



# Letter on innovation

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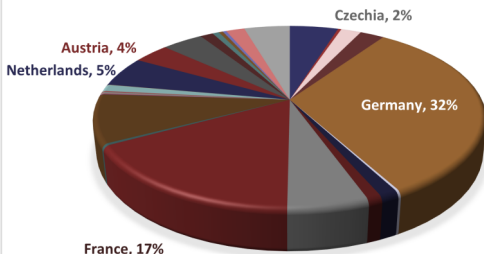
## why a strategy for innovation matters.

Czechia has benefited greatly from an economic policy based on incentivizing investment into its manufacturing base and integrating into the EU market. The increased industrial production capability and knowledge of one of the world's most sophisticated markets provides a foundation for the transition to a more value-added economy. To evolve successfully into one of the leading innovative economies in Europe and the world, the country will need industry, universities and the government to cooperate more effectively to produce the next generation of knowledge, technology and products.

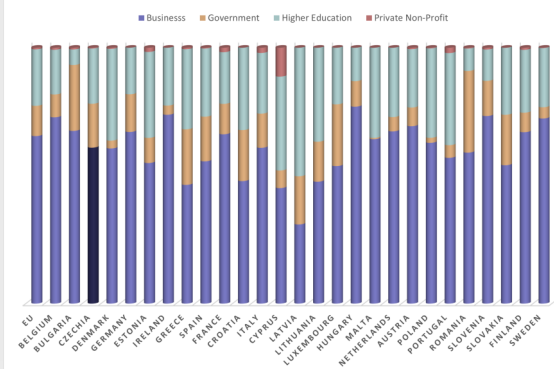
An innovation policy with clear, measurable objectives and a strategy for achieving those objectives is essential for achieving that success. Having national objectives will align the different interests, assets and capabilities of the government, universities, and business. A well-conceived strategy will channel the assets of government, universities, and business to produce the most value (as defined by the objectives) for the investment of time and resources.

As an organization that is committed to the increase of economic ties between Czechia and the United States, AmCham believes that the success of either country ultimately leads to the success of the other. Our goal is to make Czechia a top ten EU economy. This can only happen with the adoption and effective implementation of a good innovation policy. This document is intended to state our views on the objectives and strategic steps that will make Czechia one of the planet's most innovative economies.

PORTION OF TOTAL EU RESEARCH EXPENDITURES, 2020, EUROSTAT



PROPORTIONAL RESEARCH SPENDING BY BUSINESS, GOVERNMENT AND HIGHER EDUCATION, MILLION PPS, 2020, EUROSTAT



*How much countries invest in research indicates both their commitment to innovation as the primary driver of their economy, and also how attractive their public and private research community is to investors. Research investment in the EU is dominated by Germany and France. Czechia has increased its share. A high share of business investment into research indicates business confidence in the potential to translate research into commercial products.*

## how can we measure innovation?

Setting a clear objective is essential to align the interests of the three major contributors to innovation (government, universities, business) and to allocate their resources to achieve the best possible result.

### Two choices for shaping innovation policy

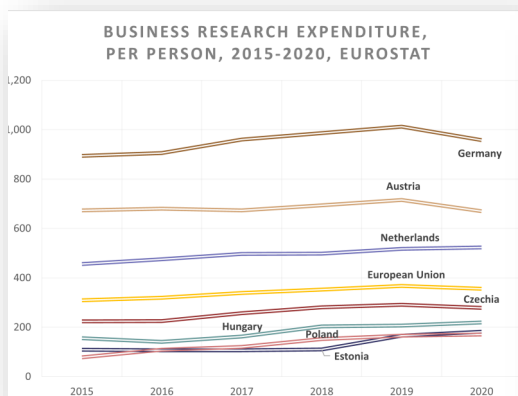
Different governments approach setting objectives differently. The US aligns innovation objectives with broader policy goals. For example, the government spurred the creation of Silicon Valley through investing into research on technology to guide intercontinental missiles. Israel also sets research objectives according to security and water supply policy. Following this approach requires devoting enough resources through public procurement to stimulate private sector investment.

Other countries adopt an innovation policy that aims to create key technologies for products that can be exported globally. Germany seems to use this aim to drive its innovation policy, and, though it is not stated explicitly, Czechia has also followed this model in the past. We are assuming that the government will continue to pursue the development of commercial technologies as it has until today, and recommend establishing objectives based on high tech export.

