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Fuelling scientific innovation: eu funding opportunities for high growth enterprises

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ABSTRACT

Scientific innovation is essential for economic growth, societal progress, and global competitiveness. High-tech startups are key players in transforming research into market-ready products. However, they often face challenges in bridging the gap between research and commercialization. The European Union (EU) addresses these challenges through funding mechanisms such as Horizon Europe, which provide substantial support for high-risk innovations in areas like artificial intelligence, healthcare, and sustainability.
By utilising EU funding opportunities enabling technological progress, startups can contribute to a sustainable European economy, while addressing global challenges as well.

Keywords: European Union (EU) funding, Scientific innovation, High-tech startups, Research to Commercialization, Horizon Europe, EIC Accelerator

1. Introduction

Importance of Scientific Innovation

Scientific innovation is a cornerstone of economic growth, competitiveness, and societal advancement. High-tech startups play an important role in forming cutting-edge research into marketable applications. However, bridging the gap between research and commercialization often requires substantial resources. EU funding is instrumental in addressing this gap by supporting high-risk, high-reward innovations and enabling tech startups to scale and succeed globally.

Role of Startups in the EU Economy

High-growth enterprises serve as engines of job creation, industrial renewal, and productivity in the EU's single market. These companies are essential to post-COVID-19 economic recovery and vital for continuous EU economic growth. The symbiotic relationship between startups and innovation emphasises their collective role in shaping a healthy economy.

Practical guidance

There are many European funding programmes, and as we will see below, they can be quite difficult to navigate. Fortunately, there are effective methods available to help find the right funding opportunities for our small and medium-sized enterprises (SMEs). The aim of this

article is not only to provide an overview but also to offer guidance on accessing suitable resources for our own business.

2. Research methodology

My paper focuses on two main topics:

1. The overview and statistical comparison of European countries based on their innovation index and number of high growth companies in the country.
2. The funding mechanism structures of the European Commission.

I synthesise data from EU policy documents, funding program guidelines, statistics, and case studies to evaluate the scope and impact of EU funding opportunities. My approach begins with an evaluation of the innovative characteristics of various European countries. This is followed by a quantitative analysis of high-growth enterprises using statistical datasets. For the statistical analysis I will analyse the relationship between the innovative value and the number of startups and SMEs by examining statistical data. Finally, the two indicators are compared to draw conclusions from the findings.

3. Theoretical background

3.1. Importance of Scientific Innovation

Economic literature and policy initiatives suggest (Smaranda and Tkacik 2024) that venture capital (VC) plays a key role in helping innovative start-ups grow by providing both finance and business know-how. A review of 34 firm-level studies in Europe found that VC has a predominantly positive impact on firm expansion and reducing credit limitations, though its effects on innovation, productivity, and positive exits are miscellaneous. The findings support the use of government VC (GVC) as a policy instrument to scale up high-tech start-ups.

Within the EU, the Multiannual Financial Framework (MFF) 2021-2027 allocates €1.211 trillion, with an emphasis on priorities such as the European Green Deal and digital transformation. Although the MFF is not fully a GVC, it includes several programmes that align with the concept of government venture capital.

The main topics supported by innovation funding mechanisms are technological advancements and economic competitiveness.

3.2. Examining SMEs in the EU Economy

To get a better view of the connection between the innovative value of innovative startups and SMEs, I will examine their statistical background. First I will focus on the number of a high-growth enterprises (HGE) using Eurostat quantitative statistics. Then I will take a look at the innovative nature of each European country. Finally I will make a comparison between these two indicators and draw conclusions based on the findings.

Definitions:

- Small and Medium-sized Enterprises (SMEs)

Small and Medium-sized Enterprises (SMEs) are businesses that are categorized based on their number of employees and annual turnover or balance sheet total. In the European Union, SMEs are classified into three categories: micro, small, and medium-sized enterprises. Micro enterprises have fewer than ten employees and an annual turnover or balance sheet total of up to €2 million. Small enterprises have between 10 to 49 employees and an annual turnover or balance sheet total of up to €10 million. Medium-sized enterprises employ between 50 and

249 people, with an annual turnover of up to €50 million or a balance sheet total of up to €43 million.

- Startups

A startup, as defined by Mitchell Grant at Investopedia (Grant 2024), is a young company founded by one or more entrepreneurs to develop a unique product or service, bring it to market, and make it irresistible and irreplaceable for customers. Startups are characterized by their innovative approach, high growth potential, and scalability. They often face high uncertainty and risk, but aim to disrupt existing markets or create new ones.

