North Macedonia

**57th**  
North Macedonia ranks 57th among the 131 economies featured in the GII 2020.

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 North Macedonia 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 North Macedonia in the GII 2020 is between ranks 55 and 65.

<table>
<thead>
<tr>
<th>Years</th>
<th>GII</th>
<th>Innovation inputs</th>
<th>Innovation outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>57</td>
<td>46</td>
<td>63</td>
</tr>
<tr>
<td>2019</td>
<td>59</td>
<td>52</td>
<td>63</td>
</tr>
<tr>
<td>2018</td>
<td>84</td>
<td>71</td>
<td>93</td>
</tr>
</tbody>
</table>

- North Macedonia performs better in innovation inputs than innovation outputs in 2020.
- This year North Macedonia ranks 46th in innovation inputs, higher than last year and higher compared to 2018.
- As for innovation outputs, North Macedonia ranks 63rd. This position is the same as last year and higher compared to 2018.

**13th**  
North Macedonia ranks 13th among the 37 upper middle-income group economies.

**35th**  
North Macedonia ranks 35th 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, North Macedonia’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.

North Macedonia produces less innovation outputs relative to its level of innovation investments.
BENCHMARKING NORTH MACEDONIA AGAINST OTHER UPPER MIDDLE-INCOME GROUP ECONOMIES AND EUROPE

North Macedonia’s scores in the seven GII pillars

Upper middle-income group economies

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

Conversely, North Macedonia scores below average for its income group in three pillars: Human capital & research, Business sophistication and Creative outputs.

Europe

Compared to other economies in Europe, North Macedonia performs:

- above average in one out of the seven GII pillars: Market sophistication; and
- below average in six out of the seven GII pillars: Institutions, Human capital & research, Infrastructure, Business sophistication, Knowledge & technology outputs and Creative outputs.
OVERVIEW OF NORTH MACEDONIA RANKINGS IN THE SEVEN GII AREAS

North Macedonia performs best in Market sophistication and its weakest performance is in Creative outputs.

*The highest possible ranking in each pillar is 1.

INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of the strengths and weaknesses of North Macedonia in the GII 2020.

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Code</strong></td>
<td><strong>Code</strong></td>
</tr>
<tr>
<td>1.3</td>
<td>2.1.4</td>
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<tr>
<td>1.3.2</td>
<td>2.3.3</td>
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<td>4.3.3</td>
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<td>5.2</td>
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<tr>
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<tr>
<td>4.1.1</td>
<td>5.2.2</td>
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<tr>
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<tr>
<td>6.2.4</td>
<td>7.1.4</td>
</tr>
<tr>
<td>6.2.5</td>
<td>2</td>
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<tr>
<td>7.2.1</td>
<td>2.4</td>
</tr>
<tr>
<td>7.2.4</td>
<td>2.6</td>
</tr>
</tbody>
</table>
STRENGTHS

GII strengths for North Macedonia are found in all GII pillars.

- Institutions (50): exhibits strengths in the sub-pillar Business environment (30) and in the indicator Ease of resolving insolvency (28).
- Human capital & research (72): shows strengths in the indicator Pupil-teacher ratio (18).
- Infrastructure (49): demonstrates strengths in the sub-pillar Ecological sustainability (17) and in the indicator ISO 14001 environmental certificates (7).
- Market sophistication (17): displays strengths in the indicators Ease of getting credit (23) and Ease of protecting minority investors (12).
- Business sophistication (66): exhibits strengths in the indicators Intellectual property payments (23) and FDI net inflows (33).
- Knowledge & technology outputs (58): reveals strengths in the indicators ISO 9001 quality certificates (22) and High- and medium-high-tech manufacturing (21).
- Creative outputs (76): shows strengths in the indicators Cultural & creative services exports (29) and Printing and other media (14).

WEAKNESSES

GII weaknesses for North Macedonia are found in five of the seven GII pillars.

