

No. 18 – 2020



LIVING METALS

PLANSEE

The Plansee Group

Dear readers,

In our soon-to-be 100-year history, we have learned to deal with business cycles and crises. Over the past 30 years, we faced the aftermath of the Gulf Wars, the bust of the dot-com bubble and the financial crisis. And now we have to cope with the consequences of Covid-19.

At the same time, history also shows: **every economic setback Plansee suffered was followed by an even greater recovery.**

Based on this experience and knowledge, we intend to emerge stronger from the current economic crisis.

On the following pages, we provide insights into current projects and success stories: How we plan to expand our performance capability (p. 12). Or how we help make the next generation of even more powerful microchips possible (p. 44). We show you how man and machine team up to pack a punch in the wear analysis of machine tools (p. 40). And we provide a forum for employees who build bridges between the Group's locations and to the customer (p. 48).

Table of content

The year in pictures p. 4

Interview p. 12

Wolfgang Köck and Karlheinz Wex want to score points with customers with greater speed and flexibility during the coronavirus crisis.

A different approach, just to be safe p. 16

André Boße explores the trends that are being sped up by the COVID-19 crisis, and the opportunities being created.

Interview p. 22

Peter Doralt has been a member of Plansee's Supervisory Board for 46 years and considers himself a sparring partner for the Executive Board.

Matmatch p. 26

Daniel Kipp and Lionel Girard share why Matmatch has become the most important tool for them for steel and copper materials marketing and sales.

EUV p. 44

Christoph Adelhelm is driving the use of molybdenum components for the new EUV technology at Plansee.

Plansee in daily life p. 60

Sponsoring p. 56

Ane Santesteban is the Ceratizit brand ambassador and supports young cyclists in their cycling career.

The right tool p. 54

Bridge builder p. 48

Mobile employees: they build bridges between locations, cultures and people, and promote knowledge sharing.

Interview p. 40

Jannis Walk utilizes machine learning to automatically identify and analyze the wear behavior of tools.

Together with furnace building experts, customers and IT specialists, Bernd Kleinpaß developed a configurator for hot zones.

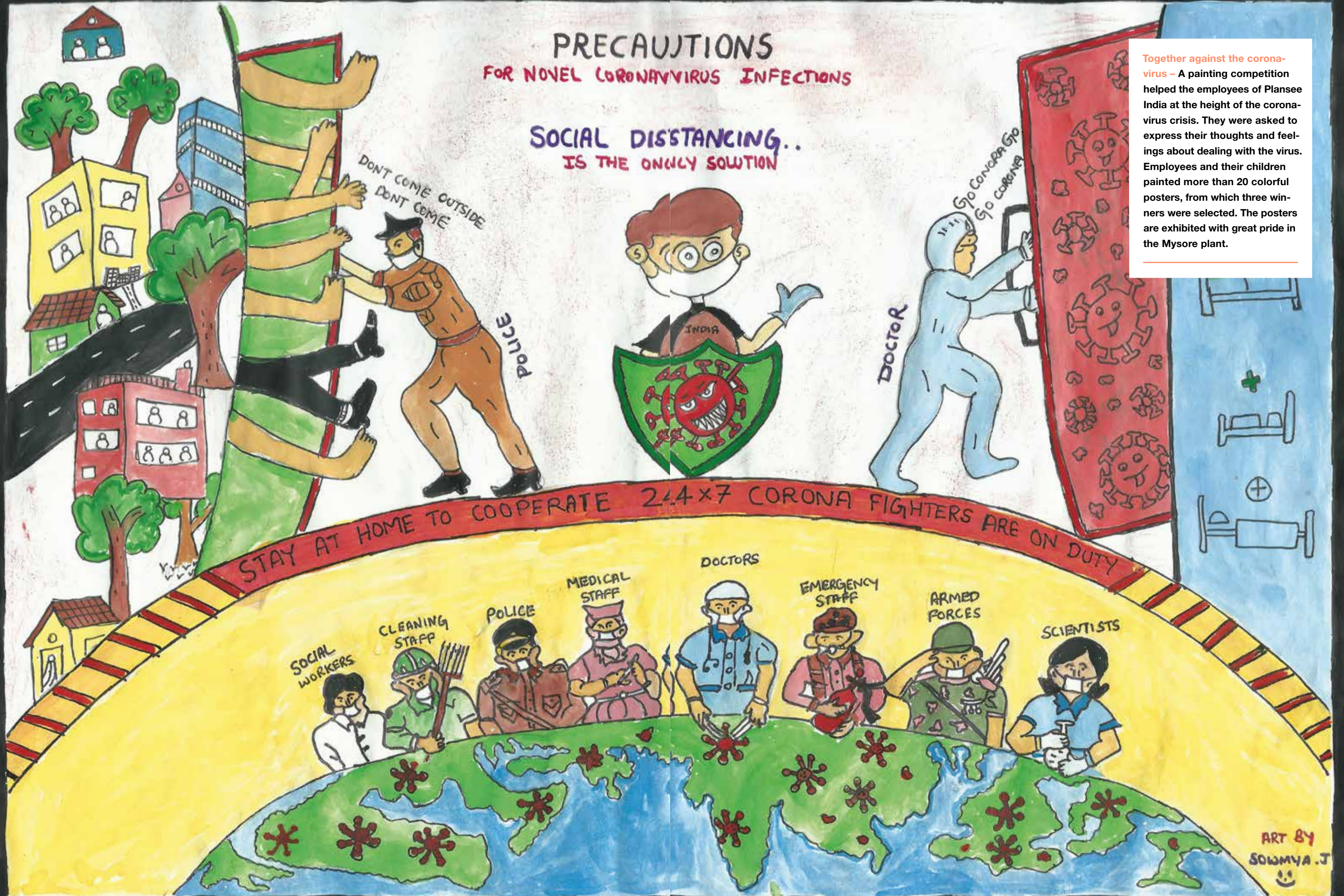
Configurator for hot zones p. 36

Daniel Lubos analyzes what processes and workflows at Plansee and Ceratizit are actually like in order to identify and avoid bottlenecks or weaknesses.

An X-ray look at processes p. 30

PRECAUTIONS FOR NOVEL CORONAVIRUS INFECTIONS

SOCIAL DISTANCING..
IS THE ONLY SOLUTION



Together against the corona-virus – A painting competition helped the employees of Plansee India at the height of the corona-virus crisis. They were asked to express their thoughts and feelings about dealing with the virus. Employees and their children painted more than 20 colorful posters, from which three winners were selected. The posters are exhibited with great pride in the Mysore plant.

ART BY
SOWMYA.J

**High-school graduates
“produced” at Plansee –**

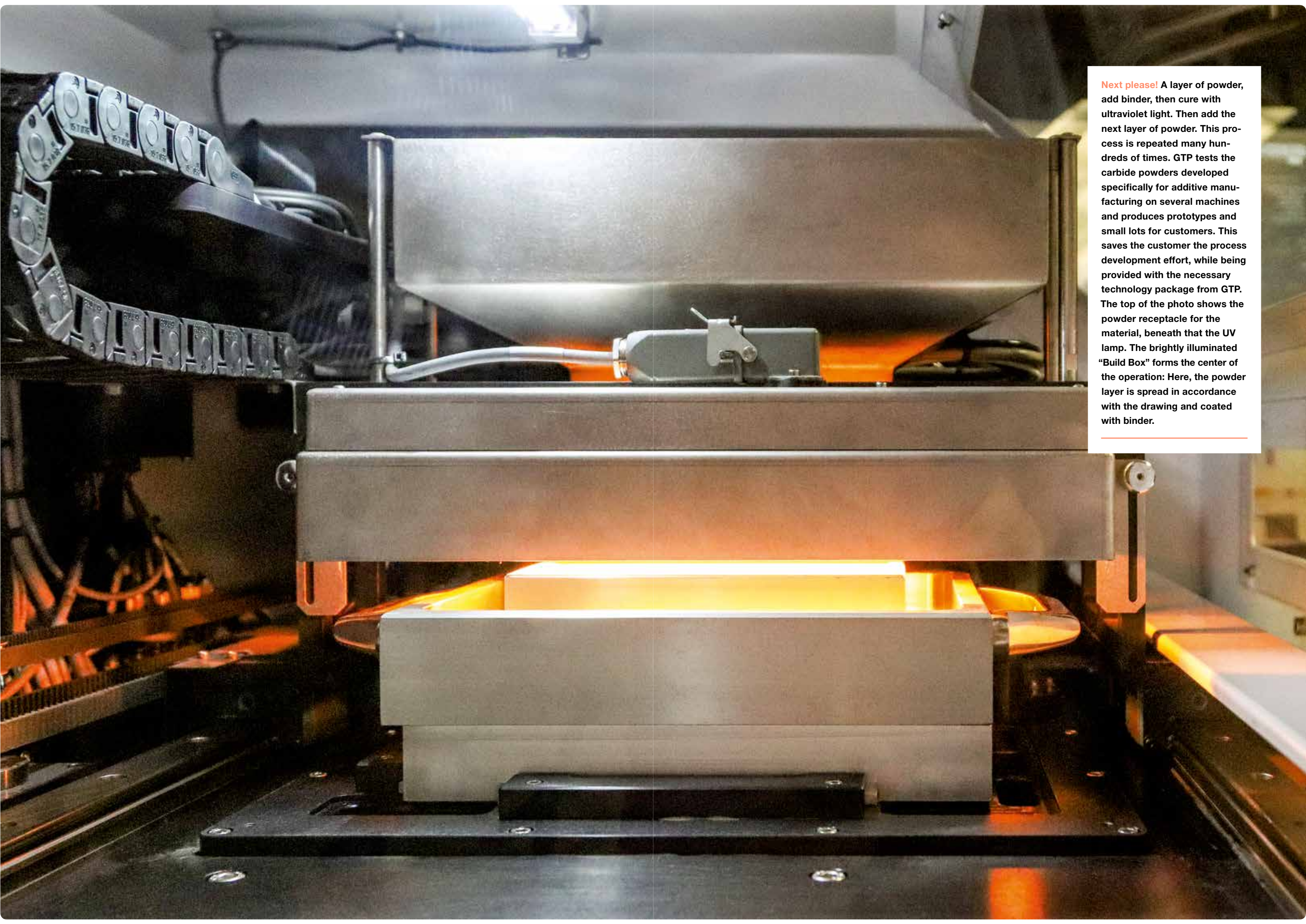
In 1959, eleven high schoolers completed their university entrance qualification on Plansee’s premises. The 60th anniversary was celebrated in style in November 2019. The former graduates met at Plansee for a plant tour and a luncheon. Plansee founder Paul Schwarzkopf made classrooms available in the middle of the plant in the 1950s, creating the prerequisites for regular classes in the newly established preparatory school in Reutte.



【第四章】 年度盛宴



Colorful celebration – There was a lot to celebrate at Plansee China just before the coronavirus lockdown: Employees received awards for their outstanding achievements, and a total of 21 service award recipients were recognized for their long-standing loyalty to the company. Employees had prepared an artistic and cultural program with lots of loving attention to detail, which they presented on the stage. The evening concluded with a lottery, joint games, and a festive meal.



Next please! A layer of powder, add binder, then cure with ultraviolet light. Then add the next layer of powder. This process is repeated many hundreds of times. GTP tests the carbide powders developed specifically for additive manufacturing on several machines and produces prototypes and small lots for customers. This saves the customer the process development effort, while being provided with the necessary technology package from GTP. The top of the photo shows the powder receptacle for the material, beneath that the UV lamp. The brightly illuminated “Build Box” forms the center of the operation: Here, the powder layer is spread in accordance with the drawing and coated with binder.



12

Stop or top? This is not only a question of perspective, but also of attitude. During the weeks of the global corona shutdown, Plansee asked itself: What developments and trends will be intensified and accelerated by the pandemic? What does this mean for us, and what lessons can we learn from it? And how can we prepare ourselves to be successful in the future?

“Covid-19 was just the beginning”

Today, diversity of products, sales markets as well as a production and logistics network that spans the globe is more important than ever for the future of the Plansee Group. An interview with Executive Board members Wolfgang Köck and Karlheinz Wex.

livingmetals: What general economic and political conditions does the Plansee Group have to prepare for in light of the coronavirus crisis?

Wolfgang Köck: Covid-19 was just the beginning — experts are already talking about the most severe global economic crisis since World War II that may follow now. We expect that it will take some industries years to recover. Politically, we have to be prepared for an increase in protectionist tendencies and trade tensions.

And even though the Covid-19 crisis has largely displaced the climate debate, we all know that this topic will come back with great force.

What does this mean for our global activities?

Karlheinz Wex: Going forward, we will have to expect even greater ups and downs in our business performance. This necessitates an extremely adaptable and flexible organization.

