

**ECONOMICS** – REGIONAL STUDIES

# Corporate innovation in **Austria:**

Findings from the EIB Investment Survey



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# Corporate innovation in Austria: Findings from the EIB Investment Survey

**EIB Regional study**

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The mission of the EIB's Economics Department is to provide economic analyses and studies to support the Bank in its operations and in its positioning, strategy and policy. The Department, a team of 40 staff, is headed by Debora Revoltella, Director of Economics.

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## 1. Introduction

Investment in innovation is a key driver of long-term prosperity. The capability of economic agents to create new products and improve production processes and their capacity to absorb new technologies, which have been invented elsewhere, are determining the competitiveness of an economy and hence the employment chances of its workforce and the profitability of its firms. Therefore, policymakers are eager to create and support an innovation system that stimulates investment in research and development (R&D) and higher education.

The innovation system represents all the institutions that influence the creation and diffusion of new technologies within an economy. This set of institutions can be rather broad, ranging from tax incentives to educational policies or intellectual property rights and access to venture capital. If these institutions are designed in an innovation-friendly way, it will be easier for enterprises and research organizations to come forward with new technologies and new products. While the concept was originally introduced as national innovation system, for example in Lundvall (1992), we find that innovation systems in Europe often transcend national borders, especially for small open economies like Austria.

Therefore, improving the innovation system is an objective not only for national policymakers. The Europe 2020 strategy for creating smart, sustainable and inclusive growth includes eight ambitious targets; one of them is raising the gross expenditures for R&D (GERD) to 3% of GDP. This 3% goal has been a main objective of Austrian innovation policy for quite a while: in the late 1990s, the Austrian GERD was close to the EU average at around 1.9%, but since then it has increased significantly and in 2016, Austria had the second highest R&D ratio next to Sweden. However, as Janger and Kügler (2018) emphasize, the sheer amount of GERD is not sufficient to increase the innovative potential of an economy if the efficiency of innovation spending is too low.

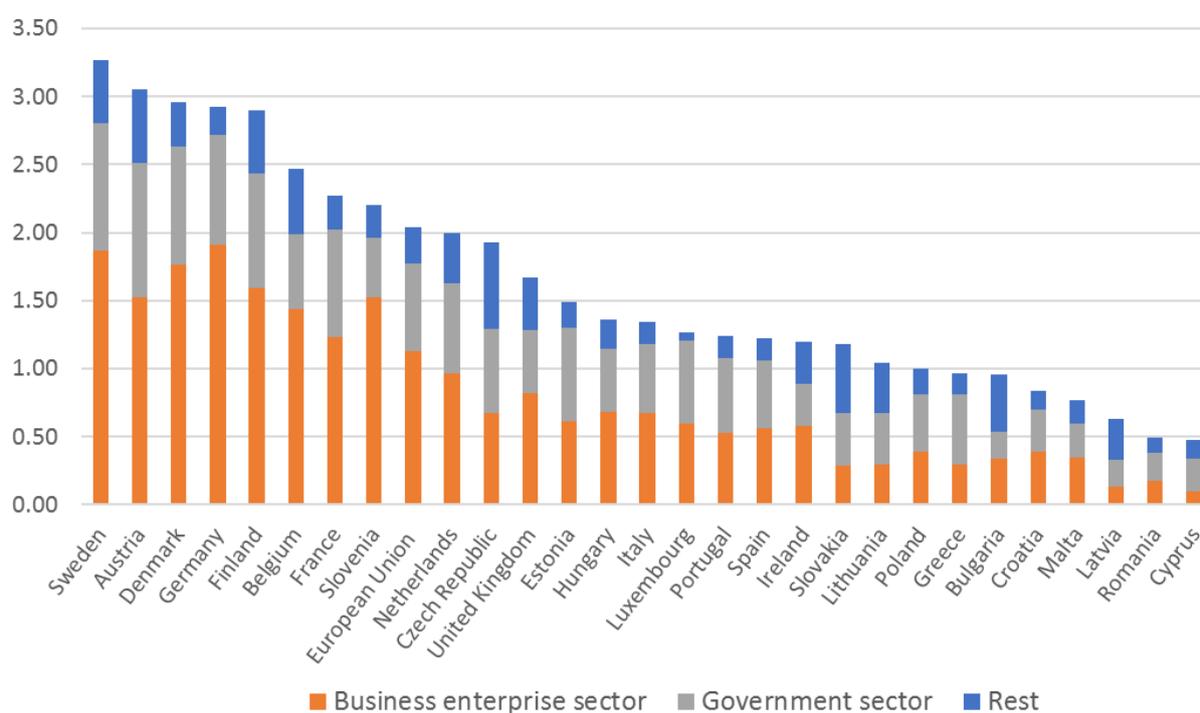
While previously policymakers often aimed at picking industries that seemed promising and clustering them in specific regions by providing subsidies, policies targeted towards a better innovation system exhibit more of a bottom-up design; the direction of innovation is left to innovators and markets. Nevertheless, government interventions play an important role, as many of the risks involved in the innovation process are too big for private actors to take, especially in the early stages when research is more basic and marketable outcomes cannot be expected for the foreseeable future. Mazzucato (2013) highlighted the significant role of the state for the direction and the speed of innovation and questioned the distribution of the returns to innovation between the private and the public sector.

The financing of innovation activities is an important input to the national innovation system; both, the private and the public sector, are active in this field. In Austria, the role of the state is quite substantial. According to the Austrian Research and Technology Report 2017, 36% of

GERD in Austria are financed by the public sector, over 30% by the federal government. This amount of public funding, which is equivalent to 1% of GDP, is outstanding in the EU, where according to Eurostat the average public contribution to R&D amounts to 0,67% of GDP. Even top performers in innovation and research like Sweden and Denmark spend less of their public budgets on R&D. Interestingly, more than a quarter of the public expenditures on R&D accrues to the corporate sector, which is also exceptional in EU comparison. While public funding of basic research or higher education is common among OECD countries because these expenditures often display positive externalities, funding corporate innovation activities is usually left to the private sector as the returns to these activities mostly accrue to the private sector.

A second distinct feature of Austria's R&D funding is the high share of foreign expenditures. Foreign companies fund about 16% of GERD in Austria, which is also the highest share in the EU. On the one hand, the high inflow of R&D investment proves the outstanding innovative capacity of Austria's economy, which makes it attractive to many multinational corporations. On the other hand, this bears the risk that multinational corporations could redirect their R&D investments if they assess Austria less attractive in comparison to other locations because they are not subject to a home bias with respect to Austria.

**Chart 1: R&D expenditures by source of funding in 2015 (% of GDP)**



Source: Eurostat

The R&D expenditures of an economy are not independent of its sectoral composition, as different sectors require different research intensities. The sectoral composition of economies is often path-dependent and cannot be changed deliberately or rapidly. In this respect, the OECD (2017, chap. 5) performed an interesting thought-experiment: what would

the intensity of business R&D in economies look like if they all had the same sectoral structure? The business R&D expenditures vary significantly across countries because they have specialized in different products and industries over time. If all OECD member states had a sectoral composition equal to the OECD average, Austria would be the country with the highest business R&D intensity, even higher than the OECD top performers Korea, Sweden, and Finland. This indicates that Austria currently has a sectoral structure that is not particularly strong in the most innovative industries like ITC or pharma.

The remainder of this paper is structured as follows: section 2 will discuss the Austrian innovation system and its assessments by international comparisons. In section 3, we present the current policies to address the strengths and weaknesses in the ecosystem and its major instruments in terms of funding agencies, research centers or tax policy. Section 4 contrasts this descriptive policy analysis with findings from the EIB's unique survey on innovation and investment by Austrian firms. This allows us in section 5 to derive some innovation profiles for Austrian companies. Finally, section 6 concludes.

## 2. Assessment of the Austrian innovation system

One of the objectives stated by the government in its strategy on research, technology and innovation in 2011 was to make Austria an innovation leader according to the ranking of the European Innovation Scoreboard (EIS). The EIS is one of many benchmarking exercises in the EU and assesses the research and innovation performance of all Member States. Following the definitions of the EIS, innovation leaders are countries whose innovation performance is well above the EU average. Despite the government's acknowledged strategic ambitions, the latest version of the EIS<sup>1</sup> does not feature Austria among the innovation leaders, but still among the strong innovators (i.e. the second most innovative group of countries in the EU), as measured by the Summary Innovation Index. This Index is a composite indicator merging several dimensions of innovation into one scale. The four main areas of interest (framework conditions, investments, innovation activities and impacts) comprise 27 indicators like the number of new doctorate graduates, the degree of broadband penetration or the amount of patent applications.

