



SPECIAL ANALYSIS

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The path to prosperity: Company expenditure on R&D in the EU

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Introduction

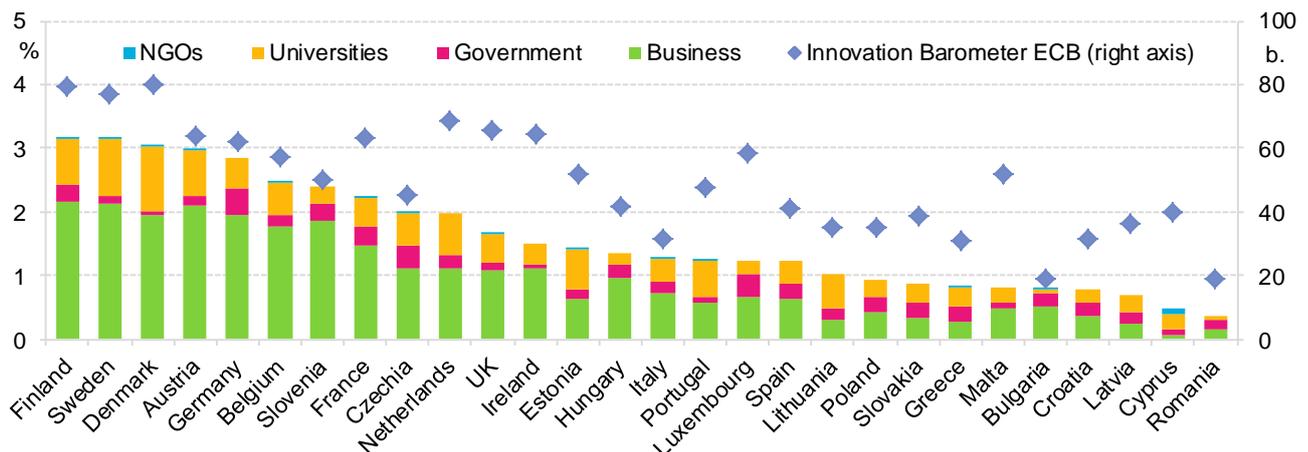
Back in 1912, Josef A. Schumpeter, the best known economist born on Czech territory, wrote his book *The Theory of Economic Development* in which he said the only source of economic growth was the businesspersons who through their own innovative activity tries to be better than their competitors. In his later work he then understood the central role of company research and development (R&D) – companies constantly try to develop better and more sophisticated products that better correspond to the needs and demands of consumers. And it's company expenditure on research and development in the European Union that is the theme of May's EU Monthly news.

Expenditure on research and development within individual member states of the European Union varies dramatically and correlates closely with the economic development of a given country. In the high income economies in western and northern Europe quality research and development is able to be financed not only domestically but also via foreign investment in other countries. On the other hand, in states where they are unable to fund innovative research there is often significant economic instability and the standard of living in these countries isn't very high. It's certainly not possible to say that merely increasing funds for research and development triggers substantial changes in the standard of living. But the fact that long-term and systematic work on effective research leads to economic miracles is demonstrated by the ECB's Innovation Barometer, which we publish regularly.

Investment in research and development is a necessary but not sufficient condition for economic development – there are many factors that are not so dependent on finance, but ultimately they can significantly limit or even halt development. Interaction plays a key role for a successful economy – research doesn't have to take place only in university ivory towers and institutions conducting primary research; a key role is also played by work on specific innovations as part of applied research. The main role in improving competitiveness is without question played by companies.

In countries with the best innovation system for this there are close connections between various research sectors and other important players. Particular emphasis is placed on research management – this balances interests between independent primary research and more binding applied research and tries to look for examples of “quality” research and promote it at the expense of “lower quality” research.

General expenditure on R&D as percentage of GDP in 2014 and Innovation Barometer ECB



Source: Eurostat; EU Office; Innovation Barometer 2015

The public sector plays a very important role in research and development – apart from the fact that it conducts a substantial amount of research itself, for example in the Czech Academy of Sciences, it is also an active player in the business sector. As part of its support for research it influences what companies will research and at the same time tries to motivate companies with institutional settings. It's not sufficient, however, for the state to dispense money and hope and that “something will turn up”.

Responsible people have to carefully study the potential of the local economy and look for a competitive advantage that could in future improve regional prosperity. Top EU leaders therefore require a Regional Smart Specialisation strategy – each region should know its weaknesses and strengths and actively take part in local research and development in companies in accordance with this.