We have to become more broadly positioned in the spirit of glocalization. We are located where our customers need us. In this regard, the global presence of the Plansee Group is already helping us a great deal. Now, we have to go into the individual regions and markets to an even greater degree and show the flag with our strong brands.

Are there vulnerabilities in the Plansee Group that became more apparent as a result of the coronavirus crisis?

Wolfgang Köck: It was quite astonishing to see how quickly our high “dependence” on the megatrend mobility reversed from opportunity to risk in no time. First the climate debate, and then Covid-19, presented transportation, the automotive industry, aviation and, as a result, the entire supplier industry with huge challenges. We don’t know how quickly these industries will recover.

How are we responding?

Karlheinz Wex: We must further reduce our dependence on sectors and regions, and diversify our portfolio more.

We cannot predict which markets and industries will grow in the future, but we can ensure that we are sufficiently adaptable and flexible so that we are ready to ship our products in all regions and all markets at all times. And we trust that our materials will continue to be needed, especially in new applications and high-tech industries. We are driving the development of new products in close cooperation with our customers accordingly.

13

Are there changes or adjustments that are being accelerated by Covid-19?

Wolfgang Köck: The coronavirus crisis clearly revealed the economic interwovenness and the interdependencies of a globalized world. Suddenly, stable and reliable supply chains are of central importance. This gives rise to the question: What infrastructure and what goods does a region, a country, an economic community have to be able to produce itself?

We expect our customers' risk awareness to rise, at least temporarily. The key is to safeguard the procurement situation and ensure stable supply chains. Every company that can supply its customers anytime, anywhere will be among the winners.

Karlheinz Wex: In a globalized world where, on the one hand, data, production plans and powder formulations are rapidly made available around the world and, on the other hand, products are manufactured to a greater degree at the regional and local level, we need even better processes — this is where the tools of digitalization are more sought-after than ever.

The skilled labor shortage in certain professions will further intensify — in information technology, for example.



This is another reason why we will be much more focused on the corporate purpose. Why does the Plansee Group exist, and what does it contribute to a better, more livable world? The answer is an increasingly important argument — on the labor market as much as in society.

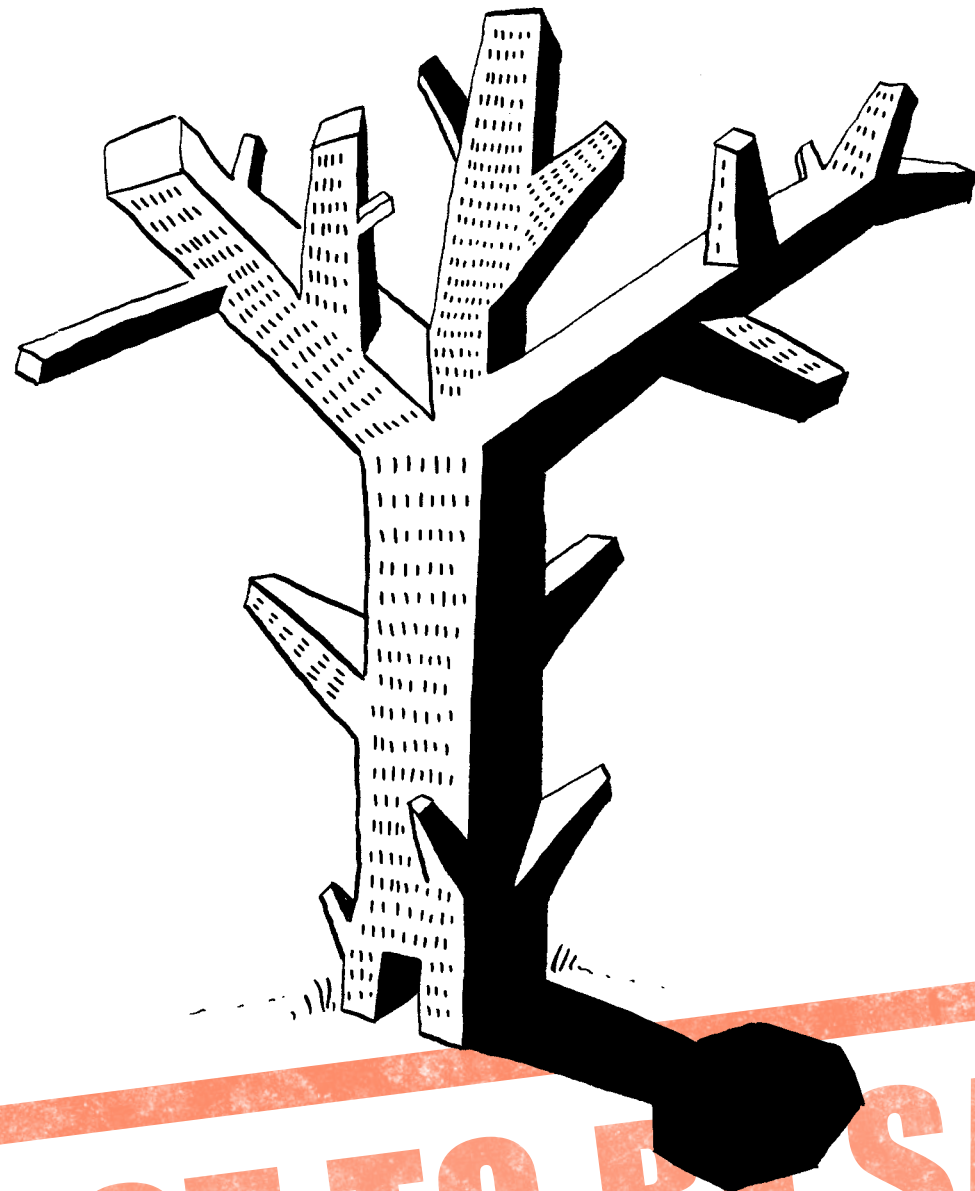
What gives us stability, and where is flexibility needed?

Karlheinz Wex: We draw stability from our positioning: We develop, produce and market our strong metals molybdenum and tungsten for high-tech applications all over the world. We want to be a major player in all those product areas where molybdenum and tungsten are indispensable due to their special properties. Flexibility is needed now during the economic crisis. We are proceeding with caution. We are seizing every business opportunity. And we are making arrangements to stand out in our markets with greater speed and flexibility.



“Flexibility is needed now during the economic crisis. We are proceeding with caution. We are seizing every business opportunity. And we are making arrangements to stand out in our markets with greater speed and flexibility.”

[A different approach]



A crisis fully reveals what was beginning to emerge even before: dogmas become less important, trends drift in a different direction, digitalization solves few problems, but offers room to maneuver. In this situation, anyone who recognizes that the global economy is part of the world's complex affairs can benefit.

Essay by André Boße Illustration by Sebastian Rether

Josef Harder is not just a fantastic satirist, but also a passionate observer of human behavior. In a recent interview with German daily newspaper "Süddeutsche Zeitung," he explained what has been striking during this unusual time. He found it interesting that the virus was increasingly bringing societal fissures to light: "Everything comes into focus, the positive and the negative."

Indeed, the COVID-19 crisis is much like spectacles. It corrects the farsightedness and distance vision of the globalized society and mercilessly bares what we have been trying to suppress: The cracks and risks—they are still around. Nobody has been able to rationalize them away. On the contrary: at present, it is becoming apparent what is in store for a world that has trimmed any and all buffers, similarly to athletes getting rid of their flab. "During crises, the costs of this kind of rationalization become evident," says organizational sociology expert Stefan Kühl. Frantically, companies are now attempting to mitigate the impact, "mobilizing additional resources without regard to cost." Organizational precision is traded for the bazooka: efficiency—the guiding theme just a moment ago—is making way until further notice. All it takes is a crisis, and dogmas fall like over-ripe fruit.

The myth of self-optimization

This is a vexing experience for the global economy. Many players were under the assumption to be operating in a robust system after the 2009 financial crisis. Fueled by growth and new digital technologies, global demand and supply chains arose that, despite their complex nature, worked astonishingly flawlessly and with pinpoint precision. When a screw was needed in Tyrol, it would be

swiftly supplied from China—only to end up a short time later on its way back to Asia as part of production. Strategy papers focused on further optimizing this system. Risks did not represent any specific menacing scenarios and, at the most, led to the vague feeling that problems of an unknown magnitude could loom beyond the horizon, with global warming leading the way. The crisis existed in the past or as a theoretical construct. The work focused squarely on optimization processes. In this respect, companies were no different than mid-40-somethings who expect to assure their mental and physical well-being by wearing smart sports watches and attending yoga workshops. Speaking of self-optimization: people and companies assessing themselves independently is not an option.

We all arguably have someone in our personal network whose health was seriously rocked overnight. Despite sports watch and yoga. Seemingly entirely out of the blue. And yet, when you look back you realize: this person was often stressed, had too many things going on at any given time, brushed risks aside like kids do with their Legos when they don't really feel like cleaning up. The machine was running—but the set-up was precarious. If anything goes wrong, from a cardiovascular point of view or emotionally—it knocks you for a loop. It no longer matters how robust you felt before, but how quickly you bounce back. Part of the therapy is then to ask: What has to change? It is important to note that, after such a setback, most people recognize quite well how it came about, and what has to change. What does Josef Harder say about the crisis? "Everything becomes clearer."

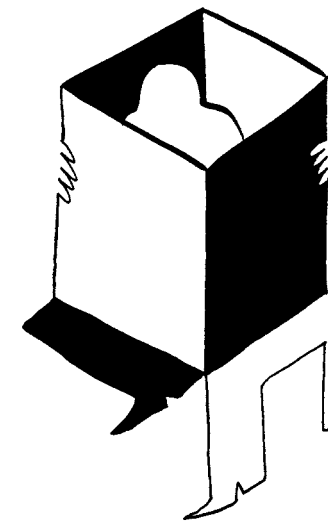
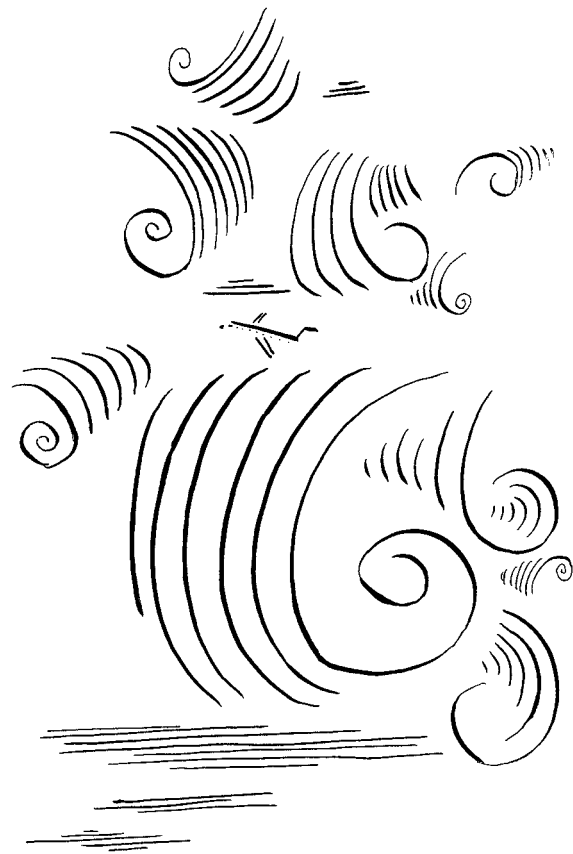
Options for the future are already here

For the global economy, the pandemic is such a setback. The virus provides a historic turning point, we are experiencing an exceptional worldwide situation. "And yet, this world will not be completely different in the future," says Harry Gatterer, a trend researcher from Vienna and CEO of Zukunftsinstitut, whose reports are some of the most significant accounts of the world of tomorrow. Something like an alien world is not to be expected. So will everything be the way it was? "I don't think so." According to Gatterer's theory, crises tend to speed up latent changes that were apparent even before. "They 'beam' us into a new world that we have essentially long expected and dreamed of." That doesn't sound so bad. While talking about the crisis as an opportunity has become a catch phrase, one can also put it differently: a setback pushes us to recognize and capitalize on other opportunities. Opportunities we don't have to invent, because they have already been around. As a current event, the crisis is coupled to the past and the future: its causes lie in what was, and its solution manifests itself in what will be.

The cracks and risks—they are still around. Nobody has been able to rationalize them away.

