Heroes and hurdles

The garage in Los Altos, south of San Francisco, where Apple founder Steve Jobs and his friend Steve Wozniak developed video games and dreamed of creating a personal computer for everyone, is an oft cited symbol of small beginnings becoming big successes.

The two-room apartment in the former nurses’ dormitory at the University Medical Center Mainz, situated on the seventh floor of the rear building, where the heroic story of the university spin-off BioNTech began in June 2008, was not much more comfortable than a garage, and certainly a very humble beginning. The gruelling work of translating a scientific vision into a viable company required all of the strength and energy of BioNTech co-founders Özlem Türeci and her husband Uğur Şahin.

Twelve years later, their biotech company was the first to receive approval for a vaccine against the coronavirus. “You have made Germany believe again that it can achieve great things,” praised the German news magazine DER SPIEGEL. The British daily The Financial Times, named the couple its “Person of the Year” in 2020. The US magazine TIME featured pictures of the two researchers on its January 2021 cover with the headline “The Vaccine Revolution”.

On 19 March 2021, in Berlin’s Bellevue Palace, Federal President Frank-Walter Steinmeier awarded the two Germans of Turkish origin the Grand Cross of Merit with Star, Germany’s highest decoration. It is recognition for outstanding achievement in biotech and medicine and for an outstanding stock market success story.

What did these researchers do better than other start-up founders? Which parts of this blueprint can be emulated? And what lessons should policy makers learn from this success? We will answer these questions in the following four sections. Each section represents a different phase in this extraordinary biotech company’s journey.

The early years

The year is 2001, and three oncologists specialising in immunotherapy at Johannes Gutenberg University Mainz start the company Ganymed Pharmaceuticals. The two physicians Şahin and Türeci and their mentor Professor Christoph Huber sought to translate basic science into market-ready personalised cancer therapies. For the trio of researchers “market-ready” meant that the results of their work would reach the patient’s bedside.

The majority of their investors – mostly investment funds – ignored the fact that it can take a decade and sometimes even longer to develop new drugs. They became impatient after five years and informed the founders of their intentions to sell.

The different time horizons of investors and life science entrepreneurs is a common obstacle faced by biotechnology start-ups during their formative years. Conflicts are inevitable when
one side seeks a fast and favourable exit, while what its partners value above all is doing sound long-term work. Reconciling such a difference after the fact is difficult.

Such a dilemma tugged at the Mainz research couple. They were looking for a situation that would allow them to concentrate on their studies for at least five years.

On 27 April 2006, Türeci and Şahin presented their vision to Munich-based investor Michael Motschmann: “The tumour of every person with cancer is unique in its structure. My wife and I want to find individualised solutions to attack and eliminate this tumour.”

The two researchers wanted to win Motschmann as a financial backer to replace the restless investors. Their scientific acumen, their enthusiasm, their modesty convinced the investment professional. Anyone who wants to get to the bottom of BioNTech’s success must remember these three qualities.

Motschmann invested €5 million in Ganymed via his investment fund MIG Capital AG, while his friend Thomas Strüngmann put in another €2 million. In the next step, Thomas Strüngmann acquired over 70 percent of the company for €60 million. Motschmann secured a further 8 percent. The remainder was retained by private equity funds that already had a stake. The goal of taking over Ganymed completely fell through due to their objection to the deal.

Biotechnology entrepreneurs usually do not receive bank loans as it is unclear whether they will be able to repay this external capital. So it is usually equity investors – such as family offices like that of the Strüngmanns – or international investment companies such as VC firms that shoulder the costs of medical biotechnology R&D in this country.

A similar scenario occurred on 25 September 2007. The 42-year-old Şahin and the 40-year-old Türeci again presented their vision, this time to entrepreneur Thomas Strüngmann as well as to Michael Motschmann, Christoph Huber and asset manager Helmut Jeggle, the then managing director of the Strüngmann family office Athos.

The couple once again delivered a convincing and inspiring pitch. In addition to Ganymed, they planned to launch a second company: BioNTech, which stands for Biological New Technologies. It would be a company without conflicts of interest. Thomas Strüngmann and his twin brother Andreas Strüngmann were willing to take a risk and agreed to provide €135 million in start-up capital. Co-investor Motschmann added another €13.5 million, to make the total nearly €150 million – an amount never before raised in seed funding in Germany.

