.1.3	Utility models by origin/bn PPP\$ GDP	n/a	2017	World Intellectual Property Organization
7.1.1	Trademarks by origin/bn PPP\$ GDP	n/a	2017	World Intellectual Property Organization
7.2.3	Entertainment & Media market/th pop. 15–69	n/a	2017	PwC

Outdated data

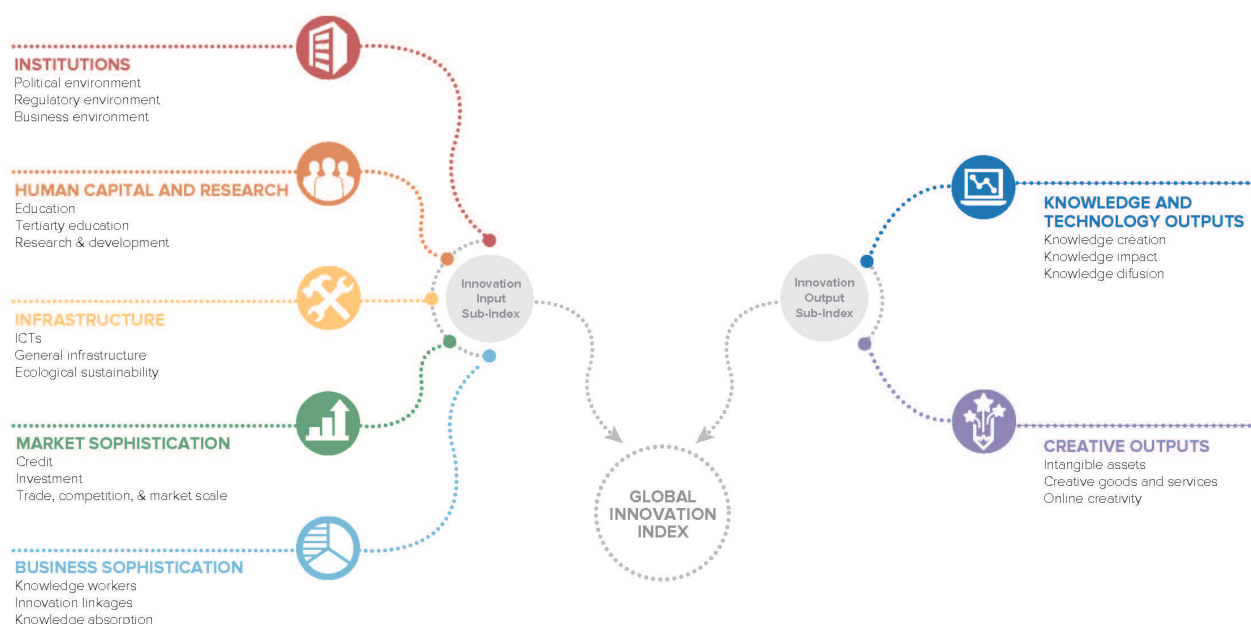
Code	Indicator name	Country year	Model year	Source
2.1.3	School life expectancy, years	2015	2016	UNESCO Institute for Statistics
2.1.5	Pupil-teacher ratio, secondary	2015	2017	UNESCO Institute for Statistics
2.2.1	Tertiary enrolment, % gross	2015	2017	UNESCO Institute for Statistics
2.2.2	Graduates in science & engineering, %	2015	2016	UNESCO Institute for Statistics
2.2.3	Tertiary inbound mobility, %	2015	2016	UNESCO Institute for Statistics
6.1.1	Patents by origin/bn PPP\$ GDP	2013	2017	World Intellectual Property Organization
6.2.5	High- & medium-high-tech manufactures, %	2015	2016	United Nations Industrial Development Organization
7.2.4	Printing & other media, % manufacturing	2015	2016	United Nations Industrial Development Organization
7.3.3	Wikipedia edits/mn pop. 15–69	2014	2017	Wikimedia Foundation

ABOUT THE GLOBAL INNOVATION INDEX

The Global Innovation Index (GII) is co-published by Cornell University, INSEAD, and the World Intellectual Property Organization (WIPO), a specialized agency of the United Nations. In 2019, the GII presents its 12th edition devoted to the theme **Creating Healthy Lives—The Future of Medical Innovation**.

Recognizing that innovation is a key driver of economic development, the GII aims to provide a rich innovation ranking and 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 countries that incorporate the GII into their innovation agendas.

Framework of the Global Innovation Index 2019



The Index is a ranking of the innovation capabilities and results of world economies. It measures innovation based on criteria that includes 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 containing three sub-pillars.

