

TRANSFER

THE STEINBEIS MAGAZINE 01|19

SUSTAINABILITY



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DEAR READERS,

Sustainability is one of the most important guiding principles of our time. The goal: to preserve the ability of systems to regenerate themselves and thus continually – i.e. today and tomorrow – answer the needs of humanity. Discussion regarding sustainability first arose in the field of forestry, fueled further in the 1980s by an international enquiry commission's publication of the Brundtland Report and the Club of Rome. In 1992, Agenda 21 was published following the United Nations Conference on Environment and Development in Rio de Janeiro and finally, in 2015, 17 sustainable development goals were ratified by the UN as part of Agenda 2030 – including 169 subgoals and 232 global indicators (as of July 2017). Three pillars were laid down for ensuring the goals foster development around the world in a way that is environmentally compatible, socially just, and economically efficient. The German Federal Government's sustainability strategy is based closely on Agenda 2030.

The guiding principle of sustainability is becoming increasingly important for many people in their everyday lives. The products and services we demand should be produced and made available in a sustainable way. We want the work we carry out on behalf of enterprises to be meaningful. Accordingly, companies increasingly gauge themselves by the extent to which they pursue sustainability goals and operate in a way that is not only economic and effective, but also environmentally friendly and socially responsible. Furthermore, it's important to manage firms in ways that are sustainable in the long term. Sustainability management transcends a number of tasks pertinent to internal and external communication.

Speaking for myself, I have dedicated the research, development, and advisory services I have carried out for companies through the University of Kassel, Fraunhofer, and Steinbeis to an important subgoal of sustainability: the energy transition – shifting to renewables as a source of energy. This has involved considering the electricity, thermal energy, and transportation industries. Essentially, it's about electrification of the thermal energy and transportation industries, in order to use photovoltaic equipment and wind turbines for energy supplies across all sectors of industry. An important prerequisite for this is a cost-efficient and robust infrastructure. Aside from focusing on energy provision, sustainability includes other aspects, too. This edition of Transfer Magazine shows the many ways in which the experts at Steinbeis have been involved in the guiding principles of sustainability in the work they carry out for their projects. I do hope it makes an interesting read!

With kind regards,



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08



18

03
EDITORIAL

FEATURE TOPIC

08
“WE HAVE NO CHOICE BUT TO ENCORPORATE SUSTAINABILITY WITHIN COMPANIES AS A KEY SUCCESS FACTOR”
An interview with Almut Kaupp, Director of Steinbeis Consulting Center International Marketing & Sustainability

11
LESS IS MORE: CARBON EMISSIONS OF BUILDINGS ENERGY CONCEPTS DURING THEIR LIFE CYCLE
Steinbeis study showcases measures for achieving climate protection goals in housing construction

13
A SUSTAINABLE SOLUTION TO POTHOLES
Potential solution provided by a life cycle assessment of transportation infrastructure based on building information modeling

15
“FOR ME, RESEARCH IS ABOUT FINDING SOLUTIONS!”
An interview with Professor Dr.-Ing. Volker Jehle, Director of the Steinbeis Transfer Center innovative nonwoven technology

18
INVESTING WITH A CLEAR CONSCIENCE
Prof. Dr. Philipp Haberstock and Steffen Lohrer show that it is possible to acquire a company and create social returns

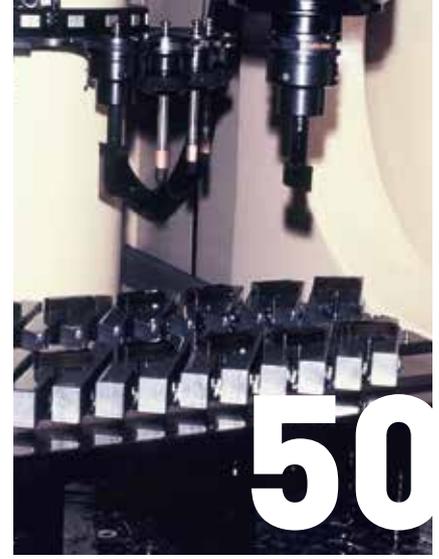
22
ACHIEVING EXCELLENCE THROUGH EFFECTIVE SUSTAINABILITY
BUERGOFOL, the manufacturer of packaging and industrial foil, is setting new standards in its sector of industry thanks to the support of Steinbeis experts

25
THE IMPORTANCE OF VALUES AND SUSTAINABILITY
Steinbeis expert Wolfgang Natzke shows how sustainability and authenticity can take companies to the next level