BioNTech has had its headquarters in uptown Mainz since 2011. Additional laboratory and office space to accommodate 2,000 employees will be built in the immediate vicinity over the next few years. © BioNTech
Dawn of a new era
The hopeful start began under the commercial register number HRB 16295. Jeggle has since chaired the supervisory board. The other two founding supervisory board members, Motschmann and Huber, also came from the inner circle of backers.

Türeci, a physician and researcher like her husband, took the reins of Garrymed, overseeing the work on antibodies. Şahin was appointed head of BioNTech, focusing his research on individualised cancer therapies. Şahin was able to use the laboratories at the University of Mainz for his research. A clear separation of responsibilities and functions was necessary because the two companies had different shareholders.

Besides Şahin, BioNTech’s founding team consisted of part-time employee Michael Kring, head of the consulting firm High Tech Corporate Services, who helped get business operations up and running. Kring is a consummate professional who in 2008 had already steered 30 young firms through the choppy waters of the initial start-up period. He was perfectly fine with his half-time job, although some weeks he voluntarily worked seven days. It’s a common mistake, Kring says, for a start-up to hire an accountant, a financial controller and a CFO. Combining all three functions satisfactorily in one person doesn’t work; plus, he says, there isn’t enough work to go round for everybody. His advice is that it is often cheaper in the long run to procure these services externally.

Reality Check
Most biotechnology start-ups spring from basic research. The sense of security provided by a university setting can help researchers make the leap into entrepreneurship.

Annual budgets ranged from €5 to €15 million. Kring, who became CFO in 2009, says: “I was in the comfortable position of being able to request capital as part of the large financing round that had just been completed. That was a big advantage for me. Most CFOs of other start-ups spend the bulk of their time raising funds.”

Policy shortcomings
Kring’s criticism hits the nail on the head as to why a thriving broad-based biotech sector has not yet materialised in Germany. Idea labs are constantly at risk of going out of business due to a lack of funds. For instance, an unsecured loan from the local savings bank saved CureVac from bankruptcy. In 2020 the government helped keep the development of CVn-CoV, CureVac’s COVID-19 vaccine, at full steam with a €300 million injection of equity funding.

Government funding works well in some places, but private investors willing to take risks and provide start-ups with an adequate financial basis for several years are still lacking in Germany. It is true that in 2020 investors put €3 billion into the German biotech sector, a higher sum than in previous years. “But how long will the interest last?” Viola Bronsema, managing director of BIO Deutschland, asked worriedly at a finance forum in July 2021. Some investors think too small, too traditionally, too short term. The tax framework offers no incentive to take risks.

Reality Check
Because of high R&D costs, biotech companies that develop therapies usually post losses for a period of ten years or more. They generally do not generate any sales during this time, causing expenses to exceed revenues. Blanket restrictions on the use of losses, like those found in section 8c of the German Corporation Tax Act (KStG) and section 10d of the German Income Tax Act (EStG), contravene the principle of taxing profits. Potential investors are deterred by in effect having their capital substance taxed.

Foreign investors – according to investment professional Motschmann – “hold back because there is a lack of a start-up culture among the public” and because investors from outside the EU are subject to intense scrutiny.

There are two exceptions to this funding wasteland. One is Dietmar Hopp, who since 2006 has provided continuity as a long-term investor in CureVac through his Dievini Hopp BioTech Holding, and who has helped fund a whole host of biotech companies, especially in southwestern Germany. And the other are the brothers Andreas and Thomas Strüngmann through their stake in BioNTech and a wide range of other investments. According to the German Technology Report, in 2014 some 80 percent of seed funding came from these two family offices. Other investors with a risk appetite are few and far between.

Reality Check
In Germany there are hardly any VC companies or family offices that focus on biotechnology. That is why it is usually necessary to search for equity capital far beyond Germany’s borders, such as in the United States or China.

Money alone is not the key to success. Just knowing that there are partners on the investor side who support Şahin’s endeavours has had a stabilising effect on BioNTech. The company was never completely on its own. From the very beginning, Jeggle was able to provide the new company with business know-how gained in the Strüngmann brothers’ family office where he had managed investments in Germany and abroad.

Show promise and you shall receive
From the perspective of 2021, it is easy to forget that BioNTech was a start-up that despite its comfortable starting position, had to earn its top spot in a highly competitive environment.

