

Recommendation regarding the efficient translation of research results into innovations

Background

As a country with a very high standard of living but also very high wage and business location costs Austria is compelled to constantly come up with innovations and launch them onto the market. Austria will only be able to keep up with other countries by engaging in intensive R&D activities and applying the results to the market. Translating innovative know-how and technology into commercial products and services is a complex matter, and promoting this presents political decision-makers with a challenge. The process starts by encouraging an interest in natural science, technology and enterprise in children. It then leads through the necessity for proof-of-concept support for researchers and extends to issues of corporate taxation.

The Austrian economy is dominated by small businesses. 96.6 percent of firms are small and medium-sized enterprises with less than 250 employees, and together they account for 56.7 percent of gross value added. In other words, such firms are a driving force behind the economy and also make a significant contribution to the innovation process. This sector is complemented by an outstanding scientific structure at universities and non university-based research institutes with an international reputation. Innovative ideas in the form of scientific results and findings that are rendered marketable are then output by industry as innovative products and services – in Austria generally by small and medium-sized businesses. If we now consider those indicators as representing the level of innovation among Austrian SMEs and so the results of knowledge transfer, our ratings rank slightly above the EU average according to the Innovation Union Scoreboard. However, there has been a dramatic fall in recent years. Overall sales generated in Austria with market innovations are below the average in the European Union.

The above-mentioned transfer of knowledge into commercial results in this field also comes up against barriers where implementation is concerned. This should be addressed systematically to ensure that the impetus of innovation in Austria is maintained, along with its ability to compete at an international level. For this reason the Austrian Council for Research and Technology Development has commissioned an external study to identify drivers and obstacles for the transfer of know-how and technology into marketable products in an Austrian context. Very interesting opportunities

have been developed to support this process with the help of international examples of best practice and interviews with researchers, experts and industry. The results of this analysis have been used to draw up recommendations for measures to be taken in the following four fields of action.

1. *Education*

2. *Communication*

3. *Organisational framework conditions*

4. *Funding system*

1. Education

Where the implementation of innovative ideas is concerned, there is a general lack of staff with sound interdisciplinary training and a background in industry. Such a background is one of the key prerequisites for operating successfully at the interface between technology and the market. In the sector of research such interfaces are generally located at universities or non university-based institutes and are therefore governed not only by the culture of the relevant institute but also by its pay scales, which often act as a deterrent to people who come from industry. This makes it very difficult to find suitable staff for technology transfer and business development in areas closely linked to research. The situation is little different as regards the conditions at start-up centres and business incubators. There is a need for people with a good education (generally a university degree), combined with interdisciplinary know-how (e.g. qualification in technology with business courses) and experience in industry.

The Council therefore recommends:

- encouraging **interdisciplinary education** at schools and universities
- giving greater emphasis to **entrepreneurial thinking** and aspects of realising ideas in the syllabuses of both secondary and tertiary education
- improving the **crossover between education systems** in the sense of 'dual' education to make it easier to switch between industry and the academic world. This concerns the crediting of vocational skills at universities including the necessary legal and material prerequisites and conversely, the crediting of qualifications acquired at university to vocational courses, the organisation of access to higher education and the development of courses of study for persons with vocational qualifications oriented to their needs.

2. Communication

Communication, exchange and the ability to speak a common language are a key factor for transferring innovations to the market. The involvement of customers and consumers and regular communication with them are essential if the results of research are to be commercialised successfully. Projects will generally come to fruition and work results put into practice if customers have a true need for the product, which is already taken into account during the project planning stage and remains actively present throughout the project.

The exchange between researchers and industry is however frequently problematic. One key obstacle is the different corporate and institutional cultures, languages, objectives and time frames. There are often mental barriers to seeking contact on both sides. Good cooperation is already taken for granted at many institutes of technology and business management. In other areas contact is frequently not even sought. Important factors here are conviction and willingness on the part of the institute director to encourage staff to adopt such an attitude at their institute.