28
THE ROLE PLAYED BY SMART CITIES AS INNOVATION HUBS FOR CITIES AND REGIONS
Steinbeis experts create innovation processes for EU projects

30
FUTURE-PROOF AND EMISSION-FREE THANKS TO SOLAR ENERGY
Steinbeis experts turn their sights on the SolarAktivHaus^{plus}

34
SUSTAINABILITY THROUGH SOCIAL RESPONSIBILITY
Steinbeis experts develop corporate social responsibility concept



38
STEINBEIS SWIPE!

CROSS-SECTION

40
DEEPTECH4GOOD: START-UPS COMING TO THE FORE
Steinbeis Zi remains important partner of European Union accelerator program

42
A MANAGEMENT CULTURE LIKELY TO LAST
Steinbeis experts moderate management development project

45
MEET ME AT MEDIWA: SHAPING DIGITAL TRANSFORMATION IN THE WORLD OF MEDIA
A look back at the 2018 Network Event

48
FINDING DEFECTS ACOUSTICALLY
A Steinbeis test measurement system can detect welding defects using acoustic emission analysis

50
AN EXCELLENT NOTION OF EROSION
Steinbeis experts develop measurement-based process for grinding profiles using spark erosion

51
STEINBEIS IN GRIEF FOR ONE OF ITS PIONEERS
Obituary: Professor Karl Sinn

52
BRINGING FAMILY AND A CAREER UNDER ONE ROOF!
Master's thesis by Louisa Madu of Steinbeis University points to the benefits of female empowerment

55
SUCCESSFUL SUCCESSION IN THE MAKING!
After 30 years, Günter Willmerding is closing down his Steinbeis Center after successfully handing the baton to Jakob Häckh

56
HESSIAN CLOTH WAS YESTERDAY: SUSTAINABLE FASHION AND FAIR PRODUCTION
Steinbeis Coach helps Stuttgarter business founder to set up her own company

58
NEW RELEASES

61
PUBLICATION DETAILS

SUSTAINABILITY





SUSTAINABILITY, a term many immediately associate with environmental protection, renewable energy, and recycling. But sustainability is about much more: Sustainable **ACTION** means thinking about the **FUTURE IMPACT** of what we do – so sustainability is omnipresent, dovetailing **ECONOMIC, ENVIRONMENTAL**, and **SOCIAL ASPECTS** and thus transcending all areas of modern life. This is captured in a nutshell by the **PRINCIPLE OF SUSTAINABILITY**: We should not use more than can be grown, regenerated, or made available again in the future. What this means in practice and how to make a success of sustainability, is demonstrated by the projects of our **STEINBEIS EXPERTS** in a variety of sectors of industry.



“WE HAVE NO CHOICE BUT TO ENCORPORATE SUSTAINABILITY WITHIN COMPANIES AS A KEY SUCCESS FACTOR”

AN INTERVIEW WITH ALMUT KAUPP, DIRECTOR OF STEINBEIS CONSULTING CENTER FOR INTERNATIONAL MARKETING & SUSTAINABILITY

Climate goals, scarce resources, but also the protection of human and labor rights are the responsibility of companies and workers alike. An ecosystem is only stable if the rate of natural reproduction is taken into account, as well as capacities to use and regenerate resources. If these limitations are not considered, conditions become unstable endangering the continued existence of the overall system. Steinbeis expert Almut Kaupp spoke to TRANSFER about the different ways sustainability management can help companies to avoid such circumstances, and how to make this happen in practice.

Hello Ms. Kaupp. Sustainability management is one of those buzzwords, but what's in it for a company?

The term “sustainability management” presupposes that a company is pursuing sustainable development and has declared that corporate social responsibility is part of its strategic orientation. Thus sustainability management is the outcome of an ethical and responsible attitude taken by a company. In broad terms that means a company is managed in such a way that it can survive in the long term, while making careful use of economic, environmental, and social resources.

In individual terms, this affects four areas: The society, the business enterprises, the market, and the environ-

ment. All these should be part of making a contribution to positive, sustainable developments in society. Conscious of this, doing business responsibly requires long-term business planning. This entails several factors, one of which is setting up sustainability management within the company and instilling it within the organization. This includes tangible, financial, informal, and cognitive resources, as well as permanent contact with stakeholders – so the organization is prepared in process terms for growth in the market and the environment. Other essential aspects are continuous sustainability reports for internal transparency, commitment, and last but not least a focus on sustainability in all areas across and within the company operations. A sustainable focus with a healthy sustainability management helps secure the long-term future of the company and the maintenance and growth of sales. It also enhances resource efficiency in all areas of the business.

