



# European Innovation Scoreboard **2024** Country Profile **Croatia**

## European Innovation Scoreboard 2024 – Country profile Croatia

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# **European Innovation Scoreboard 2024 Country profile Croatia**

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**Emerging Innovator** ●Summary innovation index (relative to EU in 2017): **76.6**Rank: **26**Change vs 2023: ▼ **-0.1** Change vs 2017: ▲ **14.4**

Croatia is an Emerging Innovator with performance at 69.6% of the EU average in 2024. Performance is above the average of the Emerging Innovators (48%). Performance is increasing more than the EU (+10%).

Indicator	Performance relative to the EU in 2024	Performance change 2017-2024	Performance change 2023-2024
<b>SUMMARY INNOVATION INDEX</b>	<b>69.6</b>	<b>14.4</b>	<b>-0.1</b>
<b>Human resources</b>	<b>71.0</b>	<b>4.9</b>	<b>9.8</b>
New doctorate graduates	86.9	11.6	23.1
Population with tertiary education	76.0	0.0	0.0
Population involved in lifelong learning	45.8	0.0	0.0
<b>Attractive research systems</b>	<b>48.6</b>	<b>29.2</b>	<b>-0.6</b>
International scientific co-publications	79.6	46.8	-6.9
Scientific publications among the top 10% most cited	41.5	21.4	2.1
Foreign doctorate students as a % of all doctorate students	31.8	30.9	-0.5
<b>Digitalisation</b>	<b>67.1</b>	<b>22.7</b>	<b>-5.2</b>
Broadband penetration	50.8	73.6	17.6
Individuals with above basic overall digital skills	90.1	-27.5	-27.5
<b>Finance and support</b>	<b>81.4</b>	<b>42.5</b>	<b>-9.4</b>
R&D expenditure in the public sector	86.9	41.0	-1.6
Venture capital expenditures	135.5	94.9	-19.9
Direct and indirect government support of business R&D	7.7	-16.2	-8.5
<b>Firm investments</b>	<b>44.5</b>	<b>-15.7</b>	<b>-5.4</b>
R&D expenditure in the business sector	51.3	27.0	15.0
Non-R&D innovation expenditures	63.4	-62.2	-25.7
Innovation expenditures per person employed	19.7	-13.4	-6.6
<b>Use of information technologies</b>	<b>87.9</b>	<b>-12.3</b>	<b>-6.8</b>
Enterprises providing ICT training	90.8	-24.9	-13.4
Employed ICT specialists	85.2	0.0	0.0
<b>Innovators</b>	<b>131.3</b>	<b>54.5</b>	<b>0.0</b>
SMEs introducing product innovations	145.4	82.0	0.0
SMEs introducing business process innovations	119.8	28.5	0.0
<b>Linkages</b>	<b>111.5</b>	<b>58.0</b>	<b>8.0</b>
Innovative SMEs collaborating with others	99.6	30.8	0.0
Public-private co-publications	158.6	87.2	9.0
Job-to-job mobility of HRST	102.1	67.6	14.7
<b>Intellectual assets</b>	<b>46.1</b>	<b>8.6</b>	<b>1.7</b>
PCT patent applications	36.8	-3.6	-3.4
Trademark applications	70.5	30.3	5.1
Design applications	33.7	7.1	5.5
<b>Employment impacts</b>	<b>88.1</b>	<b>25.5</b>	<b>5.7</b>
Employment in knowledge-intensive activities	70.8	0.0	0.0
Employment in innovative enterprises	103.0	48.7	11.1
<b>Sales impacts</b>	<b>49.4</b>	<b>17.6</b>	<b>7.4</b>
Exports of medium and high technology products	52.5	-1.9	12.0
Knowledge-intensive services exports	13.6	4.7	-2.2
Sales of new-to-market and new-to-firm innovations	100.4	66.4	13.2
<b>Environmental sustainability</b>	<b>60.3</b>	<b>-20.2</b>	<b>-6.6</b>
Resource productivity	83.2	17.7	16.5
Air emissions by fine particulates	75.9	13.9	4.1
Environment-related technologies	17.6	-100.0	-40.9

**Relative strengths**

- Public-private co-publications
- SMEs introducing product innovations
- Venture capital expenditures