A number of programmes and initiatives (e.g. COMET, FFG general programmes) has helped to establish a culture of communication between the worlds of science and industry. The next step is to ensure its further improvement and institutionalisation on a long-term basis – including when not part of concrete funding programmes.

The Council therefore recommends:

- the setting-up of an **Industrial PhD programme** based on the Danish model to ensure that cooperation between science and industry is anchored in education. This would give doctoral students a detailed insight into how industry sees, thinks and works and cultivate strong personal links between the two worlds.
- stronger anchoring of **endowed chairs** to speed up the transfer of scientific results to private enterprise. Industrial partners should be selectively targeted with offers of endowed chairs.

3. Organisational framework conditions

The implementation of research results and the transfer of know-how and technology is not generally a priority at research institutes and as such, is not included for example in the performance agreements of universities or publicly financed science institutes. Proximity to the world of business is not a criterion at many universities/research centres or for a career as a researcher. In addition, companies generally lack a clear-cut research and innovation strategy in the case of research partners. The absence of such strategies makes it difficult for research institutes to agree topics of research with industry.

The Council therefore recommends:

- incorporating the **transfer of technology** in the **performance agreements** of the universities. The commercialisation of research results should, where appropriate, form part of the performance agreements concluded with university staff. If necessary, the statutory framework conditions should also be amended here.
- providing for a **return to the universities** should a start-up fail so as to reduce the barriers to creating spin-offs, as in the case of young researchers this generally takes place in a phase of life that tends to be less certain (family / career planning).

4. Funding system

The funding landscape in Austria is essentially considered to be adequate. In particular, the general programmes of the FFG are seen as a suitable instrument for driving forward promising research results. But the COMET programme or the Christian Doppler Laboratories are also very well regarded at both a national and international level. The Pre-Seed and Seed programmes of the aws sometimes help to make up for any lack of venture capital. However, when it comes to the commercialisation of research results, greater momentum is still required.

The guidelines laid down by many funding programmes often present an obstacle to the transfer of technology and know-how to the market: It is not permitted to finance developments that are ready for the market. Near-market developments in turn have very low funding rates, which frequently represent an obstacle, particularly for the scientific project partners. Something that Austria clearly lacks when compared with other countries is a form of proof-of-concept or proof-of-prototype funding. One successful example here is the “Proof of Concept Programme” found in Denmark.

Another problem is the reluctance of public funding bodies to take risk. An insufficient share of the funding budgets goes to highly innovative, i.e. high-risk projects, whose level of success on the market is not easy to estimate. The financial crisis has now also made institutional investors such as banks, who were already averse to risk, even more reluctant to finance innovative projects. This is something that particularly affects applied research in Austria. Funding for small, innovative businesses by the banks has all but dried up, and the private venture risk capital market with venture capital or business angel financing is largely non-existent.

The securing of exploitation rights, for example by means of patents, is a very laborious process that is also very costly. There is a need for a suitable central contact point for patenting issues. The Austrian Patent Office is currently characterised by a lack of services, particularly where scientific inventors are concerned.

The Austrian Council therefore recommends:

- the development and introduction of a **proof-of-concept programme** based on an international model, which would enable researchers to evaluate the commercialisation potential of scientific results
- the funding of **high-risk projects** . This would make it more likely that major, extremely innovative ideas could be launched with major impact on the market. In this context the introduction of a risk fund should be analysed, so offering funding for very risky projects with a high probability of failure.
- the availability of **tax breaks** for capital that is used as venture capital or for business angel activities or start-ups in order to interest a wider section of the public in this market and to make funding for new, innovative companies more readily available
- increase and **differentiation** of the **research premium** , whereby small innovative companies can claim a greater percentage than large, established companies
- extension and **improvement** in the services offered by the Austrian **Patent Office** in relation to patent searches, applications and advice. The Patent Office should be modernised according to the international model, with comprehensive patent analyses and strategies being drawn up for this purpose.