Previous governments have set the target of research spending as percentage of GDP. We have two concerns about this measurement. First, this target measures resource commitment, but not outcome. Second, the primary goal of innovative products is to earn a greater return on investment. Therefore, a truly innovative economy should generate more units of GDP for every unit invested in research. We suggest replacing that target with one input and one output measure.

*(When proposing these measures, we recognize that the government has resisted adopting business investment to measure performance. This could be reconsidered for two reasons. First, this strategy proposes establishing a societal (not only government) objective in order to align all three major forces in innovation policy. Second, if the goal will remain high tech export, business is primarily responsible for the final stage that turns technology into a commercial product. Not measuring how well policy increases how often research results in investments into this last stage would likely result in misalignment of interests. We understand, however, that universities may develop different criteria as part of their current M17+ reform, and hope that those goals are designed to align with business goals.)*

### Input Objective



### Secondary Target



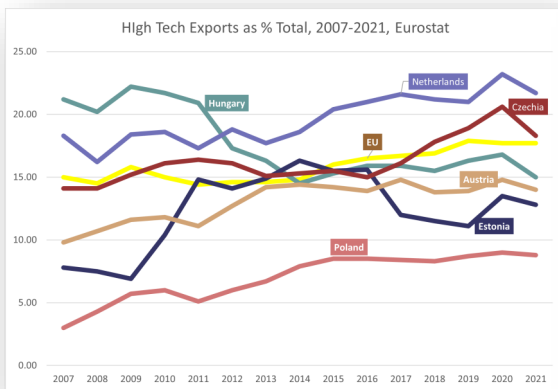
## Measuring input into innovation

The input measure could be **business investment per capita**. Businesses make the critical investments that turn research into technology, and technology into commercial products. The more businesses invest into research, therefore, the more likely the country is conducting both the basic, applicable and applied research that result in achieving its innovation goals. By establishing business investment into research as its input objective, the government would have a indicator of how attractive the country's research community was for the type of private investment that is most likely to generate high value-added innovation. This objective would also reflect how the private sector valued the output of university research and the effectiveness of government policy.

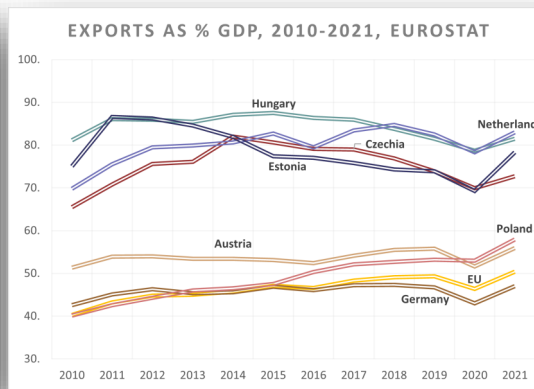
A secondary measure that could measure how well public investment is stimulating business investment is the research ratio. The business ratio measures business investment versus government and university into research, and provides a proxy for how much private investment is generated per one unit of public investment.

For instance, the government could establish the goal of doubling the per capita business investment by 2030 and achieving a 2:1 ratio of business-to-other research investment.

## Output Objective



## Secondary Target



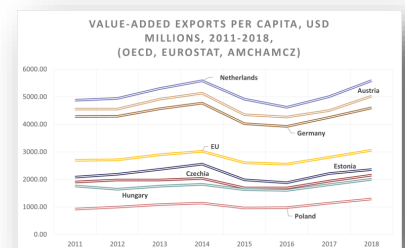
## Measuring Innovative Output

Measuring investment into innovation provides a good indication of how public sector and university investments into education and research generate private sector investment into high tech exports. Innovation policy, however, can only be considered successful if it generates higher rates of high tech export. Therefore, the output goal of innovation policy should be high-tech exports as a percentage of total exports. That serves as a proxy for how innovation policy generates commercial products that generate national wealth.

**High tech exports as a percentage of GDP allows the government to assess 1) the role of innovation in national wealth creation through export, 2) how competitive the country's innovative products are in the global market, and 3) the success of the country's policies in increasing the value of the high tech sector in the country's economy– and compare the country's performance to other EU economies.** The proportion of high tech exports– which typically sell at a higher premium than lower tech exports– indicates the success of innovation policy in creating research, technologies and products that demand a premium for their competitive value in the global market. We can assume therefore that the higher percentage of export that is high tech equates to higher corporate profits, higher average wages, and higher government tax revenue– in other words, greater prosperity. The higher the proportion of high tech products, the greater the spread of the prosperity across society.