Corporate expenditure on R&D in the EU

In 2014, nearly EUR 300 billion was spent on research in the European Union, i.e. an amount that exceeds the GDP of Finland and Denmark. On average, around EUR 560 was spent per capita, of which 60% represented corporate expenditure.

In total, 2% of European GDP was spent on research and development. Companies not only conduct research, but to a large extent they also finance it – on average 55% of all resources allocated to R&D in the EU are financed by businesses. Companies fund primarily their own research (they contributed more than 80% to the funding of corporate research), but to a certain extent they also finance research at universities and they may also participate in public sector research.

The overall amount of funds going into research and development has long been increasing, both as an absolute amount and in relation to the other sectors of the economy.

While corporate expenditure on R&D in 2005 was around 1.1% of GDP, in 2014 it reached 1.3% of GDP – growth of 0.2 percentage points over 10 years is not dramatic, but it did not cease with the onset of the financial crisis.

There is significant heterogeneity between states, however. While expenditure on research and development in companies in Finland, Sweden and Austria exceeds 2% GDP, in Cyprus, Lithuania and Latvia corporate research is negligible (less than 0.4%).

In general, the more competitive an economy is, the more money companies spend on research and development. In Sweden, Finland and Germany, companies finance almost more than 60% of research and development.

In east European countries this share is less than 40%, and on a considerably lower base. A calculation pursuant to purchasing power parity shows that absolute corporate expenditure on R&D is more than 10x greater in Sweden than in Greece and Bulgaria.

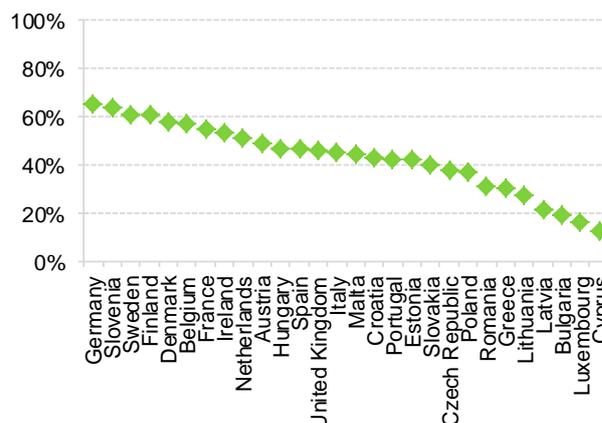
Foreign resources

It's not only expenditure on R&D that varies in the EU, but also price levels, labour costs and other factors that motivate western companies to do research beyond their own domestic economy. In addition, the European Union's regional policy redistributes a considerable amount of funds from western countries to the poorer ones, and one of the important channels is also funding for research and development from grants.

This development can help poorer countries – if it creates a sufficiently attractive environment for competitiveness research then foreign companies will be interested in investing (and are already investing) in local research and development. But it doesn't work automatically – for a country to successfully link to with international research there needs to be a quality education system in that country which develops specialists who are able to compete with specialists from richer economies.

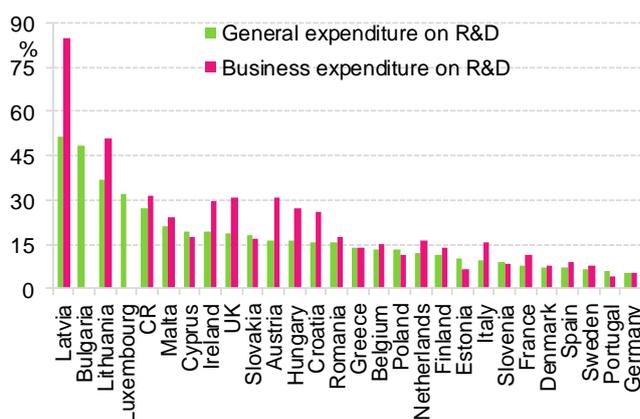
But it is also necessary to build research infrastructure – scientists have to have access to equipment and laboratories to carry out research effectively. A necessary condition is also the ability to attract and maintain highly qualified specialists. It's therefore

Percentage of business enterprise R&D expenditure



Source: Eurostat; 2013

Expenditure on R&D funded from abroad



Source: Eurostat; share of expenditure on R&D funded from abroad on general expenditure on R&D

necessary to motivate them not only financially, but also with the job description – the research must be relevant, ambitious and commensurate with the world leaders. Upon fulfilment of these conditions one can expect a considerable inflow of research investment from abroad.