The appraisal of the Austrian innovation system in the EIS indicates several strengths, but also some room for improvement. Whereas Austria is among the top performers with respect to science-industry collaboration and firm investments, in the category "innovation-friendly environment" it ranks only in the lower third of EU countries. This is mainly due to the lackluster broadband penetration among enterprises, which is below EU average and far below the Nordics or the Baltic states. However, it should be noted that despite this rather negative assessment of the innovation environment, Austria ranks way above EU-average in

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<sup>1</sup> European Innovation Scoreboard 2018, published in June 2018  
[http://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards\\_en](http://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards_en)

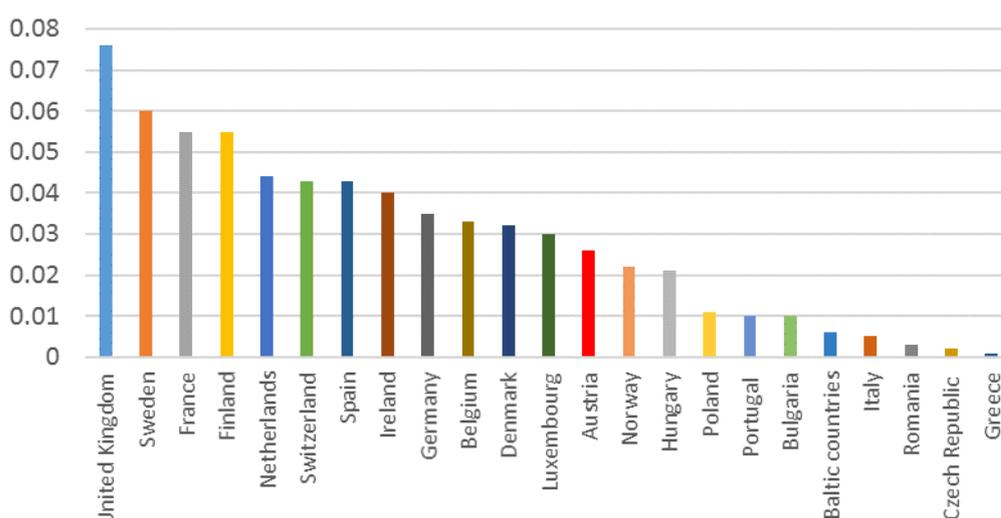
eight out of nine indicators measuring innovation activities and only average in one. The lack of an all too innovation-friendly environment (according to the definitions of the EIS) seems to be not much of an impediment to the active innovators in the country.

The EIS reports another weakness of the Austrian innovation system with respect to the impacts of firms' innovation activities. The "impacts"-component of the EIS should illustrate how innovation translates into benefits for the economy as a whole, e.g. employment impacts or sales effects. A sub-indicator in this field is employment in fast-growing enterprises, where Austria scores the lowest value but one of all EU countries<sup>2</sup>. Exports of knowledge-intensive services and sales due to innovation activities, two other sub-indicators which are measuring the impact of the innovation system, are also below EU-average.

## 2.1 The funding of corporate innovation in Austria

The EIS also judges the availability of finance for innovation projects by venture capital expenditures as significantly below EU average, although improving. This finding is corroborated by the statistics on venture capital expenditure published by Invest Europe<sup>3</sup>, the association representing Europe's private equity, venture capital investors. In 2016, the total venture capital investments in Austria amounted to 0.014% of GDP, which was roughly half the European average. In 2017, venture capital investments had risen to 0.026% of GDP (see Chart 2), while all over Europe it averaged 0.039%. Austria's meagre endowment with venture capital has been a feature of its innovation system for more years, see Gassler and Sellner (2015).

**Chart 2: Venture Capital investments in 2017 (% of GDP)**



Source: Invest Europe

In general, banks always had a strong role in funding business investments in Austria. The OECD (2018) reports that bank loan conditions for SMEs are still among the most favorable in

<sup>2</sup> Only Cyprus has a lower value, whereas for Greece no score is available.

<sup>3</sup> Invest Europe (2017) and (2016)

international comparison. Of course, bank funding is often not an option for young innovative firms as they lack collateral and an established credit history. The open question is still whether the venture capital funding is so scanty due to supply restrictions or because there is not more demand (for an extended discussion, see Jud et al. (2013)). Within the last years, the government has implemented several policies to address potential supply-side constraints, but it is too early to judge whether these measures have been sufficient. Gassler et al. (2018) find that the number of companies in which venture capital funds had invested is even higher in Austria than in France or in the United Kingdom, if the numbers are adjusted for the size of the respective economies. This together with the low ratio of Austrian venture capital in GDP (as reported above) indicates that these companies are rather small in Austria relative to other countries, which might be related to the limited size of the domestic market and/or the sectoral specialization of these firms in less capital intensive sectors.

## **2.2 The infrastructure for technological transformations**

Adapting to the challenges of the digital economy is currently one of the main tasks of an innovation system. Policymakers are committed to facilitate firms' access to new technologies and workers' access to new skills so they can manage the transformation of the economic environment successfully. The European Commission also publishes a Digital Transformation Scoreboard (DTS)<sup>4</sup>, which assembles key performance indicators on the state of play and evolution of the digital transformation in Europe, and the Digital Economy and Society Index (DESI)<sup>5</sup>, a composite index that summarizes indicators on Europe's digital performance and tracks the digital competitiveness of EU member states.

The DTS for 2018 suggests that Austria's performance in the field of investments and access to finance is rather strong. This is mostly due to the high expenditures on R&D, but also financing through the local equity market and the ease of raising funds by issuing shares or bonds in the capital market are far above the average EU level, only the availability of venture capital is merely average (which we have addressed above). The DTS and the DESI find the digital infrastructure deficient. Austria is among the last countries in the EU with respect to the take-up of faster broadband varieties.

The OECD in its Science, Technology and Industry Scoreboard 2017 sees a solid foundation for innovation in Austria, as it records strong spending in higher education and vocational programs as well as high general R&D expenditures and a high share of investment in ICT. There is a well-established scientific base with a high share of researchers in the workforce, and many innovative, R&D-performing SMEs are competitive in niche export markets.

A well-educated workforce is a necessary precondition for innovation and technological competitiveness. Especially in view of the challenges of the digital transformation ahead, education and firm-based trainings are important to secure production and employment.

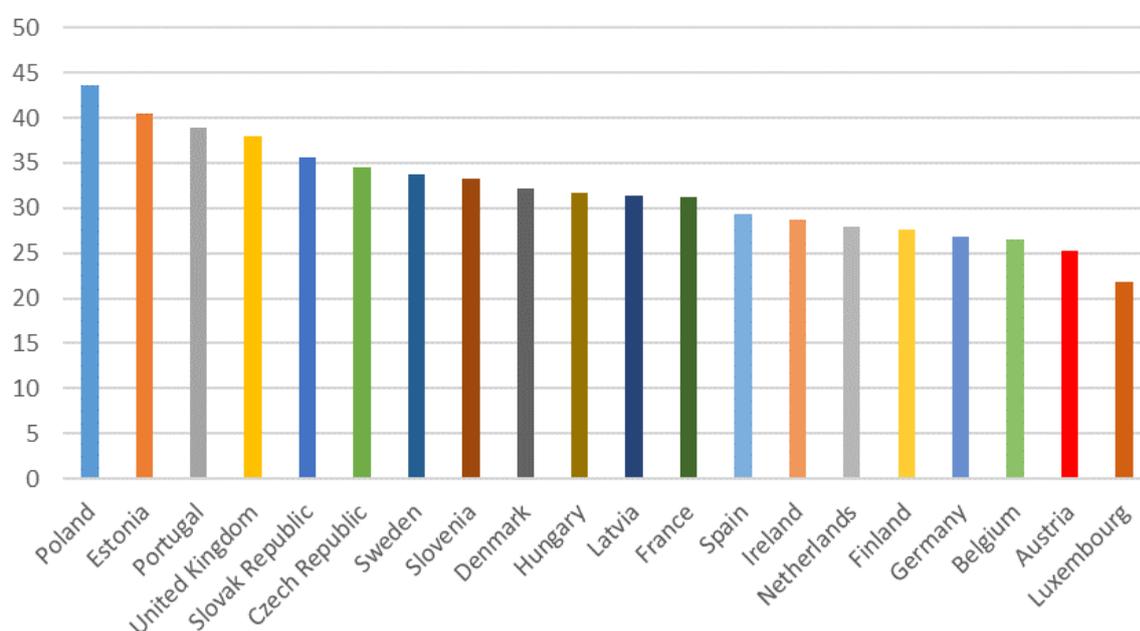
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<sup>4</sup> <https://ec.europa.eu/growth/tools-databases/dem/monitor/scoreboard>

<sup>5</sup> <https://ec.europa.eu/digital-single-market/en/desi>

Austria exhibits the 4<sup>th</sup> highest share of higher education expenditure in R&D in the OECD and Austria has also the 4<sup>th</sup> highest rate of graduates at tertiary level in science, technologies, engineering and mathematics (STEM) within the OECD. This generally positive assessment of the higher education system comes with one qualification, as the share of women among the STEM graduates is one of the lowest in the OECD at 25%. In addition, the Austrian share of IP5 patents<sup>6</sup> invented by women is one of the lowest in the OECD. Part of the explanation for this might be the rather traditional attitude towards child-rearing in Austria, which results in insufficient numbers of early childcare facilities that forces mostly women to interrupt their careers. Simply changing this attitude might open the scope for innovation in Austria without inflicting much higher expenses to the corporate or the public sector.

**Chart 3: Percentage of women in STEM graduates**



Source: OECD

The educational ambitions of Austrian firms are rather modest.<sup>7</sup> 58.5% of Austrian workers receive firm-based training, which is close to the OECD average. In leading countries like Finland, Denmark or the Netherlands,  $\frac{3}{4}$  of the workforce have been trained by their employers. Most of the training programs offered by Austrian employers are for medium-skilled employees. In Finland, for example, about half the firm-based trainings are for high-skilled workers, whereas in Austria, high-skilled workers receive only 25% of all firm-based trainings, which is the lowest share in all OECD countries. The OECD mentions that firm-based training courses not only improve individual productivity by learning new techniques, but also serve as devices to motivate and reward employees.

