

We have to do a better job of utilizing our own ideas

The Max Planck Society is a basic research institution with a mission that the theoretical physicist Max Planck, after whom the MPG is named, once expressed as follows: "Insight must precede application." The insights gained into the laws of nature and society, into structures and contexts, are what create the basis for true innovation. The world of tomorrow and the day after tomorrow will build on the knowledge gained through this research.

TEXT **MARTIN STRATMANN**

Basic research is the most important way to find innovative solutions to major problems. However, the wealth of new ideas first has to be sifted in order to filter out those with potential for practical application. Next comes the lengthy journey from idea to marketable product, a journey that is not only risky and potentially doomed to failure, but also extremely expensive.

Back in 1970, with this in mind, the Max Planck Society established one of the first technology transfer institutions in Germany; formerly named Garching Instrumente, this company is now known as Max Planck Innovation GmbH. Over the last 50 years, the company has supervised more than 4,500 inventions and concluded 2,500 license agreements. Almost 80 percent of the roughly 160 spin-offs supervised by Max Planck Innovation are still in business today; seven of them have even made it to the stock exchange. Measured by its income of approximately EUR 500 million, Max Planck Innovation is one of Germany's leading technology transfer organizations, the other being Fraunhofer.

Germany has enormous scientific potential. We have to mobilize this for innovations in all sectors. In its expert opinion of 2019, the Commission of Experts for Research and Innovation (EFI) directed by

Dietmar Harhoff of the Max Planck Institute for Innovation and Competition emphasized the special part played in the innovation system by start-ups whose new business models and products provide important stimuli for the economy.

Over the last few decades, the Federal Government has set up various funding lines for start-up founders in order to foster greater enterprise. Nevertheless, the German enterprise birth rate remains un-

Start-ups provide important stimuli for the economy

changed at 4.97 percent; Germany's performance in the Global Entrepreneurship Monitor for 2018/2019 is only mediocre. One of the key recommendations of the EFI is therefore to continue accelerating the country's start-up culture in order to promote start-ups from within the scientific community.

The Max Planck Society accordingly wishes to encourage young researchers to explore the potential applications of their scientific findings in greater depth. Here scientific excellence and economic success are



not mutually exclusive. On the contrary, the Max Planck Society's Nobel Prize winners in particular have always kept potential applications in their sights. They include Manfred Eigen, for example, who was awarded the Nobel Prize in Chemistry in 1967 at just 40 years of age. In the 1980s, he put his theories about the self-organization of complex molecules into practice by developing so-called evolutionary machines. The company Evotec based its business model on bioreactors capable of accelerating this natural process. This makes it possible to identify new molecular substances, which can then be used to develop new pharmaceutical drugs. In 1993, Eigen not only gave the new biotech company his patents and the necessary machinery, but also furnished it with capital and became one of its co-founders. It is now one of the most successful on the MDAX stock index.

Theodor Hänsch, who was awarded the Nobel Prize in Physics in 2005, developed the optical "frequency comb synthesizer", with which it first became possi-

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ble to count the exact number of light pulses per second and thus to determine light wavelengths with absolute precision. This Nobel Prize winning technology is now used as the basis for optical frequency measurements in numerous laboratories worldwide and is the core business area of the company Menlo Systems, which was founded by Hänsch and his staff.

The most recent Max Planck Nobel Prize laureate, Stefan Hell, is also an entrepreneur. The STED microscopy developed by Hell, for which he received the Nobel Prize in Chemistry in 2014, has catapulted light microscopy into a new dimension and made optical resolution possible down to a few nanometers. However, the STED microscope was to be just the first of a whole family of diffraction-unlimited light microscopes. Hell established no fewer than two companies, Abberior and Abberior Instruments, one of which develops fluorescent dyes while the other manufactures microscopes.

However, start-ups require more than just an innovative idea or invention – they also need an envi-

ronment in which they can grow and thrive. Today there are already areas in Germany that meet the basic requirements for this, for example the region in and around Stuttgart and Tuebingen with its outstanding research facilities and innovative industrial landscape. Our aim – with the help of spatial consolidation – is to intensify the flow of knowledge between research facilities and companies while creating sufficient scope for companies and the science sector to test new technology and business models in practice. We seek to create locations where high-risk projects and business models can be piloted, and where a failure is not perceived as a threat.