- High-Growth Enterprises (HGEs)

Based on the definition by **Eurostat** (Eurostat, European Union 2025), HGE is a business that achieves substantial growth over a three-year period, demonstrating significant expansion either in turnover or in the number of employees. Average annualized growth refers to the consistent yearly rate at which a value (e.g., revenue or number of employees) increases.

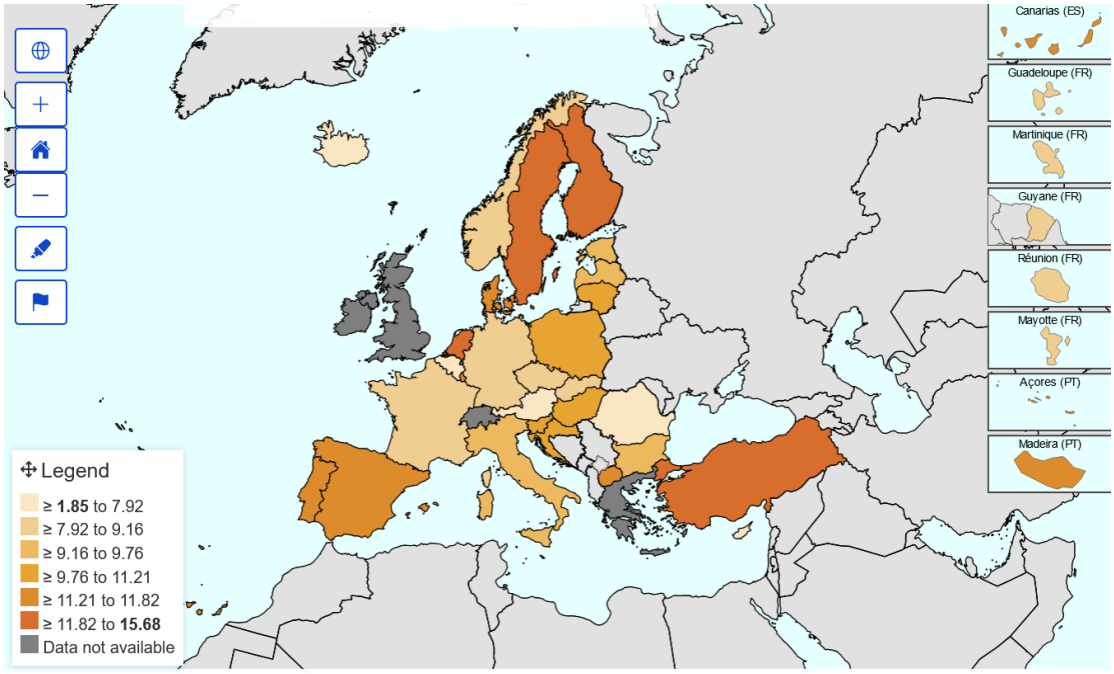
While they can be startups, not all startups achieve HGE status. HGEs can also be more established companies that have found a way to significantly accelerate their growth. These enterprises often invest heavily in innovation and expansion to capture larger market segments. HGEs are developing dynamically and fast, often overtaking their industry peers.

4. Main research findings/Results

4.1. Comparison of two datasets

In Figure 2 we can see the geographical representation of HGRs. Eurostat's methodology for these statistics analyses focuses on structural business data and uses specific indicators to assess the performance of enterprises. This Eurostat dataset provides statistics on high-growth enterprises (with at least 10% growth) and related employment across various industries (NACE Rev. 2 classification) in the EU from 2008 to 2020 (Eurostat 2024). It tracks business demographics, highlighting trends in rapidly expanding companies and their impact on employment. One of the main indicators is the **percentage of high-growth companies (Dataset 1)**, which grow quickly in terms of employment. This percentage is calculated by comparing the number of these fast-growing businesses to the total number of active companies with at least ten employees. The data also uses the NACE Rev. 2 classification system called, which focuses on the **overall business economy** but leaves out holding companies. This system ensures that data from different European countries can be compared easily. By combining these approaches, Eurostat provides a clear picture of how fast-growing businesses are contributing to the broader economy.