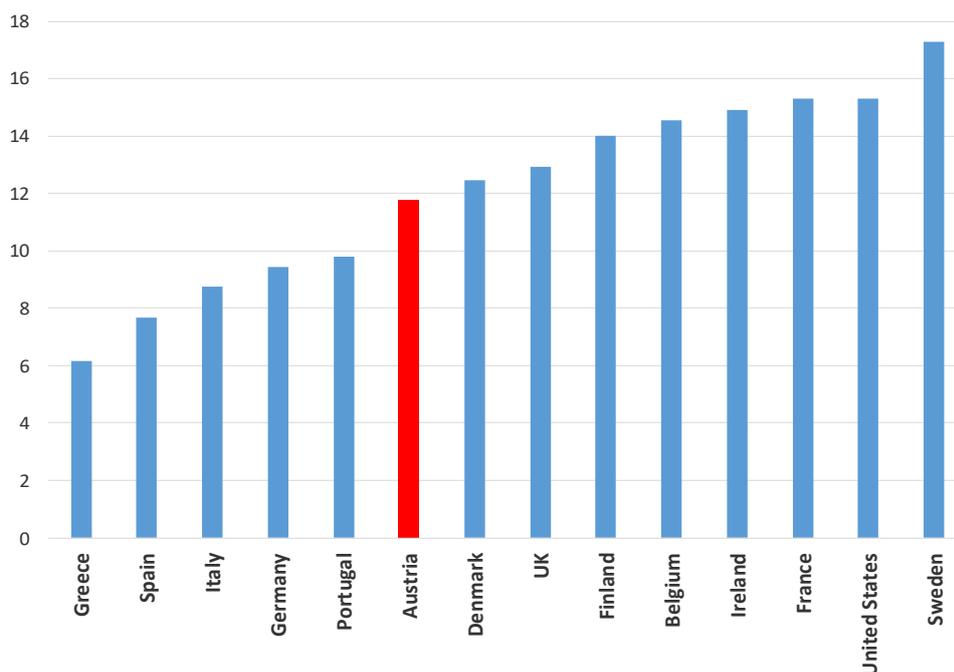
<sup>6</sup> IP5 refers to the five largest intellectual property offices in the world,

<sup>7</sup> These results are confirmed by the EIBIS results below.

The OECD also analyzed the impact of innovation-related inputs other than R&D on competitiveness and productivity. These inputs are referred to as knowledge-based capital (KBC) or “intangible assets” and they are as diverse as patents, design, software, brands, firm-specific training or organizational capital. Like the traditional production inputs, labor and capital, KBC can enhance the productive capacity of an economy and the OECD tries to measure their impact in a growth decomposition exercise (for an overview, see Niebel et al. 2017). Austria is among the countries where KBC makes a substantial contribution to labor productivity growth and hence to competitiveness. Among the different components of KBC, software and ICT equipment seems to be less important in comparison to peer countries.

When compared to selected EU countries and the United States, Austria’s business sector does not rank among the top in terms of intangible investments. We follow OECD (2018) in its definition of intangible assets as “identifiable non-monetary assets without physical substance”; in most cases, this means intellectual property such as patents, brands, copyrights or software. However, as shown above (chart 1) with respect to general business expenditures on R&D, Austria does score at the top of the EU.

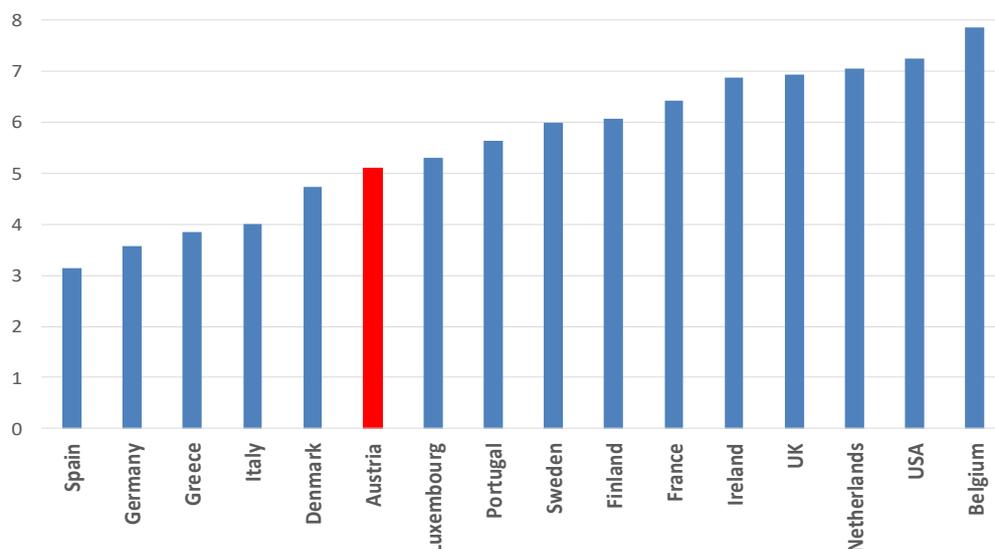
**Chart 4: Intangible investment by the business sector (% of GDP)**



Source: INTAN-invest, Eurostat, OECD. 2014

If Austria ranks top in R&D expenditures, but mid-range in other elements of intangible investment, then obviously firms in the other countries must be investing more in non-R&D intangibles to score higher in total business intangible investment. Indeed, firms in most other EU countries and in the United States invest relatively more in the part of intangibles related to economic competencies, namely advertising, market research, organizational capital and employee training.

**Chart 5: Business spending on economic competencies – firm brand, organizational capital, and employee training (% of GDP)**



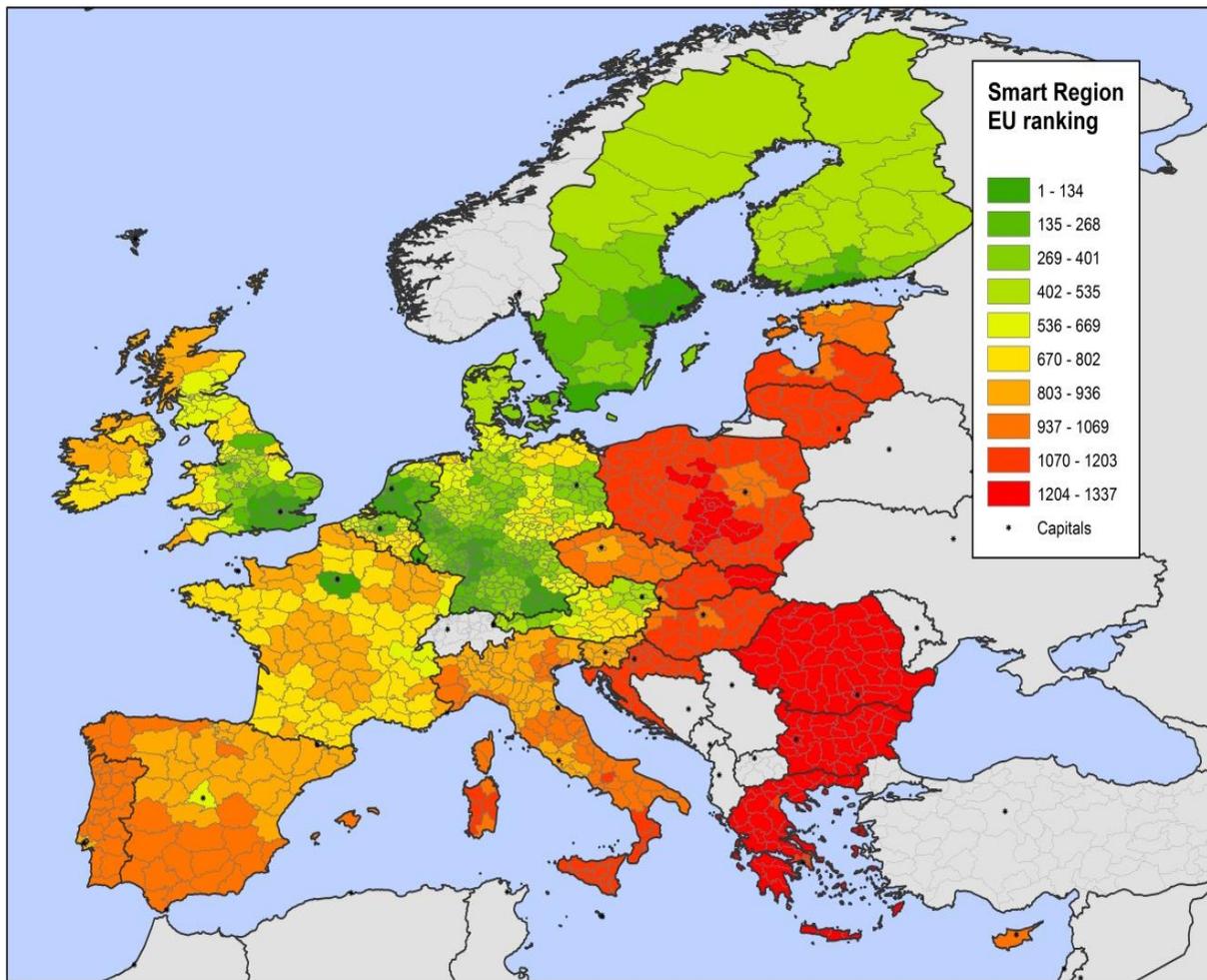
Source: INTAN-invest, Eurostat, OECD. 2014

In terms of the Smart Regions Index developed by the EIB, the Austrian regions and cities score well in comparison to their EU peers. The index shows that the smartest regions and cities are located in the Vienna area and in the west of Austria. Within the individual smartness pillars, Austria scores particularly high in the EU context in the smart environment, smart governance and smart economy pillars, while it registers more within-country divergence in the smart living, smart mobility and smart society pillars, see Kollar et al. (2018).<sup>8</sup>

To conclude this section, we find that Austria has a well-developed innovation system, which is outstanding in some areas. The general expenditures on R&D are among the highest in the EU and the OECD. Cooperation between the business sector and universities or other research institutions (like AIT – the Austrian Institutes of Technology) is working very well and the workforce is highly educated. Multinational corporations consider Austria an interesting location to invest in. There are some shortcomings, too, but their causes are mostly outside the direct control of innovation policy. The access to broadband internet seems to be insufficient. The inclusion of women in the field of innovation and technology is also behind the level of innovation leaders. Moreover, the entrepreneurial culture or “innovation-friendly environment” is rated under par, but this is an assessment that Austria shares with some of the top performers in innovation.