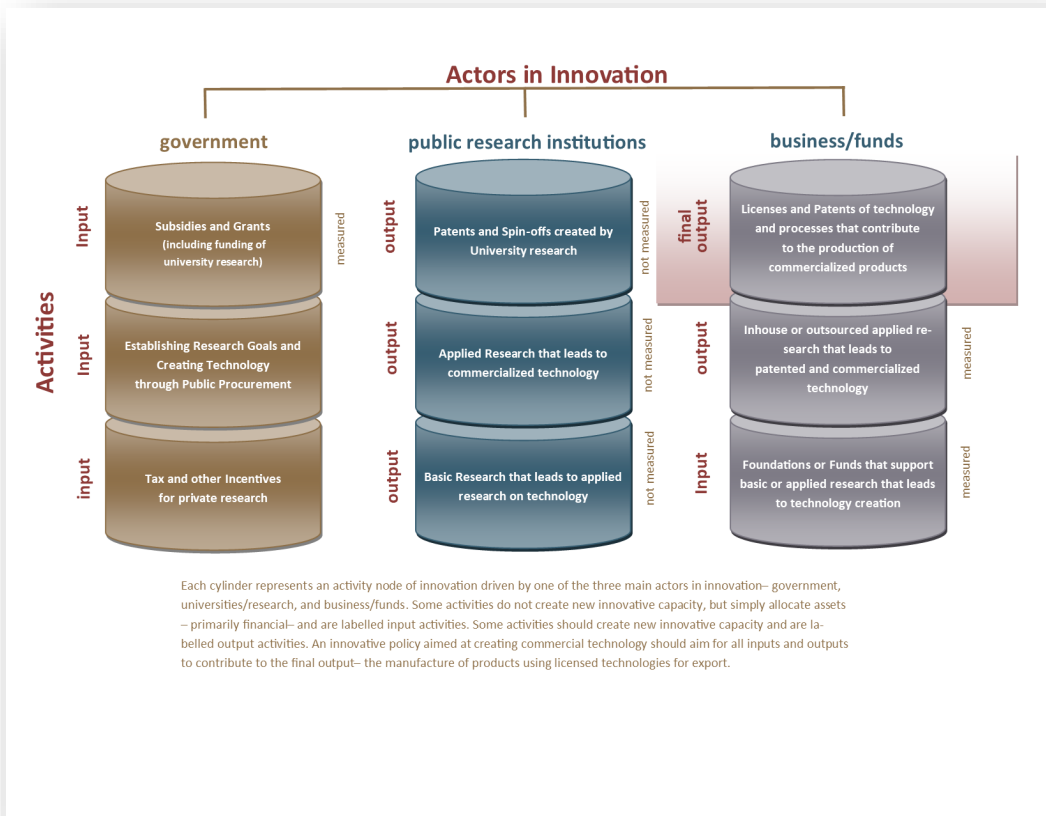
Some experts argue that measuring the value-added in export products is a more accurate indication of the role of Czech innovation in export products. We agree. The time needed to compile this data makes it less relevant as a policy measure, and we would recommend using it as a secondary tool for tracking how much Czech innovation contributes to high tech exports.

## Secondary Target



## What is our current competitive advantage?

Most successful strategies utilize current competitive advantages to create further strengths. The first step, then, is to assess how the three major actors in innovation policy compete in the global innovation market. Each actor fulfils specific functions in the innovation process that can be tracked and benchmarked against those from other nations.



### Government Activities

**Government direct financial support of research.** The combined research expenditures of the Czech government and higher education system totals 2.3% of all such spending by EU governments and higher educational institutes (*Eurostat, AmCham Czech Republic*). That represents the 11<sup>th</sup> highest total for EU states. Government financing, therefore, is a neutral-to-positive asset when assessing competitive advantage.

**Government public procurement.** The Czech government does not set research goals through public policy or use public procurement to promote innovation.

**Tax and other incentives for private research.** The Czech government offers tax and other investment incentives for private research. Some input– number of projects and size of deductions are available– but we could not compare how Czech financial incentives compare with other countries in both amount and result. This area thus cannot be assessed for its competitive advantage.