Figure 1 High growth enterprises (growth by 10% or more) and related employment

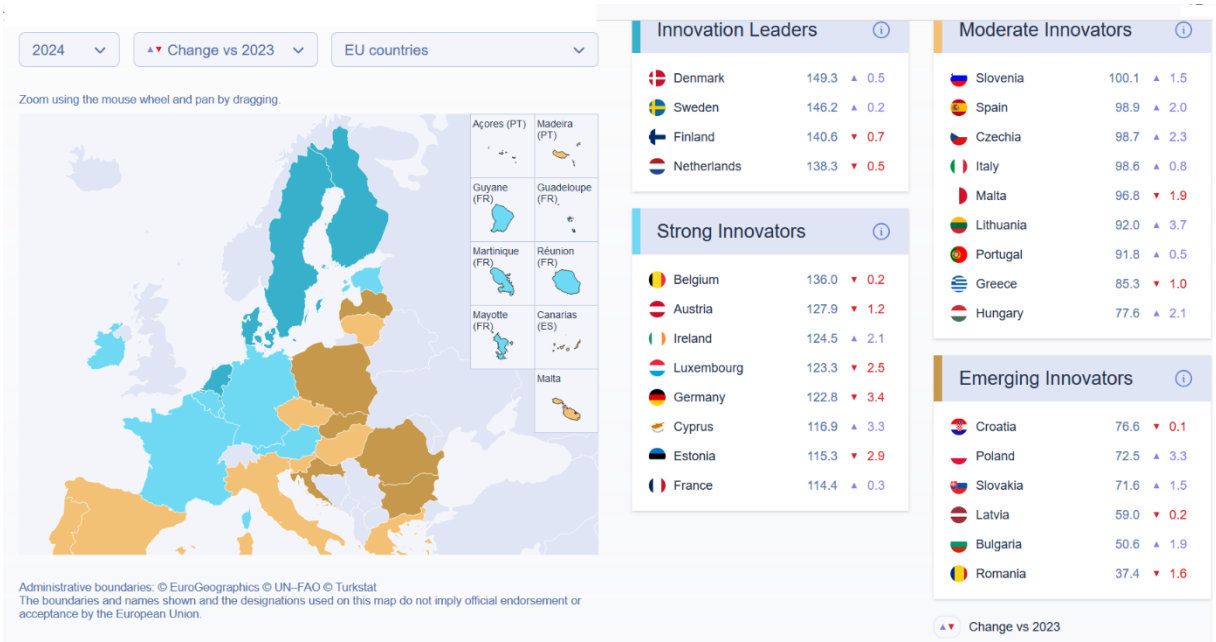


Source: (Eurostat, European Union 2025) Innovation Index

Our next dataset **(Dataset 2)** used is the **European Innovation Scoreboard** (European Innovation Scoreboard (EIS) 2025) which provides a comparative assessment of the Research and Innovation performance of EU Member States, other European, and selected third countries. It helps countries assess the relative strengths and weaknesses of their national innovation systems and identify challenges that they need to address. The European Innovation Scoreboard 2024 categorises Member States in four innovation groups based on their scores: Innovation Leaders (performance is above 125% of the EU average), Strong Innovators (between 100% and 125% of the EU average), Moderate Innovators (between 70% and 100% of the EU average) and Emerging Innovators (below 70% of the EU average). The European Innovation Scoreboard 2024 was released on 8 July 2024.

The index is calculated based on 32 indicators including a range of activities and factors related to innovation. EIS uses the year 2017 as the reference year for indexing.

Figure 2 The European Innovation Scoreboard's Innovation Index



Source: (European Innovation Council 2025)

EIS divides countries into 4 categories:

1. Innovation Leaders:

Countries with the highest innovation index scores, indicating strong performance in innovation and high-growth enterprises. Among these frontrunners are Denmark, Sweden, Finland, and the Netherlands. Each of these nations has impressive innovation index scores—149.3, 146.2, 140.6, and 138.3, respectively.

2. Strong Innovators

Following closely behind the leaders are the strong innovators, countries with solid innovation index scores, showing strong but slightly lower innovation performance than the leaders. Belgium, Austria, Ireland, Luxembourg, Germany, Cyprus, Estonia, and France fall into this category. Their innovation index scores range from 136.0 in Belgium to 114.4 in France.

3. Moderate Innovators

Countries with moderate innovation index scores occupy the middle ground, performing above emerging nations but below the strong innovators. Slovenia, Spain, Czechia, Italy, Malta, Lithuania, Portugal, Greece, and Hungary are part of this group. Their innovation index scores vary from Slovenia's 100.1 to Hungary's 77.6.

4. Emerging Innovators

Finally, we have the emerging innovators, countries that are still developing their innovation capacity. Croatia, Poland, Slovakia, Latvia, Bulgaria, and Romania are included in this category, with innovation index scores ranging from 76.6 in Croatia to 37.4 in Romania.

