

# Brief for Minister Havlicek on implementing The Country for the Future

AmCham advocates investment, economic policies, and workforce development that will enable the Czech Republic to become a top ten EU economy by 2025.

We believe that aim is synonymous with the goal of becoming The Country for the Future.

This brief addresses technological innovation. It is divided into look at key indicators of five strategic assets of an innovative economy and recommendation of policies to utilize them.

The Czech Republic has a strong strategic position as an innovative economy in Central Europe, and this creates an opportunity in Europe– and globally– as companies optimize their product development investment after the pandemic.

To take advantage of this position, the country could take immediate and long-term steps to enhance its competitive position in the five strategic factors: workforce, commercial research, university research, government services/procurement, and urban innovation. Efficient manufacturing can also become a major source of innovation, and is therefore included.

## Workforce

### Short term.

- 1) Tax deductions for digital certification.
- 2) Scholarships for top foreign STEM students in target industries.

### Long-term.

- 1) Increase the number of STEM students graduating from public universities through promoting such education at primary and secondary level, and promoting Czech university STEM education throughout Europe.
- 2) Multi-year academic fellowships for visiting professors in target industries.

## Commercial and Public Research

### Short-Term

- 1) Big Bets program to attract development and production of key components of important global industry.

### Long-Term

- 1) Building clusters of start-ups, spin-offs, and public research around high-tech Czech global companies.
- 2) Target specific key components of the mobility industry that can be built on current automotive industry.
- 3) Create National Innovation Fund to provide initial and scale-up capital for start-ups and spin-offs based on domestic research.

## Public Services (long-term)

- 1) In targeted areas, use government services and procurement to make markets for innovative products based on local research.
- 2) In areas in which the public sector dominates markets, align improvement in public services with allocation of public research money (for instance in the National Cancer Plan.)

## Urban Innovation (long-term)

- 1) Create research campuses that incorporate universities, research labs, and research companies in every urban area with technical university.

## Manufacturing

- 1) Implement a carrot-stick approach to converting manufacturing to digitization and sustainability.

We believe the Czech Republic should be The Country for the Future. For too long the pride in the country's technology capability, and in its citizens business acumen, have been muted, and the focus has been on its history. Stating an ambition is the first step to reaching it.

We believe the Czech Republic has the potential to be The Country for the Future. The STEM educational system is strong and the numbers of STEM graduates slightly below the EU average. Research spending as a %GDP also is comparable to the EU average. The manufacturing base is one of the highest in Europe, and many of the world's most successful high tech companies operate in the country.

What is here.

Assessing current re-  
search capacity.

- 1) Key indicators of workforce capability.
- 2) Key indicators of research capacity.

Recommendations for  
how to use the four strategic assets to increase.

Whether the country will become The Country for the Future depends on how well four strategic tools– university and workforce education, commercial and public research, procurement for public services, and urban innovation–are utilized. A successful strategy will use each of those tools in a way that creates a beneficial feedback loop between them so that the sum is greater than each of the parts..

In this brief, we assess the current capacity of two primary ingredients of an innovative economy– people and research funding. We quickly analyze several key indicators related to educational skill attainment and the amount of research investment, especially commercial research investment, which serves as a proxy of the commercial potential of the research being done in the country.