But what does this mean for companies? We called Professor Marion A. Weissenberger-Eibl, a business administration graduate. She is a good contact when it comes to learning specifics about the dynamics of the global economy. German journal “Manager Magazin” named her one of the “top 100 most influential women of the German economy.” She is the Director of the Fraunhofer Institute for Systems and Innovation Research ISI and holds the Chair for Innovation and Technology Management at the Karlsruhe Institute of Technology (KIT), working on central interfaces between research and industry. Looking at the near future, Marion A. Weissenberger-Eibl believes an interesting shift lies ahead. For some time now, “innovation” has been considered the crucial driver behind a successful future. Now, a leading innovation researcher of all things states that, at present, the key “was less to find a solution in certain innovations.” It was much more important to fine-tune the “important factors for a resilient company.” What are these? Weissenberger-Eibl specifies them: an interdisciplinary orientation, cross-industry networks, entrepreneurial flexibility, and a differentiated understanding of the interests of one’s own stakeholders. Does this mean innovations have outlived their purpose? “No,” she says. “They remain the road to the future.” Still, it is important to be properly equipped. There are obstacles and risks, and players unexpectedly stumble, perhaps even waver. The art now is to get back up, like the tumbler toy figurines that always straighten up again, regardless of how they are positioned. This ability is known as resilience. “And that,” Marion A. Weissenberger-Eibl comments, “will not solely be achieved by a single innovation, but through structured innovation management. I would therefore recommend that companies make time now for taking stock as well as for a strategic analysis and a look ahead.”

It was much more important to fine-tune the “important factors for a resilient company.”



Future without a comfort zone

Here is a small exercise in this regard: there are companies that, during the early phase of the pandemic, responded ad hoc and changed their production, for example to manufacture medical protective equipment. Regardless of the question whether this was necessary in the individual case and turned out to be successful, organizations should increasingly explore the question as to whether they could in fact do so and have the necessary responsiveness. Marion A. Weissenberger-Eibl advises companies to expand their scope of potential opportunities, and to ask “which of the company’s skills and capabilities can be used differently than in the past.” This requires a willingness on the part of organizations to venture out of their own comfort zone. At the same time, this is inevitable anyhow: even before the coronavirus, being comfortable was no longer good advice.

The world is complex — let’s learn to live with it

Trend expert Harry Gatterer from Zukunftsinstitut refers to business cases outside the entrepreneurial comfort zone as “context-sensitive models.” They are no longer based on defined basic assumptions or economic wishful thinking, but to a greater extent on political, social and ecological realities. “Viable models therefore have to elevate their context drastically beyond the business management-only function,” Gatterer states. This does not make matters easier: compared to the global context, business administration is a piece of cake. Still, it does not help if the economy decouples from the world. After all, what will make international companies viable in the future “is having social ties to the world,” as Harry Gatterer puts it. The trend forecaster therefore calls on companies to organize bridges that “serve as feedback loops to identify blind spots” and to lead to a business model that is recognized as a continuous process.

What skills and capabilities will companies employ differently during the coronavirus crisis than before? Pondering this requires creativity and dedication. Olaf Plötner provides assistance — and formulates three megatrends that presently shape the global economy — according to him “all three would have been observed even without the coronavirus.” Plötner is professor at the internationally renowned Berlin European School of Management & Technology (ESMT), where he conducts research about corporate strategies in global markets.

Trend number one

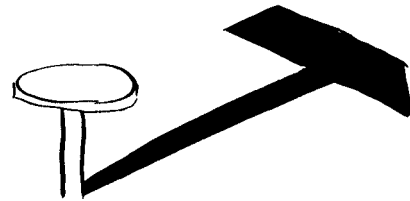
Growth is where prices are low

Plötner is looking at those segments that most recently generated exceptionally strong growth. “Companies are yielding the highest growth rates in areas where the customers’ willingness to pay is the lowest.” Here, growth is achieved through volume, not margins. Affordable versus premium. Or premium in affordable, however you look at it. Plötner has Asia’s emerging countries in mind that post large population growth, such as Indonesia, India or the Philippines, as well as China. “Companies that want to benefit have to explore these markets in great detail,” says Plötner. “They have to find out what customers are willing to pay, which needs truly have to be satisfied, and what components are relatively insignificant.” The concept is referred to as “no frills”: full functional capability without all the bells and whistles. The definition of what is dispensable may differ from region to region. “This means effort,” says Olaf Plötner about the first megatrend. “It’s not sufficient to simply adapt what works elsewhere.”

Trend number two

Digital platform economy is gaining ground

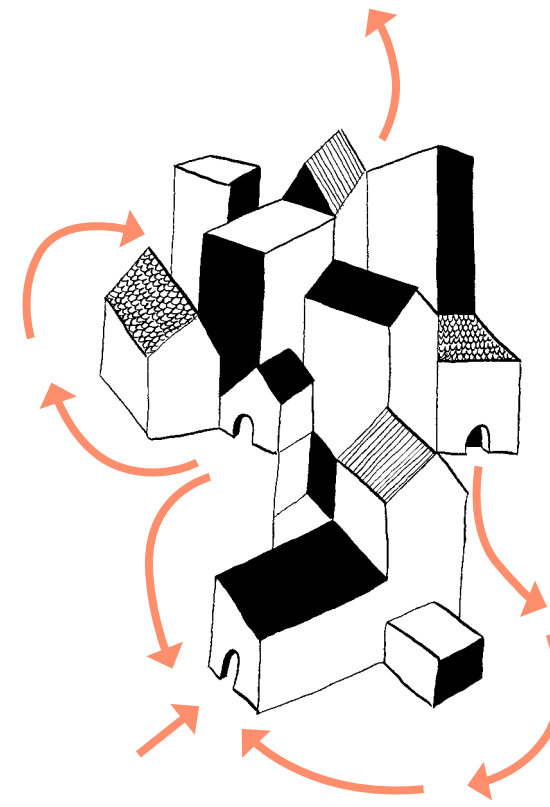
During the first phase of the pandemic, the economist, a visiting professor in the USA and China, was particularly interested in the quest for segments that were trending up, despite the crisis. Olaf Plötner found them — mega-trend number two. “Digital industry services grew, and remote control solutions in particular, where a company displays the status of a machine equipped with 3500 sensors via remote access, for example.” Monitoring of functions and performance no longer takes place on-site, but virtually on digital platforms. “Demand for these models has been rising for some time now, and this trend is currently intensifying because people are realizing two things: First, there is no other option at the moment. And second, it’s better this way.” This is the point where visionary thinking comes in. When a company, with the aid of sensors and the “Internet of Things,” has access to the performance data of the equipment it produces, why doesn’t it sell the machine’s output, instead of the machine itself? Olaf Plötner refers to the model as power by the hour. The advantage is that the manufacturer, who is more familiar with the equipment than the customer, retains ownership. Previously, there has been uneasiness with this model in industry. Plötner: “Customers had an issue with having to divulge their operating data with this model. And nobody is happy to do so.” Olaf Plötner has observed, though, that this understandable fundamental skepticism has recently subsided. Every crisis requires companies to speed up flexible thinking. “The winners are companies that customers trust,” Plötner explains. “And that means, in general, less so the big corporation, and instead medium-sized hidden champions with strong customer relationships.”



Trend number three

Globalization with new content

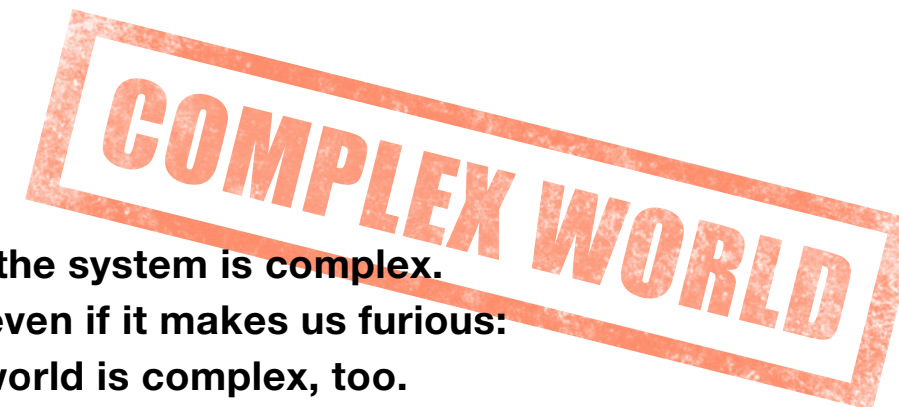
Plötner refers to the presently observed shift away from globalization as a “skid mark.” Indications have been around for some time now, prompted — albeit not exclusively — by the protectionism of certain countries and their heads of state. “It will become more difficult to produce at home and then export the product to the world,” Plötner surmises. Ever new areas of friction are emerging in global merchandise logistics. This held true even before the coronavirus, and has now been intensified by the coronavirus. “Still, this doesn’t mean that the flow will come to a halt,” Olaf Plötner states, assessing the trend. Globalization will not end, and countries or companies will not start to follow their own recipe for doing things — especially since the list of ingredients would shrink from one country to the next. What will change, however, is the content: data packets will compete with freight containers, digital logistics will gain in importance, and the platform economy will turn into the most important trading venue. “The winners will include international companies that turn this trend into new business models,” adds Olaf Plötner — with the sale of technical expertise, service and maintenance in mind. “Manufacturing itself will take place in the customer’s particular region, at least to some extent.”



We cannot eliminate the unpredictable from the world.

Incidentally, this is not a complicated undertaking. It is, however, a complex one. Where is the difference? Complicated things do not change. Television science journalist Harald Lesch explains that complicated things are like the one-way road system in Florence: “Because the rules don’t change there, you will understand them after a while, and just like that the system doesn’t appear quite as complicated anymore.” Matters become complex when the rules of the system change. To stay with Harald Lesch’s example of Florence: “50 people find themselves in the morning at the wrong end of a one-way street and say: Today we decide that traffic can flow the other way around. What will happen then is what makes us furious: While a moment ago, the one-way road system was a predictable matter, it is now changing constantly, prompted by the road users’ conduct.” Now the system is complex. And even if it makes us furious: The world is complex. As is the economy.

We cannot eliminate the unpredictable from the world. Not even optimizations help there. What remains is the complexity of the human psyche, of the social structures, of the natural ecosystems. Like a kaleidoscope, its elements cannot be predicted. It has always been this way. We suppressed it. The virus came to remind us. And the climate problem is anything but resolved. So it is time to prepare.



Now the system is complex.
And even if it makes us furious:
The world is complex, too.



after all —

would you

do it

again ?

A legal background is important, but not crucial: it is at least as important to Professor Peter Doralt to listen to his gut feeling when making difficult decisions. Doralt has supported the development of the Plansee Group for 46 years as a member of the Supervisory Board. *livingmetals* spoke with him in Plansee's Vienna office.

Peter Doralt takes the time he needs. We have an interview scheduled, and before we get started, he first has a cup of coffee. And talks. And drinks another cup of coffee. There are not many topics that the professor emeritus is not interested in. The 80-year-old law graduate has been a member of the Supervisory Board of the Plansee Group for 46 years and is not the least bit tired of his post. Quite the contrary: he would like to continue for as long as the owner has confidence in him.

livingmetals: **Mr. Doralt, how did you end up at Plansee?**

Peter Doralt: At the recommendation of then Chairman of the Supervisory Board Walter Kastner. I was a lecturer for commercial law at the University of Vienna and one of Kastner's students. This is what brought me to Reutte for the first time in 1974. I recall the conference room very well where Walter Schwarzkopf, who then was the Chief Executive Officer and sole proprietor of Plansee, gave me an overview over Plansee's history and its technology. He showed me parts of the plant, and then invited me to lunch with the family. In the afternoon, he gave a rousing speech during the staff meeting and spoke about Plansee's situation and plans.

How would you sum up the development of Plansee over the past 45 years?

Peter Doralt: In a word: magnificent! Plansee has grown continuously, achieved a global presence, completed the important separation of its refractory metals and hard metals activities, and driven professionalism in every respect.

Have the duties of the Supervisory Board changed over the course of the years?

Peter Doralt: One of the Supervisory Board's core tasks is to supervise the business conducted by the Executive Board. Over the course of the decades, the priorities have shifted: discussions with the Executive Board have grown more intensive. Our role is less that of supervising, and more that of a sparring partner for the Executive Board.

As a member of the Supervisory Board, do you have to like everything that the Executive Board does?

Peter Doralt: Of course not. In addition to my legal expertise that I have contributed, which is and has been the reason of me serving on the Supervisory Board, I have also attempted to listen to my gut feeling at all times. I recall discussions about our first steps in India, which went sour because we did not have our own local staff. And our initial attempts to gain a foothold in Japan, which failed because of differences in mentality.

Let's talk about key development steps of the Group you were part of.

Peter Doralt: In contrast to the refractory metals, where we traditionally held a leading position in the market, the hard metal area did not carry so much weight until the 1970s. We did try to become stronger through acquisitions. But after a period of challenges and the clear separation of business activities, we only accomplished the breakthrough for our hard metal business after the joint venture with Cerametal and the establishment of Ceratizit.

