

TRANSFER

The Steinbeis Magazine

Pioneering Spirit and Entrepreneurship

Feature Topic: Entrepreneurship

Insights from Steinbeis experts
into recent projects

Creating a strong bond

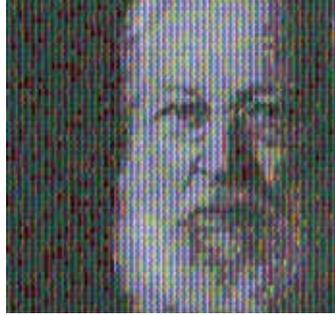
A team of Steinbeis experts develops a process
for thermally joining coated composites

Voting with your feet: competi- tion between population areas

Steinbeis assesses the positioning of cities and
municipalities across Germany

Quality stuff? Most definitely!

Steinbeis experts develop testing system for
plastic pipes

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		The picture on the front cover is a composite image of Ferdinand von Steinbeis. In the 19th century, von Steinbeis laid the foundations for the Steinbeis Network, an organization which now actively promotes knowledge and technology sharing throughout the world. To thank Ferdinand von Steinbeis for his commitment to economic development, enterprises made financial contributions toward the establishment of the first Steinbeis Foundation in 1868, thus making it possible to promote vocational training among adolescents.
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Dear readers,



Prof. Dr. Barbara Burkhardt-Reich is responsible for the German youth startup contest *Jugend gründet*. She is also director of the Steinbeis Innovation Center for Business Development at Pforzheim University, which focuses on issues related to schools and business, entrepreneurship education, vocational orientation in schools and educational establishments, women in management, and marketing intelligence/online-marketing/marketing communication.

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You've probably already been to our website and seen our promotional film *Early Birds*. Who is it that ensures research finds its way into everyday life? Who injects real value into knowledge? People who think entrepreneurially, who act entrepreneurially. People we need, because they become innovators, they seize new ideas and make them happen, they're prepared to stick their necks out, and they have no problems dealing with uncertainty – true entrepreneurs!

The world of business is undergoing sweeping change. It's times like this that topics such as entrepreneurship become particularly important to all of us, so I was delighted when I heard that this edition of the Steinbeis TRANSFER magazine is being dedicated to the topic. Entrepreneurship in the way Schumpeter described it should not be confused with inventiveness. Entrepreneurs don't invent things, they translate the existing into successful innovations through realignment and an analytical understanding of markets.

The new possibilities opened up to us by digital technology are fuelling disruptive changes to entire markets and business models. As in the past, the first place people turn to – in awe – is Silicon Valley and its "one-step-ahead economy" (to loosely translate a term coined by the German economist Ernst Helmstädter: *Vorauswirtschaft*). Indeed, concepts like Uber and Airbnb are completely novel business models and things like crowdsourcing platforms are fundamentally changing business processes as we speak.

The culture of entrepreneurial thinking and action also needs to be made a higher priority in Germany if we are to shape the changes that are about to hit us. What we need are entrepreneurs on a number of fronts – people who found companies but also people who are already actually employed by companies. We need to think about the kinds of ecosystems that will need to be put in place to convince committed men and women that starting up a company is a good idea in Germany. But we also need to create cultures within companies that allow people to work independently, cultures that foster knowledge, cultures that nurture people's ability and people's willingness to spot an opportunity and translate ideas into actions.

Cultures of entrepreneurial thinking and action also require other things: suitable framework conditions such as a startup ecosystem, innovative business cultures, but also – at its core – coherent entrepreneurship education as part of business training. This is because the characteristics of an entrepreneur – strong communication skills, self-confidence, the capacity to innovate, a willingness to take risks, leadership skills, the motivation to achieve great things, creativity, and flexibility – are things that people can learn.

This is something the authors of the Global Entrepreneurship Monitor (GEM) also recommended in their 2015 report on Germany. They stated that training and education still offer the greatest potential when it comes to improving the startup climate, since it is here that there were, and still are, significant shortcomings in Germany compared to the international picture. The authors continued by suggesting that more discussion is required among businesspeople, politicians, within the ministries of education and art, and at trade unions, and this would help make teaching a higher priority than it has been until now in fostering creativity, (entrepreneurial) independence, and personal initiative.

There is still so much to be done when it comes to entrepreneurship. So let's go for it!

Prof. Dr. Barbara Burkhardt-Reich



From Concept to Market Success

Steinbeis experts showcase their skills at the SME Innovation Day

The Federal Ministry for Economic Affairs and Energy (BMWi) offers an innovation program called the ZIM, which is primarily targeted at the broad German Mittelstand (SMEs). Its aim is to foster the innovative flair and competitiveness of small and medium-sized companies. This year's annual ZIM event again included an SME Innovation Day, which was staged on the grounds of the BMWi and was co-organized by AIF Projekt GmbH. In his opening speech, Sigmar Gabriel, the Federal Minister for Economic Affairs and Energy, described ZIM-backed excellence as a shining example of innovation, an attribute that is valid throughout the world. Being one of the 350 exhibitors at the annual SME Innovation Day means walking proud in markets as a pioneer with all the hallmarks of a "process innovator." For the third year in succession, Rüdiger Jung and his team at the Mannheim-based Steinbeis Innovation Center for System Solutions in Measuring and Automation Technology were eligible to take part in the event and showcase their special exhibit: a solution developed in collaboration with research partners as part of a project backed by the BMWi.

The team has developed a mobile hop picking machine in collaboration with the engineering firm WOLF Anlagen Technik GmbH & Co. KG. The machine increases the efficiency of hop harvesting. The solution developed by the partners makes a huge difference to the load placed on picking equipment during the picking process.

The machine can be used as a stand-alone unit, it can be retrofitted as a separate module on existing picking machines, or it can be integrated into the new generation of picking machines, thus allowing hop pickers from any producer to plan a reliably productive harvest without interruptions. The Steinbeis experts designed the construction and rotational velocity of transportation and picking drums on the harvesting unit to work precisely and in harmony, so that as little damage as possible would be caused to the hops during picking. The umbels and bines of the hops are left completely unscathed and are not crushed like on other machines. The machine picks the hop flower, small bracts, and entire bines so neatly and precisely that the entire raw material can be quickly transported away, removing the load on the machine.

The machine was also popular with visitors to the SME Innovation Day. Sebastian Weber, sales representative of WOLF Anlagen Technik, did a

good job outlining the many merits of the new system to the German parliamentarian Erich Irlstorfer, who was accompanied by the official technical consultant Mavin Kotowenko and a trade delegation from Taiwan.

Both project partners were satisfied with the outstanding success of the exhibition in Berlin and are similarly pleased with the introduction of the hop picker to the market. More collaborative research projects are now being planned between WOLF Anlagen Technik and Steinbeis.

Image: The project team from WOLF Anlagen Technik GmbH & Co. KG and the Steinbeis Innovation Center for System Solutions in Measuring and Automation Technology



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Feature Topic: Entrepreneurship

Insights from Steinbeis experts

The definition of entrepreneurship has changed over time but people still don't question it. It's a possible driver of innovation and creates new jobs. In the feature topic article about Prof. Dr. habil. Andreas Aulinger, director of the Steinbeis Transfer Institute of Organization and Management, he discusses changes in the definition of the term entrepreneurship over time and the characteristics that a successful entrepreneur needs to have. Prof. Dr. Barbara Burkhardt-Reich, director of the Steinbeis Transfer and Innovation Centers for Business Development at Pforzheim University examines successful entrepreneurship education and the challenges faced in this area. In an interview with TRANSFER magazine, Prof. Dr. Orestis Terzidis, director of the Institute for Entrepreneurship, Technology Management, and Innovation at Karlsruhe Institute of Technology (KIT) and co-project coordinator of the KIT Founders' Forge (Startup Incubators), talk about entrepreneurship research and technology entrepreneurship. Dr. Bernward Jopen and Uwe J. Umlauff from the Steinbeis Transfer Institute for Innovation & Business Creation provide an introduction to seven key questions that have to be answered to understand the potential of business ideas. Prof. Dr. habil. Achim Walter is director of COMMIT, the Steinbeis Consulting Center. In his article, Walter outlines his views on the factors that are crucial for the success of an academic spin-off. Prof. Dr. Werner G. Faix and Jens Mergenthaler of the School of International Business and Entrepreneurship (SIBE) at Steinbeis University Berlin (Herrenberg) examine the role played by the personality of a business founder in making a startup a success. What the future holds for the development of a business is the issue looked at by the directors of the Steinbeis Consulting Center for Entrepreneur Excellence. Prof. Dr. Peter Philippi-Beck is director of the Steinbeis Transfer Center for Internationalisation – Equity Participation – Succession Regulation (I/B/N). In his article, he examines the interplay between technological trends and entrepreneurship. Prof. Peter Schäfer, the head of ifex (the "initiative for startups and business succession") at the Baden-Württemberg Ministry for the Economy, Employment and Housing attempts a prediction at the future of the startup scene and entrepreneur culture in Baden-Württemberg. Prof. Reinhold König, director of the Steinbeis Transfer Center for Technical Sales and Management at Karlsruhe University of Applied Sciences explains the importance of business models when planning the future of a company. Finally, the Steinbeis consultants Ruben Maier, Peter Becker, Christel Rosenberger-Balz, Mario Buric, Martin Ritter, Johannes Merkel, and Felicitas Steck provide a peek behind the scenes of their everyday work in advising startups, introducing us to some of the successful young business founders they have worked with.



“True Entrepreneurs Aren’t Driven by Change. They Drive It.”

An interview with Professor Dr. habil. Andreas Aulinger, director of the Steinbeis Transfer Institute for Organization and Management

Professor Dr. habil. Andreas Aulinger describes how the definition of entrepreneurship has changed over time and discusses the issues examined in entrepreneurship research. In an interview with TRANSFER magazine, he also explores the impact of digital technology in business on entrepreneurs.

Hello, Professor Aulinger – the term entrepreneurship first started entering the wider circles of German business studies in the late 1990s, but it was by no means anything new. Richard Cantillon developed the first theory of entrepreneurship as early as 1730. He saw an entrepreneur as someone who was marked by a willingness to take business risks with the desire to generate high profits from this wherever possible. How has the term changed over the years?

Our current understanding of an entrepreneur really is quite different from the way Cantillon described it nearly 300 years ago. It’s closer to the way Schumpeter described it in the early 20th century when he said that a person who innovates, invests all his creativity and creative energy in new business ideas he has thought up himself. That being said, just like 300 years ago, from today’s point of view, a “real” entrepreneur is someone who is also successful with his business ideas. It was only this view that they are also successful innovators that made entrepreneurs

likeable characters in politics and industry. Of course people don’t feel that happy about them if they’re directly affected by the “creative destruction” Schumpeter said entrepreneurs cause with their innovations.

One area you’re involved in is research in entrepreneurship. What are your goals in this area at the moment?

Of course entrepreneurship research looks at things like Schumpeter’s innovators, the nature of their personality, and their startup strategies, but it also examines the overall conditions and the business environments that entrepreneurs favor and where they thrive. Silicon Valley is currently the best-known environment for entrepreneurs, and there’s lots of research in the ways other areas are trying to mimic it. Another direction for entrepreneurship research is corporate entrepreneurship. This is where you examine how companies can remain or become innovative, even if they’re older and have grown. Even in that respect, Silicon Valley offers some of the best-known places to exami-

ne this topic, with companies like Apple, Google, and Ebay. At the Steinbeis Transfer Institute for Organization and Management (IOM), we're now particularly interested in corporate entrepreneurship; we also call this "agile entrepreneurship."

What qualities should an entrepreneur have in order to succeed?

Success-seekers are more likely to succeed than failure-avoiders. Basically, this means people who believe they mainly shape their lives and their own successes themselves. They're more likely to succeed than people who think their lives and their success are dictated by their environment. The term used by specialists here is "locus of control." But even if someone does have these rather useful qualities, they can still come unstuck as entrepreneurs, partly because there are simply so many other factors that influence the specific circumstances surrounding a startup. This is also because you can sometimes have too much of these two qualities. If you go out on full throttle as a success-seeker and have absolutely no fear of failure, or your locus of control allows you to be totally convinced you're right, too much of a good thing can also make you fall flat on your face. If I'm totally honest, I'm actually quite relieved it's not possible to identify clear success factors because that means everyone has the right or the opportunity to try their hand at being an entrepreneur, whatever their personal style or personality. We're amazed sometimes and still take joy in seeing the sorts of interesting people and personalities that end up succeeding as entrepreneurs – despite all pre-conceptions.

Digital technology is bringing about major changes in industry at the moment, in fact, not just for companies but also for society in general. What effect is this trend having on entrepreneurs, and what challenges will they have to deal with?

True entrepreneurs aren't driven by change in the economy. If anything, they're the ones that drive it. Individual and corporate entrepreneurs are currently bringing something to this world that we call Industry 4.0, which deals with the issue of smart and interconnected factories. If the key issue is how established companies should cope with all the change caused by successful entrepreneurs, we have to look more closely at agile management practices. These are currently experiencing a boom because they show companies how to keep pace with the accelerating rate of change. Agile companies actively manage change. In the best-case scenario, their agility allows them to become entrepreneurs themselves and pave the way for other companies. It's worth mentioning a white paper here, which we've just published through our institute. It's called "The Three Pillars of Agile Organizations." In the paper, I describe how classic (agile) management methods have to work alongside new (agile) management methods and agile mindsets for companies to remain agile or become agile. This is also important for them to be able to operate as entrepreneurs, both inside and outside of a company.

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- Logistics leadership
- Data science

Image: Steinbeis Transfer Institute for Organization and Management (IOM)



Prof. Dr. Andreas Aulinger has been a full professor and holder of the professorial chair for organization at the Steinbeis University Berlin since 2012. He has been director of the Steinbeis Transfer Institute for Organization and Management since 2011. The center was set up by Prof. Aulinger with Markus Heudorf, and it provides advanced executive degree programs in the fields of leadership, change management, organizational management, and HR management. In 2015, Aulinger founded a community for agile organizational practice under the auspices of the organizational society gfo.



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Mastering the Transition to a Modern Working World Thanks to Entrepreneurship Education

Young founders' initiative teaches innovative thinking and entrepreneurialism

Disruptive changes resulting from the digital revolution do not just have an impact on business processes and business models, they also change working practices. There is an opportunity for Germany to go its own way in the long term by managing these historic changes in industry. A key factor in making the transition a success will be the people, who will need the tools to actively shape digital business and working practices, plus the confidence to do so and the right skills. It's never too early to start training in this area. One of the key issues is which specialist and personal skills we should hand on to the next generation to prepare them for "Working World 4.0."

The important point is that this is not just about focusing school education on business needs, or making schools "available" to the economy. Education is not about cramming people full of knowledge, it's about skills, attitudes, and behaviors of the modern world. It's about acquiring such know-how for oneself and others. When the world changes – which it does more rapidly in times of disruptive innovation – then the education offered by schools has to react to this.

If change could be based on a standard counting system from 1 to 4, then Working World 1.0 was the beginning of industrialization and the first organizations of workers. Working World 2.0 was then the onset of mass production and the beginnings of welfare states in the late 19th century. Working World 3.0 saw a consolidation of the welfare state and workers' rights based on the social market economy. Since the 1980s, production has undergone further automation through IT and electronics, with a sharp rise in service provision and an opening up of domestic markets as a result of Europeanization and globalization. Working World 4.0 is more closely networked, more digital, individual, and adaptable. Broad-based skills are becoming more important. Accordingly,

Work 4.0 not only requires qualified and motivated people, it's especially important that they can work independently and become capable "controllers" of digital processes. The ability to train oneself – and assimilate what one has learned creatively in a way that adds value – is becoming a key competence. It is also important to use smart sources of knowledge, to pull out the essentials, to then use knowledge practically, share this with others, and work systematically.

Entrepreneurship education plays an important role in this area. According to the authors Kirchner and Loerwald, it is "all education processes that promote entrepreneurial creativity, the ability to innovate, a conviction in one's own effectiveness, the drive to perform, a rational approach to risk, a sense of responsibility, and sharing such business and generic competences, which are required to set up, realize, and reflect on entrepreneurial initiative." This raises a question: How can this be achieved in schools? According to studies, young people have specific expectations of the working world, for example that it will offer challenging, meaningful, and socially responsible tasks; personal freedom; responsibility; and a collegial, minimum-hierarchy, project-related wor-

king environment with a strong identification with tasks. Such expectations are clearly compatible with self-employment and largely congruent with the personalities of entrepreneurs. As a result, a foundation can be laid for training people on such personality factors. The aim in doing so is not to adapt to business needs, but to make education about holistic personal development. As such, entrepreneurship education fits in well with contemporary general education. At its core lies learning through research and the kinds of projects that can be offered at all kinds of school through a variety of subjects. This is unlike classic classroom-based lessons – people do things. The approach to learning is based on giving students tasks to work on so they can apply what they have just learned independently, if possible as part of a team. They learn to analyze tasks, gather information and evaluate it, make decisions as a team, implement these, and monitor their impact. Developing creative solutions, planning, deciding, implementing, checking if targets have been met – these are the classic activities of entrepreneurs, and people can be trained on this. It's also important to engender a matching culture of individual feedback: Which skills were needed? Who in the team has which strengths? Where does the emphasis lie for each individual? What can we do to work on these? What does this mean for subsequent career choices?

A specific example of all these issues in the world of business is Young Founders (German: *Jugend gründet*), a competition sponsored by the Federal Ministry of Education and Research (BMBF). The contest has taken place nationally since 2003 under the coordination of the Steinbeis Innovation Center for Business Development at Pforzheim University, and until now over 44,000 young people have participated in the program. The competition starts by focusing on finding an idea, or brainstorming. The aim here is to develop an innovative business concept in people's minds and a number of creative techniques are provided on the Young Founders website to help come up with ideas. Students are encouraged to work in teams. Once they have an innovative business concept, the next task is to work up a robust business plan. To help with this offline process, there is a special business plan canvassing poster. Around 600 business plans are submitted each year and these are evaluated by special judges. All teams are given online feedback on different aspects of their business plan. Once the plans have been assessed, the best teams are invited to one of three events in different parts of Germany to present their business ideas. The mixture between online elements of the competition and the physical events is an extremely important feature of the sustainable learning experience.

The next part of the competition is a business simulation in which the students go through a virtual launch of their own company. The timeframe for the startup is the first eight years after the startup. The students decide the product price and have to hire and train workers. They make decisions regarding marketing budgets and have to make strategic decisions on each of the simulation periods (financial year), covering HQ location, type of business, certification etc. All of these factors are influenced by ups and downs in the economy and the students experiencing the simulation have to adapt to the situation again each time. The competition is also simulated. The outcome is judged by the cumulative value of the business. With *Jugend gründet*, this is not just based on short-term factors such as the operating profit, but also other factors such as product quality, customer satisfaction, and employee satisfac-

tion. After each phase of the simulation, the ten overall best teams from the two phases of the competition are invited to the final. At this point, they have to design a trade show booth and present their project to the expert judges. The main prize is a trip to Silicon Valley sponsored by Steinbeis.

Experience has shown that these teaching and learning methods are extremely well received by the young entrepreneurs, thus providing a unique vehicle for sharing specialist and personal skills in a learning environment that fits in well with the younger generation. Business simulations allow young people to place themselves in the position of an entrepreneur. They learn to make decisions, even in situations that are not entirely clear due to the interplay between different variables. They quickly discover the impact of their decisions and learn to draw conclusions from them. This gives young people an understanding of issues from an entrepreneur's and employer's perspective as they experience first-hand how much room there is to maneuver in business and how fascinating it is taking personal responsibility – almost "incidentally" gaining important insights into the world of business.

With every new school year, the judges are surprised by the innovative flair of the young people and the business concepts they submit. They are often a reflection of the zeitgeist and show how passionate young people can be about their projects, their creativity, their drive, and how much they can identify with projects that allow them to research and learn new things under their own responsibility.

Image: The Colorgy team presents its innovative tent at the 2016 national finals of Young Founders. Independent uses embedded dye cells to capture solar energy and generate eco-electricity.



Prof. Dr. Barbara Burkhardt-Reich is director of the Steinbeis Transfer and Innovation Centers for Business Development at Pforzheim University. Her Steinbeis Enterprise offers products and services to a number of target groups. These include running entrepreneurship education projects, support with youth career planning, websites, marketing intelligence solutions, and integrated communication.



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“Most startups are about user-centric innovations”

An interview with Professor Dr. Orestis Terzidis, who heads the Institute for Entrepreneurship, Technology Management, and Innovation (EnTechnon) at the Karlsruhe Institute of Technology (KIT) and is joint project coordinator of Founders' Forge (Startup Incubators)

Professor Dr. Orestis Terzidis talked to TRANSFER about research into entrepreneurship, the nature of technology entrepreneurship, and the impact that the current trend toward digitalization will have on future entrepreneurs.

Professor Terzidis, you work in the field of entrepreneurship research, which is a lot about the paradigm of human-centric cybernetics. Why did you decide to take that approach to entrepreneurship?

Established companies know their business model and get on with implementing it, unlike startups which are trying to identify a business model. Putting it bluntly: established firms deliver. Startups learn. An important part of entrepreneurship is systematically supporting this learning process for startups and making it efficient. The basic metaphor of cybernetics is the helmsman (kybernetes). It really is like someone at the helm of a ship. They have a target destination, they look at their environment (the wind, the sea, the coastline), and they have different ways to steer the boat (the helm, the sails, the rudder). Regardless of what they take in around them, they guide the boat to its destination. There's not really a fixed plan to work to, they react to the situation around them as they need to and re-orientate themselves each time. It's the same with startups. Iterative interaction with the environment, agile development, lean startups – they're all well-known reflections of this phenomenon. It's about uncharted territory waiting to be explored and this exploratory approach is what makes entrepreneurship what it is. You're not planning and carrying out a fixed plan. It's dynamic navigation within a sphere of problems and solutions until a sustainable business model has been identified. Entrepreneurs explore in a series of feedback loops, which is why we talk about human-centric cybernetics.

How important are innovation and technology transfer for research and teaching organizations?

Research and teaching facilities generally provide an extremely constructive framework for innovations and setups. They provide space, room to question established technologies and value-adding processes. They allow people to explore new avenues. All important innovation ecosystems have research and teaching facilities, and these play a pivotal role. Technology startups are exceptional cases and they're important. Transfer research can work by going through established companies or through startups, but in both cases, the aim is to transform new knowledge that has emerged through research into benefits – benefits to society, the environment, companies, private individuals. Research institutions also play an important role when it comes to technology transfer. This is because, in legal terms, they own intellectual property and every element of innovation that is based on this intellectual property has to take that into consideration.

Another area you conduct research into is technology entrepreneurship. What's so special about this area?

At an organization like KIT, which is involved in such intensive research, lots of new knowledge is generated and with that, lots of intellectual property. There were around 60 patent registrations in 2015 alone. Over the years, that adds up to a respectable portfolio of patents. With technology entrepreneurship, the aim is to translate these new possibilities into market-ready applications. Incidentally, most startups don't actually stem from patents, they're about user-centric innovations. There are a number of methods already available for user-centric processes. There's design thinking, where you start with the overall context of the user and based on the observations you make, you adopt one angle,

generate some ideas for solving the problem, create some prototypes, and then validate the ideas with actual users. If the innovation process is sparked off by a new scientific discovery or a new technology, you have to use a different method. Then you start by looking at – or characterizing – the exact nature of the technology, you develop some ideas for possible applications, and then the options this throws up are evaluated according to their potential to make things happen. The sequences, content, and iterations of analytical, creative, and empirical elements are different with a technology-centric innovation compared to a user-centric innovation. Developing the right approaches and methods is one of the central aspects of technology entrepreneurship.

You lecture in the art and science of entrepreneurship at your chair for entrepreneurship and technology management. Does that mean anyone can learn how to be an entrepreneur or are there certain defining characteristics that are needed to succeed in this area?

You can compare that question to another question: Can you learn to be a pilot? Or to play the piano? Sure, things like that take talent, but they can also be learned. It's no different with entrepreneurship. Teaching can help unfurl a certain disposition. Time and again, researchers try to find out whether there are certain psychological traits that define an entrepreneur. The famous professor of entrepreneurship William Gartner points to three such traits. First is the need for achievement, the second is a conviction that the entrepreneur can make things happen (locus of control) rather than being determined by the circumstances, and the third is a risk-taking propensity. There is, however, a completely different view. Some people point to something called the individual-opportunity nexus, a kind of resonance between a business idea and the enterprising individual. When the resonance is there, it releases the energy to pursue an opportunity. This allows individual potential to develop which would otherwise lie fallow. Entrepreneurship teaching is a good way to prepare people for this.