**Relative weaknesses**

- Direct and indirect government support of business R&D
- Knowledge-intensive services exports
- Environment-related technologies

**Strong increases since 2017**

- Venture capital expenditures
- Public-private co-publications
- SMEs introducing product innovations

**Strong decreases since 2017**

- Environment-related technologies
- Non-R&D innovation expenditures
- Individuals with above basic overall digital skills

**Strong increases since 2023**

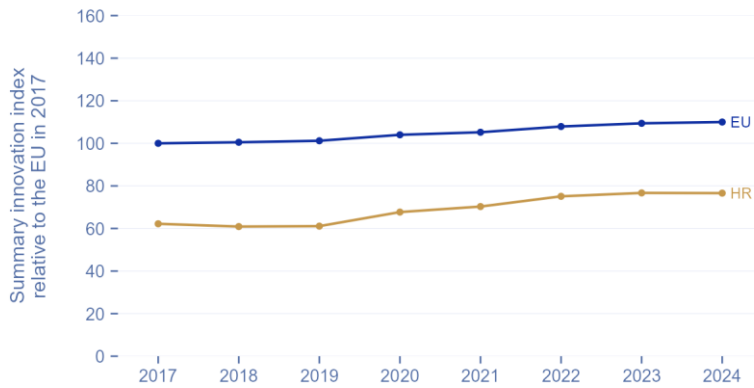
- New doctorate graduates
- Broadband penetration
- Resource productivity

**Strong decreases since 2023**

- Environment-related technologies
- Individuals with above basic overall digital skills
- Non-R&D innovation expenditures

**Footnote:** The first data column shows scores relative to the EU in 2024, with colour codes indicating performance levels. The subsequent columns show performance changes over time, with scores relative to the EU in 2017, coloured in purple for positive change and red for negative change. As reference years differ between the first column (2024) and the last two columns (2017), scores cannot be directly compared or subtracted across these columns.

Emerging Innovators Moderate Innovators Strong Innovators Innovation Leaders



### Summary innovation index

The line chart shows the evolution of the innovation performance of Croatia over time, relative to the performance of the EU in 2017.

**Footnote:** All performance scores (SII and dimensions below) are relative to that of the EU in 2017.

### Framework conditions

In Croatia, the availability of a highly educated workforce is limited, with only 35% of the Croatian population having tertiary education, which is among the lowest shares in the EU and represents 76.0% of the EU average. New doctorate graduates in STEM are below the EU average, although significantly above a few other EU countries and improving over years (+11.6%-points between 2017 and 2024). When it comes to lifelong learning, only 4% of the population is concerned, which is among the lowest across EU (45.8% of the EU average) and further highlights the challenges in the Croatian education system.

Furthermore, Croatia faces issues with low broadband penetration and declining digital skills. In 2024, 25% of the Croatian population reported having above basic digital skills (90.1% of the EU average), down from 31% in 2022. The lack of available skilled workers negatively affects the labour market, contributing to labour shortages, a low employment rate and slow productivity growth. To address these issues, Croatia is investing under the Recovery and Resilience Plan (RRP) and the European Social Fund Plus (ESF+) in training and upskilling, with an increased focus on skills related to the green and digital transition.

Efforts have been made to establish a more appealing research system, as evidenced by the +46.8%-point increase in international scientific co-publications since 2017, although it still remains below the EU average (79.6%). The improvements in the attractiveness of the research ecosystem are also visible through the increase of foreign doctorate students, which has almost quadrupled over the last years to stand at 8% in 2024, although it represents less than a third of the EU average. The share of publications among the top 10% cited remains among the lowest of the EU, despite the notable improvements over the years (+21.4%-points between 2017 and 2024). According to the European Semester Report (2024) of Croatia the modest quality of scientific publications could be attributed to low investments in research and innovation, along with the fragmentation of public research and higher education institutions, which affects the efficiency and impact of investments.

