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TRANSFER

The Steinbeis Magazine

Thinking Laterally: Thinking Against the Flow

Feature Topic: Lateral Thinkers
Steinbeis experts and their experience with thinking about the radically new

Innovating Differently – New Angles on Technology Transfer
A look back at the kick-off of a new Steinbeis initiative

Standing Strong
Steinbeis experts develop cement-free casting compound for industrial floors

03 | 2017

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Dear Readers,

Dr. Petra Püchner

Beate Wittkopp

Dr. Petra Püchner is director of Steinbeis 2i GmbH and Beate Wittkopp heads the Steinbeis Transfer Center TransferWorks BW. Together, they have been working under the Steinbeis umbrella to launch an initiative called "The Other View on Innovating. Women in Technology Transfer". They are also the editors of a publication of the same name which has appeared in Steinbeis-Edition and provides insights into the activities of the successful female entrepreneurs in the Steinbeis Network.

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Society is subject to change and so is the world of work, driven by the increasing level of interconnectivity between processes, machine tools, and the content of production itself. This may facilitate lateral thinking and lateral vision, but only when networks transcend sectors of industry and areas of know-how, and only when key players are able and willing to step outside their traditional areas of expertise.

A key leitmotiv of Steinbeis in its pursuit of entrepreneurial technology transfer is to "transfer visions into business." It is thanks to visions of society and the future world of work that solutions are spotted – solutions that quite possibly do not exist yet, but are already conceivable, assuming we're willing to think laterally.
Lateral thinking is original, it takes us into new territory, and it allows people to make mental connections and have leaps in thought. Everything seems possible! Sometimes it's not known what the outcome will be. So it's important not to see the goalposts as a given, but rather to consciously choose alternative approaches. Compared to linear thinking, such lateral thinking is not always immediately understood or accepted. It's thinking against the flow.

So if we talk about the future, we don't just think in terms of trends and predictions that may well turn out not to be true. We think laterally. Thinking laterally makes it possible to invent and shape the future and to leverage new realms of technological feasibility, in order to create a world that is worth living in.
Other viewpoints stimulate business, even if at first they feel like they're slowing things down. Innovative leaps forward often happen by chance or when new or known technological developments are consciously thrown into the same melting pot. The art lies in ensuring that the other ingredients of this process are the needs and wishes of sometimes highly different target groups. A target group should not be seen as a uniform whole; instead differences within the group must be picked up on, which is also lateral thinking.
Radically lateral thinking always takes an ability to break down established patterns and processes. Creating space to think or dealing playfully with information also takes a certain degree of creativity. The arts and literature are sometimes a good source of inspiration, and fantasy can discharge a fountain of ideas for innovation.

In practice, the challenge in business is to make entrepreneurship, curiosity, and fantasy perfectly permissible and introduce new skill sets. When new ideas are lifted from differing playing fields of science, but are also discovered in fiction and linked together, this leads to new lateral value chains – with new players and a variety of expert fields.

This lateral creation is also the goal of a new initiative in the Steinbeis Network called "The Other View on Innovating". We want to remove the barriers between specialist fields by using different formats and opening new doors, thus laying new roads for transferring knowledge into the market. Having started with a book, which was first presented with a bang at an event at the State Gallery in Stuttgart, the next step will be to lift the lid on the transfer skills of women in the Steinbeis Network. These will be networked into new lateral value chains, which will encompass not just technology skills, but also creative competence and skills important in societal terms.

More courage is also needed in everyday business practice. It is not enough to fill rooms and whole stories of company buildings with new furniture and equip people with creative tools. It's important to allow people to think differently.

Allow us to engage in a lively and courageous exchange of ideas and shape the future creatively – a future that will be worth living in for us and for generations to come.

We hope you experience many new insights while reading this latest edition of TRANSFER: Add value and form links in the chain – LATERALLY!

Dr. Petra Püchner Beate Wittkopp

Full Steam Ahead or Time to Heave To? Uncertain Times for SMEs

The need to think laterally in order to bring about change

A situation we're probably all familiar with: A new project gets under way. At first, everything seems to be going fine and things are running smoothly. But sooner or later along comes the first stumbling block, slight problem, or minor catastrophe. No choice but to think again and set a new course. But this usually isn't the only minor catastrophe. Another spanner ends up in the works and the time to make that crucial final decision looms nearer. The author of this edition's Steinbeis Swipe!, Uwe Haug, sees two options in such situations. Either bite the bullet and go for it – come what may – or heave to quickly and stop dead in the water!

Unfortunately, for many companies there's actually no choice. Processes, next steps, binding delivery contracts have been put in place. Everything is signed and sealed, waiting to be delivered. Yes, but what if it's about more than actual projects? What if there's been a quick succession of huge changes in circumstances, if our entire business model needs to be questioned? What sort of shape are we in as a company in such situations? What should we do if that's the big challenge? Leave the sails up – keep the engine on? Not always the best thing to do. To make a technical analogy, the machinery might overheat and it could do more damage than good. And when you're going full steam ahead you miss important clues – warning signals and even no-entry signs. And then it comes, that inevitable moment when there's not enough draft under the boat – ten meters till you run aground.

Now heave to? Despite all the warnings, you ease the sails to stop and think? That takes courage, real determination, and a clear vision that actually, this will get you somewhere. If this is about a whole company, it's usually a longer process, but it's more balanced. Completely stopping would mean halting what's underway, but then going full steam ahead again as soon as something new comes along. So is it actually possible to do both?

What if neither were a feasible option? Imagine you're sitting in a train and you see something on the line ahead – something the train will collide with if it's going full speed. You can't see the emergency brake anywhere. There's no way back. There's absolutely no way to stop the train you're sitting on. Or as Jethro Tull once sang in Locomotive Breath: "Old Charlie stole the handle and the train it won't stop going, no way to slow down." What now? Jump off at full speed? Well, looks like we'll just have to remain a bit more agile, despite all the changes going on around us. Agility entails a lot of important factors: business models, co-workers, training, networks, and technologies.

So it's obvious what comes next: We'll need some lateral thinking; we'll have to look at everything from another angle and turn everything on its head. In our own minds, we'll have to heave to and shape a new course. This is when previous experience based on previous situations will be important, but by itself, it won't be enough. The problem is, as an individual business, making changes on this scale is usually extremely difficult. Our networks might help, but only to a certain extent. They're still "inside the box."

In the same way that the human brain seeks new ways to connect synapses after damage to the nervous system, it's time for us companies to develop an ability to remain proactive even with all the change going on around us.

From experience we know that this ability usually only develops under certain stress situations. So the challenge is to actively manage potential risk and know how to manage it. We need to be more involved and face up to things – and not just gather information. Of course there are always some factors that can be influenced (with proper planning). But if we're honest to ourselves, things are so much more volatile these days and this has an impact on our actions as a company. And things are getting worse, not better! Standing still (even if notionally) can therefore be a means of moving forward if it opens new doors and unveils new ways of doing things.

Without question, we have once again reached a turning point. But this time it won't be enough to simply appeal to people to think differently. We're quite simply confronted by the task of leading our companies through a revolution – nothing more, nothing less! And given the number of things that are changing at the moment, it will no longer be enough to keep doing what we've done until now and make yet another improvement – what we should be doing is throwing ourselves at change so we can be part of this change, to facilitate something new! Don't worry, there's always one or other option. But sticking your head in the sand or backing down isn't one of them.

Now, more than ever, it's down to every one of us. Decide for yourself.

Steinbeis Swipe! is a regular feature in Transfer Magazine in which an author takes a look at a specific topic and may even take a swipe – left, right, up, or down – along the lines of a critical commentary.

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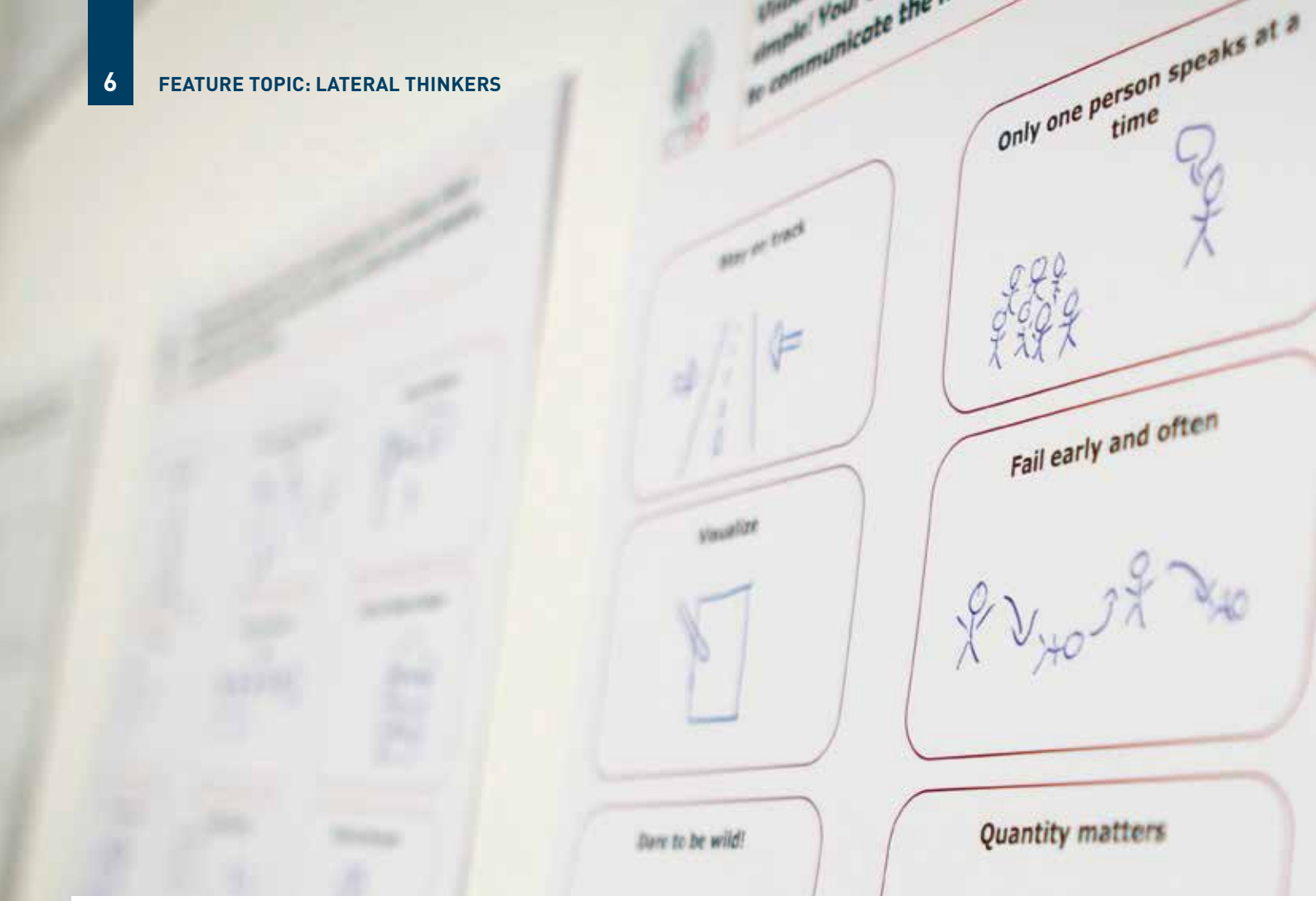
Feature Topic: Lateral Thinkers

Insights from Steinbeis experts

You can't pigeon-hole them and they make many feel uncomfortable. Lateral thinkers often have a really difficult time in the world of work – where people think rationally and in straight lines. Yet their potential can be invaluable to companies. But what or who is a lateral thinker? What attributes distinguish them from others? Steinbeis experts look at the answers to these and many other questions surrounding lateral thinkers. Stefan Odenbach, project manager at the Steinbeis Transfer Center Technology – Organization – Human Resources, examines the definition of a lateral thinker and delves into the role lateral thinking plays in the development of innovations. Marcel Reiner, who works at the Steinbeis Transfer Center Infothek, looks at a specific example and examines how MeetNow! uses the overlaps between the unconventional and the creative to come up with successful ideas. Jürgen R. Schmid, founder and managing director of Design Tech, provides some insights into the world of a lateral thinker. Dr. Andreas Crivellin, theoretical physicist at the Paul Scherrer Institute (PSI) in Villigen (Switzerland), discusses the status of knowledge of particle physics, explaining why unconventional thinking is crucial when researching the fundamental laws of nature. In an interview Professor Dr. Bernd Jörs, director of the Steinbeis Transfer Center for Online Marketing Engineering & Business Analytics and a professor in information economy and online marketing engineering at Darmstadt University of Applied Sciences, explains why to teach, university lecturers must think laterally. Alexandra Rudl (bwcon GmbH) outlines why business enterprises need a corporate culture that allows every individual to think laterally, make mistakes, and learn from them. Dr. Philipp Liedl, managing director of STASA Steinbeis Angewandte Systemanalyse GmbH, explains how interdisciplinary lateral thinking can help companies manage huge volumes of data. Dr. Petra Püchner (Managing Director, Steinbeis 2i GmbH) and her colleague Saskia Heyde believe strongly that lateral thinking cannot work without awareness for and inclusion of the views held by other groups of people in society.

Image: © Fotolia.com/ blobbotronic



Space for Lateral Thinkers

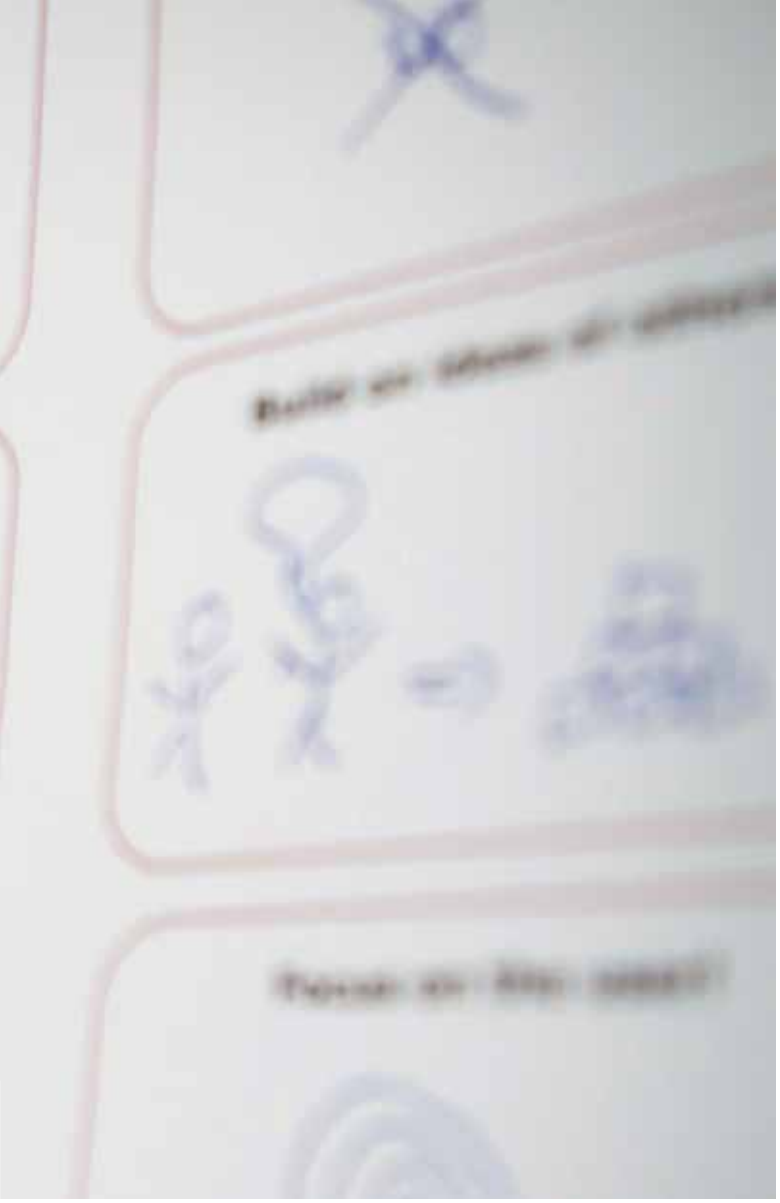
An appeal for more openness and agility

Nothing stays the way it is. That's the impression more and more established companies are getting, given trends such as digital transformation, globalization, and climate change. In a working world of increasing complexity, these trends are seen as an opportunity, but at the same time, they are also considered a threat. One thing most people agree on is that something has to change. But that will only be possible with the support of lateral thinkers and a corporate culture that actually allows people to think laterally. The Steinbeiser Alexandra Rudl (bwcon) has been putting some thought into the best setups for this to happen.

One thing most people agree on is that something has to change about the way products are developed – in shorter and shorter development cycles, focusing from the outset on customer requirements. But this also affects the actual culture of a company, moving it away from fixed hierarchies under management that "should know everything." As knowing everything is practically impossible anyway in complex, modern times, management is increasingly becoming everyone's responsibility. Ideally, every employee should be able to shape the fortunes of a company and actively contribute to safeguarding competitiveness by adding their own ideas.

Quick development cycles and the aforementioned aspects relating to agile corporate culture are only attainable, however, if we allow people to think laterally. This is not about quickly recruiting lateral thinkers, who are often now referred to as intrapreneurs, or relying on them to come up with some or other new, groundbreaking business model. Lateral thinkers can only unleash their creative potential if they are given enough leeway within a company culture, and the culture has to allow individuals to make a contribution. And, above all, should something go awry, this should have no negative consequences for them. This is because when we think laterally and something new comes out of this, there is no way of knowing if the result will be something successful. What this means is that the context within which we operate is one of uncertainty. Coping with this uncertainty and allowing it to exist is a challenge for any company, especially if it has done everything it can until now to keep everything in place and "safe and sound."

But what is the best way to engender such a culture? Well, the first difficulty has already been dealt with. Many companies are now becoming aware of the fact that they need to give people enough space and break down rigid company hierarchies. It's here that Alexandra Rudl is reminded of something somebody at an established manufacturer from Baden-Wuerttemberg once said to her, which went something along the lines of it "feeling like his employer had been playing it safe for decades." The company had a tremendous infrastructure, and management had been so convinced it was right for so long that nobody could possibly compete with it – not quickly. But now we have startups like Airbnb and Uber demonstrating how it's possible to completely conquer a market in next to no time – without a proper infrastructure. Knowing this has made people realize that you have to do something yourself before it's too late.