**Public research institution activities.**

Some public data exists that allows a comparison of the expenditure of Czech public research institutions with other countries' institutions. We could not find data comparing the result of this expenditure on high tech export. Thus, this area cannot be assessed for the purposes of this document for its competitive advantage.

**Business/Fund activities**

**Commercialized Technology exported.** High-tech exports comprise a higher percentage of exports for the Czech Republic than the EU average. This represents a competitive advantage.

**Business investment into research.** Businesses in the Czech Republic totaled 1.9% of the total business investment into research in the EU. This ranked twelfth among states, and can be considered a neutral-to-positive advantage.

Not enough data is publicly available to assess businesses indirect support of innovation through venture capital arms, foundation grants, or other tools to support the development of science and technology.

**Summary.**

Greater effort to track and benchmark key innovation activities would make the government able to allocate resources to create innovation more effectively.

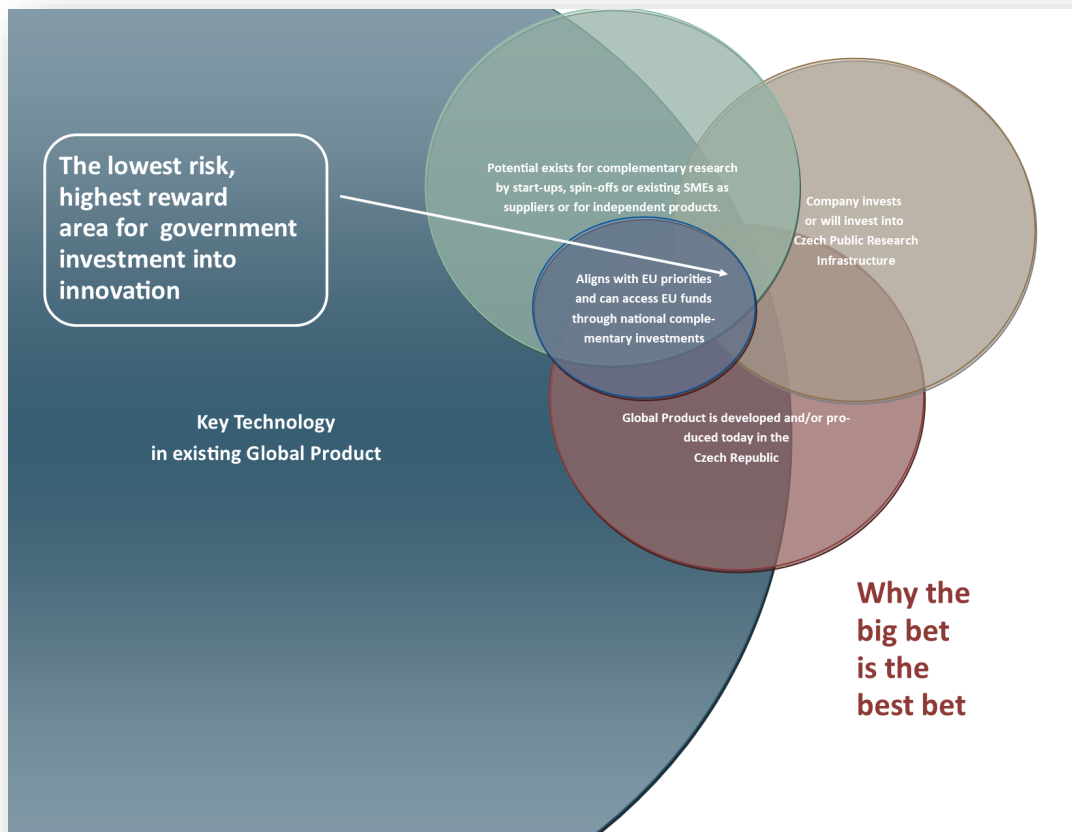
From the data we have, **the clear competitive advantage today is the number of high-tech exports produced in the country. Several of those high-tech exports are 1) increasing the value-added component generated in the Czech Republic, 2) increasing their cooperation with Czech public research institutions on the development of new technologies and education of new science, and 3) vital for achieving the missions outlined in Europe's Green New Deal. An innovation strategy could be built around developing the new generation of sustainable products for key technologies/products in these important sectors, as well as attempting to diversify the number of products those technologies could serve.**

## Technology Policy: Why the big bet is the best bet

The next generation of business will be a battle of replacing existing high technologies with newer more sustainable version. This transformation will require major changes in the materials, technologies, and manufacturing processes, and thereby create extraordinary opportunities for patenting and licensing new technologies that could dominate the global market. Due to the substantial degree of change needed to create sustainable products, existing investments into research and production facilities will play less a role in decision-making than in an equilibrium market. This provides Czechia with a great opportunity to compete successfully with the more established and larger innovative economies of the EU and the world.