The start-up scene is in a constant state of flux due to a variety of competitions for funding. Ambitious young scientists, a spirit of entrepreneurial optimism and lengthy application procedures make for a dynamic mix. In the funding competitions organised by the Federal Ministry of Education and Research (BMBF), the number of applicants is ten, sometimes even thirty times the number of projects ultimately receiving support. Public funding comes from taxpayers, and of course it doesn’t fall from the sky like rain. Those who want funding must go through a selection process and fulfil numerous requirements.
### Reality Check

**Aid regulations stipulate that so-called companies in difficulty that are more than three years old and have a thin equity base are excluded from support measures. This means that biotech companies may not currently be eligible for funding under the Central Innovation Programme for SMEs (ZIM) or for the research allowance.**

The GO-Bio competition rounds are another example of public funding. This government programme is designed to financially support and strengthen young life science researchers in the difficult initial phase of starting a business.

### Reality Check

The BMBF has approved €156 million in grants for GO-Bio start-up projects from 2007 until 2018 (50 projects in the first funding phase, 16 projects in the second funding phase). Projects are also supported through an additional scheme to strengthen technology transfer at universities and research institutions, as well as through the Biotechnology Innovation Academy. In addition to BioNTech, Chromotek (sold abroad), Ethiris and Rigontec (sold abroad) are further success stories coming out of this programme. The GO-Bio programme in this form has since been discontinued following massive criticism from the Bundesrechnungshof.

The first GO-Bio round (1 March 2007 to 28 February 2010) saw 176 project outlines and then 27 project proposals submitted. A panel of leading scientific experts evaluated the submissions.

One of the recipients of a Phase I non-repayable grant of €1,124,119 was the University Medical Center Mainz for the “Development of Innovative Vaccines against Cancer”, which included the proposals submitted by Türeci and Şahin. In Phase II of that GO-Bio round BioNTech was directly awarded a grant of €2,913,286.

The German grant amounts are paltry compared to the hefty sums available to US companies. But they are still highly sought after – and not just because of the money. They force young entrepreneurs to focus on clearly defined projects. A start-up that is among the first-place finishers sharpens its public profile. It has, for example, better chances to attract equity investors and top talents.

Recognition as a leading-edge cluster is several orders of magnitude bigger and more important than funding competitions. Germany now has a number of successful biotech clusters. Business students know the famous definition by US economist Michael E. Porter: “Clusters connect companies, universities, research institutions and other actors in a region along a value chain. They pool resources and create synergies for research and innovation.” Munich’s BioM Biotech Cluster has been successfully creating added value for the region since 1997.

BioNTech and Ganymed together did not form a cluster. The trio of Şahan, Türeci and Huber had the foresight to create a competence centre in Mainz consisting of several scientific institutes. The most broadly based is the Research Institute for Translational Oncology (TRON). Pharmaceutical companies such as Boehringer Ingelheim and Abbott as well as smaller companies in northern Hesse were included to expand the value chain. In 2012 the Cluster for Individualised Immune Intervention (Ci3) was given the go-ahead by the BMBF. Federal funding totalled some €40 million (2012 to 2017) plus supplementary state funds. Of this, the cluster centred around Şahin received about half. Türeci served as Ci3’s medical director.

It is an example of the high art of laying the groundwork for long-term growth. When asked by SPIEGEL editors what percentage of them were still researchers and what percentage were entrepreneurs, Şahin’s answer was “100 percent researchers and 70 percent entrepreneurs”. The answer could also have been “170 percent research manager”.

### Reality Check

German biotech clusters or BioRegions have a very positive impact on the sector’s development. Here, the BioRegio competition from the 1990s of the Federal Research Institute must be singled out for praised. It has led to the establishment of what are today very important and successful biotechnology hubs – hubs that should continue to be supported.

**Breaking up is hard to do**

Intellectual property rights are a start-up’s most important asset. Outstanding research results must be protected by patents. This is the prerequisite for being able to grant licenses in order to generate revenue with one’s own scientific discoveries.

### Reality Check

Against this background, the call to waive COVID-19 vaccine patents must be viewed critically. Intellectual property rights are the basis for innovation and provide an incentive for investors to invest in scientific advances.

The first employee hired at BioNTech was a patent clerk with 20 years of experience. Şahin and Türeci’s patents belonged partly to them personally, while others were the property of Johannes Gutenberg University Mainz. They had to be transferred to Ganymed Pharmaceuticals AG and BioNTech AG, and their four then volatile subsidiaries. The founders have since created a holding structure for their company.