4.2. Comparison of results (for the details see Annex I.)

Observing trends in innovation and enterprise growth shows a definite pattern among countries. High growth and innovation leaders, such as Sweden, Denmark, and Finland, has higher innovation index values and correspondingly high growth rates in enterprises, with Sweden and Denmark leading both categories. Strong innovators like Belgium and Austria, despite having high innovation index values, show lower enterprise growth compared to some other countries in Dataset 2, such as Malta or Slovenia. Moderate innovators, including Slovenia and Portugal, display solid enterprise growth despite their lower innovation index. Emerging innovators, such as Croatia and Poland, have a bit lower innovation index scores but still maintain relatively high enterprise growth rates, with Croatia at 11.07% and Poland at 9.76%.

As **Hungary** is my home country, I have examined its metrics more deeply. Hungary is categorized as a Moderate Innovator in the Innovation Index dataset, with an innovation index score of 77.6. In terms of high-growth enterprises, Hungary shows a growth rate of 10.37% in 2020, which is relatively strong compared to other countries in the Moderate Innovators group. This growth rate positions Hungary in the middle of the group in the high-growth enterprises dataset.

It demonstrates that while Hungary may not lead in innovation metrics, its growing number of high-growth enterprises points to a dynamic business environment. Hungary has **a healthy entrepreneurial ecosystem, with several high-growth companies** driving the economy.

4.3. Statistical analysis

4.3.1. Reasoning

Innovation drives economic growth and the success of enterprises. According to Wong et al. (Wong, P.K.; Ho, Y.P.; Autio, E. 2005) high growth potential entrepreneurship is found to have a significant impact on economic growth. Countries with higher innovation capacities (as measured by the Innovation Index) are expected to support enterprise growth. The Innovation Index and High Growth Enterprises datasets are complementing each other, thus analysing the relationship between innovation and enterprise growth can offer valuable insights into how innovation translates into economic performance.

4.3.2. Limitations

Comparing the Innovation Index and High-Growth Enterprises by Country is feasible, but with important caveats. On the one hand the Innovation Index is a composite measure examining broader factors, e.g., R&D spending, human capital, digital infrastructure. On the other hand, the figures of high-growth enterprises are actual outcomes of such an ecosystem, being a single metric focused on business performance.

Also the two datasets do not fully align, as not all countries appear in both datasets, which could distort results or reduce the soundness of statistical analysis. To solve this issue I cleaned the data and included only those countries which appear in both the Innovation Index and High Growth Enterprises datasets. So I present it as an exploratory analysis, rather than a definitive conclusion.

4.3.3. Results

Based on the comparison of the two values, the following observation can be made:

For defining the connection between the Innovation Index and High Growth Enterprises I calculated the Pearson correlation coefficient. For the countries that appear in both datasets **Pearson's r is approximately 0.316**. This indicates a moderate positive correlation, suggesting that countries with higher innovation index scores tend to have higher growth in enterprises, but the relationship is not very strong. Other factors may also play a role in influencing growth in enterprises. For the detailed calculation see Annex II.

4.4. Funding Mechanisms

4.4.1. European overview

The European Union has a comprehensive set of funding mechanisms that are categorized into several policy areas, each addressing specific aspects of regional and global development. These programmes aim to support high-potential start-ups and innovation by providing financial resources.

1. **Horizon Europe**: This program focuses on research and innovation, with a budget of €95.5 billion, funding for cutting-edge projects and startups. This flagship research program tackling climate change, digital transformation, and innovation.
    a. **European Innovation Council (EIC) Accelerator**: The EIC Accelerator is a funding program under Horizon Europe and the European Innovation Council that supports SMEs and startups through grants, equity investments, and business acceleration services. It focuses on high-risk, high-impact innovations startups and SMEs developing game-changing innovations with significant scale-up potential.
2. **InvestEU**: This program aims to boost investment in innovation, small and medium-sized enterprises (SMEs), and infrastructure projects across the EU.
3. **Digital Europe Programme**: Supports the digital transformation of businesses and public services, including funding for digital innovation and startups.
4. **Cohesion Fund**: Provides financial support to less developed regions, helping to reduce economic disparities and promote sustainable development.

4.4.2. Domestic landscape

Drilling down to country level, funding mechanisms are managed by decentarised programmes. Decentralised programmes are partially or fully implemented with the support of national or regional entities. Some programmes have both centralised and decentralised components, managed by European agencies and designated National Agencies in Member States. Understanding this distinction is vital as it affects application processes, project selection, fund distribution, and points of contact.