- Human capital & research (72): exhibits weaknesses in the indicators PISA scales in reading, maths, & science (67), Global R&D companies (42) and QS university ranking (77).
- Market sophistication (17): shows weaknesses in the indicator Domestic market scale (115).
- Business sophistication (66): demonstrates weaknesses in the sub-pillar Innovation linkages (120) and in the indicators University/industry research collaboration (112), State of cluster development (101) and JV–strategic alliance deals (102).
- Knowledge & technology outputs (58): displays weaknesses in the indicator Growth rate of PPP$ GDP/worker (109).
- Creative outputs (76): reveals weaknesses in the indicators Global brand value (80) and ICTs & organizational model creation (112).
## NORTH MACEDONIA

### GI 2020 rank

<table>
<thead>
<tr>
<th>Output rank</th>
<th>Input rank</th>
<th>Income Region</th>
<th>Population (m)</th>
<th>GDP, PPP$</th>
<th>GDP per capita, PPP$</th>
<th>GI 2019 rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>63</td>
<td>46</td>
<td>Upper middle</td>
<td>EUR 2.1</td>
<td>34.3</td>
<td>14,393.0</td>
<td>57</td>
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</tbody>
</table>

### INSTITUTIONS

<table>
<thead>
<tr>
<th>Score</th>
<th>Value</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>68.9</td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>

#### 1.1 Political environment
- 1.1.1 Political and operational stability*: 58.6 65
- 1.1.2 Government effectiveness*: 71.4 58

#### 1.2 Regulatory environment
- 1.2.1 Regulatory quality*: 56.6 44
- 1.2.2 Rule of law*: 39.3 79
- 1.2.3 Cost of redundancy dismissal, salary weeks: 14.4 55

#### 1.3 Business environment
- 1.3.1 Ease of starting a business*: 88.6 63
- 1.3.2 Ease of resolving insolvency*: 72.7 28 ● ●

### HUMAN CAPITAL & RESEARCH

<table>
<thead>
<tr>
<th>Score</th>
<th>Value</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>29.1</td>
<td>72</td>
<td></td>
</tr>
</tbody>
</table>

#### 2.1 Education
- 2.1.1 Expenditure on education, % GDP: 53.3 [44]
- 2.1.2 Government funding/pupil, secondary, % GDPcap: n/a n/a
- 2.1.3 School life expectancy, years: 13.6 76
- 2.1.4 PISA scales in reading, maths, & science: 400.1 67 ○
- 2.1.5 Pupil-teacher ratio, secondary: 8.7 18 ●

#### 2.2 Tertiary education
- 2.2.1 Tertiary enrolment, % gross: 42.5 67
- 2.2.2 Graduates in science & engineering, %: 21.9 59
- 2.2.3 Tertiary inbound mobility, %: 4.7 47

#### 2.3 Research & development (R&D)
- 2.3.1 Researchers, FTE/1000 pop: 79.5 58
- 2.3.2 Gross expenditure on R&D, % GDP: 0.4 74
- 2.3.3 Global R&D companies, avg. exp. top 5, mn $US: 0.0 42 ○ ○
- 2.3.4 QS university ranking, average score top 3*: 0.0 77 ○ ○

### INFRASTRUCTURE

<table>
<thead>
<tr>
<th>Score</th>
<th>Value</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>46.4</td>
<td>49</td>
<td></td>
</tr>
</tbody>
</table>

#### 3.1 Information & communication technologies (ICTs)
- 3.1.1 ICT access*: 63.8 68
- 3.1.2 ICT use*: 58.6 60
- 3.1.3 Government’s online service*: 71.5 70
- 3.1.4 E-participation*: 70.2 70

#### 3.2 General infrastructure
- 3.2.1 Electricity output, kWh/mn pop: 2692.4 69
- 3.2.2 Logistics performance*: 29.8 80
- 3.2.3 Gross capital formation, % GDP: n/a n/a

#### 3.3 Ecological sustainability
- 3.3.1 GDP per unit of energy use: 50.0 55
- 3.3.2 Environmental performance*: 55.4 41 ●
- 3.3.3 ISO 14001 environmental certificates/1000 PPP$: 9.4 7 ● ●

### MARKET SOPHISTICATION

<table>
<thead>
<tr>
<th>Score</th>
<th>Value</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>59.7</td>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>

#### 4.1 Credit
- 4.1.1 Ease of getting credit*: 41.2 68
- 4.1.2 Domestic credit to private sector, % GDP: 50.3 68
- 4.1.3 Microfinance gross loans, % GDP: 0.3 43

