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Smart Innovation Ecosystems

ESTONIA - national innovatio framework & ESTONIA analysis of the innovation status

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ESTONIA - national innovation framework

• Research, development & innovation GOVERNANCE/SYSTEM

The responsibility for implementation of the strategy is shared equally between the Ministry Economic Affairs and Communications and the Ministry of Education and Research.

The national research and innovation policy is guided by the Research and Development Council, comprising four ministers and eleven members appointed by the government. In addition to advising the Government on R&D related matters, the Council also submits an annual report on upcoming R&D objectives. The Research and Development Council has a say in the Government's draft state budget, relating to R&D financing.

The overall R&D sector is regulated by the Organisation of Research and Development Act. The Act outlines, details, regulates and enforces everything R&D related in the country. From organisation of R&D institutions and state involvement, to financing and staff requirements.

In January 2021, The Estonian Reform Party and the Estonian Centre Party formed a government and signed an agreement to maintain the progressive nature of Estonia, aiming to continually develop the state in all fields and regions. This included some of the following relevant RDI points:

- „We will allocate at least 1% of the GDP to research and development. We will prioritise investments made into research and development by the private sector."
- „We will create a financial facility of the future to accelerate the climate and digital transitions, resources from which will be directed into research, development, and establishing a knowledge-based economy."
- „We will support companies that can contribute to creating and implementing science-based and innovative technologies and need the support of the state in decreasing investment risks."
- „We will implement an applied research program to support enterprises in establishing and funding applied research and finding suitable partners."
- „We will implement a support measure for start-up companies and find a solution for the shortage of specialists, making Estonia an attractive country for creating and testing innovative solutions."

Startup Estonia is also a leading figure in supporting and uplifting startups and innovation. The head of Startup Estonia, Eve Peeterson spoke in an interview with Invest Estonia, that „Estonia is a flagship tax-competitive country in the whole OECD. It can boast of the simplest and most transparent taxation regime. We are also talking 0% income tax on retained and reinvested profits, clear stock options regulation, plus double taxation treaties on file with at least 60 countries."

• POLICY & STRATEGIES boosting research, development & innovation

The priorities of Estonian RDI are set in the E**stonian Research and Development, Innovation and Entrepreneurship Strategy 2021-2035**, which connects science more closely with the society and economy and sets common goals and directions till 2035. There are four general indicators for measuring the success of the strategy:

Indicator	Unit	Baseline level	Reference year	Target level 2035
R&D funding as a share of GDP	%	0.75	2019	≥1
Private sector R&D expenditure as a share of GDP	%	0.86	2019	2
Nominal labour productivity compared to the EU 27 average	%	78.7	2019	110
Ranking in the European Innovation Scoreboard		Strong innovator	2020	Innovation leader

The strategy focuses on **three axes: knowledge transfer, research system and business environment.** Each of them having 2-3 key indicators with target values.

To promote knowledge transfer, Estonia will focus on the following lines of action:

- increasing the RDI intensity and knowledge transfer capacity of enterprises,
- increasing the knowledge transfer capacity of research institutions and higher education
- institutions,
- strengthening the societal and economic impact of R&D and innovation.

To ensure basic capabilities of the research system, Estonia will focus on the following lines of action:

- maintaining a high level of research excellence, enabling research institutions and the research community to increase their capabilities,
- ensuring the availability and quality of research infrastructures and supporting the shared use of infrastructures,
- providing opportunities for international research cooperation.

To create supportive business environment, Estonian will focus on the following lines of action:

- developing a competitive and smart business and consumer environment,
- increasing the capacity for higher added value and exports,
- fostering technology- and development-intensive investments.

- PROGRMMES boosting research, development & innovation

2014-2020

	Name of the program	Measure/ Call	Target beneficiaries	(N) National/ (R)Regional/ (E) European	I) Individual application or (C)Collaborative
1	Applied research programme	Aims to support the development of innovative products and services through financial backing.	SMEs	National	Individual application
2	Innovation and development voucher grants	Aims to raise the competitiveness of Estonian SMEs through offering innovative products and services with higher additional value, as well as creating new technologies	SMEs	National	Individual application
3	Estonian Research Council grants	The grant is aimed at supporting high-quality R&D projects and the accompanying research activities.	SMEs	National	Individual application