<sup>8</sup> The concept of “smart” was divided into six pillars : Smart Economy, Smart Governance, Smart Mobility, Smart Society, Smart Living and Smart Environment. Pages 25-26 show the results for the EU as a whole. See the reference for more details.

Chart 6: Smart region ranking (EU-28 NUTS-3 regions)



Source: Kollar et al. (2018)

### 3. Innovation policy in Austria: strategy and instruments

The Austrian strategy for research, technology and innovation as presented in Bundeskanzleramt (2011) aims at transforming the innovative and economic activity towards smart and sustainable growth to the effect that Austria would be an innovation leader by 2020. To achieve this overarching goal, the government has defined a number of operational objectives like educational reforms, e.g. improving the link between the education system and the innovation system and lifting the quality and quantity of human capital. Other objectives are strengthening basic research and the innovative capacity of domestic firms by increasing public support for business innovation and intensifying technology transfer and applied sciences.

Innovation policy uses direct and indirect instruments to support innovative activities in firms. The direct instruments usually take the form of grants, subsidies or loan guarantees, which enables a firm to conduct R&D or other innovation-related processes. Indirect instruments

come as tax grants or tax breaks. Additionally, the government also implemented topical initiatives when it had identified areas of particular relevance for the improvement of the innovation system.

### **3.1 The direct instruments of innovation policy**

The two major government agencies in Austria to fund and support business innovation are the Forschungsförderungsgesellschaft (FFG) and the Austria Wirtschaftsservice (aws). FFG is the national funding agency for business research and development. The FFG's toolbox is quite broad and ranges from support programs for exploring potential research topics in very early stages of the innovative process to grants for the development of marketable products. Next to the direct support at the individual firm level, the FFG also funds so-called structural programs that aim at improving the framework for innovation by supporting science-industry cooperation. Some FFG programs are also mission-oriented and follow the purpose to contribute to the solution of clearly defined social needs. In 2017, the FFG accepted 3.200 applications for grants; overall (including loans and guarantees), the FFG's funding amounted to 685 million Euro.

The agency aws is a promotional bank for firms with a special focus on enterprise creation and growth. It provides financial and consulting services and its funding is based on federal support, ERP funds<sup>9</sup> and EU subsidies. The financial services mainly aim at improving access to finance for firms by providing guarantees or direct loans. In 2017, the aws funding amounted to 1.15 billion Euro, of which 600 million were loans and 306 million were guarantees; the rest was spent for subsidies and participation in equity. Guarantees are especially valuable for companies, which would not receive bank loans without them, and they are an efficient way to leverage the available capital of the aws.<sup>10</sup> In the recent past, aws was also tasked with the support of startup enterprises and designed some special programs for these small, young firms.

Other funding agencies focus on supporting scientific research, most prominently the Fonds zur Förderung der wissenschaftlichen Forschung (FWF). The FWF provides grants for single researchers, research projects or doctoral programs. Its main recipients are universities. In 2016, the FWF supported 624 projects with a total of 184 million Euro; the acceptance rate of all applications stood at 23%. The underfunding of the FWF has been an issue in Austria's innovation policy for many years now. Over the past 20 years, the sum of applications has increased in value by over 600%, whereas the total sum of grants has merely doubled.

The FFG, the aws and the FWF are the most prominent direct funding instruments in Austria, but they are by far not the only players in this field. Due to the federal structure of the country, there are numerous regional funding agencies and there is considerable overlap between

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<sup>9</sup> ERP stands for European Recovery Program; this was the title of the US support for Europe under the Marshall Plan.

<sup>10</sup> aws guarantees have been co-financed since 1998 by the European Investment Fund (EIF) part of the European Investment Bank (EIB) Group.

these institutions and their programs. In view of the scarcity of public funds, it might be useful to reconsider the organization of direct R&D funding and to streamline the existing structures.

Janger et al. (2010) recommend more focus on areas of research with higher expected social returns and mention as one example climate-change related research. They suggest more funds for green basic research, which is not a priority in Austria's innovation policy so far despite the ambitious goals of the Paris climate accord. In fact, due to the organizational and regional fragmentation of innovation funding, it is rather difficult to identify a single strategic mission behind all these activities.

### **3.2 The indirect instrument of innovation policy**

There is currently only one indirect instrument of R&D support in Austria, the so called research premium ("Forschungsprämie"). The research premium was first introduced in 2002, when there was still another indirect instrument, an additional tax break for R&D expenditure, which was abolished in 2010. At the beginning, the research premium amounted to 3% of R&D expenditures by enterprises and was granted directly by the ministry of finance. Over the years, the research premium was increased repeatedly and since the beginning of 2018, amounts to 14% of all R&D related expenses. To increase the accuracy of this instrument and to reduce unintended windfall gains by firms, the government implemented a reform in 2010: since then, all firms that want to receive the research premium must apply to the FFG first and their application is examined for its R&D content. Before that, all Austrian firms could claim that they would conduct R&D because the ministry of finance was not in a position to appraise the applications correctly.

At approximately 600 million Euro per year, the research premium is quite a substantial transfer to innovative firms. Therefore, it was due for evaluation in 2017<sup>11</sup>. The evaluation showed that about 1.500 firms do not apply for the research premium any longer since applications for premia are examined by the FFG, which implies that there were significant windfall gains before that reform. Under the current system, about 2/3 of the premium accrues to larger firms with turnover of more than 50 million Euro. A survey among firms that have successfully claimed the research premium showed that they are willing to take more risk due to the premium and are more inclined to invest in infrastructure. The premium benefits those firms that are continuously engaging in R&D activities, it is not co incentivizing firms to invest in R&D that have not done so before.

Multinational corporations take the premium positively into account when they decide where to locate their research activities. In this sense, the premium was an effective tool in redirecting investment towards Austria, but from a European perspective, it could be seen as harmful tax competition as other countries might be incentivized to grant similar benefits to firms in their jurisdiction to attract more R&D funds. From an Austrian perspective, besides the obvious benefits, it is a risky strategy because favorable tax treatment can be copied by

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<sup>11</sup> See Ecker et al. (2017)

other countries and legislated at short notice. Other relevant framework conditions for innovation like a highly skilled workforce, excellent universities and research centers or a healthy entrepreneurial culture are more difficult to establish and cannot be developed within a couple of months.

### **3.3 Topical policies**

As we have seen in section 2, several assessments of the Austrian innovation system conclude that the general framework is quite favorable, but the access to broadband internet is lacking. The competent ministry for transport, innovation and technology addressed this issue in 2014 by establishing the so-called broadband strategy 2020<sup>12</sup>. The aim of this strategy is to provide access to ultra-fast broadband internet in all the country by 2020. The initiative is also part of the government's strategy to make Austria an innovation leader by 2020 and it is a major effort to prepare the economy for the challenges of digitalization.

The development of high-capacity networks that would secure download speed of 50 Mbit/sec or more in even remote areas of the country is considered as an important precondition in the attempt to increase the competitiveness of firms across the country and to ensure digital inclusiveness among all citizens. The government committed a billion Euro to this target over the period until 2020. The funds are earmarked for the rollout of fiber networks, the improvement and overhaul of existing networks and for excavating empty installation tubes for later cabling. By the end of 2017, about one third of the earmarked funds have been spent.

In 2016, the government initiated the so-called startup package, a bundle of policies aimed at improving the conditions of startup entrepreneurs. The lack of venture capital and the resulting difficulties for founding enterprises has also been mentioned in the assessments compared in section 2. Hölzl and Reinstaller (2013) also reported financial restrictions as a problem for young technology-intensive firms in Austria. Among these measures was a subsidy to the non-wage labor costs of the first 3 employees of a startup enterprise to make it easier for startups to hire staff. The capital of the already existing awb business angel funds was increased and investments in startup equity were subsidized. Regulatory changes should make private equity investments in SMEs easier. Other regulatory measures included a one-stop shop for the founding process and so called "start-up visa" for innovative entrepreneurs from abroad. Overall, the government dedicated funds of 185 million Euro to the support of startup enterprises over a period of 3 years. The European Commission in its Small Business Act factsheet on Austria called the startup package a "remarkably broad set of innovative measures (which) is evidence of Austria's commitment to fostering start-ups".