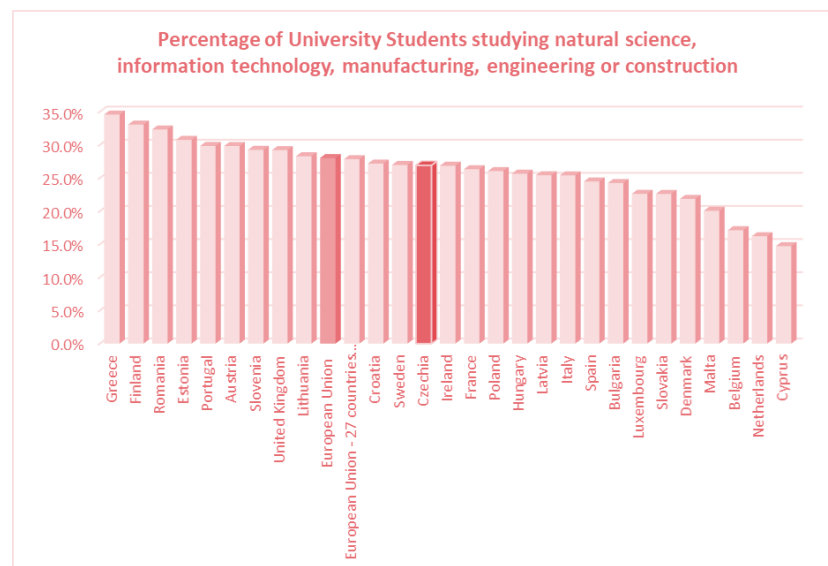
Then we recommend ways to utilize the four strategic tools to generate better economic incomes. We suggest five ways to generate more commercial research focused on product development. We outline three ways to increase the capability of the innovative workforce. We put forward one project that could increase the innovative capacity of urban areas, and a carrot-and-stick approach to persuade manufacturers to move faster

### A quick survey of our strategic assets for innovation

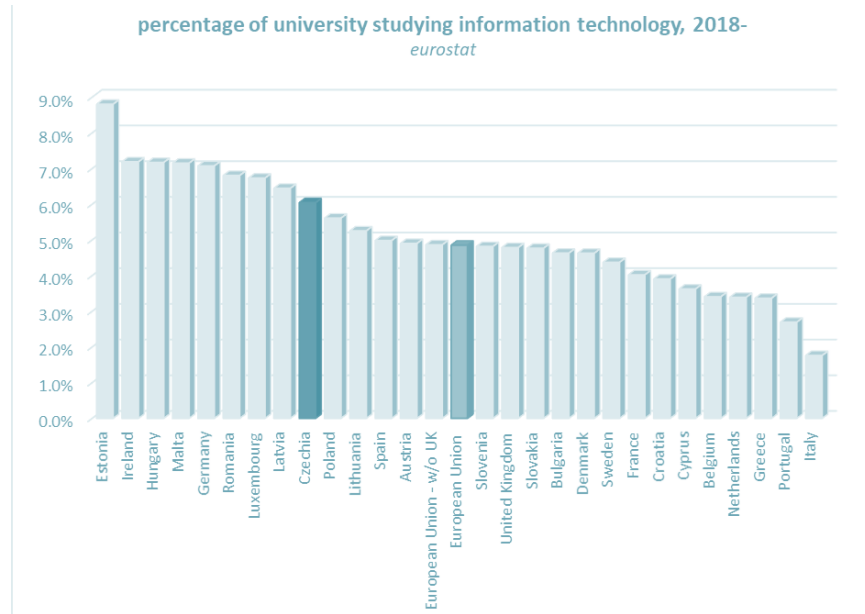
We recognize that indicators do not tell the full story. They indicate, or suggest what the story may be. We have chosen indicators that we think address important factors of the innovative economy, and allow comparison relatively timely comparison with other EU economies. With some, we set some targets that would benefit our competitiveness.

