

European Innovation
Scoreboard **2024**
Country Profile
Luxembourg

European Innovation Scoreboard 2024 – Country profile Luxembourg

European Commission

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European Innovation Scoreboard 2024 Country profile Luxembourg

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**Strong Innovator** ●Summary innovation index (relative to EU in 2017): **123.3**Rank: **11**

Change vs 2023: ▼ -2.5 Change vs 2017: ▼ -5.5

Luxembourg is a Strong Innovator with performance at 112.1% of the EU average in 2024. Performance is above the average of the Strong Innovators (111.3%). Performance is decreasing, compared to the EU growth of (+10%).

Indicator	Performance relative to the EU in 2024	Performance change 2017-2024	Performance change 2023-2024
SUMMARY INNOVATION INDEX	112.1	-5.5	-2.5
Human resources	168.7	26.8	13.0
New doctorate graduates	178.6	81.1	46.3
Population with tertiary education	192.9	-8.4	-4.8
Population involved in lifelong learning	128.7	-17.4	-19.4
Attractive research systems	202.3	23.9	-12.4
International scientific co-publications	283.8	116.5	-2.5
Scientific publications among the top 10% most cited	115.6	-4.3	-22.2
Foreign doctorate students as a % of all doctorate students	264.4	0.0	0.0
Digitalisation	115.4	5.4	-4.6
Broadband penetration	124.9	28.7	8.5
Individuals with above basic overall digital skills	102.3	-17.6	-17.6
Finance and support	64.4	-18.2	-7.1
R&D expenditure in the public sector	59.0	-18.0	-4.9
Venture capital expenditures	103.6	-31.7	-16.3
Direct and indirect government support of business R&D	21.8	-3.4	-0.1
Firm investments	43.8	2.6	-6.6
R&D expenditure in the business sector	31.9	-12.0	-2.2
Non-R&D innovation expenditures	50.2	16.2	-1.6
Innovation expenditures per person employed	50.8	4.1	-16.6
Use of information technologies	140.2	4.3	2.3
Enterprises providing ICT training	96.6	-21.7	4.5
Employed ICT specialists	182.3	29.0	0.0
Innovators	84.1	-33.9	0.0
SMEs introducing product innovations	87.8	-36.4	0.0
SMEs introducing business process innovations	80.8	-31.6	0.0
Linkages	179.2	47.9	-9.7
Innovative SMEs collaborating with others	82.5	7.3	0.0
Public-private co-publications	437.9	192.3	-10.0
Job-to-job mobility of HRST	154.1	14.7	-17.7
Intellectual assets	111.7	-36.9	-4.4
PCT patent applications	80.6	10.9	9.9
Trademark applications	165.5	-40.7	-15.3
Design applications	101.5	-96.4	-14.3
Employment impacts	127.0	-32.0	-1.2
Employment in knowledge-intensive activities	193.3	0.0	0.0
Employment in innovative enterprises	70.6	-61.4	-2.5
Sales impacts	68.9	-15.2	-4.4
Exports of medium and high technology products	62.0	-14.6	3.8
Knowledge-intensive services exports	104.5	-10.3	-1.8
Sales of new-to-market and new-to-firm innovations	24.6	-22.7	-21.1
Environmental sustainability	115.0	-10.5	4.2
Resource productivity	175.5	5.9	4.1
Air emissions by fine particulates	103.6	6.6	-0.6
Environment-related technologies	75.0	-48.4	10.7

Relative strengths

- Public-private co-publications
- International scientific co-publications
- Foreign doctorate students as a % of all doctorate students

Relative weaknesses

- Direct and indirect government support of business R&D
- Sales of new-to-market and new-to-firm innovations
- R&D expenditure in the business sector

Strong increases since 2017

- Public-private co-publications
- International scientific co-publications
- New doctorate graduates

Strong decreases since 2017

- Design applications
- Employment in innovative enterprises
- Environment-related technologies