The country's disadvantage is its relative size. A smaller population generates less revenue to fund research and development. Smaller technical universities means fewer research teams. A smaller business community means fewer resources for converting research into commercial technology. If we want to compete against the Goliaths, we have to aim quickly and well.

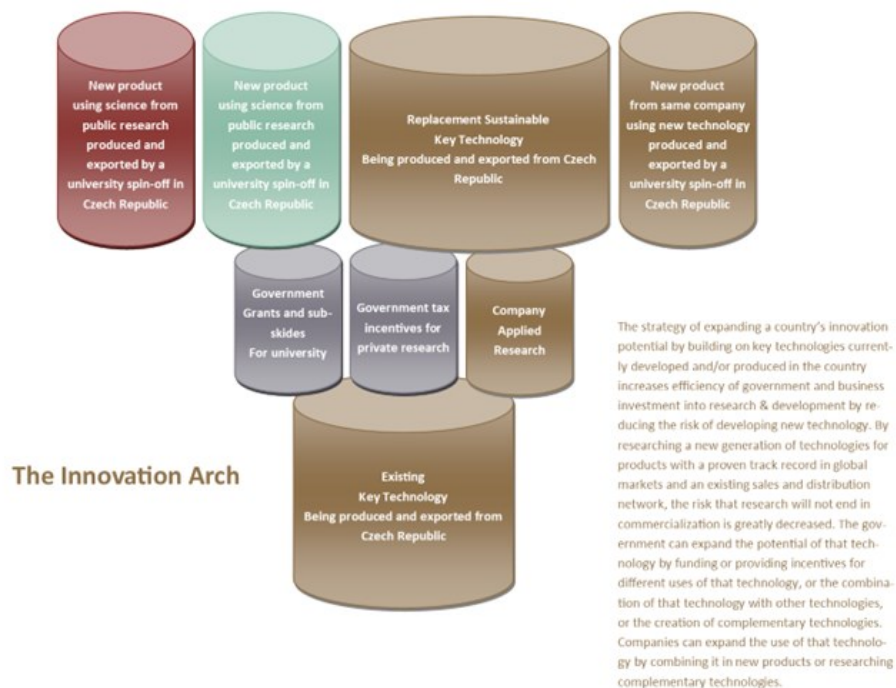
That argues for an innovation policy that concentrates on a few key technologies that drive global products, and to shape government and university innovation policy on becoming the global leader in the research and development of these technologies. By selecting key technologies that already are developed and produced in the Czech Republic, the country reduces the risk of investing into technologies that may not achieve global commercial success, as well as reducing the acquisition cost of placing those technologies in the Czech Republic.





If the government decides to pursue developing its greatest competitive advantage, **we recommend that a selected ministry or agency identify technologies that meet this criteria and map the company's plans for developing that technology and ideally holding the intellectual property for that technology in the Czech Republic. The government could then create a proposed plan for supporting that investment based on:**

- 1) the potential size of the global market for the product using that technology,
- 2) potential secondary uses of that technology (including by that company),
- 3) the potential investment of the company into public research infrastructure that could be utilized for research and development unrelated to that product,
- 4) the potential for that product or technology to generate related or unrelated spin-offs and start-ups operating in the Czech Republic, and
- 5) relevance to EU policy goals and ability to utilize EU funding through national complementary funding.