What factors are important for a company entering into sustainability management?

As mentioned, sustainability management primarily presupposes some level of identification within the corporate philosophy, so it means laying down corresponding guidelines to provide a framework and code of con-

duct for sustainability management. We base the work we carry out at my Steinbeis Consulting Center on a holistic approach: An enterprise is considered as a whole, embedded within a micro- and macro-economic context. We conduct workshops with a mixture of employees from different departments and positions to derive the very essence of a company and develop the corporate philosophy from the inside out. What are the properties that define the substance of this company? What's its DNA? What's already done in terms of the constituents of sustainability? And what are the underlying motivations?

There are the stakeholder surveys that look at the overall field of influence of the company. Starting with the employees and looking at the customers, the suppliers, the local communities, where the company is headquartered, the investors and so on. A picture of the company is drawn, which “holds a mirror” to its social context. From the goals that have been worked and the existing commitments – and I'm sure that most SMEs are already involved in sustainable activities in many areas – a sustainability roadmap is dressed up, which is used as a basis for the sustainability management and to ensure its realization. We have to scale off the “silo mentality” whereby isolated sustainable measures are restric-

ted to only certain parts of a business and have to focus more on holistic operational implementation, which also cover external factors and international areas.

Sustainability and globalization – how can these two seemingly irreconcilable aspects be brought together?

This is a good question, especially when considering that globalization – as a basic condition of export – seems to be responsible for the non-sustainable conditions we are living in. Despite this, I don't think we should start shipping our parcels to Russia on bicycles. I would even suggest that exports and internationalization are an opportunity and an obligation for us to "export" and implement our ethical parameters and standards internationally (round the world). As already applied in the particulars of the export controls, which include provisions on complying with sanctions and anti-terrorism regulations, these set important international standards.

But it's also important to consider the value chain. Since our international procurement management offers many options to act in a sustainable way. Now there are a lot, who say that they might not be able to introduce control mechanisms along to the very last supplier. Here I have to disagree. Every company acting on the international floor already has implemented processes concerning the calculation of the goods origin. You might see, that it's easy to adapt these processes in order to safeguard sustainability. With regard to the international business my suggestion is to apply more favorable customs rates to sustainably produced goods. This should promote the protection of human rights, the occupational safety, the recyclability, and the production that conserves resources and should emphasize the importance of sustainability worldwide. It should be a matter of course for a sustainably

oriented company that sustainability management is not just implemented in the parent plant, but that the ethos is proliferated into each country in which it has business relations – whether that's through a subsidiary, suppliers, or even customers and negotiation partners.

What do you think the future holds for sustainability within companies, and which technological and societal trends will be decisive in this respect?

If we want a sensible future, we have no choice but to incorporate sustainability within companies as a key success factor. There's nothing new in that, and the "honorable man of commerce" was a well-known term at the beginning of the last century. But until now, entrepreneurial success is based on monetary growth. Fortunately, there is an increasing tendency to rethink this in the world of business. Society is developing a growing appetite for innovations and an openness to new working models and setups. What we also need is a book of rules that stipulates business to be successful if they behave responsible towards people and the environment and they're committed to business that saves resources – in an environmental and economic sense, as well as in a social one. We've already achieved a great deal in many areas, with ISO certification in energy (ISO 50001), the environment (ISO 14001, or EMAS 3), and quality (ISO 9001).

Combined with technological developments stemming from Industry 4.0, I see the emergence of completely new

market opportunities – with industries opening up new procurement markets for recycling companies, thus creating new jobs. We already have the technical possibilities, we just need to apply them where they're currently needed globally. It is really interesting that we've developed exponentially in lots of sectors of industry in technological terms and are more advanced than in the recycling industry in the same areas. It's time to catch up, and it is merely a question of importance and capital distribution. There's also plenty of potential in non-monetary areas where, among others, the social management systems are working (ISO 26000, OHSAS, 18001, SA 8000, AA 1000). This raises many questions and challenges. How can I make social values more measurable? What can I do to quantify increased motivation levels among staff – by new tasks, or the uplift you get from vacations? Which are the impacts of new working hour models? And can they be incorporated in reporting systems and controlling? In order to see the "big picture" for the overall business these are even crucial.

We're currently undergoing a period of upheaval, in which the state of our planet and its effects are pointing out to us in which areas we need to apply our innovative capabilities to, and where we need to introduce technological and digital developments in order to create value in the long term – and we have every potential to do this!