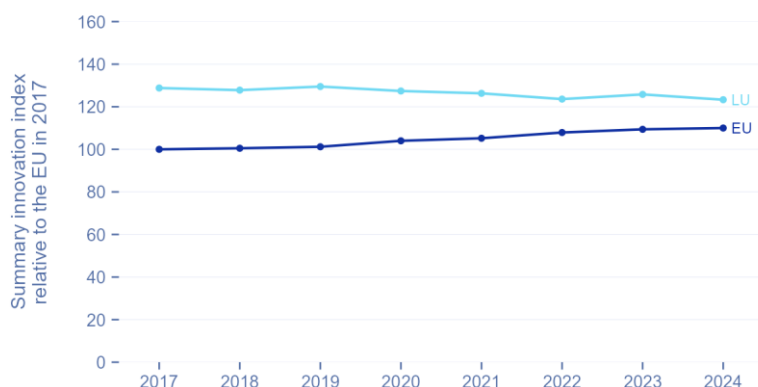
Strong increases since 2023

- New doctorate graduates
- Environment-related technologies
- PCT patent applications

Strong decreases since 2023

- Scientific publications among the top 10% most cited
- Sales of new-to-market and new-to-firm innovations
- Population involved in lifelong learning

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.



Summary innovation index

The line chart shows the evolution of the innovation performance of Luxembourg 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

Luxembourg is a Strong Innovator, performing above the EU average in terms of framework conditions, and with respect to all three dimensions considered. The country's dimension scores grew considerably since 2017, while growth vs. 2023 was in most indicators negative, but overall, not to a worrying degree. Luxembourg continued to improve in terms of human resources (+26.8%-points since 2017), particularly in terms of new doctorate graduates (+81.1%-points), also confirming the attractiveness of the country's research system, which performs exceptionally well in terms of international scientific co-publications (283.8% of the EU average in 2024). However, the share of the population with tertiary education and of those involved in lifelong learning continued to follow a downward trend, albeit remaining at high levels compared to peer countries.

While Luxembourg's research system remains highly attractive, some of its indicators are normalising following exceptionally strong readings in the aftermath of the pandemic. Meanwhile, the country is somewhat above the EU average in terms of digitalisation (115.4% of the EU average in 2024), but this positive performance is sustained essentially by high and improving broadband penetration, while digital skills are worsening and now only rank on a par with the EU average.

Human resources



Attractive research systems



Digitalisation



Investments

Luxembourg is moving further below the EU average in finance and support (64.4% of the EU average in 2024), as well as in firm investments (43.8% of the EU average in 2024). In the area of finance and support, public sector R&D spending and venture capital expenditure saw a further worsening in 2023, while government support for business R&D remained particularly weak, notwithstanding several initiatives to support of business innovation.

Firm investments are low and failing to improve across all dimensions, including on BERD as a share of GDP (31.9% of the EU average in 2024); this fact represents Luxembourg's apparent "Achilles' heel" among the dimensions, detracting from its otherwise outstanding country rankings. At the same time, the country's position as a major financial centre and its skewed industrial composition complicates the interpretation of financial indicators such as investment scores. On the positive side, its use of IT is above the European average (140.2% of the EU average in 2024), mostly thanks to a high share of employed ICT specialists; meanwhile, ICT training is just above the average.

Finance and support**Firm investments****Use of information technologies****Innovation activities**

While Luxembourg performs well in innovation activities overall, its outperformance compared to EU peers is exclusively concentrated in the area of linkages (179.2% of the EU average in 2024), while the indicators on innovators and intellectual assets are at the EU average only. SME-related indicators are below average values and have seen considerable declines since 2017. By contrast, Luxembourg's high interlinkages scores stand out, driven by on public-private co-publications and mobility of HRST, pointing to the country's excellence in terms of economic networks and openness. Finally, Luxembourg has seen a marked decline in terms of intellectual assets (-36.9%-points since 2017), thought this may also be owed to its idiosyncratic economic structure.

Innovators**Linkages****Intellectual assets****Impacts**

While Luxembourg performs well in two out of three indicators in the area of impacts, since 2017 the country has seen its rankings decline in almost every area. Employment impacts are above the EU average (127.0% of the EU average in 2024), while sales impacts are well below (68.9% of the EU average in 2024). Echoing the negative data on business R&D, employment in innovative enterprises scores low, as do sales of innovative or technologically advanced products and services. On a positive note, the country performs well in terms of environmental sustainability despite its low performance in terms of green technologies.