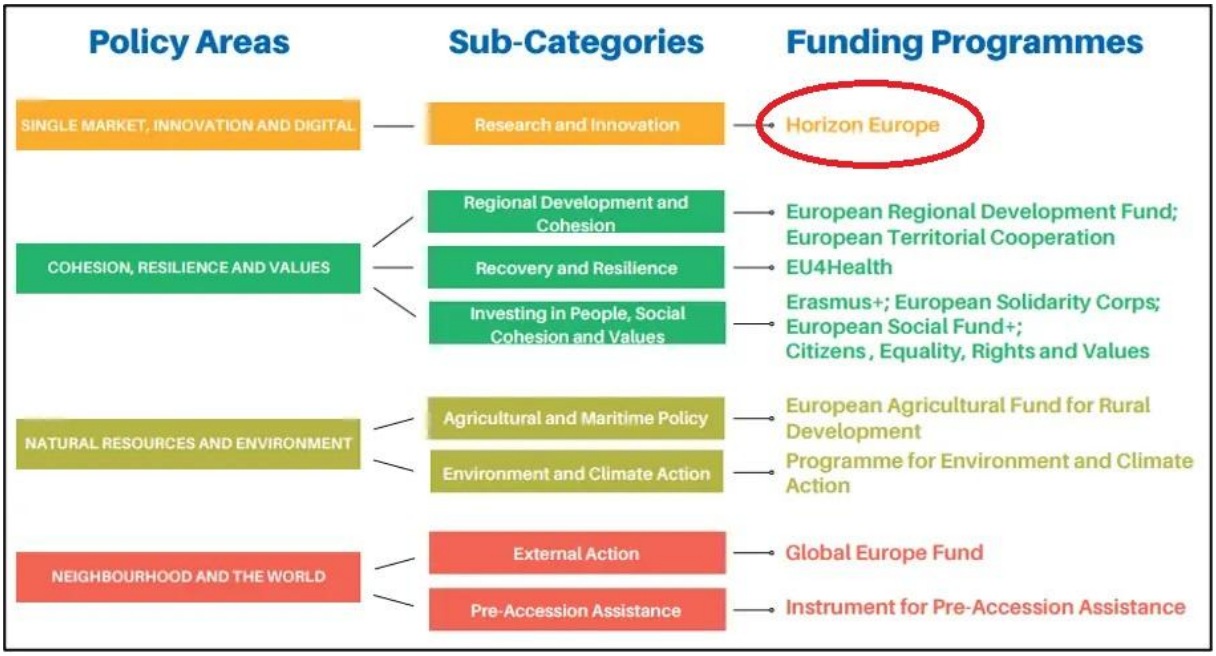
The EU funding system in Hungary is structured around several key mechanisms and programmes (About Hungary 2023). The main sources of EU funding include the European Regional Development Fund (ERDF), the European Social Fund (ESF), and the Cohesion Fund, which are part of the broader Multiannual Financial Framework (MFF) for 2021-2027.

Additionally, Hungary benefits from specific programmes like the Recovery and Resilience Facility (RRF), which provides grants and loans to support recovery efforts from the COVID-19 pandemic. The Common Agricultural Policy (CAP) also plays a significant role in providing financial support to the agricultural sector.

4.5. Structure of Policies and Funding

The EU's budget of Multiannual Financial Framework (MFF) 2021-2027 contains €1.211 trillion, averaging around €173 billion annually. The policy areas are broken down to several funding programmes that assist Member States and associated third countries in developing and implementing EU and national policies, see Figure 1.

Figure 3 EU Funding Programmes



Source: (EOC EU Office 2024)

One major policy area is the Single Market, Innovation, and Digital. This encompasses initiatives aimed at enhancing the single market and fostering innovation and digital technologies. A notable program within this policy area is **Horizon Europe**, which focuses on research and innovation projects.