You're also the joint project coordinator of the KIT Startup Incubators, the Founders' Forge initiative that was set up in April 2013 to support the development and promotion of entrepreneurs and companies and help their innovations succeed. What services do you provide and who are the target groups?

The emphasis lies in a number of areas. We offer a wide spectrum of entrepreneurship teaching, models for research assistants to hone their technology transfer knowledge, an accelerator program for new startups, a special KIT crowd funding platform, services in the area of consulting, support with startup projects, networking events in the surrounding area, and lots of news and information sharing, both internally and externally. Accordingly, the target groups are students and scientists, but also anyone working in this field such as investors, entrepreneurs, and their counterparts in economic development, the Cyberforum, and the IHK chamber of commerce. The world is now a global network so contacts abroad are particularly important and we also offer things like a spring and summer school in English.

The current digital technology trend is hugely important for growth in Germany and safeguarding the future viability of the

economy in the face of international competition. What opportunities are there for future entrepreneurs, as well as challenges, and what can they do to prepare for them?

Digital technology is the key to a whole host of business opportunities, although to use the term invented by Schumpeter, it also has the potential to cause creative destruction. It makes it possible to reach out to users and customers. It raises productivity and process flexibility. It supports production processes. This transformation already started decades ago, but it keeps coming back with wave after wave of sweeping changes. There's every sign that the next wave is about to hit us. From an entrepreneurial point of view, this will create many new opportunities and the startup scene has plenty of ideas up its sleeve to tackle these new opportunities. As in the past, there are lots of services and products that can be made to work better through the internet than in all other formats we're familiar with. Integrating the real world into digital environments takes on a whole new quality with sensors and robots. The physical world and digital world are merging. These are realms that offer completely new opportunities, but at the same time they challenge the established offering. Entrepreneurs need to track trends and develop an eye for the areas where there's potential for sustainable innovations.

Image: KIT/KIT Founder Incubators (Founders' Forge)



Prof. Dr. Orestis Terzidis heads the Institute for Entrepreneurship, Technology Management, and Innovation at the Karlsruhe Institute of Technology (KIT). The aim of the institute is to further knowledge and skills that make it possible to implement new technologies and business models through entrepreneurial undertaking revolving around innovation.



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Business idea:

Permanent anchorage system

Customer solution:

The detailed description of your solution tailored to your customers is given in the Position Statement.

Your value proposition:		Your customers:	
Your industry:	<input type="text" value="Construction"/>	Market model:	<input type="text" value="B2B - Business to Business"/>
Your competitive advantages:	<p>The new permanent anchor system for scaffolding solves divers customer problems: it is easier to install (complexity problem), remains in the wall (time or availability problem), is thermally decoupled so that no heat bridges are created (quality problem), and is also cost-effective (cost problem).</p>	Market segment:	<input type="text" value="Double or multi-sided platform"/>
		Market space:	<input checked="" type="checkbox"/> regional <input checked="" type="checkbox"/> national <input checked="" type="checkbox"/> international
		Level of customer needs:	<input type="text" value="Security needs"/>
<input type="button" value="Show value proposition details"/>		<input type="button" value="Show customer details"/>	
Sales revenues:			
Revenue model:	<input checked="" type="checkbox"/> One-time sales revenues	Price model:	<input type="radio"/> Price leader
<input type="checkbox"/> Usage fees	<input type="checkbox"/> Subscription fees	<input checked="" type="radio"/> Price fighter	<input type="radio"/> Price follower
<input type="checkbox"/> Rental, lending and leasing fees	<input checked="" type="checkbox"/> License and patent fees	<input type="radio"/> None of them	
<input type="checkbox"/> Brokerage fees	<input type="checkbox"/> Advertising revenues	Payment method:	<input checked="" type="checkbox"/> Payment in advance
<input type="checkbox"/> Other sales revenues		<input checked="" type="checkbox"/> Cash purchase	<input checked="" type="checkbox"/> Credit purchase
Description:	<p>One-time revenue sales can be generated by selling to other scaffolding builders. Also possible are license fees in the context of internationalization.</p>		

Seven Key Questions Leading to Success

Putting business concepts and innovations to the test

Innovation & Business Creation, the Steinbeis Transfer Institute based in Gräfelfing just west of Munich, has developed a checklist method called Seven Key Questions (SKQ), which helps assess business concepts and innovations with just a short list of controls. It also highlights whether concepts are implementable with respect to target customers, the value they add, differentiation from the competition, and financial viability.

The institute's checklist is an expanded version of an original model called the Six Key Questions, which was developed by eLab in the 1990s as part of a collaborative venture between two universities, LMU Munich and the Technical University of Munich. The new SKQ model is used to evaluate business concepts and innovations to see if they can be realized immediately and if they should deliver results that are both financially acceptable and sustainable. The method is aimed at:

- Potential startups who want to put their business model to the test to see if it might work in practice

- Young managers hoping to expand their business or go international
- Established businesses looking to enter new markets
- People who want the company they work for to take on an idea (intrapreneurs)
- Investors and funding providers, who need reassurance and checks regarding a financial commitment

To answer the Seven Key Questions, the model is not about sequentially putting check marks in boxes but rather about going round and round in loops. If respondents discover that answering one of the key questions

raises issues with a previous question they answered, they simply go back to it again. In this way, the method has parallels with so-called design-thinking techniques. A good example of how this works in practice is the winner of the 2015 Seifriz Award, the Bad Sassendorf-based scaffolding manufacturer Wolfgang Henning, which developed a new kind of permanent anchorage system for scaffolding in collaboration with the TU Dortmund University. The anchors use a special fixture to remain permanently attached inside walls. This makes it possible to use the anchors again the next time a building needs plastering or painting.

Key Question 1: Who is the customer? Every business concept or innovation should be aimed at a specific target group. Defining and understanding the exact nature of this group is a key to successful implementation. The primary customers in the case of Wolfgang Henning are all of the other 3,827 scaffolding manufacturers in Germany.

Key Question 2: What problem does the product or service solve? Ideally it solves a customer problem by fulfilling an urgent need or addressing the most challenging shortfalls. Depending on whether it's a B2B or a B2C business model, this could be something like capacity problems, quality issues, time constraints, availability problems, performance problems, risks, budgetary problems, image problems, application or complexity problems, etc. With the new scaffolding anchor, the product solves several problems at the same time. It's easier to mount (complexity problem), it stays where it is in the wall (time or availability problems), it's not affected by temperatures, so it does not conduct thermal energy (quality problem), and it's inexpensive (budgetary problem).

Key Question 3: What value does the solution add? Can problems faced by the customer be expressed in numbers? If so, can the corresponding value added by the solution also be expressed in volumes, time, or units? The better the benefit can be quantified in its ability to solve a quantifiable problem, the more likely the customer is to perceive the value of the benefit – and thus the more likely they are to buy the product. In the case of the scaffolding anchor, it is possible to point to the time it saves during mounting and the improved thermal insulation. This is ignoring cost benefits.

Key Question 4: Why is the solution that's offered better than any comparable alternatives? It's not enough to solve a customer's problem. A solution must do this better than the competition. With this question, it's important to keep an eye on direct and indirect competitors. Wolfgang Henning's direct competitors are producers of other permanent anchorage systems, whereas indirect competition comes from other anchorage systems, as well as totally free-standing scaffolding.

Key Question 5: What's the market potential? This depends on the theoretical maximum (annual) volume of the market. Taking the real market volume (i.e., actual current size of the market per year) as a proportion of the potential market size gives a number equating to the current level of market penetration. This is an indication of how much of this market potential has already been exploited. It's also important to consider whether a market is expanding or shrinking. The annual turnover of German scaffolding companies has risen in recent years. Accordingly, this is a growth market. Breaking down market turnover by the different kinds of anchoring systems also provides a more detailed picture. This will also make it possible to estimate market shares.

Key Question 6: How can money be made out of the proposed offering? By selling products and services, companies generate turnover. This can be through one-time sales or through repeat business, such as monthly rent or leasing fees, commission, or advertising revenues. However, it may be more important to calculate the anticipated cash flow and not so much the revenues. This is especially the case for business founders and new startups, which have no established business model as a reference point. As a result, calculations should not just cover sales revenues but also the resulting cash flows. When calculating the cash flow for the new permanent scaffolding anchors, budgeted income had to be contrasted with forecasted outgoings. Later on, this had to be compared with actual payments received and expenditures.

Key Question 7: Does the business concept match the company well? Dr. Bernward Jopen and Uwe J. Umlauff at the Steinbeis Transfer Institute for Innovation & Business Creation are convinced that entrepreneurial freedom is not a function of financial independence but also the amount of leeway individuals are given to make decisions themselves and lay their own plans. As such, companies should start by asking themselves whether a business concept or innovation is also compatible with their values, skills, professional experience, or even personal experience. If it's not, even if the revenue prospects look good, the entrepreneur, experienced businessman, or even the investor, should really steer clear of it.

Image: A business concept can be depicted in a diagram and developed into a business model by using the so-called Business Model Canvas. Similarly, this automatically makes it possible to write a positioning statement that can be used to present the business concept in no more than two minutes to an audience – such as to investors at an elevator pitch.



Dr. Bernward Jopen



Uwe J. Umlauff

Dr. Bernward Jopen is founding director and Uwe J. Umlauff co-director of the Steinbeis Transfer Institute for Innovation & Business Creation. The Steinbeis Enterprise's portfolio of services ranges from entrepreneurship education to startup management and business training.



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“Every idea needs someone to bring it to life.”

Professor Dr. habil. Achim Walter speaks to TRANSFER magazine and explains what six blind men and an elephant have to do with the term entrepreneur. He also explores the factors that are essential for the success of an academic spin-off.

Hello, Professor Walter. If you ask ten experts what they mean by the term entrepreneur, you get at least eleven different answers. Why is that?

[Grinning ...] Sounds like the analogy with the six blind men and the elephant: The six men are asked to identify what kind of animal the elephant is by touching different parts of its body. Sometimes it's exactly the same way in science. Depending on their specialty and the kinds of methods they gravitate toward, each of the experts comes up with a different answer and it's only when they sit down and compare their insights that they figure out the "big picture" together. At the moment, the search is primarily on for business scientists, but also psychologists and sociologists with a sufficient grounding in empirical methods that make it possible to say what makes a good entrepreneur. Sometimes the focus lies in researching personal attributes to work out the phenomenon of entrepreneurship – like striving for power, or the motivation to achieve something. Sometimes it's more about people's personal networks or the specific ways they act, like when they face a decision. Then there are factors like the way society's view of entrepreneurs has changed over time. In the old days, they were like wandering minstrels, inventive tradesmen, or bosses with their sights set on a goal – people matched to the idea of adding value through a business undertaking. These days, the image people have of entrepreneurs is shaped by clever networkers, people like Mark Zuckerberg.

One of your main areas of research is academic entrepreneurship. How important are academic technology spin-offs for exploiting expert knowledge in the world of business?

Yes – academic entrepreneurship, it's an amazingly fascinating area. On a general level, it involves all kinds of activities, people, initiatives, and organizations that are of benefit to the commercial exploitation of scientific insight. On a functional level, academic entrepreneurship is about striving to translate new technologies that come up through universities or other research bodies into products and processes that add value. This usually won't work without the involvement of the creators and developers of the innovative technologies, so we need the person who has the know-how, with the right entrepreneurial ability to form a link in the chain between science and business. Academic spin-offs are business undertakings founded by scientists working at public research institutions. They're often using the technology at an early stage of development, so it's at a point where an established company won't be all that interested in it yet. I know scientists who always have a prototype somewhere up their sleeve to make sure they don't miss an opportunity to show somebody in industry how useful their idea is. It's a really important part of the transfer process. The challenge is to run real experiments or a kind of hidden object game to see who exactly might find a new technology useful. One and the same kind of technology can sometimes be used to come up with several successful innovations, even though they're completely different.

I strongly believe that academic spin-offs can provide a strong impetus in developing regions of innovation. There are a number of studies that indicate that such spin-offs are usually set up in the immediate area around the mother organization and that this creates jobs for highly qualified workers. International studies show that companies formed as spin-offs of research institutions are highly likely to survive in the

long term. Once they've made it through the early stages, they rarely have to throw in the towel. Academic spin-offs do a relatively large share of business through exports and their presence attracts other hi-tech companies – and this stimulates business clusters. Established companies can take over academic spin-offs and bolster their long-term competitiveness. At the same time, they can broaden the focus of their own R&D to other fields of application. Spin-offs offer potential growth, so for venture capital companies, they can be an attractive investment – even if this is often associated with high levels of risk. When publicly funded research promotes industry at a regional level, this also has a positive impact on the image of the organization acting as the incubator – so this also justifies giving it funding. I see robust funding and research bodies moving around within a region as a reliable starting point for economic development.

What do you believe is the most important factor for such spin-offs to succeed. How important is the idea, or the entrepreneur, or the newly set up organization?

Before I answer that, I have to say that the academic spin-offs we encounter consist of very few female entrepreneurs. Our own studies found that less than 10 percent of teams include a woman. There are reasons for this and they have to be talked about so that we can change things. As for the key success factors for academic spin-offs, there are several. Apart from needing a marketable technology and a solid financial basis, which are prerequisites, they need enough leeway to work as an entrepreneur – either within the mother organization or separately – and perhaps the most important factor is the human factor. Entrepreneurial opportunities are discovered or developed by people. Without their special aptitudes, their above-average self-confidence, their personal drive to get out there and meet people in the market, and to create something new, nothing would move forward. Every idea needs someone to bring it to life. Technologies don't end up in value-adding applications by themselves. Academic entrepreneurs become the discoverers and creators of entrepreneurial opportunity through the things they do and decide. To do this, they need to believe in their own ability, they need business acumen, a certain amount of luck, and, more than anything else, competent partners at the research institutions. Academic business founders benefit hugely from carefully targeted support, especially when they're taking their first steps. They need help getting organized, drafting contracts, speaking to clients in industry, and looking for appropriate funding.

For such spin-offs to succeed, their knowledge and technology has to work in actual application and this has to be recognized, especially by industry. The transfer process plays an important role in this respect. Who would you say is responsible for ensuring this works properly, and how?

The easiest way to figure out the answer to that question is to think about how insecure companies feel at first about the idea of collaborating with an academic spin-off, which is there to provide the know-how. Established companies find themselves standing opposite an innovation partner which is still new and mainly has the scientific background but often has no market reputation to speak of and can't even point to any proper reference customers. So at the beginning, it

all depends on how much support is given to the transfer project by establishing a sense of trust.

In terms of the actual transfer process, that means that the academic entrepreneurs should not be simply given funding because they have the right know-how, they should be expected to be so-called relationship promoters. As such, academic startups should build a bridge between their own business undertaking and the customers of their innovation. In their role as relationship promoters, they should be professional networkers, who forge and foster personal contacts in business and underscore their commitment to gain the trust of their transfer partner. This helps mobilize the required resources to develop the academic spin-off and commercialize its core know-how. It also reduces the risk of misunderstandings between the technology provider and the beneficiary, who achieve a balance between their different interests more quickly. As relationship promoters, academic entrepreneurs help unveil specific and hitherto unrecognized needs of the transfer partner and if conflicts do arise, they find constructive solutions. Time and again we find that successful transfer processes depend on all parties learning lots and this is made much more difficult if they're held back by "can't-do" or "don't-want-to-do" attitudes.

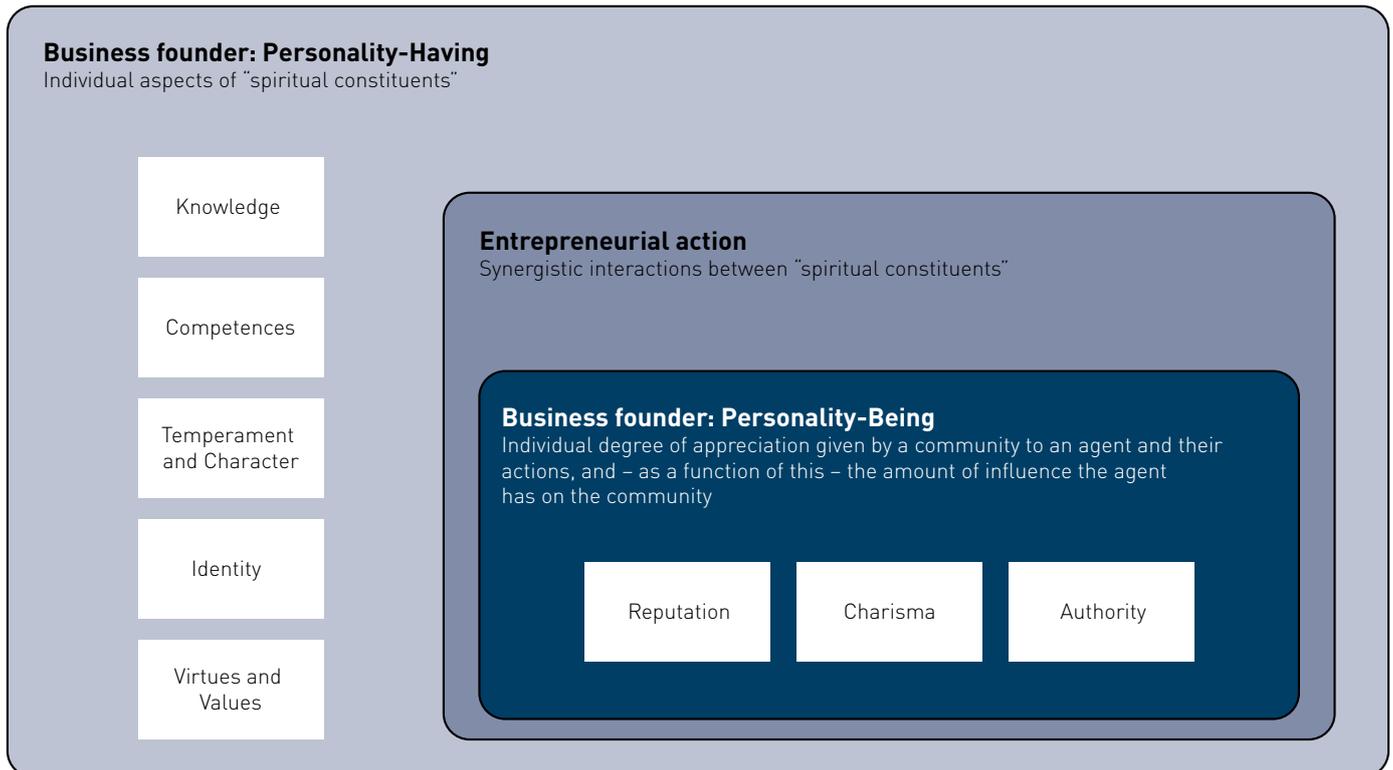
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Professor Dr. habil. Achim Walter is director of COMMIT, the Steinbeis Consulting Center. His Steinbeis Enterprise looks at strategic planning and evaluation, offering its clients services relating to the analysis of customers, suppliers, technologies, and innovations. It also helps with implementation.



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The Personality of Founders – A Key Success Factor

Nature or nurture?

A number of factors dictate the success or failure of a business startup, as has been understood for some time now. But what role does the actual personality of the business founder play? And how can this role be defined? Are you born an entrepreneur or is it something one can learn? This and many other questions have been examined as part of research carried out by Prof. Dr. Werner G. Faix and Jens Mergenthaler at the School of International Business and Entrepreneurship (SIBE) at Steinbeis University Berlin.

The research uncovered four key factors that are central to the success of a startup:

1. The quality of the startup concept and the opportunity that's open to it
2. The professionalism of the startup analysis, planning, and implementation activities
3. External factors affecting the startup (funding options, government policy, the economy, society, technology, legislation, environmental aspects, and value expectations)
4. The personality of the founder

Research and business practice have underscored time and again just how important founder personality is as a key success factor. As a result, considering the personality of the founder is a core part of business planning. For Werner G. Faix and Jens Mergenthaler, this key success factor is actually pivotal to successful startups. Somebody may have identified a great opportunity or come up with a big idea, all the preparation can be right, external business conditions may be ideal – but without a go-getter, someone with the magic touch, and the sheer drive of an entrepreneur to make things happen, an opportunity remains an opportunity and an idea is simply that: an idea.

More than anything, business founders need an entrepreneurial personality, the ability to create things – creativity itself – to translate ideas into reality and add value.

People often talk about personality and they have a lot to say about the issue, so there are countless definitions of the term. Faix and Mergenthaler see the term in its narrowest sense as an aspect of human behavior. On the one hand, personality is something that underlies everything we do; on the other, everything we do, agree to, and desist from doing is a visible reflection of what and who we are. Personality is thus a collective term for the entirety of our inclinations, our qualities, our abilities, and our intentions, and these are all portrayed through our specific actions.

The German language uses the term personality in a pragmatic sense that has two distinctions. On the one hand, personality is about something people have ("having"), on the other, it's something they are ("being"). The having aspect is seen in the fact that people can work on their personality and develop it. This aspect is also seen when something expresses (or is a product of) their personality. Personality thus appears to be a deep-seated attribute that belongs to people, something they can (re)shape. It is also a basis for their behavior and interactions.

Personality in terms of what people are ("being") is reflected in German in saying things like "He is an amazing personality [character]," or "She's a leading personality in sport/politics/business/society/the arts etc." Personality is used in this sense to refer to a person who plays a particular role in society. In other words, the being part of a personality represents the result of a complex social process in which a community apportions value to the standing/significance/influence etc. of a person on that community. So in a general sense, German describes people as "having" a personality and "being" a personality. According to this definition, we could therefore take a pragmatic view that personality is Personality-Having and Personality-Being. Personality-Having is about possessing a host of attributes that make a person unique and make them an identifiable individual. This having consists of a deep-seated individual totality which includes the following: knowledge, virtues and values, skills, identity, temperament, and character.

When all these elements come together they are reflected in our actions, what we do, agree to, or desist from doing. The fact that we do things and how we do them subsequently results in others seeing us in a certain way. Ultimately, this social estimation process is intimately linked to what we call Personality-Being. This is because it's our actions that cause others to see in us whether we're a personality in the eyes of others, and what kind of personality that is: A person who "is" a personality, is – in the eyes of others – attributed a reputation, authority, and charisma.

There is ongoing discussion in startup research about whether you're a founder by nature or whether founders can be nurtured. The debate revolves around whether founders have this or other characteristics (in the sense of personality traits) in their genes, or whether there is a way to train such things. There is still no clear answer to this question, and there (probably) never will be. Nonetheless, there is a clear tendency showing that even the deepest layers of personality can be influenced by education. There are dynamic interactions between knowledge and competence acquisition on the one hand, and character on the other. However, changing the deepest layers of personality is a long-term process. As a result, if people want to develop their potential to become an "entrepreneurial personality," they should start as early as possible.

Ideally, the "life phases" companies go through can be divided into different stages. During each of these stages, founders face different challenges and are required to make different decisions. Before the startup stage, the main priority is to have an inspiring idea and decide whether to set up a company in the first place. During the startup stage, it's about strategic considerations, lining up finance, and even dealing with red tape. At this point, a decision is made as to whether to enter the market or not. During the consolidation stage, it is about everyday operations within the company and possibly even first management responsibilities. Assuming this goes well, the next decision is how to keep the company going (sell, set up another company, just maintain course, expansion etc.). As things start to grow, the priority is to set new targets for oneself and the company. The decisions made at this point depend largely on the role played within the company (manager or entrepreneur).

Each of these phases requires the entrepreneur to think carefully about their own personality and even decide if and how they should work on

their personality. At every phase of the company, the entrepreneur has to ask the following questions: What do I know? What am I capable of? Who am I? What do I want? Also, what do I need to know, what should I be capable of, what do I need to be and what must I want in order to make it through this stage successfully? How the startup develops is thus closely linked to the development of the personality of the business founder. In other words: the company is a reflection of the personality of the entrepreneur.