Being supplied with our key materials molybdenum and tungsten is a question of principle that is subject to continual discussion and is never conclusively answered. The markets are not just open to manipulation and political. As a company, every backward integration means you enter new territory and become a competitor of the suppliers.

Incrementally increasing our Molymet holdings starting in 2011 was a step to protect the supply of molybdenum. And with the acquisition of GTP in 2006, we were ideally prepared to safeguard the supply of tungsten.

Which of Plansee's strengths have you learned to appreciate?

Peter Doralt: Plansee's starting situation was favorable. As a result of Paul Schwarzkopf's know-how, the company had a technological edge from the start, which we were able to preserve. Additionally, Paul Schwarzkopf was instrumental in making collaboration, co-operation, part of the company's DNA. This is apparent even today: many minds work together to maintain this lead.

24 I also value the fact that decisions are prepared with great diligence, but that Plansee also has the courage to take risks and to revise decisions when the general conditions have changed. The principle of mutual trust that exists at all levels of the company is a major strength. I hope that future management generations successfully continue to shape this climate of trust.

What challenges do you see?

Peter Doralt: We are a global company. We need more employees who are willing to go out into the world for a while.

In your view, what is Plansee's purpose and raison d'être?

Peter Doralt: For one, the goal is to safeguard the company's long-term continued existence as a social community, while continually re-balancing the interests of everyone involved, such as shareholders, employees, customers, and the general public. This is an essential duty of the Executive Board.

Additionally, the products that Plansee manufactures improve our quality of life and reduce the costs of this improvement. One example is the radiation helmet for the treatment of cancer. With this solution, the life of a person can be improved or extended.

When you take stock after 46 years of serving on the Supervisory Board – would you do it again?

Peter Doralt: Absolutely, with a passion!

Absolutely, with a PASSION !



JUST SEEK

nickel-chromium-iron-al|



Googling the nickel-chromium-iron alloy Inconel-718 will return more than 1.8 million hits within 0.37 seconds. This sounds like a wide range of choices, but frequently marks the start of a nerve-racking search for the user: Who can supply me with what I genuinely need? In the thicket of the information, it is easy to lose interest and track. What would be helpful is a portal that leads the customer to a perfectly fitting provider. While the portal yields fewer hits in the search for specific materials, each of them is **right on target**. Matmatch is such a platform.

The digital platform Matmatch, a subsidiary of the Plansee Group, brings material suppliers and potential customers together with the help of an information-rich database. The secrets of the corporate success are a spirit of digital adventure and the specialist know-how of the Matmatch team. Since its inception in 2017, the subsidiary of the Plansee Group has been matching customers with suppliers based on the materials database created by the Matmatch experts. Engineers looking for certain materials for their projects will find reliable information here, receive direct contact information for the providers, and—if everything fits—be doing business quickly. The database currently lists some 26,000 materials, which can be searched and compared via a search screen. Stored data, technical articles as well as other customers' evaluations serve as additional reference. Instead of having to battle with information overload from the Internet or the technical literature, Matmatch offers all the relevant details at a glance. And on top of that, it is free-of-charge.

The platform is evolving into an important sales and marketing tool for a growing number of materials suppliers. Deutsche Edelstahlwerke (DEW) from Witten, Germany, one of the world's leading manufacturers of stainless steel products, is among the material producers that make intensive use of Matmatch. *For a long time, the company focused on traditional marketing channels to reach customers: trade show presentations, catalogs, printed ads, and online brochures.* "In the end, though, we realized that more and more customers are searching directly online for materials," says Daniel Kipp, in charge of Technical Marketing at DEW. The company was looking for ways to increase its digital presence—and hooked up with Matmatch. "The platform is an ideal solution for us because it allows us to offer our

Nerve-racking search: Who can supply the material I genuinely need for my application? In the thicket of the information, it is easy to lose interest and track.



AND YE SHALL FIND



Doing business quickly: Matmatch brings material suppliers and potential customers together with the help of an expertly structured materials database.

specialty products in such a targeted way that customers from all over the world can in fact find them," says Daniel Kipp. The data sheets provided by DEW were accessed almost 23,000 times in 2019 alone, with these contacts resulting in direct orders and new business relationships.

Those who search the net for particular materials frequently look at the price first. For Ampco Metal, a manufacturer of copper-based metal products headquartered in Switzerland, this presented a sales challenge. The company's products are priced slightly higher than those from large parts of the competition. At the same time, the materials are higher-quality—and the company offers better advisory services. How do you convince the customer, though, that the value of a material cannot be measured by the inexpensive price? "Matmatch helps us in this process," says Lionel Girard, Global Engineering Manager. Through data sheets and technical articles, Ampco Metal shares the special properties of its products, and interested parties can contact the company directly. The company also maintains close communication with the Matmatch employees to continually optimize the presentation of the materials. *"We tried several platforms, but now work exclusively with Matmatch,"* comments Lionel Girard. "The young team combines materials expertise with know-how about the digital world, and we are happy to help drive the digital transformation of the industry, together with Matmatch."

An X-ray look at processes

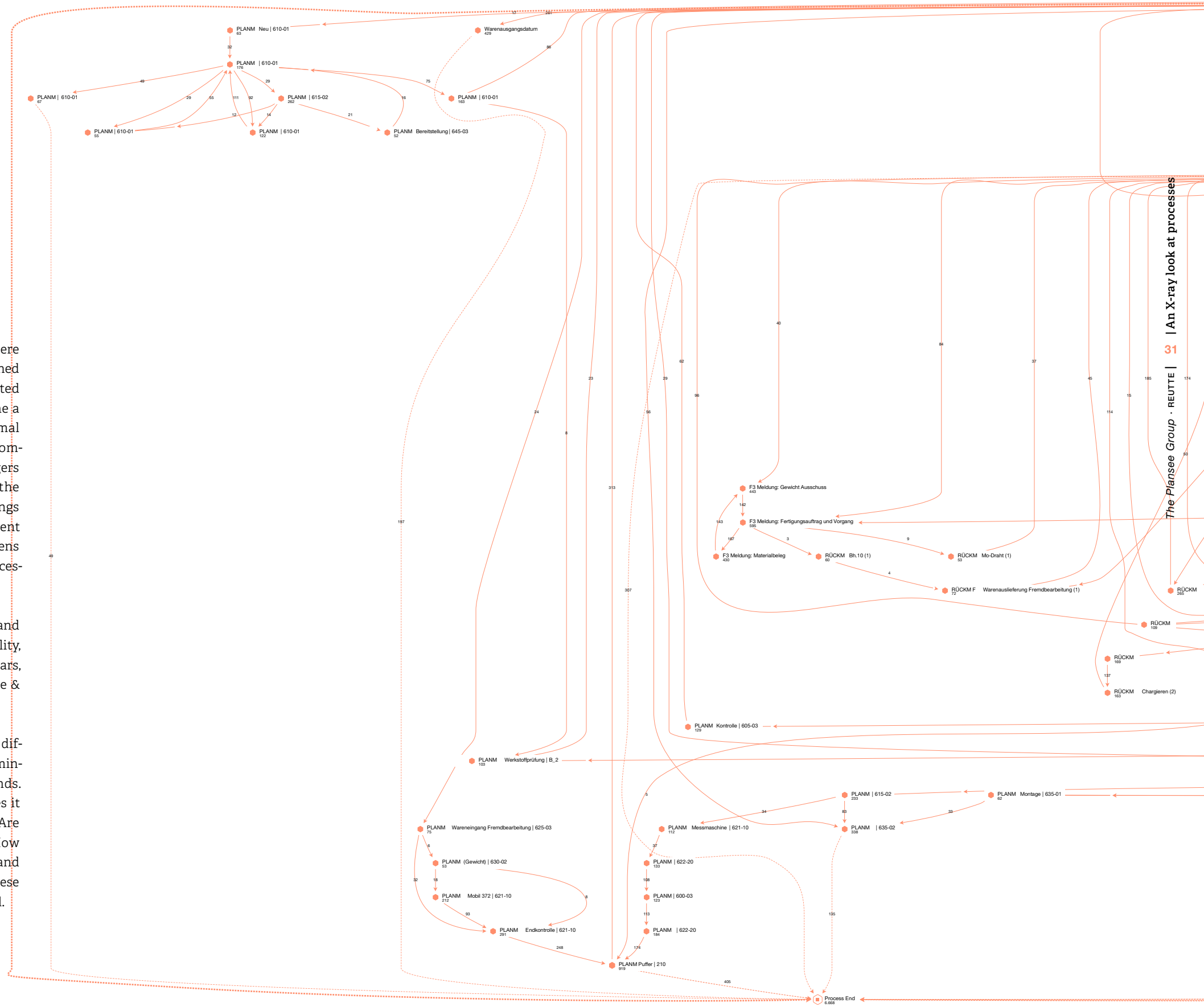
Planned processes and workflows are often not encountered this way in reality, or progress differently.

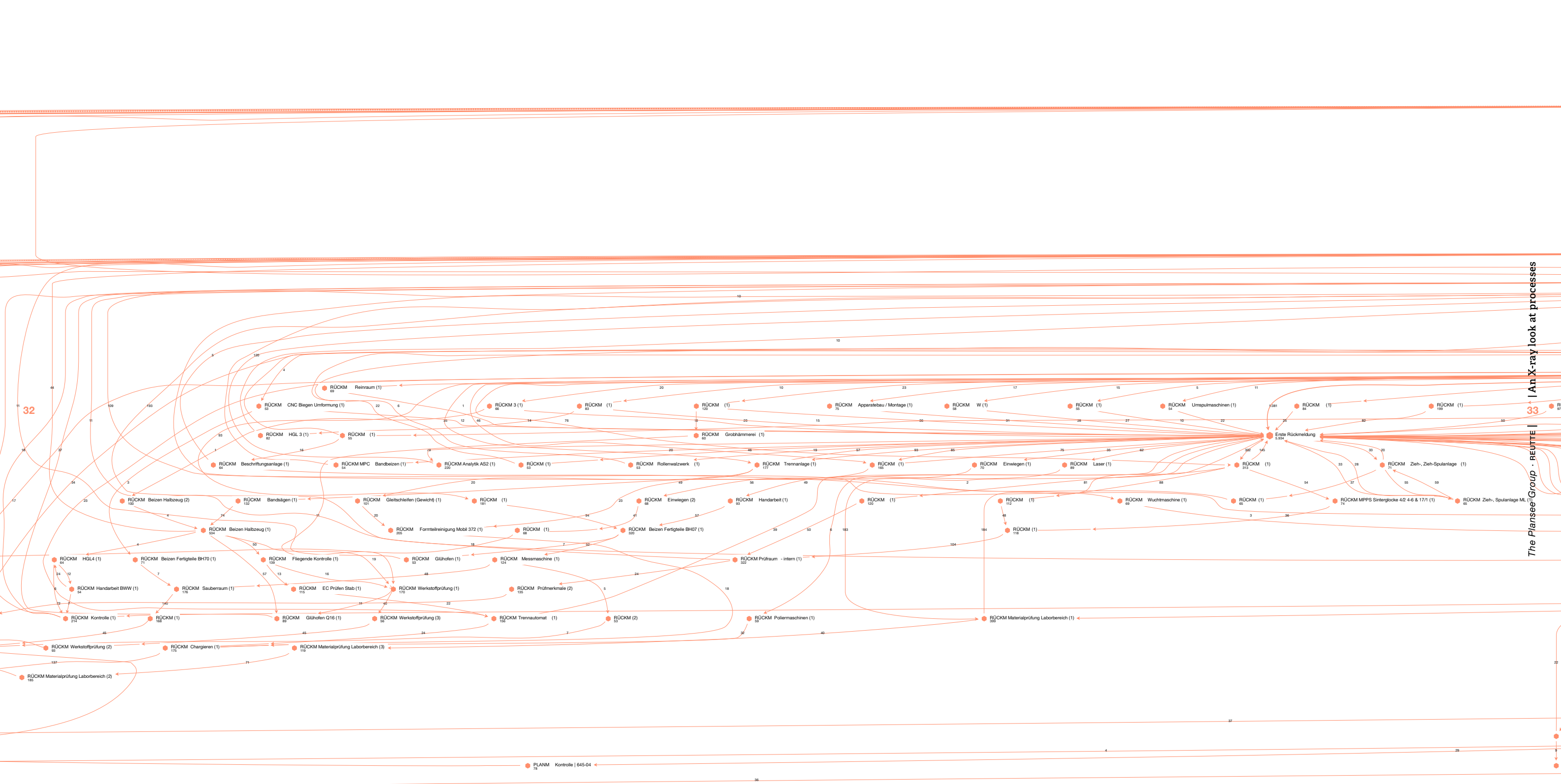
30 With the digital analysis of business processes (process mining), the Plansee Group is creating the conditions for transparency and targeted optimization.