#### Human resources



#### Attractive research systems



#### Digitalisation



### Investments

Croatia's investments in innovation and R&D are catching up with the rest of the EU Member States. In particular, R&D expenditures in the public sector have increased dramatically over the last years, and stand at 0.65% of GDP in 2024, slightly below the EU average of 0.75%. When it comes to innovation investment by the private sector, the R&D expenditures in the business sector have significantly increased (+27.0%-points), while non-R&D expenditures have dramatically declined (-62.2%-points), leading to a drop in the overall innovation expenditures (R&D and non-R&D) per person employed (-13.4%-points between 2017 and 2024). Government was not in position to compensate for this decline as the direct and indirect government support to R&D in businesses has also decreased, reaching in 2024 one of the lowest levels of the EU, or 7.7% of the EU average.

At the same time, a significant increase has been recorded in venture capital investments, which have more than doubled in recent years (+94.9%-points) and outperforms the EU average in 2024 (135.5% of the EU performance). This has helped to partially offset the decrease in R&D spending by providing alternative funding sources for innovation in companies. However, according to the European Semester Report (2024), the lack of diverse financing sources complicates Croatian firms' access to finance.

Croatia has also experienced a slight decline in the use of information technologies, with a drop in the percentage of enterprises providing ICT training since 2017 (-24.9%-points). ICT specialists represent 4.3% of total employment in Croatia, close to the EU average of 4.8%.

Finance and support



Firm investments



Use of information technologies



### Innovation activities

Despite the mixed performance in innovation investments, Croatia's SMEs have become increasingly active in innovation activities over the recent years. The share of SMEs introducing product innovations and business process innovations both increased dramatically between 2017 and 2024, reaching respectively 35.6% and 47.2% and outperforming the EU average of 25.5% and 41.2%. Innovative SMEs also tend to collaborate increasingly with each other (+30.8%-points between 2017 and 2024), reaching similar levels of collaboration as those observed at the EU level.

Collaboration has developed significantly between the business sector and the public sector, as evidenced by the high performance in public-private co-publications, which is 158.6% of the EU average. Croatia's Science and Technology labour market is dynamic, with rapidly growing job-to-job mobility for staff working in this field (+67.6%-points between 2017 and 2024). The production of intellectual assets lags behind, with PCT patent applications and design applications among the lowest in the EU, around a third of the EU average performance. Trademarks applications are below the EU average as well but catching up gradually over the years, with an increase of 30.3%-points between 2017 and 2024.

Innovators



Linkages



Intellectual assets



### Impacts

While the share of employment in innovative enterprises (38.4%) gradually improved in Croatia since 2017, exceeding the EU average today, the share of employment in knowledge-intensive activities (12.6%) remains among the lowest in the EU (70.7% of the EU average), also linked to the significant skills mismatches on the Croatian labour market.

The growing innovation activities of Croatian SMEs and business sector led to a major increase in the sales of new-to-market and new-to-firm innovations (+66.4%-points between 2017 and 2024), reaching the EU average level. However, Croatian sales impacts of innovation activities in terms of exports are among the lowest across Member States. Exports of medium and high-tech products as well as exports of knowledge-intensive services are equally under-developed, representing only 52.5% and 13.6% of the EU average.

When it comes to environmental sustainability, Croatia has improved its resource productivity in recent years, performing at 83.2% of the EU average. However, Croatia has seen a significant and ongoing decrease in the production of patents related to environmental technologies, reaching the lowest level among all Member States in 2024 (17.6% of the EU average).

**Employment impacts****Sales impacts****Environmental sustainability****Structural differences****Performance and structure of the economy**

Croatia's GDP per capita is 73% the EU average. Nevertheless, the Croatian economy is rapidly growing, by 5% on average annually, the second highest GDP annual growth rate in the EU. According to the European Semester Report (2024), this growth was mainly driven by an increase in private consumption, resulting from a rise in employment and in real wages. Croatia is expected to maintain relatively high GDP growth rates in 2024 and 2025.

The economic structure of the country is still relatively more oriented toward manufacturing than the EU average (17.5% versus 15.8%), particularly in lower-medium tech sectors. The employment share in services (38.6%) is similar to the EU average, though less knowledge intensive.

SMEs account for 99.8% of enterprises in Croatia. The relative importance of SMEs in the Croatian economy is reflected in a turnover share of SMEs relatively higher than the EU average. On the other hand, the turnover share of large enterprises is considerably lower than the EU average. Lastly, the share of foreign-controlled enterprises in value added is significantly higher than the EU average (18.2% versus 13.3%), highlighting the importance of foreign investments.