This pressure to do something is a matter Rudl and her team take seriously in their work for the "Baden-Württemberg: Connected" business network. Not only is it witnessing strong interest in collaborating with startups, there is also growing demand for innovation workshops, offering a chance to learn the methods used at startups and how agile software development works. These methods can be seen as a kind of guide to lateral thinking, since they radically question behavioral patterns and structures that were considered "correct" until now.

For instance, design thinking challenges people to work in teams that are as heterogeneous as possible, to let any idea go through at first, and to think "radically." Just one example of the sort of thing you will hear when people are applying design thinking is that the term "yes, but" is actually a good way to stifle an idea – instead, you should answer "Yes, and..." And then there is effectuation, which involves encouraging people not to do any planning in the early phases of innovation. According to effectuation logic, which stems from entrepreneurship research, when things are a bit hazy – for example when developing a disruptive innovation – we're wasting our time with planning. After all, it's not as if one can look backwards and search for the kind of reliable data people need to write a proper business plan. Without data, it's impossible to make any statements about the profitability of a concept in the early stages. As a result, with effectuation it is recommended that you simply get on with things in small steps, based on whatever is available at the time. The new project can be pulled together and made more tangible with business partners as you go along, instead of planning everything right from the beginning.

But what about management? Are managers just going to set off on a journey without knowing where they are headed or whether it will be worth it? That is not the sort of idea managers at established companies have readily signed on to in the past, so again, a certain ability to think laterally is required. In terms of methodological approaches that are required to do this, there is Management 3.0, a technique lifted from agile software development that makes management the task of everyone. Similar to effectuation, the focus does not lie in planning or predictability; instead, the idea is to continuously improve the company by enhancing working conditions, productivity, and employee satisfaction.

In the increasingly complex world of business, not just thinking laterally, but also making hierarchies more adaptable, allowing people to fail, and accepting uncertainty are all key ingredients if a company wants to remain competitive in the long term. Despite this, given all the buzzwords now creeping into business from the world of startups, established companies should not forget where their strengths lie and they should ensure that their own drive to bring about change remains a pivotal part of their strategy. The reason for this is that an established company isn't a startup – and it can't go back to being one, either. There are simply too many people at big companies, routine processes, know-how that has been accumulated over years, and the resources that go hand in hand with this. What's more important is to find a way to introduce more agile processes and openness as a fundamental part of the corporate culture – in ways that dovetail with existing company values and procedures, and in ways that are also inspired by startups and the methods they apply.

Alexandra Rudl is director of the Innovation Academy at bwcon GmbH. She is a certified Effectuation Coach and has undergone training in Management 3.0. Rudl and her team provide support to a broad variety of organizations with transformation processes and employee training. As an external innovation expert for the European Commission, she also evaluates research applications and business plans from the whole of Europe.

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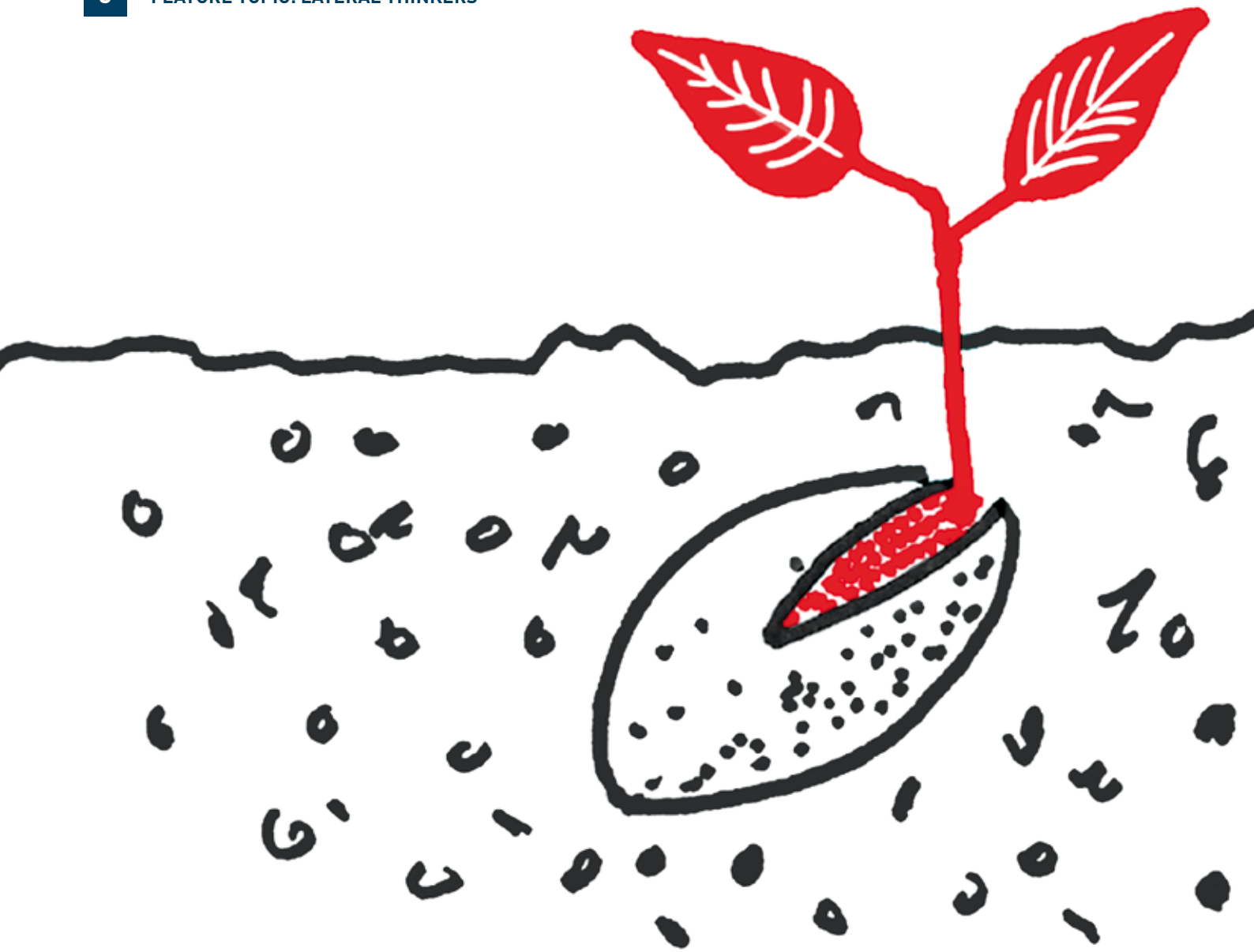

You Can Only Reap What You Sow

The thought processes of a lateral thinker

If Jürgen R. Schmid didn't always wear white shirts, he would have Individuality emblazoned in red letters on his chest. Sometimes it really isn't easy being a gentle rebel. A rebel who strives for freedom but at the same time always keeps everything under control. A rebel who prods, but does it respectfully. Coping with this individuality is also a major opportunity. How this works is explained by the founder and manager of the design company Design Tech, drawing on the example of a collaborative project with Heldele.

Every project begins with the brief – which is where the first danger lies: starting with the wrong task. The famous Italian car designer Giorgetto Giugiaro, who lent the Golf 1 its "look," once said that outcomes are a reflection of the task at hand. He makes it clear how important it is to define what needs to be done. Make the wrong assumptions, and the wrong things come out at the other end. Accept a brief is given and start working on it right away in keeping with some sort of guidelines, and you'll often end up working on the wrong things – even if you do your work properly. If we surround ourselves with people who simply accept orders, our partners become "extended workbenches" – skilled workers who know their stuff, but who won't necessary achieve the best results. Another thing that needs considering is an old way of looking at things: I once discovered through my own experience that the apparent task is just a starting point – a place to start thinking about certain topics. Clients pull together briefs for their tasks based on their own inside-out view of the world. But there are always so many more important ways to look at things. So you should never really start working on something until you know what the successful outcome would be in terms of solving the task. In practice, this is the exception for SMEs and mechanical engineering companies. I've noticed that almost all companies start working on something before they've even established what a successful outcome would be.

So even if people don't want to hear this: We need more "unsolvable" challenges. When I was approached by Heldele, they asked me about an electric charging station that looked good. If I'd taken that as my task before embarking on my work, I could have come up with thousands of options and picking the right one would have felt like a random choice

But even this problem was solved, thanks to courage and vision. Senior managers came along with their can-do spirit and stopped all the discussion: Everything should be miniaturized. At this point, the developers broke into a sweat because everyone knew solving that one would be an impossibility. Nonetheless, after six months the electronics of the charging station had indeed been crammed into a shoebox. What an amazing job they did at Heldele! Working with my industrial design team, at this stage of the project we spent a lot of time doing whatever we could to provide the engineers with support. But in fact, up until this point, we'd not spent a second thinking about the actual look or design of the Heldele project; we had no aesthetic concepts, because industrial design factors had not been part of the picture at the beginning of the project. Nonetheless, this step became our main contribution on the road to success. It was now about psychology, motivation, courage, visualization, creative processes…

In some ways this project was like many of the others we deal with on a day-to-day basis. The appealing product of our work is a welcome, appreciated "waste product" of a "process to success." First and foremost, at the beginning it's about working out the task and then focusing systematically on the slog and graft of getting things done. This is my general way of thinking and it always results in added value, with solutions that were inconceivable before the project. Not every outcome is that radical or spectacular. Often outcomes are opportunities that were uncovered by sifting through the detail and making optimizations. But in the end it's always a success that the team is proud of. And this lights the touchpaper for the next assignment.

based on personal preferences or the particular taste of the decision-maker. It was only after multiple rounds of discussion that we had examined all the possible "barriers to acceptance" – we worked out unknown possibilities and undisclosed opportunities that would eventually dictate success.

After digging deeper and conducting more intensive research, it became clear to us that the crux of the issue would not just be intuitive controls, but also integrating units into the surroundings of both an old city and a modern metropolis. This immediately highlighted a key sticking point: All of the electronics would need to be contained in a unit the size of one of those ticket machines you see next to parking lots. But I'd never seen a machine at a parking lot that blended in well with its surroundings. So the size of the unit would be critical. I made two suggestions: They would either have to put the electronics under the ground or cram everything into the size of a shoebox. Both options were met by the developers with understanding – but also disbelief. Understandable really, given that neither option looked in the slightest bit possible.

Image: © Design Tech

As Jürgen R. Schmid likes to tell people, design is a way of thinking. He is clearly right, judging by his successes – and not just the fact that he invented the world-famous mini cordless screwdriver. Schmid founded Design Tech in 1983 and the firm is now a leading international supplier of outcome-centric machine design.

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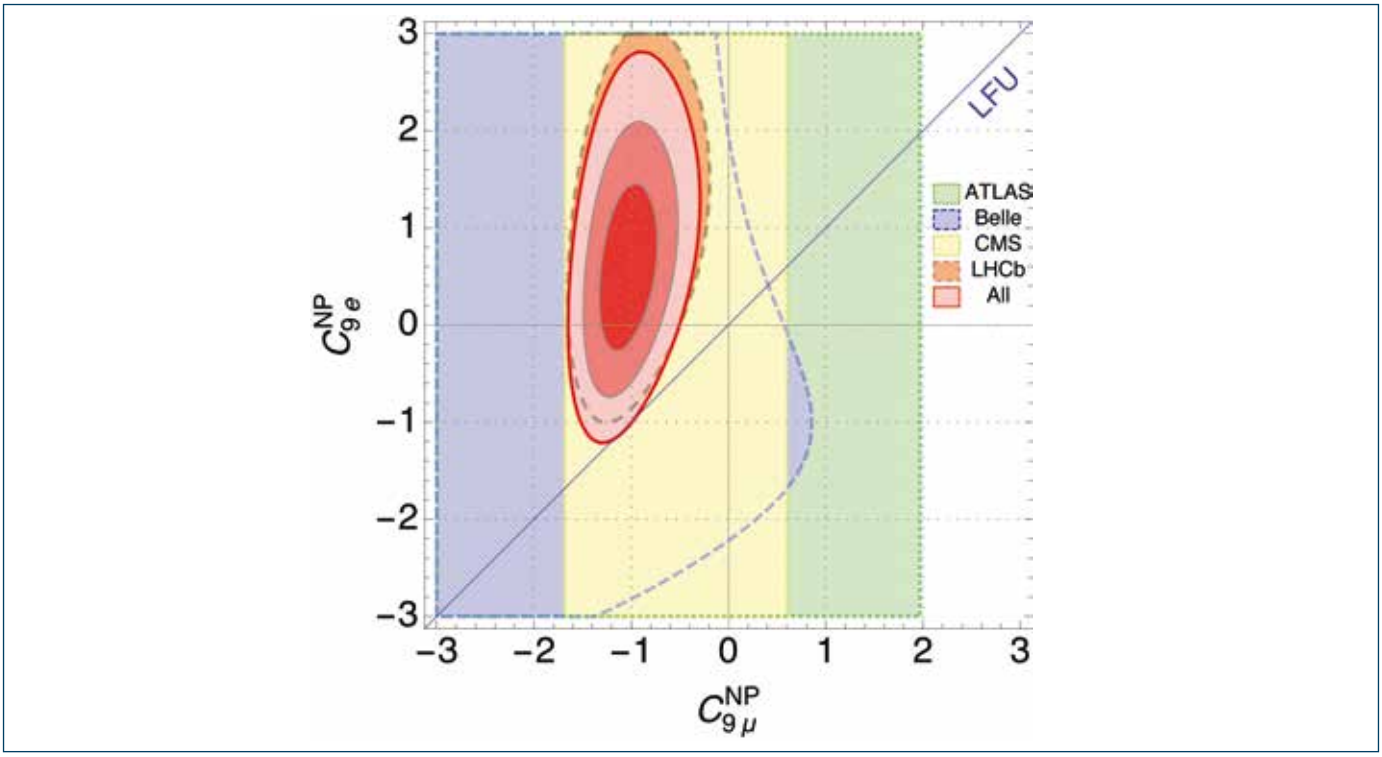

"You need a lot of perseverance and creativity, but also unconventional thinking to track down the fundamental laws of nature"

An interview with Dr. Andreas Crivellin, theoretical physicist at the Paul Scherrer Institute (PSI) in Villigen (Switzerland)

What are the typical questions theoretical particle physicists look at? What are their tools of the trade and how important are creativity and lateral thinking in theoretical physics? These and further questions were posed to Dr. Andreas Crivellin for TRANSFER by the Steinbeiser Ute Villing.

Hello, Dr. Crivellin, you deal with the mathematical description of the fundamental building blocks and interactions of matter. Can you briefly summarize the current state of knowledge?

The standard model (SM) of particle physics states that the matter all around us consists of fundamental building blocks and that interactions also originate from the exchange of particles. I'm sure you know the concept of atoms from school or university – that they consist of protons and neutrons in the nucleus and that they orbit around electrons, or rather there's a kind of cloud of electrons around them. There's a force holding the atoms together called electromagnetic interaction. As far as we can say today, the electrons really are fundamental particles and in terms of their mathematical description they're like little dots. Protons and neutrons on the other hand aren't elementary; they're composed of individual building blocks. These building blocks – quarks – are held together by powerful interaction, which has a somewhat surprising property: As the distances between particles increase, the interactions increase rather than decrease. As a result, you can't observe individual quarks, you can only indirectly deduce their existence.

The third and last interaction with the SM is a weak interaction which appears to be extremely exotic and only occurs in "everyday life" during radioactive decay. Last but not least, there is the famous Higgs boson particle, which was discovered in 2012 in the Large Hadron Collider (LHC) at CERN in Geneva. This particle not only lends mass to other elementary particles, it also gives itself mass.

So that's what's happening in terms of secured know-how in particle physics. But what questions does that leave open – the things people are still looking into?

Since the discovery of the Higgs boson – which is sadly and wrongly sometimes called the God Particle, even though it's just a particle – the SM of particle physics is now complete. We now have our eyes peeled for the existence of new, unknown particles, which are so heavy that they couldn't even be identified until now. Directly searching for these particles is the main remit of the LHC at CERN. But it's also possible to search indirectly for new particles using precision experimentation. The reason this is feasible is that Heisenberg's principle of uncertainty means that even heavy particles can be produced in a vacuum for a short

period of time and then they can be destroyed again. Such experiments are carried out at the PSI, among others. For example, lots – lots and lots – of muons are produced and measured as they disintegrate. Searching directly for heavy particles in the LHC hasn't unearthed any indication of their existence until now and most of the precision measurements that have been taken tally with the standard model. Despite this, some deviations have been noticed recently in B meson decay, which I find highly interesting.

What's the connection between your theoretical research and the experimentation that is going on at the moment?

I'm looking at the design of new theoretical models, which serve to extend the SM. These models include new particles which can be important for direct searches and indirect measurements. My role in this is to calculate the predictions for these models. In particular, I'm trying to develop models that can explain the aforementioned deviations in the decay of B mesons and any potential correlations with other possible measurements.

What structure does your research follow, and how important is creativity and unorthodox thinking?

In theoretical particle physics we mainly work in small groups, usually just two, three, or four people. I supervise a doctoral student at the PSI who I'm conducting research with. I'm also working with other scientists in a theory group at the PSI, though I do have lots of other contacts to physicists across the globe, some of which are quite close, and I do work such as writing publications with them. It's important in this respect to present your research findings at international conferences and talk in seminars at universities and research institutions. So I tend to travel a lot to keep my research network up to date and expand my scientific network.

With model-building, by which I mean designing models for new physics, creativity has an important role to play. Work's been going on in this area for decades and it's not easy coming up with new ideas that nobody's looked into yet. That said, perseverance is an extremely important attribute in this respect. You need it in research because of course not all models you think up actually work, so you have to be able to deal with setbacks. One thing you really have to stay focused on is that even if lots of models appear consistent, there's only one actually in place in nature, so there's very little likelihood of hitting the jackpot.

But unconventional thinking – i.e., exploring new territory – also has its benefits. For example, we've not found a single experimental indication of a model that can be described as interesting from a mathematical point of view and has already been extensively investigated in the past. There are also indications that there are models that most physicists would not consider "natural." Of course one has to adhere to "norms," in the sense that a model is not self-contradictory and that the calculations have to be right, but one thing I value about the area I work in is that people are generally quite open and tolerant – not just regarding new things and unorthodox concepts, but also when it comes to extraordinary people. Overall, it would be safe to say that you need a lot of perseverance and creativity, but also unconventional thinking to track down the fundamental laws of nature.