This tortuous process of patent transfer took six years to complete. To this day, the university receives annual payments for transferring its share of the intellectual property rights.
Almost 20 years after the amendment to section 42 of the German Employees’ Invention Act (ArbEG) and the establishment of technology transfer structures at universities, the debate on how to further optimise the transfer of scientific research results from the university sector to private companies remains topical. Universities are expected to stimulate innovation, thereby helping to strengthen the economy’s competitiveness on a stable long-term basis.

The spin-off of BioNTech was the next master stroke. The university asked to be given a 25 percent stake in the new company, without contributing any capital itself. This arrangement is popular with universities, but presents a barrier for venture capitalists to invest in spin-offs. Members of the university administration thus sit on the supervisory or advisory boards. That is a nightmare for start-ups, which need to be nimble and decisive. In the end, the university gave in and did not take a stake in BioNTech.

Paving the way for an integrated biotech company
BioNTech CEO Şahin studied his second favourite subject – mathematics – after completing his doctorate with summa cum laude. As an entrepreneur, he no longer needed to learn how to combine and creatively assemble building blocks.

If acquiring companies achieved the goal more quickly than developing something himself, he suggested to the supervisory board that they seize the opportunity. In May 2009 BioNTech purchased the peptide specialist JPT Berlin, and two weeks later Eufets AG in Idar-Oberstein.

Eufets, with its 60 employees, was a manufacturer of small quantities of therapeutic agents for clinical trials. Its customers were pharmaceutical companies.

Biotechnology companies often come out of academia like BioNTech did. They then consist of a small team that focuses primarily on conducting research and raising capital. Often funding must first be secured through services. Clinical trials are frequently outsourced or carried out in partnership with pharmaceutical companies. In contrast to this are the fully integrated pharmaceutical or biotech companies, which combine everything from R&D to marketing and sales under one roof and fund themselves through product revenues. The business model of biotech companies is thus unique: high research intensity, high capital requirements and high risk.

Şahin saw Eufets as one of the building blocks of the integrated biotech company that he and Türeci already had in mind at the time. The company became the nucleus of BioNTech Innovative Manufacturing Services GmbH (BioNTech IMFS). In 2020 the Idar-Oberstein site, together with a new production line in Mainz, produced the BNT162b2 (Comirnaty®) vaccine to protect against COVID-19 disease in 50,000 individual steps. The fastest clinical vaccine trial in the company’s history had 43,000 participants.

In parallel to the creation of a viable production and organisational structure, BioNTech scientists spent many hours a day in their labs preparing their results for preclinical and clinical studies. The start was the MERIT (Melanoma RNA Immunotherapy) programme in 2009. Today, 18 clinical oncology studies are running in parallel at BioNTech.

Decisive moves in 2013/2014
Şahin calls the first five years the “underwater phase”: no website, no communications department, no mainstream interviews except for pieces in the Allgemeine Zeitung, the Mainz-based regional daily newspaper; appearances on local radio stations; and specialist lectures at Johannes Gutenberg University Mainz. No one could yet imagine the rush and clatter of the vaccine years. The professor invested a lot of time in publishing 150 papers in international journals like Nature and The Lancet. The impact of these scientific fireworks was to burnish BioNTech’s image in professional circles. The company received 25,000 applications from Germany and abroad when it advertised 80 scientific vacancies in the scientific field. That’s right, 25,000.

The seed funding, €150 million in start-up capital plus public grants, was used up by late 2013. The company posted negative cash flow every year. But that did not necessarily signal trouble. On the left side of the balance sheet were the company’s increased assets, in the form patents and preclinical results. Yet these assets could pay for neither employees’ salaries nor clinical trials.

Raising money through licensing deals and/or collaborations was the order of the day. But the company was spoilt for choice. Commenting on this dilemma, supervisory board chairman Jeggle says: “Do I want to share all my knowledge with others? Where do I draw a red line so as to have products that belong to me alone? The decision was made to work with partners to distribute the early products, while bringing the later products to market ourselves.”

BioNTech had no product to commercialise in 2014. The vision of “individualised cancer therapy” was at the time a long way off from becoming reality – and has yet to be translated into products as of 2021. But the conditions are excellent. Şahin and Türeci have developed several promising therapeutic platforms and service companies under the holding company to achieve their goal. RNA Pharmaceuticals is the best known of the subsidiaries, but not the only one.