#### 4.2 Investment
- 4.2.1 Ease of protecting minority investors*: 82.0 12 ● ●
- 4.2.2 Market capitalization, % GDP: n/a n/a
- 4.2.3 Venture capital deals/1000 PPP$: n/a n/a

#### 4.3 Trade, competition, and market scale
- 4.3.1 Applied tariff rate, weighted avg, %: 1.9 55 ○
- 4.3.2 Intensity of local competition: 62.5 96
- 4.3.3 Domestic market scale, bn PPP$: 34.3 15 O ○

### BUSINESS SOPHISTICATION

<table>
<thead>
<tr>
<th>Score</th>
<th>Value</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>25.4</td>
<td>66</td>
<td></td>
</tr>
</tbody>
</table>

#### 5.1 Knowledge workers
- 5.1.1 Knowledge-intensive employment, %: 33.4 60
- 5.1.2 Firms offering formal training, %: 28.7 49
- 5.1.3 GERD performed by business, % GDP: 0.1 60
- 5.1.4 GERD financed by business, %: 30.1 59
- 5.1.5 Females employed in advanced degrees, %: 13.4 52

#### 5.2 Innovation linkages
- 5.2.1 Number of University/industry research collaboration: 30.2 112 ○ ○
- 5.2.2 State of cluster development: 38.6 101 ○ ○
- 5.2.3 GERD financed by abroad, % GDP: 0.0 60
- 5.2.4 JV-strategic alliance deals/1000 PPP$: 0.0 102 ○
- 5.2.5 Patent families 2+ offices/1000 PPP$: 0.1 65

#### 5.3 Knowledge absorption
- 5.3.1 Intellectual property payments, % total trade: 14.2 23
- 5.3.2 High tech imports, % total trade: 5.5 103
- 5.3.3 ICT services imports, % total trade: 13.5 55
- 5.3.4 FDI net inflows, % GDP: 4.5 33 ○

### KNOWLEDGE & TECHNOLOGY OUTPUTS

<table>
<thead>
<tr>
<th>Score</th>
<th>Value</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>23.0</td>
<td>58</td>
<td></td>
</tr>
</tbody>
</table>

#### 6.1 Knowledge creation
- 6.1.1 Patents by origin/1000 PPP$: 16.4 48
- 6.1.2 PCT patents by origin/1000 PPP$: 0.1 58
- 6.1.3 Utility models by origin/1000 PPP$: n/a n/a
- 6.1.4 Scientific & technical articles/1000 PPP$: 8.6 57
- 6.1.5 Citable documents H-index: 6.1 95

#### 6.2 Knowledge impact
- 6.2.1 Growth rate of PPP$ GDP/worker, %: -1.1 109 ○
- 6.2.2 New businesses/1000 pop: 15-64: 3.6 39 ○ ○
- 6.2.3 Computer software spending, % GDP: 0.0 79
- 6.2.4 ISO 9001 quality certificates/1000 PPP$: 13.4 22 ○ ○
- 6.2.5 High-speed internet-high tech manufacturing, %: 41.6 21 ● ●

#### 6.3 Knowledge diffusion
- 6.3.1 Intellectual property receipts, % total trade: 0.1 48 ○ ○
- 6.3.2 High tech net exports, % total trade: 2.8 48 ○ ○
- 6.3.3 ICT services exports, % total trade: 2.6 40 ○ ○
- 6.3.4 FDI net outflows, % GDP: 1.0 57 ○ ○ ○

### CREATIVE OUTPUTS

<table>
<thead>
<tr>
<th>Score</th>
<th>Value</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.9</td>
<td>76</td>
<td></td>
</tr>
</tbody>
</table>

#### 7.1 Intangible assets
- 7.1.1 Trademarks by origin/1000 PPP$: n/a n/a
- 7.1.2 Grobal brand value, top 5000, % GDP: 0.0 80 ○ ○ ○
- 7.1.3 Industrial designs by origin/1000 PPP$: 1.9 51 ○ ○ ○
- 7.1.4 ICTs & organizational model creation: 41.1 112 ○ ○ ○

#### 7.2 Creative goods and services
- 7.2.1 Cultural & creative services exports, % total trade: 0.9 29 ○ ○ ○
- 7.2.2 National feature films/pop: 15-69: 5.1 44 ○ ○ ○
- 7.2.3 Entertainment & Media market/pop: 15-69: n/a n/a ○ ○ ○
- 7.2.4 Printing and other media, % manufacturing: 2.1 14 ○ ○ ○