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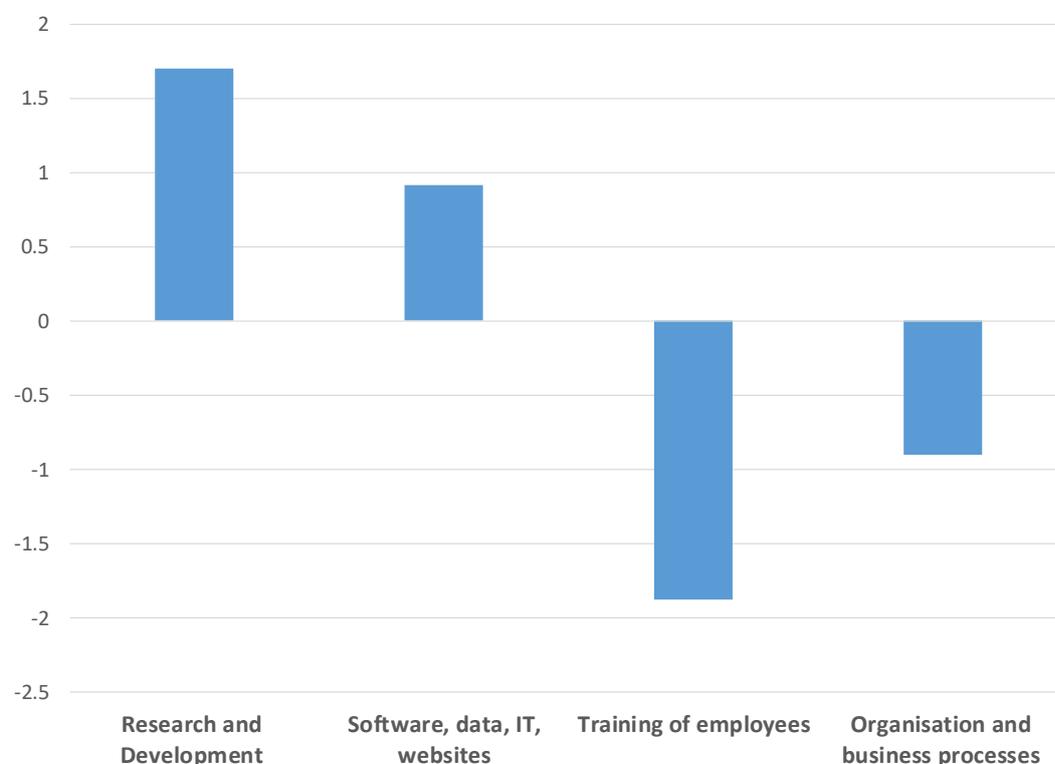
<sup>12</sup>[https://www.bmvit.gv.at/service/publikationen/telekommunikation/downloads/breitbandstrategie2020\\_ua.pdf](https://www.bmvit.gv.at/service/publikationen/telekommunikation/downloads/breitbandstrategie2020_ua.pdf)

## 4. Innovation in Austria through the lens of the EIB Investment Survey of firms

To complement the trends in innovation policy and provide a microeconomic analysis at the level of firms, we use the EIB Group Survey on Investment and Investment Finance (EIBIS). This is a unique EU-wide survey in a panel of more than 12,000 firms conducted annually. In Austria, the survey covered 479 firms. It collects data on firm characteristics and performance, past investment activities and future plans, sources of finance, financing issues and other challenges that businesses face. EIBIS is representative across all 28 Member States of the EU, as well as for firm size classes (micro to large) and four main sectors (manufacturing, services, construction and infrastructure). The data is weighted by value-added to better reflect the contribution of different firms to economic output. The survey provides a timely micro-level perspective on investment activity as perceived by firms.

The large weight of R&D expenditures in intangible investment in Austria and relatively smaller weight of business spending on economic competencies (see charts 1, 6, and 7 above) is also confirmed by the EIBIS results. In comparison to the EU average, the Austrian firms are more likely to invest in R&D and software, data, IT and websites and are relatively less likely to invest in training of employees and organization and business process improvements.<sup>13</sup>

**Chart 7: Intangible investment areas – Austria vs EU net difference (% of firms)**

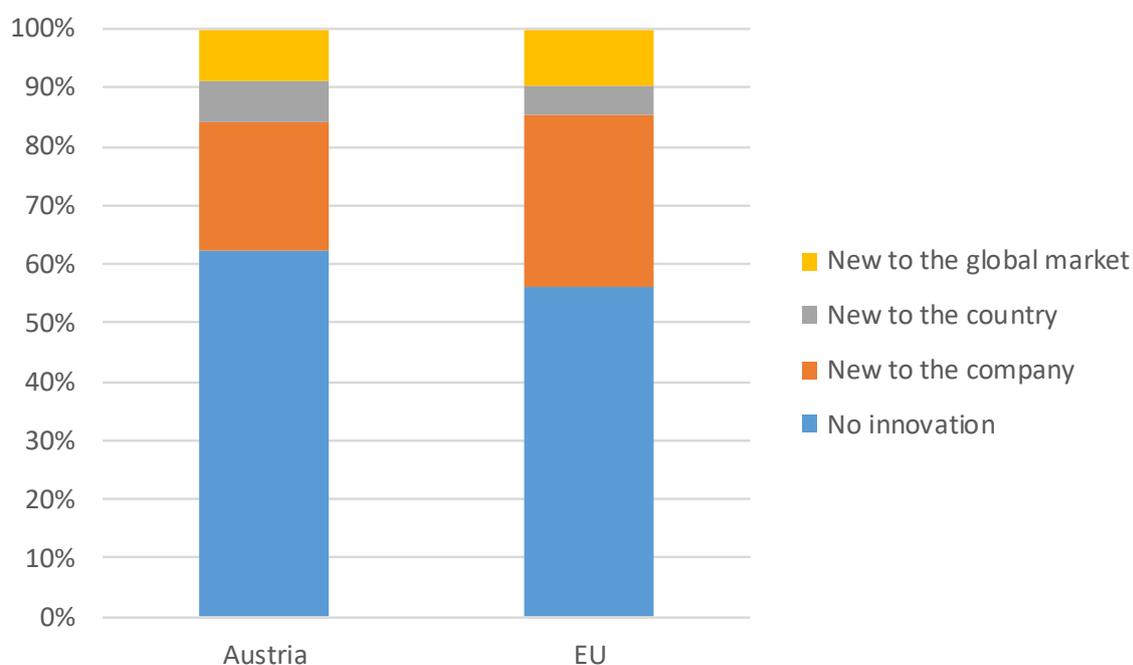


Source : EIBIS 2017

<sup>13</sup> These results also relate to the OECD numbers on firm-based training as stated above.

According to EIBIS, almost 63% of Austrian firms claim that they did not invest in developing new products at all, compared to 56% in overall EU context. About 9% of Austrian firms invested in developing new products that are new to the global market, which is in line with the EU average of 10%. Almost 29% of Austrian firms invested in products that are new to the country or new to the firm, whereas the EU average stands at close to 34%.

**Chart 8: Innovation areas – Austria vs EU (% of total)**

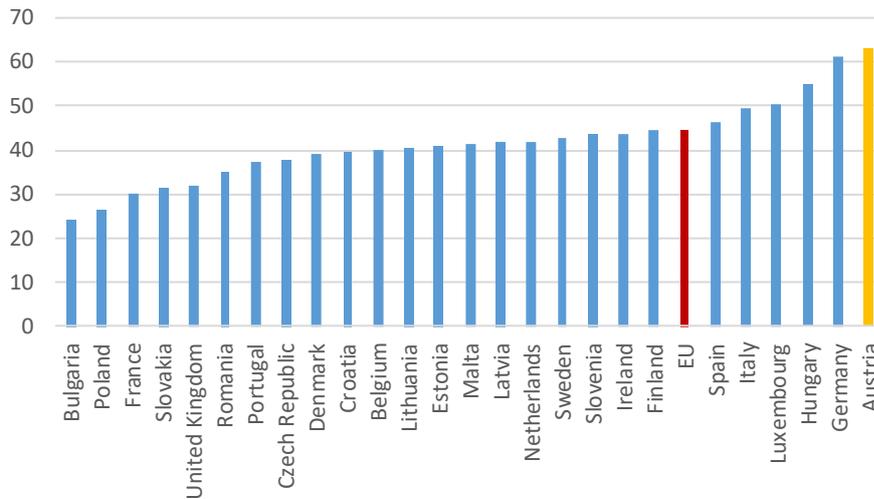


Source : EIBIS 2017

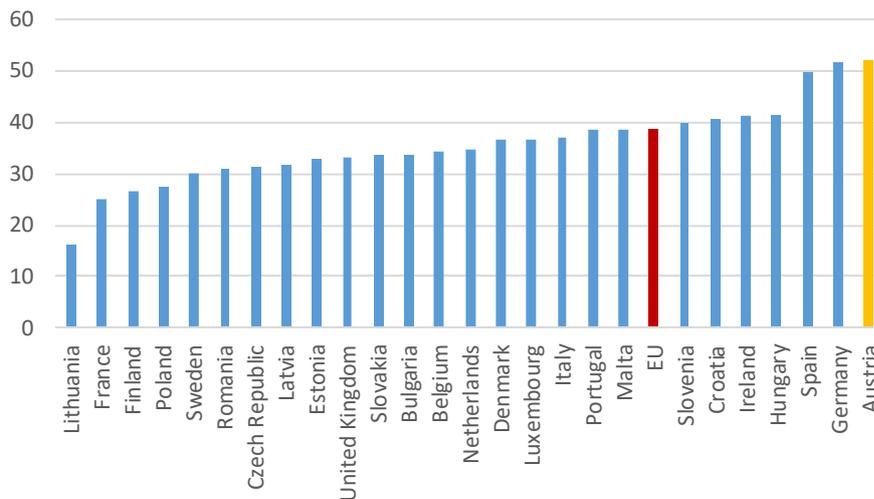
Even as the business expenditures on R&D as a share on GDP have been increasing since 2000<sup>14</sup>, Austria’s market share of exports to the world has been gradually declining. This can be for multiple reasons (including FX, impact of China, etc.), but part of it could be also due to lack of innovation for global markets.