Image: The red ellipses show the preferred area where measurements combine. As the diagram indicates, there are no overlaps between this area and the origin of the coordinate system, which corresponds to the standard model value. The analysis therefore suggests the existence of a new kind of physics.
Source: Patterns of New Physics in $b \to s\ell^+\ell^-$ transitions in the light of recent data
Autoren: Bernat Capdevila, Andreas Crivellin, Sébastien Descotes-on, Joaquim Matias, Javier Virto

Dr. Andreas Crivellin

Ute Villing

Dr. Andreas Crivellin is a theoretical particle physicist at the Paul Scherrer Institute in Villigen (Switzerland). He studied at the Karlsruhe Institute of Technology (KIT) and currently works at the University of Bern and at the European Organization for Nuclear Research (CERN) in Geneva. Crivellin is currently looking at the mathematical description of the fundamental building blocks and interactions of matter. His particular area of expertise lies in expanding the standard model of particle physics, which involves investigating the influence of new and previously undiscovered particles on the decay of heavy mesons (quark bonding states). As part of his studies, Crivellin will be giving a talk on the topics touched on in this interview on January 29, 2018 in Rottweil.

Ute Villing is a project manager at the Steinbeis Transfer Institute Business School Alb-Schwarzwald, which belongs to Steinbeis University Berlin. The school has been offering management degree programs since 2004 with an emphasis on people already in employment (and future managers). The Steinbeis Enterprise also offers a selection of university-standard training courses and a variety of networking options.

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Translating Data into Knowledge

Lateral thinking on an interdisciplinary level can be helpful in managing floods of data

Terms such as Industry 4.0 (smart production) and big data are bandied around everywhere these days. Businesses are connecting up their production facilities, capturing data at every stage of the value chain, and even gathering increasing volumes of data on the purchasing behavior of their clients. But now that they have these huge volumes of data and information, what should they do with them? By applying methods and algorithms on an interdisciplinary level, firms can gain new insights into complex relationships and, step by step, improve their processes. How this can actually work in practice is being demonstrated by Dr. Philipp Liedl, Managing Director STASA Steinbeis Angewandte Systemanalyse GmbH.

These days, practically every business operates in what looks like a vast ocean of data. But which data is really useful? Which factors are really relevant and can be used to make reliable predictions about things to come? What is the best way to capture and analyze complex interrelationships in visual terms? What methods can be used to make predictions about future developments? And how can analyzing data help companies make better decisions regarding this strategy?

Many companies, particularly SMEs, feel uncertain about their chances of success with data analysis projects ("data science" initiatives), and this stops them even getting out of the starting blocks. The actual aims of such projects are often captured in nebulous descriptions or people simply do not even understand them. One problem is that managers are sometimes inexperienced, but they also lack the right vision regarding the doors data science projects could open to them, or how to make effective use of business data. Another issue with data is that it is often unstructured or has to be pulled together from different sources, so a first step would have to be to painstakingly prepare data. Also, these days analyzing data or implementing such projects is not part of everyday business, so resources have to be freed up and new priorities need to be set.

STASA Steinbeis Angewandte Systemanalyse GmbH has been tackling such issues for over 20 years. One of its strengths is its ability to think laterally, taking statistical methods originally developed and used in other fields and transferring them to new areas of application in order to come up with new ways to solve data science projects.

Often, using data analysis techniques or self-learning algorithms can result in even more questions than answers. For projects in this area to succeed, it makes sense to involve experts with an understanding of each field of application. This ensures there is sufficient transparency regarding the interplay and relationships between different factors.

Over the last couple of years, STASA has been developing examples of best practice and showing its clients in trade and industry, as well as public administration, how to implement projects, successfully analyze data, use modeling, or create forecasts. The aim of the Steinbeis Enterprise is always to work in close collaboration with its clients in order to take the specific idiosyncrasies of each area of application into account, as well as related solutions. This allows the Steinbeis experts to work on the data science projects for and with its clients in ways that ensure it is a win-win situation for everybody.

Using different data analysis and modeling instruments properly, including across different specialist areas, is a good way to unveil new opportunities to apply methods at an interdisciplinary level. One example of this is STASA QC software, which helps optimize machine phasing and quality forecasts in manufacturing processes. The software is based on self-learning and self-structuring models, and it works by drawing on the specialist knowledge of the user regarding a specific production process. It teaches itself how to work out different relationships by looking at correlations – either between the machine settings and sensor data (or process readings), or between the machine settings and different quality assurance measurements, machine cycle times, or energy requirements. The software is marketed worldwide by Kistler Instrumente AG from Winterthur in Switzerland. Kistler is a leading manufacturer of piezoelectric pressure sensors used to monitor processes found in plastic injection molding. Close collaboration with the company allows the know-how of STASA to flow successfully into new analytical functions offered by Kistler's hardware systems, as well as its software assistants.

Another example of successful application is a joint project with the Reutlingen-based institute Dr. Foerster GmbH & Co. KG. The project involved merging physical models and pattern recognition processes to develop an algorithm for automatically detecting unexploded bombs. The system examines data gathered from magnetic readings of large areas of land and determines the exact location, depth, and diameter of bombs. This was the sort of task previously carried out manually by experts involving huge time investments. By combining the team's algorithm with a filtering technique used in image processing, the area of technology application could be extended to archaeology. Now, even before investing major resources in digging up artifacts, objects can be quickly identified, despite the fact that – compared to unexploded bombs – archaeological artifacts tend to be bigger and thus more difficult to identify using magnetic fields. The project was awarded the 2011 Steinbeis Foundation Transfer Award – the Löhn Award.

STASA has also developed a tool called the Regional Change Monitor (RCM), which has succeeded in using population movements in local areas (people moving house) to understand the attractiveness of different regions and certain interrelationships, simply by processing data and making it more understandable. In a joint project with IW-Consult GmbH (a wholly owned subsidiary of the Cologne Institute for Economic Research), the Steinbeis Enterprise offers methods for analyzing the strengths and weaknesses of rural districts, cities, and communities, using this to derive recommended courses of action. The RCM is based on an established migration model developed by Weidlich and Haag. The model draws on a master equation that has been used for years in physics to understand statistical changes of state (Haag, G: Modelling with the Master Equation. Solution Methods and Applications in Social and Natural Sciences. Springer Publishing, 2017).

STASA has conducted a number of other successful interdisciplinary projects recognizing anomalies in time series, such as an evaluation of test bed data (condition monitoring), local population forecasting, assessment of regional indicators, analysis of key indicators used in the healthcare industry, and evaluations of traffic and locations.

With many projects, success is not just about gathering the large volumes of data. The ideal approach is often to take things slowly in small steps in order to work out the most effective way to spot interdependencies. This fuels new ideas regarding different options for using business data. Newly acquired knowledge can then be expanded step by step, adding more data sources to improve solutions. STASA uses its successful approach to generate new knowledge and thus add value for its customers. Maybe it's time for you or your business to do the same. Transform your data into knowledge. The STASA experts are lateral thinkers and happy to help.

Image: © fotolia.com/chombosan

Dr. Philipp Liedl is managing director of STASA Steinbeis Angewandte Systemanalyse GmbH. The aim of his enterprise is to introduce methods into business for systematically analyzing data. The focus of his work lies in data analysis itself, quality assurance, the optimization and control of production processes, and various projects related to urban and regional development, location analysis, and transportation development.

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The Myth about Lateral Thinkers: A Know-It-All or Real-Knower?!

Lateral thinking as a prerequisite for innovation

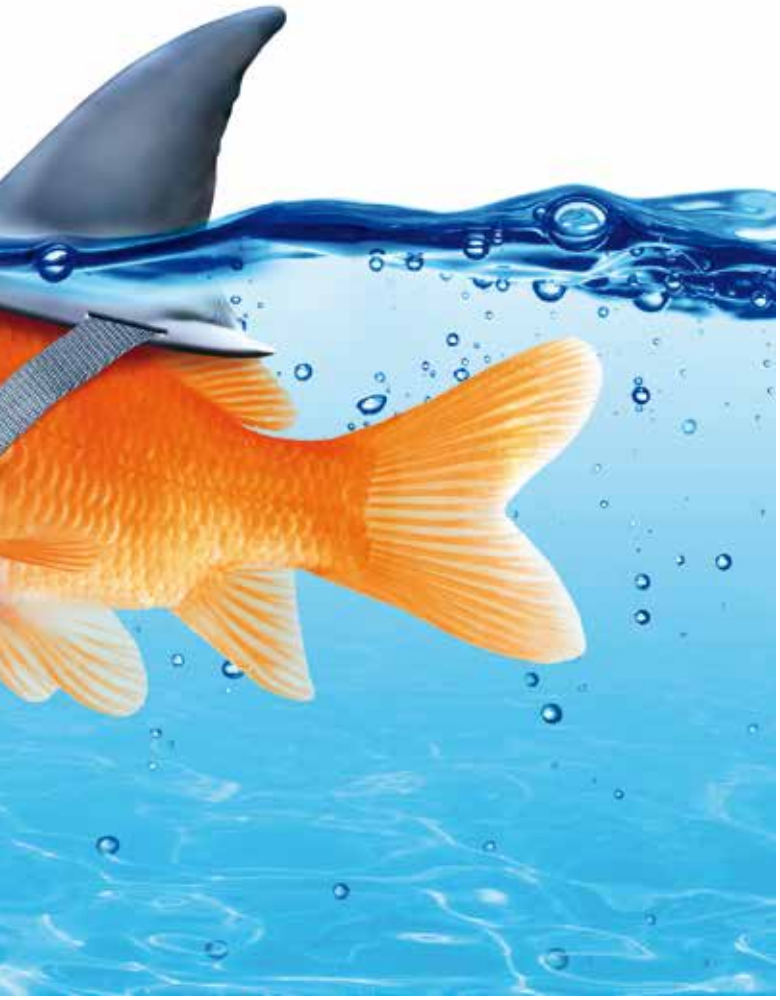
Magazines and blogs are good at proclaiming things like "The world needs more lateral thinkers." But is there a generally accepted definition of what a lateral thinker actually is, or does, or the things they should not do to call themselves a lateral thinker? Stefan Odenbach, a project manager at TOP, the Steinbeis Transfer Center for Technology – Organization – Human Resources, decided to delve deeper into the topic for TRANSFER.

If you ask Google what a lateral thinker is, it comes up with answers like "A person who solves problems with an indirect and creative approach." The lateral part of the term is an important part of the concept, as is underscored by the Latin origins of the word: latus, or side. So lateral thinking according to Wikipedia is an approach that deliberately moves aside from the standard perception of creativity as "vertical" logic. It finds ideas that may not be possible with traditional step-by-step logic. The term was promulgated as long ago as 1967 by Edward de Bono and has been used in a variety of publications ever since. In everyday language, lateral thinking is reflected in terms like "thinking outside the box." The opposite is vertical or linear thinking.

According to the common definition, lateral thinking is not necessary an ability possessed by a genius or hugely talented person, something enjoyed only by certain people. As such, it is therefore learnable. This also explains the growing number of courses for learning lateral thinking and the methodical – thus deliberately systematic – approach called Design Thinking. Whether uncreative people can really be transformed by this, is something you have to work out for yourself.

Well, that's the drab theory, but what is it like in reality on the front line of everyday business? The fact of the matter is, being able to think laterally is coming more and more into demand, and it even comes up in job interviews. For some jobs, it's considered a special skill or even a fundamental prerequisite that is seen as an asset (depending on the field or profession). The best example has to be Apple, which without doubt has to be the most innovative company of modern times; and sadly, the world has to have lost one of the best possible lateral thinkers when Steve Jobs passed away – much too early. As everyone knows, Apple only wants the best of the best: astute, analytical, quick-witted. When they interview people, some of the most remarkable, almost odd questions are asked. For example, if you apply as a product design engineer, you may be asked: "We have a cup of hot coffee and a small cold milk out of the fridge. The room temperature is in between these two. When should we add milk to coffee to get the coolest combination earliest (at the beginning, in the middle, or at the end)?"

So is a lateral thinker just someone who thinks they know everything, or do they actually know something the rest of us don't? If we look back



over time, we find that the best lateral thinkers in their area, such as Aristotle, Einstein, and Galileo, were often mocked and at first, their ingenious ideas did not go down too well. All too often, thinking laterally – even trailblazingly, questioning convention – could put life and limb at risk. Sometimes people only started praising the virtues of lateral thinkers when they were dead. In certain ways, things are no different nowadays. Even Steve Jobs sometimes had his difficulties and there are examples of other innovative startups that were initially either laughed at by the market, or they were consciously played down until they had a breakthrough (such as Uber and Airbnb). Other lateral thinkers like Elon Musk of Tesla Motors have a highly proactive approach to their own role as a lateral thinker and make heretic utterances like, "If a trend becomes obvious, you're too late!"

A lateral thinker is thus a highly self-confident person, sometimes self-centered or smug, and quite often they come across as arrogant. That's probably a good thing if you spend a lot of time in a lonely struggle against the initial stance of resistance adopted by your friends, co-workers, work superiors, customers, or market competitors. If we look through the resume of lateral thinkers, we often find they had lots of stopovers in different roles. The majority end up working for themselves, probably because rather than work at cross-purposes with people, you can only concentrate properly on your own ideas if you're your own boss. So lateral thinkers have not had it easy in their (working) lives and the typical corporate career is often impossible because of all the internal impediments. Let's be honest – if anything, lateral thinkers are one thing: "uncomfortable." They always question why things are the way they are, and they're always pushing to change things.

And that is precisely the lifeblood of innovation. If you're not able to engage in continual self-criticism when it comes to your own products, services, or thought patterns, if you're not able to consciously challenge things, you won't survive in the market in the long term. That's the way it's always been, since evolution continues relentlessly, and if you don't keep pace you're usually threatened with extinction. As a consequence, companies have to promote lateral thinking within their own ranks. Companies are not usually the best breeding ground for innovation, because they are often about standardizing procedures or mass production, and lateral thinking slows down cogs in the machinery. Big companies have recognized this and either set up their own startups (think tanks), or they have special creative departments working as staff functions somewhere outside the standard company hierarchy. This allows innovations to develop without restraint, feeding off the required budgets, in order to enter completely new markets. The best examples of this are Google and Facebook, who invest billions in totally new products and people. And judging by their success, they're doing the right thing. Lateral thinkers actually do know something: the Earth is round and it goes around the sun!

So we have a question for you: When should you add the milk to the coffee? We've all met this everyday problem and who has never burned their tongue on a hot drink? So how would you solve it? If you'd like to, you can send us your ideas via email or add a comment to this article by going to transfermagazin.steinbeis.de.

Image: © fotolia.com/Romolo Tavani

Stefan Odenbach is a project manager for digital transformation at the Steinbeis Transfer Center Technology – Organization – Human Resources. The Steinbeis Enterprise offers support with raising productivity and reducing costs within companies and organizations; business analysis, company assessments, business evaluations, and business restructuring; the management and financial monitoring of collaborative agreements, investments, and company divestments; the analysis, assessment, and implementation of training instruments; the analysis of management accounting instruments; the analysis of costing and process cost controls in companies and organizations.

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Heterogeneity: A Driver of Innovation

Equal opportunities in the energy technology sector

When women are closely involved in technical innovation processes, does this have any influence on the results and market success? This was the question looked at by the Steinbeis-Europa-Zentrum (SEZ) during a project financed by the German Ministry of Education and Research called GENergie. For the project, the SEZ interviewed both men and women working in science and academia, and in research and development. The findings were underpinned by insights gained through discussions with experts from Germany, Austria and Denmark. Dr. Petra Püchner and Saskia Heyde provide an outline of the findings to date.

When the American management consulting expert Tom Peters penned his book The Circle of Innovation in 1997, he dedicated an entire chapter to the topic of women and innovation. "It is the RIDICULOUSLY rare corporation that takes advantage of the WOMEN'S OPPORTUNITY. What a costly mistake," wrote Peters. Around fifty percent of consumers are female. Most family purchasing decisions are made by women.

Despite this, although there are a small number of exceptions, products and services are typically developed by men, from the initial idea to the design – especially if they are technical products. Little has changed as a result of Peters' book. Yet the target group of product users consists of both men and women. There were two key questions the Steinbeis-Europa-Zentrum posed for the GENergie project: Which specific parts of the innovation process are pertinent to which differences? What can be done to take heterogeneity and diversity into account?

Gender factors are not immediately apparent when conducting research. If you are looking at fuel cells or the development of new chemical fuels, it is not necessarily obvious that there may be gender influences. Despite this, as a number of examples such as mobility, buildings, urban planning, product development, and service planning demonstrate, gender issues do have a role to play.

The Gendered Innovation initiative started by Stanford University and the European Commission has already singled out the criteria that can make a difference to a research project, even at the beginning when defining any questions that will need addressing. This is because the approach adopted in research already defines the general direction, which can lead to heterogeneity and diversity being ignored and thus result in false assumptions. As an example like suburban travel shows, the target group is typically restricted to two types of people: people traveling to work and schoolchildren – the kinds of people who are moving around in the mor-

ning and evening rush hours. But Professor Inés Sánchez de Madariaga of the Technical University of Madrid examined local traffic flows from a different perspective and identified a user group of a similar size (at least), which tends to move around in networks. It mainly consists of women. Within this group, journeys to work are linked to shopping trips and running errands for the family. This places completely different demands on local transportation networks. Travel is not about getting as quickly as possible from A to B; it is about the most convenient way to get quickly from A to B while taking in connections to C and D, even taking children and older passengers along on the journey at the same time.

User behavior and demand are thus different things, as can also be seen by looking at the use of energy solutions. A study looking at the usage instructions for rectifying faults in a pellet heating system showed that most women in a household find the described procedures incomprehensible. This may also apply to men, but they tend to use trial and error to work out the solution. Understandable instructions and user-friendly design thus play an extremely important role in reaching out to all kinds of users. Another study conducted by the Danish company Danfoss looked at the user-friendliness of air conditioning controls in domestic environments. It showed that the design of equipment overlooked women, children, older people, and teachers in classrooms. As a result, the authors recommended basing the design more closely on users and their requirements in order to significantly raise acceptance and thus ensure equipment is used properly.

The mere fact that an innovation team made up of men and women is sitting together does not guarantee that other perspectives are included and examined in the approaches. Getting men and women to work together in an innovation team is just the starting point – similar to considerations such as different cultures and age groups. But another crucial factor is awareness – encouraging people to think about the possible criteria and impacts of innovation projects with respect to different social clusters, for example women and men.

When it comes to education and training in the energy sector, it is important to identify potential jobs in their entire thematic range if women are to be recruited for energy technology. For example, it should be shown that energy is closely linked to sustainability, the environment, climate protection, and the shape of things to come – topics that are of interest to many women. The course content of degrees should also be made more tangible by including examples of applications. By consciously targeting women on all levels of management, this sector of industry can be made attractive to more women and this would also be good for its overall image.