Image: Model showing Personality-Having and Personality-Being (Faix/Mergenthaler)



Prof. Dr. Werner G. Faix



Jens Mergenthaler

Prof. Dr. Werner G. Faix is holder of the chair for Business and HR Management at Steinbeis University Berlin and founder/Managing Director of the School of International Business and Entrepreneurship (SIBE) at Steinbeis University Berlin. Jens Mergenthaler MBA is a personal scientific assistant to the management of SIBE. SIBE stands for successful knowledge sharing and the systematic development of skills in the world of science and business, with a focus on companies, organizations, and public administration on the one hand, and competent, entrepreneurial, "high potentials" on the other, who think and act globally.



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“My aspiration is to try out something new and learn as much as possible, and of course I also want to be successful as a businessman.”

An interview with business founder Thomas Link and Steinbeis consultant Ruben Maier

Thomas Link founded his own startup with Philipp Pfundstein and Karl-Bang Gottlebe. It was based on the concept of a drivable transportation table called FTT and the team was supported by Ruben Maier, director of the Steinbeis Research Center for Simulation, who works for Steinbeis as a startup advisor. The project was backed by an ESF funding program which awards EXI startup vouchers. In a joint interview with Thomas Link and Ruben Maier, they talk about their experiences on the project.

Hello Mr. Link, when and how was the decision made to set up your own company?

It was after writing my thesis at university. I'd been going through the business case for a drivable transportation table and I knew that once my studies were over, I was going to work with Philipp Pfundstein to make the idea happen. I got onto Ruben Maier after a recommendation from an acquaintance who'd also been advised by him on a startup. I approached him in June 2015 when I was working on my bachelor's thesis. The thing that was important for us to know was if it's the sort of idea that would work in business. We wanted to speak to an expert who had experience in setting up a company and who would help us avoid basic mistakes.

And you, Mr. Maier, what approach did you take to the consultation?

We had an initial session to get to know each other and take a look at the prototype. It didn't take long for me to tell Thomas and Philipp that I found their idea good and that the product concept looked like a winner. It was an eight-hour initial consultation session which is free for anyone interested in setting up a business. So we went through eve-

rything and the aim was to work out if the business concept had any legs to stand on, and whether the two founders were even suited to setting up a business.

And what happened next in terms of advice?

Link: Our aim was to get an EXIST startup grant from the Federal Ministry for Economic Affairs and Energy to obtain the right funding and structural support. Mr. Maier quickly recognized that we'd need another co-founder to join us if we were to have any chance of benefitting from the program. So as a result, our main goal in the next consultation was to pull a new team member on board, someone ideal to fill our skills gap in the field of mechatronics.

Maier: We managed to organize a series of interviews with students at Pforzheim University who'd be willing to start a business. Our absolute favorite was Karl-Bang Gottlebe and we managed to convince him to join the team. In technical terms, he was the perfect complement to the team because he was a mechatronics student, so he had the crucial know-how that was missing in the company. Also, he's a good match with the team on a personal level. We also had product design and ergonomics on the agenda, as well as pricing.

Mr. Link, it's still early days in self-employment for you, but despite this, what would you say were your biggest successes and what are your goals as an entrepreneur?

Our biggest success has to have been getting the EXIST startup grant since August. The bursary will now be paid to us monthly as a startup salary with funding for the company. Thanks to gaining this approval, Philipp was able to quit his full-time job to join me and Karl and concentrate fully on the startup. My aim as an entrepreneur is to fulfill my personal goals and come into work everyday looking forward to it. My aspiration is to try out something new and learn as much as possible, and of course I also want to be successful as a businessman.

Would you be willing to divulge what your biggest fears and doubts were regarding the startup?

Even at the beginning, I fully understood the level of risk involved in setting up a business, but I also knew that "he who dares, wins." For us as a team, the main thing that's important is to talk openly about risks and worries and then decide together which risks we're prepared to take. One worry that will probably take some time to go away would be if we can't find common ground for essential strategic decisions, or if someone's not pulling their weight. Despite that, I'm certain there are more positives than negatives setting up a business as a team. You achieve more together. And then there are a whole lot of external risks, for example if a customer doesn't pay or if the bank doesn't give us the credit we need. That was where analyzing risks was a help in identifying potential risks internally and externally. Now it's up to us to put measures in place to prevent risk or minimize it, to look as far forward as possible as we enter self-employment.

Mr. Maier, you've worked with lots of business founders now. What mistakes do you witness most often? What are the classic stumbling blocks? And what can business founders do to prepare for them?

Lots of startups have a very one-sided view of their concept. Unfortunately, they're often a long way off market needs and customer requirements. Also some of them worry about talking to their friends about their business idea, often because they're scared somebody might steal their idea. Actually that's not something they need to worry about because the road from the initial idea to successful implementation is usually a long and bumpy one. So I can only recommend getting as much feedback as possible beforehand – from acquaintances, friends, even potential customers.

Mr. Link, so what's next for you?

Of course we're trying to drum up more funds for our business and get more visibility. We regularly take part in pitch competitions and Mr. Maier has been helping us with this and giving us coaching. If possible, he gives us a bit of moral support by coming along to events. Otherwise the obvious goal is to prepare our product for the market by next year and work up the sales and marketing strategy.

Mr. Maier, what tips would you give to people who are toying with the idea of setting up a business at the moment?

A startup always involves a certain amount of risk. So because of this, it's important to get professional advice before the startup. My recommendation to anyone interested in setting up a company is to turn to the right people – like the chambers of commerce, which will offer an initial consultation for free. If the setup becomes more concrete and you seriously think there's good potential for your own company, in Baden-Württemberg there's the ESF program with its EXI startup vouchers. The advisors that are approved under the program, like Steinbeis, have experts with the right experience who are always happy to help turn an idea into a reality.

Image: Ruben Maier talking with the young founders



Thomas Link



Ruben Maier

Thomas Link is a graduate of Pforzheim University and he turned to the university for help with identifying a topic for his thesis. It was then that he first met Philipp Pfundstein, who had a business idea based on a drivable transportation table to help in household and care homes. Pfundstein, who is a qualified plant engineer, originally thought of the idea after injuring his leg. He screwed a tray onto the top of a remote control toy car which allowed him to transport coffee, plates and other objects around the room – despite needing two crutches!

Ruben Maier is a mechanical engineer and director of the Steinbeis Research Center for Simulation. As well as lecturing at a private university he also works at Pforzheim University. As part of his work as a startup advisor for Business Start-up, the Steinbeis Consulting Center, Maier helps young business founders with their projects.



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Climbing to Success

Agile entrepreneurship

Founders Markus Matt and Arne Sauer are old hands in their leisure sport, rock climbing and bouldering. On the other hand, they are completely new at the business of running indoor rock climbing facilities. Three years ago, they had the idea of opening a bouldering center in Freiburg, thereby turning their hobby into a job. But before the idea could even get off the ground, two competitors popped up, who were already in the middle of the construction phase for a similar project. Just in the nick of time, it became clear to the founders how important it is to know your market, keep an eye on the competition, and seek professional support. With the help of Steinbeis consultant Peter Becker, this ambitious endeavor would finally become a reality.

Fueled by hard work, expert know-how, and industry knowledge, the planning of a modern bouldering center got underway in a different location. The two founders had previously had their eye on a suitable property in Grenzach-Wyhlen, a community located on the outer edge of southwestern Germany. The new property had also been discovered by the competition, but this time they were determined to beat them off the starting line.

To do this, they needed an extensive financing package, and to overcome this financial hurdle would require bringing various investors on board with a selection of financial instruments: equity capital, private risk capital (from business angels), subordinated capital from the reconstruction loan corporation and startup loans, as well as credit from house banks and guarantee banks. Early support from a private investor known to both founders was very important for both of the young entrepreneurs. To convince all investors that the two founders' plans were feasible, the first step was to carefully develop the business plan, which was still in its rough draft. In a second step, they had to give close thought to ownership arrangements and contingencies. With many parties involved and lots of discussions going back and forth, this was an arduous process that at times seemed destined for failure, especially considering they had to get the financing in place before someone else swooped in and signed a rental contract on the property they had in mind for the project. And since, at the time, the building wasn't an indoor climbing facility, the construction company started getting a bit impatient, eager to move ahead with the planning of the interior. This type of project requires very detailed planning and it's essential to work through each individual point of action – from the preparatory phase to the grand opening. That's because there are huge upfront costs, even in the preparatory stages, and these cannot be covered by income at this point.

At the start of September this year, the time had finally come: LÖbloc – DIE Boulderhalle (LÖbloc – THE Bouldering Center) opened its doors in Grenzach-Wyhlen. It was designed to unite the rock climbing scene

with a wide-reaching audience in order to tap into the potential of climbing as a widely popular sport. Bouldering (rock face climbing), used to be considered a good way to train technique for athletic climbing. In the meantime, it has developed into its own type of rock climbing, a hugely popular trend in athletic climbing. So a modern bouldering center has to appeal to a wide range of customers. It has to be both a sports facility and a place to meet up. The snacks, drinks, accessories, and equipment on offer in the shop are an important secondary source of income for the business owners.

The aim of the founders? To make LÖbloc a meeting place for sports enthusiasts in the tri-border area. With workshops and introductory courses, the founders hope to get more people excited about the trendy sport – especially people who have no previous experience with bouldering.



Peter Becker works at the Steinbeis Consulting Center for Business Startups. The Steinbeis Enterprise focuses on consulting and coaching in the pre-startup phase with brief consulting sessions of eight hours or less and in-depth consulting sessions of up to a maximum of ten days. They touch on aspects such as founder personalities, KODE analysis, skills and requirements profiles, and reasons or motives for founding a business.



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Sustainable Jeans from Freiburg

An example of a new kind of entrepreneurship

Sustainable, fair, authentic. New entrepreneurs are looking for meaning. They want to found a business that feels right. The key factor: slow growth derived from little startup capital. The Steinbeis Consulting Center Sustainability – Strategy – Innovation has developed a "sustainable business design concept" for this special kind of business founder.

"I see fairjeans as a way of actually doing something, not just talking about it," says Walter Blauth, to which his business partner, Miriam Henninger, adds: "Good working conditions and the sustainable production of raw materials have to become the standard in the long term." They are standing in their shop in the Vauban district of Freiburg, where they sell their men's jeans. They tell us how their vision took shape: "We were talking about the shortcomings of the fashion industry with respect to the personal dignity of workers, sustainability, and ecology. We wanted to do better. We set out to create jeans because it's a product that has continually established itself on the market over decades and it's a product that's generally made in environmentally damaging conditions that aren't socially acceptable. Researching the industry quickly revealed that there is a genuine market gap for ecological jeans produced under fair conditions – a gap that the large producers have yet to fill. There was a real opportunity there, so fairjeans OHG was founded to create a quality product that was both fair to the environment and to people.

The Steinbeis Consulting Center Sustainability – Strategy – Innovation stepped in to support the young entrepreneurs with this endeavor. The consulting focused on developing a concept that fits to the character of the modern entrepreneur. The founders want to grow slowly, starting from modest startup capital. The "component system" – i.e., building stable partnerships – is ideal for this. Modern entrepreneurs want their business and their products to contribute to a future-ready and sustainable economy. The Steinbeis experts have developed a new process for establishing "green" business models. It's a combination of Fichter & Tiemann's "Sustainable Business Canvas" and Faltn's "Entrepreneurial Design Concept": the "Sustainable Business Design Concept."

The "fair" jeans are produced in the EU from high-quality Turkish cotton and they are certified by the GOTS (Global Organic Textile Standard). This renowned international seal of approval defines eco-technical requirements and social criteria. The two young entrepreneurs quickly realized that they wouldn't produce the jeans themselves, but rather looked for good partners instead. The location of business partners was very important to them. Since the jeans should be affordable, producing them in Germany was unfortunately out of the question. The founders ultimately opted for a partner in Posen, one of Poland's most bustling cities. In a next step, Blauth and Henninger went on the lookout for high-quality organic

denim and set out to design the final product. Their primary aim: seeing their sustainable, basic cut jeans make it into every man's closet. The jeans are offered in three levels of washed denim, with a classic cut that fits most men. This is also a reason why online sales have been so successful. Online business will be the focus of their activities in the future.

The young entrepreneurs' next goal is to make more use of materials and processes that extend the durability of products. As with all things so far, they continually run up against barriers because there are limits to what the market can currently offer. But Blauth and Henninger are optimistic that more and more producers will follow suit over time. fairjeans is a trend-setter in reducing product lines down to a few basic options. It stands for long-term durability and sustainability and intends to hold down a secure position in this niche market. Blauth and Henninger pay close attention that all of their partners and suppliers offer socially acceptable working conditions and that they work in line with ecological standards. The motivation is simple: fairjeans should serve as an example of how easy it is to bring respect and dignity into the production of fashion.



Christel Rosenberger-Balz is director of the Steinbeis Consulting Center Sustainability – Strategy – Innovation. The services offered by this Steinbeis Enterprise are geared toward new founders as well as companies guided by values that place an emphasis on sustainability.



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Where is Company Development Headed?

Entrepreneurs are the new company shapers

Companies that want to keep pace with the constantly changing and increasing demands of the market have to constantly change and develop themselves. The directors of the Steinbeis Consulting Center for Entrepreneurial Excellence have started to question what a typical business development process should look like in order to achieve success, and why failure can happen even despite careful preparation.

Two factors shape the way companies develop. One factor relates to external influences on a company like, for example, threats caused by changes in the market and rivalry among competitors. The other is internal: influences on the company itself, such as the founder, the management, and the company employees. This begs the question: Why do development projects sometimes fail or come to nothing, despite the fact that results are targeted, change processes are defined, and change management departments have been put in place? Many businesspeople shy away from investing resources again once they've had to terminate projects, see stagnant (change) processes, and watch precious resources like money, time, and nerves wasted on fruitless endeavors.

This is one reason why the term "entrepreneur" (the French word for a business founder) is now often used in discussions in Germany about company development. The phenomenon of using a new term when old vocabulary seems to have served its purpose and can't be resuscitated is very well known. But why does it seem that today of all times a new concept or description is necessary? Classic businesspeople shape their company by working in and at the business. They're the source of all

strategic thinking and action. In many cases, however, they're just a business administrator in the sense of a manager – someone who still works at the company and is often his own best expert. This contrasts to real entrepreneurial spirit, the driving force of innovation that is increasingly overshadowed by product requirements, KPIs, and far too strict specifications. Company development based on re-inventing processes is reaching its limits. So it's precisely this space that these new entrepreneurs hope to fill – and should.

A company can only develop in the same measure as the entrepreneur is willing to develop himself. It is crucial that he sets the right targets for himself – both professionally and privately. Realizing "My company is a part of my life" logically leads to the question: "What is really important in my life?" To be able to reach his own goals effectively, he should be very clear about his values and keen to develop his own skills. Company development makes it very clear what the entrepreneur would like to change in his life and how to approach this change. Thus it is the first step in the subsequent development of the company. The company development process makes sense if the entrepreneur wants to once again

take on more of the role of a business shaper, instead of letting himself be shaped by others. But how is this development in the entrepreneur perceived within the scope of company development?

The next step focuses on strategy development. Based on the realizations derived from the entrepreneur's personal development, he will develop his business goals and will transfer these to the company. To successfully put these into practice, managers and employees develop professionally as part of organizational development by training their thinking and skills. Thanks to this type of empowerment, they actively contribute to shaping change within the company by adjusting processes and systems to match changing requirements. For example, digital transformation in a company begins in the minds of the employees and only then does it move to upgrading the actual hardware and software. In this way, an entrepreneur creates a company culture of co-creators. What was once an entrepreneur becomes a community of entrepreneurs.

So within the scope of organizational development, it is important to turn company employees into co-entrepreneurs. The trend toward agile methods and working within structured projects clearly shows that success depends more than ever on using skills and coordinating this properly – not just among managers, but also between managers and each individual employee. A look at current employment histories confirms this trend. Projects, tasks, and responsibilities change quickly. This places strong demands on each individual entrepreneur in the company, not only in terms of their specialist skills, but especially in terms of interdisciplinary skills. The most important success factor in the company is the organization's ability to set up dynamic structures and teams that more or less organize, dissolve, and develop on their own in order to reach goals. In an age when (specialist) knowledge is available ubiquitously at any time, knowledge about the specialist skills of each individual becomes secondary. It's much more their general skills that allow people to succeed in a highly dynamic environment. It is the need to organize oneself, communicate effectively, and develop and actively implement creative ideas that determine success or failure. Classic management structures based on hierarchies are clearly insufficient in this regard, or too rigid.

More specifically, as a first step, companies have to do more in the future to create more transparency regarding the interdisciplinary skills of everyone in the company. The question as to who takes on responsibility for which task has to be approached from the perspective of skills, and not based on structures that have developed over time.

The second step is then to develop an organizational culture that can match the dynamic demands of markets and which can be further developed with the commitment of each individual. The aim is having intrinsically motivated employees, who are not just aware of the company's aims and strategies, but who have also compared these to their own personal aims and have linked the two. This is how employees become co-entrepreneurs, who independently recognize the time for change and actively shape it. In this way, change management – which all too often imposes decisions top-down, despite resistance within the company – suddenly becomes change supervision based on employee participation. It is then something that supports and promo-

tes employees to get organized in line with the company's goals as well as their own.

The decision to go back to shaping things autonomously can trigger the necessary impetus. While the complicated, time-consuming analysis and design process is underway, there are actually ways to shorten analysis and planning phases in order to accelerate the overall process. This entails identifying obstacles to success and hindrances early on. The top priority has to be to introduce measures that are an exact match with requirements and all resources should be put to use where they are most useful – in implementation and the final outcome.

Image: © fotolia.de/Robert Kneschke



Markus Riehl



Dr. Lars Öhler



Dr. Uta Hessbrüggen

The Steinbeis Consulting Center for Business Excellence supports startups and existing SMEs with company development and organizational development. The guiding principle for this is "people first" – everything revolves around the individual. That applies in same measure to business owners, business directors, managers, and employers. As part of their service portfolio, the Steinbeis experts use established methods and tools for strategy and

organizational development, in addition to methods based on the results of independent research.



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Lessons Learned: The Road to Self-Employment is Not What People Expect

Extracts from the diary of a startup

When we embarked on our startup, the only thing we were actually clear about was the concept, but we didn't realize that until afterwards – looking back. The concept was about setting up a platform for experience-based learning, which would be fundamentally different from what was on the market. It was a long and sometimes challenging road to turn this idea into a reality but we had the professional support of Steinbeis along the way. When I say "we," that's Sonja Johanna Döring and Alex Müller, the founders of no/academy in Stuttgart.

As a business founder, you're on the road a lot trying to get to know as many people as possible, who not only like the idea but also stand by you with help when it comes to the inevitable formalities like the company formation, capital, collaboration partners, suppliers, and ultimately the customers, who you also have to go out and find. The issues are complex from the very beginning, because you don't know where to start, and there are a variety of places to turn to for the first stages of the startup. Anyone who's invested five minutes looking at the startup scene notices that there's a whole host of initiatives, accelerators, investors, business angels, startup advisors, all financial institutions – all with their own recommendations, which, ideally, you're supposed to look at right away. The first thing we learned was that there's no kind of timetable that immediately works for you. And at the beginning it really wasn't a comfortable feeling because the more people you talk to, the more you realize what you don't know.

We asked ourselves so many times over the last twelve months what's actually special about our startup – or different – and we asked plenty of questions but nobody seemed to be able to give us simple or clear answers. It was like, "In this country, n-thousand companies are set up every year, so why – now of all times – can no one tell me if we need money on a bank account before we march off to the notary public, or whether we have to go to the notary first in order to set up an account?" That's just one example. Just a simple question for which we got a whole variety of answers. We were often in this kind of situation and we

were astonished by the kind of fundamental issues we had to deal with. In the end, we went with all of the many open questions to Steinbeis, where we got a startup voucher (EXI). And that's where we met the startup consultant Mario Buric, who still works with us today. The EXI voucher helped us get support during the pre-startup phase. We went through a variety of topics during the consultations with him. The starting point was to identify the business model, which is where the business model canvas came into it. Then came the strategic positioning and the funding strategy, which involved a detailed comparison of funding options until we got to the best financing concept. Based on the business strategy, we then worked up the product portfolio, made adaptations, and set the pricing. There was a lot of intensive discussion about the structure of the business plan and during this time, our networks expanded massively in both directions – through different events and intro sessions with various key players in the startup scene in Stuttgart and Karlsruhe. In the end, we managed to pull together a startup plan and significantly reduced the anticipated capital requirements. So now it was possible to press the green button with a low level of financial support, basically funded through customers and an extremely precautionary approach to costs.

We embarked on the startup in May of this year. The direction of the concept changed another two times since originally hitting upon the idea. We used a lean business canvas and some pretty austere calculations, and we had lots of incredibly useful insights – which we'd be

happy to share with other startups. They're not so much recommendations on doing it exactly this way or that, more a variety of ideas that were important for us as a startup. These ideas still inspire us and remain with us to this day.

The point where our startup became a success was when we realized that treading "our" path, doing the journey our way, was actually the whole aim of it. Experiencing things ourselves, getting a feel for our consultants, concepts, techniques, and customers – those were the things that were decisive in taking us forward. And yes, we reached a point where we realized that it was about the personal insights we were gaining and our own personal development. Independent of what everyone else thinks. We've internalized this, deep within us.

A pivotal part of the way we develop our products is being fundamentally open to outcomes and remaining flexible, how we communicate with customers, how we approach issues ourselves. It's about seeing things from a different angle, constantly questioning yourself, and never seeing anything as a given. Looking at amazing opportunities, or sliding into hopelessness – neither helped us shape our original idea, and neither hindered it, either. If anything, it was about challenging things from different angles, changing perspectives, trying out new things, and, ultimately, not having to do everything perfectly. We've learned to reflect on being a team and to not let go of this idea whatever happens. We wouldn't want to have missed out on a single thing, no matter how difficult it was. For us, entrepreneurship is being ourselves, whatever the challenge.

The other things we've learned along the way with Steinbeis and Mario Buric include:

- How to approach a startup, even on a part-time basis.
- How to tackle difficult decisions, to trust our intuition and our gut feelings. If something doesn't feel right, we don't do it.
- How to take something positive out of a situation that seems negative or is frustrating. At the end of the day, being turned away or something going wrong is an indication that you need to do something differently – you just need to look at it from a different angle.
- How to deal with capital requirements. And that's not just about reducing any foreign capital that might be needed. It's about how we take on each decision and ask ourselves every day if we need something. And if we do, who might be able to lend it to us or do it better themselves.
- How we can fund our startup ourselves, starting from nothing.
- We were a totally "normal" startup and as such, in Germany, you have to go through all the regulations, rules, provisions, laws, and obligations. It was also clear that we could call on lots of people for help and advice.
- We also learned that, as a startup, we founders really complement each other well with our original skills and capabilities, and these were completely different from what we expected. These weren't just specialist skills, they were more about empathy, inspiration, stamina, and a shared mindset or understanding. We learned that a startup is built on trust and a shared idea, and if we're not sure about something, we can ask each other. This philosophy of openness and attentiveness is something we'd want to share with others.

- We also learned that being open to outcomes and taking an adaptable approach to our startup has an influence on how we shape the overall concept, or the products, or even our relationships with our customers and key stakeholders. We don't develop ideas in an ivory tower, we work together with people on products from the very beginning – resulting in success and first orders!
- For us, being open to different outcomes also means that we'll have products that weren't 100% planned but evolved through interactions with those around us – and not by leaning on market research data. At the core of every product are "components of open outcome" which are developed through interaction
- The initial fear of failure evaporated on the shared journey, even in unusual ways, and it ended up in the things for which no/academy stands: Learning New Things – You're the Starting Point.



Mario Buric studied economics (Diplom-Ökonom, MBA, CSP, certified credit advisor, qualified banker) and is a startup advisor at the Business Start-up Steinbeis Consulting Center where he supports startups identify business models, draft business plans, and find startup funding. As co-founder of CROWD NINE, he provides advice on crowd funding, crowd investment, crowd lending, and other crowd topics. He also works

as a guest lecturer at a variety of universities. In his role as a mentor and coach, he supports startups through a variety of initiatives offered by different accelerators, incubators, and the EU. He is a founding member of Startup Stuttgart e.V. and the German Crowdfunding Network.