Forthcoming 2021-2027

	Name of the program	Measure/ Call	Target beneficiaries	(N) National/ (R)Regional/ (E) European	I) Individual application or (C)Collaborative
1	Development cooperation consulting for product and service development	- Aid businesses in becoming leading innovators in their sector. -Aid businesses in broadening their scope, finding new networks and development partners. -Aid businesses in developing their product, service and/or project and finding funding.	SMEs	National	Individual application
2	Diagnostics of innovation capacitys	Improving business' innovation capacity by rating and mapping their strengths and weaknesses, with a thorough report on what to improve	SMEs	National	Individual application
3	Applied research programme	Aims to support the development of innovative products and services through financial backing.	SMEs	National	Individual application
4	Estonian Research Council grants	The grant is aimed at supporting high-quality R&D projects and the accompanying research activities	SMEs	National	Individual application

ESTONIA analysis of the innovation status



• Introductory data about the region

Estonia has 1.33 million inhabitants in 2022, 615 000 of them live in the capital city Tallinn and the surrounding county. The other bigger regional centres include Tartu, Narva and Pärnu, and altogether 62% of the population lives in urban settlements.

Majority of the research and development activities takes place in the capital region of Tallinn, university town Tartu and industrial north-eastern Estonia.

The unemployment rate was 5.6% in IIIQ 2022 in Estonia.



• Macroeconomic indicators and business environment

The innovativeness of Estonian companies has remained relatively high in recent years. According to the innovation survey conducted for the years 2018–2020, 64% of Estonian companies were innovative. The result has fallen somewhat compared to the past, but remains at a good level. The most innovative are large companies with more than 250 employees, almost all of which, or 92%, are innovative. The most innovative industries are architecture and engineering, research and development, and advertising and market research companies. The least innovative is the wholesale, transportation, and warehousing sector. Companies in the industrial and service sectors are at a relatively similar level of innovation, 65% and 63%, respectively.

	2015	2016	2017	2018	2019	2020	2021	2022
50-249 employees	1 200	1 184	1 150	1 172	1 159	1 156	1 122	1 136
10-49 employees	6 281	6 293	6 391	6 548	6 779	6 509	6 284	6 572
less than 10 employees	109 722	112 777	119 887	123 744	125 662	130 143	138 134	140 783
Total SMEs	117 203	120 254	127 428	131 464	133 600	137 808	145 540	148 491
Population	1 313 271	1 315 944	1 315 635	1 319 133	1 324 820	1 328 889	1 330 068	1 331 796
SMEs per 1000 persons	89	91	97	100	101	104	109	111
GDP per person EUR	20 631	21 282	22 515	23 367	24 241	24 107	26 039	

Table no. 1. Estonian SMEs and GDP per person, 2015 -2022

The innovativeness of companies is divided into two: process innovation and product innovation.

Process innovations are activities during which companies have developed their work or production processes. The survey shows that in recent years more emphasis has been placed on renewing the work

organisation. This may be caused by the fact that during the study period there was a massive spread of the coronavirus, which is why it was imperative for companies to change their work arrangements, and a lot of people began to use the option of working from home offices.

Product innovation refers to the development of companies' goods and services, including competitive and non-competitive products. Competitive products are goods and services that others already offer, but which are new to the company itself. Non-competitive products include products that are not yet offered on the market. Estonian companies are rather characterised by the renewal of competing products and the improvement of goods and services.

Innovations related to the environment were also an important part of this study, which show the extent to which companies are committed to the environmental issues and to what extent they adapt their operations to be more environmentally sustainable. At the time of the survey, environmentally friendly innovations that reduce the use of energy or the CO2 footprint both in work processes and in the consumption of products were mostly dealt with. A lot of attention was also paid to the reduction of materials and water in the work processes.

- Business support framework

In Estonia, the main stakeholders of the business support framework are:

- Ministry of Economic Affairs and Communications,
- Estonian Business and Innovation Agency, formerly Enterprise Estonia, which is the key national entrepreneurship supporting agency.
- Estonian Chamber of Commerce and Industry, representing more than 3600 companies, who pay more than 40% of all the taxes in Estonia.
- Local governments and municipalities, among them Tallinn and Tartu focusing a bit more among other topics also on innovativeness of companies.
- County based business support centres (in total 15), who provide a variety of business support services for early-phase and experienced entrepreneurs..
- Universities, research and development organisations, University of Tartu and Tallinn Technical University being the largest research organisation.
- Incubators and accelerators for startups, where the number has rapidly increased during the last 5 years, including at least 35 incubators and accelerators for pre-start-ups, start-ups and scale-ups.

Regarding innovation, a few networks can be highlighted.