Image: Closing conference of the project in Stuttgart. February 8, 2017 © Burkhardt-Mayer Photography

The Gender in Energy Technology project (GENergie) was sponsored by the Federal Ministry of Education and Research for 15 months. The project involved two key areas of action: the involvement of both genders in research, innovation, and decision-making in the energy industry; and the role played by gender as an intrinsic aspect of research and innovation projects. Three workshops were organized with a closing conference to discuss different studies and examples of good practice, and continual emphasis was placed on critical assessment of existing structures and any underlying conditions. The project showed that gender issues are an important factor in innovation. The results of the project were published in a German paper called GENergie – equal opportunities in energy technology, which was edited by the Steinbeis-Europa-Zentrum. For more information, go to the website: www.genergietechnik.eu.

Women4Energy – 5th International Conference on Dec 6, 2017 in Stuttgart

The Women4Energy network (the European Network of Women for Innovative Energy Solutions) was set up by the Steinbeis-Europa-Zentrum (SEZ) in 2012. The aim of the network is to provide a platform for women to exchange ideas and information, to promote training and knowledge-sharing, and to raise the profile of women. The SEZ organized and ran the 4th International Women4Energy Conference in Stuttgart in November 2016, focusing on low-carbon economies. Around 80 people attended the event. The 5th conference will take place in Stuttgart on December 6, 2017. For more information, go to the website: http://www.women4energy.eu.

Dr. Petra Püchner

Saskia Heyde

Dr. Petra Püchner is a managing director of Steinbeis 2i GmbH, where Saskia Heyde works as a project manager. Steinbeis 2i works in the field of innovation and internationalization and is a partner in the Enterprise Europe Network of the European Commission, which currently involves 600 partner organizations in over 50 countries. The aim of the network is to provide support to companies on all issues relating to business in Europe, innovation, research, and technology transfer. It also helps firms exploit the findings of European research. Steinbeis 2i is a partner in the Baden-Wuerttemberg consortium and works in collaboration with the manual trades association Handwerk International, bw-i, the Ministry for Economic Affairs, and six chambers of industry and commerce.

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"You teach people, not subjects"

An interview with Professor Dr. Bernd Jörs, director of the Steinbeis Transfer Center for Online Marketing Engineering & Business Analytics and an information economy and online marketing engineering professor at Darmstadt University of Applied Sciences

Do university lecturers have to be lateral thinkers? How much "lateral infuence" does a university need between the degrees it offers and business practice? And how is people's understanding of the role played by university teaching staff changing in times of digital transformation? TRANSFER spoke to Professor Dr. Bernd Jörs about these questions, as well as the relaunch university lecturing is currently undergoing.

Hello, Professor Jörs, can we start by asking what you think makes a good lateral thinker? In fact, would you consider yourself a lateral thinker?

I sometimes get the impression that lateral thinking has something threatening about it in Germany – it's even seen as arrogant or "like being a know-all." But for me lateral thinkers are a really important scientific institution or really important scientific people; far as my processes of scientific discovery are concerned, they provide me with important ideas – necessary ideas, other ways of looking at things. I think it's that function that makes someone a lateral thinker. As a university lecturer, one of the big reasons I have respect for the ability to think laterally is that I'm a believer in the critical-rational scientific views of Karl R. Popper, so I always want to eradicate wrong thinking or misguided thinking when looking for an answer. It's why I'm so pleased when I recognize an error in reasoning or weaknesses in a theory – I don't have to hold onto things dogmatically, so I can see that this shifting recognition will stand the test of time. In the specialist area I work in, which is data-driven online marketing engineering, we're also crying out for more debate with lateral thinkers, because of the rate of change. In this area, dogma would be like opening the door to deadlock. What should define a lateral thinker is being relaxed, laughing about things, standing above things, not expecting to be able to sell the subjective search for truth as some sort of objective, ultimate, irrefutable legitimacy – and not demanding it. The way I see it, the best way to attract young students to a subject or discipline, and even inspire them in a topic, is to play devil's advocate and challenge them to engage in a bit of lateral thinking as early as possible. If people can be open to this understanding of science, if people can continuously challenge their own position and methods, if people can acquire empathy – for the good of the audience – those are already some of the prerequisites you need for lateral thinking. But just being or wanting to be a lateral thinker isn't enough. If you're a lateral thinker you have to constantly challenge your own lateral thinking and make humility one of its important ingredients of lateral thinking, especially if you're a Socratic, who should know the limitations of his or her own knowledge. If you adhere to this, you can say you're a lateral thinker.

Unicum Beruf career magazine ran a competition and you were named Professor Of The Year 2016 in the humanities, social, and cultural science category. Clearly your positive "lateral influence" between studying and practice, and between the university and companies, had something to do with this. Is this lateral influence intentional or was it just luck?

When we're teaching at a university, something I think you can't emphasize enough is that we bear responsibility toward the young generation and increasingly even for the alumni and their prospective careers. Something we have to keep reminding ourselves is that we're there for those people, not the other way around. Given all the discussion at the moment about digital transformation in the workplace, and the predictions being made about impacts on the world of employment, there's virtually an obligation to take responsibility for the future and engage in early

conversation about the requirements this all entails regarding young people's qualifications. This is where the onus is on university lecturing to open doors to talented individuals as they jump on the career ladder, by anticipating probable qualifications and, more than anything, by actively involving and working with business – early!

The fact of the matter is, business practice is becoming more scientific and at the same time, academic qualifications are focusing more on business practice. But conversely, businesses need to be kept up to speed with the quality of qualifications so they can make a realistic assessment of the actual skills of graduates. This is why it's crucial that university lecturers improve their ability to actively keep business informed. The ball is in the court of the universities and lecturers, whose job has to be to pave the way for the graduates' careers and take responsibility as agents of education and talent. The challenge is to lay foundations for a vision, which is a lifelong partnership of learning and instruction. These are just some of the reasons why the lateral influence was no mere coincidence but was entirely intentional, for reasons of self-development but also for the good of students and business. I believe Steinbeis adheres to this approach in many areas. And I'd love to inject life into these plans with corresponding activities.

So you're closely involved in relaunching the profession of university lecturers. Why's that so important to you? Is lateral thinking a must in this respect?

When you've been working in university lecturing for more than 30 years, you learn a pretty important thing: "You teach people, not subjects." If you decide to go into this area of lecturing you need to be totally clear about the fact that you have young people in the target or age group sitting in front of you. So you need to be clear about your attitude: I enjoy teaching and I like these young people aged between 18 and 27. The way I see it, this emotional connection to young people and talents is a decisive prerequisite for working in this profession. I started pricking my ears up when I noticed that there's growing alienation between the universities, the lecturers, and the students. I started to notice more and more despondent lecturers, who were frustrated and swallowing their disaffection with the lecturing they were doing, absconding to do "ivory-tower research" resulting in meaningless, unread, and never-cited publications. I think relaunching university lecturing is crucial in this kind of situation. In fact it's unavoidable – something has to be done about the extremely higher number of people breaking off with their studies; these people are often disorientated, they need inspiring by "lighting the fire" with empathy and sympathy. But unfortunately, the number of lectures that light fires is going down continuously. My usual phrase is "We're there for the students, not the other way around," but most people think it's mischievous and even mock it. People sit back because they're in the majority; committees are safe places. Well if you want to come at it from that angle, I'm a lateral thinker on that front, too. I think the university lecturing profession needs to look at itself in a different way. This also means lecturing has to valued more, so we need more recognition for the large number of evidence-based insights in university education and all of the neuro-biological insights stemming from teaching science; we need more stringent checks during admission to the profession (based on didactic aptitude testing); we need more acceptance of the proven and incredibly important role played by lecturers in successful teaching outcomes; we need to find alternative occupation options for despondent lecturers. If we're not willing to do this, students will increasingly see the learning opportunities offered by YouTube or MOOCs as an alternative to the poor and incompetent university lecturers who've passed their use-by dates in university teaching. There'll be more and more empty lecture rooms. Is that what we want?

To secure its own future, a profession has to keep moving forward. How do you think somebody should see their role if they feel a calling to the profession, especially if they want to provide people with training for the next decade and it has to be academically sound, as part of a degree?

We have to do everything we can if we want to stay "on the ball" as university lecturers, in terms of both specialist knowledge and multidisciplinarity. Working with business enterprises and other institutions will be crucial for our survival. From a scientific standpoint, traditional theories, methods, and patterns of thought are virtually being lifted out of their hinges in many areas at the moment, so lateral-thinking "people with a calling" are needed – who are willing to question methods and think outside the box of their own disciplines. This is why I'm all for "lateral-thinker communities" pulling together people from lots of different specialties – to break down traditional university compartmentalization, which puts everything in specialist departments. It would also be useful for lateral thinking if people could be attracted to university teaching by offering more part-time professorships. We need to find ways to appoint people so that they can spend 50% of their working week at the university and 50% of their time in business. But to do justice to the aspect of "passionate teaching" – an understanding of teaching that places the emphasis on taking responsibility for teaching and the learning success of the young people, that encourages them to adopt a critical and rational approach, and above all engenders self-confidence in graduates, so that they remain curious throughout their lives – the university teaching profession needs a relaunch. This is because successful learning primarily involves authenticity on behalf of the teacher – a winning attitude that revolves around successful learning.

Image: © istockphoto.com/alphaspirit

Professor Dr. Bernd Jörs is director of the Steinbeis Transfer Center for Online Marketing Engineering & Business Analytics. The services offered by the Steinbeis Enterprise range from research and consulting projects to continuing professional development programs in the interdisciplinary field of online marketing engineering, business analytics, and business and financial data engineering.

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From Four to One

Add creativity to the unconventional and the result is success

A recent Steinbeis project has shown the best way to manage technology transfer in business and how to make a success out of projects through systematic cooperation. For the project, four different parties were brought together, one of whom was Infothek, the Steinbeis Transfer Center from Villingen-Schwenningen. The initiative resulted in productive synergies that paved the way for the successful implementation of an innovation project.

As Michael Krieger, managing director of the Albstadt-based company MeetNow! announced at the beginning of the project, "This holds huge potential." His company has devised a platform-independent software development kit called Avian®, which safeguards the security and simple connection of smart products and apps used through the cloud. It does this by functioning as an authentication system. The solutions make it possible to start using smart products more safely and more easily than previously, and Avian® fully addresses EU directives dictating security and data protection. One particular feature of the platform is the encryption it applies to individual components, which ensures that even if a security loophole is exploited, only one device would be affected and not the overall installation. Given the growing threat posed by cyber criminals, the importance of Avian® is set to increase.

Despite this, the actual potential offered by using the new product was not immediately evident. It was only as the innovation processes unfurled that the full picture became apparent. Although the MeetNow! solution had major commercial potential and the company had a sufficiently broad skills base, the founders and company directors felt it would be necessary to speak to the experts at the Infothek Steinbeis Transfer Center to exploit the full potential of the product, think beyond the horizon, and come up with new ideas. After a number of constructive rounds of discussion with Steinbeis director Wolfgang Müller, the two parties immediately uncovered some useful synergies. "When Mr. Krieger outlined the idea behind the project, or rather the benefit, I started homing in on ideas in different areas. I immediately wondered why MeetNow! wasn't using the innovation itself and wanted instead to focus on making it accessible to other companies. This thought grew stronger when we conducted the market analysis and examined the potential, which my team carried out for MeetNow! as part of a funding project called go inno. The things we discovered led to a completely spontaneous question regarding the strategy. I felt that the innovation would be a good fit with the company's own value chain activities," explains Wolfgang Müller. Steinbeis's partner is still grateful for the idea: "Hearing that was incredibly important to me. If all the arguments stack up, I'm more than willing to change my thinking and adapt plans – and that's exactly what happened. Talking to Steinbeis was definitely a major boon for us," says Michael Krieger.

One thing everyone involved in the project is absolutely clear about is that a well thought-through idea offering plenty of potential, plus all the meetings to check and query long-term success in a highly innovative sector of industry, are not necessarily enough by themselves. As a result, another key player was brought on board: Ruckh, a patent attorney from the city of Bad Boll near Göppingen. Wolfgang Müller is convinced that the idea needs protection and some creative thinking will need to be added to the project to make it a success in the long term. Seeing patent protection as the starting point for further innovation processes is by no means the conventional approach with such a project. Whether Müller could therefore be considered a lateral thinker

remains to be seen. He describes it like this: "The unconventional and the alternative are part and parcel of every innovation, because innovation presents you with something that's different compared to what exists now – so thinking beyond or even contrary to the trodden path is an effective way to realize an innovation and success." Krieger is highly familiar with the IT industry and underscores the connection between the unconventional and innovation: "There are lots of highly technical gimmicks in our market now. To differentiate yourself from the competition, it's particularly important to think laterally."

The fact that the creative and unconventional could become something conventional and emerge as a success has very much to do with the strong know-how of one other party involved in the project: the Reutlingen Chamber of Commerce (IHK), which organized a special event called a contact forum. Describing the value added by his organization and his conviction regarding the networking event, Dr. Stefan Engelhard, manager of innovation and environmental issues at the Reutlingen IHK says, "There's no exchange of ideas without contacts and there's no knowledge network without an exchange of ideas." Trust is a key factor in this process, and trust can only be engendered through personal contacts.

Summarizing the outcome of the project, Krieger says: "There were four parties, but one goal: success. Even during the exchange process within our knowledge network, everyone was open regarding the outcome – which we all benefited from. If you enjoy success with others, you learn from each other – and that's what we did." Müller agrees entirely: "All four parties knew how to play to their strengths at all stages of the project. If there were differences in opinion, the winning argument was what mattered. Everyone was prepared to delegate responsibility if one of the other network partners was in a better position to provide a competent answer. The result was four times know-how making one success."

Beyond the specific subject matter of the successful project, the actual processes the project went through led to a number of important insights, which are generally applicable to a variety of planned initiatives. First, an innovation process can only be managed by a single party (the company) under certain circumstances. To steer an innovation project successfully, it is usually important to organize cooperation into some kind of network. This is because aspects such as technology, law, and the market are highly complex. This necessitates the involvement of specialists who are familiar with the processes in each individual area, people who can coordinate processes professionally, tap into their knowledge networks, and (if required) give constructive criticism to the people with the idea – with an open mind, especially when it comes to the outcome. Involving a variety of players is about as close as it gets to looking at an innovation objectively. If the party with the idea or others involved in the alliance misjudge things, this can be pinpointed early and dealt with accordingly before there are any significant financial impacts. Successful innovation processes require different competences to be channeled, even if know-how can vary according to the industry, region, or size of the business involved in the project. As a result, it is not possible to define universally applicable milestones. It is however necessary and entirely possible to pool the specific know-how required for a project in a kind of network, and this helps systematically reduce the increasing level of complexity experienced with innovation projects, which is advantageous when it comes to successful outcomes. The general formula for this is: From X to 1. Taking MeetNow! as an example, which can provide inspiration for other innovation processes coordinated through a network, this formula would therefore be expressed as: From Four to One.

Image: © MeetNow! GmbH

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Innovating Differently – New Angles on Technology Transfer

A look back at a kick-off Steinbeis event at the State Gallery in Stuttgart

With its high columns, the room chosen at the State Gallery in Stuttgart could not have been a better setting for the first staging of the new Steinbeis initiative, which goes by the name "The Other View on Innovating." Every seat at the event was occupied. The two initiators of the event, Dr. Petra Püchner and Beate Wittkopp, demonstrated many ways to dare to be different. This was not only reinforced by their recent book, which was brought out to coincide with the event, but also by its authors and the audience in the interactive discussion groups.

"The Other View on Innovating. Women in Technology Transfer" was jointly written by 17 women from the Steinbeis Network and the Steinbeis Board of Trustees, who shared their insights and expertise on the innovation processes of technology transfer. The topics dealt with in the book reflect the breadth of know-how offered by women in the Steinbeis Network, from technological fields like new materials, material recycling, resource management, and electric vehicles, to issues such as entrepreneurship, innovation processes, company cultures, and the digitalization challenges faced by companies. The book was published by Steinbeis-Edition to coincide with the initiative started by Steinbeis.

The editors developed a special new format for the event called a Fish Bowl Quartet. A topical, lively, and varied discussion arose in the antique Column Hall at the State Gallery, with plenty of differing angles not only on innovation, but also on the actual opportunities and approaches of women in technology transfer. "We need new processes in knowledge-sharing. Innovations shouldn't be looked at from a research angle but from the standpoint of application and societal significance. Of course that also means the needs and user behavior of women also play a role. If we involve that more closely in the innovation process, we'll have a broader spectrum of innovations to show for it in the future," highlighted Dr. Petra Püchner (Steinbeis 2i). The event was not without its controversial moments, also looking at skills and responsibilities and how relevant these are in the everyday tasks of innovation projects, as well as the impacts and opportunities of digital transformation. Beate Wittkopp (Steinbeis Transfer Centre TransferWorks BW): "The interfaces are becoming more and more important and things are moving faster, reinforced by digital transformation and the increasing level of convergence between industries. The gaps in between thrive on a strong culture of lateral thinking. It's exactly here that the traditional borders between specialist fields and organizations have to be crossed – people have to be open to 'inter-action' with new kinds of people, functions, qualifications, skills, and cultures." Drawing on their experiences and expertise, the participants in the discussion offered many different opinions and engaged in a sometimes critical discussion of the differences. As a result, one of the key areas of output of the kick-off event soon

emerged: More needs to be done to highlight the skills and working methods of women in the Steinbeis Network, plus the role played by different perspectives. As everyone in the group agreed, the diversity this would foster is a valuable factor in innovation and combined with the people from the network, this would generate added value.

Even before the day, the editors received feedback on the publication and the event, and this was highly motivating – and all the more so after the feedback from the participants at the kick-off event. The new book is available through normal outlets and Steinbeis-Edition. It deliberately catches the eye, using colors to signal the way women see themselves as key players in innovation.

The aim of the publication is to provide initial insights into the diversity of skills offered by women in the Steinbeis Network, although it is just one of the many windows to the house of Steinbeis. Many other areas of expertise are represented by women in the Steinbeis Network, and these should be made more visible and lead to other networking opportunities. Building on the ideas that emerged at the event, the initiators plan as a next step to join forces with any other women at Steinbeis who may be interested in setting up a competence platform, and thus provide ways to exchange ideas and collaborate on new business models.