A bus schedule is tricky. It may work well on paper. There is a starting point and a destination of the route. Defined stops. An average travel time and exactly calculated stays at the stops. To sum it up: the planner has done a great job. But does it work in practice? Under optimal conditions it will. But what is optimal? Morning commuter traffic with long traffic jams, scores of passengers pushing and shoving at the entrance and exit, and the resulting delays? Or the trip on early Sunday mornings where the driver has to wait at every bus stop to prevent arriving at the destination too early? And what happens when the driver oversleeps or a construction site necessitates a detour?

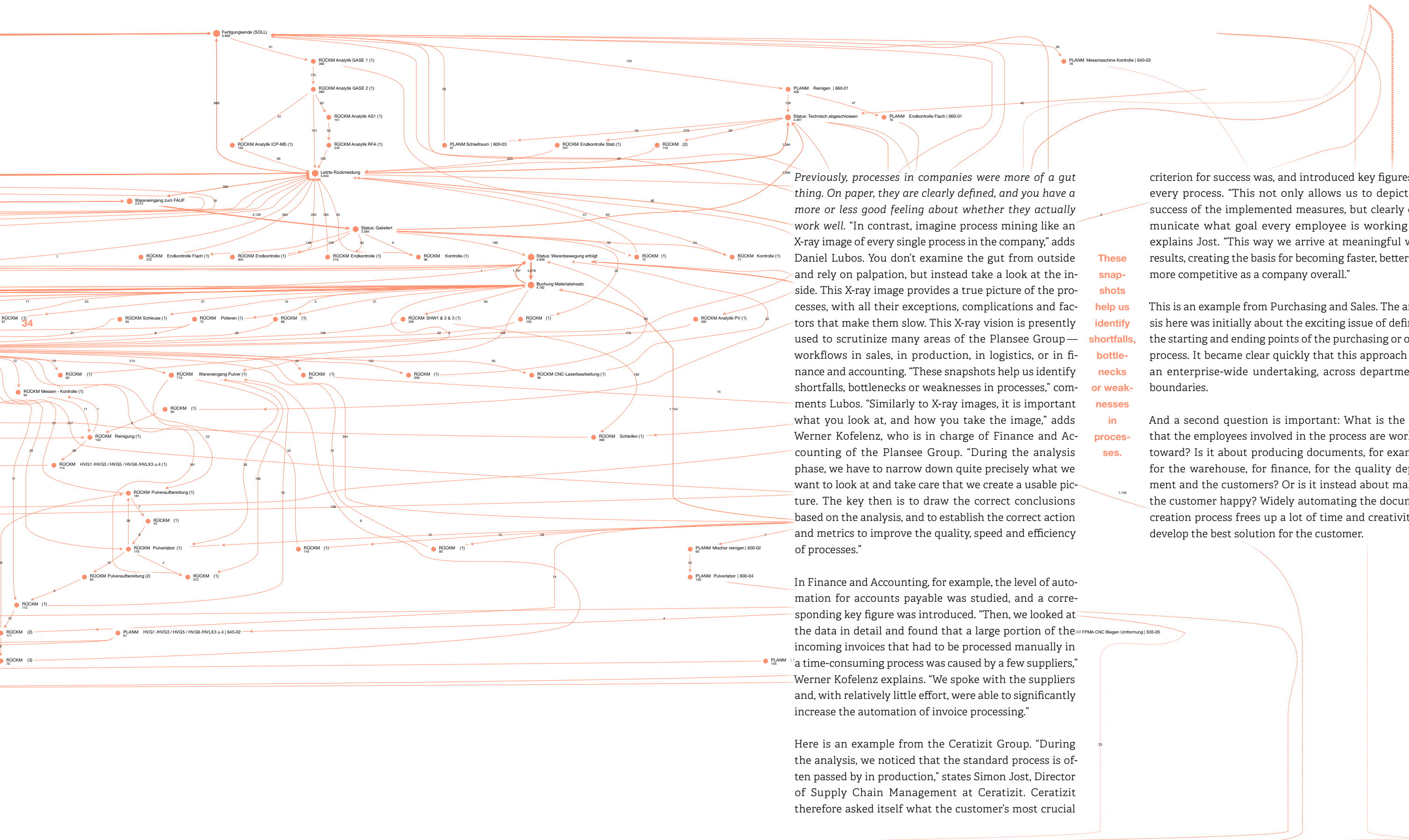
"This example demonstrates that planned processes and workflows are often not encountered this way in reality, or progress differently," says Daniel Lubos. For two years, he has been in charge of developing the Data Science & Analytics department at the Plansee Group.

What is process mining? Here is an example from a different sector. A major German airline uses process mining to analyze the workflows when an airplane lands. The software analyzes countless data: How long does it take passengers to deboard? Is the fuel truck late? Are there problems with docking at the jet bridge? How much time does it actually take between boarding and when all passengers are sitting on the plane? When these workflows are optimized, airplanes are more punctual.





The Plansee Group · REUTE | An X-ray look at processes



Previously, processes in companies were more of a gut thing. On paper, they are clearly defined, and you have a more or less good feeling about whether they actually work well. “In contrast, imagine process mining like an X-ray image of every single process in the company,” adds Daniel Lubos. You don’t examine the gut from outside and rely on palpation, but instead take a look at the inside. This X-ray image provides a true picture of the processes, with all their exceptions, complications and factors that make them slow. This X-ray vision is presently used to scrutinize many areas of the Plansee Group—workflows in sales, in production, in logistics, or in finance and accounting. “These snapshots help us identify shortfalls, bottlenecks or weaknesses in processes,” comments Lubos. “Similarly to X-ray images, it is important what you look at, and how you take the image,” adds Werner Kofelenz, who is in charge of Finance and Accounting of the Plansee Group. “During the analysis phase, we have to narrow down quite precisely what we want to look at and take care that we create a usable picture. The key then is to draw the correct conclusions based on the analysis, and to establish the correct action and metrics to improve the quality, speed and efficiency of processes.”

In Finance and Accounting, for example, the level of automation for accounts payable was studied, and a corresponding key figure was introduced. “Then, we looked at the data in detail and found that a large portion of the incoming invoices that had to be processed manually in a time-consuming process was caused by a few suppliers,” Werner Kofelenz explains. “We spoke with the suppliers and, with relatively little effort, were able to significantly increase the automation of invoice processing.”

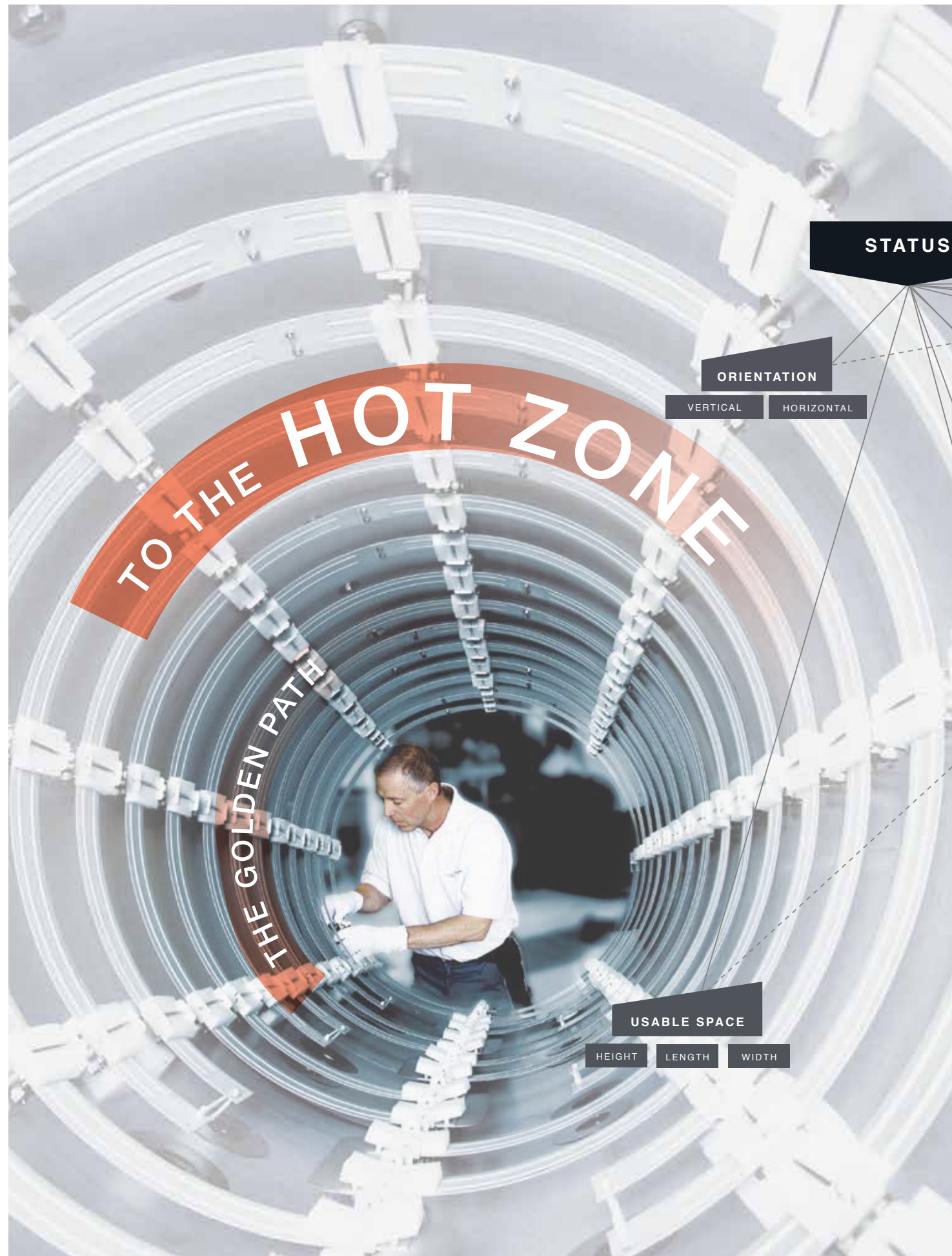
Here is an example from the Ceratizit Group. “During the analysis, we noticed that the standard process is often passed by in production,” states Simon Jost, Director of Supply Chain Management at Ceratizit. Ceratizit therefore asked itself what the customer’s most crucial

criterion for success was, and introduced key figures for every process. “This not only allows us to depict the success of the implemented measures, but clearly communicate what goal every employee is working for,” explains Jost. “This way we arrive at meaningful work results, creating the basis for becoming faster, better and more competitive as a company overall.”

This is an example from Purchasing and Sales. The analysis here was initially about the exciting issue of defining the starting and ending points of the purchasing or order process. It became clear quickly that this approach was an enterprise-wide undertaking, across departmental boundaries.

And a second question is important: What is the goal that the employees involved in the process are working toward? Is it about producing documents, for example for the warehouse, for finance, for the quality department and the customers? Or is it instead about making the customer happy? Widely automating the document creation process frees up a lot of time and creativity to develop the best solution for the customer.

These snapshots help us identify shortfalls, bottlenecks or weaknesses in processes.



Online configuration options do not just include cars and kitchens — Plansee now also offers this service to furnace builders and operators for custom-made hot zones.