2% club as a section of **Estonian Employers' Confederation**: community of development managers and entrepreneurs who invest 2% of their companies' turnover or at least one million euros per year in research and development activities.

Estonian Innovation Leaders Club: The Innovation Leaders Club is a community of corporations, universities, start-ups and business support organisations, whose joint activities pave the way for innovative future solutions that put Estonian companies at the forefront of innovation in the world.

• Private funding

Estonia is one of the most successful countries, when it comes to raising venture capital investments per capita out. In 2022 Estonia had investment levels at a 3.6% share of GDP. The only other country in the 'above 1% of GDP' category on their investment levels is Croatia.

"Estonia, one of the smallest countries in the Central and Eastern Europe, leads the whole of Europe when it comes to VC investments per capita as well as start-up creation — €1,967 per capita raised and one start-up per 1,048 people — which won't come as a surprise to many readers," wrote Sifted in 2021.

In 2022 the tech market is experiencing a dramatic overhaul, and Estonia is at €994 invested per capita, beating the European average of just €132. The closest competitors are the Nordic nations: Iceland (€511) and Sweden (€449).

• Foreign direct investments

Estonia is among the leading countries in Central and Eastern Europe regarding foreign direct investments per capita.

The country is highly developed in the FDI-attractive fields of IT, biotechnologies, and green industries. A balanced budget, a free trade regime, a fully convertible currency, a competitive banking sector, and an investment-favorable environment have all contributed to the success of the country. FDI by field of activity, share in total (2021):

- 30% financial and insurance activities
- 18% wholesale and retail trade
- 17% real estate activities
- 11% manufacturing
- 7% professional, scientific and technical activities
- 5% information and communication

Origin of FDI (2021):

- 21% Finnish companies
- 19% Luxembourgian companies
- 13% Swedish companies
- 8% Latvian companies
- 6% Belgian companies
- 4% Lithuanian companies

- Education environment

Upon regular evaluation, i.e. external evaluation, research of a specific field of the R&D institution is assessed, comparing it with the internationally recognised criteria. Twenty-two Estonian research institutions have successfully passed regular evaluation in at least one field, including six public universities: the University of Tartu, Tallinn University of Technology, Tallinn University, the Estonian University of Life Sciences, the Estonian Academy of Music and Theatre, and the Estonian Academy of Arts

Compared to non-evaluated institutions, a positive evaluation grants R&D institutions an opportunity to apply for funding from the state budget for their research and development activities.

- Research & Innovation

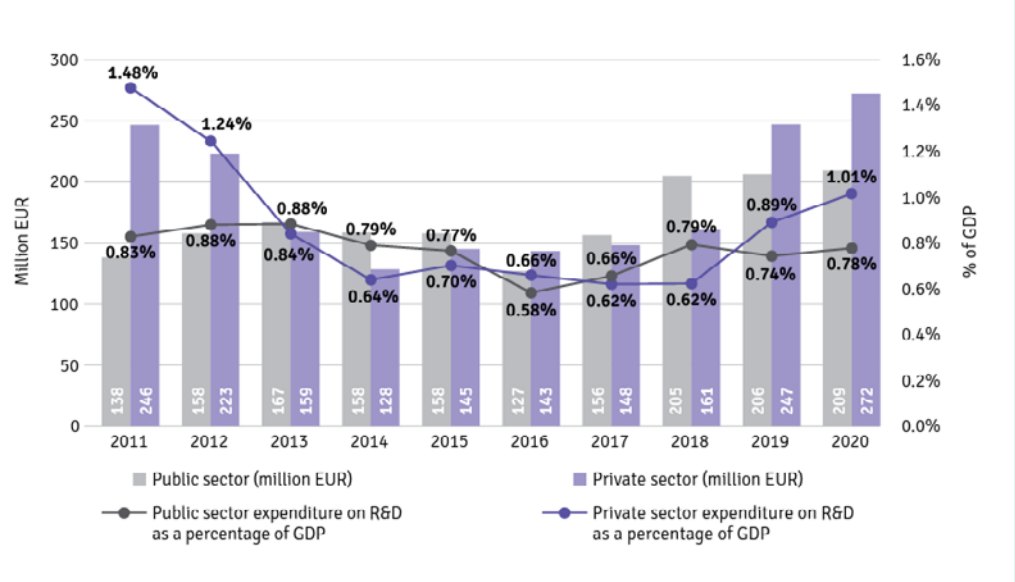


Fig. no. 1. Public authorities – status in relation to innovation / digitalization [general info about the level, which innovative instruments are used, if its a national digital network or local, which kind of services are digitized] - + example of used cases / awards