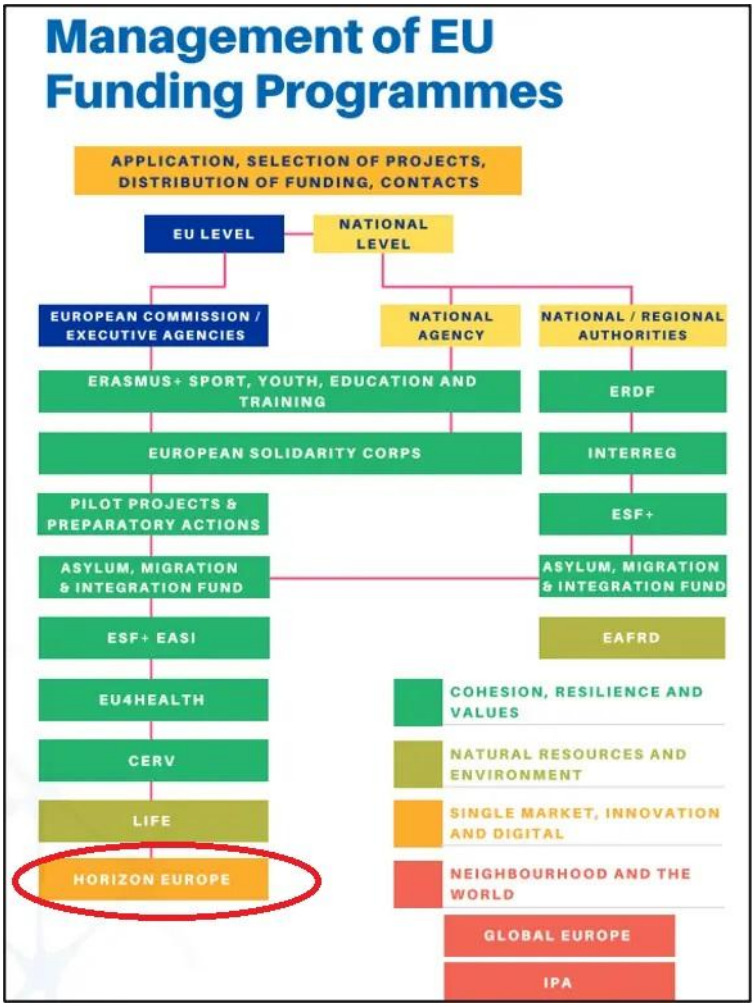
Centralised programmes are managed by six EU Executive Agencies and not by Member States.

The six agencies are as follows (EUR-Lex 2003):

- European Climate, Infrastructure and Environment Executive Agency (CINEA)
- European Education and Culture Executive Agency (EACEA)
- European Health and Digital Executive Agency (HaDEA)
- European Innovation Council and Small and Medium-sized Executive Agency (EISMEA)
- European Research Council Executive Agency (ERCEA)
- European Research Executive Agency (REA)

These agencies manage various EU programmes and initiatives, ensuring effective implementation and support across different policy areas. It is beneficial to know about them, as different funding programmes below to different agencies with different grant application requirements.

Figure 4 Funding Programme Management



Source: (EOC EU Office 2024)

I outlined Horizon Europe as an example to have an understanding of the horizontal and vertical structure of the different programmes.

4.5.1. Focus Areas for EU Funding

The focus areas below are part of the broader EU funding. These areas align with the EU's strategic priorities across various funding programmes:

- Artificial Intelligence (AI): Supported across multiple programmes, including Horizon Europe, Digital Europe Programme, and InvestEU, with a focus on ethical development and applications in sectors such as healthcare, manufacturing, and public services.
- Healthcare Technologies: Funding through Horizon Europe, EU4Health, and the European Regional Development Fund (ERDF) to advance medical technologies, pharmaceuticals, and digital health solutions to enhance patient care and system efficiency.
- Sustainability and Green Technologies: A core focus of the European Green Deal, with funding from Horizon Europe, the Cohesion Fund, the LIFE programme, and the Innovation Fund, driving innovation to reduce greenhouse gas emissions and achieve climate neutrality.

These focus areas are integrated into various EU funding mechanisms to ensure comprehensive support for innovation, sustainability, and technological advancement across the Union.

4.6. How to write a good proposal

Securing EU funding is not an easy process. First we need to identify the right program, then prepare the proposal itself, which is a long and difficult procedure and involves our whole team and in some cases external grant writer experts.

To search for the right programme we have to use **EU Funding & Tenders Portal**.

The EU Funding & Tenders Portal is the official platform for finding funding opportunities to European Union programs. It is the central database for seeking EU grants, contracts, or procurement opportunities.

To find information about already funded project, which is also enormously useful before starting our application, we have to search in CORDIS. **CORDIS (Community Research and Development Information Service)** is the main public repository and portal for disseminating information on all European Union-funded research projects and their results.

After identifying the right call, we have to start the application process: identifying the right funding program, preparing the proposal, submitting it and waiting for the evaluation results.

Writing a grant application lasts from 3-4 weeks to 3-4 months depending on the type of grant, but it is rather the month-length type. For writing the proposal you need experts from different fields: CEOs, project managers, technical, IT and marketing experts. You have to follow the rigorous requirements of the Work Programme and the Call Document. The criteria of EU proposals in general are Relevance/Innovation, Impact, and Implementation Quality.