Employment impacts**Sales impacts****Environmental sustainability**

Structural differences

Performance and structure of the economy

Luxembourg is one of the most advanced and prosperous economies on the continent, with a high degree of openness that exposes it strongly to developments in neighbouring countries and trading partners. The country bounced back well from the pandemic and growth has resumed, notwithstanding the shock to the EU generated by the war in Ukraine and the European Central Bank's tighter monetary stance.

Economic growth in 2024 – 2025 is underpinned by resilient domestic demand, although fixed investment activity is still held back by relatively tight financing conditions. Despite the strength of its financial sector, which accounts for some 30% of GDP, Luxembourg is diversifying its economy in other sectors such as logistics and the IT sector. Its manufacturing sector is very small, while the employment share in services and knowledge-intensive services is well above the EU average. The turnover of its SMEs sector is close to the EU average, while the large enterprises sector is below it. However, the country's openness and attractiveness for foreign companies is especially evident in terms of share of value added generated by foreign-controlled enterprises, which is well above the EU average.

Business and entrepreneurship

The entrepreneurial dynamics of the Luxembourgish economy are slightly better than the EU average, with a positive rate of enterprise births and total entrepreneurial activity. The country has long been extremely attractive for foreign investors for its highly developed financial sector and for its extremely competitive tax regime. While it is argued that Luxembourg's tax rules are used by companies to engage in aggressive tax planning, FDIs in the country shrank considerably over the period 2020 – 2022. In 2023, the new Luxembourg FDI Screening Law was introduced and its impact on investment is yet to be seen. While BERD is low with respect to the very high GDP levels, the country hosts many R&D top performers. Its level of buyer sophistication is also relatively high.

Innovation profiles

No data is available.

Governance and policy framework

Luxembourg represents a very attractive country for investments when the governance and policy framework are considered. While government investment in R&D remains low and innovation procurement as a share of total public procurement is well below par, all other related indicators point to a stable and supportive business environment. The corruption perception index and the rule of law scores are much higher than the EU average, while the country ranks well in terms of government procurement of advanced technology products. The country's economy is extremely dynamic and offers a favourable entrepreneurial culture, which is supported by a long tradition of entrepreneurial education and training.

Climate change

The performance of Luxembourg with respect to circular material use rate is very low with respect to the EU average. While the country ranks high in terms of eco-innovation performance, its circular economy is affected by high waste generation, material footprint and import dependence. GHG emissions are also higher than the EU average, despite its small manufacturing sector, with the largest contributor being the transport sector.

Demography

Luxembourg counts some 647,000 inhabitants and is one of the smallest countries in Europe in terms of size. Unlike many other European countries, its favourable living conditions, work opportunities and high wages have attracted many workers, many of which commute cross-border, compensating the negative effects of an ageing population. In fact, its population growth rate is high and well above the EU average, while it continues to rank as a densely populated Member State.

Structural indicators

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

	LU	EU
Performance and structure of the economy		
GDP per capita	253.7	100
Average annual GDP growth (2021-2023 average)	0.1	1.9
Employment share Manufacturing	3.1	15.8
Employment share High and Medium high-tech		37.9
Employment share Services	43.5	39.8
Employment share Knowledge-intensive services	56	28.6
Turnover share SMEs	13.9	12.6
Turnover share large enterprises	44.4	49.6
Foreign-controlled enterprises – share of value added	22.7	13.3
Business and entrepreneurship		
Enterprise births	0.9	0.8
Total Entrepreneurial Activity	8	6.8
FDI net inflows	-117.3	1.9
Top R&D spending enterprises	57.7	8.4
Buyer sophistication	4.9	3.6
Governance and policy frameworks		
Corruption Perceptions Index	78.7	64
Basic-school entrepreneurial education and training	3.9	2.6
Government procurement of advanced technology products	4.7	3.4
Rule of law	1.8	1
Innovation procurement as a share of total public procurement	4.5	9.2
Climate change		
Circular material use rate	6.3	11.5
Greenhouse gas emissions intensity of energy consumption	90.2	82.8
Eco-Innovation Index	179	121.5
Demography		
Population size (in millions)	0.6	447
Average annual population growth (2021-2023 average)	2	0.3
Population density	245.4	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](#).



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

Studies and reports

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