Looking at our proxies for the quality of the capital stock, machinery and equipment of Austrian firms is among the most state-of-the-art in Europe (based on firms’ self-reporting form EIBIS), and the same applies to the energy efficiency of the building stock of the Austrian firms. This suggest that the Austrian firms might have prioritized boosting the quality of their capital stock, which could have led to under-investment in other areas, including the already mentioned training of employees and organization and business process improvements.

<sup>14</sup> See WIFO - The Austrian Institute of Economic Research, [www.wifo.ac.at](http://www.wifo.ac.at)

**Chart 9: State-of-the-art machinery and equipment (% of total)**

Source : EIBIS 2017

**Chart 10: Share of building stock meeting high energy efficiency standards (% of total)**

Source : EIBIS 2017

***What are the innovation profiles of Austrian firms?***

Using the results from EIBIS, EIB (2017, chapter 9) developed a methodology to identify five different innovation profiles for EU firms for analytical purpose. These profiles are based on the R&D investment and other innovation activities and allows us to cluster the surveyed firms into five distinctive categories: basic firms, adopters, developers, incremental innovators, and leading innovators.<sup>15</sup>

<sup>15</sup> The development of new products is based on questions 18 and 19 of EIBIS, namely “Q18. What proportion of the total investment was for developing or introducing new products, processes or services?” and “Q19.

Based on this methodology, we can assign the 479 Austrian firms that participated in EIBIS in the following manner:

- About **12.1%** of Austrian firms are **leading innovators** (i.e. those that develop products new to the country and to the global market and report substantial R&D expenditures)
- **7.8%** of Austrian firms are **incremental innovators** (i.e. those that develop products new to the company and report substantial R&D expenditures)
- **21.2%** of Austrian firms are **adopting innovation** (i.e. those that report no substantial R&D expenditures and that develop products that are new only to the company).
- **9.6%** of Austrian firms are **developing innovation** (i.e. those that report substantial R&D expenditures, but that do not yet develop products new to the firm, country or global market).
- Finally, **49.3%** of Austrian firms are **“basic” firms** (with no substantial R&D expenditures and no development of new products).

**Chart 11: Innovation profiles – Austria vs EU and vs peers (% of firms)**

**Austria**

<b>R&amp;D expenditures</b>	Active	9.6% Developers	7.8% Incremental Innovators	12.1% Leading Innovators
	Inactive	49.3% Basic	21.2% Adopting	
		No	New to the company	New to the market or globally new
<b>Developing new products</b>				

**EU**

<b>R&amp;D expenditures</b>	Active	7.3% Developers	14.3% Incremental Innovators	6.1% Leading Innovators
	Inactive	48.5% Basic	23.9% Adopting	
		No	New to the company	New to the market or globally new
<b>Developing new products</b>				

Were the new products, process or services (A) new to the company, (B) new to the country, (C) new to the global market?" R&D activity is defined as firms reporting substantial R&D (amounting to at least 0.1% of firm turnover).

## Peer group: Denmark, Finland, Germany, Sweden

R&D expenditures	Active	7.9%	11.9%	12.5%
		Developers	Incremental Innovators	Leading Innovators
	Inactive	44.3%	23.4%	
		Basic	Adopting	
		No	New to the company	New to the market or globally new
<b>Developing new products</b>				

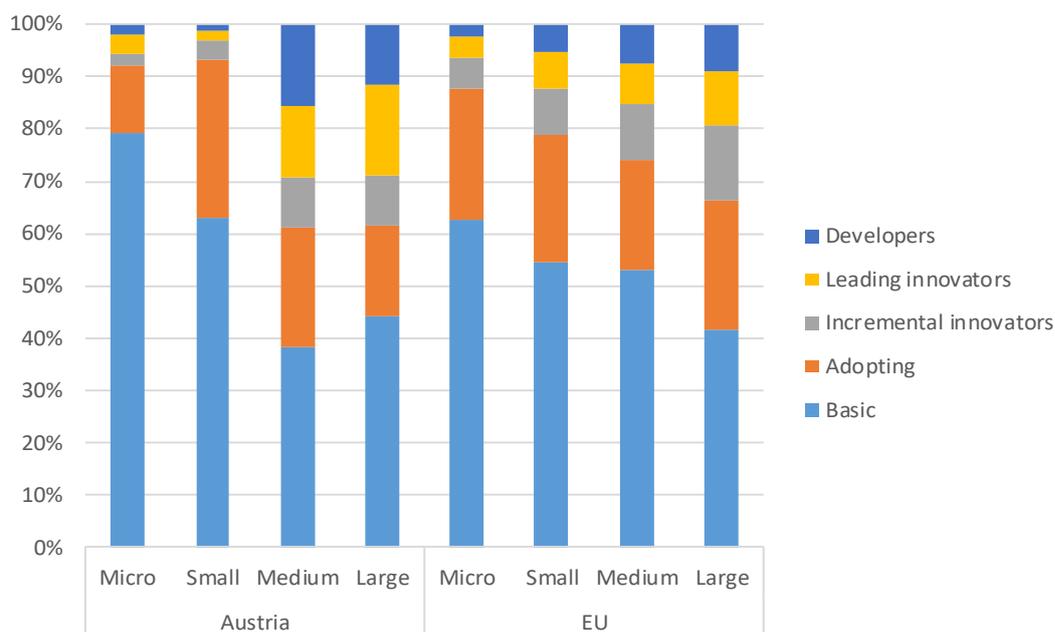
Source : EIBIS 2017

In comparison to the EU, Austria has more leading innovators, but less incremental innovators. It has more developers than the EU, and about the same share of firms adopting innovation and basic firms. Innovation in Austria is concentrated predominantly among leading innovators, whereas for the EU on average incremental innovators are more prominent. Austria's innovation profiles are comparable to its peers. In comparison to a peer group comprised of Denmark, Finland, Germany and Sweden, there is about the same share of leading innovators in Austria, slightly less incremental innovators, and more developers.

If we look deeper at the innovation profiles of Austrian firms, starting with size, we can see that most innovation activity (i.e. share of incremental and leading innovators) takes place in medium and large firms. Smaller firms are predominantly "basic firms" and "innovation adopting firms". In comparison to the EU, there are less developers, incremental and leading innovators among small firms in Austria. Moreover, Austria has less small-size leading innovators, but more medium-size and large leading innovators. This could be the outcome of the policies presented in section 3: the research premium is likely to attract investments from large foreign corporations in Austria, which would bias overall innovation activity against smaller firms. Additionally, we have seen that Austria's entrepreneurial culture is lacking therefore it is probably easier in other countries to start an enterprise. Even innovative young firms tend to start small, therefore a cultural shift towards more risk taking and entrepreneurial spirit might induce the founding of more innovative small firms in Austria.

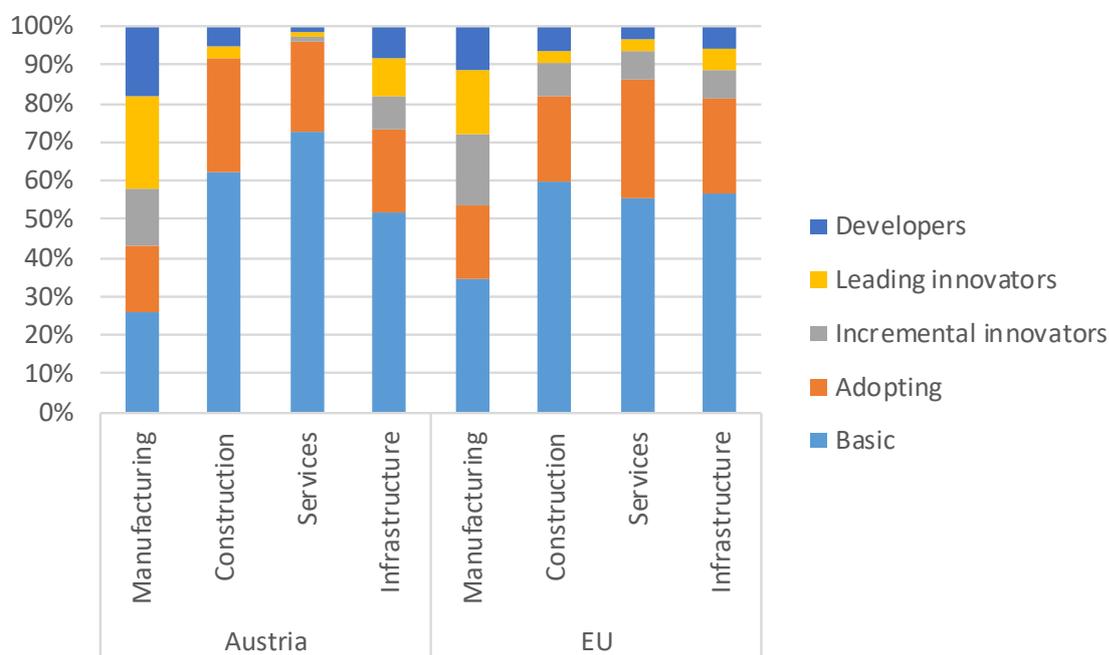
In terms of sectors, manufacturing industry has the largest share of incremental and leading innovators in Austria, followed by infrastructure sector. In comparison to the EU, Austrian services firms have less incremental and leading innovators, which might reflect the relatively larger share of trade, accommodation and food services in the Austrian economy.