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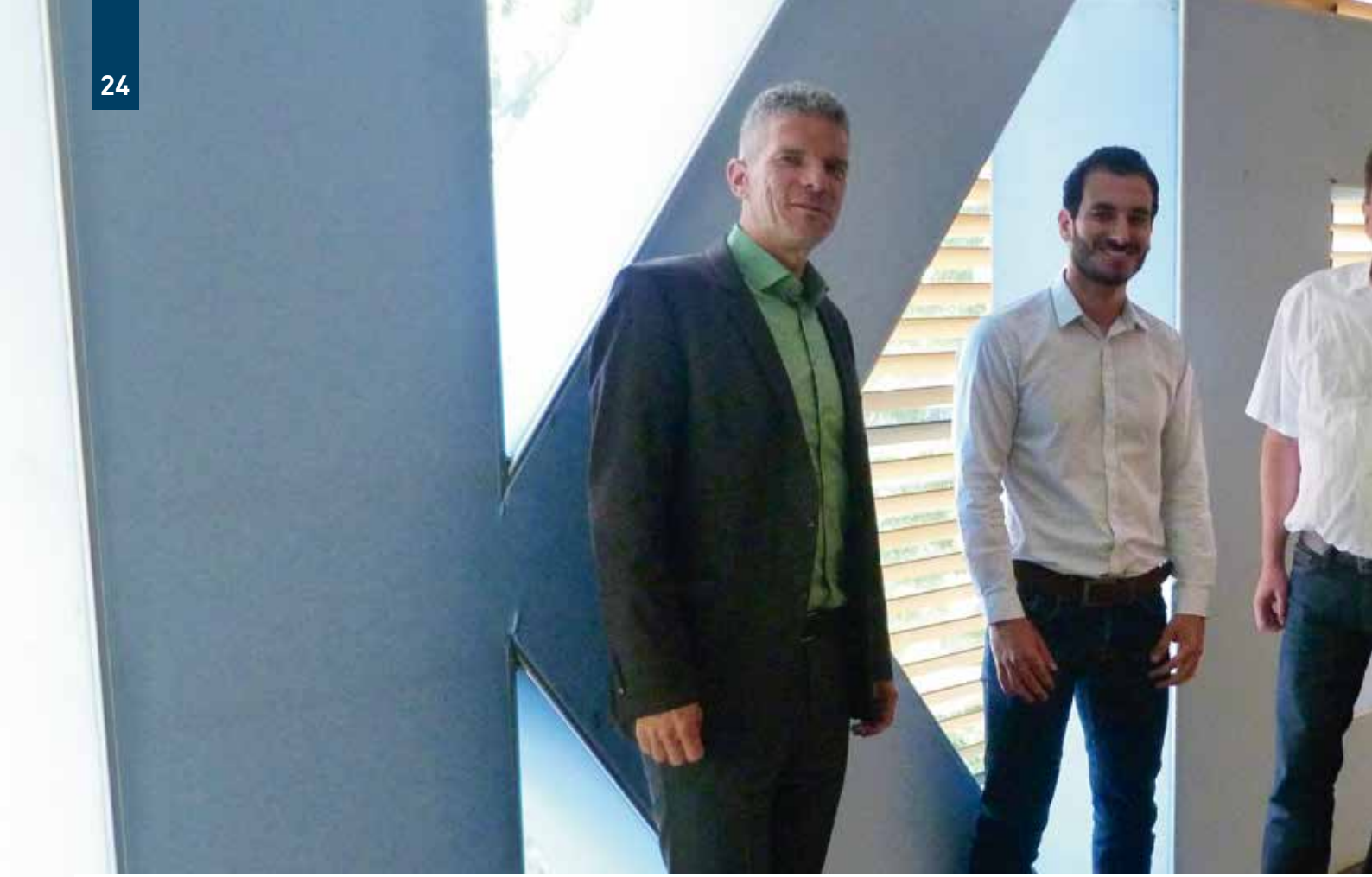

The Steinbeis Perspective Program: A Win-Win Situation for Participants and Companies

The Steinbeis University program provides support with the integration of refugees in the German employment market

Marwan Shaaban is 26. In the summer of 2015 he fled his home in Syria and came to Germany. Now, two years later, the construction engineer with sought-after qualifications is working for LBBW Immobilien Kommunalentwicklung GmbH (LBBW KE), a subsidiary of the state bank Landesbank Baden-Wuerttemberg. The arrangement was lined up through a program Shaaban was involved in at the School of International Business and Entrepreneurship (SIBE), which belongs to Steinbeis University Berlin. By the end of the program, he will have completed a management degree in parallel to his time in employment. In an interview with TRANSFER, the young engineer, Martin Riedißer (Managing Director of LBBW KE), and Heiko Richter (senior project manager and Shaaban's boss) talk about their positive experience with the joint project.

Hello, Mr. Riedißer, could you tell us what led to your company deciding to take on a refugee and what factors the decision was based on?

Riedißer: We heard about the interesting program offered by SIBE and wanted to provide an opportunity to a refugee. There was an applicants' day in Herrenberg and for us, there were five candidates in the running; Mr. Shaaban had already been our favorite. One factor that was also important was that hiring people is becoming increasingly difficult, especially in technical areas. Mr. Shaaban has studied construction engineering and we find it difficult to inspire construction engineers to come and work for us because our niche is not very well known among construction engineers. Also the construction industry simply pays higher salaries! So for us it was good to be able to take on a young person who can grow into the local government consulting business. So it's a win-win situation for both parties.

One essential point that needed clarifying beforehand was how to communicate. In urban development, everything is immersed in the local language and goes hand in hand with the culture. So it was important to be clear about how somebody who is now completely removed from his home country could be integrated into the processes. We now want to send out a signal about our positive experiences. In essence this can work for any company!

Turning to you, Mr. Shaaban, you've now been on board at LBBW KE for half a year. What are you working on right now?

Shaaban: My brief is to look at the success factors of large-scale projects such as the Bahnstadt development in Heidelberg or projects in Bad Kreuznach and Freiburg. I'm analyzing the parameters that dictate success for a major construction project. I'm also involved in the day-to-day business, carrying out research for project planning, checking calculations, and lots of other things. We need the right factors to be in place for every project in order to make the right decisions. This is important for successful projects. I'm so happy that I'm able to work on something this big – it's the sort of thing I dreamed about as a child.

Richter: One project we've involved Mr. Shaaban in is the big Bahnstadt development in Heidelberg. They're building a completely new city district for Heidelberg called Bahnstadt on the site of the old freight depot. Everything an urban district needs is being put in place on an area measuring 120 hectares. So there'll be apartments, places to work, a movie theater, maybe even shopping centers. This involves carrying out the urban planning; we're putting the local public infrastructure in place, and we're talking with investors. This is where Mr. Shaaban's master's thesis comes in, which forms part of his degree at the School of International Business and Entrepreneurship (SIBE) at Steinbeis University. The aim is also for Mr. Shaaban to get to know our bread-and-butter business, so this will involve a smaller project developing a two-hectare plot of land in the Black Forest.

Riedißer: For us, the success of the project hinges on things such as whether the development goes down well with people, or whether people really want to live in Bahnstadt in Heidelberg. Of course it's also important to us that a major project like this is successful, or in other words that we can work on it and make a profit. So that's a factor that Mr. Shaaban will also need to take a look at. For his degree project, he's developing a system for working out the success factors of large-scale projects.

Richter: Hey Mr. Shaaban, you know we can't wait to see the ideas you come up with!

Another question for Mr. Shaaban: What made you decide in favor of doing the SIBE program?

Shaaban: I've wanted to work since the first day I arrived in Germany and I was always looking out for opportunities. The SIBE program, which allows you to work and study as part of an English-language master's program, addressed all of the important factors for me and fulfilled all the key requirements.

Richter: We're consciously pushing the model to inspire people to work for us. We're convinced that we have some interesting things for the students to work on. And of course that's exactly what the students are looking for – to work on something meaningful.

You mentioned the challenge with the language – how is communication working in everyday situations?

Richter: We made a conscious decision to speak German to each other. Mr. Shaaban's understanding of German is getting better the whole time, which also has something to do with the German course he's doing, which is being organized by SIBE. I wouldn't go so far as to expect him to write minutes after an entire meeting; instead I give him tasks that are a good fit for him. Mr. Shaaban is mainly working in technical areas and spends a lot of time working with Excel, which is an area where there aren't so many language barriers.

Based on your experience to date, what advice would you give to other companies?

Riedißer: That's an easy one: Give it a go! I believe there's a niche in every company where you can use somebody who hasn't yet gotten a proper grip of the German language. People shouldn't get so hung up about the language and cultural side of things. There are always ways to solve issues. Cultural differences just aren't an issue if somebody is interested in becoming integrated like Mr. Shaaban. But even if they were an issue, we have ways of dealing with them. Some people spend too much time worrying rather than seeing things as an opportunity. And that's the point: I think there are opportunities for employers to gain access to graduates in specialist areas that are otherwise difficult to find people in. And that doesn't just mean construction engineers. It also gives firms a chance to fill vacant positions and introduce people to a new profession. And of course having a degree in something like management is always useful!

Richter: At the beginning of the interview, you said something about us being a perfect example of how the model works – I think we can confirm that. We feel totally optimistic about it. Working with Mr. Shaaban really does add value for us – it's a big gain!

Image: Martin Riedißer, Marwan Shaaban, Heiko Richter (v.l.n.r.)

For further information on the Perspective Program, go to
http://www.steinbeis-sibe.de/unternehmen/unsere-angebote/perspective-program/

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Quo Vadis Baden-Wuerttemberg?

Former economics minister Ernst Pfister gives a speech at Business School Alb-Schwarzwald on the future of Baden-Wuerttemberg

Ernst Pfister is practically "part of the furniture" in state politics in Baden-Wuerttemberg. Originally from Trossingen, Pfister was a long-standing member of the Baden-Wuerttemberg state parliament and between 2004 and 2011 he was the Baden-Wuerttemberg state minister for economics. As part of the Baden-Wuerttemberg Week of Industry and a Studium Generale initiative at Business School Alb-Schwarzwald, which belongs to Steinbeis University Berlin (SHB), Pfister recently gave an enthralling and lively talk in Rottweil.

If there's one thing Ernst Pfister is convinced of, it's that Baden-Wuerttemberg and Germany are looking good at the moment, but to keep moving forward, Europe requires a sharp jolt. Regional questions relating to education and business can be resolved on a domestic level, but the big topics of our times such as defense, the refugee situation, and terrorism are tasks for Europe.

What key changes does Pfister believe will have to be dealt with positively in the coming years? As a politician interested in economics, he believes that innovation, research, and development must be permanently driven forward. It is helpful in this respect to have the decentralized university system to turn to in Germany. One important aspect related to this is the improved digital infrastructure, although this is currently being hampered by a huge investment backlog.

Pfister believes it will be particularly important to create a new culture of entrepreneurship, especially given the high number of company successions looming on the horizon. He also says there must be a halt to the erosion of pension provisions, which he considers particularly worrying. Manpower shortages are impeding economic success in the state and Pfister believes that it will not just be important to keep effective training and employee development systems in place, but there is also a requirement for modern migration legislation. Funding for small and medium-sized companies is a particular concern for Pfister; this central powerhouse of society is highly vulnerable to fiscal drag.

Ernst Pfister discussing a key question in Rottweil: Quo Vadis Baden-Wuerttemberg?

Despite the hot weather in Rottweil on the day, an interesting discussion subsequently developed between Pfister and the many people in the audience, many of whom will have taken a key thought of Pfister's away with them: As an experienced politician, he believes a fear of change is always a bad advisor.

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Management and Technology Update for Technicians and Engineers

SHB certification course on current best practice know-how in business administration and engineering

Technical experts are keen to keep moving forward, have their say, and be part of business decision-making. To do this, it is essential to have a solid grasp of the most important interdependencies in business while also keeping pace with the very latest technologies. To share this knowledge, Business School Alb-Schwarzwald at Steinbeis University Berlin (SHB) is offering a certification course called Management and Technology Update for Technicians and Engineers.

The course revolves closely around business practice, providing a memorable overview of the connections in business, underpinned by practical examples. As such, it provides an ideal foundation for becoming involved in management decision-making or entering management.

The course spans ten seminar days in total over the course of several weeks. The sessions before 3 p.m. each day focus specifically on management topics for technical experts. After 3 p.m., attention is given to updates in the latest technologies. Each day the course participants visit a different company, where they can talk with (development) engineers and hear about concepts in a variety of sectors of industry. This is because some of the most important new ideas often come from different industries and this can help foster "foresight." The courses are held in Rottweil and the surrounding area, considered a hotbed of medical technology and mechanical engineering.

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ICE/IEEE TEMS International Technology Management Conference 2018

Expert conference to take place for first time in Baden-Wuerttemberg

A successful outcome for bwcon GmbH, Steinbeis, and the IST Innovation Institute (Constance University of Applied Sciences), who together applied to stage the 2018 ICE/IEEE TEMS International Technology Management Conference: The leading technology management conference in Europe will take place in Stuttgart from June 17 to 20. The focus of the conference in 2018 will lie in transferring technology into profitable business application. Another key emphasis will be tech startups.

The motto for the event will be The Era of Connectedness: The Future of Technology, Engineering & Innovation in a Digital Society and the conference will be staged in the Hospitalhof building in Stuttgart in collaboration with the IEEE Technology and Engineering Management Society (IEEE TEMS), the world's biggest alliance of engineers. One of the highlights of the event will be a gala dinner in the Hall of Fame at the Stuttgart region MOTORWORLD.

The conference, which was first staged in 1994, looks at socio-technological systems revolving around the development of products and services, as well as the innovation process in business and its acceptance in society and industry in general. As a platform of scientific knowledge in the fields of technology and innovation, it is also a forum for academics to network with people in business and plan collaborative projects in the field of technology transfer. Everything at the event revolves around exchanging experiences and exploring or lining up opportunities to collaborate. The target group comprises academics and people from business working in the fields of engineering, technology, and innovation.

The ICE Community is an alliance of leading scientists in the field of technology management. The organizational committee brings together a number of leading universities (including Leiden, Delft, Trondheim, Aachen , Berkley, and Monterrey). All conference publications are subject to a peer review process and are indexed in the IEEE Xplore® digital library and published after presentation. A variety of editors of international journals also attend the conference on the lookout for the best publications. Such publications are pulled together in special issues of their journals. There is also a fast-track process for selected papers from the conference and these may also feature in special issues after a review process at the conference.

A number of keynote partners and keynote presenters have been invited to the event, such as Anke Kleinschmit, Head of Group Research & Sustainability at Daimler, and Volker Nestle, Head of Corporate Research at Trumpf and Chairman of the Board of Directors at Hahn-Schickard. The conference will also receive financial and organizational support from Trumpf and Daimler, who will act as partners.

Aside from presentations of papers and discussion panels, there will also be workshops on a variety of topics including sustainable innovation, as part of the EU's D-STIR project (backed by Interreg Danube programs). Business practice workshops have also been successfully lined up for the conference in partnership with Trumpf and Daimler.

ICE/IEEE TEMS International Technology Management Conference 2018 – Schedule

Call for Papers:	October 2017
Paper submission deadline:	Feb 13, 2018
Paper acceptance:	Mar 20, 2018
Conference:	Jun 17 - 20, 2018
NITIM Doctoral School:	Jun 20 - 22, 2018

The conference is still looking for further networking and support partners. For the latest information go to www.ice-conference.org.

If you are interested in partnering with the conference, please enter your details here: https://venture-dev.com/webform/Hjb3UPSVYbm1c3wG/

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Standing Strong

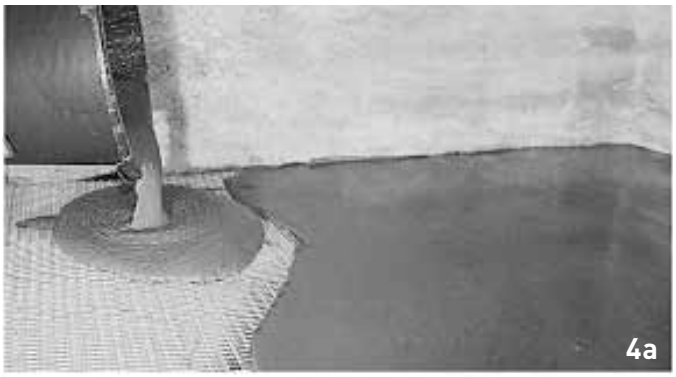
Steinbeis experts develop cement-free casting compound for industrial floors subject to strong wear and tear

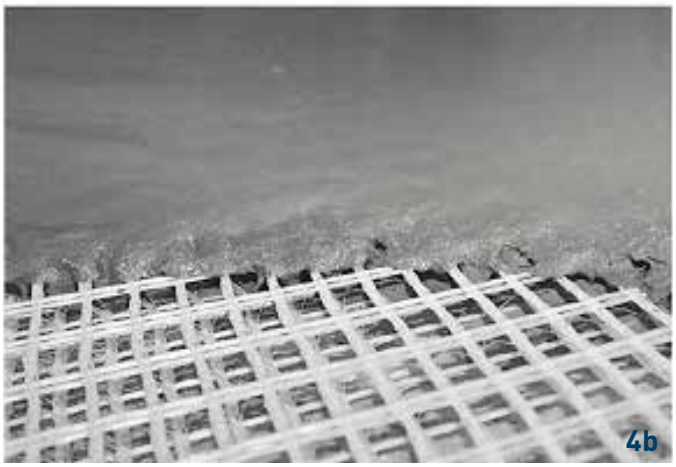
Portland cement has been the most important binding agent mixed into concrete in the construction industry for over 100 years. Over two billion tons of cement are produced every year, and this extremely high output volume comes with a major price tag when it comes to the economy and the environment, primarily because it results in high emissions. Saving resources has become more and more important to the construction industry in recent years – without significant improvements to efficiency, it will be extremely difficult to make construction or housing more sustainable. As a consequence, there is tremendous demand for light but strong materials and composite construction methods. FiberCrete, the Steinbeis Innovation Center based in Chemnitz, has been working on the development, testing, and production of new fiber- and textile-reinforced construction materials and compounds, as well as production technologies. Its main focus lies in material development, design, technological implementation, analysis, and the determination of critical factors. As part of a network project, the Steinbeis experts have now developed an energy-efficient alternative to Portland cement.

The research project is receiving backing from the Federal Ministry for Economic Affairs and Energy as part of the ZIM initiative (Central Innovation Program for SMEs). The Steinbeis experts have been working alongside their partner in industry, Hainspitzer Bauchemie Hand GmbH, to develop a cement-free, fiber-reinforced casting technology. Their solution is called AlkaliTex® and is now ready to launch, providing an alternative to Portland cement for producing mortar systems and concrete parts.