#### Key workforce indicators.

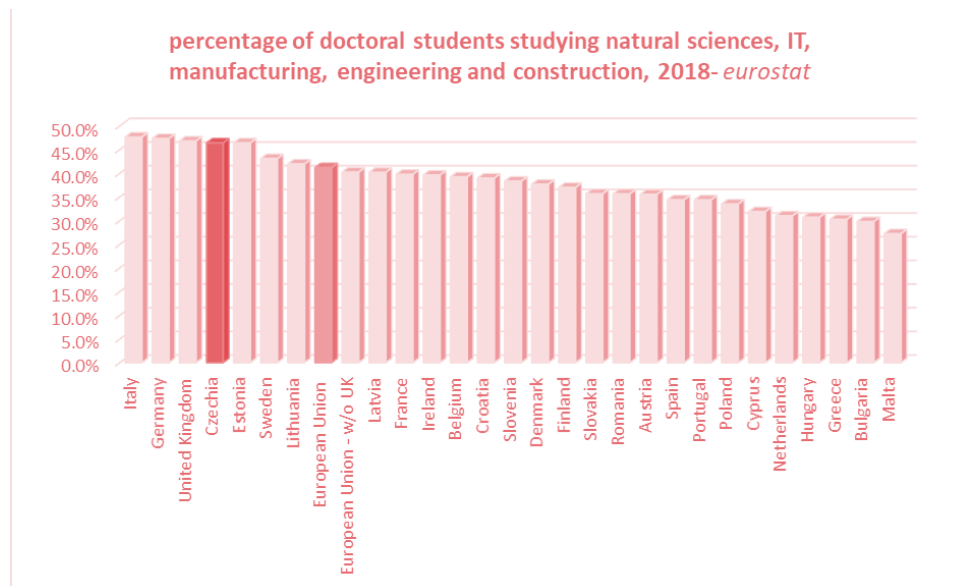
**Percentage of university students studying natural science, IT, manufacturing, engineering or construction.** Our pool of technology graduates needs to deepen to compete at the top levels of innovation in Europe. The goal should be to exceed the EU average for percentage of university students studying STEM subjects in 2025, and surpass 33% by 2030.



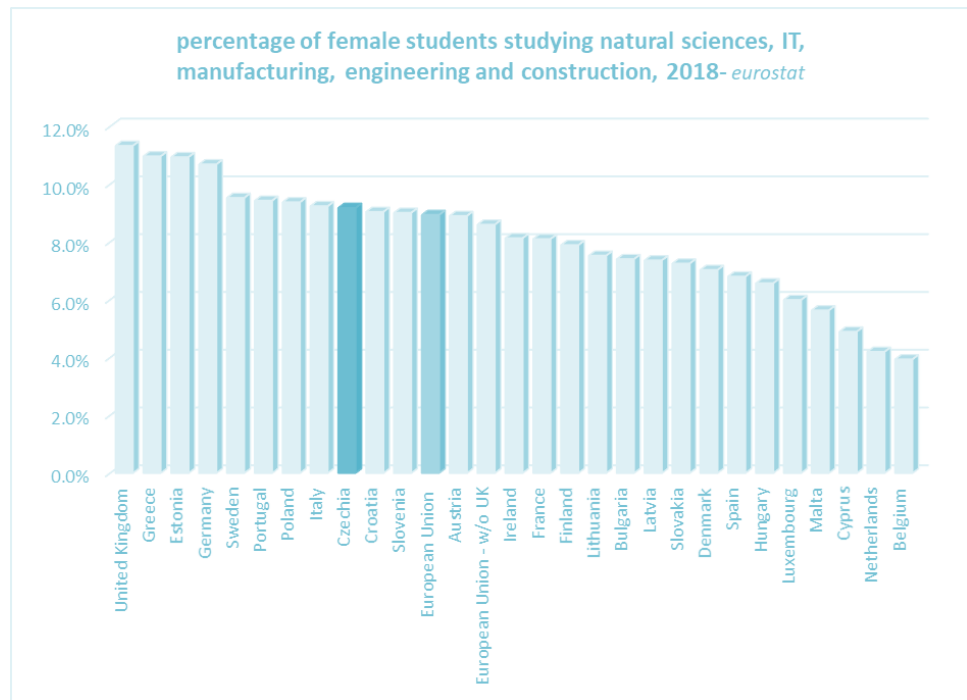
**Percentage of university students studying IT.** Our pool of ICT workers is proportionally higher than the EU average, but below countries such as Germany, Estonia and Finland. We should aim to have 9% of the university population studying IT by 2025.