Sonja Johanna Döring and **Alex Müller** are the founders of no/academy, a platform for experiential learning offering training sessions, coaching and events. Their startup works alongside a variety of partners to train and support professionals working in the "people business". Döring and Müller draw on disruptive models and techniques to develop new outlooks and skills. They provide people with ideas for making personal changes in new working environments. They also help people perceive and appreciate their collaboration with others – from startups to established companies.



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A silhouette of a person in a suit climbing a jagged rock formation against a sunset sky with scattered clouds. The person is in a dynamic, upward-leaning pose, reaching for the top of the rock.

Technology Trends and Entrepreneurship

Interdisciplinary approaches are a crucial element of success

Entrepreneurs change the world. Forever. They are so enthusiastic about a new idea – or so frustrated with the current situation – that they introduce a novel idea to the world, and in doing so, they come up with new ways of doing things that are better than anything we've previously known. They create jobs, they fuel affluence, and they enhance the ability of an economy to innovate. One aspect that is central to this is technological development and the business models it engenders. Just why this is so is described by Prof. Dr. Peter Philippi-Beck of the I/B/N Steinbeis Transfer Center (Internationalisation – Equity Participation – Succession Regulation).

So entrepreneurship, or rather, entrepreneurial behavior, is about fostering change. According to the definition of Schumpeter, it's also about driving innovation. If the changes and innovations this results in are successful (as it says above), this creates jobs and affluence. The significance entrepreneurship therefore holds is clearly understood by politics, business, and science. This is reflected in the wealth of funding programs that now exist, as well as business plan contests, plus a rich selection of venture capital options. From an academic standpoint, entrepreneurship is now also engrained in teaching, at home and abroad.

But what are the constituent elements of success when it comes to entrepreneurship? At first glance, it seems to be something about people's personality, something which is underscored by terms like creativity, courage, and determination. But it's also about how people deal with risk and all of these aspects are a prerequisite for entrepreneurial individuals to want to occupy themselves with "the new," or to dare to innovate, or to want to be an entrepreneur in the first place.

Innovation is not necessarily always about technical novelty. For example, an innovation can be a new process or an innovative variation on service delivery. The skill of the entrepreneur is to spot an opportunity that makes it possible for an innovation to succeed. It also takes a good concept that is matched to the requirements of an industry, or a market segment, or the needs of a group of customers. To do this takes a de-

tailed understanding of customer requirements and the market. This is because innovations can only be positioned properly in a market if they deliver customer benefit.

This in turn means that innovations make new, customer-centric business models possible – indeed they require such models, and these can then change an entire industry. Examples of this are innovative ideas like Apple's i products or the launch of Uber. These business models resulted in changes to customer relationships, revenue models, production concepts, etc. They made it possible to establish strong customer relationships and offer solutions that appeal more directly to customers.

And this brings us on to another aspect of entrepreneurship: the link between innovations in the field of technology (or processes) and underlying business models. Successful entrepreneurs know how to translate such business models into reality. Innovative business models make it possible to set up successful companies and make a commercial success out of technical solutions. This takes things full circle, allowing the economy of a country to develop better, remain competitive, and create affluence.

That being said, entrepreneurs are not alone in their endeavors. Their success depends on the motivation of those who work with them, those who drive innovations, and those who make business models happen.



Entrepreneurs are in a position to spot co-entrepreneurs and support them. When they do this, they help support innovations, and, as such, they flourish in this role.

At this very moment in time, digital solutions are opening the door to scores of new opportunities to establish such innovative business models and thus keep existing companies moving forward or even set up new companies. Examples of this can be seen in digital networks, mobile end devices, self-learning machines, artificial intelligence, and the possibilities presented by sensors, all of which offer a basis for new business models. New technologies change almost all areas of modern life. This starts in aspects like how information is exchanged, how devices are controlled through the Internet of Things, or how production is connected and controlled in keeping with Industry 4.0. For Germany in particular, this is a huge development opportunity – especially if newly developed technologies and the technological changes they bring about also have an impact on different sectors of industries, or even entire industries.

To be part of such changes, however, it's necessary to spot technology trends and to acquire (or already possess) an in-depth understanding of business models and how they are influenced by technology. It's especially important to understand how existing business models can be influenced by technological change. In this respect, new competitors are a particular threat to established companies because they have the potential to burst into entire industries with their disruptive business models. Given the fact that a number of these disruptive business models (such as Amazon and Uber) and their competitors have been coming from abroad in recent years – and not Germany – yet they've still had an

impact on business models here, we can see how important entrepreneurship has become for our society.

Another prerequisite for introducing new business models is an interdisciplinary understanding of technological trends and how technologies are translated into products, processes, and business models. This is another defining feature of successful entrepreneurship, in the way different disciplines are integrated into a business model and thus add value.

To support entrepreneurs in Germany, the Steinbeis Network offers a range of interdisciplinary consulting options, spanning technology trend research and the translation of findings into products, production, and business models. The framework for this is provided by Steinbeis KTU (competence team for technology implementation and business optimization). The KTU encompasses scientists, engineers, and business experts, who work with and for companies to develop competitive solutions that revolve around future technologies, resulting in new products, production methods, and business models. They also provide support to entrepreneurs to identify future technologies, to spot the innovations these could fuel, and to actually make these happen. By working in partnership with research institutions and universities of applied science, entrepreneurs are offered an attractive package of services with the aim of creating business models with genuine appeal that will help stand firm in the face of competition.

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Prof. Dr. Peter Philippi-Beck is the director of the Steinbeis Transfer Center for Internationalisation – Equity Participation – Succession Regulation. His Steinbeis enterprise provides customers with support and advice on issues relating to company succession, acquisitions, and sales. It also helps with funding options and the development of business models against the backdrop of technology trends.



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Geschäftsidee: e-buddy :: Smart Mobility

02



“The national and international competition for the best startups is already fully underway”

An interview with Professor Peter Schäfer, the head of ifex (the “initiative for startups and business succession”) at the Baden-Württemberg Ministry for the Economy, Employment, and Housing.

In an interview with TRANSFER magazine, Professor Peter Schäfer outlines why he is so passionate about entrepreneurship education and introduces the services offered by ifex.

Hello, Professor Schäfer. One issue you fight for is ensuring that entrepreneurship is adopted in planning at schools. Why is it so important for you to introduce this topic to young people?

People stand to earn more money in paid employment so it's important in our state to foster early awareness of the potential on offer to people interested and willing to set up a business, and they need the right training. Also, more than anything else, it's important to identify entrepreneurial talent and sponsor it in a targeted manner. Entrepreneurship education has a long tradition in Baden-Württemberg schools. ifex was already working on a program that revolved around schools and self-employment as early as 1997. The program is still in place today, and over the years, it's resulted in a plethora of innovative entrepreneurship education tools. But what's even more important is that these tools have been kept in place in the long term, or at least they've gone a long way in becoming established across the state, and this is mainly thanks to collaboration with partners, the ministry of education and cultural affairs, project backers at the chambers of commerce and business as-

sociations, different foundations, the education authorities, and the schools themselves. Our aims will be bolstered further in the future by the fact that the new Baden-Württemberg education plan includes the subject Business, Career, and University Studies Orientation.

As the person heading up the initiative for startups and business succession at the Baden-Württemberg Ministry for the Economy, Employment, and Housing, you're familiar with the startup scene in the state. Baden-Württemberg counts as one of the most innovative regions in Europe, but business founders still have a large number of obstacles to overcome here. What do you do at ifex to help them with this?

The startup scene in Baden-Württemberg can't be compared with Berlin or Hamburg, because there are completely different startup scenes in Karlsruhe, Mannheim, Freiburg, Stuttgart, Tübingen and Ulm, which are completely different in terms of industry focus or key technologies. But if you look at them together – as an overall ecosystem – we're probably

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in more of a B2B startup state, so it's important that this is reflected in the support that's provided. So much is done within the individual areas, adhering to such high standards, and we support these initiatives carefully with the right funding for consulting, coaching, accelerator sessions, startup camps, plus a variety of new and more experimental formats. Of course we also have a powerful catalogue of financing options to offer, ranging from low-threshold innovation vouchers to high-volume funding through our own L-Bank or the SME investment company, Mittelständische Beteiligungsgesellschaft.

That being said, ifex doesn't just work in the startup field, but also deals with company succession issues. It's particularly important in that kind of area to mediate between the young and old. Where do you see the biggest obstacles in this respect?

The biggest difficulty we have is with the huge dip in the number of company successions within families. Only around 40% of family businesses resolve succession internally. So the measures we carry out these days focus more on sensitizing the people who will potentially be handing down the company, and getting to them earlier on. We also go through a matching process with external parties interested in taking

on a business. Baden-Württemberg is unique within Germany for the services it provides in this area, with company succession moderators (at the chambers of commerce and the German Hotel and Restaurant Association) or the business transfer coaching program, which can help plan company succession early.

If you had to make a prediction for the future, in what ways do you think the startup scene will change over the next five years, as well as the startup culture, and which areas do you think should receive support?

The national and international competition for the best startups is already fully underway. We need to work together with all partners in positioning ourselves more confidently as a business location – that means working on our appeal to people in the state who're keen to set up a business, but also to people outside the state with an innovative service or a hi-tech product, who are looking for a business location that doesn't just offer outstanding support through consulting and funding, but also has key orders to point to and entrepreneurial partnerships.

But the scene is also changing and new players are popping up. So it's important not just to seek dialogue with our tried-and-trusted partners, the chambers, the associations, or the economic development bodies, but also with new networks and initiators – and to offer to work together with them. That especially means the new startup associations, business angel networks, VC networks, or corporate accelerators, which are being set up by a number of large companies in the state.

Image: The Baden-Württemberg Elevator Pitch, 2015 state finals



Professor Peter Schäfer is the head of ifex (the initiative for startups and business succession) at the Baden-Württemberg Ministry for the Economy, Employment, and Housing. ifex initiates state campaigns, competitions, new funding models, and fast-track initiatives. It acts as a coordinator of projects and partners at a regional and international level, supporting communication, training, consulting, and coa-

ching, as well as target group-specific pilot schemes and regional projects offered by partner organizations.



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Business Models and their Importance as a Success Factor in Entrepreneurship

Using the Business Model Canvas to plan the future

An increasing number of firms organize business initiatives to react positively to the threat of changes in the economy and society. In the future, business models will dictate how successful agile companies are. A variety of approaches provide support with systematic development and testing, and one of these is called the Business Model Canvas (BMC). Prof. Reinhold König, director of the Steinbeis Transfer Center for Technical Sales and Management, explains the model to TRANSFER.

Modern times are about rapid change in many areas of society. Inventions in the world of IT, medicine, biology, manufacturing, and many other fields of technology seem to explode onto the scene every day. In the background, governments make alterations that affect the business environment, as do environmental concerns, and this also affects business activities. These are made worse by sweeping changes in society in terms of its value systems, demographic developments, population movements, etc.

Overall, this results in a whole variety of areas for firms to embark on business initiatives. It's almost like society actually needs wide-scale entrepreneurial activity just in order to cope with the challenges of continuous change. And more and more developments will be disruptive, so we can expect changes to happen in leaps and bounds as society strives to deal with the personal and professional workload. Just pulling out one simple example of an area where something like this has already happened: business and private correspondence – which has practically

been swept away by electronic communication in a matter of years. Additive manufacturing will also fuel tremendous changes in production processes, with individualized products, logistics systems, and warehousing.

As a result, society will need a larger community of entrepreneurs than it has in the past. People often associate the term entrepreneurship with the word startup or setting up a business, and of course the developments touched on above do indeed hold a variety of opportunities for new businesses. Despite this, entrepreneurship should not just be seen within the context of startups. Even established companies have to react to threats to their existing activities and seize business opportunities. This is precisely why existing firms invest time in new business concepts, which require the right kind of realigned structures and will not be implementable under established business models. The term used to refer to this is corporate entrepreneurship and the "intrapreneurs" who work in this area are comparable to business founders. They have



entrepreneurial responsibilities and are given the freedom they need to work independently. This puts them in a different category compared to managers in the established business. Another area in which entrepreneurial skills are required is business succession. This is because a firm that was shaped by a business owner will have a new entrepreneur at the helm. Such processes are typically marked by people questioning or expanding existing business models and changing a firm's financial arrangements. So this means that corporate entrepreneurship, startups, and business succession are all important areas requiring genuine entrepreneurial skills.

One key success factor in business is ensuring a company applies a suitable business model. The role of a business model is to provide a succinct picture of the value that will be created for specific target groups, how value chain processes will be matched to this, and the underlying revenue model of any commercial undertaking. In the future, competition will revolve around business models. Industry outsiders and new firms will suddenly pop up in the markets of established companies with services that go the extra mile based on completely novel business models. Just one example of this is Airbnb, which has grown into a major competitor for hotel chains within a matter of years. It's important to note that new business models are not just about new technologies or

inventions. Instead, new funding models, alternative capital investment arrangements, new market entry models, or even unique links with target groups can result in successful business models. As this happens, there's a risk that existing business models – that were previously perfectly successful – simply become obsolete.

This raises a key question: How does one identify or develop a potentially successful business model? Well, in recent years a number of new methods have been developed that make it possible to systematically foster creativity in order to provide overviews of business activities and develop business models that can then be tested and implemented in actual markets. These methods pull together a combination of creative and engineering-based techniques and one of them is called the Business Model Canvas (BMC). The BMC was first introduced in groundbreaking books by Osterwalder et al. called *Business Model Generation* and *Value Proposition Design*.

Their techniques are also used at the Steinbeis Transfer Center for Technical Sales and Management, which provides support with entrepreneurial projects aimed at developing, checking, and reworking business models through a combination of consulting and coaching. The BMC method was made available as a strategic tool for planning and implementing entrepreneurial activities. To develop a successful business model, key players are brought together to form a business model team. They learn the methods directly as they work on a solution to the specific problem. This also involves testing alternative business models and the overall technique is based on early implementation, a measured application of risk, and quick adaptation if new insights are gained. Naturally, Steinbeis also provides help with these parts of the process.



Prof. Reinhold König is director of the Steinbeis Transfer Center for Technical Sales and Management at Karlsruhe University of Applied Sciences. His center was set up in 2002 with the aim of providing companies with services that improve their success rates with the marketing of products and solutions. Its most important services now include the development and assessment of business models, consulting and

coaching, and market research in the fields of marketing, technical sales, and internationalization.



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Cell-Garden: Supplying Energy from the Kitchen

Steinbeis advises young business founders on entering self-employment

Why do companies go to so much effort growing healthy bean sprouts in jars or plastic containers? This was the question that led Josef Teips and his startup colleagues Marina Zeisler and Alexander Lier to found a company called Cell-Garden. Their idea was to make a kind of ultra-modern "fast reactor" – not like a huge atomic power station, but as part of a quiet revolution in the kitchen. They were accompanied on their journey of setting up a business by the director of the Steinbeis Consulting Center for Safeguarding Companies.

Anyone who has tried to grow bean sprouts to top up with energy or simply add a bit of taste to a salad will tell you how fiddly it is – and how disappointing the results can be. Cell-Garden wants to make things easier. Their idea: to develop a fully automatic sprout germination device. "Cell-Garden has set itself the goal of positively changing the health of consumers with bio-organic products," explains Josef Teips. "The vision of our company is to make holistic and nutritiously unblemished nutrition achievable for everyone – without flavor enhancers, additives, or chemical substances," he adds.

The startup is based at the Innovation Center at Aalen University, which offers founders everything they need to set up their own company. They have their own office, a startup-friendly infrastructure, and close links to the research and development networks within the university – offering a good basis for successful product development. One thing Teips, Zeisler, and Lier were quick to realize, however, is that developing a product is just one step on the long and often arduous road trodden by successful entrepreneurs. This road is littered with questions: How do you go into business? Where do we want to go with our company? Who would our products actually benefit? What is our target market? How much money will we need? The three young entrepreneurs got answers to these questions in a pre-startup consulting session offered by the State of Baden-Württemberg and sponsored by Steinbeis.

The three founders were supported throughout the entire startup process by Martin Ritter, director of the Steinbeis Consulting Center for Safeguarding Companies. Of course the new firm needed a business plan and it goes without saying that it had to analyze the situation to explore the market and draft a robust financial budget and staffing plan. After an initial market analysis, it became clear that there is no such thing in the market as an automatic bean sprout watering system. This would put Cell-Garden and its solutions into a completely new niche by itself. Its business concept is based on a high degree of individualization, offering plenty of variety, ease-of-use, and product indulgence – ideal prerequisites for a startup. To shield itself from fast followers in the market, the Cell-Garden system is being patented. The Federal Ministry of Economics is providing the young entrepreneurs with support through the WIPANO program to help them protect R&D findings through patents and registered designs.

As with other new companies, none of the planned activities would be a success without a sustainable funding concept. It soon became clear that the required financing could not be drummed up through personal funds or a conventional loan from a bank. As a result, the startup pulled together financing from a mixture of sources, including state backing, bank lending, and crowdfunding. The crowdfunding option allows consumers to place advance orders. The money that is now coming in will be used to develop the germination device until it is market-ready and establish the necessary commercial infrastructure.

Driven by the idea of making the world a better place, supported by a variety of backers, helped along the way by Steinbeis and other partners who believe in them, Teips, Zeisler, and Lier and their firm are making good progress with setting up a successful company and developing totally new sprout germination devices. Cell-Garden is a name to look out for.

Image: The three founders of Cell-Garden: Alexander Lier, Josef Teips, and Marina Zeisler.



Martin Ritter is director of the Esslingen-based Steinbeis Consulting Center for Safeguarding Companies and regularly consults potential entrepreneurs through his project work for the Steinbeis Consulting Center Business Start-up.



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Südfilm and its Passion for Storytelling

Steinbeis consultant helps filmmaker set up his own company

Bülent Gençdemir had already been working as a successful technical director in radio and TV for ten years when he took the plunge and decided to become self-employed. He set up his own company in 2016 under the name SÜDFILM, offering "film and TV production from the Breisgau city of Freiburg." He was supported during the startup phase by Johannes Merkel, director of the Steinbeis Consulting Center for Business Establishment and Development.

Bülent Gençdemir shot a variety of film portraits for the city of Freiburg in 2016. Even if he is at home in this somewhat technical profession, his heart lies in films and TV productions, primarily because of the exciting stories they recount, tales that fascinate the viewer.

In July of 2016, Freiburg became the backdrop for a TV production shot by AyYapim from Istanbul. SÜDFILM worked alongside the large Turkish film company as a production partner. The film that AyYapim is currently working on is part of a series examining the lives of Turkish guest workers living in Germany. Gençdemir has now started shooting the first episode of a crime story for leading directors of Tatort, the German whodunit series. The two authors – who unfortunately cannot be named here – have written several complete volumes of the successful crime series, so SÜDFILM is highly unlikely to run out of production material.

This made it all the more important for Gençdemir to have a competent partner at his side as he set up his business. He grins broadly as he recalls starting the company, describing the bureaucracy as the biggest challenge. Even now, he keeps running into it. Optimizing the strategy and business plan, setting up the right financing and acquiring equipment, getting support with employment – it was crucial for Gençdemir that the advice he received from Johannes Merkel through the Steinbeis Consulting Center for Business Establishment and Development was an exact fit with his requirements. He didn't have time to make basic errors, so he wanted to know exactly what the authorities expected of him and how to go through all the right steps in the right order.

He now has priorities on a different level. Gençdemir has to "cope with lots of projects at the same time, with all the corresponding paperwork." The Steinbeis consulting sessions were funded by the state of Baden-Württemberg (100% for the first phase) and ESF, the European Social Fund (80% for the second phase, alongside the state). Quite rightly, SÜDFILM is now a success. The question is: What makes a success, and what were the ingredients of success for Gençdemir? "Stories make the world go round, so it's important to tell these stories properly. I'm passionate about storytelling, so I always derive pleasure from sharing sto-

ries with others – stories that people like to hear," explains Gençdemir, with complete conviction. It's his foible for telling tales that he also plays to as a journalist when he is writing for a well-known regional newspaper. He has now even written a film script with his business partner Tevhit Özbulut and his hope is that he will soon be able to produce the script for the cinema.

Gençdemir is, in everyday terms, a go-getter, a filmmaker driven by passion. In real life, he's just like his films: likeable, genuine, captivating. Those are all good things to have on board for a successful future. "To keep up the momentum," he first needed the professional advice from Steinbeis. And now? He needs a back office, which is already being run by his partner Tevhit Özbulut and another colleague – so the next stage in the development of SÜDFILM has already been sketched out.



Johannes Merkel is director of the Freiburg-based Steinbeis Consulting Center for Business Establishment and Development. Merkel and his team of freelance consultants offer practical advice and coaching to business founders, young entrepreneurs, and the self-employed.



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New Company or New Manager?

Two young graduates successfully set up their own business with the support of Steinbeis

For an entrepreneur's ideas to work, a variety of important questions need to be answered in advance. The Steinbeis Consulting Center Business Start-up is helping entrepreneurs with their first steps into self-employment through EXI startup vouchers. One company that got off to a successful start through the program was KPI GmbH from Tuttlingen.

KPI Engineering is a new engineering company that has introduced some innovative and carefully designed solutions, allowing itself to carve its way into the regional market for automation solutions. The firm provides consulting services to SMEs and carries out detailed on-site evaluations with the aim of developing suitable automation solutions with its clients. It then offers its client ways to ramp up machines into full scale projects, by taking on the responsibility of project management, management of procurement, and dealing with development and design. If the solution involves a robotics system, it will also take care of programming.

The brains behind KPI Engineering are two energetic mechanical engineers with a thirst for success: Marvin Plantius and Arthur Klinger. They both studied at Karlsruhe University of Applied Sciences, graduating in 2016 with distinction. A market analysis of the automation industry actually formed part of the bachelor theses written by the two entrepreneurs for their degrees. They also worked as interns in industry to gain work experience and it was during their studies that they first turned to Steinbeis expert Felicitas Steck for advice on making a success out of a business concept. Steinbeis provides free, short consulting sessions of up to eight hours for innovative, technology-based spin-offs from universities of applied sciences.

"The founders were highly motivated, pursuing some totally realistic goals, and they had a winning business concept – so it was an optimum situation for an entrepreneur," summarizes Steck, who is a business consultant and systemic coach and provides startup advice to service providers, freelancers, IT specialists, and engineers. The key question Plantius and Klinger came to her with at the Steinbeis Consulting Center was whether they should set up a new company or take on an existing company as new managers.

During the first advisory stage of the project, the priority was to check the idea and compare the startup risks to the succession risks. A detailed discussion took place between the entrepreneurs and the consultant to examine their venture. This showed that there were many factors speaking in favor of taking on a company, which would already be established in the market, with a customer base, experienced staff, and a network of business partners and suppliers.

But there were also downsides to this option. Long-established structures and a responsibility toward people at the company would make restructuring the business and becoming accepted by staff as the new bosses extremely challenging. After a detailed analysis and advice from the Steinbeis expert, the two young graduates decided to start their own business venture. "Our goal is to manage a company based on our own values, offering carefully designed engineering solutions without being tied to existing structures," explains Plantius. The duo quickly moved on to the next questions: How do I set up my own company and what type of company should it be? Given the nature of risk encountered in the industry and general acceptance, the duo chose to make their firm a German limited liability company, or GmbH. Existing networks and a checklist provided by Steck meant they could set up the GmbH within four weeks.

There is always a risk when setting up a business that customers do not yet trust the company enough and the firm fails to enter the market. The entrepreneurs managed to sidestep this issue by drawing on the advice of the Steinbeis consultant and entering into a fixed cooperation agreement with a firm already established in the field of automation. In the long term, KPI Engineering hopes to produce a number of components required in the automation industry by itself. The founders also received advice from Steinbeis on financial backing, with two suitable options being backing through the ZIM program and hi-tech innovation vouchers (voucher B) through the federal state. The two engineers are already drafting their business expansion plans.



Felicitas Steck has been working as a business consultant and management coach for 12 years. Her work at the Steinbeis Consulting Center Start-up involves advising clients on company startups, consolidation, and succession. She also provides training and gives talks.


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Discussing Experiences With Other Companies in the Area

Innovation Circle set up in Göppingen

“Sharing innovative ideas and discussing these in the network” – this is the idea behind an innovation forum that has been set up in the rural district of Göppingen by WIF, an economic development and innovation funding enterprise belonging to the district of Göppingen. The project is part of a collaboration with the Stuttgart regional chamber of commerce in Göppingen. The forum plans to meet up regularly in the future to hear speeches, tour local companies, and promote information exchange in general between different firms in the area.