Within the EU, funding sources from abroad vary substantially – while they comprise a mere 5% of overall expenditure on R&D in Germany, in Latvia they represent nearly 50%. In terms of corporate expenditure, the proportion is slightly higher, but comparable.

Cost structure

Companies have to pay workers from their own expenditure on R&D, as well as other costs – normal operating expenditure on maintenance and investment in new projects, property, buildings, equipment and laboratories.

Within the EU the structure of expenditure varies dramatically – while personnel costs greatly predominate in the Netherlands and Germany, in Bulgaria for example more than 50% of the very small budget for corporate research is comprised of operating costs.

A key factor for an economy in a given country to be able to be successful in research is its willingness and ability to pay the best specialists available and provide them with the best conditions for original and relevant research. Countries which have enough funds to pay for the quality discoveries of researchers greatly increase their chance of success in the future. Countries which don't try to do this undermine their potential and expose themselves to risk in the future. A sufficiently developed level of scientific research is thus one of the ways of at least slowing down the brain drain.

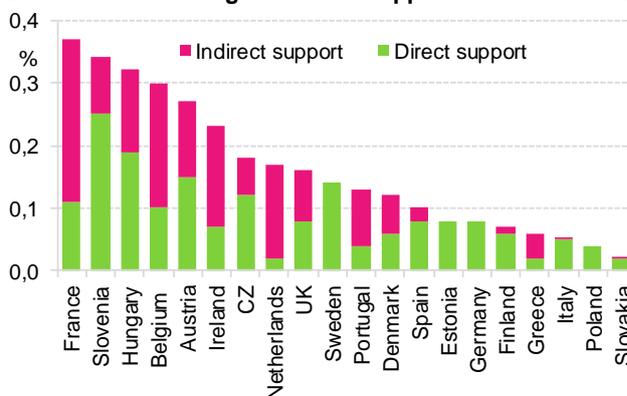
Support for research

The state tries to motivate companies to devote themselves to research and development. One form of assistance is direct support – grants for specific projects that in the context of the Czech Republic are distributed for example by the Technological Agency of the Czech Republic. In order for a grant to be effective it's necessary to pay attention to the substitutional effect – the state has to watch whether companies really are spending money on research that they wouldn't manage to finance from their own resources or whether because of the receipt of grant funding other research projects are not being restricted which would not otherwise be subsidised.

In many countries, however, there are also indirect incentives in addition to direct grants – especially in the form of tax deductions. The data, however, do not demonstrate a strong relationship between subsidised science and research and corporate expenditure. For example, in Slovenia and Belgium both support and corporate expenditure on research and development is high. Conversely, support is very low in Germany and Finland.

While there's no indirect support at all in Germany in the form of tax deductions for investment in research and development, the role of direct support in the Netherlands is minimal.

Direct and indirect government support of business R&D



Source: OECD; share on GDP; 2013

Corporate R&D in the Czech Republic

The Czech Republic, thanks to its historic tradition and location in the heart of the European Union, has expectations and the opportunity to get to the highest level of research and development – the Czech education system produces competitive graduates and the results of Czech science are in some technical fields at least comparable to Western Europe (see the [IDEA study](#)).

And it appears that Czech companies have been relatively successful in trying to make use of this position – corporate expenditure on R&D since 2005 has more than doubled. This development can be partially explained by the general growth in economic activity, but corporate research is also increasing relatively. While in 2005 corporate research represented 0.7% of GDP, in 2014 it already exceeded 1.1% Corporate research has long been at around 55 – 60% of

overall expenditure on research and development. Eighty-five percent of spending on corporate R&D comes directly from corporate funding, 10% is paid from domestic public sources and 5% comes from public foreign sources (i.e. EU funds in particular). Research dependence in the Czech Republic on EU grants is therefore not particularly high.

As a small open economy, the Czech Republic greatly depends on foreign investors and this also applies to research and development. According to European Commission data, foreign sources make up more than 30% of expenditure on R&D. More than half of the total corporate expenditure on R&D is carried out in companies with a private foreign owner. In enterprises with a domestic owner, 38% of investment goes into R&D. The benefit of foreign owners to the Czech economy is also well illustrated by the fact that two-thirds of the overall growth in spending on R&D has been contributed by foreign-owned companies.