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LESS IS MORE: CARBON EMISSIONS OF BUILDINGS ENERGY CONCEPTS DURING THEIR LIFE CYCLE

STEINBEIS STUDY SHOWCASES MEASURES FOR ACHIEVING CLIMATE PROTECTION GOALS IN HOUSING CONSTRUCTION

Climate protection is currently one of the most pressing issues facing politicians. Approximately 40% of carbon emissions in Germany are created by buildings. The Federal Government is striving to ensure existing buildings have a zero carbon footprint by 2050. But will the current requirements placed on residential buildings be sufficient to achieve this climate protection goal? And what defines a residential building with a zero carbon footprint anyway? These are the questions being looked at by the Stuttgart-based Steinbeis Transfer Center for Energy, Building and Solar Engineering as part of a study commissioned by the Federal Environmental Agency and the Federal Institute for Research on Building, Urban Affairs and Spatial Development.

The Federal Government has set itself a target of reducing greenhouse gases by 80 to 95 percent by the year 2050 compared to 1990. According to the government, the Energy Saving Ordinance (EnEV 2016), already fulfills low-energy building requirements laid down by the European Union. Draft legislation for the new building energy act will not therefore include tighter regulation. The average pro-capita emissions for German housing, travel, food and drink, other areas of consumption, and infrastructure currently stand at 9 tons of carbon dioxide per year (cf. Statista 2018). To meet the goal of limiting global warming to 2°C versus levels prior to industrialization, it will be necessary to cut annual pro-capita emissions to 2 tons of carbon dioxide by 2050 (cf. Rogelj 2011). For the housing sector, this means each person will still have an "allowance" of between 0.5 and 0.7 tons of carbon dioxide per year (cf. SIA 2011, ifeu). Taking the average amount of floor space used by each person living in an urban area as roughly 40 square meters, the estimated target for a carbon-neutral building would be the equivalent of between 12 and 17kg of carbon dioxide per square meter of living area per year.

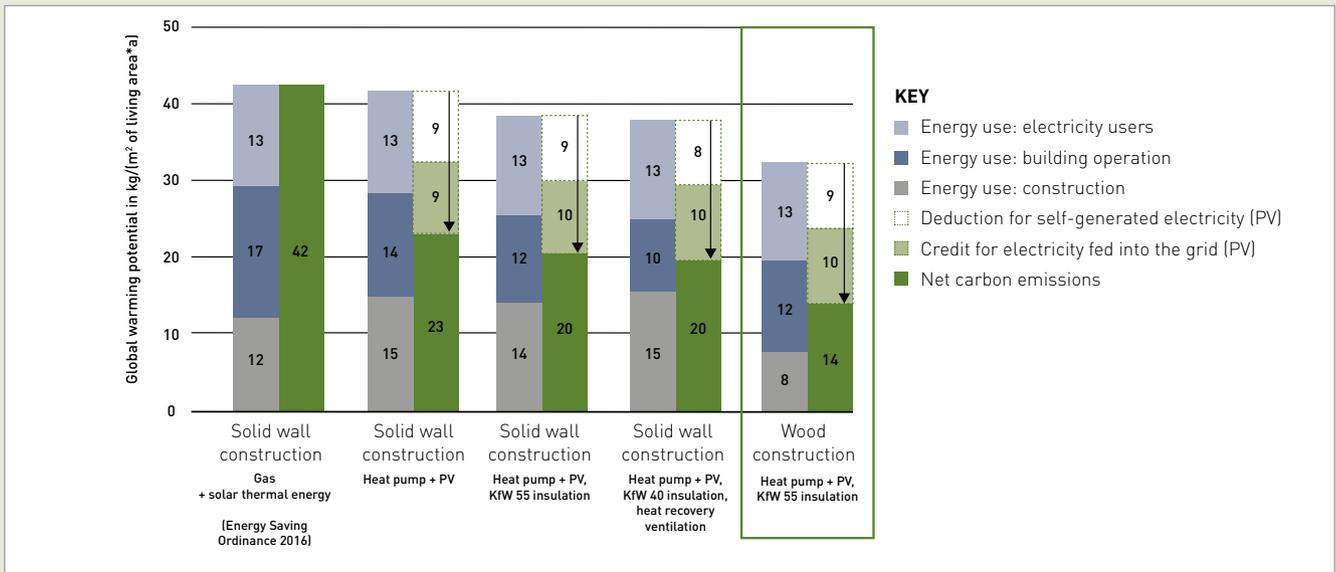
As part of a study for the Federal Environmental Agency, a comprehensive assessment was made of typical buildings, both new and old, looking at different types of heating systems and

energy sources. It showed that the target carbon emission levels could be achieved with technology already available today. However, a standard new apartment building adhering to the actual Energy Saving Ordinance (EnEV 2016) – with a gas boiler supported by solar thermal heating for hot water – creates 42 kg of carbon equivalent emissions per square meter of living area per year, so it would fall short of this target by a long way.