Reiner Lohse, managing director of WIF, which is also run by Steinbeis, explains more: “For us it’s about meeting up with people from all sorts of companies and sectors of industry in a friendly work atmosphere and letting loose with ideas, or sharing views on business concepts. People only open up to others if there’s a mutual sense of trust but when they do, they start to share know-how and experiences.”

The Innovation Circle is being run as a series of workshops in which the participants lay down an annual program of different topics, each revolving around the concept of innovation. These include aspects such as digital solutions and changes in products, processes, and business models. Given changes that haven’t been thought about until now, how will people buy services or products in the future? “Another thing we’re planning is to revisit topics a second time in a subsequent workshop, since people often only start to exchange views when they’ve experienced something themselves,” continues Lohse.

The businesspeople have some fascinating topics to look forward to, all with a bearing on the future. The idea was first mooted in June and a number of companies in the Göppingen area are now being invited to the next events.



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Katja Wolter outlining the potential of the creative industry

The Creative Industry – a Sector with Plenty of Promise

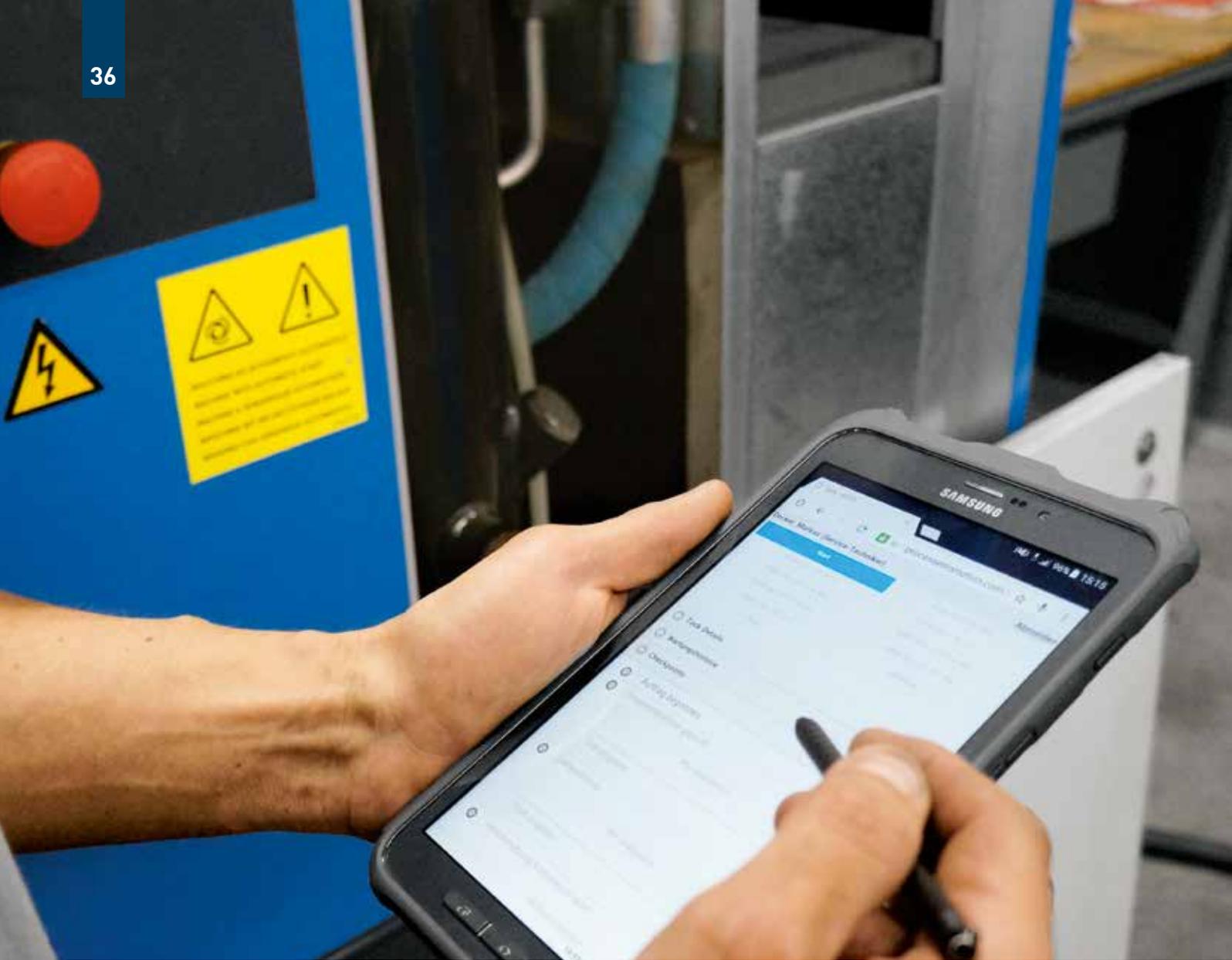
Steinbeis advises experts working in the arts and creative industry in Mecklenburg-West Pomerania

According to an industry review presented by the Federal Ministry of the Economy in 2015, more than 12,000 people work in the arts and creative industry in the state of Mecklenburg–West Pomerania. The industry generates sales on a par with mechanical engineering and the metal processing industry, although the creative sector has a higher number of registered full-time employees. “The arts and the creative industry are not just a growing sector in the large cities, there’s also growth in large rural areas like Mecklenburg–West Pomerania,” says Katja Wolter, director of the Institute for Resource Development, the Steinbeis Research Center based in Greifswald. “But there’s still plenty of potential for the industry in Mecklenburg–West Pomerania.” Steinbeis is helping to establish a network of creative companies and do lobbying for the industry.

As part of the project, a panel discussion was organized in July with industry experts from a variety of other states and political parties represented in the regional state parliament of Mecklenburg–West Pomerania. The results of the exciting evening showed that the creative industry is even a driver of innovation in this state on the Baltic Sea – in times of digital transformation it is creating new types of jobs, products, and services and it has every ability to transfer these to other industries.

Most firms in the sector are small or employ freelancers. To support them, Mecklenburg–West Pomerania needs different ports of call and networks to bolster industry skills and foster collaboration. Especially in rural areas, there is still so much hidden potential and this needs to be tapped into in order to stimulate cooperation between the creative industry and other sectors of industry such as tourism, real estate, and health care.

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Digital Solutions Enter the Realms of After Sales

Steinbeis experts introduce a paperless digital after sales service system

Know the feeling? The heating breaks down and when the handyman comes around, he whips out a piece of paper for the customer to sign to show they agree to the repairs – sometimes with terms and conditions attached that are as long as your arm. After hopefully successful repairs, he then pulls out another wad of paper detailing exactly what was done – and expects this to be signed as well. And where does all the paperwork end up? It's still quite common for information to have to be transferred manually onto invoices before filing, sometimes with a yellow carbon copy going to accounts, a blue one going to the warehouse, and a variety of other copies going to other departments. Standard everyday procedures, it seems. But if this isn't the heating, but repairs or maintenance for a huge industrial plant instead, things can really get complex. Some firms seem to treat their after sales function like a forgotten relative. When digital solutions come along, they're the last ones to know. Yet the potential offered by digitalization is there for all to see. This was the motivation for a team of experts at the Göppingen-based Steinbeis Transfer Center Processes in Motion, spearheaded by its directors Prof. Dr.-Ing. Ben Marx, Prof. Dr. Christian Cseh, Prof. Dr. Rainer Elste, to work together on the development of a comprehensive digital service system. Its name: 4tfs (for technical field services).

Mader GmbH & Co. KG is an owner-managed specialist in compressed air systems and pneumatics based in Leinfelden (near Stuttgart). Apart from producing and selling its own products, Mader also carries out maintenance on the entire pressurized air systems operated by its customers. Until now, maintenance procedures were broadly carried out in line with the example described in the introduction. Maintenance and replacement parts contracts were always captured systematically, but then they were transferred to worksheets – pieces of paper that were filled in manually and transferred back to an ERP system afterwards. Not

only was this process inflexible – especially if part of the planned routine changed – it also took up too much time, and each manual process had every potential to create administration errors. Controlling and assessing service efficiency was a long-winded task that could only be completed by going back through analog information.

The Steinbeis team adapted 4tfs to the specific procedures followed at Mader so that the entire service process can now be carried out without the need for any paper documentation whatsoever. Operators can view

maintenance records for individual service technicians and if a replacement part is used, this gets logged instantly by the system. All necessary or requested servicing is shown in the right order alongside machine data, with important information on the operating environment. At the bottom of the screen is an area for customers to sign, just like confirming a parcel has been delivered by UPS. As Peter Maier, the managing director of Mader explains: "4tfs allows us to manage the service process more efficiently and eradicate the kinds of errors that are caused by jumping between bits of paper and PCs. Digitalizing the process means we can react more quickly and more flexibly to unscheduled requests and be more accommodating when it comes to customer requirements. The documentation is now seamless with a complete servicing history, so we can offer customers maximum transparency."

4tfs is not tied to any specific type of hardware or the operating system used on a mobile end device, since it's programmed as a web-based app with encrypted access rights. The experts at the Processes in Motion center also ensured that the system links directly into the ERP system used at Mader by working directly with the ERP provider.

The Steinbeis Transfer Center experts go beyond simply developing service applications or adapting them to individual requirements. There's another aspect which Ben Marx highlights as crucial: the analysis phase. "It's important to us to get a precise overview of the servicing procedures followed by our customers. Quite often we actually travel around with staff, visit workshops together, or interview clients with everyone else involved so we know what to adapt to the existing service process. This involves taking a holistic view and drawing on expertise and excellence in engineering, IT, and business administration, all of which is offered by the directors and project managers at our center."

Of course launching an entire digital service system also requires a certain openness to change, especially from service technicians and the sales office. When asked if older employees tend to have problems adjusting, Maier answers: "My honest belief is that it's not about how old people are, it depends how they react to innovations and change. We made sure our service technicians were involved in the project right from the start, and we were especially careful about asking the opinions of the people who were most likely to have their doubts, mainly due to their experience. It was clear to us that we'd need to win over those kinds of users because they'd be more likely to be critical. I think we did a good job with it." The proof of the pudding is in the eating: Mader no longer uses yellow or blue copies of documents – and certainly nobody misses them.

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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 over 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 enterprises, go to www.steinbeis.de/en/news. Welcome to the Steinbeis Network!



Information on recently founded enterprises in our network can be found at www.steinbeis.de



More on recently founded enterprises in the network can be found at <https://twitter.com/SteinbeisGlobal>





Master's Students at the School of Management and Technology at SHB Enjoy Time in America

Off to the land of opportunity SMT students go on college visit to United States

Master's students at the School of Management and Technology (SMT), which belongs to Steinbeis University Berlin, have been off in search of the American dream. To gain qualifications that would equip them to work in international business, 49 students at SMT traveled to the USA, the land of opportunity, to complete the 2016 Global Management Development Program at the well-known Indiana University – Kelley School of Business (KSB) in Bloomington. The successful partnership is part of an agreement going back almost 20 years between the School of Management and Technology and Indiana University (IU).

The School of Management and Technology allows students on the Master of Business Engineering program to choose between two specializations for their degree while still in Germany. The idea is to receive additional instruction on the subject of their choice. The specializations are general management and business intelligence, and once in the U.S., the students work on case studies to actively involve them in seminars. The approach taken in the States also places emphasis on knowledge transfer to make applied use of the theory learned.

The SHB fellows were divided into teams to work on a business plan for a new (hypothetical) product. This had to be produced in China or India

to be put on sale afterwards in the U.S. The main challenge was to develop a fully functioning product (again, in theory) in order to open up a potential market and this had to be evaluated in financial terms. A jury of IU professors acted as potential investors and they had to be won over in a final presentation.

Apart from introducing the SMT master's students to more management topics, the professors also told them about the values and traditions of IU. One tradition is an absolute must, the university anthem Hail to Old IU!, which is mainly sung (loud and proud) at IU sports events. The sports teams at IU are called Hoosiers and they act as a figurehead for every university in the United States. This made the honor given to the SHB students after completing the 2016 Global Management Development Program all the more gratifying: They were adopted into the ranks of the Hoosiers as members of the IU alumni program.



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Key Skills Acquired through NLP: Communication and Psychology

SHB certification courses on the applied psychology of communication

What is NLP? A question with sometimes very different answers, depending on the priorities of who uses it. The usual answer goes something like this: Neuro-linguistic programming is a meta-model for communication and change offering a method derived from this model for short-term therapy and practical communication at work. The competence institute unison, a Steinbeis Transfer Institute at Steinbeis University Berlin, joined forces with the German NLP Association (DVNLP) in July of this year to start offering certification courses for all of the association's levels of training and standards.

The methods used for the courses revolve around the area of application. In short-term therapy and coaching, there are specific foundation elements such as "reinterpretations," "trances," and different points of perception, as well as different formats to follow – a bit like a recipe for working with others – and offer varying degrees of flexibility. Each format outlines the procedures of certain steps to be taken. With commu-

nication, NLP provides a meta-language to talk about language and communicate more precisely. NLP can also help explain how misunderstandings occur in communication.

One advantage with NLP's focus on practical application is that it is relatively easy to get into. The formats also simplify moving into action mode – "it's easy to cook a recipe yourself, without doing a complete cooking course." Also, the corpus is increasingly being expanded by systemic factors. The program offers university certificates called DVNLP Practitioner (SHB), DVNLP Master (SHB), Coach DVNLP (SHB), Master Coach DVNLP (SHB), Trainer DVNLP (SHB), Teacher-trainer DVNLP (SHB), Teacher-coach DVNLP (SHB), and NLP Basic DVNLP (SHB). They are awarded without an official title but they allow course participants to prove they have received well-founded, practical training on communication, coaching, training, and consulting – thus demonstrating the sustained quality of their skills to others.



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Just What Managers and HQ Specialists Need New SHB certification course in Rottweil

When leadership becomes challenging and communication breaks down, it's important to recognize the patterns and mechanisms that make this happen. There are a number of models that help us understand certain situations and these make it possible to offer solutions to everyday occurrences – solutions that match the individual circumstances. The experts at Business School Alb-Schwarzwald, a Steinbeis Transfer Institute belonging to Steinbeis University Berlin, have been working with HR specialists at a variety of firms to develop a certification course that offers a university certificate on Communication and Leadership Psychology.

The course is tailored exactly to the needs of HR specialists and managers. The aim is to provide the know-how this target group requires in their everyday work. The certification course spans four modules, not only to examine the underlying theory but also to cover actual business practice. The curriculum is taught by experienced lecturers and the subjects are dealt with in a practical way, based on actual application. This is also achieved by underpinning lectures with visits to companies and exchanging views with people in business.

The course includes a 3-day module on modern HR development in which managers start by sharing tips on ways to establish a meaningful framework for strategic personnel development. This module also looks at demographic change, the different assessment methods of HR, and areas where it makes sense to use software tools in HR development.

Another three days are spent looking at communication, managing meetings, solving conflicts, and dealing with difficult situations. This is a particularly important area for HR specialists and managers, who have to be equipped with the right skills. Two of the days focus on psycholo-

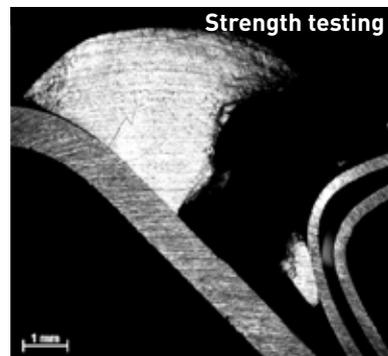
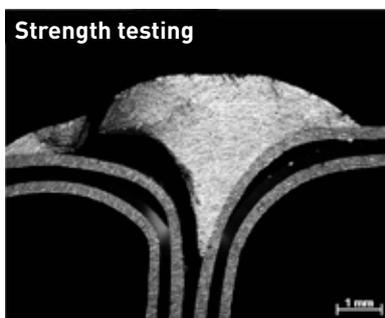
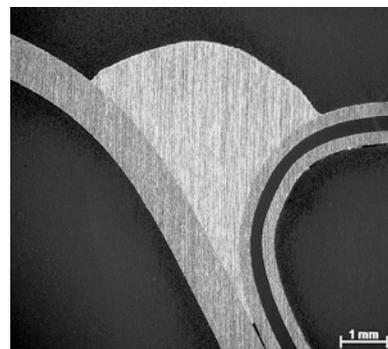
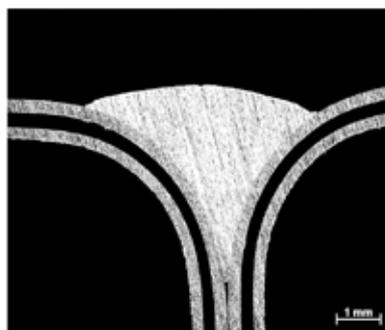
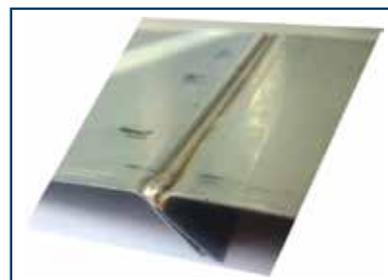
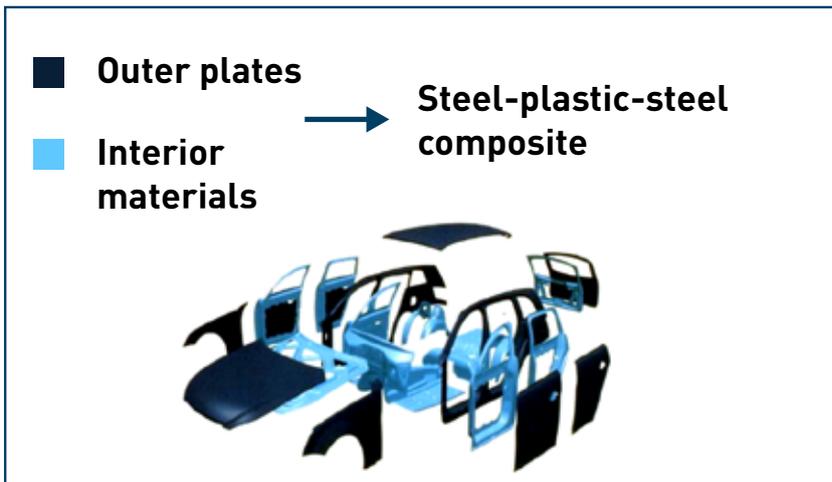
gical and psychosomatic disorders. The participants visit a hospital for psychosomatic ailments and talk to therapists and people who have suffered burnout. This allows them to see how to deal with such ailments and reintegrate people into the workplace.

Another aspect of everyday work at companies is dealing with different cultures. This complex topic is examined in the last module of the certification course by looking at sensitivity to different cultures, intercultural competence, and tools that can help interact with people from different cultures.

Overall, the course gives HR specialists and managers a comprehensive understanding of the issues encountered in their everyday work, both on a strategic and practical level. The seminars are modular so that participants can attend individual modules or the entire course, which culminates in a university certificate as proof of attendance.



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a

b

c

Image: Examples of project results a) The new welding burner including process technology b) Litecor®-to-Litecor® flanged seam c) Litecor®-to DC-grade steel flanged seam

Creating a Strong Bond

A team of Steinbeis experts develops a process for thermally joining coated composites

The car of the future will have to meet a growing number of expectations from society in terms of energy efficiency, fuel consumption, environmental protection, safety, driving comfort, and sustainability. One key focus will be reducing vehicle weight by using innovative materials and introducing multi-material systems to the production process. To exploit the full potential to reduce weight, thyssenkrupp Steel Europe has developed a state-of-the-art composite material called Litecor®. A team of experts at the Steinbeis Innovation Center for Intelligent Functional Materials, Welding and Joining Techniques, Implementation has now created a process for joining the material thermally.

Litecor® is a combination of ultra-thin body plates with a polymer filler material (a core layer of plastic of varying thicknesses in between). As a composite material, not only does it weigh essentially the same as aluminum, it also offers a number of further advantages:

- lower cost
- superior bending rigidity
- superior buckling strength
- excellent formability with very small radii
- type-same joining
- no stretching deviation

The key priority at the start of the project was to develop a production technique so that the material could be used in applications compatible with industry – and to do this quickly. This was because even when using the very latest cold metal transfer welding methods to carry out thermal joining, the plastic between the two steel layers was being damaged. These layers are 0.2 and 0.25 mm thick and the plastic was separating from the steel. The team at the Dresden-based Steinbeis Innovation Center set themselves the goal of developing a new thermal joining technique. Their aim was to use a defined joining geometry, such as a flange seam, not just with steel-plastic-steel composites, but also in combination with steel sheets. The project also involved developing a compatible burner technology with an automation option, plus suitable soldering materials. For the steel-plastic-steel composites, development work focused on applications like producing linear joins around the 2 by 3 meter connection between the vehicle roof and side parts. The experts had to address a number of factors: the concave nature of the seal, the narrowness of the metal weld, corrosion resistance, and a significant reduction in post-process finishing.

An innovative development approach was taken based on a non-transferring light arc process. This kind of energy source was primarily chosen because of the filler material. One of the key priorities was to avoid layer separation – delamination of the polymer – during joining. There was also a need to prevent damage to the zinc coating on parts that were going to be joined, mainly because zinc coating provides corrosion protection. It was, however, permitted to subject the materials to temperatures of up to 250°C. The phases formed in the area along the joins on the base material, and the joins themselves, had to be thermally

stable at temperatures of up to 220°C. The key priorities with the seams were the flanged seams and the fillet seams welded on the lap joint in standard positions. The target joining speed was ≥ 1.0 m/min.

The problem faced by the Steinbeis experts from Dresden was highly specific to the material involved, so as a result, they decided to design and develop a kind of “tungsten inert gas (TIG) cold wire burner head.” A central aspect of their concept is the TIG burner. The filler material is fed into the plasma ray of the burner through a separate cold wire insertion device. The system consists of a burner head fitting, which includes the integrated inert gas supply and the filler material feeder, and a tungsten electrode integrated into the burner head. Unlike conventional TIG welding processes, the light arc is ignited between the tungsten electrode and the fusing filler material.

Working in collaboration with manufacturing partners and a committee overseeing the project, the team succeeded in using the new burner system to invert the polarity of the burner, thus significantly reducing the work function of the light arc. The project teams managed to orientate the burner and its energy source to explore a whole variety of parameters until they could control the heat input in such a way that the filler material within the composite received sufficient wetting and connection to the surface. This avoided delamination and composite imperfections.

The new TIG cold wire burner prototype was used by the team to produce samples that were then put through rigorous testing. The result: The samples fulfilled all requirements, meaning there is now nothing to prevent the technique from being used to produce flanged seams on Litecor® with DC grade steel, offering joins of the quality required for car roofs. The new joining process and the equipment it requires are easy to implement and automate.

Facts and figures

Joins tested with a TIG cold wire burner prototype:

- Suitable for use with Litecor®/Litecor® ZE (1052) 0.25/0.3/0.2 and Litecor®/steel DC06+ZE75/75 (E513837) joins with welding materials SN99.9 and SnCu3 (Sn97Cu3)
- Wire diameter of 1.20/1.60 mm
- Joining speed of up to 1.80 m/min
- Maximum tensile strength with samples welded with SN99.9 of up to 6.0 kN (approx. 70% of tensile strength of basic Litecor® material)



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Competence. Networking. Action.

A look back at the 2016 Steinbeis Consulting Day and its focal topic: Business 4.0

Digital transformation across entire sectors of industry, the intensified convergence of key enabling technologies, and the increasing degree of networking being witnessed in markets and commerce – trends that are a central challenge to the effectiveness of any modern business. There is strong demand for more information on current trends and the skills profiles that companies and consultancies will now need to deal with. Around 300 visitors attended this year's Steinbeis Consulting Day, which looked at the topic of Business 4.0 from a variety of angles. The event took part on June 29, 2016 at the Haus der Wirtschaft (house of commerce) in Stuttgart.