There was already a growing tendency in recent years to save money by using Portland cement composites. These typically contain Portland cement clinker and other secondary raw materials. To meet the Federal Republic of Germany's climate goals, which entail a 40 percent drop in greenhouse gases by 2020 compared to 1990, simply using composite cements will not be sufficient (cf. Gartner, E. M.; Macphee, D. E.: A Physico-Chemical Basis for Novel Cementicious Binders, in Cement and Concrete Research 2011, 41). Also, due to its low chemical stability at low acidity, Portland cement-based concrete cannot be used freely in all areas. Alkaline-activated binders (AABs) are an interesting alternative for manufacturing concrete and mortar, as they partly deliver superior properties and are capable of reducing greenhouse gases versus Portland cement.

The first step for the project team was to process an optimized mixture of components consisting of reactive secondary raw materials – ground granulated blast furnace slag and coal fly ash – in a pugmill mixer to create an AAB casting mortar. First the binding agent and aggregates were added and then they were mixed for 30 seconds. The mortar was then activated by alkaline, using a mixture of caustic soda and aqueous sodium silicate solution at ambient temperature. Next, alkaline-resistant glass fibers were added. To avoid damaging the vulnerable glass fibers, any further mixing was kept to a minimum and the amount of energy used during mixing was reduced. The AAB compounds were then poured into molds. The compounds were left to settle at ambient temperature for six hours before being removed from the molds.





Components of alkaline-activated binding agent
A coal fly ash "EFA filler" supplied by Bauminerale GmbH and ground, granulated blast furnace slag provided by Holcim Kies und Beton GmbH were used as the reactive binding ingredients. Quartz sand was used as an aggregate with grains of up to 2 mm.

The activator solutions consist of a mixture of sodium silicate and sodium hydroxide solution. All of the activator solutions were specially prepared 24 hours before producing the AAB, due to the heat released when the sodium hydroxide is dissolved in the water.

To strengthen the AAB matrix, the project team used short fibers made of alkaline-resistant (AR) glass, e-glass, basalt, and carbon, producing strands measuring 12 mm with a mass of between 45 and 60 g/1000 m ($\triangleq$ tex).

To improve tensile strength, SitGrid 3D webbing supplied by V. Fraas Solutions in Textile GmbH was used to produce a textile-reinforced AAB casting compound. The webbing is 10 percent impregnated by weight, consists of alkaline-resistant glass fiber with a linear mass density of 2400 tex, and is woven in a warp-and-weft structure.

To check the properties of the new AAB casting mortar, the researchers tested representative material samples. The casting mortar falls into a slump-flow category called F1 under DAfStb guidelines (the German Committee for Reinforced Concrete's directive for the manufacturing and application of cement-bonded concrete and concrete grout). An assessment of compressive and bending tensile strength resulted in values of 47.6 and 5.2 MPa respectively, although these could be raised to 67.5 and 22.9 MPa respectively by including a 3D weave. After 14 days, shrinkage had occurred resulting in a deformation of 0.94 mm/m. A number of measurements identified that this high level of shrinkage deformation was due to continuous restructuring and polymerization in the aluminosilicate gel structures. The pH value of the fresh AAB was 14, and after 14 days reactions had reduced this to 10. To determine the durability of the AAB matrix, the project teams examined frost resistance, water permeability, and acid resistance.

After the positive testing in theory, it was then time to conduct tests in real application. "We took a number of industrial floors measuring between 15 and 20 square meters as our reference points, and some of the floors had serious surface damage. Our aim was to restore the concrete surfaces by using self-flowing AlkaliTex®," explains Dr. Sandra Gelbrich, director of the FiberCrete Steinbeis Innovation Center. The renovations involved using short fiber-reinforced and textile-reinforced AAB setting compound with varying degrees of thickness of between 8 and 20 millimeters. To prepare for testing, the dry and liquid ingredients were poured into two separate containers using gravimetric dispensing. Mixing was carried out at different intervals in a portable pugmill mixer, which was specially developed for the AABs, first dispensing the liquid components and then adding the dry ones. After mixing the ingredients for three minutes, the pugmill mixer was emptied and the fresh AAB was poured in small quantities onto the floor. Within two hours of the renovation work, the new floor could be walked on and was strong enough to bear a load. The industrial floors repaired with the AAB showed no sign of cracking or surface defects.

The experts working on the consortium project believe that alkaline-activated binding agents are an interesting alternative for partially or entirely replacing Portland cement in the production of mortar solutions and concrete elements. AlkaliTex® consists of an alkaline-activated bonding agent with integrated textile reinforcements and has been adapted for industrial floors. It delivers high levels of mechanical and chemical resistance and is extremely durable. The solution developed by the experts has already been patented and the team is also going full steam ahead with other developments. Given the major potential of fiber-reinforced alkaline-activated binding agents, the Steinbeis experts are currently working on other AlkaliTex® products for restoring and reinforcing surfaces subject to chemical influences.

Image 1: 3D SitGrid webbing, which is integrated into the AAB matrix
Image 2: A cross-section of the textile-reinforced AAB casting compound
Image 3: An industrial floor after restoration
Image 4a, 4b: Pouring of the fresh AAB compound Pouring of the fresh AAB compound

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A Successful Round of Research with the ZIM

Steinbeis experts present their successful ZIM projects at the SME Innovation Day

As in the past, the SME Innovation Day pulled in the crowds again this year. A good 1,800 visitors descended on Berlin to take a look at over 200 new ideas from the research and development programs of small and medium-sized business enterprises and research institutions. Something all projects had in common: They all received backing from the government innovation program for small and medium-sized business (ZIM), which is financed by the Federal Ministry for Economic Affairs and Energy (BMWi) – or they received funding through the BMWi's IGF program, which supports collective research in manufacturing. Two Steinbeis Innovation Centers were among the 300 or more exhibitors: System Solutions in Measuring and Automation Technology, which is based in Mannheim, and Application-oriented Material-, Production-, and Process-Technology from Jena. The two Steinbeis teams each showcased one of their successful ZIM projects.

There are always questions asked about the effectiveness of equipment used to clean machinery in the food and chemicals industries. This was the motivation for the Steinbeis Innovation Center System Solutions in Measuring and Automation Technology to join forces with the equipment engineer Wiedenbauer Apparatebau AG and VLB, the Berlin-based association of research and training for the brewing industry. Their aim: to develop a reliable method for cleaning equipment that could be integrated into fully automated sterilization processes. The project was given financial backing through the ZIM. The result of the collaborative development is a mobile cleaning device called Mini-CIP ("cleaning in place"). The system provides a variety of flexible connection options to automatically clean production equipment and areas containing manufacturing plant that is not or cannot be integrated into existing cleaning cycles.

In terms of the process used by the project team, the CIP adheres to a principle called "lost cleaning" – cleaning solvents are mixed separately with processing water using concentrates in a 150-liter feed vessel; this is then introduced to a cleaning cycle and removed again on completion of the cycle. Individual stages of the cleaning process can be controlled manually or regulated according to a preconfigured schedule in the cleaning protocol. If the desired cleaning results have not been achieved, a notification pops up on a display on the Mini-CIP machine. There is also an option to connect the machine to a network to store cleaning results on a server or save data to a memory stick. One of the defining features of the new cleaning device is a sensor developed by the experts at Steinbeis, which is capable of ascertaining how effectively equipment has been cleaned. The sensor takes reference solvent and uses organic methods to calculate residual soiling. The color of a reference solvent may change depending on the outcome of a cleaning process. For ex-

ample if it is yellow the soiling is heavy, and if it is green the equipment is fairly clean, whereas violet indicates that there is no soiling whatsoever. The measurement device has an integrated component for producing LED white light to illuminate a medium in the measurement chamber. Next, the modified light is absorbed by an RGB sensor which captures readings in a micro-control unit and translates values into the HSV color spectrum. This makes it possible to transfer analog data to a unit with a memory-programmable control function.

The Steinbeis Innovation Center for Application-oriented Material-, Production-, and Process-Technology also took the transition to alternative energy sources into account for the project. Green energy is leading to growing demand from small-scale manufacturers, farmers, and private individuals looking to acquire regenerative energy equipment, especially for their own energy requirements.

A number of studies indicate that there is strong market potential for small wind turbine power generation equipment. But in many cases, there are still some major stumbling blocks affecting purchasing: poor quality, the high initial outlay, and a lack of equipment standardization. Solar systems have run into some serious obstacles in recent years, partly due to somewhat dubious practices in overseas markets, and partly due to the slashing of subventions in Germany. Things are slightly different for small wind turbines targeted at small businesses and private households, which are benefiting from strong market expansion, sometimes fueled by international initiatives. In the meantime, there are a large number of producers that have specialized in developing and manufacturing compact wind turbine systems, and there is fierce competition selling these systems. To sidestep this competition, ways need to be found to develop small wind turbines that clearly offer premium quality, and these turbines must deliver what the manufacturer claims they do. A key component with these systems when they are used to create energy is the generator unit. Until now, there have been a number of alternatives in the market, with both asynchronous and synchronous motors. One aim all generators have in common is that they are supposed to generate high amounts of energy with a minimum number of revolutions, or offer maximum performance with relatively high efficiency. Also, by offering more effective damping, small wind turbines could be particularly effective at compensating for the kind of torque shock that is experienced with strong gusts of wind. In practice, however, it is extremely difficult to adapt generator concepts to allow for a wide range of turbine speeds on different kinds of rotors. Until now, the generators have mostly been relatively large components, and some could be extremely heavy. This was reason enough for the Steinbeis experts in Jena to team up with the drive technology and development firm ate gmbh & Co. KG and develop a special generator for small wind turbines, ideally in different formats.

The generator the specialists came up with can be adapted in terms of size to fit into available spaces. The project team managed to reduce the overall size of the units and achieve significant weight reductions compared to existing generators. The special generator they developed is already able to generate large amounts of energy at low speeds in light winds. Measurements taken on the test bench showed that it delivered significantly higher outputs. The units are currently undergoing live testing in small wind turbines. In terms of price, the team of specialists does not intend to compete with low-price products, but would rather

like to differentiate the product through quality, making the units as interesting as possible to small businesses and private customers. This is to achieve quick payback. The result of the project: a generator offering horizontal or vertical operation, delivering significantly improved overall performance – with values that speak for themselves:

- low mass inertia in the rotor (starting at wind speeds of 0.3 to 0.5 m/s),
- energy generation at low wind speeds of 2 m/s (as a function of the rotor)
- integrated sensors to detect torque and automate shutdown
- speeds ranging from 0 to 150 rpm, as a function of the rotor and wind turbine model
- temperatures ranging from -40 to +100°C
- low-maintenance/maintenance-free and low cogging torque
- minimum noise pollution
- scalable output of 1 to 10 kW
- approx. 1,000 euros per KW

Gefördert durch:

Bundesministerium für Wirtschaft und Energie

aufgrund eines Beschlusses des Deutschen Bundestages

Image (left): From left to right: Stefan Reimann (VLB e. V.), Florian Wiedenbauer (Wiedenbauer Apparatebau KG), Rüdiger Jung (Steinbeis), Michael Mayer (Steinbeis), Christian Prager (Steinbeis)
Image (right): Jan Koltermann at the exhibition booth with open and closed prototypes of the generator.

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Like Father, Like Son?

Steinbeis experts examine the role of transgenerational transfer in relationship patterns

As the experts at the Hamburg-based Steinbeis Consulting Center for Transgenerational Transfer will tell you, psychology, economic science, and technology are closely interwoven. To meet current challenges faced in geopolitical, economic, social, and psychosocial areas, close collaboration is required on an interdisciplinary level. Transgenerational transfer (or transmission) and its importance are nothing new, but this area is gaining a higher profile thanks to research into the descendants of people who have suffered personal trauma. The Steinbeis specialists from Hamburg are conducting research in this field as part of a project with students at the Hamburg University of Applied Sciences and Medical University (MSH).

"Our feeling is that transgenerational transmission also plays an important role in lots of other areas, not just in fields relating to trauma," explains Dr. David Dickinson, director of the Steinbeis Consulting Center. Dickinson and his colleagues are therefore thinking broadly – not just focusing on the transgenerational causes of psychological disorders, but also on two other key areas. The first involves examining the transgenerational background of the current refugee crisis, the processes of refugee integration, and the radicalization of terrorist groups influenced by Islam. In the other area, Dickinson and his team want to gain an overview of transgenerational factors in sociopolitical movements since the Second World War and observe future developments. The project manager, Marcus Ruhnau, underscores the importance of such factors: "Transgenerational transfer is based on family and cultural legacies, which are handed down on to following generations either explicitly or implicitly and thus lay a foundation for the identity of the recipient." Such legacies stem from the interplay between cultural expectations regarding life or the values of a family, its culture, and its behavioral patterns. This is partly due to belief sets and partly due to personal experiences in a society.

To gauge the impact of transgenerational transmission, Dickinson and Ruhnau are working with Lauren Skaliks, Antje Hinrichs, and Johannes Pennekamp, who are all studying at MSH. The students are gathering data for their master theses to examine factors such as lifestyle, outlook in life, and any belief sets that could be transferred between different generations and thus have an impact on a following generation alive today, especially in terms of behavioral patterns and choice of a partner. The data they are gathering looks at the experiences respondents had with their parents and the psycho-social backgrounds of their families.

The aim is to compare the data and recognized experiences with behavioral patterns observed when respondents interact with their partners. The Steinbeis experts are also assessing how stable current and past relationships are or were and the cultural backgrounds of respondents. The goal of the project is to ascertain whether people's attitude toward relationships and their choice of partner are influenced by transgenerational transfer and thus whether they are dictated by cultural and family backgrounds. The researchers aim to use this information to see if there are combinations of factors that promote stable relationships. This would make it possible to determine whether any of the factors identified in the research have the potential to fuel conflict between the respondents and their current partner. The Steinbeis experts are hoping to use the results of their study into transgenerational influences on relationship patterns to find new ways to offer relationship counseling, partner matches, and systemic psychotherapy.

Image: Antje Hinrichs (left), Johannes Pennekamp, and Lauren Skaliks, three psychology students at Hamburg Medical University currently working on the social research project.

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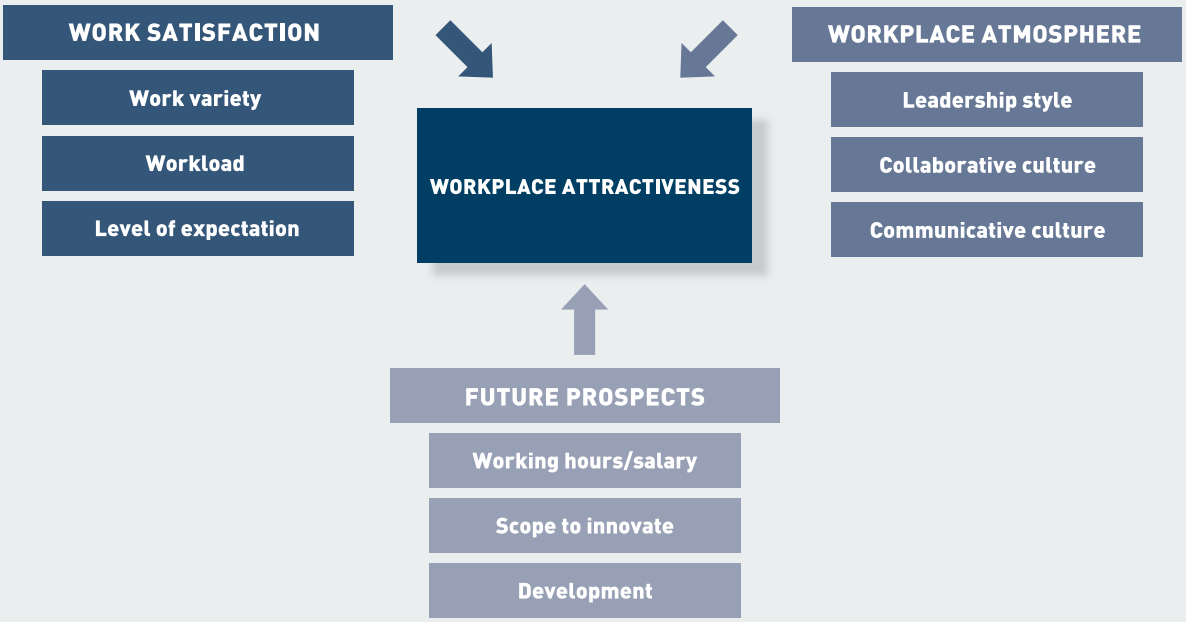

It's Good Working Here

Steinbeis experts use analysis tool to gauge the attractiveness of workplaces

Difficulties finding new people, skills shortages, a lack of loyalty to the company among specialists: just some of the problems currently facing employers. The future of innovative companies and their ability to deal with such challenges hinges on the extent to which they can offer an attractive place to work. Many companies are already doing something about this situation by offering staff appealing employment terms and family-friendly working hours. However, few companies have systematically analyzed how appealing their company is in the opinion of the workforce. This is where an analysis tool developed by BAT-Solutions, the Steinbeis Transfer Center at Karlsruhe University of Applied Sciences, helps.

BAT-Quest is a tool developed by the Steinbeis experts to assess workplace attractiveness in order to understand the views of employees with respect to work satisfaction, the working atmosphere, and future prospects. Gauging how attractive the workplace is entails understanding the importance to employees of individual factors such as work satisfaction, the working atmosphere, and future prospects. One also needs to know where they feel their company needs to make the biggest improvements. The new instrument is particularly useful for consulting firms because it highlights issues that are important from the standpoint of employees, especially when it comes to the future development of the company.

"Workplace attractiveness isn't the sort of thing you can assess directly – you can only get to it indirectly. We pinpoint whether staff find the workplace attractive by looking at latent attributes such as a feeling of affinity to a company, or a sense of personal commitment," explains Dr. Maja Jeretin-Kopf, director of the Karlsruhe Steinbeis Transfer Center. The new analysis tool measures both of these factors. Personal considerations also play an important role when understanding workplace attractiveness. Some of these attributes are measured at the beginning of the BAT-Quest test: age, gender, management responsibilities, length of time at the company, and vocational qualifications. Even these factors show that workplace attractiveness is a complex concept that is influenced by lots of factors, albeit to a different extent.

What kind of insights can firms gain by using the analytical tool? Sweeping statements that could apply to any company in the industry or the sector in general are of little use to a business, because such general statements do not provide a good basis for measures that would be likely to appeal to its own workers. As a result, the kind of results that are likely to be more interesting to a firm are the ones that explain individual factors, the ones that are linked to the specific situation facing a company. By using statistical techniques, the Steinbeis experts can highlight the extent to which personal factors have an impact on workplace attractiveness. Another interesting thing for companies to find out is the areas in which people perceive the biggest need to make improvements and how this influences the feeling of "belongingness" or personal commitment.