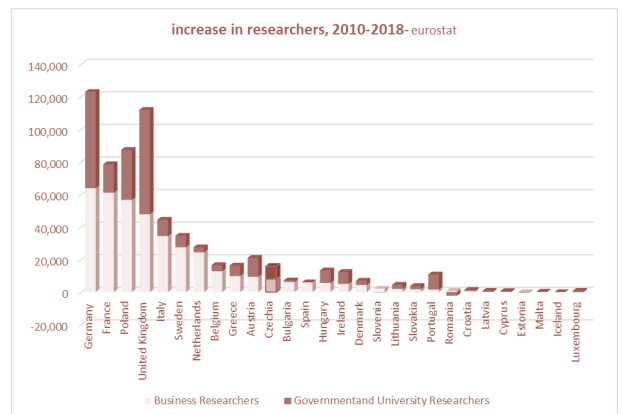
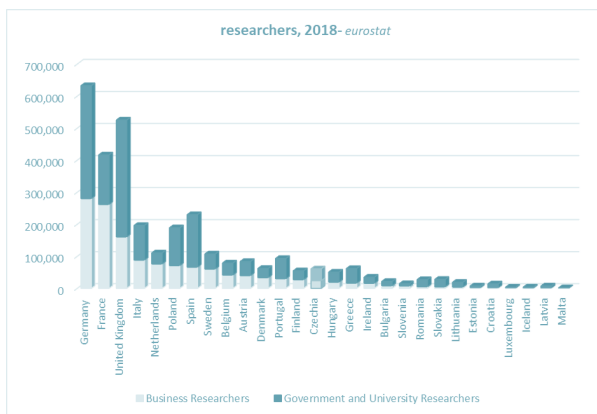
**Percentage of doctoral students in STEM subjects.** The proportion of doctoral students studying science, engineering, or IT is among the best in the EU. Our results stem from the second highest proportion of engineering doctoral students in the EU (after Romania). Otherwise, our proportion of natural science and IT doctoral students match the EU average. Since digitization is going to be vital for commercial innovation, we propose to increase the percentage of IT doctoral students from its current 3.3% to 7% by 2030.



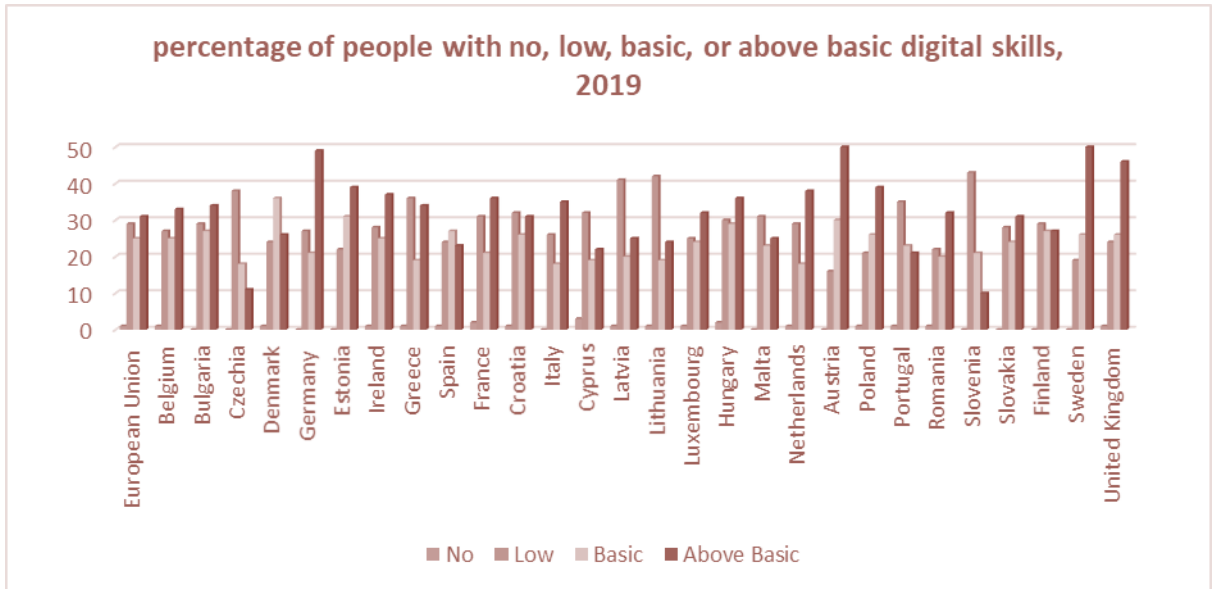
Percentage of Female Students studying STEM subjects. The Czech Republic has a higher number of women studying STEM subjects at university than the EU average. Nevertheless, we should aim for women studying IT to comprise 3% of the total university student population in 2030 (from 1% in 2018).