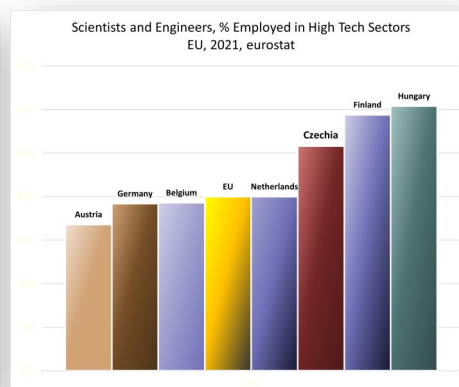
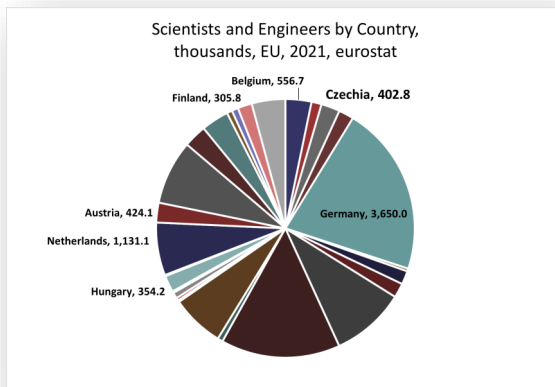
Aside from adopting strategy of the Big Bet, the **government can spur innovation by using public procurement as a tool that spurs innovation.** In areas in which the government has major market power- for instance, health care, land use, transport and energy- the government could fund fully or partially pilot projects of joint university and private sector aimed at achieving policy goals such as smart transport, effective land use planning, or improved patient care. These pilot projects could introduce the concept of developing innovation that could become commercial export products into government procurement.



## People Policy: Why the big bet is the best bet

The essential resource in all innovation is people. The aim is to have as many people as possible in innovative activities, and, if the goal is to develop leading global technology, as many scientists and engineers working in high tech sectors. The Czech Republic is doing well comparatively with the EU average.

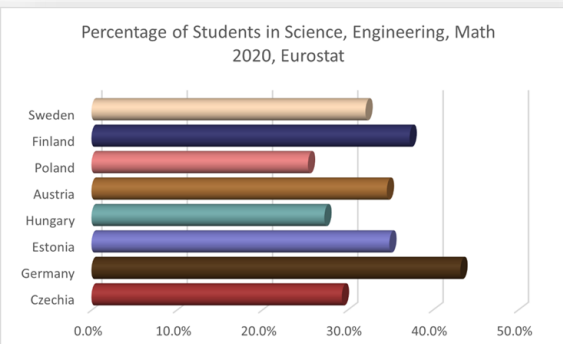
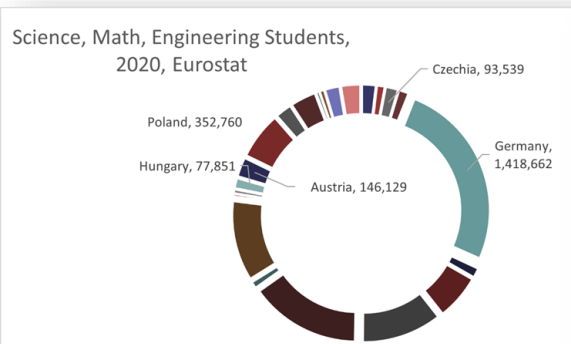
A policy based on big bets would make the country even more attractive to innovative people. People with innovative skills tend to circulate around the globe in search of the work opportunities that provide intellectual challenges, build their skills, increase their qualifications, and pay well. Technologies that fit the criteria of Big Bets generate such work because they require world class research, development, and production skills.



### Building the innovative capacity inside the borders

Czechia, of course, faces the same challenge of all countries with a small population: being able to compete with the volume of scientists and engineers other countries can produce. The country can address this in two ways.

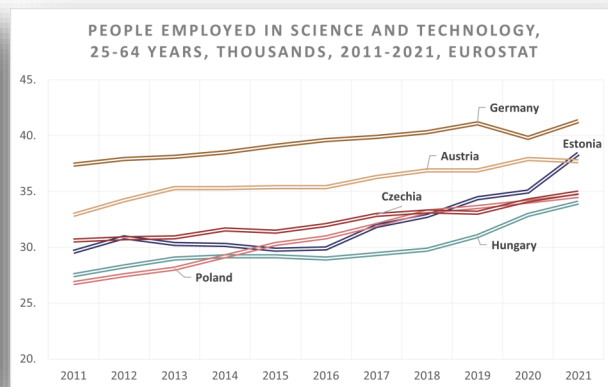
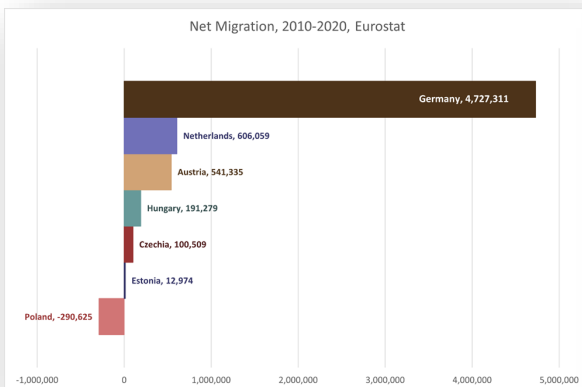
**One, universities can produce a higher percentage of STEM (Science, Technology, Engineering and Math) graduates and post-graduates.** Czechia channels students into STEM students at higher than EU average. Therefore, if Czechia is going to generate the innovative people capacity of, for instance, Austria, the country needs to attract a greater portion of foreign STEM students.