» **NOT ONLY DID WE LOOK AT HOW BUILDINGS ARE OPERATED, AS USUAL; WE ALSO CONSIDERED THE OVERALL LIFE CYCLE OF BUILDINGS, INCLUDING HOUSEHOLD ELECTRICITY REQUIREMENTS AND EXPENDITURES ON CONSTRUCTION, MAINTENANCE, AND DISPOSAL – SO-CALLED GRAY ENERGY, «**

explains Dr.-Ing. Boris Mahler, director of the Steinbeis Transfer Center for Energy, Building and Solar Engineering.

Combining heating supply by a heat pump with photovoltaics results in emissions equivalent to 23 kg of carbon dioxide per square meter of living space per year, and can thus almost halve emissions. Improving insulation in keeping with the German housing standard "KfW Effizienzhaus 55" reduces energy requirements and carbon emissions further to the equivalent of 20 kg of carbon dioxide per square me-



↑ Life cycle assessment of building concepts, based on the example of an multi family apartment building © Steinbeis Transfer Center EGS

ter of living space per year. Adding ventilation with heat recovery and improving the building envelope to meet the requirements of the “KfW Effizienzhaus 40” does not lead to further reductions in carbon emissions in case of a regenerative heating system.

Between 30 and 40 % of carbon emissions generated during the entire life cycle of buildings made with solid walls (bricks or concrete) stem from “grey energy” during construction. This share of emissions can be almost halved by constructing apartment buildings with resource-saving wood and timbers. “Combining wood construction, maximizing the use of solar panels on the roof, supplying heat through heat pumps and improving insulation to meet “KfW Effizienzhaus 55” already make it possible to construct a zero carbon footprint residential building right now,” highlights Simone Idler.

Most scenarios for 2050 assume an electricity mix for Germany with significantly lower carbon emissions. Even under such circumstances, there would be no change in the findings of the Steinbeis study. Effective, cost-efficient

measures for achieving climate protection targets include using regenerative heating supplies from heat pumps, biomass, or environmentally friendly district heating, and combining this with distributed electricity supplied by solar and wind energy, a carefully insulated building envelope adhering to “KfW Effizienzhaus 55” (especially for new buildings), plus a resource-saving approach to construction using wood, lightweight materials, or hybrid methods – for new buildings or preservation by renovation of existing buildings. Over and beyond these building measures, it would also be necessary to decarbonize the energy infrastructure.

As the Steinbeis study highlights, assessing a building holistically should also consider net carbon footprints beyond the actual operation of a building and take expenditures on “grey energy” and electricity requirements of the user into account. To accelerate the implementation of zero carbon footprint buildings, the experts at the Steinbeis Transfer Center recommend starting to use carbon footprint labels when auditing buildings.

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A SUSTAINABLE SOLUTION TO POTHOLES

POTENTIAL SOLUTIONS PROVIDED BY A LIFE CYCLE ASSESSMENT OF TRANSPORTATION INFRASTRUCTURE BASED ON BUILDING INFORMATION MODELING

Transport infrastructure maintenance is an important task of local government: Roads not only have to be safe, they must also be economical to operate and maintain. An important aspect of this is sustainability. Steinbeis experts Dr. Ute Stöckner and Prof. Dr.-Ing. Markus Stöckner, who look at issues relating to the sustainability of municipal roads and highways as part of their work at the Steinbeis Transfer Center for Infrastructure Management in Transportation, explain what local authorities can do to react to all these changes.

Systematically planning maintenance has emerged as a technical imperative in recent years. Systematically adhering to a methodical approach automatically entails becoming involved in asset management. One effective way to consider the entire life cycle of a project and map processes is to use building information modeling (BIM).