At the event, speakers approached the topic from three angles. In the first session, the focus was on human resources. What does HR management look like in Business 4.0, what kinds of skills are needed, how can these be systematically nurtured, how can successful HR management safeguard these skills, and what role can company consulting play to this end? To examine these topics, Prof. Dr. Jutta Rump (the IBE Institute for Employment and Employability at Ludwigshafen on the Rhine University of Applied Sciences) gave a speech on "Employability Management: From HR Management to Network Competence Management," providing a number of insights into the latest research findings. In a speech by Prof. Dr. Armin Trost (Furtwangen University), these findings were contrasted with consulting practice. Trost suggested that diversity, freedom, and networked communication and collaboration are not just an essential feature of modern HR management, but that they

are also a central task of the consulting business. Claudia Haney, director of division program management at K+S KALI GmbH then took part in a discussion on a live case with the Steinbeis consultants Prof. Dr. Arnd Gottschalk (Steinbeis Transfer Center for Human Resources and Organisations) and Dr. Sabine Horst (Steinbeis Consulting Center, Competences, Communication, Cultures), examining the current challenges facing change management stemming from the sometimes opposing interests of digital transformation and organizational development at K+S KALI GmbH.

The second session took a closer look at processes, examining how production processes and systems are changing in Business 4.0, the impact this has on the working world, and what kinds of concepts and recommendations are needed from business consultants.



Prof. Dr. Heiner Lasi (Ferdinand Steinbeis Institute at the Steinbeis Foundation) examined these and other issues in his speech on Enterprise 4.0: The Challenges Placed by Production 4.0 on the Working World. There then followed another live case in which Horst Maywald (header of workstation systems at Elabo GmbH), Prof. Dr. Heiner Lasi, and Prof. Dr. Manfred Wehrheim (Steinbeis Consulting Center for Manufacturing Systems and Processes) discussed the issue of process optimization with and at Elabo GmbH, highlighting the special opportunities and challenges this poses for SMEs in their attempts to adapt, plus the nature of investments in networked production and organizational processes.

The keynote speech at the 2016 Steinbeis Consulting Day was given by Philipp Depiereux (etventure GmbH), who looked at Processes 4.0 – a Revolution in Working. Depiereux fundamentally challenged traditional forms of technological and organizational change, rattling the audience by hypothesizing that changing into a Business 4.0 will mean changing existing structures, working environments, organizational forms, processes, and business models in ways that are both fundamental and disruptive, especially through innovative startups and spin-offs. This assertion, and his belief that digital transformation has to be a

boardroom issue (due to the broad implications of the required decisions regarding structures and strategy), and that this requires a completely new mindset when it comes to working practices and the management culture, were discussed afterwards in detail in an interactive panel session, which involved a selection of experts, speakers, and especially members of the audience.

Speakers at the 2016 Steinbeis Consulting Day

- **Prof. Dr. Thomas Breyer-Mayländer [moderator]**
Vice-Principle of Marketing and Organizational Development at Offenburg University; Director of the Steinbeis Consulting Center for Leadership in Science and Education
- **Philipp Depiereux**
Founder and Managing Director of etventure GmbH
- **Prof. Dr. Arnd Gottschalk**
Steinbeis Transfer Center for Human Resources and Organisations
- **Claudia Haney**
Director of division program management at the potash and magnesium specialist K+S KALI GmbH
- **Dr. Sabine Horst**
Director of the Steinbeis Consulting Center, Competences, Communication, Cultures
- **Prof. Dr. Heiner Lasi**
Director of the Ferdinand Steinbeis Institute at the Steinbeis Foundation
- **Horst Maywald**
Authorized officer and departmental head of workstation systems at Elabo GmbH
- **Prof. Dr. Jutta Rump**
Director of the IBE Institute for Employment and Employability at Ludwigshafen on the Rhine University of Applied Science
- **Mario Schnurr**
Head of Entrepreneurship at Wirtschaftsjunioren (Young Entrepreneurs) Baden-Württemberg
- **Prof. Dr. Armin Trost**
Professor for HR Management at Furtwangen University
- **Prof. Dr.-Ing. Manfred Wehrheim**
Director of the Steinbeis Consulting Center for Manufacturing Systems and Processes
- **Roman Zitzelsberger**
Regional Director IG Metall (Metalworkers Union) Baden-Württemberg

Excerpts of the speeches (in German) can be streamed online in the Steinbeis media library by going to: www.steinbeis.de/mediathek.



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Knowledge Management as a Facilitator of Quality Leadership

SHB graduate designs knowledge management system for his company

Production errors are an unwelcome feature of business. Not only do they raise costs, if nobody notices until the product arrives at the customer's, it can have a long-term impact on client relationships. It's all the more frustrating if the knowledge the company needed to prevent the mistake was already somewhere within the business, but nobody thought about telling production. This was the starting point for a degree project carried out by Christian Casar, who recently completed his studies toward a Master of Science in Innovation and Technology Management at the School of International Business and Entrepreneurship (SIBE), part of Steinbeis University Berlin (SHB). Casar worked on the project on behalf of TRUMPF Hüttinger GmbH & Co. KG, the leading producer of process energy supply solutions and manufacturer of products such as semiconductor chips.

The project revolved around the introduction of a knowledge management system in order to improve product quality in the long term. The aim was to make systematic use of knowledge and previous experience both in serial production and product development. Casar's job was to support this process by introducing a task and communication tool called 4tasks (www.4tasks.de). This would share information relevant to quality by issuing quality management progress reports. The money this could save was a six-figure number, assuming the right knowledge management system is put in place. This would also have an impact on customer satisfaction by improving product quality. A further benefit of the project related to personnel and skills management, which would be supported by promoting internal networking among staff and this would also be directly influenced by knowledge sharing.

The project was implemented successfully, resulting in an immediate move up the career ladder for the young SHB student. On completion of his degree, Casar was appointed head of quality management at TRUMPF tool-making division in Teningen, where he is now realigning the existing management system to match TRUMPF quality, energy, environment, and safety standards. He also shares responsibility with an IT colleague for managing the introduction of an SAP solution to replace the current system.

Even in his new job, Casar still benefits from the things he learned during his project skills degree at SIBE. "The SHB degree isn't about sharing fixed content, it's about helping you to remove your blinkers and understand the signs of the times and trends – identifying the implications this will have where you work. In an era of big data, information and knowledge alone are becoming less and less important," concludes the SHB graduate. Casar says there are a number of reasons why he'll never regret deciding to study again: the long-term benefits, the possibility to have a positive impact on the development of a company, and personal development – which was a key focus of his degree.

Image: © iStockphoto.de/Shade0N



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Formula 1 Technology for the Workshop

Steinbeis develops trolley for moving compressed gas cylinders around the workshop

In Formula 1 and touring car racing, changing tires in a matter of seconds is decisive for the win. In most workshops they use pneumatic tools powered by cylinders of compressed air mounted on trolleys. If the trolley topples over during use, which is conceivable considering the job it must do, there is a major risk of accidents, especially through damage to the exposed fittings. DK Edelstahl design, a company specialized in stainless steel design based in Pfullingen, Baden-Württemberg, has been working with the Steinbeis Transfer Center for Process Development in Reutlingen and its director Prof. Karl Schekulin to develop a new type of secure transportation trolley for all kinds of compressed gas cylinders. Not only did their solution withstand the acid test of being used in Formula 1 racing, it also proved absolutely viable for everyday use in standard workshop environments. The project was supported through an innovation voucher offered by the state of Baden-Württemberg.

DK-Edelstahl design is a medium-sized business that produces small batches of metal and aluminum components based on customer drawings. The designs are laser-cut in house before processing – which primarily involves bending, trimming, and welding parts made of stainless steel. The company's customers come from the automotive sector, kitchen furnishings, mechanical engineering, and medical technology. The company was already on the lookout for a product it could produce to supplement its portfolio of services, hoping to gain a secondary footing on the market. The opportunity revealed itself when the request came in from the field of motorsports: find a solution to address the constant danger of damage to the exposed fittings of gas cylinders when changing tires.

Working with the Steinbeis Transfer Center for Process Development, the project team at DK Edelstahl design researched the current state of the technology and the extensive lists of rules and regulations for pressurized containers. Pressurized containers are always a latent source of danger, particularly when it comes to the exposed fittings and connection points like the pressure regulators, manometers, connecting threads, and seals.

For gases like standard air, nitrogen, carbon dioxide, oxygen, hydrogen, helium, argon, or even acetylene, compressed cylinders are generally transported in tubular racks (similar to shopping carts) both in industry and in motorsports. In most cases, valve fixtures aren't removed and replaced with protective caps because removing them is too time-consuming and wouldn't make much sense in terms process flow. This increases the chance of accidents because fittings are left exposed. This became the biggest challenge for the project: The fittings would need to be protected indirectly with a safety engineering solution. This would mean developing a mechanical partial housing without affecting the handling of the cylinders, fittings, tubing, and tools.

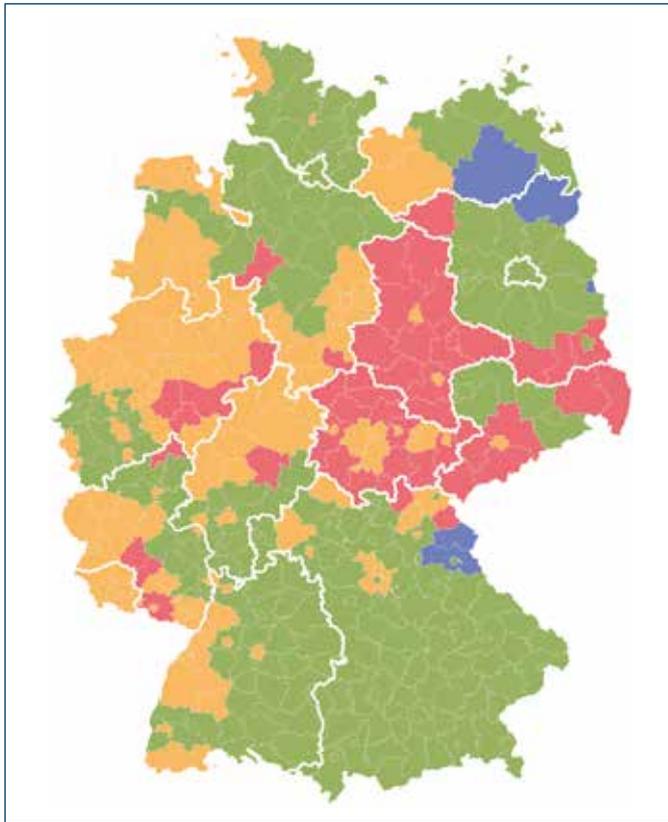
Systematically working through a variety of design options revealed that conventional designs made of tube-like elements are too instable and too expensive to produce. Instead, the Steinbeis team decided to use beveled sheeting. The trolley components are kept stiff by engineering in sufficient internal strength, with functional surfaces to provide protection to the fittings. The design of the resulting prototype is now based on a partially cut octagonal tube. This delivers ultimate shape retention at low material costs and affordable production costs. The prototype passed hazard testing and even worked in practice during a Formula 1 and touring car race. Nothing stands in the way of using this design in everyday applications in industry and trade, and DK Edelstahl design now has its own product to add to its portfolio.



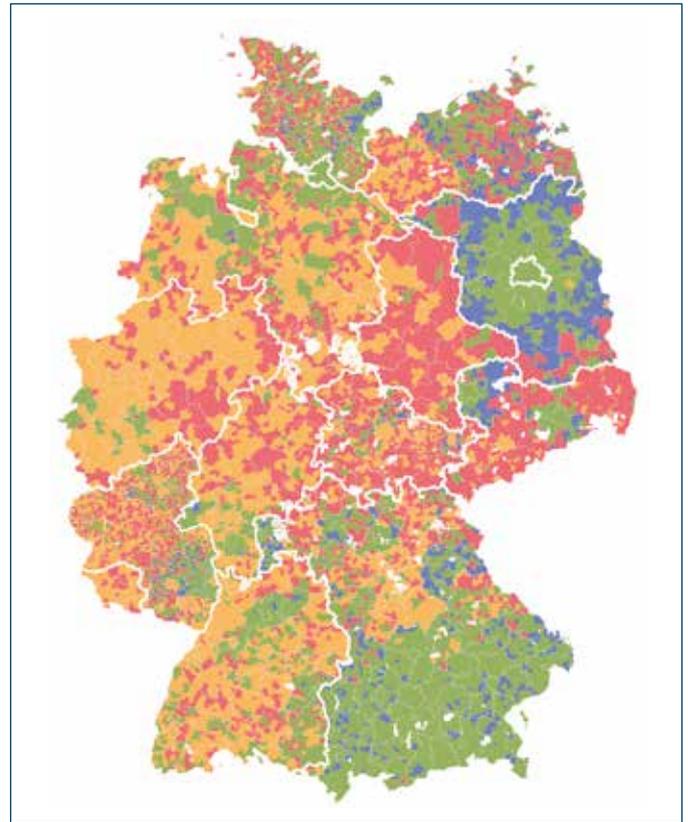
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Top-Level Opportunity areas Risk areas Low level



Top-Level Opportunity areas Risk areas Low level

Voting with Your Feet: Competition Between Population Areas

Steinbeis uses a regional opportunity monitor to analyze the positioning of cities and municipalities across Germany

Around 70% of demographic change in cities and communities is the result of short-distance flows of people between cities and rural districts. It is the single largest influence on future developments. The level of migration and its nature in demographic and social terms are just some of the factors affecting population growth, so this has an influence on fundamental economic and social aspects in society – for example, it affects tax revenues, the need for hospitals, jobs, housing requirements, and thus land prices and rent. At the same time, the degree to which people are willing to move depends strongly on their age. Apprentices and students are around ten times more likely to move than old people. The Steinbeis Transfer Center for Applied System Analysis (STASA) has been analyzing these trends with a “regional opportunity monitor” called RCM.

Whether the total population of a city or community is rising or falling can be seen by looking at the official statistics. It's different with the reasons why people move, which vary tremendously and depend strongly on the age group. Apprentices and students tend to move to cities offering the best education opportunities, but at the same time, they need somewhere affordable to live. A key factor affecting moves after training or studies is the number of employment opportunities, which are typically found in higher numbers in urban areas. Starting a family often causes people to move again, especially to rural areas or city outskirts. With each stage of life, the demand changes for local services. This affects things like regional transportation, services like day care facilities, the availability of doctors, and shopping. Local transportation, regional links, and networks also play an important role in where people decide to move and these factors are central to how people weigh up the alternatives to a certain city or community. Major cities have close ties to one another through the networks of business (such as company

subsidiaries), and as a result, they often compete head-on. Smaller cities and communities tend to have more local networks and this can make them appealing as a place to live, a bit like bubbles which can sometimes separate themselves off from competing cities. One drawback with this, however, is that they can lose inhabitants due to demographic changes, especially if they don't succeed in raising their appeal as a region.

One reliable way to measure population preferences and the strength of regional networks between cities and communities is to use the internationally recognized decision-oriented migration model developed by Weidlich and Haag. Their model provides a migration matrix for the whole of Germany which can be used to arrive at index values denoting regional “preference levels,” even down to individual communities. Population flows are broken down by age groups making it possible to make detailed statements about factors such as education migration or

employment migration. The model captures around 160,000 migration flows for local districts, with roughly 22,000 additional community calculations tallying up which people come and go.

The results of the migration analysis are updated continuously and fed into the RCM regional opportunity monitor developed by STASA. The RCM defines popularity levels calculated by the migration model as above or below average, resulting in a net migration figure. For example, if more people come to an area than leave it, it has positive net migration. Opposite population flows give a negative balance. This provides four kinds of areas and there are specific recommendations for communities belonging to each. The RCM gives decision-makers who work for district authorities as well as economic development experts a powerful instrument for positioning their region (city, district, community) and defining its strategic direction.

The following four areas have been defined by the STASA team, each relating to communities' positioning within an overall region:

Opportunity areas:

Negative net migration and above average popularity, showing that a city or community may be losing population but it still has a clear opportunity to encourage positive migration by making suitable structural changes and, if necessary, work together with other cities and communities.

Risk areas:

Positive net migration is no guarantee that things will remain positive in the future. If the preference score of the population is below average versus other areas, the positive net migration level will not last forever. The priority here is to analyze the causes early enough to be able to take preventative action.

Top level areas:

Positive net migration and positive preference levels are ideal for the overall sustainable development of a region. Nonetheless, a detailed analysis of structural factors can still help in order to keep positioning an area in a positive light versus other regions.

Low level areas:

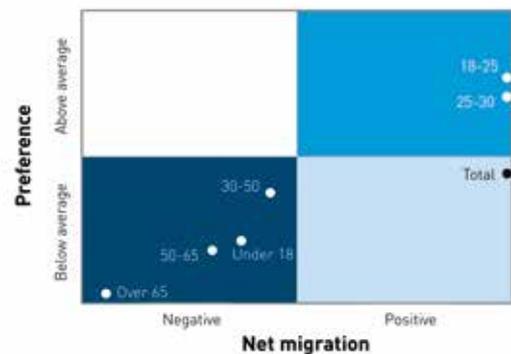
Low level areas have a combination of negative net migration and a below-average preference level. In such areas it is particularly challenging working on future developments. It will be necessary to analyze structural factors and identify potential development parameters. To do this, the current status has to be examined in detail by looking at population preferences and other structural indicators in comparison to other areas. The aim should be to diminish negatives in the medium to long term versus other cities and communities.

The maps in this article show the RCM for cities and rural districts in the whole of Germany, plus the results for local communities versus the overall population. They clearly show the distinct regional structures for individual administrative districts and communities. The first RCM scores regions on the criteria outlined above. The method for scoring is complex, based on backgrounds and root causes, and it involves a detailed analysis of a large number of structural factors as well as acces-

sibility. Benchmarking areas against similar regions is also useful and this is also accounted for in recommendations.

To provide an example of how this works, an analysis of Stuttgart is shown below. For the younger population (18 to 25-year-olds and 25 to 30-year-olds), net migration is high and so is the preference level. This makes Stuttgart a Top Level area for this section of the population. As people age, however, net migration becomes negative and preference levels recede. Overall, the RCM defines Stuttgart as a risk area because it has positive net migration but the preference level overall is just below average.

STASA has been working on the analysis in close collaboration with the Cologne-based German economic institute IW-Consult. The Steinbeis experts are conducting detailed regional analyses based on the results of the RCM and augmenting this with other regional indicators relating



to the economy and local infrastructure. The regional profiles this provides help with understanding strengths and weaknesses and recommending actions to be taken in each area. Results can be depicted and processed by STASA in web apps on interactive maps and diagrams, thus going beyond conventional reports and drawing on state-of-the-art presentation and evaluation tools.

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Image 1: The regional opportunity monitor (RCM) broken down by district (left) and individual community (right) for the total population of Germany (Source: STASA GmbH)

Image 2: An RCM positioning map of Stuttgart by different age group. The under-18 group represents families with children, the 18 to 25-year-old group includes apprentices and students. The popularity of Stuttgart is plotted on the Y-axis with the net migration for each age group shown on the X-axis (source: STASA).



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DanuBalt Optimises Application of Research Findings in the Baltic and Danube Region

Steinbeis takes the lead in the EU funded initiative

The EU-funded project DanuBalt facilitates networking between the two macro regions around the Baltic Sea and countries along the Danube River. Under the coordination of Steinbeis-Europa-Zentrum (SEZ), six partner organisations from Denmark, Germany, the UK, Romania, the Czech Republic, and Hungary are analysing different ways to successfully market healthcare innovations.

The results of the analysis will be used to identify ways to turn investments in the regional health care systems into profitable products and solutions by leveraging funding in each macro-region as efficiently as possible. The DanuBalt project will also help build on synergies between the European structural funds and financing provided through the EU framework programme Horizon 2020.

SEZ conducted an evaluation of research activities in 2015 and carried out an online survey. Its findings were validated in three rounds of meetings with stakeholders in Jurmala, Bucharest, and Budapest, which were organised with representatives from industry, research, and politics. In late June 2016, SEZ also organised a DanuBalt stakeholder forum in Stuttgart involving relevant stakeholders active in the health care sector. Instruments are already in place to support research and innovation in the Baltic Sea region, especially in the field of health care, but progress is slower in

the 14 Danube regions. As a result, the project partners have identified 10 examples of good practice and drafted a catalogue of research results, technology offerings, and EU partner searches containing over 120 examples of potential areas of cooperation. Four pilot initiatives are planned over the coming months. The aim is to keep up the momentum of measures already in place and to improve the competitiveness of the Danube region and the Baltic Sea. The initiatives revolve around attracting specialists, providing support services for SMEs, education and entrepreneurship, innovation contests, and trans-national projects in the field of health care.



The EU DanuBalt project consortium



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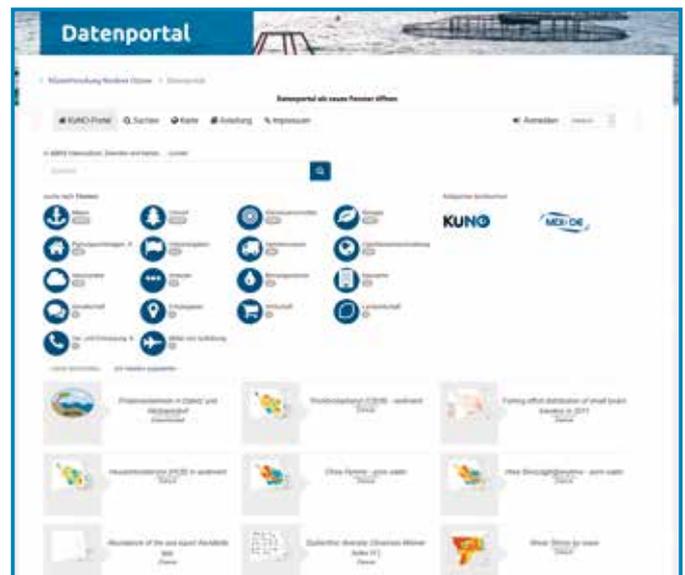
Smart Ways to Safeguard Research Data in the Long Term

Steinbeis experts develop online geodata framework

Research data is a highly valuable asset, especially considering the increasing role played by data in science. As a result, it is essential in interdisciplinary research to make research findings available online, also in order to safeguard such results in the long term. The Rostock-based Steinbeis Transfer Center for Geoinformatics has developed a state-of-the-art web-based geodata framework called GDI. It's part of a BMBF project going by the name KüNO, which deals with coastal research around the North Sea and Baltic Sea.

The project was initiated by the IOW (the Leibniz Institute for Baltic Sea Research in Warnemünde) which heads up a broad consortium of marine research institutions in Germany. The aim of research is to improve the scientific fundamentals that affect how coastal resources are managed – with the ecosystem and sustainability in mind – and to make available any findings generated by science, practical application, and society in general. Findings will be posted on the KüNO data portal.

The new portal is broken down into three levels and is based on open source software. The first level is the opening section with a meta-information system called GeoNetwork, the next level contains services including a geo-server, and the final level provides data stored in a background database system using PostgreSQL. The data catalog has been designed to work on multiplayers layers. There is the web layer, which is the part seen by users on the screen. There is a service layer for offering standardized web services. Then there is a backend layer for storing user data, categories, data records, and other settings. The system also includes a harvest-



The opening screen of the KüNO data portal

ting function which can be used to integrate metadata conforming with the open geospatial consortium (OGC), plus data and services from other portals such as the German marine data infrastructure (MDI-DE).



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Award for Laser Marking Microstructures onto Surfaces

Prof. Dr.-Ing. Frank Mücklich wins the Berthold Leibinger Award

Prof. Dr. Frank Mücklich, Prof. Dr. Andrés Lasagni, and ten of their colleagues at the Steinbeis Research Center, the Material Engineering Center Saarland (based at Saarland University), at TU Dresden, and at the Fraunhofer IWS have received one of two second prizes under the 2016 Berthold Leibinger Innovation Award. The award honors new developments in the field of applied laser technology and is one of the most important innovation and research prizes in the field of optics.

The water-repellent lotus effect and friction-reducing shark skin are two well-known examples of the functional benefits offered by nano-structured and micro-structured surfaces. A number of different processes are used to produce such effects, which depend on very specific requirements and the type of material used. One highly flexible method is to use lasers, which can even focus thermal application below the surface of the material in question and can be applied "cold" through ultra-short pulsing. One major challenge with lasers, however, is the processing time.