**Business and entrepreneurship**

Croatia boasts one of the highest enterprise birth rates in the EU, with enterprise births representing 2.1% of active enterprises, the second highest rate in the EU. The high total entrepreneurial activity, nearly the double of the EU average, reflects a strong entrepreneurial culture. Additionally, the substantial share of foreign-controlled enterprises in Croatia likely contributes to the significant proportion of FDI net inflows in GDP.

**Innovation profiles**

Croatia's share of enterprises introducing product innovations new to the market and share of enterprises introducing product innovations new to the firm are slightly higher than the EU average. However, compared to the EU average, relatively fewer enterprises introduced business process innovations. Overall, Croatian non-innovative enterprises show a greater disposition and potential for innovation than the EU average.

**Governance and policy framework**

Croatia faces challenges in its governance framework. The high perception level of corruption and the significant lack of trust in the rule of law hinder the creation of a secure business environment. Innovation procurement as a share of total public procurement is 7.9%, below the EU average.

Nonetheless, Croatia's Recovery and Resilience Plan aims at improving the business environment and the efficiency of the public administration, and notably includes measures to speed up judicial processes and digitalise public services.

**Climate change**

Croatia shows negative results in the three climate change indicators, exhibiting a share of material resources coming from recycled waste materials two time lower than the EU average, relative higher greenhouse gas emissions from energy consumption, and weaker eco-innovation scores than the EU average.

**Demography**

On 1 January 2024, Croatia had a population of 3,916,518 inhabitants and an average annual population decline of 2.3%. According to the OECD (2024) in the last 20 years, Croatia has faced a population decline of 11.2% in total, owing primarily to low fertility rates and negative net migration. The decline was most pronounced in the least developed

areas of the country. Zadar and Zagreb were the only cities witnessing slight population growth (by 3.5% and 1.7%, respectively). The emigration of young, educated individuals combined with an ageing population will likely contribute to the shrinking of the workforce and a decline in economic growth and productivity.

## Structural indicators

The table below presents some structural differences between Croatia and the EU.

	HR	EU
<b>Performance and structure of the economy</b>		
GDP per capita	73	100
Average annual GDP growth (2021-2023 average)	5	1.9
Employment share Manufacturing	17.5	15.8
Employment share High and Medium high-tech	20.5	37.9
Employment share Services	38.6	39.8
Employment share Knowledge-intensive services	25	28.6
Turnover share SMEs	15.7	12.6
Turnover share large enterprises	37.3	49.6
Foreign-controlled enterprises – share of value added	18.2	13.3
<b>Business and entrepreneurship</b>		
Enterprise births	2.1	0.8
Total Entrepreneurial Activity	12.9	6.8
FDI net inflows	4.7	1.9
Buyer sophistication	2.7	3.6
<b>Innovation profiles</b>		
In-house product innovators with market novelties	14.4	11.7
In-house product innovators without market novelties	15.5	13.7
In-house business process innovators	15.9	17.6
Innovators that do not develop innovations themselves	8.2	6.1
Innovation active non-innovators	1.1	4.2
Non-innovators with potential to innovate	18.2	17.8
Non-innovators without disposition to innovate	26.9	30.6
<b>Governance and policy frameworks</b>		
Corruption Perceptions Index	49	64
Basic-school entrepreneurial education and training	2.8	2.6
Government procurement of advanced technology products	2.5	3.4
Rule of law	0.3	1
Innovation procurement as a share of total public procurement	7.9	9.2
<b>Climate change</b>		
Circular material use rate	5.7	11.5



	HR	EU
Greenhouse gas emissions intensity of energy consumption	87.4	82.8
Eco-Innovation Index	88.8	121.5
<b>Demography</b>		
Population size (in millions)	3.9	447
Average annual population growth (2021-2023 average)	-2.3	0.3
Population density	71.4	109

## References

The country's relative strengths and weaknesses for each indicator, compared to other EU Member States and neighbouring countries, can be found in [Annex B](#).

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This report provides the Country profile from the 2024 European Innovation Scoreboard for Croatia

*Studies and reports*