Number of researchers. The number of researchers in both universities and the private sector is growing. We employ 3% of the government and university researchers in the EU and 2% of the researchers employed in the private sector. While the EU has added 1.8 researchers in the private sector for every one added to the public sector since 2010, the ratio in the Czech Republic is 1:1.

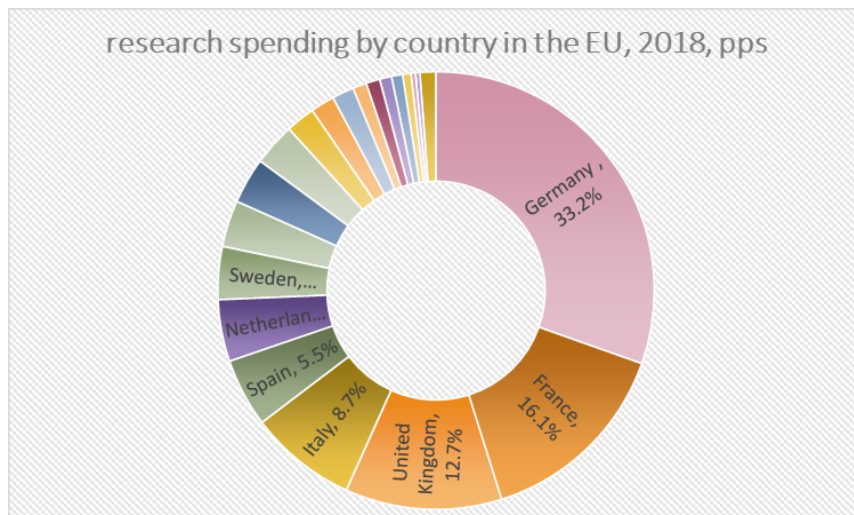


**Proportion of population with digital skills.** While the talent pool at universities is promising for achieving an innovative economy, the situation among the general population needs immediate and significant intervention. The country's ratio of digital skills is 0(no)-38(low)-18(basic)-11(above basic). The EU average is 1-29-25-31. We should devote education and training resources to having more than 50% of the population with basic or above basic digital skills.