At the Saarland University, Mücklich has been working on combining the flexibility of lasers with processing larger areas by using a simple optical effect. He has discovered a half-way house solution combining longer-lasting spot application and less flexible stenciling techniques. Overlaying two or more laser beams makes it possible to create so-called interference patterns. These can be mapped and calculated to adjust the laser beams as required. As a result, intermittent micro and nano designs can be added to surfaces as wide as a laser beam, and by then combining lots of laser beams, millions or even billions of small structures can be created at once in a

AGRIFORVALOR: Bringing added value to the agriculture and forest sector by valorizing side-streams

SEZ leads this EU project

The EU has launched a project called AGRIFORVALOR with the aim of establishing a pyramid system for making use of residual materials generated through agriculture and forestry. The project will register materials stemming from agricultural side-streams (high potential waste, residues, and by-products). The project is coordinated by Steinbeis-Europa-Zentrum (SEZ). The aim is to help promote a so-called Bio-economy 2.0 within Europe, which would not compete with food production.

To achieve these goals, a number of innovation partnerships are being set up to bridge the gap between research and innovation. The project encompasses 16 partners from 6 countries in Europe, ranging from people directly involved in everyday farming and forestry to experts in research and teaching, as well as SMEs from the bio-industry. Three bio-mass innovation design hubs are being set-up in Andalusia (Spain), Hungary, and Ireland to provide hub managers with advice and support on measures for processing certain kinds of sidestreams. The support includes training based on the requirements of key players and help them implementing business concepts by providing to-one mentoring and



The team of winners together with Prof. Dr.-Ing. Frank Mücklich (6th from left), Prof. Dr. Andrés Lasagni (5th from left), and Laudatory speaker Henning Kagermann, President of acatech (6th from right). © Berthold Leibinger Foundation

single sweep. These structures can be adjusted as required and can be used in the same way that a stamp can be used to add repeated patterns to materials. This technique can even be used to add structures to larger surfaces. Mücklich has been working on functional materials with a select group of specialists. These materials can perform a variety of different functions, and to ensure they are put to everyday use, he founded the Steinbeis Research Center Saarland in 2009 as a transfer organization for working in partnership with industry.



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coaching. This will enable partners in the AGRIFORVALOR value chains to open the door to new commercial opportunities—locally, nationally, and on a European level. In the first months, project members of the University of Gent (Belgium) and Wageningen University (Netherlands) have worked with hub managers and partners from a variety of pilot regions and conducted desk research for the findings of research and development projects across Europe. Their focus will lie in exploring new techniques and processes that make it possible to process and exploit sidestreams generated by agricultural and forestry production. In parallel to this, the teams have investigated for examples of good practices in the pilot regions as well as other parts of the EU. These will demonstrate ways on how to generate income from sidestreams. The results will show successful cases as lighthouses in this new business field on new ways for exploitation and valorization of sidestreams rather than simply dispose or burn them. Initial findings have already been gathered in an interactive database called the Side-stream Value Tool, which was set up on the project website in September: www.agriforvalor.eu



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3D-Printed Shoe Makes a Lasting Impression

Steinbeis graduate makes successful entry into the world of self-employment with mass-customized shoes

A shining example of knowledge transfer: In 2010 Timo Marks graduated from the School of International Business and Entrepreneurship (SIBE) at Steinbeis University Berlin (SHB) with a Master of Science in International Management; five years later, he has just set up his own company: Schuhleister GmbH & Co. KG.

The original idea came to Timo Marks a number of times while studying at SHB. It wasn't just because his degree project for arvato was about entering foreign markets with a focus on China. He also ended up in the "Middle Kingdom" for his foreign studies trip. And while he was there, the idea took root of setting up his own company. He and his co-students were discussing the advantages of lower wages as part of a company tour. Producing and personalizing made-to-measure clothing even occupied his thoughts during his time off in the country. Looking back now, it's clear that this was the moment the idea behind Schuhleister was born. His thinking was that customized shoes are either simply too expensive in Europe – or they're expensive and not quite what the customer was looking for in visual terms. As he thought more about the problem, Marks struck upon the idea of individually adapting footwear to offer the quality of bespoke shoes by standardizing certain processes – all at an affordable price. Schuhleisters are a marriage between good old handiwork, customized shoe production, modern foot measurement techniques, and 3D printing. The result is a made-to-measure shoe that looks modern and offers premium quality at the same time. It only takes a single session to take all the measurements and new shoes can be re-ordered anytime as required. Schuhleister is operating as a B2B service to support commercial customers in making their own customers satisfied.

The approach allows Schuhleister to revolutionize a market that has until now focused on mass production and produced goods for the warehouse. It is doing this by thinking about the exact fit of the shoe before it's tried on for the first time. So even before the first materials are cut in production, the data on the customer's foot is already in the system (a move based on Toyota principles: away from push to pull production). The corresponding shoe lasts (Schuhleisten, or molds) are then made available in the right design.

As well as offering on-site solutions, Schuhleister also provides online options for ordering other products that match foot measurements and it's currently developing an app for this. The process and the services offered by Schuhleister have received an extremely warm reception among business clients and end customers. A variety of stores and companies

have already used the service and were extremely satisfied with the results. Made-to-measure shoe production has allowed Schuhleister to teach customers that batches of individual items are now possible. The company is now able to provide stores, designers, and other companies with their own white label collections in minimum volumes.

Schuhleister is currently automating more and more stages of the shoe making process. This process optimization work is being galvanized by the experience already gathered by the team and its advisors, as well as the prospect of revolutionizing a niche within a highly competitive market – in ways that provide services to B2B clients and end customers and offer tangible benefit. With the help of 21st century technology, Schuhleister will be able to offer people working at companies added value and offer a new service to the end-customers of trade clients.

For Marks, the project competence degree (PCD) at Steinbeis University Berlin laid important foundations for his role as a business founder and the manager of a growing company. A variety of topics and tasks covered during his degree played a decisive role in helping him position Schuhleister as an innovative company – from drafting financial plans, to implementing a live business project at arvato, and even the repeatedly underscored innovation philosophy of Schumpeter. It also required drawing a deep breath and focusing strictly on solutions – also aspects that are a central feature of the executive Steinbeis master's program, indeed factors that were important for Marks while setting up Schuhleister.

Image: Two salesmen for Schuhleister: Timo Marks and Joshua Meskemper | **Copyright:** Frank Nürnberger



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Early Investments that are Worth it

Steinbeis experts help small and medium-sized companies with apprentice training

Every year, large numbers of young Germans start an apprenticeship. This is an important first career step, also for firms hoping to grow their next generation of managers. Around the same time (usually in August), the press is full of headlines about open apprenticeships with no applicants. Demographic change, lower student numbers, and shifts in perception regarding vocational training are just three factors journalists point to when this happens. While politicians, trade associations, and the trade guilds look for ways to make young people more interested in vocational training, the companies themselves have been rolling up their sleeves and have thought up their own, future-oriented training concepts. Their investments are worth it. At many companies, apprentices become committed workers that stay much longer with the company than average. The Steinbeis Transfer Institute for System Science, Management, and Consulting, which is part of Steinbeis University Berlin, has been working on a modular training scheme aimed at improving everyday vocational skills in collaboration with the Steinbeis Transfer Center for Strategic Management – Innovation – Cooperation.

When young people start their apprenticeships, they find themselves in a completely foreign setting and face totally new expectations. Their everyday circles now include co-workers, bosses, suppliers, and clients. Figuring out "how to behave and how to adjust the way I communicate with others" is one of the first major challenges to be mastered. This learning process is supported by the Steinbeis experts in a six-part train-

ing course that was first organized in late 2015, initially for a group of industrial and commercial apprentices working at manufacturing companies just outside Vechta. The training was set up under a Steinbeis initiative supported by Diana Diephaus, an official representative of the German Confederation of Small and Medium-Sized Enterprises (BVMW). Several companies were involved in the collaboration. Because firms can book the cooperative training sessions together, it is also possible for small businesses with only a few apprentices to offer in-house courses to their trainees. The scheme even allows individual apprentices to sit in as a guest on training sessions offered at larger companies. The collaboration is being jointly coordinated by Steinbeis and the BVMW.

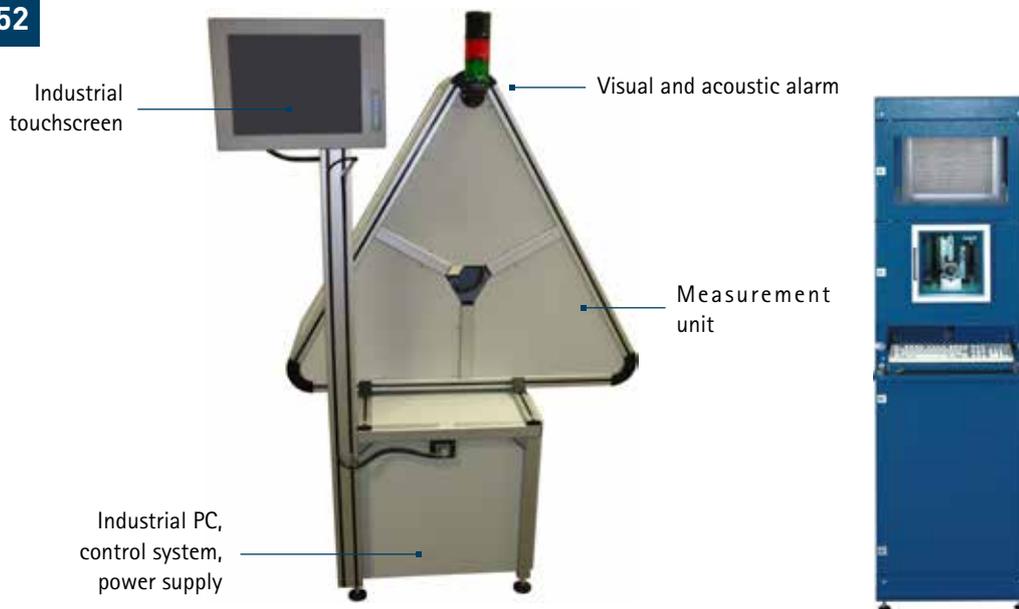
The pilot training scheme lasted seven hours and focused on the switch from being at school to being an apprentice – plus the impact this has on becoming independent, assuming responsibility, and communicating appropriately in everyday situations. Afterwards, the course participants agreed on one thing: The training was well worth it! They were not simply presented with information, they could acquire knowledge, communication strategies, and new behaviors under the supervision of the trainers and then link this to their daily work and things they had experienced so far.

"What we're finding is that lots of apprentices have never consciously thought about how they communicate or prepared for discussions or had to deal with their own shortcomings. These are often things that just somehow happened; they either went well or badly," say Karola Jamnig-Stellmach and Larissa Ney, describing their observations during the first round of training. The Steinbeis experts would like to create greater awareness for the fact that apprentices can actively manage communication and take responsibility for this themselves. This is a first step in proactively managing their own training, consciously "thinking solutions," building a rapport with co-workers, and being approachable to customers.

Plans are already underway to develop the next parts of the apprentice training. "Our training allows us to work with the apprentices on their everyday vocational skills, which means their social and communication abilities, and their problem-solving and conflict resolution skills. It's particularly areas like this that knowledge transfer is so important. So as of this year we're offering further support. We'll keep finishing the training just as we have until now and identify practical targets for the apprentices, as in 'What do the things they've learned mean for them?' and 'What do they now want to do with this knowledge?' But what's new is the ongoing support after the training sessions in a digital format that's not expensive for the companies," explains Jamnig-Stellmach.



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Quality Stuff? Most definitely!

Steinbeis experts develop testing system for plastic pipes

If anyone has an eye for quality – literally, including for plastic piping systems – then it has to be the experts at the Steinbeis quality assurance and image processing enterprise *Qualitätssicherung und Bildverarbeitung GmbH*. The team from Ilmenau has developed an innovative testing process for checking plastic pipes. It's a tube dimension testing device called PipeTest that makes it possible to run random checks on pipes and ascertain internal and external diameters, wall thickness, ovality, and random anomalies in wall thickness. The experts also have a quality testing device that works "inline" (during live production) called PipeScan, which makes it possible to run 100% checks on external diameters as well as surface defects on plastic pipes.

The testing devices are easy to operate and extremely robust meaning they can be used directly on production lines. The measurements taken by the PipeTest device are tactile and taken at random. With PipeScan, testing is contactless using an optical system on the production line. The devices come with comprehensive, user-friendly software for taking automatic measurements and evaluating 100% or pipes inline. Alternatively, a random testing station can be set up. PipeScan and PipeTest can be provided in a number of varieties to cover different diameter ranges.

Both devices are suitable for different types of materials and can be used on pipes with diameters of 9–32 mm or 40–110 mm. If required, they can even test pipes of up to 125 mm. The system works by examining extruded pipes as they pass through the PipeScan testing station using three linear CCD cameras positioned around all sides. These assess the diameter, surface abnormalities such as dents, bubbles, or lacerations, and color variations. The fault tolerance can be set for all kinds of surface defects with a minimum detection area of 0.05 mm².

The system can also continuously measure internal and external pipe diameters. If an error is detected, the device is equipped with a visual and acoustic alarm. A recent software even allows for differentiation between innocuous water droplets and actual defects. To set parameters, operate the system, and view and assess test results, the system comes with an application called PipeScan 2.0. The testing devices deliver high performance which is reflected in the fast throughput rate of 36 m/min and the experts at Steinbeis have already carried out testing with speeds of up to 72 m/min.

If required, a recent addition to PipeTest gives the option of measuring surface roughness (longitudinal scoring). It also allows operators to monitor signal and tolerance limits using a traffic light system to give feedback on

material quality in green, amber, or red. "These testing devices are extremely user-friendly and sturdy, so they're practically error-free. Introducing our innovative quality testing equipment requires absolutely minimal training and the measurement times are quick," says Steffen Lübbecke, managing director of Steinbeis *Qualitätssicherung und Bildverarbeitung GmbH*, summarizing the advantages of using the system.

The testing devices can be managed through standard industrial PCs using Windows. To operate, graph, and evaluate test results, the system comes with user-friendly software called PipeTest and PipeScan. The system is set up for interfacing with enterprise IT networks and CAQ systems. The Steinbeis experts have also developed a remote control and data transfer via internet protocol, and MS Access or MS SQL Server®R2 can be used as databases.

Image: PipeScan (left) and PipeTest (right)



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Inspired by Microelectronics for 25 Years

A big anniversary for the Steinbeis engineering services provider TZM

25 years in business and a countless number of successfully completed projects – reason enough for the Göppingen-based Steinbeis Transfer Center for Microelectronics (TZM) to celebrate in style. TZM is now one of the biggest enterprises in the Steinbeis Network. It has developed into a powerful and agile engineering services provider employing around 100 people working across a variety of sectors of industry.

"Our focus lies on the automotive industry, medical technology, measurement and testing technology, and solutions used in automation technology," says Edgar Grundstein, director of TZM. The engineers in Göppingen also develop software, specialist devices, product concepts, and solutions used by companies in other sectors of industry. It works as a service provider but also has its own products. "Our know-how quickly makes products market-ready; we know a lot about complex approval processes and statutory requirements and we address such issues for the sake of our clients," explains Grundstein.

How successful TZM has been with its own products can be seen by the successful spin-off company FlexRay, which was sold just under a decade ago to Eberspächer Electronics. And TZM is currently working on medical products for a new company, a German limited company (GmbH) in the Steinbeis Network. "Our systems link up a wide variety of medical devices. This makes it possible to set up distributed alarm systems to help patients even faster and give them optimum support," says Grundstein.

Anniversaries are always an opportunity to look back, and it's no different with TZM: The original Transfer Center for Microelectronics grew out of a development on the Göppingen Campus of Esslingen University of Applied Sciences. In 1991, Prof. Dr.-Ing. Jürgen van der List set up the Steinbeis Transfer Center for Microelectronics (or TZM for short) with Prof. Dr.-Ing. Heinz Osterwinter, who passed away in 2013. At the time, TZM was based in rented facilities directly at the university in Göppingen. The underlying idea was to make use of the highly modern laboratory equipment and research facilities on the recently founded campus of Esslingen University of Applied Sciences and to allow the Steinbeis Foundation to take care of organizational details. The first transfer projects were carried out by the founders themselves. In the years that followed, demand grew continuously and TZM expanded. The industries and key areas TZM worked in also changed in keeping with market developments. The management team working alongside Prof. Dr. Rainer Würslin and

Prof. Dr.-Ing. Bernhard Schwarz had to be expanded in the early years, partly because the professors still had to focus on their full-time jobs at the university. In the years that followed, TZM grew to over 100 employees, and in 1999, Edgar Grundstein took on the time-consuming task of managing the day-to-day operations at TZM. In 2002, the project engineers moved into new premises directly next to the university and these now house the Göppingen offices. These offices laid a solid foundation for the future success of TZM.

TZM has picked up numerous awards for its track record as an employer. "We place a great deal of emphasis on the pleasant working environment and modern equipment. This enables us to attract highly qualified engineers to work for us and join our projects. Our most important asset is the people who enjoy developing and creating things," explains Grundstein. The close relationships TZM enjoys with science and research have put it in the best possible position to tackle the future, helping safeguard market competitiveness for itself and its customers. TZM is always looking for engineers who would like to join it on this journey.

Announcement:

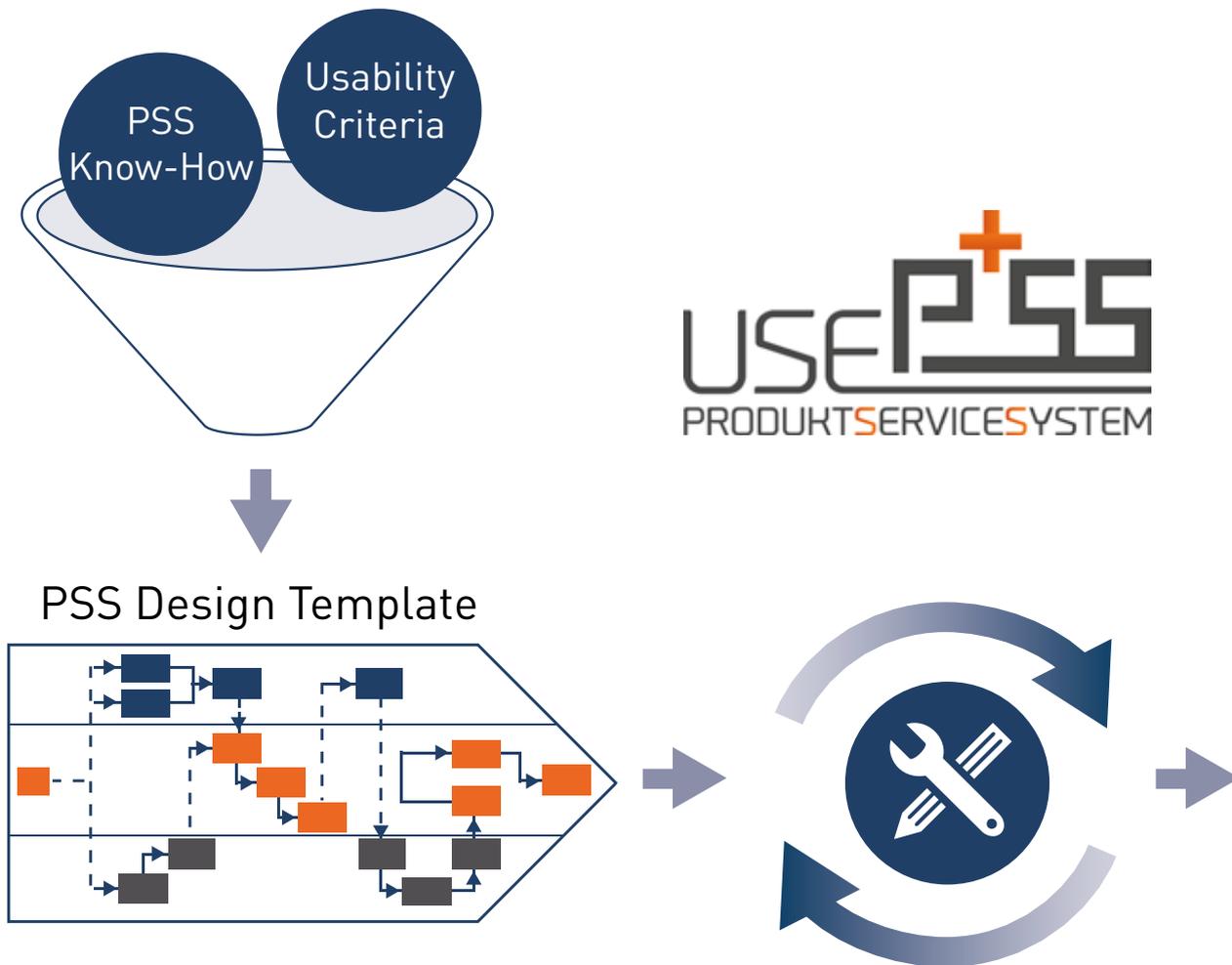
Software Engineering Dialogue Forum | March 8, 2016, Göppingen
The publishing house Carl Hanser Verlag and TZM welcome visitors to their cross-sector convention, which will discuss system networking and connectivity, user experience and the IoT, and software quality and testing automation.
For more information go to www.softeng-forum.de.



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USEPSS
 +
 PRODUKTSERVICESYSTEM

SMEs Transform from Product Manufacturers into Solution Providers

Steinbeis experts develop product service systems for SMEs as part of a network project

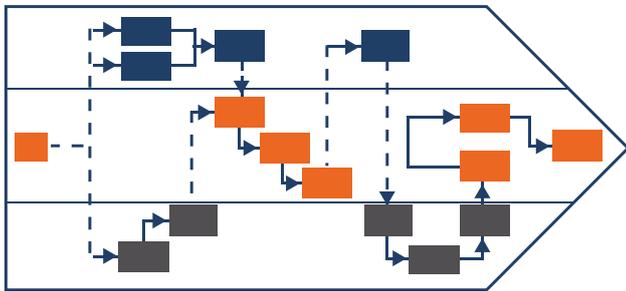
In 2015, the Federal Ministry for Economic Affairs and Energy launched a partnership project as part of a funding initiative aimed at supporting digital technology strategies within SMEs and the digital transformation of business processes. The project was named Use-PSS (usability of commercial product service systems among SMEs). The background for the project is the sea change affecting the role played by manufacturing companies. Previously, manufacturers focused primarily on the development, production, and selling of premium quality tangible goods, but in the future, customers will expect end-to-end solutions. A particularly effective way to provide such 360° solutions is to adopt a "product-service system" (PSS), with one element being the product and the other being its related services. How much emphasis is placed on each element depends largely on the area of application. The aim of the project is to provide SMEs with support in setting up such a PSS. This is being achieved by working on real application scenarios with SME partners in order to develop and then test an innovative usability template for creating a PSS. The organizations that worked as partners on the project include the Pforzheim-based Steinbeis Innovation Center 2 Digital Business, Pforzheim University, bwcon GmbH (Stuttgart) – all of which belong to the Steinbeis Network – and their partners from industry, doubleSlash Net-Business GmbH (Friedrichshafen), NETSYNO Software GmbH (Karlsruhe), and teXXmo Mobile Solution GmbH & Co. KG (Böblingen).

Across all sectors of industry, manufacturers face a similar challenge, which they all need to react to quickly. Customer requirements are changing, shifting away from only wanting tangible products to buying user-centric holistic solutions instead. These are end-to-end packages combining products and services. Continual product upgrades and premium quality are no longer enough in the long term to remain competitive. The types of things that can become a USP include products enhanced by smart services and add-ons that allow them to be embedded into the

processes of end users. PSS's are now being designed and implemented as part of an extended value chain network with close ties to the customer. These will allow manufacturers to undergo a fundamental strategic change and transform into customer-oriented service providers. However, this is particularly challenging for companies if they are an SME.

To show how companies can be transformed into a PSS provider, the project team likes to draw on the example of a mechanical engineering com-

Use-PSS Competence Center



pany that used to only ever think about its products. As it shifts gradually toward becoming a solution provider, the company is confronted by the need to develop an appropriate business model. This will allow the business to pull together a PSS that revolves around its current offering, and thus offer customers an end-to-end solution that focuses on solving customer problems. So instead of simply selling machines like it used to, the firm could start by renting out its machines. The client then benefits from extended support such as training, maintenance services, or help with process optimization. As the emphasis shifts firmly to focusing on services, the company still offers its customers the same machines, but as part of a 360° service package, even allowing for payment per produced component. Such end-to-end solutions cover all tasks linked to the life cycle of the customer's own product, from procurement to selling and disposal.