#### 7.3 Online creativity
- 7.3.1 Generic top-level domains (TLD)/1000 pop: 15-69: 6.8 47 ○ ○ ○
- 7.3.2 Country-code TLDs/pop: 15-69: 5.7 49 ○ ○ ○
- 7.3.3 Wikipedia edits/1000 pop: 15-69: 66.2 45 ○ ○ ○
- 7.3.4 Mobile app creation on/1000 PPP$: 11.3 43 ○ ○ ○

NOTES: ● indicates a strength; ○ a weakness; □ an income group strength; □ an income group weakness; ◎ an indicator; ● a survey question; ○ indicates that the economy’s data are older than the base year; see Appendix I for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (MMC) requirements were not met at the sub-pillar or pillar level.
DATA AVAILABILITY

The following tables list data that are either missing or outdated for North Macedonia.

Missed data

<table>
<thead>
<tr>
<th>Code</th>
<th>Indicator name</th>
<th>Country year</th>
<th>Model year</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1.1</td>
<td>Expenditure on education, % GDP</td>
<td>n/a</td>
<td>2018</td>
<td>UNESCO Institute for Statistics</td>
</tr>
<tr>
<td>2.1.2</td>
<td>Government funding/pupil, secondary, % GDP/cap</td>
<td>n/a</td>
<td>2016</td>
<td>UNESCO Institute for Statistics</td>
</tr>
<tr>
<td>3.2.3</td>
<td>Gross capital formation, % GDP</td>
<td>n/a</td>
<td>2019</td>
<td>International Monetary Fund</td>
</tr>
<tr>
<td>4.2.2</td>
<td>Market capitalization, % GDP</td>
<td>n/a</td>
<td>2018</td>
<td>World Federation of Exchanges</td>
</tr>
<tr>
<td>4.2.3</td>
<td>Venture capital deals/bn PPP$ GDP</td>
<td>n/a</td>
<td>2019</td>
<td>Thomson Reuters</td>
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<tr>
<td>6.1.3</td>
<td>Utility models by origin/bn PPP$ GDP</td>
<td>n/a</td>
<td>2018</td>
<td>World Intellectual Property Organization</td>
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<tr>
<td>7.1.1</td>
<td>Trademarks by origin/bn PPP$ GDP</td>
<td>n/a</td>
<td>2018</td>
<td>World Intellectual Property Organization</td>
</tr>
<tr>
<td>7.2.3</td>
<td>Entertainment &amp; Media market/th pop. 15–69</td>
<td>n/a</td>
<td>2018</td>
<td>PwC</td>
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Outdated data

<table>
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</thead>
<tbody>
<tr>
<td>2.1.5</td>
<td>Pupil-teacher ratio, secondary</td>
<td>2017</td>
<td>2018</td>
<td>UNESCO Institute for Statistics</td>
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<tr>
<td>6.1.1</td>
<td>Patents by origin/bn PPP$ GDP</td>
<td>2013</td>
<td>2018</td>
<td>World Intellectual Property Organization</td>
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<tr>
<td>6.2.5</td>
<td>High- and medium-high-tech manufacturing, %</td>
<td>2015</td>
<td>2017</td>
<td>United Nations Industrial Development Organization</td>
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<tr>
<td>7.2.4</td>
<td>Printing and other media, % manufacturing</td>
<td>2015</td>
<td>2017</td>
<td>United Nations Industrial Development Organization</td>
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</table>
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 2020, the GII presents its 13th edition devoted to the theme *Who Will Finance Innovation?*

Recognizing that innovation is a key driver of economic development, the GII aims to provide an innovation ranking and rich analysis referencing around 130 economies. Over the last decade, the GII has established itself as both a leading reference on innovation and a “tool for action” for economies that incorporate the GII into their innovation agendas.

The Index is a ranking of the innovation capabilities and results of world economies. It measures innovation based on criteria that include institutions, human capital and research, infrastructure, credit, investment, linkages; the creation, absorption and diffusion of knowledge; and creative outputs.

The GII has two sub-indices: the Innovation Input Sub-Index and the Innovation Output Sub-Index, and seven pillars, each consisting of three sub-pillars.