The evaluation process is very strict, thus the landscape highly competitive with low success rates. For example, the EIC Accelerator number of submitted applications and success rates is as follows, see Table 1.

Table 1 Success rates of EIC Accelerator grant applications in 2023.

EIC Accelerator Statistics
Step 2: 969 submissions, 347 (35.6%) passed
Step 3: 347 interviews, 68 (19.6%) were funded
Combined Success Rate for Step 2 & 3: 7%

Source: Edited by the author based on data from Strata

Some tips for Startups for successful application:

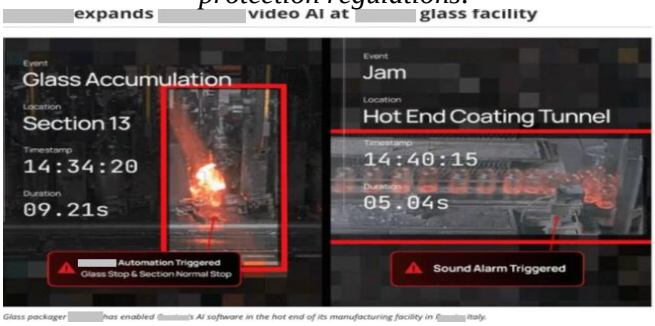
- Clear vision and impact: Clearly articulate the problem and solution, and demonstrate the potential societal and/or economic impact. Include lots of KPIs and indicators!!!
- Market readiness: Highlight commercialization strategy and market demand.
- Partnerships: Building consortiums or partnerships can strengthen proposals and increase chances of success.

4.7. Case Studies

Here I briefly present two real-life examples of successful European startups applying and winning funding resources. For GDPR reasons their names are obviously not given.

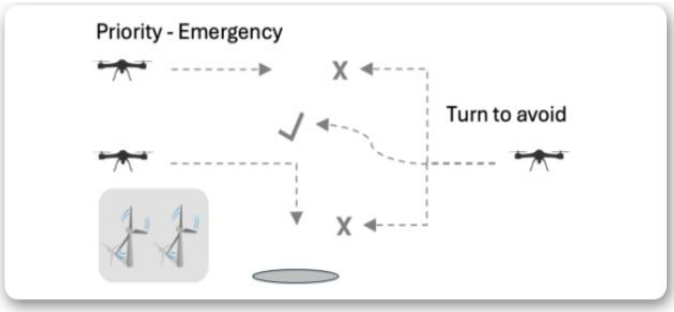
A successful startup secured funding to develop advanced video AI-powered technology. They use real-time Computer Vision automation to detect dangers on the manufacturing line aiming to achieve "problem-free production" in mostly glass manufacturing. The technology improves manufacturing efficiency and safety to achieve higher productivity, while saving human resources. Their main innovative feature is real-time anomaly detection and decision support, consequently employees handle complex tasks more effectively.

Figure 5: Example of the AI.
Source details cannot be disclosed due to data protection regulations.



1. An EU-funded drone startup developed a service a Digital Air Traffic Control Service for Unmanned Traffic Management (UTM) systems handled by different drone operators. Their solution makes it possible that drones operated by different people can fly together safely and to foresee and mitigate potential conflicts and crashes.

Figure 6: Drone Digital Air Traffic Control
Source details cannot be disclosed due to data protection regulations.



5. Conclusions, recommendations

As we have seen, the European Union offers several funding mechanisms to support innovation, sustainability, and digital transformation in various fields. These programmes, such as Horizon Europe, InvestEU, and the Digital Europe Programme, align with strategic priorities like artificial intelligence, healthcare technologies, and green innovations. Centralized and decentralized funding structures makes it sure that applicants will find the opportunity which fits them best.

Obtaining EU grants requires a strong dedication, a solution which is already proven to be needed for the market, and a well-written proposal with lots of supporting data and indicators that meet strict evaluation criteria. Case studies further illustrate the potential of EU-funded initiatives in advancing cutting-edge solutions across industries.

To further enhance the impact of EU funding on innovation, the following recommendations are proposed:

- Increasing outreach to underrepresented regions, ensuring broader access to funding opportunities.
- Simplifying the application process to encourage greater participation from diverse startups, making it easier for innovators to access resources.
- Enhancing mentorship and support services for grant recipients, providing the guidance necessary for startups to succeed and scale.

These measures will strengthen the EU's ability to support technological innovation across its member states.