Here the Cyber Valley research consortium initiated by the Max Planck Society is to show the way forward, with the Max Planck Institute for Intelligent Systems in Tuebingen and Stuttgart at its core. It is currently developing into a creative hot spot for scientific progress and economically successful innovations in the field of artificial intelligence – and is attracting companies both large and small. Cyber Valley recently established a start-up network with the aim of creating a community of start-up entrepreneurs.

The corporate technology groups Bosch and Amazon are also investing heavily in this area. Bosch, for example, has announced that it will be constructing a new campus in Tuebingen at which research is to be carried out by around 700 AI experts, while Amazon is planning to establish a research and development center with a workforce of around 100 within the next five years.

Yet even if we succeed in inspiring more entrepreneurial spirit, there is one thing aside from inventors and managers that we need above all: capital. Germany is strong on basic research. However, German investors have very little appreciation of the possibilities this opens up for product development and commercialization. Instead, German start-ups are becoming increasingly dependent on foreign backing. The growing interest being shown by U.S. investors confirms the quality of the research being carried out in our country, but this also entails a risk that our expertise and value creation potential will migrate still further in the long term.

The Max Planck Society can already point to numerous examples of this, one of them being Anthony Hyman, Director at the Max Planck Institute of Molecular Cell Biology and Genetics in Dresden. At the end of 2018, he founded the biotech company Dewpoint in cooperation with the Whitehead Insti-



tute at the MIT in Boston. This company is pursuing a new approach to the treatment of diseases such as cancer. With the support of lead investor Polaris Partners, the start-up established its headquarters in Bos-

Germany needs more risk capital

ton and a subsidiary in Dresden, and secured USD 60 million in start-up funding. Start-up founders in Germany can only dream of such sums.

Another example is the first RNAi drug, which was licensed in 2018 and which is based on technology developed at the Max Planck Institute for Biophysical Chemistry. We would have liked to keep this technology in Germany. For this reason, the U.S. biotech company Alnylam was initially only granted a co-license, while a second license went to the German company Ribopharma AG. However, this company was taken over by Alnylam back in 2003, which meant that all the associated rights went to the U.S. Alnylam now has a stock market value of more than EUR 14 billion (around USD 15.8 billion) and employs more than 1,000 people.

Furthermore, the most successful life sciences invention in the history of the Max Planck Society, the pharmaceutical drug Sutent, was commercialized through a start-up in the U.S. named Sugent Inc. The company was finally taken over by Pfizer – another U.S. pharmaceutical group. Its active principle was discovered in the 1990s by Axel Ullrich and his team at the MPI of Biochemistry.

In order to improve the level of funding start-ups in Germany, we would therefore welcome a national initiative that increases the risk capital available across sectors and makes it easier to supply start-ups with sufficient functional equity capital.

Technology transfer, like research, thrives on change. New instruments have to be developed to translate academic research into practical application, and new research focuses have to be set. In recent years, this has been accomplished with great success in the early-phase drug development sector. The LDC and its partners have just secured funding amounting to EUR 60 million for promising projects.

In future, it seems likely that more and more of these projects will be put to practical use, not only by

classic licensing, but also by start-ups – an area which Max Planck Innovation aims to become even stronger in the years to come. At the MPG, we intend to work together on improving the culture of innovation and entrepreneurship at the Institutes, for example by increasing the presence of Max Planck Innovation and taking steps to raise awareness for this topic.

Start-ups are to receive support in the form of largely standardized, flat-rate licensing conditions featuring positive stakeholder and entrepreneurial terms, deployment of industry experts, their own “company building” activities with experienced external management (“founding without founders”) and improved training in entrepreneurship. Close cooperation with Cyber Valley in the area of IT is planned. These and other measures will enable Max Planck Innovation to continue playing a leading role in technology transfer in Germany. ◀



Martin Stratmann, born in 1954, studied chemistry at the Ruhr University Bochum. He completed his doctorate in 1982 at the Max-Planck-Institut für Eisenforschung. Following on from a postdoctoral position in the U.S., he became a Group Leader at the Max-Planck-Institut für Eisenforschung. He habilitated at the University of Dusseldorf and then taught at the University of Erlangen-Nuremberg from 1994 to 1999. In 2000, he accepted the appointment of Scientific Member and Director at the Max-Planck-Institut für Eisenforschung. He has received numerous awards, including the U. R. Evans Award presented by the British Institute of Corrosion in 2005. Martin Stratmann was appointed President of the Max Planck Society in June 2014.