To help SMEs develop and introduce a PSS that is easy to follow, the Use-PSS initiative is introducing a number of tools and measures:

- The project team has created a design template for developing a PSS, taking certain usability criteria into account.
- These procedure models will be tested with SME providers and users in the second phase of the project in order to arrive at validated best practices regarding the right approach to adopt when developing and implementing a PSS for an SME.

- To share findings with a broader audience, further stages of the project will involve posting information online for specific target groups and organizing information days, seminars, and training.

Using PSS solutions makes it possible for providers to raise their turnover in the long term and offer customers more benefits. As a result, customer loyalty is enhanced resulting in competitive advantage. To help companies undergo such a transformation, one of the key outcomes of the Use-PSS project will involve setting up a competence center for SMEs and thus providing a first port of call and networking platform. The plan is to continue running the center to provide SMEs with support even after the project has been completed.

Two main areas that the 2 Digital Business center at Steinbeis is working on as part of the project are firstly to pull together examples of best practice when using the new methods and models at an SME, and secondly to develop services that will work in practice. The results of this work will then be shared with SMEs. The Use-PSS project is part of an initiative backed by the Federal Ministry for Economic Affairs called Simply Intuitive – Usability for SMEs.

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by the German Bundestag

Image: The underlying approach of the Use-PSS project, from initial foundations to the competence center

For further information on the Use-PSS project, go to www.mittelstand-digital.de.



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The Impact of Industry 4.0 on Education, Work, and Technology

Steinbeis joins partnership on study into developments in the work environment

All the talk in Germany at the moment is of Industry 4.0 – or smart manufacturing, which describes the growing use of digital technology in production and digital connectivity between humans, machines, and objects, all made possible thanks to cyber-physical systems. The door is opening to entirely new scenarios that will affect the world overall and the world in which we work. To research the impact this will have on workers, the Karlsruhe University of Education and Karlsruhe University of Applied Sciences are currently conducting a study with the support of the Steinbeis Transfer Center SITIS (Institute for Transfer Technologies and Integrated Systems) and rst IT Consulting GmbH.

Previous research has identified a number of key challenges that firms will have to face in the future if they want to remain competitive against the backdrop of Industry 4.0 developments. This will involve technological renewal, innovation, changing production hierarchies, networked value chains, and novel business models. But what impact will sweeping change have on the people working for these companies?

The Institute for Transfer Technologies and Integrated Systems, also known as SITIS, is a Steinbeis Transfer Center based at Karlsruhe University of Applied Sciences. Through scores of industry consulting assignments and many projects conducted through its SITIS Academy, SITIS has gained detailed insights into the work environment of people working at companies in the fields of tool-making, metal construction, medicine, and the aerospace industry. These experiences overlap closely with the findings of different studies and can be summarized in the following key points (see separate box for sources):

- The utilization level of new technology stands at between 40% and 60%.
- Many workers have not yet arrived in the world of Industry 2.0
- There is less and less time for staff training/CPD
- People often learn what they already know when they receive training and there's a tendency in business to emphasize learning "on the job" (learning by doing), typically with vague goals or structures

If companies want to meet the challenges of Industry 4.0, time is of the essence. They have to manage what they are doing right now while also casting an eye toward future activities. This is made worse by two further factors. Firstly, there is a skills shortage, which is likely to worsen due to demographic developments – and this will increase the onus on the small-

er numbers of workers. Secondly, people will be expected to take on new tasks and they will still have to acquire the right skills to do this.

People are adaptable, capable of learning, and effective – assuming the right conditions are in place to motivate them and allow them to enjoy their work. Recent studies indicate that one in two workers believe they are not able to make full use of their skills at the workplace. Under a quarter of workers say that they receive recognition for their commitment and performance. If companies want to master future challenges with their workers, they will need to have everyone fully on board. But this is only possible if they not only take a variety of factors into account, such as age, people's expectations regarding role models, qualification levels, and hierarchies, but also emotional factors and issues relating to how people manage their work.

To research the relationships between all these issues, the consortium (Karlsruhe University of Education, Karlsruhe University of Applied Sciences, the Steinbeis Transfer Center SITIS, and rst IT Consulting) has been working on a study entitled Education – Work – Technology. The study is based on a technique developed by Steinbeis and rst which allows firms to gain feedback from workers on the emphasis of tasks during any current situation – e.g., with respect to Industry 4.0.

Evaluating data from the study should make it possible to explain:

- the key priorities of a company and how these are seen by its workers
- connections with age patterns, known problems, and the affective impact of such aspects
- goals, values, and how these values can be targeted and justified, given any problems raised by workers



Companies are also provided with a timeline analysis showing the development of goals and values from the viewpoint of staff, plus different problems in the value chain. Drawing on the results of the study allows firms to draft long-term action plans. Actively involving workers in the survey of key priorities also makes it possible for them to contribute directly to solving problems considered important to the survival of the company.

Image: © iStockphoto.de/alice photo

Manufacturing enterprises are entitled to participate in the study for free for a period of six months. Depending on resource availability, queries can be submitted until the end of December 2016.



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Steinbeis Award for Prof. Gerhard Walliser Recognition for outstanding contributions made through project work

Award for a member of staff who is practically an institution in himself: Prof. Dipl.-Ing., Prof. h. c. (YZU) Gerhard Walliser, director of the Steinbeis Transfer Center for Automotive Engineering in Esslingen, was bestowed a special award on the occasion of his 80th birthday.

The honor is awarded to "Steinbeisers" for outstandingly successful projects, their unique personality, their fundamental approach, or the respect they gain as a role model. Prof. Dr. Michael Auer, Board Chairman of the Steinbeis Network, presented the award to Gerhard Walliser in the presence of a variety of guests who had gathered to mark his big birthday.

Since starting at Esslingen University of Applied Sciences in the early 1970s, Walliser worked for Steinbeis as an engineering consultant for many years. In 1995, he founded the Steinbeis Transfer Center for Automotive Engineering in Esslingen, which he has headed up ever since. The center offers its clients consulting services, studies, and expert reports, as well as support with applied R&D. It also provides a comprehensive selection of staff training courses on the topics of vehicle drive chains, vehicle bodies, and vehicle mechatronics.



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The 2016/2017 "Products Seek Producers" Exhibitions

Steinbeis trade shows in Reutlingen, Ulm, and Karlsruhe

The Steinbeis series of trade shows called Products Seek Producers (PsP) has now achieved four successes in matching new product concepts to manufacturers. PSP is now starting a triple round of events. Steinbeis is once again opening its doors to its innovation shows in the coming months, this time in Reutlingen, Ulm, and Karlsruhe.

October 11, 2016 | Reutlingen University

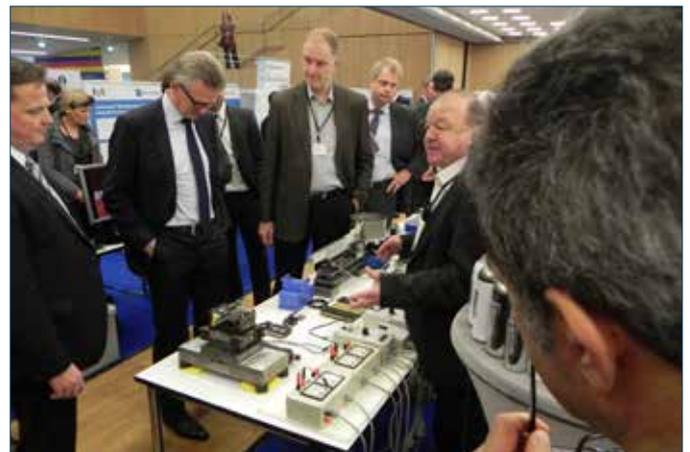
It's not often a technology leads to a new product just by itself. It usually requires certain skills to make an innovation happen. The PsP on "Technology Convergence: Materials – Processes – Electronics" will showcase a variety of products at Reutlingen University that span several technologies at the same time.

November 18, 2016 | Ulm University of Applied Sciences

Modern travel solutions and the automotive industry are considered two key technology fields of the future. Strong growth is anticipated in these markets, which are marked by rapid change, especially in the field of e-vehicles, which is likely to spawn new products in many areas of society. The PsP on "Mobility and Automotive Solutions" will showcase new products and technologies that are looking for producers, collaboration partners, and investors.

January 27, 2017 | IHK Karlsruhe

The new German term for connected manufacturing, Industry 4.0, is instantly associated with digital media and new types of hardware and software. In no other field is the rate of technology change so rapid. As the merging of hardware and software starts to affect all areas, with solutions that deserve a "smart" label, there are savings to be made, plus new products. The PsP in Karlsruhe will therefore focus on "Digital Media: Software and Hardware in a Digital World."



Each trade show is open from 9 a.m. to 4 p.m. For more information and registration details, go to www.produkte-suchen-produzenten.de.



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Science Slam – Knowledge Transfer with a Twist

Steinbeis joins forces with the Stuttgart Hütte Academic Foundation

If anyone needed proof that research can be entertaining and made easy for anyone to understand, the young scientists at the 12th Science Slam in Stuttgart in June certainly provided it. They also proved that there is continuing fascination with scientific topics – not one of the 370 seats at the Hospitalhof in Stuttgart stood empty. Steinbeis joined the event for the first time as partner to the Stuttgart Hütte Academic Foundation.

At a science slam, complex scientific relationships are explained in simple terms for everyone to understand and these are presented in the most creative and entertaining ways possible – all in no more than 10 minutes. Five slammers took part in the event at the Hospitalhof in Stuttgart, presenting their projects to an excited audience.

Dr. Burkhard von Stackelberg and Dave Tjiok gave a talk on The muck that can save the world, explaining how vegetable carbon can turn infertile soil into fertile farmland. The slammer Hagen Eckert approached the evening from a sporting angle. In his slam on the Science Olympics, Eckert unveiled the mysteries of university rankings and explained how statistical methods and special procedures are used to identify the elite universities of this world. Lukas Kürten went for a Spinning Spin through stores and chose a highly entertaining way to show how products that claim to have quantum physics properties are promising buyers much more than they are capable of delivering in scientific terms.

The delighted winner of the event was Helene Hoffmann. In her Ice-Ice Baby slam, Hoffmann completely brushed aside many of the clichés about environmental researchers, at the same time delivering a number of perfectly timed punch lines that not only kept the entire audience entertained, but also won everyone over in an instant. Aside from leaving a lasting impression of her own good self, the researcher shared a great deal of scientific know-how with the audience on how to ascertain the age of glaciers. So there was no doubting the winner in the audience's mind and Hoffmann was awarded the hotly contended Science Slam Cup by the trustees of the Stuttgart Hütte Academic Foundation.

The Science Slam marked the beginning of the new collaboration between Steinbeis and the Stuttgart Hütte Academic Foundation. The alli-

ance stems from an initiative started by Reinhard Stahl, deputy chairman of the board of trustees at the academic foundation. The partnership allows current and former members of the foundation to gain access to the Steinbeis Network and thus become involved in current issues relating to applied scientific practice and knowledge transfer.



Slamer of the 12th Science Slam Stuttgart:

- Hagen Eckert | PhD student at the Institute for Material Science at TU Dresden and project manager at the Steinbeis Research Center quantUP
- Helene Hoffman | PhD student at the Institute of Environmental Physics at Heidelberg University
- Lukas Kürten | PhD student at the Max Planck Institute for Solid State Research in Stuttgart
- Dr. Burkhard von Stackelberg & Dave Tjiok | University of Stuttgart



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Best Grades for Environmental Protection and Nature Conservation

Steinbeis innovation center attends Berlin Environmental Week

At the beginning of June, German president Joachim Gauck joined the German federal environmental foundation DBU at Berlin Environmental Week in the gardens of Bellevue Palace in Berlin. The event goes back to an initiative started by the former German president Johannes Rau, and this was the fifth time it has taken place at the president's residence. The event included presentations of significant and innovative contributions to the environment and nature conversation. Representing the Steinbeis Network, the Sinsheim-based Steinbeis Innovation Center for Logistics and Sustainability (SLN) also organized a booth at the event.

A panel of judges appointed by the German president selected the best and most innovative projects from over 600 applications. "We were absolutely delighted to be invited to Berlin to present our energy efficiency in logistics project, which was backed by the DBU," says Jens-Jochen Roth, director of the Steinbeis Innovation Center in Sinsheim.

The Steinbeis team presented the project on both days of the event, showing visitors how solution-based innovations were developed for the transportation and logistics industry, including examples of creative ideas thought up by apprentices – such as the GreenCube idea, which was also translated into practical application. There were roughly

12,000 visitors at the event, who came to find out more about nature conversation and environmental protection innovation in business.

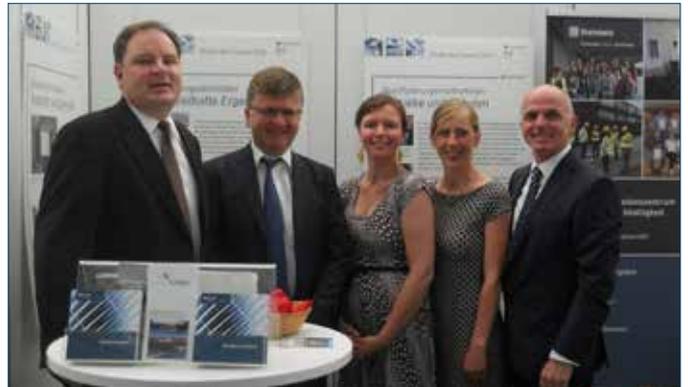


Image: Jens-Jochen Roth (Steinbeis), Jens Schumann (DB Schenker Deutschland AG), Carolin Schlenther, Ines Blumenthal (Potsdam Institute for Climate Impact Research), Prof. Dr. Andreas Fischer (Leuphana University of Lüneburg)

For more information, go to www.woche-der-umwelt.de, www.sln-sinsheim.de, or www.energieeffizienz-logistik.de.



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Industry 4.0 at SMEs

Conference proceedings published for inaugural Steinbeis event

The Steinbeis working group on Human Factors in the Product Development Process got off to a successful start with around 60 people meeting up at the end of last year to look at the issue of Industry 4.0 at SMEs. The question they asked: Are you in good shape enough for the future? A key challenge faced by SMEs is how to push ahead with digitalization in ways that work in the long term – in harmony with the technology used by SMEs, their actual room to maneuver, and the people involved. The conference proceedings have now been published.

The Steinbeis working group on Human Factors in the Product Development Process stems from an initiative launched by Prof. Dr.-Ing. Rüdiger

Haas, director of the Institute for Transfer Technologies and Integrated Systems SITIS, a Steinbeis Transfer Center, in collaboration with Oliver Brehm, director of the Steinbeis Transfer Center for Innovation und Organization. The forum is open to all centers belonging to the Steinbeis Network and experts involved in the field, who are keen to promote dialogue between science and academia on the one hand, and business on the other. The working group consciously works at an interdisciplinary level and is targeted at SMEs that would like to take on the challenges of digital transformation.

The conference documentation was published by Steinbeis-Edition and includes more than 100 pages of actual solutions and guidelines pertinent to connected factories (Industry 4.0) at SMEs. The plan is to continue the event this year in Stuttgart on November 24, 2016.

Image: Oliver Brehm, co-organizer and speaker at the event on Industry 4.0 at SMEs, which asked "Are you in good shape enough for the future?"

The conference proceedings are free and can be obtained through Steinbeis-Edition or via download by going to www.stzio.de.



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Transferplattform BW supports SMEs

Steinbeis embarks on smart manufacturing project with the universities of Aalen, Esslingen, and Reutlingen

The starting gun has been fired for Transferplattform BW, following confirmation in August from the Baden-Württemberg Minister of Economics Dr. Nicole Hoffmeister-Kraut that a funding grant worth just under two million euros will be going to the universities of Aalen, Esslingen, and Reutlingen, as well as Steinbeis. The Baden-Württemberg Ministry for the Economy, Employment, and Housing is providing funding for a joint transfer platform for Industry 4.0 (connected or smart manufacturing). Its aim is to help SMEs make better use of the opportunities opened up by digital networks and smart manufacturing.

"Baden-Württemberg fulfills all the right prerequisites for the advent of Industry 4.0. It will be particularly important for small and medium-sized enterprises to receive support with the increasing complexity of production and logistics systems – support based on actual business practice," explains Dr. Nicole Hoffmeister-Kraut. In keeping with this, the Ministry for the Economy is backing a joint know-how sharing platform for Industry 4.0 at three universities in collaboration with Steinbeis.

The funding reflects the intention of the state of Baden-Württemberg to address the challenges posed by innovation policy in the field of Indus-

try 4.0. Providing a joint transfer platform puts practical solutions at the fingertips of SMEs in the state. The universities will work together with Steinbeis to coordinate transfer activities and dovetail two separate instruments. One entails setting up Industry 4.0 labs to function as demonstration centers across all locations. The other involves managing how know-how is shared, based on the same principles. The universities and companies will focus on actual demand and will work together to write product specifications. This will be translated into hands-on solutions through research and development projects in the Industry 4.0 labs at the universities, as well as staff training and courses. The transfer platform is a pilot project, so the aim is also to gather experience that can be handed on to other universities.

Image: Receiving funding confirmation from Dr. Nicole Hoffmeister-Kraut (left to right): Prof. Dr. Christian Maercker (Principle, Esslingen University of Applied Sciences), Prof. Dr. Hendrik Brumme (Reutlingen University President), Prof. Dr. Michael Auer (Board Chairman of the Steinbeis Foundation), and Prof. Dr. Gerhard Schneider (Principle, Aalen University) with (on the far right) the representative of the Steinbeis Board of Trustees, Tobias Wald (member of regional state parliament).



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New releases from Steinbeis-Edition

Steinbeis-Edition, the publishing arm of the Steinbeis Foundation, regularly publishes works reflecting the scope of the Steinbeis Network's expertise. All titles can easily be ordered via our online shop at: www.steinbeis-edition.de.



The Consumer Acceptance of Mobile Click 'n' Collect Systems as a Determinant of Purchase Decisions Norbert Beck

2016 | Hardcover, B&W | 232 pages, German
ISBN 978-3-95663-080-4

About the author

Norbert Beck studied business psychology (B.A.) and graduated with an M.Sc. in International Management. He gained the highest grades in his year for business psychology and was awarded a scholarship by the Friedrich Ebert Foundation for the highly gifted. He previously worked for adidas and The Boston Consulting Group before completing his Ph.D. at Steinbeis University Berlin in 2016.



The Effect of Ostrom Variables on the Intensity of Collaboration in Financial Alliances Jörg Hahne

2016 | Paperback, B&W | 308 pages, German
ISBN 978-3-95663-091-0

About the author

Jörg Hahne trained as a bank clerk before supplementing his education at the Frankfurt School of Management & Finance. He also completed a diploma in Banking Administration at the Akademie Deutscher Genossenschaften (ADG) in Montabaur before taking a further Business Administration degree (FH) at Harz University of Applied Sciences. Hahne has been a board member of the Volksbank eG in Seesen since 2013 and is an honorary member of a variety of committees relating to the cooperative Volksbanken Raiffeisenbanken group. He completed his Ph.D. studies at Steinbeis University Berlin in 2016.



The Effective Selection and Control of Research Portfolios Stefan Lacher

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ISBN 978-3-95663-100-9

About the author

Stefan Lacher studied international management and management accounting at Ludwigshafen University of Applied Sciences and Deakin University in Melbourne. He has been working in a variety of fields of research and development for a number of years as well as marketing in the software industry. During this time he has often been confronted by whether innovations are particularly likely to succeed, and if so, how to measure their success. He completed his Ph.D. parallel to full-time work at Steinbeis University Berlin in 2016.



Management Succession in Family-Owned Businesses Julia Regine Eberhardt

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About the author

Julia Regine Eberhardt inherited ownership of a small/medium-sized enterprise. She started at the firm in 2010 after previously completing a bachelor's degree in business administration and a master's degree in social and organizational psychology at the London School of Economics and Political Science (LSE). She also worked for a number of years in business consulting. Parallel to her management role, she completed a Ph.D. on management succession at family-owned companies at Steinbeis University Berlin in 2016.



Range Optimization Opportunities in the Fitness and Health Industry Jörg Loth, Ralf Recktenwald

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About the author

Prof. Jörg Loth is a board member of IKK Südwest and an economics professor at the DHfPG University of Applied Sciences (German prevention and health management university) in Saarbrücken. Ralf Recktenwald is a director of an international management services provider, interim manager, and guest lecturer at ADG Business School at Steinbeis University Berlin. He has been streamlining portfolios and companies for years.



Black Forest Innovation Winners
Steinbeis Consulting Center for Change Management (ed.)

2016 | Hardcover, color | 47 pages, German
 ISBN 978-3-95663-103-0

About the author

Claudia Koch is the founder and director of the Steinbeis Consulting Center for Change Management. Being an engineer, Koch provides advice on process optimization and is an experienced change manager during times of personal crisis and growth. Her book brings together passion for writing and her entrepreneurial know-how, providing 16 memorable portraits of exceptional and – perhaps most importantly – successful small and medium-sized enterprises in the Black Forest and Upper Rhine Valley.

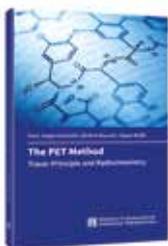


NoGAP: Knowledge Transfer Community to Bridge the Gap Between Research, Innovation and Business Creation
Vadym Yashenkov, Oksana Tsurkan, Oliver Rohde

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 ISBN 978-3-95663-092-7

About the project partner

This publication was written by Oliver Rohde of the German Aerospace Center in Bonn, together with Vadym Yashenkov and Oksana Tsurkan of the Center for Scientific and Technical Information and Innovation Promotion in Ukraine as part of a collaboration with Steinbeis-Europa-Zentrum (SEZ). The SEZ is a member of the Steinbeis Network and helps companies, research institutions, universities, and regional economic development organizations build bridges across Europe.



The PET Method
Tracer Principle and Radiochemistry
Hans-Jürgen Machulla, Ehab Al-Momani, Noeen Malik

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 ISBN 978-3-95663-081-1

About the co-author

Prof. Dr. rer. nat. Hans-Jürgen Machulla completed his Ph.D. at the University of Cologne and has worked in Jülich Research Center and Brookhaven National Laboratories (USA) on the reactions of suprathermal radionuclides. Returning to Germany, he played an instrumental role in setting up PET centers in Jülich, Essen, and Bad Oeynhausen. He gained his professorship at the University of Essen. In 1989, Machulla was awarded the Tübingen University professorial chair for radiopharmacy in the development and clinical application of radiopharmaceuticals. He is now director of the Institute for Radiopharmacy, a Steinbeis Transfer Center in Tübingen.



A Practical Guide to ISO Standard 9001:2015
Gerhard Weindler

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 ISBN 978-3-95663-094-1

About the author

Prof. Dr. (UCN) Gerhard Weindler is director of the Steinbeis Transfer Center for Management Quality and former director of the Steinbeis Transfer Institute for Operations Management. For many years he has been acting as a guest lecturer at a variety of universities, teaching on business and management, process-oriented quality management, and applied innovation management. Weindler supports small and medium-sized enterprises with their projects, helping them implement their ideas at all stages of the supply chain, from raw materials supply to final disposal, also helping with new product development from initial ideas to market-ready products.



Industry 4.0 at SMEs – Are You Ready for the Future?

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

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2016 | E-book (PDF), color | 113 pages, German
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Dipl.-Ing. (FH) Oliver Brehm is a freelance business consultant with a focus on product development using CAD PLM and ERP, including content management systems (CMS). His work primarily revolves around system-independent advice on selection and implementation projects. Oliver Brehm has been director of the Steinbeis Transfer Center for Innovation and Organization since 2001.

Prof. Dr.-Ing. Rüdiger Haas is director of the production technology and production department at Karlsruhe University of Applied Sciences and director of SITIS (Steinbeis Institute for Transfer Technologies and Integrated Systems, also a Steinbeis Transfer Center). PD Dr. phil. habil. Maja Jeretin-Kopf is the manager of a project called Learning Factory 4.X at HsKA and a project manager at SITIS. She was awarded the professorship at Karlsruhe University of Education, where she still works as a guest lecturer. Her research revolves around intergenerational learning, business-specific curriculum development, and technology instruction in general technical training.

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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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