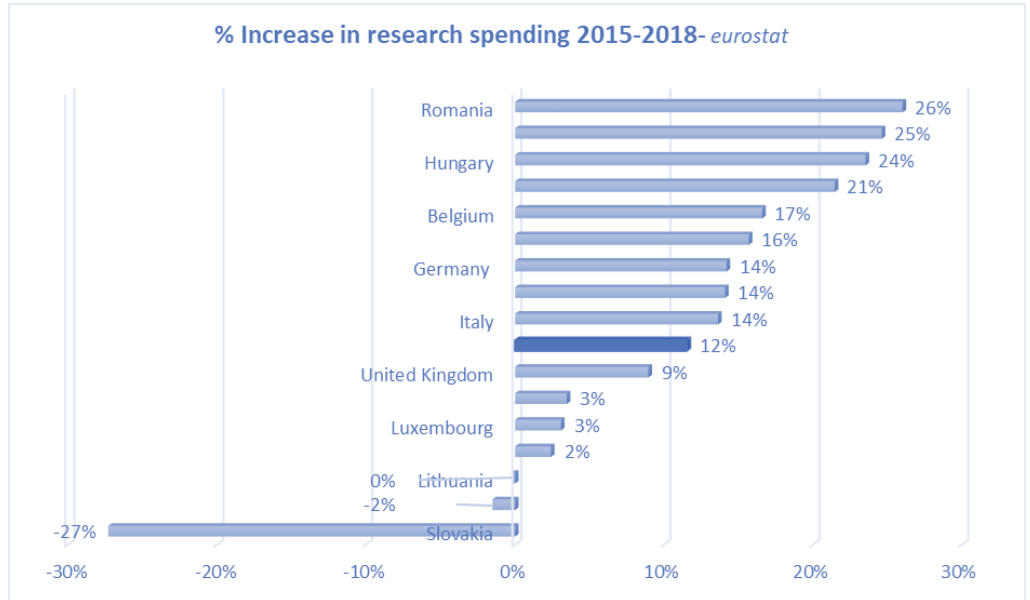


**Key research indicators.**

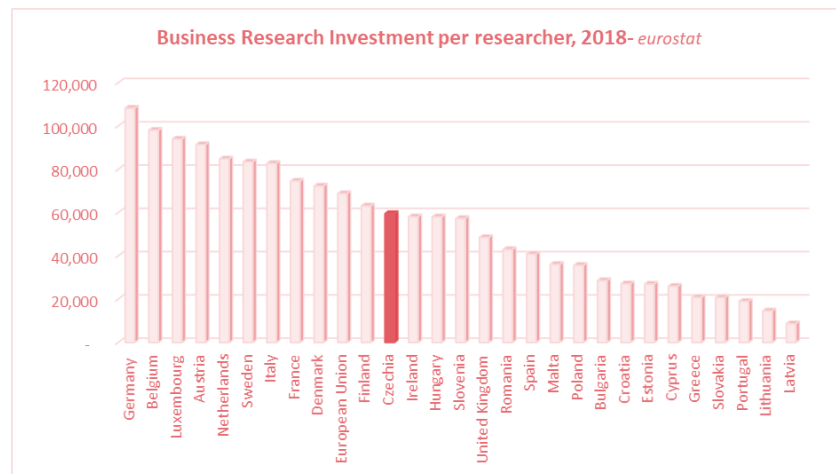
**Percentage of total EU research spending.** Czech Republic has increased the amount of investment into research to 1.9% of the total research investment in the EU.



**Increase in research spending.** The increase in our research expenditure matches the increase the EU average increase. Germany increased its spending at faster pace, and accounted for 42% of the increased spending in the EU (followed by Italy and the UK, both with 11%, and Poland with 8%). Poland, Hungary, and Romania doubled our rate of growth.



**Business research investment per researcher.** The country's productivity per researcher– measured by business research spending (a rough estimate of the calculation of commercial output)– is lower than the EU average, and approximately PPS 60,000 lower than Germany.



## Policy recommendations

The previous section used statistics to illustrate our raw innovative capacity. This section takes the four strategic assets– education, commercial and public research, public services and procurement, and innovative urban areas– and uses them in policies that could create a positive feedback loop that would allow education to increase commercial research, public procurement to improve innovative areas, and so on. When the increase in one strategic asset also results in the increase of the other three, the economy will be on a sustainable path to becoming an innovative economy.

The policy recommendation is broken down into four areas: product development, workforce, urban areas, and manufacturing. We focus on product development (instead of public and commercial research) because product development is the end goal of commercial research, and therefore critical to increase and maintain the commercial research essential for an innovative economy. We included manufacturing, because a digitized manufacturing with sustainable production not only keeps the production base high, which is important for prototype testing and scaling production, but also because a modern manufacturing industry needs research itself to stay competitive.

### Product Development

Our aim is to increase the Czech Republic's proportion of total EU research spending to 4% by 2030, with more than 2 euros invested by the private sector for every 1 euro invested by the government and universities. We will use .... Tactics for achieving this.

