Turning New Knowledge into Profit

Photo: Axel Griesch

Only continuous innovation can safeguard growth and employment in highly developed and comparatively expensive business centers. This, in turn, calls for research-intensive industries and knowledge-intensive services. According to the latest report by the German Commission of Experts for Research and Innovation (EFI), the frontrunner in developing a knowledge-based economy of this kind is the USA, where it accounts for 38 percent of value creation. Following close behind are the United Kingdom and Sweden, each at 37 percent, Denmark with 36 percent and Switzerland with 35 percent. The figure for Germany is 34.5 percent.

Germany maintains its position as a knowledge-based economy thanks primarily to the continuing strength of its industry. R&D-intensive industries in Germany account for 10.6 percent of value creation, significantly more than in the US, the UK, France and the Scandinavian countries. The German economy remains particularly strong in medium-high technology. However, the high-tech sector is of secondary significance in this country, accounting for just 2.5 percent of value creation, in stark contrast, for example, to Korea (7.3 percent), Switzerland (5.4 percent) and Sweden (3.7 percent).

We are particularly good at improving existing products. The process of deriving new products from explicit or latent customer needs is described as "market pull". Not infrequently, the ideas are brainstormed by marketing strategists on the basis of the possibilities available to them. This constitutes a refinement of that which already exists. However, what we need is "technology push" – something radically new. In this process, new and revolutionary ideas come to the fore – ideas that are in large measure derived from basic research.

Biotechnology, computer technology and nanotechnology are all aspects of that part of high-tech that feeds on the application of new knowledge. Google, Amazon and Apple are prime examples of how to make capital out of new thinking. Nevertheless, the road to application is often tortuous and stony – and very costly. A willingness to take risks is called for, a trait for which Germans are not typically known. At Max Planck, we see this reflected in figures: around half of our licenses go abroad – and far more interestingly, that is where 80 percent of our revenues come from. Evidently, ideas that yield a profit are more likely to be implemented abroad, particularly in the USA.

> Leading-edge technology is of secondary significance in this country

One example is the development of the cancer drug Sutent, first by an American startup and subsequently by the Pfizer pharmaceuticals group: its mode of action was discovered in the laboratory headed by Axel Ullrich at the Max Planck Institute of Biochemistry. Consider also the RNAi technology licensed by the US firm Alnylam. It won the 2006 Nobel Prize for Physiology and Medicine and was first applied to mammals at the Max Planck Institute for Biophysical Chemistry. Our work provided the very ba-

sis for the application of this technology in medicine. Alnylam is now valued at around four billion US dollars.

The development of high-tech innovations makes new demands on innovation management. Most young startup companies are typically short on resources and under huge time pressure to achieve success. In this respect, the climate in the US is far more favorable. It's not only that the volume of risk capital is many times greater than in Germany – in the field of biotechnology in 2012, there were some 4.5 billion US dollars in venture capital available in the US, compared with 227 million euros in Germany. In contrast to the situation in Germany, it is also much easier in the US to find managers and entrepreneurs who are willing to help a startup succeed. Without sound management, even very good ideas can be doomed to failure.

The EFI experts are right to demand greater efforts by Germany's research and innovation policymakers to substantially improve the climate for leading-edge technology in Germany, specifically in terms of promoting entrepreneurship, financing innovation and growth, and providing tax incentives for R&D.

We must also broaden our means of developing research findings that are not yet ripe for application so that they may find their way into new products. While the potential for application remains unclear, neither companies nor venture capital investors are willing to finance the initial stages of development. Nor are practitioners of basic research in a position to investigate the extent to which their findings may lead to new products and processes. In medical research in particular, it is impossible for us to fund the long chain that leads from a potential agent to a licensed drug. This structural gap in the innovation chain weakens the German economy.

With the aid of our technology transfer subsidiary Max Planck Innovation, we have developed a concept by which to smooth the path from scientific discovery to product or prototype – irrespective of whether the discovery was made at a university or non-university research institution. Some years ago, we initiated two incubators, the Lead Discovery Center (LDC) in Dortmund and the Life Science Incubator (LSI) in Bonn, in order to develop selected findings in the life sciences and bring them closer to market maturity.

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And the concept is bearing fruit. The LDC has succeeded in licensing an agent to Bayer, which is now being tested in clinical phase I trials on patients with advanced cancer, and which promises to yield milestone payments in the tens of millions. Another lead substance has been licensed to a company in South Korea. Meanwhile, the LSI in Bonn has successfully spun off one promising enterprise, with good prospects for a second.

Since 2013 there has been an offshoot in Dresden, funded by the federal government and the Free State of Saxony, scientific organizations and private investors. In addition, an IT incubator has been launched in Saarbrücken, which is intended to take up promising technologies developed at the Saarland university research institutions and Max Planck institutes. In Göttingen, a photonics incubator has been established where projects in the field of photonics (laser technology and microscopy, for example) will be developed technologically and provided with organizational support until they can ultimately be commercialized by spinoff companies.

Pre-seed support of this kind in the early stages of the germination of ideas increases the comfort level of those looking to invest in spinoffs. We hope that these examples will set a trend, because substantially more projects with overall funding requirements of between 200 and 300 million euros per year could make the transition to industry if there were more (public) finance available in Germany for validation research. As and when the Federal Ministry of Education and Research program to "validate the innovation potential of scientific research (VIP)" is renewed, it is essential that it be endowed with greater funding. Beyond that, one might also wish companies in Germany to become more open to the findings of basic research. These are the real "raw materials" that must be exploited in our country!

Peter Gruss,
President of the Max Planck Society