Such diversity gave BioNTech the opportunity to make agreements with different partners to commercialise scientific results. Each collaboration has a different focus.

Collaboration agreements have been signed with pharmaceutical companies Sanofi (mRNA-based therapeutics), Genentech (cancer), Bayer (animal health) and Eli Lilly (tumour targets), and strategic partnerships have been formed with
Danish antibody specialist Genmab (bispecific antibodies) and Genevant Sciences (rare diseases).

Partnerships between biotech and pharma are common-place. Around 50 percent of innovation in the pharmaceutical industry comes from biotechnology companies. This demonstrates once again the importance of the biotechnology industry as a transmission belt for transforming inventions and discoveries from the research lab into practice.

The partnership with the Bill & Melinda Gates Foundation (focusing on HIV and tuberculosis) follows a different logic. Şahin particularly appreciated the foundation’s global network to which he had immediate access. The foundation was also a partner that could support Şahin and Türeci’s efforts to develop vaccines for low-income countries, such as a vaccine against malaria – an area in which investors are more reluctant to reach into their pockets.

The licensing agreement with Pfizer to develop an mRNA-based influenza vaccine, concluded in August 2018, came about as the result of routine business. The pragmatic goal was a flu vaccine that could be produced and adapted to mutations more quickly than the traditional vaccines. Pfizer committed to an upfront payment of US$120 million and milestone payments of up to US$305 million.

No market researcher predicted that this deal might lead to a billion-dollar business in 2020: the BioNTech/Pfizer collaboration to develop a COVID-19 vaccine.

From 2014 to the time of the IPO, BioNTech raised a cumulative total of US$1.4 billion through collaborations, supplemented by series A (2018: US$270 million) and series B funding rounds (2019: US$325 million) and in 2018 by an ERC Advanced Grant to Şahin. The amount of the grant, namely US$2.5 million over five years, paled in comparison to the honour attached to it.

Sale of Ganymed and IPO
The sale of Ganymed in October 2016 was a great deal. This divestment followed the script of many young biotech companies: Spin off, do good science, sell to a pharmaceutical company after a few years. “Sell before you fail!” – the industry’s catchphrase did not apply to Ganymed. Türeci had excellent clinical data at the time of the sale.

The German Foreign Trade and Payments Ordinance (AWV) stipulates that such acquisitions by countries outside of Europe cannot go through without review by the Federal Ministry for Economic Affairs and Energy (BMWi). When an investor based outside Europe wants to acquire 20 percent or more of the voting rights, the acquisition must be submitted to the BMWi for clearance and issuance of a certificate of non-objection. If a detailed review becomes necessary, it will need to be swift otherwise the financing may fall through.

BioNTech has been listed on Nasdaq since October 2019 and has seen its market value increase nearly twenty-fold since then. © NASDAQ
The investors were planning, however, to sell the antibody specialist as early as 2011. They had so far invested €160 million in Ganymed and expected a return.

A serious accident during a clinical trial in the United Kingdom had an impact on research conditions throughout Europe. Delays occurred at Ganymed. According to investor Motschmann, “Investments in start-ups always take longer and always require more capital than initially planned.” Five years later, Japanese drugmaker Astellas Pharma paid a phenomenal €1.2 billion for the German company and its bispecific antibodies – €422 million in upfront payments and €860 million in milestone payments. The Strüngmann brothers had to pay withholding tax on their profits, although they wanted to reinvest the proceeds immediately.

**Reality Check**

A favourable tax treatment of profits and losses from investments in innovative start-ups and young biotech companies might help attract more investors. It would therefore make sense to do away with minimum taxation, to not require a flat-rate withholding tax after a holding period, and to allow investors to offset their losses against profits from other investments.

For Türeci, the transaction was like losing a “baby”, writes Joe Miller in his book The Vaccine: Inside the Race to Conquer the Covid-19 Pandemic. The researcher had hoped to bring the therapy to market under an accelerated approval process. After the sale, she joined BioNTech at “An der Goldgrube 12” – “At the Goldmine 12” – as its chief medical officer, an appointment that had been long in the planning. In 2014 the company had moved into a new building with the “auspicious” address.

**Getting on with it**

Meanwhile, Mainz and Munich, where the major shareholders were based, were discussing the advantages of taking part of the company public.