- 1) **Big Bets.** If the public research infrastructure is to serve as a major source of new start-ups, universities and research institutions must develop the capacity and reputation for worldclass research in fields that serve important global products. Developing this organically would require time and a high appetite for risk, because it would rely on hundreds of start-ups that do not have significant global sales or distribution. Instead, we recommend the government reduce the period needed to develop major public research capacity and reduce the risk of that investment by placing a series of “big bets” to develop, produce and export high value-added components of global industries in the Czech Republic. Such investments should 1) bring significant private sector investment into developing these products while building research capacity in Czech universities or research institutions., 2) place global experts in research or product design in Czech universities or research institutions, 3) require doctoral students from one or more faculties in Czech universities or research institutions, 4) produce the products in the Czech Republic, 5) possess numerous possible high-tech suppliers, including spin-offs or start-ups, which could also utilize public research. We believe 6-8 investments similar to the GE Aviation investment will result in a major advance in the country's research capacity and be a major factor in creating a critical mass of commercial innovative capacity.
- 2) **Build on strong foundations.** The country has already produced a number of high tech global players (Linet, YSoft, Avast). These companies have already proven the commercial competitiveness of their technologies, and have a global customer market and supply chain. Each of these companies operate in lucrative globalized industries, and each require constant technological improvement to remain competitive. The potential to build a cluster of high-tech suppliers is greater than the potential of any isolated start-up, as is the potential to generate a number of related products around the existing products. For instance, Linet produces hospital beds which allow health care professionals to monitor patients from their home. A hospital bed requires constant improvement in material and hydraulic technology, and a number of health care monitoring products could be built as accessories or complements to the bed.
- 3) **Move first in emobility.** The transition from combustion engines represents an opportunity to reposition the country in the automotive industry to play a more central role in developing and producing high value-added components in the next generation of cars. Engine, battery, and driverless operating technologies will be lucrative areas, and countries that place a series of bets in developing the intellectual property and production scaling capabilities for these segments are likely to be the biggest beneficiaries of the change. We recommend building research cooperation among universities in the CEE region through the funds the EU has dedicated to emobility.

- 4) **Public services.** One of the reasons major innovative economies have been able to sustain their investment in research is the use of public procurement to improve government services and build high tech industries. The computer industry in the US is based on research funded by its military for artillery and missile targeting. Israel has built security and water industries based on government programs. The Czech Republic recently followed a similar path for health care products required for the pandemic. Government services create a market for products, and a way to test the competitiveness of products. The success of using procurement to generate high tech industries depends on 1) creating ambitious and measurable goals for the public service that will utilize the product and 2) introducing measurable criteria for quality in the procurement process. The Czech Republic could implement a high tech public services approach in health care and energy. A National Cancer Plan is now being drafted that should include specific goals for prevention, diagnosis and treatment of health care and how national research should contribute to those goals. The new US administration has set multiple policy goals for increasing the use of clean energy, and allocated research funds to creating new technology to help achieve them; the Czech Republic could adopt a similar and complementary approach in order to find high value niches in a growing global market.
- 5) **Invest national pride into research.** The pandemic has illustrated the pride Czech citizens take in their technology capacity. The government should harness this pride by working to create a national technology fund that would allow citizens to invest into basic and applied research, and the government to match every 5 crowns invested by citizens with 1 crown of public funds. Not only would this create more private sector research funding, but it would also ensure that dividends on successful investment benefit the population more broadly.

### Workforce

In general, the Czech Republic's workforce is positioned competitively. We would encourage the development of worldclass research specializations in areas targeted for commercial development and an improvement in the digital skills of the workforce.

- 1) We would encourage the creation of multiyear technology fellowships for foreign professors and researchers to help build expertise in areas targeted for commercial development. Companies in these industries could receive tax deductions for funding these fellowships.
- 2) We would recommend the government to introduce incentives for companies and individuals to certify themselves to use widespread digital programs. We believe a full tax deduction for completed certification programs would increase significantly the attractiveness of the country for innovative companies.
- 3) Introduce "next generation innovator" scholarships (including paid position at university research lab) to foreign students in target industries such as artificial intelligence, health care, and aviation.

### Urban Innovation

Urban areas are likely to be impacted by the decline in international travel and the increase in working from home. The government could take this situation and utilize it to increase the number of innovative businesses and infrastructure (hubs, affordable housing) in the city. Brno has successfully built around its technology park. Prague and other cities would benefit from a similar park. We suggest Prague's be built near the Prague Airport, so that it could benefit from proximity to flights, access to the ring road, and a short Metro ride to and from CVUT. The state should maintain some control over the park— either through ownership of the land, or an agreement with the operator, and start-ups renting the facilities should pay partly in shares so that the rents remain affordable, and the state can benefit from those that achieve global success.