### Making innovative capacity the top priority for immigration

Two, the country can focus on bringing in scientific and engineering workforce from other countries.

Current immigration policy focuses on quotas of qualified workers based on the administrative capacity of embassies located in countries. We urge **shifting to an immigration policy based on the immigrants' ability to contribute to the economic prosperity of the country.**



This could be achieved by digitizing the process and introducing a points-based immigration system for prioritizing economically important individuals

Digitizing immigration will reduce the administrative burdens of embassy consulates, and reduce the time lost to shifting paper applications between regular ministries.

A points-based system will allow the government to implement an efficient innovation policy by ensuring that the ability to maintain competitive advantages in key technologies benefits from the best possible workforce. A points-based system should prioritize 1) current workforce in key technological sectors, 2) STEM students in fields needed for key technology sectors, 3) current workforce with STEM education or experience, and 4) STEM students.

Attracting talent from abroad should not end with revamping the immigration system. Czech research institutions would greatly benefit from further integration in the circulation of talented researchers around the globe. The Czech government recently cooperated with the Max Planck Institute to **introduce that Institute's Dioscuri program for young researchers here. This program should be expanded to include an entirely Czech component focused on areas of research related to the technologies required by Big Bet investments.**

The need to transform the economy to make it more sustainable and the opportunities created by digitization will change the work done by today's workforce. To keep both the economy competitive, we recommend that the **government offer tax deductions to both companies and individuals for certified requalification and digital skills training.**

## Infrastructure Policy: Creating the physical place and the mental space

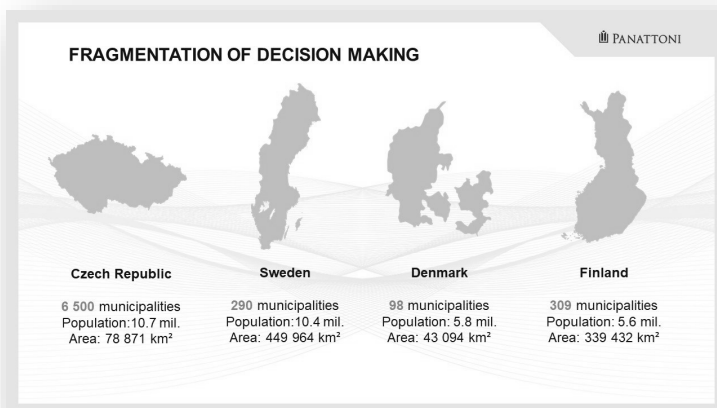
If the Big Bet strategy works well, the country should create a critical mass of research, technology, and global high tech products which generate multiple new lines of associated research, related technologies, and further high tech products in the new economic sectors. In order to capture as much of this output as possible, the country would need to introduce three policies for an innovative infrastructure policy.

### Digitize land-use planning and permitting

Much of the initial research for high tech products will take place in cities with technical universities. Testing of products and production would likely take place outside of the cities along road and rail networks that ensure rapid commuting between research facilities and production sites. One of the key factors in the competition to introduce high tech products is the length of the time between initial investment and production for export. This is why the current land use system is one of the country's greatest competitive disadvantages. Land use suffers from two major challenges.

The first is a lack of clear land use or economic development plans that are coordinated on a municipal, regional, and national level. This leads to a permit process that often addresses economic development plans and zoning when it should only confirm that the owner meets established plans and zoning rules for the particular site.