One of the first steps when conducting a life cycle assessment of road networks, especially on a municipal level, is to consider the importance of individual streets to a city. This is because even without additional land use, the requirements that existing traffic routes need to meet tend to change over time, especially when a district becomes more industrialized or shifts towards more commercial use, and this will also happen if an existing residential area is redeveloped. When this happens, one must examine the technical requirements a road has to fulfill. In many urban areas, the infrastructure requirements of road users are intensifying, resulting in conflicting interests, especially where financial resources are tight. Bus and car passengers want to reach their destination quickly and conveniently, local residents don't want to have to listen to loud traffic, and cyclists would like –

whenever possible – direct travel routes, smooth road surfaces, and to not have to brake the whole time. As for the utility companies supplying and treating water, gas, and electricity, or providing telecommunication networks – they need to be able to quickly fill up holes again after digging up roads.

ROADS ARE MUCH MORE THAN TRAFFIC ROUTES

Understanding sustainability therefore means considering a number of factors. From an ecological standpoint, a network for bicycles helps promote environmental protection by fostering a healthy and sustainable lifestyle. From a socio-cultural standpoint, roads are part of public life and they have a significant impact on the image and appearance of a city district. Ideally, the people who live in an area transcend different social groups and this can have a number of influences, including whether it would be reasonable to ask local taxpayers to fund repairs. This will make it necessary to consider the specific situation within a local area and state legislation regarding municipal funding. From an economic standpoint, sustainable road maintenance must secure infrastructure funding



Transportation infrastructure is subject to a variety of demands



↑ The different components of road traffic



↑ A dense residential area in a German city

and ensure that any measures introduced are not only appropriate in technical terms but also commercially viable. Consideration has to be given not only to any potential to save money by coordinating measures, but also to traffic flow if there are diversions.

THE IDEAL SOLUTION: A HOLISTIC APPROACH

For Markus Stöckner, the solution to all these challenges is obvious: “A life cycle assessment – because the approach of looking at sustainable infrastructure management takes a holistic view of transportation infrastructures, throughout the entire period of use.” This approach starts by looking at planning requirements as a basis for working out the individual stages within the life cycle of a road, from drafting planning documents to construction, starting to operate and use roads, and even the maintenance requirements and replacing roads. This makes it possible to work out and highlight any overlaps between different types of stakeholders, plus who will need to supply which information to whom and at which point in time. When you reach the next step, all required information will be available without any loss of know-how.

Other stakeholders that will need to be involved in municipal road construction – over and above the local authorities

and the subcontractors of the construction contractor – are the utility and waste disposal companies, and private owners of real estate developments, because they are also affected by road infrastructures when going about their business. As more and more parties intervene in the infrastructure, this highlights how important it is to ensure that everything is systematically documented, capturing when, where, and how something happened. This is also so that the right decisions can be made later down the line.

Similarly, this applies not only to environmental issues affecting road repairs (especially if old road surfaces need to be recycled), but also the quality requirements of new construction materials that will need to be processed. The experts at the Steinbeis Transfer Center for Infrastructure Management in Transportation help their clients ascertain which information to gather for each individual stage of a life cycle assessment. They also provide support in determining how and in which areas information will need to be shared with others, plus the quality requirements that will need to be considered in each area of overlap. The Steinbeis experts advise a variety of local and regional authorities on accessing existing sources of information, also helping to plug any gaps identified in knowledge or documentation. Looking at existing pro-

cesses makes it possible to continually base the approach taken toward systematic maintenance management on future needs.

“As a result, we achieve a much better understanding of different aspects relating to construction work and services, and this also takes local factors into consideration. It also helps us improve the forecasts used to estimate the duration of future life cycles,” explains Stöckner. This simplifies the planning of road repair programs and how they’re financed, which in turn makes it possible to make road maintenance more economical. Using BIM methods to conduct life cycle assessments thus makes an essential contribution to sustainable infrastructure management.

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“FOR ME, RESEARCH IS ABOUT FINDING SOLUTIONS!”

AN INTERVIEW WITH PROFESSOR DR.-ING. VOLKER JEHL, DIRECTOR OF THE STEINBEIS TRANSFER CENTER FOR INNOVATIVE NONWOVEN TECHNOLOGY

According to one definition, nonwoven materials are a wide layer or single layer of bonded fibers. So far, so good. In an interview with TRANSFER, Professor Dr.-Ing. Volker Jehle, director of the Steinbeis Transfer Center for Innovative Nonwoven Technology and a professor at the department of Textiles & Design at Reutlingen University, provided deeper insights into these materials and how they are actually produced. One thing that he made clear is that sustainability is not something that starts in production, but much earlier, when society forms its own attitude regarding consumption. The expert in wet-laid nonwovens also highlighted why thinking sustainable production through from start to finish enables us to understand why natural fibers are not necessarily superior to their chemical counterparts.