### Manufacturing

The country should assure it maintains its manufacturing expertise as the world transitions to Industry 4.0 and sustainable production. In order to encourage companies to make necessary upgrades quickly, the government could introduce accelerated depreciation for such investment, and a 50% tax deduction for small manufacturers, for a limited period of time. To motivate quick action, the government could adopt more stringent energy and environmental regulations after that time has elapsed.



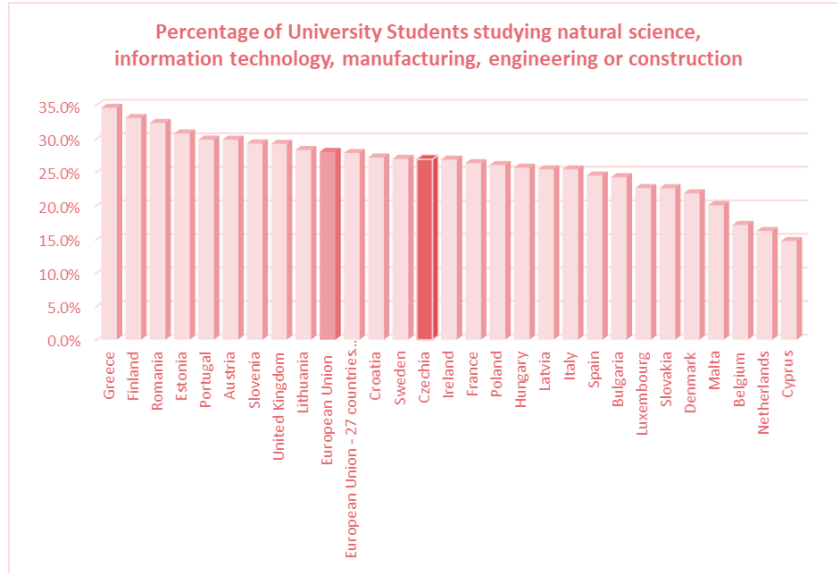
### The Three Key Performance Indicators

The goal of research policy should be the increased prosperity and security of country. Our purpose lies on the prosperity side of that equation. Therefore, our key performance indicators for research policy focus on the generation of commercial opportunity through re- search. The number of STEM students determine the primary source of research capability– people with skills. Our percentage of total EU research spending reveals how much our re- search is valued on the global market. The ratio of private spending to public spending illus- trates how businesses value the commercial potential of our research.

2025 Target

29%

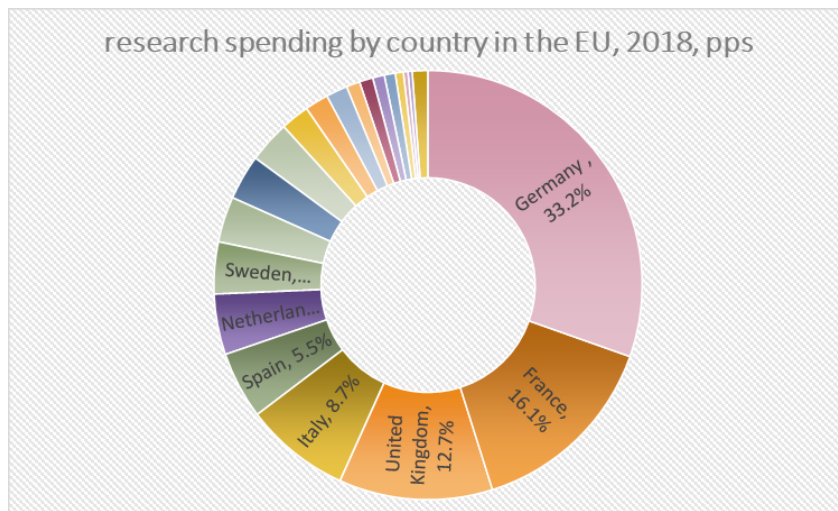
Today  
26.9%



2025 Target

3%

Today  
1.9%



2025 Target

2.1%

Today  
1.64%