**Chart 12: Innovation profiles and firm size – Austria versus EU (% of total)**



Source : EIBIS 2017

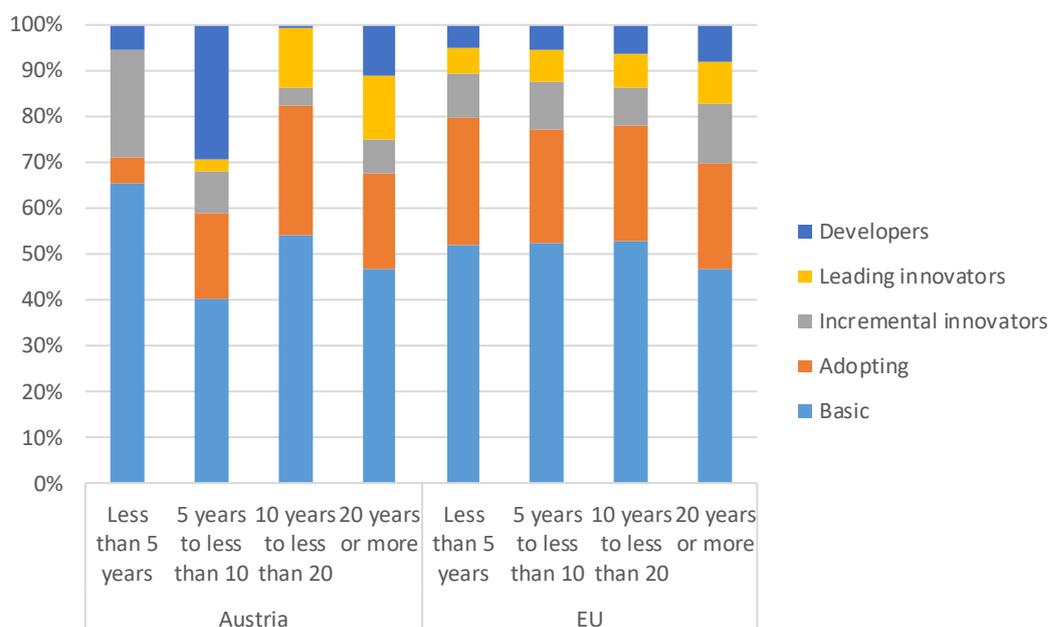
**Chart 13: Innovation profiles and sectors – Austria versus EU (% of total)**



Source : EIBIS 2017

Unlike the EU as a whole, young Austrian firms have very few leading innovators. Leading innovators in Austria are concentrated in older firms. On the other hand, Austrian firms younger than 5 years have a larger share of incremental innovators, and Austrian firms that are 5 to 10 years old have a large share of developers.

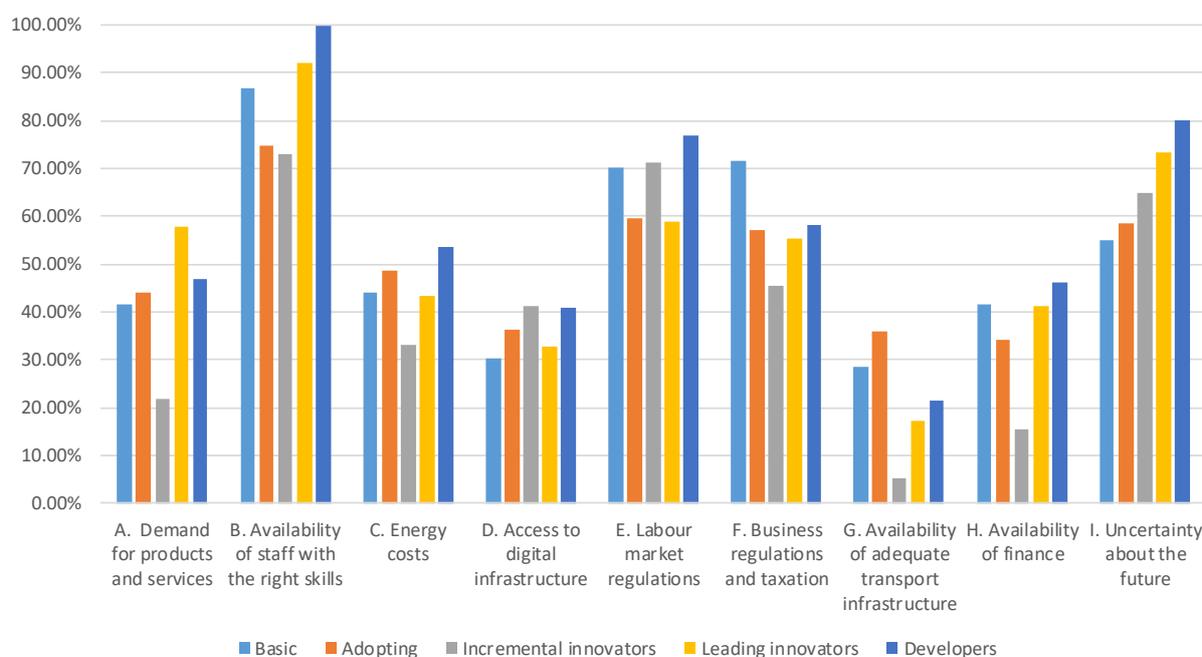
**Chart 14: Innovation profiles and firm age – Austria versus EU (% of total)**



Source : EIBIS 2017

Availability of skilled staff in Austria is an overwhelming investment obstacle across all innovation profiles, followed by uncertainty about the future and business and labor market regulation (in line with the overall country picture for Austria). Demand is most burdensome for leading innovators.

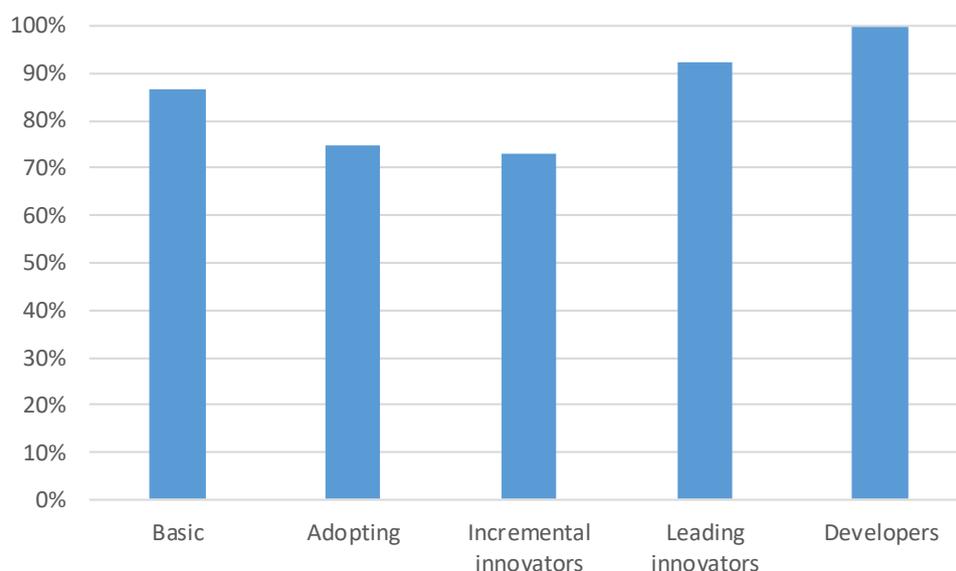
**Chart 15: Innovation profiles and obstacles to investment in Austria**



Source : EIBIS 2017

While the availability of skilled staff is a major long-term investment obstacle felt by most firms in Austria, more innovative firms complain on balance more about a lack of skilled staff. In particular, more than 90% of leading innovators in Austria feel that the availability of skilled staff is an obstacle to their investment activity, and all developers are constrained by lack of skilled staff.<sup>16</sup>