Maja Jeretin-Kopf is continuing to develop the evaluation tool. In July, she embarked on a study to validate the tool, working with Karlsruhe University of Applied Sciences, Iodata GmbH, and the Institute for Transfer Technologies and Integrated Systems (SITIS). The aim of the study is to conduct a scientific assessment of the item scales and their suitability, also for smaller companies.

Image: Factors influencing workplace attractiveness

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Innovative Compression Technology for Efficient Hydrogen Vehicles

Steinbeis experts join EU COSMHYC project

Aside from battery-driven electric vehicles, hydrogen vehicles are an important building block of climate protection, especially if the hydrogen that is required can be produced with a zero carbon footprint. Current compression technology based on hydraulic accumulation is expensive and consumes large amounts of electricity, and this is detrimental to the efficiency of hydrogen vehicles. The European Institute for Energy Research (EIFER) in Karlsruhe has joined forces with S2i and three other partners from Germany, France, and Denmark to work on new solutions.

Development is being funded by the European Commission through an EU project called COSMHYC as part of a Horizon 2020 initiative called Fuel Cells and Hydrogen 2 Joint Undertaking (FCH2 JU). FCH2 JU is a public-private partnership aimed at supporting research and development in the field of fuel cell and hydrogen technology in Europe in order to accelerate the introduction of hydrogen technology.

The goal of the COSMHYC project is to improve the availability of hydrogen stations and, on a broader level, to find solutions for improving the efficiency of hydrogen production hand in hand with reductions in investment outlays and operating costs. To do this, a prototype will be developed, built, and tested under real conditions. At each stage of the project, the commercial viability of the technology will be assessed to ensure that the technology that is developed will contribute to the competitiveness of hydrogen as a fuel source for transportation purposes. S2i will support the EIFER initiative through project management and will also be responsible for communication, as well as sharing and exploiting the results of the project. The experts from Steinbeis also provided support with applications submitted to the EU.

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An Innovative Business Model for Intelligent Traffic Systems

Steinbeis assesses obstacles and enablers of new systems as part of EU NEWBITS project

Less highway traffic, improved transportation on the roads, along waterways, and in the air – all made possible by intelligent transportation systems, a key technology in improving the efficiency, safety, and sustainability of freight forwarding. The abbreviation ITS is used to refer to a host of technologies and applications aimed at maximizing the ability of different modes of transportation to interact with one another by networking data communication. The technical foundations for collaborative ITS services have already been laid and developed in Europe, but one major challenge still remains: how to systematically introduce the solutions to the market. The problem is, there is still no effective business model. Steinbeis 2i GmbH aims to do something about this as part of a Horizon 2020 project called NEWBITS (New Business Models for ITS). It has joined forces with different partners to assess obstacles and enabling factors.

The project team started by looking at different market segments, including advanced travel information systems, the very latest traffic routing systems, modern transportation pricing systems, advanced public transportation systems, and collaborative vehicle technology. The results have been published in a bulletin called D2.2 – Assessment of Main Barriers and KPIs for the Implementation of ITS Services.

As the evaluation showed, there are an insufficient number of business models and a lack of political priority-setting. There also needs to be closer collaboration between the various stakeholders. A further obstacle is the lack of interoperability between services. This contrasts to one enabler that transcends all markets: a discernible improvement in political commitment. The growing popularity of mobility-as-a-service offerings, the increasing number of public-private partnerships, and closer involvement of end users are important enablers of ITS services.

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The bulletin underscores the changes that are expected to affect these barriers and enablers, which are shaped by trends such as urbanization, growing awareness of sustainability, new technologies, demographic change, and a rise in demand for multimodal transportation. According to the project partners, these trends could fuel stronger political commitment and more appealing business models. There is a website for people interested in the topic to enter directly into dialog with others.

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Tackling Oxygen Deficiency in the Eye

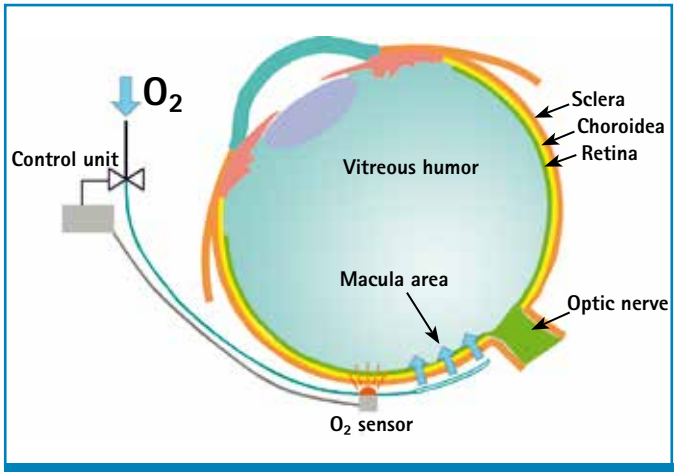
Steinbeis experts develop technology for treating eye condition

The eye has the highest metabolic rate of all organs and thus places the highest oxygen demands on the body. It also has the highest blood circulation rate of all organs, which means that if circulatory problems occur and there is a shortage of oxygen, this can have a cataclysmic impact on the eyeball. Within hours, a person can go blind. At the moment, there are no ways to successfully treat acute or chronic oxygen deficiency in the eyes. OcuTox, the Steinbeis Transfer Center, is a specialist in experimental vitreous and retinal surgery, and it is currently working on different ways to treat oxygen deficiency.

Previous attempts to treat this condition focused on the impact of oxygen deficiency or excessive concentrations, but they did nothing to regulate oxygen according to physiological requirements. The aim of the project at the Hechingen-based Steinbeis Transfer Center is therefore to remedy oxygen depletion in the outer retina or at least to regulate oxygen and thus develop successful treatment options. This should not only restore the oxygen supply to the outer retina but should also prevent excessive expression of the signal molecule VEGF, including its negative influences.

To remedy oxygen depletion or regulate oxygen according to physiological requirements, gas (oxygen, carbon dioxide, or other gases/mixtures) is channeled behind the eyeball into the orbital cavity. To do this, a thin, flexible catheter is inserted running from a reservoir of external oxygen to the area behind the eye. At the end of this tube is a double layer of synthetic membrane, which is aligned to run parallel to the sclerotic coat of the eye. The layer of synthetic material facing away from the eye does not allow oxygen to pass through, but the layer that does face the eye is permeable to gaseous oxygen. As a result, oxygen is allowed to escape and diffuse through the sclera and choroidea and pass into the retina.

The team of researchers plans to regulate the volume of oxygen emitted at the back of the eye by continuously monitoring concentrations in the eye. An oxygen sensor will be positioned in a similar way to the double-layer membrane behind the retina (macula). This is because this is the most important section of the retina for clear vision and thus the place where there is highest demand for oxygen.



Placement of the gas catheter next to the macula and the optical nerve.

Initial testing at the University Hospital of Tübingen has shown that retrobulbar application of gaseous oxygen can increase the concentration of oxygen in the eye. The semipermeable membrane and the oxygen sensor could be positioned behind the eyeball or in the vitreous humor. The electronic controls need an associated power supply and an oxygen reservoir; this can be located outside the eye, for example as an add-on to spectacles or behind the ear, similar to a hearing aid.

There are approximately 2.6 million patients in Germany alone who could benefit from such a device, or at least could have. The invention has already been registered for patents. The experts at the OcuTox Steinbeis Transfer Center are currently looking for partners from industry and sponsors so they can develop the external part of the device and the control unit together.

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Welcome to the Steinbeis Network

Steinbeis know-how: There are currently more than 6,000 experts actively involved in knowledge and technology transfer at around 1,000 Steinbeis Enterprises. The portfolio of services offered by the Steinbeis Network ranges from research and development to consulting, expert reports, training, and continuing professional development in all fields of technology and management. And this network continues to expand. For an overview of our most recently founded centers, go to www.steinbeis.de/en/news. Welcome to the Steinbeis Network!

More on recently founded enterprises in the network can be found at www.steinbeis.de

More on recently founded enterprises in the network can be found at www.facebook.de/Steinbeisverbund

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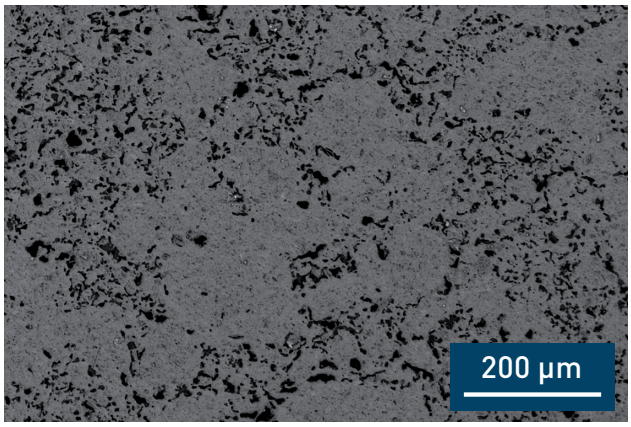
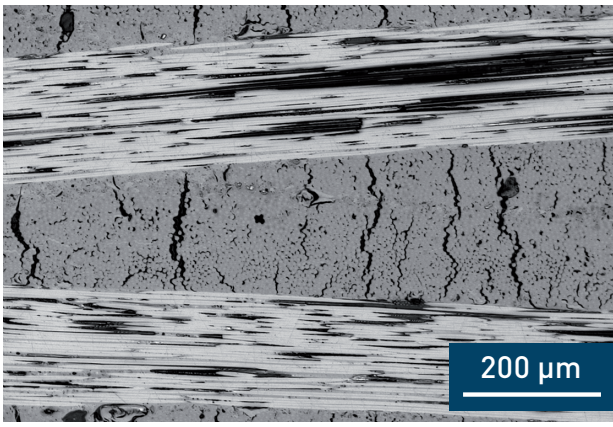
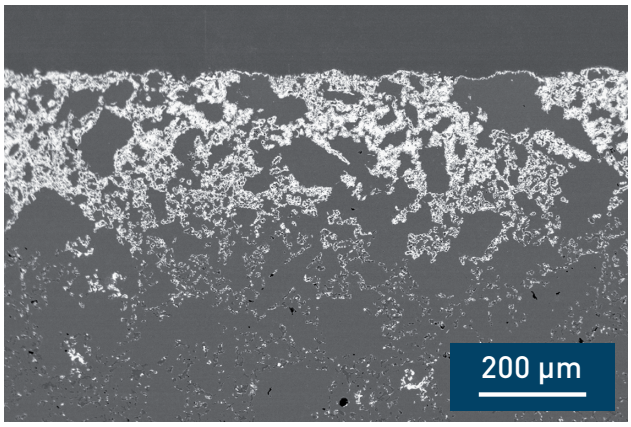
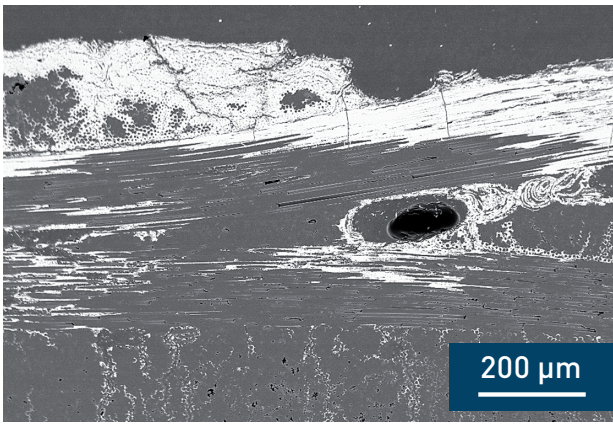
Substrate		
SiC/C-Sample		

Beat the Heat

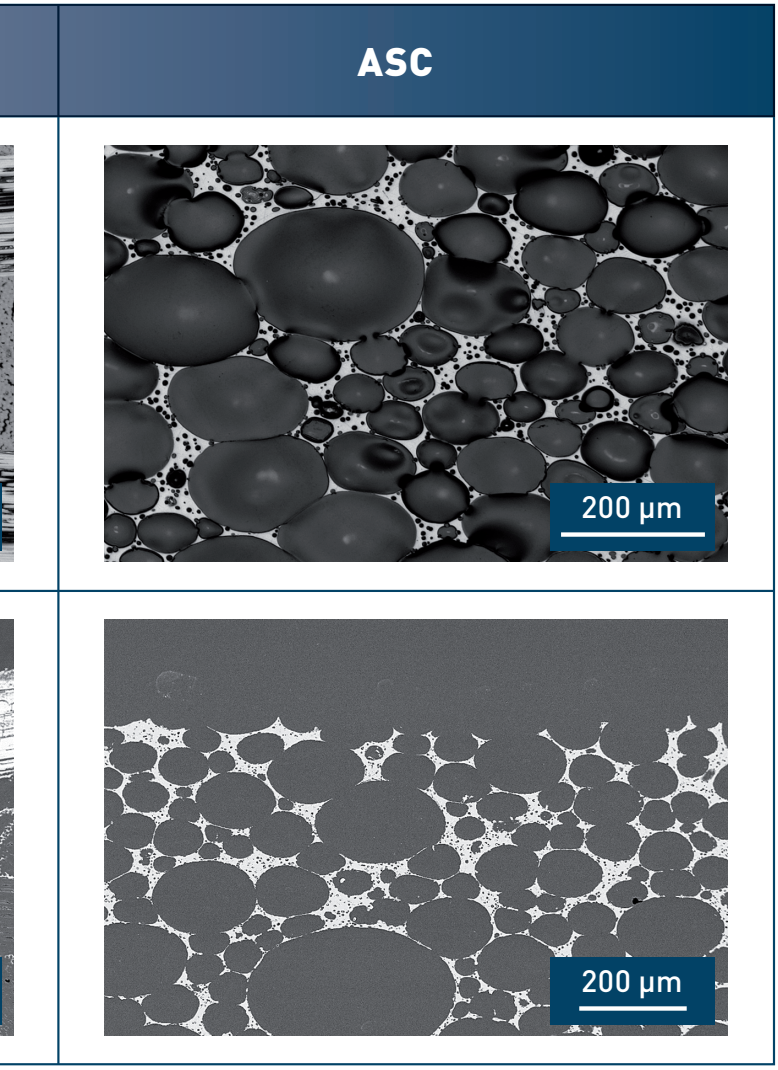
Steinbeis team provides support with the development of a synthesis process for silicon carbide

Graphite is a popular material in construction. Its chemical resistance, density, and thermal stability in the absence of oxygen make it suitable for a variety of applications. In an oxygen atmosphere, however, graphite tends to burn at temperatures above 450°C, especially if it has no oxidation protection. This is where a collaborative project being carried out as part of the Central Innovation Program for SMEs (ZIM) comes in. The project is called evo-SiC ("new products made of gas-phase reacted silicon carbide for the semiconductor industry, components for thermal engineering, and chemical systems control") and it involves Matworks (an enterprise in the Steinbeis Network), partners from industry, and Aalen University. The various parties have joined forces to research a new synthesis process for silicon carbide (SiC).

A reactor structure was developed specially for the project to provide a way to continuously produce silicon monoxide (SiO) to vary the concentration of reactive gas in a reaction chamber and thus control gas-phase reaction. This makes it possible to reinforce complex graphite geometries using silicon carbide, since the reaction on surfaces exposed to the reactive gas is channeled downward. The actual advantage of gas-phase synthesis is, that special silicon carbide structures can be produced which are not possible using conventional ceramic technology.

Compared to conventional graphite or SiC parts, the solution developed by the project team makes it possible to achieve significant cost savings, not to mention the functional advantages. KGT Graphit Technologie GmbH, the partner from industry, has several products in its range alone that should work better as (partly-)converted SiC-component. Just one example: SiC-reinforcement could be used to improve the oxidation resistance of PECVD boats. These are produced using plasma-enhanced chemical vapor deposition, making them much more durable.

For the experiments carried out for this project, the team working with the Steinbeis experts took a PECVD boat using the latest graphite technology as their starting point. The thickness of individual plates in the boat was 2.5mm so at a realistic conversion rate of 80µm/h, they could be completely converted into silicon carbide within around 16 hours. Graphite PECVD boats are subject to heavy wear during use due to oxy-



Using the ASC samples as an example made it possible for the project partners to demonstrate the feasibility of completely converting materials into silicon carbide using gas-phase synthesis, without cracks and without destroying the mechanical structure. Depending on the porosity of the graphite substrate and how the process is carried out, the substrates can be completely converted or converted in gradations. As a result, for certain application areas or material requirements, a suitable graphite substrate can be specified. Given the current inevitability of the CFC samples forming cracks, the researchers believe a good option would be partial reaction, making it possible to combine "tough" CFC properties with the mechanical wear resistance of silicon carbide.
Now that the project has come to a successful conclusion, the research and company partners working on the initiative agree that it provided an understanding of the mechanisms and reaction controls in a laboratory setting. A follow-on project has been started to upscale the procedure and carry out product development with backing from industry. The project team is already making good progress.

gen plasma, but the project team expect the SiC convertion to significantly reduce this problem. Gas-phase synthesis appears to be a strong contender for the technology used on such delicate materials.

The team developed the process of SiC gas-phase synthesis by looking at three different carbon substrates that are important for this technology: an isostatic graphite (ISO-C), carbon fiber-reinforced carbon (CFC), and an amorphous carbon foam (ASC) of different densities and porosities. Scanning electron microscope analysis (SEM) carried out on the three carbon substrates showed clear SiC transformation on all three types of carbon. An SiC gradient layer formed inside the microstructure on the low-porosity ISO-C sample, with a thin but dense SiC layer formed on the surface. A thick SiC layer formed on the surface of the CFC sample showing some cracks. SiC areas where reactions took place can be seen in all of the images. The SEM images of the ASC samples show a carbon structure that nearly reacted to the silicon carbide in all areas. Due to its foam structure, the SiO-reactive gas has no difficulty penetrating the sample and this explains why there is sufficient reactive gas in all areas to convert the sample completely into silicon carbide.

Image: SEM images of substrates consisting of three types of graphite and partial reactions on SiC/C samples. The ASC carbon foam shows an almost complete reaction to the silicon carbide; SEM, BSE, 100x, polished.