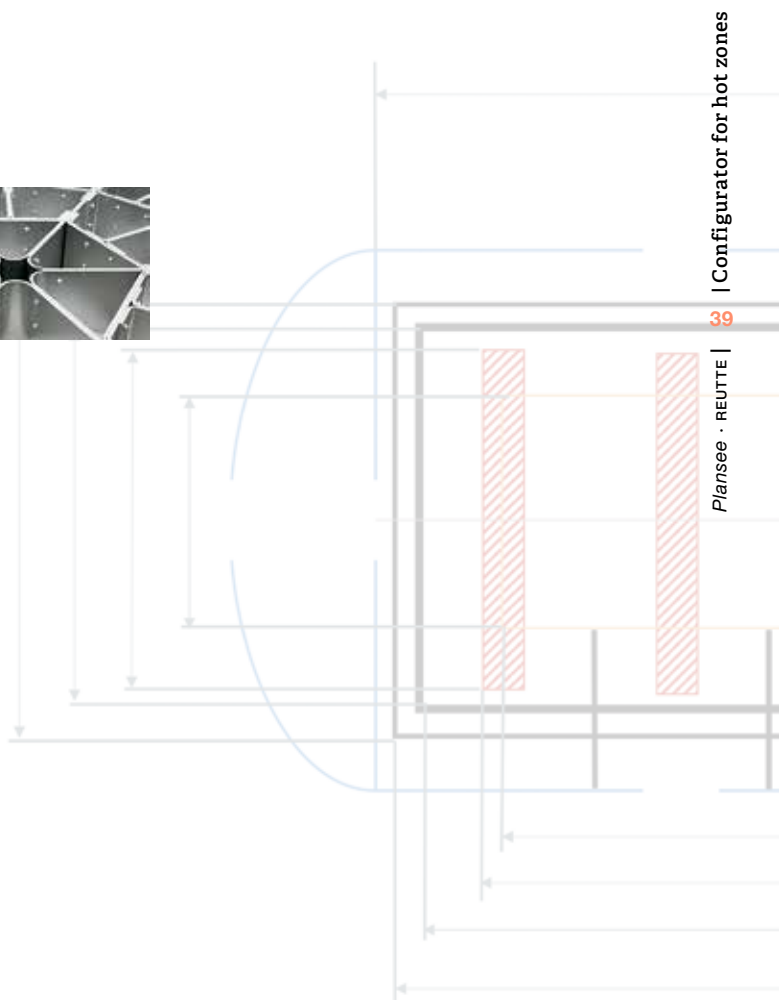
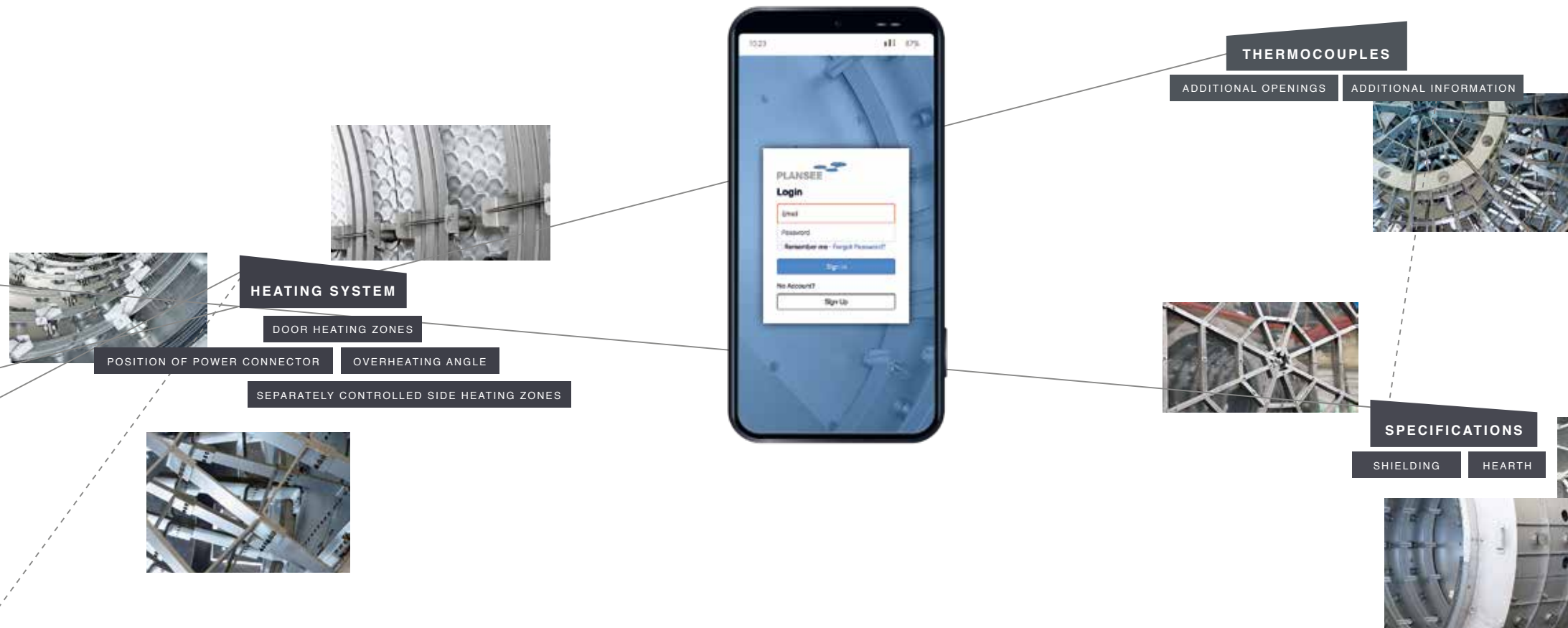
An Internet search for the keyword 'configurator' returns hits for almost all known auto brands on page one. But the average consumer today also has the option to purchase ski apparel, windows, doors, kitchens or desks not just off the shelf, but to personally configure them.

All online configurators have one thing in common: customers compile their optimal solution from an almost bewildering host of alternatives. These configurators are geared toward a mass market of hundreds of thousands, often even millions of potential customers.

The Plansee configurator for hot zones functions similarly, and yet very differently. Its customers are furnace builders and operators in need for hot zones for high-temperature processes. These furnaces are used to sinter metals or ceramics, anneal airplane components or braze together individual parts. How useful is a configurator if annual sales are just a few dozen hot zones and each hot zone is custom-made? We asked Bernd Kleinpaß, who developed the configurator together with a team of furnace building experts, customers and IT specialists.

The configurator for hot zones

- **Simple:** independent configuration
- **Fast:** technical design and pricing (almost) at the push of a button
- **Competent:** uses tried and test design rules and individual price calculation
- **Effective:** frees up customers, sales, engineering and planning
- **Far-reaching:** promotes standardization, reduces costs and delivery time



livingmetals: Can a hot zone be configured similarly to a car?

Bernd Kleinpaß: Yes and no. Everyone is familiar with the configurator for cars. The buyer primarily controls preferential aspects, such as engine power, color, wheels or many equipment details. The configuration takes place within a certain framework: the body, the dimensions and many technical standards are set. Here, our hot zone configurator offers considerably more options: every hot zone is made to order. To stay with the comparison to the car: In the beginning, the customer even defines the size of the vehicle, the weight to be loaded and the power—in other words, the temperatures—with which it is to be operated. Only then does the selection process move on to equipment variants and details.

What changes with the configurator?

Bernd Kleinpaß: The configurator changes how we calculate and produce hot zones. Previously, quoting and designing a hot zone was a predominantly manual process where the experience of the individual employee played a very crucial role. And it was a process that tended to be very protracted and cumbersome. There was often a long delay before our product managers and designers had all the necessary information to prepare a binding offer.

What are the advantages of the configurator?

Bernd Kleinpaß: With the configurator, our customer can prepare an individual offer and the entire technical design with just a few clicks. Our programs run the best-possible alternatives in the background. As with any configurator, at the end a finished product and a price are listed. At the same time, our production planners receive initial information about the number of required components and material quantities—saving us a lot of time when the customer places the order. The configurator additionally helps our sales department obtain all the relevant information from the customer in a standardized format, to be able to submit a quote that encompasses different alternatives at the touch of a button. To sum it up: it's a useful tool on several levels.

What was the prerequisite for translating this project into success?

Bernd Kleinpaß: We had to compile the expertise spread out among our employees and, in some instances, acquired over decades and find a common denominator. With this, we defined the golden path in terms of how we want to plan, calculate and manufacture future hot zones. This was arduous, but indispensable for programming the calculator.

Does this mean that the customer will only receive standard solutions in the future?

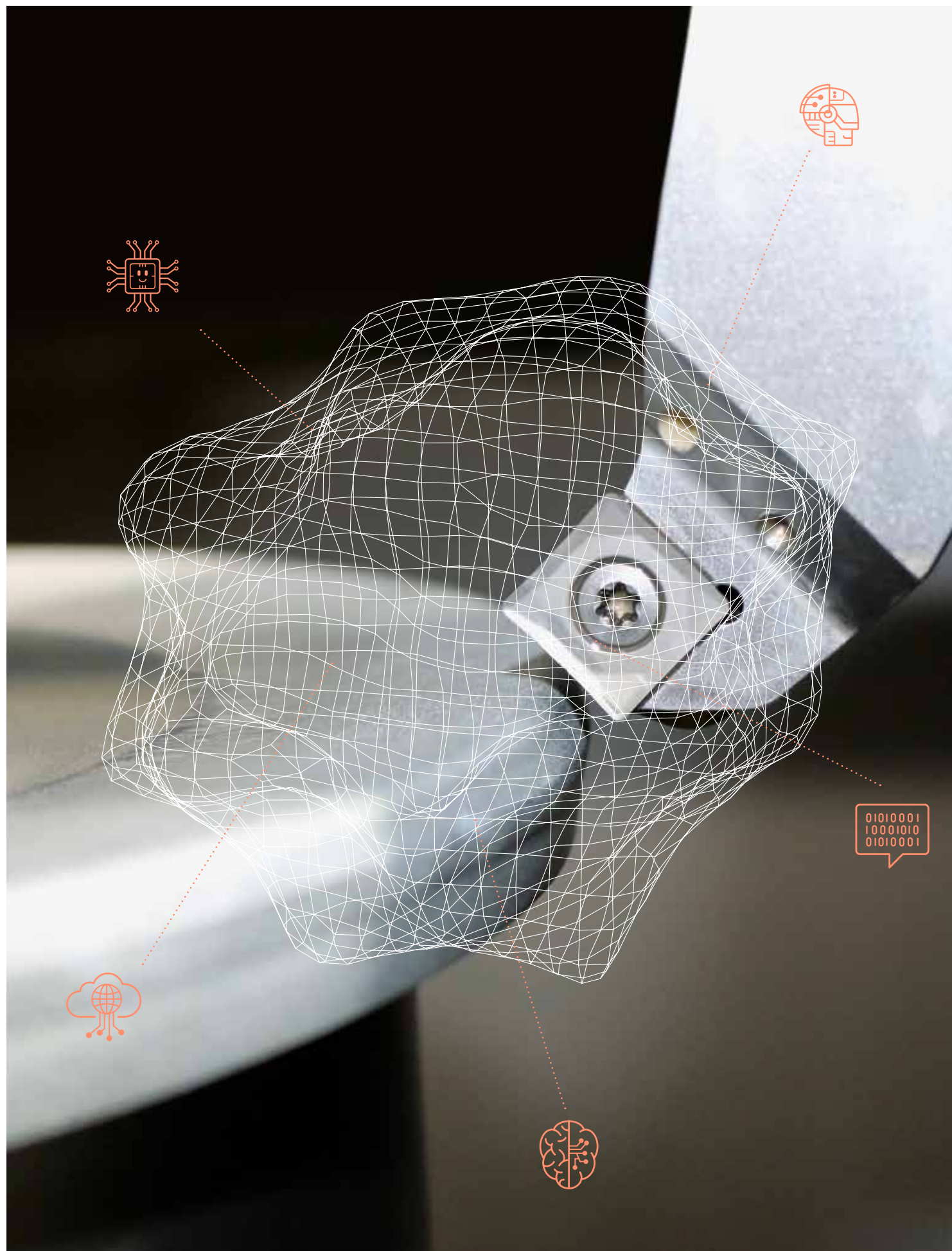
Bernd Kleinpaß: If you are asking me about how we will calculate, plan and build hot zones in the future, this way is now clearly defined and standardized. Nonetheless, it is still possible to custom-build every single hot zone for our customers using this standard procedure. In any case, customers can be sure that Plansee's collective expertise is considered in the calculation and design of the hot zone.

How do you convince customers to select the especially efficient "Enerzone" feature variant?

Bernd Kleinpaß: The calculator has useful additional programs, such as an economic efficiency calculation. Of course our Enerzone hot zone is more expensive. But we assist our customers with calculating the total costs over the entire life cycle: what do they save over time in terms of maintenance costs, how much energy can they save annually, and how does this affect the CO₂ balance? These issues are becoming increasingly important for many of our customers.

More and more customers prefer the **"green" heating element "Enerzone"**. Although it is more expensive than the basic version, it scores points for its climate compatibility and saves costs at the end of the day:

- **CO₂ emissions:** –19 percent
- **Return on investment:** 2.3 years
- **Cost savings over the entire service life:** –16 percent



Treasure instead of scrap

About the informational value
of worn tools

Much too precious to throw away. This is Jannis Walk's conviction when it comes to worn tools. Where others see residual value in scrap metal, Walk sees untapped high informational value. To raise the value and render it usable, Jannis Walk is exploring avenues for automatically identifying and analyzing tool wear for the Ceratizit Group, utilizing machine learning technologies. At the same time, he accomponies the firm into the world of artificial intelligence.

What is most astonishing about machine learning is that, so far, nobody exactly understands how it works. In the end, however, it produces impressive results. There are plenty of examples: the identification of cat images on the Internet is one of the more trivial applications. In contrast, various online translation tools provide genuine assistance in the everyday work setting. Programs that allow a vehicle to park autonomously or identify malaria parasites in a blood sample are also based on machine learning algorithms. They help provide relief for people during routine work prone to errors. We met with Jannis Walk and, for starters, asked him:

livingmetals: How does such a program learn how to distinguish a picture with cats from pictures without cats?