In 2019, private sector R&D investments increased after a long period of time, and the growth continued in 2020 as well, reaching 1.01% of GDP. In absolute terms, the investments amounted to 272 million euros, which exceeds the result of the record year 2011 (246 million euros), when Eesti Energia made large investments in the Enefit Technology. The number of companies investing in research and development has been on an upward trend since 2015, although 286 companies with R&D expenditure are only a tiny drop in the ocean of Estonian economy, with about 50,000 economically active companies. In addition to very few companies investing in R&D, these investments are also highly concentrated, and the concentration has increased over the last ten years. 75% of the total investment in 2019 was made by only 9.1% of all enterprises with R&D expenditure (14.2% of enterprises in 2008) and 90% of the total investment by only 25.2% of enterprises (32.2% of enterprises in 2008).

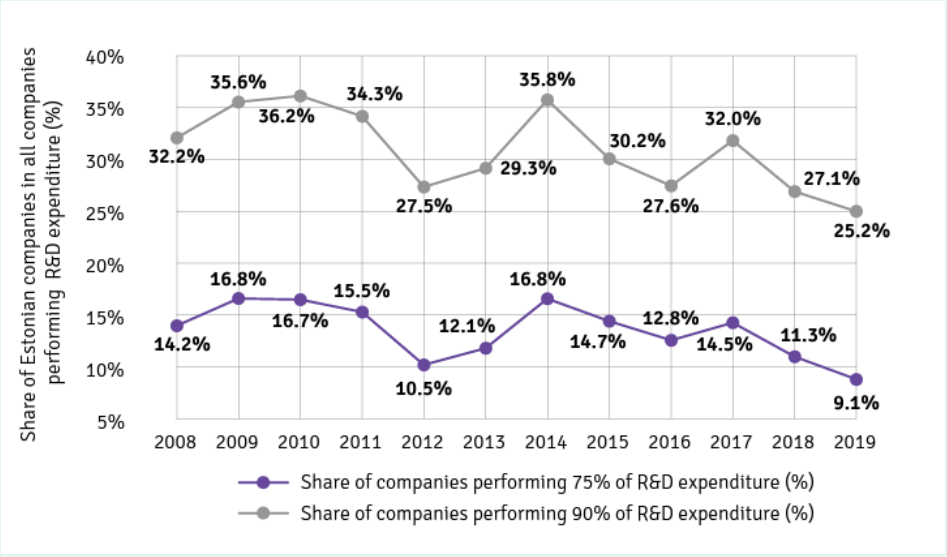


Fig. no. 2. Share of Estonian companies in all companies performing R&D expenditure, which accounted for 75% and 90% of all business R&D expenditure in 2008–2019.
Source: Statistics Estonia.

As expected, larger companies are also the largest R&D investors: in 2019, 65% of investments were made by companies with more than 100 employees (57 companies), including 45% of expenditures by companies with more than 250 employees (28 companies).

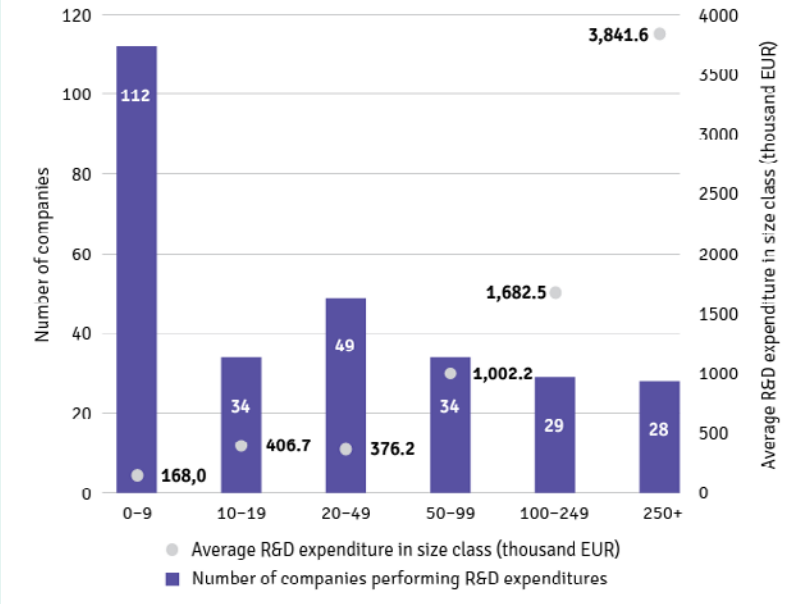


Fig. no. 3. Estonian companies performing R&D expenditures by size classes in 2019.
Source: Statistics Estonia.