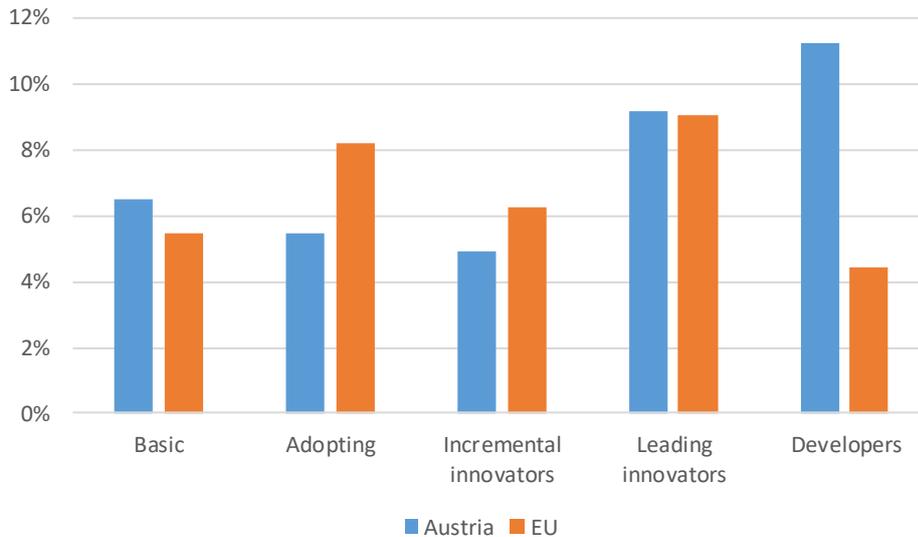
**Chart 16: Innovation profiles and lack of skilled staff as an investment obstacle**



Source : EIBIS 2017

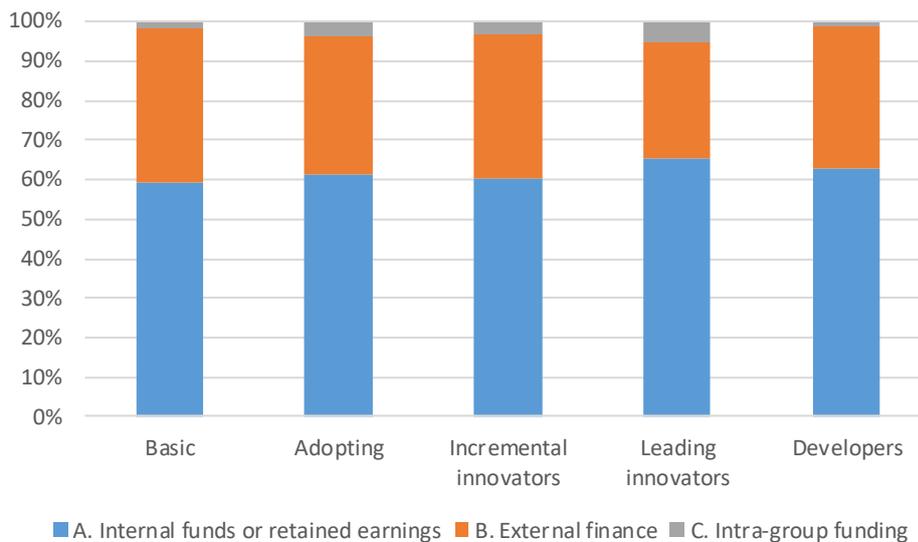
In Austria, innovative companies are relatively more credit constrained than other companies are. In particular, about 9% of leading innovators and about 11% of developers are credit constrained. In comparison to EU, relatively more Austrian developers are credit constrained, but less incremental innovators and firms adopting innovation are credit constrained in Austria. However, it should be noted that in general, significantly fewer firms mentioned availability of finance as an obstacle to investment than the availability of skills or regulatory burdens (see chart 16 above).

<sup>16</sup> These results relate to the above-mentioned gaps in firm-based training and investment in training of employees as part of intangible investment.

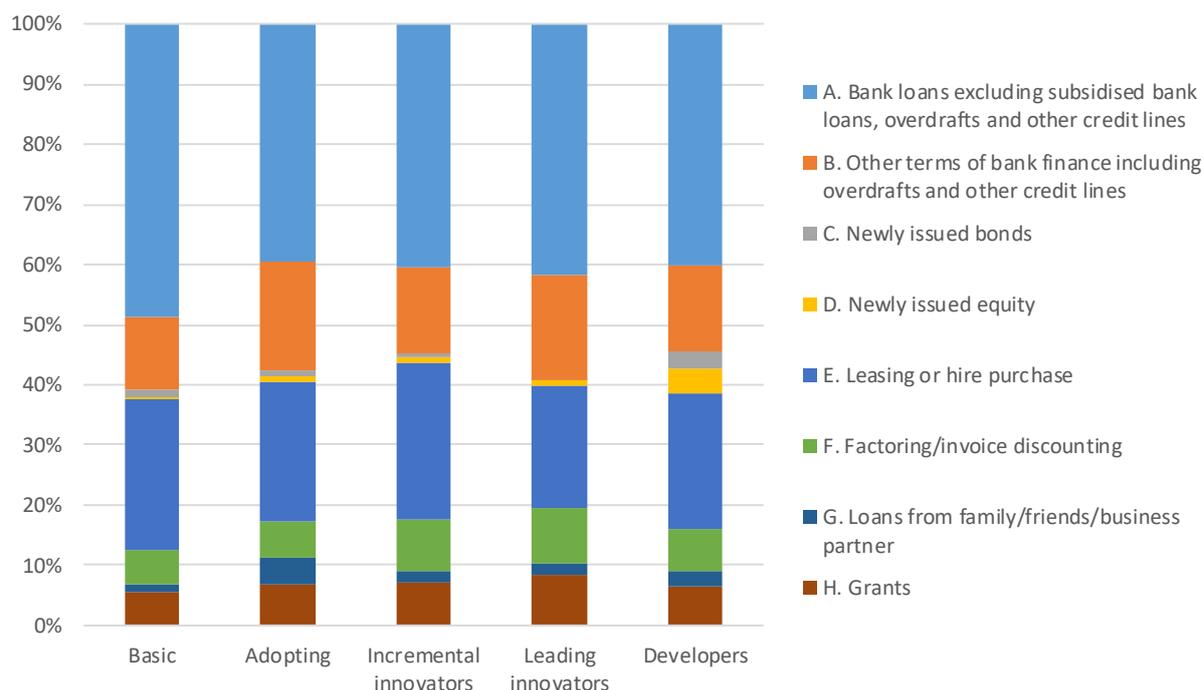
**Chart 17: Credit constrained firms and innovation profiles – Austria versus EU**

Source : EIBIS 2017

Regarding financing, in Austria, the financing mix is broadly similar across different innovation profiles, although leading innovators use slightly more internal sources of finance and intra-group funding. For all innovation profiles, internal sources of finance are more important than external sources of finance. Again, this can be seen as evidence that large companies consider Austria a good location for investments in innovation, as so many innovative firms have access to intra-group funding. The ability to rely on internal funding is evidence for the positive revenue streams in the current business cycle.

**Chart 18: Source of finance and innovation profiles (% of total)**

Source : EIBIS 2017

**Chart 19: Source of external finance and innovation profiles (% of total)**

Source : EIBIS 2017

When it comes to external finance, in comparison to “basic” firms, all innovation profiles in Austria rely on balance relatively less on traditional bank loans (see Chart 20), and tap more other types of bank finance, including overdrafts, subsidized bank loans and other credit lines. Developers are relatively more inclined to use newly issued equity and bond finance. More innovative firms have always experienced limited access to bank loans because their assets contain more intangible capital. Intangible capital (especially in the form of intellectual property rights like patents, trademarks or software) is more difficult for banks to value correctly, there are only limited ways to redeploy intangible capital in contrast to physical capital, which makes its use as collateral more difficult, as the creditors are unlikely to repossess the full amount in case of bankruptcy. On the other hand, we can see from Chart 19 that banks are willing to grant other forms of funding to innovative firms like overdrafts.

## 5. Conclusions

The stated objective of the Austrian government is to make its economy a European innovation leader by 2020. Currently, Austria is characterized by the European Commission as a strong innovator, so despite the fact that its gross expenditure on R&D is the second highest in the EU it is not among the group of innovation leaders yet. Quite a large share of these R&D expenditures is funded by the public sector, which raises the question of the efficient use of these funds. Public expenditures on R&D and innovation are outstanding in respect to their volumes, but if they fail to promote innovation activity in a correspondingly outstanding manner, a thorough evaluation of inputs and outputs seems warranted. This would allow the policy makers who choose the direction of public expenditures to align their means better to their preferred outcomes. The government spends substantial amounts on indirect instruments of innovation policies, which favour large incumbent enterprises over small innovative startups and therefore exhibit a structurally conserving bias. Streamlining regionally fragmented funds could also improve the outcomes of policies aimed at supporting innovation.

Using firm level data from the EIB's EIBIS survey, we find that about 30% of Austrian firms are actively innovating, 12% can be classified as leading innovators. In comparison to EU averages, innovation is more prominent in manufacturing industries and less in service sectors. Young small firms are less represented among the innovators in Austria, which might indicate a lack of entrepreneurial culture, which has been identified by other studies. It could also be the consequence of implemented policy instruments, e.g. the research premium, which aimed to attract R&D spending by large foreign companies in Austria.

When asked about obstacles to investments, most firms in the EIBIS survey named the lack of skilled staff as the most pressing issue. Access to finance or credit constraints seem to be of lesser importance. But more innovative firms reported to use less bank loans which might reflect banks' unwillingness to grant loans against intangible capital. Despite the fragmentation in public funds for research, the Austrian public funding agencies are supporting innovative activities to an exceptional degree and this probably compensates innovative firms for limited access to bank credit. Although funding of basic research is an essential mission of the public sector, the endowment of the responsible agency has been meagre over the recent past.

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# Corporate innovation in **Austria**:

Findings from the EIB Investment Survey



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