Jannis Walk: To accomplish this, we humans have to develop a computational model which we then "train" very intensively. We have to present a large number of pictures to the model. And we have to tell the model with every single picture: a cat is shown in this picture. And no cat is shown in another picture. Over time, the neural networks typically used for image processing tasks develop the capability to link certain features in the images to cats—or not. We do not quite know just yet whether these are contours, proportions or very specific traits such as eyes, nose or snout, and the order in which they are identified. But precisely this understanding is what we, as researchers, are currently working on. We have to be able to explain how and why the algorithms arrive at their results for confidence in this new technology to grow.

Autonomous driving is a great example: in terms of technology, it is working better and better—even if the technology is not yet fully developed. Now we have to explain how and why it works so that this technology can be certified, for example. These prerequisites also have to be created in a number of other industries to facilitate the breakthrough of machine learning.



And how do you use this knowledge for your dissertation?

Jannis Walk: I take a look at what happens with selected tools in the customer's application. Are there certain patterns when it comes to wear and tear? These findings could be helpful in optimizing the processes or the production parameters.

What specifically does this involve?

Jannis Walk: You use a particular tool, and it doesn't matter whether it's an indexable insert, a drill, or a milling cutter, in a machine tool. At some point, the tool has worn and can no longer be used. Our goal is to identify certain wear patterns on this tool. We bring several hundred of these "scrap" tools back from the customer, photograph them, and have a program that utilizes machine learning analyze them. This machine-processed data forms a good foundation for the work that lies ahead for the human experts. They look at the data, are able to interpret it based on their experience, and draw conclusions.



This example also demonstrates what machine learning is about: meaningfully combining the strengths of the new technologies with the strengths and capabilities of humans. Machine learning takes over the work that is strenuous and tiring for humans, work that is prone to errors. We did a calculation: it takes the machine approximately 40 seconds less than a person to detect and characterize a worn cutting edge. This provides effective relief of routine work for people since they are able to focus on creative work that requires experience, inference capability and imagination: what conclusions can be drawn from the data, and what could be done differently in the future.

And how does this benefit the customer?

Jannis Walk: The key is to understand the properties and capabilities of our products in our customer's application even better and in-depth—this is the only way we can continually improve them. Our customers are constantly working on optimizing the processing operations. Of course the quality has to be right, the service life of the tool should go up, production should become faster, all this at decreasing costs. With these deliberations, we can make an important contribution by being able to better explain the wear behavior. As a result, the experts can provide recommendations based on machine analyses. Should a different tool be used or even be newly developed? A different tool holder? Different cutting parameters? Or a different manufacturing process?

What makes this assignment attractive to you?

Jannis Walk: To me, the assignment is so exciting for several reasons: All of us at Ceratizit are entering uncharted territory and doing pioneering work. We recognize that tools which have outlived their purpose can have not just a scrap value, but also a high informational value if we analyze them sensibly. And we have the ability to develop more efficient processes, thereby saving resources. Also, there is tremendous interest among the colleagues from Plansee in the topic of machine learning, so we have launched initial experiments and projects there as well.

You mention pioneering work. What does this encompass?

Jannis Walk: Since the application of machine learning, as mentioned, is quite new at Ceratizit and Plansee, it was important to find a critical number of skilled and qualified people who play an active role in this process. An important part of my work is to enhance sensitization for this topic and the training. I regularly deliver presentations for employees from different departments such as Research & Development, Maintenance, Production, Marketing, Sales, Process Development, and Quality Assurance. And we must collectively develop an understanding as to how and where we should systematically collect data to create added value for us and our customers.



Jannis Walk studied engineering economics at the Karlsruhe Institute of Technology in Germany. Since June 2018, Jannis Walk has been researching deep learning applications in the research group "Digital Service Innovation" as part of his dissertation. He is in close contact with the R&D departments of Ceratizit and Plansee.

Even die-hard techies get cold feet when it comes to this technology: in state-of-the-art lithography machines for computer chips, droplets of tin are vaporized at 500,000 degrees Celsius — 50,000 times a second. How is this possible? One of the reasons: molybdenum from Plansee.

Pushing the envelope of physics and technology

Ever more power is needed for microchips: according to **Moore's law**, the complexity of integrated circuits doubles every 18 months.

Microchips are the brains of computers, smart phones, robots, cars and household appliances. They control the devices, process huge data volumes in fractions of a second and store incredibly comprehensive data records. To sum it up: without these tiny helpers, a digitized world is inconceivable.

Regardless of what these microchips are capable of, though, applications call for even greater performance. The number of transistors of a semiconductor has to double every 18 months to keep up with technological progress. This rule is described in Moore's Law. But is this kind of exponential growth possible in the long run?

This is a valid question. After all, it is the light that sets the boundaries. Previously, the exposure process using laser light has been part of the numerous manufacturing steps of a microchip. The light of the laser is projected through a precisely defined mask in the process. The light creates an image of the mask on the silicon wafer, thereby implementing the necessary structures such as switches and conductors on the microchip (memory or logic chips). The process is known as photolithography. The shorter the wavelength of the light, the smaller the patterns that can be printed on the wafer. The laser technology presently in use makes it possible to expose chips with wavelengths of up to 193 nanometers. A nanometer is one millionth of a millimeter. The structures thereby created on the microchips are up to ten nanometers large. They are not visible to the naked eye nor under an optical microscope. It takes a scanning electron microscope to render such minuscule patterns visible.

It was evident already 20 years ago: the conventional production technology potential using laser light has reached its limit for the foreseeable future, as ever smaller structures are needed on the chips. Dutch machine manufacturer ASML has therefore developed a new production technology. Using extreme ultraviolet light (EUVL) in the 13.5 nanometer wavelength range, the company expected to revolutionize, and further miniaturize, the manufacturing technology for semiconductors.

Since the new light with its tiny wavelengths is absorbed by air and glass, the technical experts had to overcome a number of challenges to render it usable for manufacturing.

Plasma instead of laser: The ultra short wavelength light has to be created from plasma. Tiny tin droplets are heated by a laser to 500,000 degrees Celsius and vaporized. At this very moment, the desired extreme ultraviolet light at a wavelength of 13.5 nanometers is produced. This process takes place 50,000 times a second.

Simplified representation of the principle of **EUV exposure**.

Mirrors instead of lenses: Since the ultraviolet light cannot be conducted over lenses, complex mirror optics had to be developed. The reticle also works differently now: instead of being transilluminated by the light (transmission), a mirror has to reflect the light behind the mask structure (reflection).

Ultra pure instead of just pure: A single dust particle measuring 30 nanometers would destroy the functional capability of the microchip — making even greater cleanliness in the machine a necessity.

Many people considered it impossible to solve these problems at the limits of physics and technology, and to accomplish the construction of such a machine. But ASML's technical experts were not discouraged. As of the end of 2019, the major manufacturers are producing the first microchips based on EUV technology. The system is the size of a double-decker bus and is assembled from more than 100,000 individual parts. The semiconductor industry is not uncharted territory for Plansee. For decades, components made by Plansee have been used to manufacture semiconductors — any time things get particularly hot or electrical conductivity and

corrosion resistance are needed. In the case of the EUV technology, it was the hot tin that made Plansee's materials a sought-after commodity. *Liquid and hot tin is corrosive. And molybdenum is the material of choice for reining in corrosive tin.* As a result, components made of molybdenum are used everywhere in the EUV machine where the liquid tin droplets are produced and vaporized by the laser, and excess tin is collected. The entire optics of the EUV lithography system requires a multi-layer coating made of molybdenum-silicon for the mirrors. The layered composite was specifically tailored to the 13.5 nanometer wavelength and ideally reflects light of this wavelength. The masks needed for structuring the semiconductors are also covered with a multi-layer molybdenum-silicon coating. The semiconductor producers quickly realized that the mask was the crucial distinguishing criterion

for the semiconductors they manufacture. The mask is used to set the properties and performance capability of the microchip. Additionally, the reticle plays a pivotal role in the quality of the chips. A lot of effort is therefore dedicated to ensuring a flawless quality of the mask. It is even checked one last time just before being used — in a

A single dust particle measuring 30 nanometers would destroy the functional capability of the microchip — making even greater cleanliness in the machine a necessity.

testing device dedicated specifically for this purpose, where the mask is also tested with EUV light. Here as well, it is usually liquid tin that is used to create the EUV light, employing refractory metals in the process.

The EUV technology is still in its infancy. While the first machines have been shipped, development is progressing quickly. Every newly delivered machine represents an improvement and enhancement over its predecessor. With even greater accuracy, and with even more precision, the machine is expected to focus the ultra short

wavelength light at the wafers for the production of microchips. It poses a major challenge, also for Plansee. Christoph Adelhelm is in charge of Business Development for EUV applications at Plansee. He expects rising requirements to cause demand for molybdenum- or tungsten-based components in the EUV machines to grow steadily. The reason is obvious: due to their special properties, the high-performance materials are more resistant to deformation than components made of stainless steel, for example, and are used for vibration damping.



BRIDGE

Florian Schaper “grew into” Plansee. While studying engineering economics in Kempten, Germany, he increasingly worked at Plansee at the same time. And just in time for his graduation in 2015, the right employment ad showed up online.

livingmetals: **Why did you want to go abroad?**

Florian Schaper: I had previously spent a year at Plansee in Franklin, Massachusetts, USA, and definitely wanted to return to America. The job posting came at just the right time.

What helped you during the application process?

Florian Schaper: My English skills, my good network at Plansee, and my experience in mechanical production at Reutte.

Three months after his successful application, Florian Schaper packed his suitcase in 2015. Initially, he worked as Product Manager in California before also assuming responsibility for the innovation management for selected product areas. The Vista production site near San Diego focuses on the manufacture of components needed in production equipment for the semiconductor industry.

In your view, what makes the work in Vista special?

Florian Schaper: The work culture is considerably more relaxed. All the doors on the shop floor and in administration are open. The employees are literally pulling together. Teamwork and open communication are a top priority. I find the people here to be cosmopolitan, which is probably due to the

eclectic mix of cultures, religions and traditions. It is very easy here to meet new people.

And what do the people on the West Coast appreciate about Reutte?

Florian Schaper: Austrians and Germans are considered to be far more direct. This has advantages. Problems are being addressed directly. I see a problem and offer solutions — this is a very welcome approach here.

What tips would you give expats?

Florian Schaper: If everything fits, life as an expat can be awesome. What is important is that your family supports you. And that you build a healthy network of friends who don't work in the company.

Favorite spot: After work, Florian Schaper likes to go to the beach — here in La Jolla north of San Diego.



Michael Schuster started out at Plansee as a Design Engineer, before working as a Project Engineer in mechanical engineering for several years and earning his mechanical engineering and industrial engineering degree while on the job. He has worked for Ceratizit in China for two years, presently as Operational Excellence Manager in Taicang/Shanghai.

livingmetals: **Did you previously have connections to China?**

Michael Schuster: During my time at Plansee, we installed a pilot line for stamped-bent parts made of molybdenum in Reutte. Later, we transferred the manufacturing concept for series production to Plansee Shanghai, which I assisted with on-site.

Michael Schuster then wrote his master's thesis about the automation of the screw press, a key machine at Plansee. "Together with a highly professional project team, I was able to implement in production what I had devised in theory," Schuster comments. In 2018 then came the decision to move abroad.

How did it come about?

Michael Schuster: The process was prompted by an in-house job posting. After having been accepted and taking a discovery trip with my partner, we were certain: let's go to China. HR greatly assisted us during the preparations. Before leaving, I had a three-month familiarization period with Ceratizit Austria. The goal was to get to know important departments and contact persons.

Initially, Michael Schuster worked as Technical Manager in the Tooling Academy in Tianjin. A year ago, he joined Ceratizit Cutting Tools in Taicang, Shanghai. The plant manufactures customized special tools, primarily for the automotive industry.

What were your experiences in China?

Michael Schuster: I am able to communicate well in English with my colleagues at work. Still, knowing Chinese is an advantage, especially in private life; otherwise you quickly reach certain limits. In terms of the contact with business partners, I had to learn that the personal relationship comes first, and the business aspects follow in some instances much later.

And from a technical perspective, my experience has been that often very similar tasks and challenges arise—for which we can develop global, cross-location solutions as a group that operates around the world. As an expatriate, I consider this an important task.

What could other locations learn from China?

Michael Schuster: Our Chinese colleagues are all about a fast pace and flexibility. As a company with European roots, Ceratizit is synonymous with technical expertise and high quality. Combining and reconciling these two disciplines could give us a crucial edge. At the same time, we should focus more on automation to remain competitive in the long run.