**Reality Check**

The number of European companies doing IPOs in the United States is increasing significantly. The most recent IPOs of German biotech companies were mainly on the US technology exchange Nasdaq.

A share placement in Germany was not even considered. “There is a lack of analysts who can professionally evaluate biotech companies,” says major shareholder Thomas Strüngmann. The veteran investor categorises the entire policy environment and legislation as “not very innovation friendly”. In a critical assessment of the German biotech industry, DER SPIEGEL warns: “There is no plan for how scientific talent can start their own businesses in greater numbers and where the necessary venture capital will come from.”

Stock options, which should stimulate staff commitment, act instead as a motivational brake in Germany. Start-up employees who take a high risk by joining a company at an early stage, accepting below-market salaries for years and receiving shares in the company in return, are penalised when the company is sold. They have to pay income tax on the proceeds and not the more favourable capital gains tax. “Not Optional”, an initiative launched to promote employee share ownership, has ranked 24 countries across Europe. Germany takes the bottom spot along with Belgium when it comes to the treatment of stock options for start-up employees. Influential political blogger Gabor Steingart warns: “Starting a business in Germany is becoming a serious financial disadvantage. The war for talent is in danger of being lost.”

**Reality Check**

Biotech companies are mostly small and medium sized and typically cannot pay the higher salaries of more established businesses in the pharmaceutical and chemicals sector. Employee share ownership can therefore make smaller companies more competitive, and if they prove successful, create millionaires – but only if taxes are commensurate with the amount paid out.

The investment climate was right in the US, but the timing was unfortunate. The public offering, ten months in the works by bankers and lawyers and set for early October 2019, required steely nerves. On 2 October the Nasdaq fell to its lowest level of the year. Two IPOs had been cancelled. The Munich-based investors consulted with its US banks and went ahead with the offering in spite of the challenging environment. The issue price was US$15 and fell briefly to US$13 due to short selling. At US$150 million the proceeds from the IPO were not lavish.

Less than a year later, CureVac’s board also chose Nasdaq over Frankfurt for its offering, which raised US$245.3 million.

Yet vaccine development is not a straight line that brings guaranteed success. On 16 June 2021, the Tübingen-based company made an ad hoc announcement that its coronavirus vaccine fell short on efficacy in clinical trials. The share price plummeted 40 percent after the bad news.

The federal government’s 2020 decision to take a stake in CureVac was immediately criticised. And the high regard for the scientific achievements of the German biotech company faded within a few hours. The CureVac example shows better than any seminar on optimal financing strategies the huge importance of having an investor who stands by management in times of crisis. “My faith in the company is rock solid,” Dietmar Hopp instantly announced.

The BioNTech success story continued after the IPO without any unwelcome surprises. In mid-January 2020, BioNTech’s management took advantage of the greater financial leeway to make its next acquisition. It paid US$67 million to Cambridge, Massachusetts-based Neon Therapeutics, a company focused on vaccines and T-cell therapeutics. It is now the most important location for its North American business and a springboard for globalisation.

BioNTech AG had changed its legal form to that of a European stock corporation (SE) in January 2019. An SE does not have employee codetermination in the supervisory board.
No more obstacles stood in the way of achieving the ambitious goal of becoming a global pharmaceutical company focused on individualised cancer therapies – a goal it planned to pursue with single-minded purpose. Things turned out differently.

A bold decision: Let’s make a vaccine

By December 2020, 14 months after its IPO, BioNTech’s share price had climbed to US$128. During 2021, share prices ranged between €200 and €390. A company that had been half a billion euros in debt in 2020 was now earning €2.8 billion in a single quarter. BioNTech currently has a stock market value of over €70 billion.

This spectacular stock market performance was driven by Project Lightspeed, an all-out initiative to develop a novel mRNA technology for a COVID-19 vaccine.

On 4 January 2020, Şahin read an article in The Lancet about a respiratory disease that had broken out in China and was spreading at an alarming rate. A pragmatic optimist, Şahin foresaw that a new vaccine would be the best way to stop a global pandemic in its tracks. First, he convinced Türeci of the need to temporarily switch the company’s focus from fighting cancer to fighting a virus. Legend has it that this momentous conversation took place over the breakfast table. Next, the duo had to persuade the rest of the company’s leadership, the supervisory board, and more than a thousand employees.