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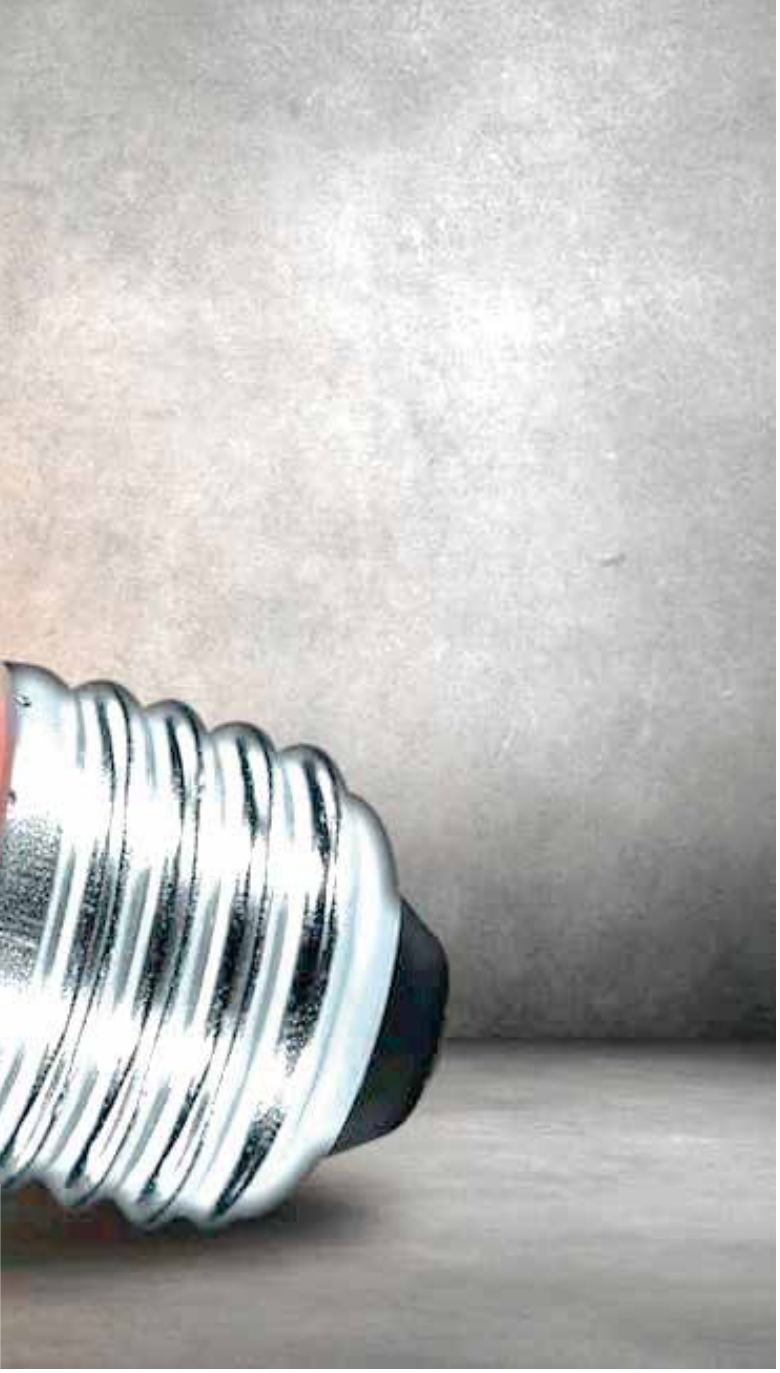
Digitalization Fosters Sweeping Change in the Value Chain

SIBE innovation teams help firms shape up for digital transformation

When a company that makes bicycles suddenly has to become a provider of transportation solutions ("mobility"), it is a fitting reminder of the changes sweeping through industry value chains – changes that include Industry 4.0 (smart production) and digital transformation. The School of International Business and Entrepreneurship (SIBE) at Steinbeis University Berlin has already embarked on a number of innovation projects relating to digital transformation. The aim is to empower firms to plan and implement digital transformation strategies under their own initiative.

Given the rapid rate of change being brought about by digital technology, it is crucial for companies to actively shape their own future by innovating now and innovating continuously. This is because digital solutions and connected factories do not just have an impact on individual areas, they result in digital transformation throughout the whole organization. This is an extremely open process, and being in a position to take independent action in open-ended situations is pivotal to success, as is the ability to establish the required skills base in the company. SIBE has developed an HR development model called Digitalization Innovation Projects to enable companies to build their own digital technology skills and prepare for changes in the business environment.

Dr. Heiner Lasi, director of the Ferdinand Steinbeis Institute (FSTI) and professor for Industrial Intelligence at SHB, who also coaches people involved in innovation projects, explains how the initiative works for companies: "Our assumption is that competition between companies is shifting more toward a competition between ecosystems. So to succeed, firms need to become part of an ecosystem." Given this, Lasi sees innovation projects as strategic initiatives that allow companies to work through scenarios and explore new ways to add value in the future. For example, it will no longer be enough for a company to produce and sell bicycles: More and more bicycles in Germany are now hired temporarily and simply constitute one link in the transportation value chain. So one firm makes bicycles, another makes bicycle stands, and another still creates apps – which in Germany include solutions like nextbike and DB Call a Bike. Producers thus face a choice: Should they simply provide access to their own link in the value chain – and thus potentially become easy to replace – or should they become part of the ecosystem as a invaluable partner?



M.A./MBA (USA): key facts

- Duration: 24 months
- Fees of € 940 per month and participant (does not include salary)
- Additional consultations can be booked separately
- Participants: graduates from all kinds of specialist backgrounds
- Expectation of companies: a clear vision regarding the project, a drive to make things happen, sufficient availability (minimum 180 ECTS)
- Interactive, 100% web-based management degree
- Close and continual supervision and advice from experts in the Steinbeis Network
- Employment terms of course participants: company FTEs
- Course held in English
- New courses start regularly

A number of students have already worked on digital transformation projects at SIBE. One such project was completed by Felix Lauer, who has been studying at SIBE since May 2016 and currently works as a strategy and innovation project analyst at DEKRA. To a certain extent, the topic of digital transformation transcends business strategy and innovation because it has an impact on the overall digital strategy of an organization plus any other digital technology projects currently relating to business innovation. The area Lauer works in also covers different departments so he always becomes involved if his company needs to implement a new digital technology project. Such projects can range from simple process enhancements to extensions to an existing service offering, but they can also entail the launch of innovative products with every potential to change the market. The role of Lauer's department on such projects is to offer workshops or coaching sessions on developing the business model. Aside from these kinds of projects, the department is also developing the group-wide digital technology strategy and working on digital transformation at the company. One thing Lauer really values about his SIBE degree is that it offers him the opportunity to exchange ideas with other students and the lecturers, and he can look at his own work from a broader angle. Lauer says, "You could say it's like getting external advice from the university on your project so you have an adviser working with you and don't feel like the burden is only on your shoulders."

The services offered by SIBE include recruiting young students, who work full-time at the company in parallel to their studies and systematically develop and implement a digital technology strategy over the course of two years. If companies do not need help with recruitment, they can also integrate people already at the company into the SIBE model. Depending on the scope and complexity of innovation initiatives, projects can be worked on by individuals or teams of two or three employees. This also allows for interdisciplinary teams, so people from different backgrounds complement each other. With this model, instead of simply bringing in expertise from outside, firms build internal skills in the fields that are becoming more and more important to them in the long term. The employees at the company receive support from an interactive, 100% online management degree offered by SIBE: the M.A./MBA (USA), which runs in parallel to full-time work. A central idea of this concept is to transfer ideas from the degree into the business project. The students also receive close, ongoing supervision and advice from the Ferdinand Steinbeis Institute and other experts in the Steinbeis Network.

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Book vs. E-Book – Do You Like a Digital Solution?

Steinbeis-Edition conducts survey

Steinbeis-Edition (STE) has also been putting thought into digital transformation in the publishing market. It has been a long time since books were only printed and published on paper. The market is now brimming with e-readers, with products like Kindle, Tolino, and Kobo. So the time is ripe for STE to assess different ways to make improvements to its own services and keep pace with modern times.

STE has been publishing a variety of individual titles and series on management and technology topics for over a decade. Over time, there has been a rise in demand for digital reading options. But do the numbers justify the financial outlay that would be required to "go digital"? And if they do, what kind of digital solutions should be considered?

These are the issues STE would like to assess with its survey. What's the best way to read STE publications – in the traditional format in print or digitally, as a soft copy or e-book? What do you like about reading books in digital formats and what's important to you if you want to enjoy reading a specialist STE publication on an e-reader?

Taking part in the survey will help STE enhance the reading experience when sharing knowledge. The survey can be accessed online by going to http://tinyurl.com/umfrage-STE2017 and if you are interested in completing the questionnaire, please submit your answers by October 15, 2017. The STE is giving away a Manager Cookbook to five lucky survey respondents.

Take part in the survey today by going to
http://tinyurl.com/umfrage-STE2017
Any questions? Contact: Katharina Stein | edition@steinbeis.de

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When an Innovation Deserves an Award: The Seifriz Award and Digital Aviation

Award ceremony on October 18 in Karlsruhe

Instead of hitting the headlines, good ideas often disappear down a dark hole, never quite making it as an example of novel, successful projects. To do something about this, every year the Seifriz Award, the transfer prize aimed at German skilled trades and science, honors successful collaboration between companies involved in the skilled manual trades on the one hand, and scientists on the other. The aim is to give recognition to jointly developed innovative solutions and market-ready developments. The public award ceremony will take place on October 18 in the House of Living Labs at the FZI IT research center in Karlsruhe.

The main theme of the event, which will take place in the evening, will be knowledge transfer and anyone from the manual trades, small crafts, or related fields with interest in changing the world is welcome. The event kicks off with the bestowal of the € 25,000 Seifriz Award, providing inspiration and insights into a variety of amazing solutions that were uncovered again this year from all the collaborative projects carried out between firms in the manual trades and research institutions. Afterwards, there will be a chance for the visitors and experts from science and business to take part in three digital pilot forums, which will focus on groundbreaking topics related to digital business models, cloud solutions, and digital communication. Who knows, maybe somewhere among the participants will be a future award-winner who will turn a small idea into something big one day.

We're looking forward to greeting everyone at the House of Living Labs and meeting you at the FZI in Karlsruhe!

The event is free but if you are planning to attend, please register by going to www.steinbeis-handwerkstag.de.

Kristina Jörs
Baden-Wuerttemberg Crafts Congress (Stuttgart)
KJoers@handwerk-bw.de | www.seifriz-preis.de

Leadership. Education. Personality. Management in a World of Fluctuation

Steinbeis Competence Day to look at current challenges facing managers

In a world that is becoming increasingly complex and dynamic, it is sometimes important to look at old challenges from a different angle. This requires managers who lead – managers with the ability to guide organizations and entire areas of society through the challenges of a world dictated by change. But what exactly is "leadership" in this context? What abilities do people need to lead in such situations? And how can such abilities be acquired or learned? These are fundamental issues that can dictate whether a company or organization remains competitive, or doesn't. Possible answers to these questions will be the topic of the Steinbeis Competence Day, the international convention taking place at the Stuttgart Haus der Wirtschaft (House of Commerce) on December 6.

The event also marks the kick-off of a series of scientific symposia being organized by the School of International Business and Entrepreneurship (SIBE) at Steinbeis University Berlin in collaboration with the Steinbeis Foundation.

To coincide with the event, SIBE will start publishing a scientific journal on the topic and related issues. The journal will offer fundamental and inspirational ideas along with new scientific insights, with reports on the practicalities of providing education in this area. The editors of the magazine are Professor Dr. Dr. h. c. Werner G. Faix (managing director and founder of SIBE, and holder of the chair for Business and HR Management at SHB) and Professor Dr. Rudolf Tippelt (Professor (ret.) for Education Research at the Ludwig Maximilian University of Munich). The editorial board have already attracted a number of leading international scientists and business leaders to contribute to the new specialist magazine.

Participation in the Steinbeis Competence Day is free. If you plan to attend, please register at www.steinbeis-competence-tag.de.

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Factors Influencing Resident Satisfaction in Long-Term Inpatient Care of the Elderly

Daniel Knaup

2017 | paperback, b&w | 314 pages, German
ISBN 978-3-95663-142-9

About the author

Daniel Knaup completed two vocational training programs in business management before doing a course in International Business Studies in Oulu (Finland). He then spent several years gathering work experience in leading positions, including as head of Business Improvement and work as a consultant. Knaup has been a hospital director of the Bürgerspital Basel hospital since 2006, where he currently heads quality and risk management. Between 2012 and 2017, Knaup gained a PhD at Steinbeis University Berlin.

Centralized Order Scheduling with Redundant Locations in an Intra-Organizational Production Network

Georg Lamers

2017 | paperback, b&w | 250 pages, German
ISBN 978-3-95663-141-2

About the author

Georg Lamers studied production and logistics as part of a bachelor's degree as well as technical management for a master's degree in Heilbronn. Among other prizes, Lamers has received awards from the Heinrich Blanc Foundation and from Heilbronn University for its innovation competition. Lamers earned a PhD at Steinbeis University Berlin in 2017.

Industry 4.0 at SMEs – SME-Compatible Journeys of Digital Transformation

Oliver Brehm, Rüdiger Haas, Maja Jeretin-Kopf (ed.)

2017 | paperback and e-book (PDF), color | 100 pages, German
ISBN 978-3-95663-137-5 (print)
ISBN 978-3-95663-138-2 (non-print)

About the event

The Steinbeis working group on Human Factors in the Product Development Process organized a convention in 2016 dedicated entirely to the topic of SME-Compatible Journeys of Digital Transformation. The interdisciplinary event was targeted at people working in engineering, management, education, and the arts. Like in the previous year, an art exhibition had been organized to coincide with presentations.

Technology, Cultural Development, and Technical Training

Rüdiger Haas, Maja Jeretin-Kopf, Christian Wiesmüller (ed.)

2017 | paperback and e-book (PDF), color | 238 pages, German
ISBN 978-3-95663-126-9 (print)
ISBN 978-3-95663-127-6 (non-print)

About the series

The new series on Technology and Technical Training has been published in collaboration with BAT-Solutions, the Steinbeis Transfer Center under the directorship of Dr. Maja Jeretin-Kopf. The authors of the first volume of the series examine the connections between technology, cultural development, and technology training, also with a critical assessment.

Qualitative Enterprise Company Checks

Steinbeis Foundation (ed.) | Michael Ortiz

2017 | paperback and e-book (PDF), color | 249 pages, German
ISBN 978-3-95663-082-8 (print)
ISBN 978-3-95663-146-7 (non-print)

About the author

Dr. Michael Ortiz (Dipl.-Soz. Univ.) gained a PhD at the University of Mannheim in the field of comparative innovation systems research. Since 2013, he has been a project manager at Steinbeis GmbH & Co. KG in Stuttgart, with a focus on the fields of company and strategic consulting, competitive knowledge and technology transfer, business competence analysis, cluster management, business startups, studies, and evaluations. He has been head of innovation and transfer management research at the Ferdinand Steinbeis Institute since 2017.

Leadership Education – An Abductive Design

Jens Mergenthaler

2017 | hardback and e-book (PDF), color | 535 pages, German
ISBN 978-3-95663-131-3 (print)
ISBN 978-3-95663-139-9 (non-print)

About the author

Dr. Jens Mergenthaler studied linguistics, journalism, and sociology at the University of Bamberg. He completed a Master of Business Administration at Steinbeis University Berlin in parallel to full-time employment. While at the Ludwig Maximilian University of Munich (LMU), Mergenthaler gained a Dr. phil. in the field of education. He currently works for Steinbeis School of International Business and Entrepreneurship as a scientific specialist in business management.

A didactic perspective on leadership education – focussing on the development of competencies within MBA programs

Ardin Djalali

2017 | hardback and e-book (PDF), color | 237 pages, engl.
ISBN 978-3-95663-132-0 (print)
ISBN 978-3-95663-140-5 (non-print)

About the author

Dr. Ardin Djalali studied political science and history (MA) at the University of Cologne. He gained an MBA at Steinbeis University Berlin. He subsequently completed a PhD program at Ludwig Maximilian University of Munich at the professorial chair for general education and training research. Djalili currently works as a director of the International & MBA Programs at Steinbeis School of International Business and Entrepreneurship GmbH (SIBE).

THERMOLYPHOS. Forum Documentation, October 4/5, 2016, Halle (Saale)

Uwe Sauermann, Markus Klätte (ed.)

2017 | paperback, b&w | 176 pages, German
ISBN 978-3-95663-070-5

About the publication

The THERMOLYPHOS innovation forum was organized by the Steinbeis Transfer Center for Resource Technology and Management with the aim of examining the extent to which pyrolysis of sewage sludge is compatible with current legislation dictating phosphorous recycling, also looking at different options. Specialists from a variety of companies and institutions attended the event in October 2016, with the aim of exploring the special nature, opportunities, and possibility of combined technologies, also discussing preliminary research findings and further potential developments.

Emotions: Remain Factual!

Gernot Barth, Bernhard Böhm (ed.)

2017 | stapled, color | 76 pages, German
Mediation | Quarter III / 2017
ISSN 2366-2336

About the editors

Associate Professor Dr. habil. Gernot Barth is director of IKOME® (the Institute of Communication and Mediation), the Steinbeis Consulting Center for Business Mediation, and the Academy for Social Aspects and Law (a Steinbeis Transfer Institute at Steinbeis University Berlin). The focal topic of his work is mediation, especially within and between companies. A qualified attorney and master of mediation, Bernhard Böhm is co-director of the Steinbeis Consulting Center for Business Mediation and head of the arbitration committee office of Steinbeis Consulting Centers (Steinbeis Beratungszentren GmbH), which are part of the Steinbeis Network. Additionally, he shares responsibility for a variety of domestic and European mediation projects involving cross-border mediation.
Mediation has been published in Steinbeis-Edition since 2012 and currently appears four times a year. Different focal topics are looked at and presented in depth from a wide range of angles, supplemented by recurring topics such as methodologies, law, market success (best practice), sport, and intercultural mediation. To round off the portfolio, current trends are looked at in the field of research, including interesting methodologies.

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Steinbeis is an international service provider in entrepreneurial knowledge and technology transfer. The Steinbeis Transfer Network is made up of about 1,000 enterprises. Specialized in chosen areas, Steinbeis Enterprises' portfolio of services covers research and development; consulting and expert reports as well as training and employee development for every sector of technology and management. Steinbeis Enterprises are frequently based at research institutions, especially universities, which are constituting the Network's primary sources of expertise. The Steinbeis Network comprises around 6,000 experts committed to practical transfer between academia and industry. Founded in 1971, the Steinbeis-Stiftung is the umbrella organization of the Steinbeis Transfer Network. It is headquartered in Stuttgart, Germany.

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