The Czech Republic is traditionally an industrial country and this is also reflected in the structure of corporate expenditure on R&D – apart from the scientific activities category which brings together companies making a living directly from scientific work (whether in the field of biotechnology or economic research), the most funds for R&D are invested in the automotive sector.

Large funds are also invested in R&D by information and communication companies, particularly software firms. And engineering companies are definitely not staying in the background.

The good news is that corporate research is not concentrated in one place and is being conducted practically across the entire Czech Republic. The most developed is Prague, closely followed by Central Bohemia. A slight distance behind is South Moravia where academic research has been successfully combined with regional policy and innovation in technological companies. The Central and South Bohemian regions have managed to increase corporate investment in R&D by more than 75% since 2005.

Two regions are significantly behind – in the Moravia-Silesia region companies spend half the Czech average on R&D, and that's despite the fact that it's a region with a substantial industrial tradition, three universities and a branch of one of the largest car makers in the world. Even worse is the North Western region where investment in R&D in comparison with the rest of the Czech Republic is critically low (around 20% of the overall Czech average).

The close connection between long-term macroeconomic stability and company expenditure on research and development sounds a warning bell for these two regions.

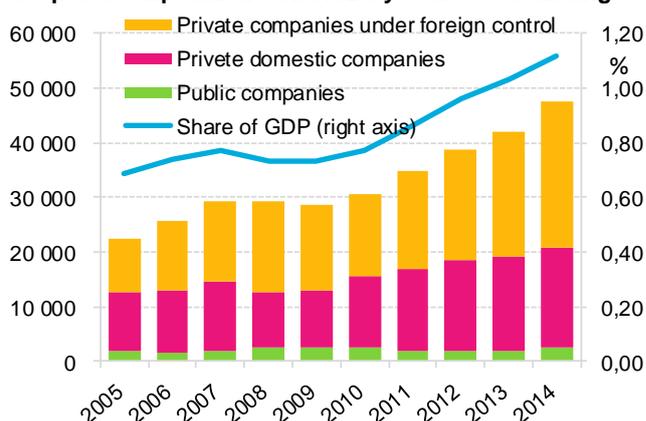
The direction for the Czech Republic

Maintaining the trend – Funds for R&D (including corporate) have long been growing and thus contribute to the integration of the Czech economy into the global economy. Corporate expenditure in 2014 represented 56% of all expenditure. We're not bad in the regional context, but we're still losing out in regard to the EU average. Companies also shouldn't fear financing research outside the parent company – while companies in Germany finance 65% of R&D, in the Czech Republic it's less than 40%.

Smart specialisation – Companies, regional policies and local universities have to work closely together and try to develop their own regions. Each region has its own characteristics and development strategies can't be managed from above. The relevant actors therefore have to understand the options and try to develop them. Rarely is it worthwhile creating completely new sectors – rather, it's necessary to improve the old ones. A region has to know what direction it wants to go in over the long run. South Moravia and its successful South Moravian Innovation Centre can serve as inspiration for this.

The devil is in the wages – Nearly 3,000,000 researchers are working at the current time throughout the EU. Thanks to this, the competition is huge and in short, top experts need to be paid. If companies in the Czech Republic want to do research at a high level, they must be willing to be pay for it.

Corporate expenditure on R&D by sources of funding



Source: ČSÚ, Eurostat; mil. CZK in common prices

On the other hand, what is also important motivation for scientists are interesting, relevant and ambitious projects, and they are often willing to sacrifice financially more enticing offers for such opportunities.

Competitive science and education – Primary research together with a university education, among other things, act as an incubator of future researchers. People learn about the boundaries of current knowledge and later they can apply this knowledge in applied research. Czechs with experience from abroad create excellent opportunities but who want to later return for personal reasons. These people are vital for competitiveness.

Research and transport infrastructure – Applied research in the Czech Republic takes place in particular in the engineering, transport and energy sectors. For top research in these areas a quality research infrastructure is absolutely necessary and it's necessary to continuously improve and renew machinery. Transport infrastructure also plays a role – by increasing cross-border mobility it significantly increases the motivation especially of German companies to invest in R&D in the Czech Republic. Given the high proportion of foreign companies in R&D, the Berlin-Prague-Munich highway could be a good innovative measure.

Don't give money where it's not needed – The effectiveness of research support doesn't come out altogether well from the statistics – it doesn't seem that support automatically leads to an improvement in economic competitiveness. Even though in some developed countries there are strong incentives, in the countries that we place at the top research support is rather low.

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