6. Summary

EU funding plays a crucial role as a catalyst for innovation in bridging the gap between research and commercialization. It helps turning ambitious ideas into practical, market-ready solutions. By prioritizing advancements in fields like AI, healthcare, and sustainability, the EU not only drives technological progress but also addresses important societal challenges.

Startups and SMEs in high-tech industries are benefitting from utilising these opportunities to scale their innovations and compete globally. As a result, EU funding contributes to building a strong and progressive economy.

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ANNEX I.

Correlation Analysis Details: Comparing the countries' Innovation Index and their high-growth enterprise performance:

1. **Innovation Leaders (Dataset 1) and High-Growth Enterprises (Dataset 2):**
   - Denmark: Innovation index = 149.3, High-growth enterprises = 11.59%
   - Sweden: Innovation index = 146.2, High-growth enterprises = 15.68%
   - Finland: Innovation index = 140.6, High-growth enterprises = 12.53%
   - Netherlands: Innovation index = 138.3, High-growth enterprises = 12.52%

2. **Strong Innovators (Dataset 1) and High-Growth Enterprises (Dataset 2):**
   - Belgium: Innovation index = 136.0, High-growth enterprises = 6.88%
   - Austria: Innovation index = 127.9, High-growth enterprises = 7.26%
   - Germany: Innovation index = 122.8, High-growth enterprises = 8.25%
   - Cyprus: Innovation index = 116.9, High-growth enterprises = 1.90%
   - Estonia: Innovation index = 115.3, High-growth enterprises = 9.53%
   - France: Innovation index = 114.4, High-growth enterprises = 8.63%

3. **Moderate Innovators (Dataset 1) and High-Growth Enterprises (Dataset 2):**
   - Slovenia: Innovation index = 100.1, High-growth enterprises = 11.04%
   - Spain: Innovation index = 98.9, High-growth enterprises = 11.28%
   - Czechia: Innovation index = 98.7, High-growth enterprises = 8.84%
   - Italy: Innovation index = 98.6, High-growth enterprises = 9.53%
   - Malta: Innovation index = 96.8, High-growth enterprises = 12.13%
   - Lithuania: Innovation index = 92.0, High-growth enterprises = 10.87%
   - Portugal: Innovation index = 91.8, High-growth enterprises = 11.62%
   - Greece: Innovation index = 85.3, High-growth enterprises = (not listed in Dataset 2)
   - Hungary: Innovation index = 77.6, High-growth enterprises = 10.37%

4. **Emerging Innovators (Dataset 1) and High-Growth Enterprises (Dataset 2):**
   - Croatia: Innovation index = 76.6, High-growth enterprises = 11.07%
   - Poland: Innovation index = 72.5, High-growth enterprises = 9.76%
   - Slovakia: Innovation index = 71.6, High-growth enterprises = 8.63%
   - Latvia: Innovation index = 59.0, High-growth enterprises = 9.49%
   - Bulgaria: Innovation index = 50.6, High-growth enterprises = 9.24%
   - Romania: Innovation index = 37.4, High-growth enterprises = 1.85%

ANNEX II.

To calculate the Pearson correlation coefficient I used Python provided by OpenAi:

```
# Country names that appear in both datasets

common_countries = [

   'Denmark', 'Sweden', 'Finland', 'Netherlands', 'Belgium', 'Austria', 'Germany', 'Cyprus', 'Estonia',

   'France', 'Slovenia', 'Spain', 'Czechia', 'Italy', 'Malta', 'Lithuania', 'Portugal', 'Hungary', 'Poland',

   'Latvia', 'Bulgaria', 'Romania', 'Croatia'

]

# Data aligned with common countries (Innovation index and High growth enterprises)

innovation_index_common = [

   149.3, 146.2, 140.6, 138.3, 136.0, 127.9, 122.8, 116.9, 115.3, 114.4, 100.1, 98.9, 98.7, 98.6,

   96.8, 92.0, 91.8, 85.3, 77.6, 72.5, 59.0, 50.6, 37.4, 76.6

]

high_growth_enterprises_common = [

   15.68, 12.53, 12.52, 11.59, 6.88, 7.26, 8.25, 1.90, 9.53, 8.63, 11.04, 11.28, 8.84, 9.53,

   12.13, 10.87, 11.62, 10.37, 11.07, 9.76, 9.49, 9.24, 1.85, 11.07

]

# Calculate the Pearson correlation coefficient again

correlation, _ = pearsonr(innovation_index_common, high_growth_enterprises_common)

correlation
```

Result: 0.3164195559884479