• Conclusions - SWOT Analysis

STRENGTHS - "sweet spots"

- E-Governance: Estonia's e-governance system is one of the most advanced in the world, providing digital solutions for everything from healthcare to taxes.
- Start-up Ecosystem: The country has a thriving start-up ecosystem with a supportive environment for innovative businesses.
- Government Support: The Estonian government provides significant support for innovation, including funding for research and development and tax incentives for technology companies.
- Digital Infrastructure: Estonia has a highly developed digital infrastructure, making it an ideal location for technology companies.
- Talent Pool: The country has a highly educated population and a strong talent pool in technology and engineering, contributing to the development of innovative technologies.
- Collaboration: There is a strong network of collaboration between universities, research institutions, and industry, fostering a culture of innovation and knowledge transfer.
- Cybersecurity: Estonia has a well-developed cybersecurity infrastructure and is known for its expertise in the field.
- Digital Identity: The country's digital identity system is one of the most advanced in the world, providing a secure and efficient way to manage personal information online.
- Data Exchange Platform: The country has a data exchange platform that allows for the efficient sharing of information between government agencies and businesses.
- Innovation Policy: The government has a comprehensive innovation policy that includes funding for research and development, tax incentives for technology companies, and support for start-ups.

WEAKNESSES - weak spot

- Limited Domestic Market: Estonia has a small domestic market, which limits the potential for the growth of innovative companies.
- Dependence on Foreign Investment: The country's innovation system is heavily dependent on foreign investment, which limits its resilience in times of economic downturns.
- Limited Access to Capital: In some sectors (e.g. deep-tech) start-ups and small businesses face difficulties accessing capital, which limits their ability to grow and innovate.
- Skill Gaps: Despite a strong talent pool, there are skill gaps in certain areas, such as data science and artificial intelligence, that need to be addressed.
- Lack of Diversity: The innovation ecosystem in Estonia lacks diversity in terms of both gender and ethnicity, which to some extent limits its ability to tap into a full range of ideas and perspectives.
- Competition for Talent: The country faces competition for talent from larger technology hubs, which makes it difficult to attract and retain top talent.
- Regulations: The regulatory environment in Estonia is too rigid for some innovative companies, and there is a need for more flexibility and adaptability.

- Language Barriers: Despite the high level of English proficiency in Estonia, there may still language barriers that limit the ability of non-native speakers to participate fully in the innovation ecosystem.
- Collaboration Challenges: There are certain challenges for collaboration between different sectors and organisations in the innovation ecosystem, which limit the effectiveness of the system as a whole.

OPPORTUNITIES - near-to-market opportunities

- Encouraging Diversity: The innovation ecosystem in Estonia does not fully reflect the diversity of the population, and there is untapped potential to increase diversity in terms of gender, ethnicity, and background.
- Supporting Social Innovation: While the country has a strong focus on technology innovation, there are opportunities to support and encourage social innovation as well.
- Building International Partnerships: There is untapped potential for partnerships and collaborations with other innovation hubs around the world.
- Attracting International Talent: Despite its strong talent pool, there are opportunities to attract top talent from other countries to further strengthen the innovation ecosystem.
- Developing Infrastructure: While Estonia has a strong digital infrastructure, there are opportunities to improve and develop other areas of infrastructure, such as transportation and energy, to support innovation.
- Encouraging Collaboration: Despite the existing network of collaboration, there are opportunities to further encourage and facilitate collaboration between different sectors and organizations in the innovation ecosystem.
- Investing in Research: While there is significant funding for research and development, there are opportunities to increase investment in basic and applied research to support long-term innovation.
- Fostering a Culture of Innovation: While innovation is valued in Estonia, there are opportunities to further foster a culture of innovation and encourage more people to pursue entrepreneurial and innovative initiatives, especially in knowledge intensive areas.

THREATS - external

- Competition from larger, more established innovation ecosystems, such as those in Western Europe and North America.
- Lack of funding for startups, particularly compared to other innovation ecosystems.
- Difficulty attracting and retaining top talent, particularly for early-stage startups.
- Limited access to international markets, which could limit the potential for growth and success.
- Lack of infrastructure and resources to support innovation and entrepreneurship.
- The need to constantly adapt to rapidly changing technologies and market conditions.
- Competition for attention and resources from other industries and sectors, such as tourism and manufacturing.