Michael Schuster in downtown **Shanghai:** Left in front of the Oriental Pearl Tower (television tower), right in front of the Shanghai World Financial Center, Shanghai Tower and Jin Mao Tower.

What would you recommend to other expats?

Michael Schuster: Given the chance, anyone who is flexible and open-minded should seize the opportunity to work abroad for his or her company. A discovery trip beforehand can help gain a realistic picture on-site—not just in terms of the company, but especially daily life abroad. Of course, your significant other also has to have a fulfilling job during this time—my girlfriend works as a German teacher in Shanghai.

Additionally, I consider the regular contact with the parent company and, ideally, with a mentor to be especially valuable. Overall, I believe that you can gain unique experience abroad, which prepares you for future responsibilities and challenges in the group in the best-possible manner.





His father was an engineer, working abroad for the German federal government as head of development projects. Henrik Schmidt grew up in Indonesia and Namibia, among others, and attended international schools.

He studied physics and earned his doctorate in Hanover. He met his wife, a Chinese national, in Singapore. Henrik Schmidt currently works for Plansee in China.

livingmetals: Why did you join Plansee?

Henrik Schmidt: The job posting was attractive. It offered onboarding at the headquarters in Reutte, followed by the clear prospect of relocating to China as a development engineer.

How does the market in China work?

Henrik Schmidt: The Chinese government has clear development plans for key industries. In recent years, the focus was on displays. In the future, communications technologies, and with this semiconductors, are to be included, using the slogan "Made in China 2025." As a result, the market is moving very quickly. We are seeing competitors that were not even around two years ago. We have to adjust to this trend equally quickly.

What do you consider to be your primary tasks?

Henrik Schmidt: In light of my linguistic, cultural, and technical abilities, I build bridges between the Chinese customers, our European colleagues in Development, and the Plansee production network. Our customers are dynamic and demanding,

but also very flexible. I consider it my task to help our customers in the best possible way to achieve their ambitious goals. I know the in-house contacts and unlock their knowledge and experience for our customers.

When Henrik Schmidt came to China almost four years ago, he initially worked as Development Engineer and Project Leader for the display industry, not just in China, but also in Korea and Japan. He is presently also the program head for the development of a production unit in Shanghai for components for the semiconductor industry.

One final question: Do you already speak Chinese?

Henrik Schmidt: Yes, but limited. When it comes to the crunch, though, the business language is still English for me. On occasion, I have to slow down my colleagues when they only speak Chinese in the heat of the moment ...

Nothing ventured, nothing gained. This holds especially true for mobile employees in the Plansee Group: anyone changing the location and division within the group is awarded the Plansee Group Pin by the Executive Board.



and the relocation to Reutte were important job and life experiences that even we, as a family, can imagine doing again at any time."

Robert van Helden joined Plansee in 2008 — working initially as a Designer in Reutte, and as of March 2018 as Marketing Communications Manager at GTP in Towanda, Pennsylvania, USA.

During the presentation of the Group Pin, former Plansee Group Executive Board member Bernhard Schretter commented: "Having worked in several locations and companies of the group myself, including in Hong Kong and Franklin, Massachusetts, USA, it is always especially important to me to support, promote and appreciate the international mobility of employees."

Robert van Helden said: "To me, my wife, and our two school children, relocating the center of our lives from Reutte to Towanda was an exciting adventure we have not regretted. It's a fantastic opportunity to learn new things, and to see matters from a slightly different perspective. We would seize such an opportunity again at any time. Especially given the security and assistance from the Plansee Group, I can only encourage all employees to take a job abroad when given the chance."

Materials scientist *Christophe Carrié* joined Plansee in 2007. Starting out in Technical Sales in France, he became Product Manager in 2010, and later Key Account Manager for Plansee in Switzerland. As of November 1, 2017, Carrié has been in charge of Mergers & Acquisitions and Business Development groupwide, working from Reutte (see 2018 livingmetals, p. 52). Looking back, Carrié comments: "The relocation from France to Austria brought with it several challenges: I had to learn a new language, become acquainted with a different culture, and familiarize myself with a new area of responsibility. Plansee assisted my family and me in the best way possible so that we were integrated quite well after just a few months."

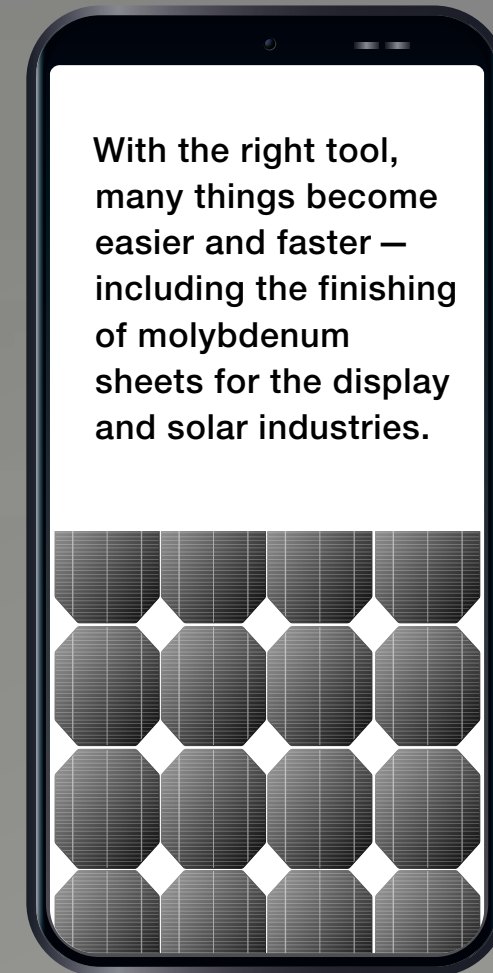
Christian Lücking started his career with Ceratizit in Luxembourg in Finance/Controlling. From 2011 to 2013, he supported the integration of CB Ceratizit into the Ceratizit Group in China. Back in Mamer, Christian Lücking headed the newly established Team Group Finance. In late 2016, he relocated to the Plansee Group in Reutte, where he is in charge of the consolidated financial statement, among other things. Lücking says: "The personal and direct exchange with colleagues from different cultures all over the world promotes a strong, group-oriented working relationship. Both the time in Asia



Turning things up a few notches

What do flat-screen displays and solar cells have in common? Not much at first glance. One product requires energy to emit light, the other picks up light to convert it into energy. A look at their inner workings, however, shows that sheets of glass coated with an ultrathin molybdenum layer are installed both in displays and in solar cells. The metal sheets (sputtering targets) made of molybdenum required for this coating are manufactured at Plansee. Ceratizit has now devised a tool that considerably speeds up the processing of these sheets.

In the final processing step before delivery, the surface of a sheet is milled until smooth. By using a milling cutter with a larger diameter, Ceratizit technicians were able to reduce the processing time. This sparked the ambition of all those involved to further fine-tune efficiency. The result is a cutter developed specifically for the machining of molybdenum sheets that cuts the processing time almost in half.



Ceratizit supports young cyclists while also enabling them to become lathe machinist trainees. The "Machining

MEETS

MACHINING MEETS CYCLING

meets Cycling" program is currently being successfully tested and launched in Spain.

Our goal is to offer our customers tooling solutions that precisely fit their needs as best possible.

He is passionate about bicycle racing. Mikel Paredes is 22 years old. On the U-23 team, he rides as many as 50 races per season for the team of Caja Laboral. Still, Mikel Paredes not only has a heart, but also a brain, which tells him: Some day, life as a professional cyclist will definitely be over. So he is completing an apprenticeship as a lathe machinist at Mendi Metal Innovation Group. Headquartered in the south of San Sebastian in Basque Country, the company specializes in the production of ready-to-install pneumatic cylinders and hydraulic assemblies.

The Ceratizit Group has supported the program dubbed "Machining meets Cycling" since 2019. Mikel Paredes is excited about this project:

"I'm very grateful for this opportunity. I receive all kinds of support to work on my career as a professional racing cyclist. And at the same time, I'm learning a solid technical profession in an innovative company." Mikel Paredes especially appreciates the support from his colleagues at work: "Many already

knew me as a professional cyclist before I joined the company. The staff is very understanding when it comes to me trying to reconcile my schedule as a bike racing pro and apprentice."

Values play a crucial role for Ibon Lete, Managing Director of Mendi Metal Innovation Group: "Only those who embody values like commitment, ambition and discipline from a very young age become professional cyclists. The same values are also important for the continued existence of our company." Koldo Agirrezabala, Area Manager of Ceratizit Iberica Tools, adds: "This is precisely why we created the "Machining meets Cycling" project: our goal is to offer our customers tooling solutions that precisely fit their needs as best possible. To do so, we need talented and qualified employees who will do anything to ensure our customers' success." Undoubtedly, machining experts who have learned how to machine a wide variety of workpieces from the ground up and can advise their customers on an equal footing are ideally suited.

To spread the word about the "Machining meets Cycling" program in Spain, Ceratizit engaged the 29-year-old professional cyclist Ane Santesteban. The former Spanish National Champion is one of Spain's best female cyclist and a solid contender for good results in hilly races. Santesteban showed her qualities over the last years with top-10 overall results at the Giro d'Italia and Spanish stages race Emakumeen Bira. She is not only the brand ambassador for Ceratizit, but also trains young cyclists. Ane Santesteban is convinced that this project will play a key role in advancing bicycle racing in Spain in a healthy and safe way. "The future lies in your hands – you just have to seize it."

Ane hopes to encourage more young people in the coming years to not just follow their passion – but to also find a clever approach for their bicycle racing career.



Is privacy at risk?

Is privacy at risk in times of Big Data? This is the question posed by the Austrian Mint with the silver-niobium coin “Der gläserne Mensch”. As many years before, Plansee has contributed the niobium metal for this coin.



The value side of the coin shows a human eye in the niobium core, which stands for surveillance on the one hand, and refers to the biometric method of iris recognition on the other. The silver ring is modelled on a camera lens. The eye has two levels: The lower one is a relief that shimmers greenish. A violet second eye lies over it.

On the other side, the human being is under the observation of a camera, as can be seen by the REC symbol and the superimposed running time 20:20. In the niobium, one of several human silhouettes has come to the fore. It seems to emanate from it small and large squares. These symbolize the personal data collected about a person.



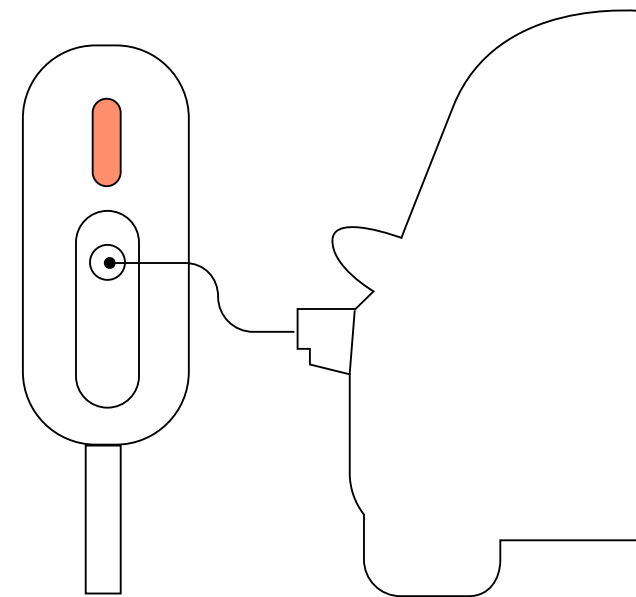


Time out for refueling and recharging

The electric motor whirs, and the driver's concentration wanes as the battery's charge declines. It is high time to combine business with pleasure: a cup of espresso for the driver, and a quick charge for the electric car.

But have you given some thought to where the electricity comes from? In contrast to gasoline or diesel, power is essentially readily available, almost anywhere and anytime. The trick is to "pump" the electricity in the right amount, with the correct adapter and, above all, as quickly as possible into the vehicle battery. Speediness is needed most notably when the driver is making a pit stop — at rest stops along highways or expressways. At the rapid charging station, this can turn into a load test for the power grid, especially when multiple vehicles are looking to get charged simultaneously with charging powers of 150 kW, or even as high as 250 kW. This is where Plansee's arcing contacts made of copper-chrome and tungsten-copper come in. The arcing contacts protect the network of the charging stations, making it possible to smoothly charge electric vehicles in the existing power grid.

With this, Plansee ensures that both the reenergized driver and the fully charged battery can get in gear again after a brief time out.



IMPRINT

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Virginia Beach, VA, USA

CONCEPT & DESIGN

jäger & jäger, Überlingen
jaegerundjaeger.de

PRODUCTION

Eberl Print GmbH,
Immenstadt
www.eberl.de

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