These were uncertain times, but Şahin had a clear vision. Few objections were raised by the team: They had enough experience of the farsighted CEO to know that he would only take on a task he was certain he would be able to master. Supervisory board member Huber says: “He is not just an outstanding scientist, he is a true leader.”

Şahin named the vaccine initiative “Project Lightspeed.”

BioNTech was poised to take on a whole new challenge. Over the following months the team didn’t only have to work carefully and precisely, they had to work fast.

How well prepared was BioNTech for this remarkable feat?

First of all, there was no need to recruit an additional team of dedicated scientists. Şahin already had close contacts with research institutes and regularly supervised the work of promising doctoral and post-doc students. Many capable young academics who had crossed his path had been hired by BioNTech and they were now ready, willing and able to work on Project Lightspeed.

Skilled onsite personnel are a decisive factor for business success. It is therefore of crucial importance to train biotech workers and keep them in the country – especially given the increased focus on Europe as a production location during the pandemic.

By 2020, the BioNTech leadership was no longer a “one-man, one-woman show”. Şahin and Türeci were already supported by three additional managers, and now a second management level was established – the executive, required to lead a large company through such a process of change.

What BioNTech lacked at that time was the infrastructure to conduct large clinical studies involving 30,000 to 50,000 subjects. It also had no sales department. If BioNTech was going to win the vaccine development race, Şahin had to find a partner among the ranks of big pharma. In March 2020 he called up German-native Kathrin Jansen, head of vaccine research and development at Pfizer, and proposed a collaboration between BioNTech and Pfizer. On 17 March, Pfizer’s CEO Albert Bourla euphorically announced the partnership in a press release. To save time, Bourla and Şahin sealed a verbal “gentlemen’s agreement” on Zoom to work together on the billion-dollar project. The actual written contract wasn’t ready to be signed until
January 2021. For the Chinese market, BioNTech concluded a delivery agreement with Fosun Pharma in Shanghai.

Alongside BioNTech/Pfizer and CureVac, another competitor entered the race – Moderna. The US company, founded in September 2010, also used mRNA technology to develop its vaccine. Moderna and BioNTech began clinical testing of their vaccine candidates at almost the same time, on 27 July 2020. Moderna was better able to acquire funding than its German counterpart. Moderna CEO Stéphane Bancel is well known for his exuberant pronouncements that stoke share prices. Moderna’s IPO raised US$600 million – four times more than BioNTech’s. Also, the US government initiated its Operation Warp Speed public-private partnership to accelerate development of a vaccine, providing Moderna with another almost US$2.5 billion. BioNTech, on the other hand, suffered a serious lack of funds during the vaccine development phase. It had severe difficulties making the upfront investments needed to expand production. On top of that was the uncertainty whether the vaccine would be sufficiently effective. In September 2020 BioNTech received financial support of €375 million from the German government.

Would all the hard work lead to success? Şahin und Türeci nervously counted the days until completion of their big clinical study. What happened next is described by biographer Joe Miller in his book The Vaccine: Inside the Race to Conquer the Covid-19 Pandemic: At 8 p.m. on 8 November 2020, Pfizer CEO Bourla called Şahin at home, saying “It works, it works fantastically well.” It turned out the vaccine was 95 percent effective – a level that exceeded even the most optimistic expectations.

In December BioNTech/Pfizer overtook Moderna. Their vaccine received regulatory approval for emergency use in the US and was authorised for use in Europe. Moderna’s vaccine was granted approval shortly afterwards, before the AstraZeneca vaccine and long before the Johnson & Johnson vaccine.

How were two biotech companies able to beat the world’s largest pharmaceutical corporations? The answer comes from Matthias Kromayer, a biochemist and investment manager with MIG Capital AG: “It was the courage to take risks, to be innovative at any cost, to make quick decisions. Also, an apolitical mentality. This would have been unthinkable in a traditional pharmaceutical company.”

In 2021, 2.5 billion doses of the BioNTech/Pfizer vaccine were produced around the globe. Additional manufacturing facilities are now being built in developing countries, particularly in Africa.

In September 2021 the BioNTech team received the Paradigm Prize for its outstanding contributions to global health. The award was accepted at an event in Stuttgart by Michael Motschmann, who is general partner and member of the executive board of MIG Capital AG as well as one of the earliest investors in BioNTech and a member of its supervisory board. The Paradigm Prize of the German biotech sector was initiated in 2021 by industry association BIO Deutschland. © S. Z. Kurc