Hello Professor Jehle. Sustainability is becoming increasingly important as an issue. What impact is this having on the technology behind nonwovens?

If I may, I'd like to answer that by quoting Hubert Markl, the former president of the Max Planck Society, who said that sustainability sounds so natural, so biological, so environmental, and because it's sufficiently unclear what it actually means, everyone can agree on it, from business and science to politics and church congresses. So what actually is sustainability when it comes to nonwoven technology? If we're talking about this in the context of recycling, nonwoven tech-

nology has a major advantage, because it allows you to process short fibers. The reason that's important is that stable fibers come in different lengths during recycling, which we have to put to good use again.

Sustainability can also entail more effective production, and this raises an important question: How can we save resources in production but also keep a lid on costs? Let's take as an example producing things by using high-price raw materials consisting of fibers: A producer cannot afford any production waste in this area, because it automatically raises prices. A nonwoven material offers a whole range of advantages with this, whether it's a wet-laid nonwoven or from fiber injection molding. The latter refers to a nonwoven technology where by nonwovens are used to produce 3D

designs with practically zero waste, so they're sustainable and resource-saving. That helps reduce component costs and enhance marketability and market penetration.

The next important factor when it comes to sustainability is extending durability. The challenge and yardstick for us as developers is to extend the usable lifetime of a component or product. We've got to move on from the widespread use-and-throw-away mentality of today. Ideally we should ask ourselves how we'll be able to recycle a part even before we produce it. For me, that's the ultimate sustainability issue and it's one of the biggest challenges facing nonwoven technology. Our goal has to be to keep components going for longer, to use them longer, and to then recycle them and put them to good use. But anot-



Wetlaid pilot line NVLA53 of the company Pill at the Reutlingen University of Applied Sciences





↑ The wetlaid pilot line is the only one of its kind that is in operation at a university throughout Europe.



her thing that's important is what happens after recycling – what do we do with the second recycling raw material? For me sustainability means thinking about issues beyond individual technology, so it's a question I already pose during development – how will I take the product I'm about to make apart again, and how can I recycle it cleanly? How can I make something useful out of it again and more importantly, how can I extend its usage life? I say this because ultimate recycling is when I don't have to recycle anything in the first place. But that's counterproductive under current thinking, because consumption is supposed to be boosted so that people keep buying more. This is where a rethink is needed because we can't keep going along the way we have until now.

Which factors are decisive for the sustainability of a nonwoven material? For example, is it enough to use recycled fibers in production or is it the actual manufacturing process that's decisive?

I'd say both. The first thing that has to be ascertained is what properties the material should offer to fulfil its purpose as effectively as possible. Then we can look at the manufacturing process in terms of which properties would be achieved most effectively with which processes. So for example you can achieve certain properties with an energy-efficient production process, but it's so complicated in terms of production technology that the product wouldn't be accepted at the end for cost reasons. That would mean we'd have to mix things, and that's the real challenge with nonwoven material production.

When you're recycling things, the manufacturing process is also important, so you have to think about what you can make out of which fibers using which production process. This is where a wet-laid nonwoven line offers major advantages. Let's take an example: recycling based on carbon fibers. This allows you to produce nonwovens by mechanically processing recycled carbon fiber composites. Because they're

recycled mechanically, there's no major drain on energy so it's relatively inexpensive. But unfortunately there's still not enough attention being given to what's supposed to happen after the actual product has been made out of recycled fibers. So for instance, glass fibers from recycled wind turbine blades are now used in concrete. Naturally, the concrete recycler then has to ask himself what he's going to do with the glass fibers when he recycles the concrete. Coming back to your original question regarding how important the production process is, I'm convinced that the crucial factor is the interplay between the suitable production process and the anticipated product properties.

One point of emphasis in your work is wet-laid technology. What's innovative, but also sustainable about this technology?

Wet-laid technology is my specialty. It offers a number of advantages over other manufacturing processes. Looking first at the process itself, you take fibers and

you dissolve them in water. The water is then passed through a sieve and flows away, leaving the fibers in the sieve which are dried and become the finished nonwoven material. The water recirculates such that it is only lost through drying. If this sounds simple, it's because it is. The first major advantage with this process is that the fibers are treated carefully. Water makes it possible to dissolve fibers extremely carefully. Fibers are often damaged anyway, especially if you use recycled fibers, but unlike dry nonwovens, with wet-laid nonwoven technology they're not subjected to even more damage. With wet-laid nonwovens you also generate comparatively little waste and you can work with extremely delicate fibers, which isn't possible with other nonwoven production processes. So we can produce extremely fine, thin nonwoven materials which are uniform and 0.1 to 0.2 millimeters thick.