The second challenge– the very large number of land use authorities in the country– contributes to the first. Digitizing land use planning can help make land use more economically productive and environmentally sustainable, and give mayors greater ability to shape the future of their municipalities, but **if the country wants to take advantage of its innovative capacity, national, regional and municipal authorities need to separate land use planning, zoning, and construction permitting, and devote more resources to each.**



**Good Technology Parks generate better innovation**

**The most important piece of infrastructure a country can provide for an innovative economy is a technology park in every town with a major technical university. A true technology park mixes university classrooms, university research labs, company research and development facilities, incubators, government agencies supporting research, as well as offices for business providing services for research projects.**

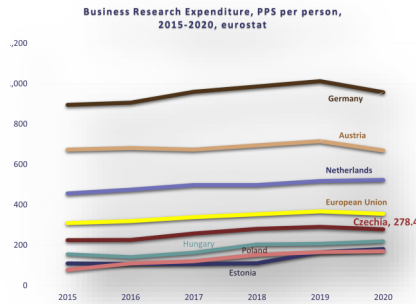
Brno has such a park, and it has likely reached its capacity without some re-organization or expansion. Prague lacks such a facility, and this is a major inhibition to the innovative development of the entire country.

Innovation typically occurs when a surprising connection is made between two concepts previously not thought to be related. Many institutes- including the Max Planck Institute- attempt to stimulate these connections by bringing together researchers from different fields to discuss their current research work. The Homebrew Computer Club, generally credited for developing and sharing the ideas that resulted in the first desktop computer, is another example of innovation network. **The government could work with universities to sponsor this sort of exchange.**

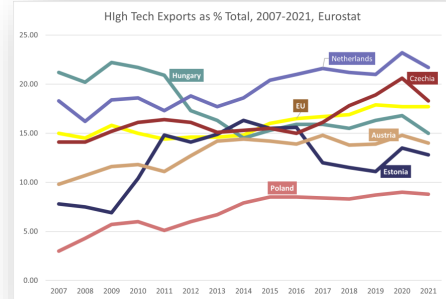
# The Innovation Policy Scorecard

## Overall Objectives

**Business Research Investment:**  
possible target: exceed EU average by 2027



**High Tech Export:**  
possible target: exceed 25% by 2027

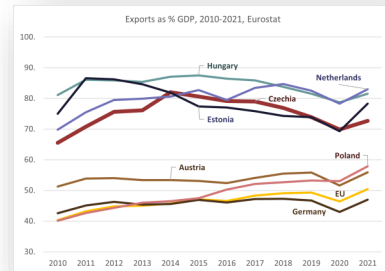


## Secondary Objectives

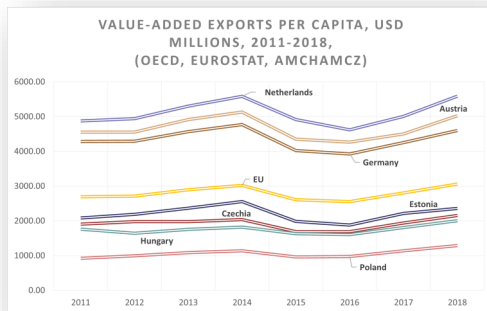
**Business Research Investment Ratio:**  
possible target: exceed 2:1 by 2027



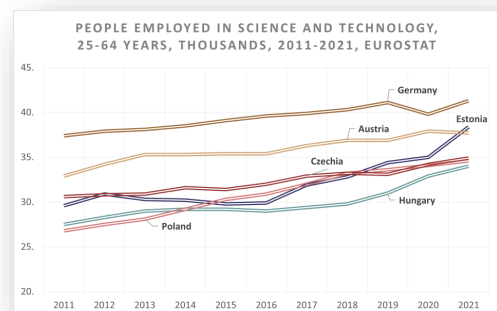
**Exports as %GDP:**  
possible target: exceed 80% by 2027



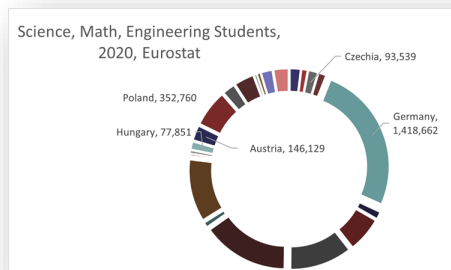
**Value-Added Exports per capita:**  
possible target: exceed EU average by 2027



**Innovative Workforce:**  
possible target: 25% by 2027



**STEM Students:**  
possible target: 100,000 by 2027



**STEM Students:**  
possible target: 35% by 2027