It's these fine nonwovens that offer major potential, one example of which are battery separators made from microglass fibers. The thinner they are, the more effective the battery can be made. So wet-laid nonwovens also play a key role in the highly topical area of electric vehicles. Or look at the student project we're conducting with the German Aerospace Center (DLR). We've developed carbon fiber nonwovens for carbon ceramic brake pads with the aim of producing brake disks more economically. Not only are the nonwovens lighter, so as a result they reduce weight; they also don't rust, so they last longer, and both of these factors are really important for electric vehicles. In addition, with some kinds of fiber composites we can use the wet-laid nonwovens produced from recycled fibers to save original raw materials by substituting certain layers with nonwovens. Naturally for safety reasons that doesn't work with components subjected to high stress, such as aircraft wings, but there's no reason why it won't work in something like a car door.

A further advantage with wet-laid nonwovens is that we can work with extremely fine fibers down to the micrometer, for example in microglass. Presently, there is no other way to process such microscopic fibers. And the last, extremely important argument for using wet-laid nonwoven technology relates to processing problematic fibers which could pose a health risk. Take silicon carbide fibers or carbon fibers. If you process them in a dry state, a hazardous carbon dust is created. With wet-laid technology, the fibers are immediately bound in the water.

There's also increasing demand for nonwoven materials made from natural renewable materials. What challenges does this development present?

Actually it's not a recent development; they've been around since the mid-1990s. There's no problem processing natural fibers. We already have the technology to do this. But I think there's a big challenge here, especially when it comes to sustainability. We produce the nonwovens from natural fibers, but we require a matrix to produce a fiber composite component. However, most of these matrix systems are not biodegradable, so we're back to the recycling problem again. A further problem lies in our demand for fibers: According to the latest figures we require 90 million tons of fibers worldwide, and that demand can't be covered with natural fibers. If you then take the overall life cycle assessment into account – water consumption, arable land, etc. – natural fibers don't look that good after all. So we can't manage without those "nasty" synthetic fibers and are forced to focus on the biggest problem: microplastics. The challenge is to produce the polyester fiber in such a way that it can be made biodegradable without compromising in terms of the required performance. To solve this prob-

lem, we have to look beyond the end of our noses. But I'm certain we'll manage this, because for me that's precisely what research is all about: finding solutions! Steinbeis has a strong instrument for this – its Transfer Centers. I believe that the connections between Steinbeis and university research should be intensified, and I can only recommend that professors set up their own Steinbeis Enterprise, especially because of the links to industry. We sometimes lose this contact in university research and disappear into "ivory-tower research." Of course fundamental research is important, extremely important, but we also need applied research. We need to enter into dialogue with industry to find out what's needed in business, or to show firms our research findings and see how they can be used in industry. For me, that's why the Steinbeis Transfer Centers are such an important instrument in making a success out of this, to the benefit of all parties.

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INVESTING WITH A CLEAR CONSCIENCE

PROF. DR. PHILIPP HABERSTOCK AND STEFFEN LOHRER SHOW THAT IT IS POSSIBLE TO ACQUIRE A COMPANY AND CREATE SOCIAL RETURNS

In October 2018, a special report issued by the Intergovernmental Panel on Climate Change (IPCC) highlighted an urgent need to limit global warming. Quick, sweeping, and unprecedented changes would be required in all areas of society. This emphatic appeal was in line with widespread expert opinion that painted a picture of ecological collapse if we do not change the way we treat our planet and its resources. The issue of sustainability is therefore something every individual should think about, not just in everyday areas but also in areas that, at first glance, appear to have nothing to do with this topic – such as investments and merger and acquisition (M&A) transactions. Prof. Dr. Philipp Haberstock and Steffen Lohrer of Steinbeis Consulting Mergers & Acquisitions GmbH explain why.

The two Steinbeis experts advise small and medium-sized firms on company acquisitions and divestments, and they also provide advice on a growth topic of global significance: social impact investment. This is a strategy whereby capital investments are made with the aim of creating social and environmental benefit without having to forego attractive interest rates. Sustainability factors are becoming increasingly important in corporate transactions, representing a key success factor in impact-centric M&A transactions, typically conducted according to ethical and social goals and placing emphasis on social responsibility.

SUSTAINABLE EQUITY INVESTMENT

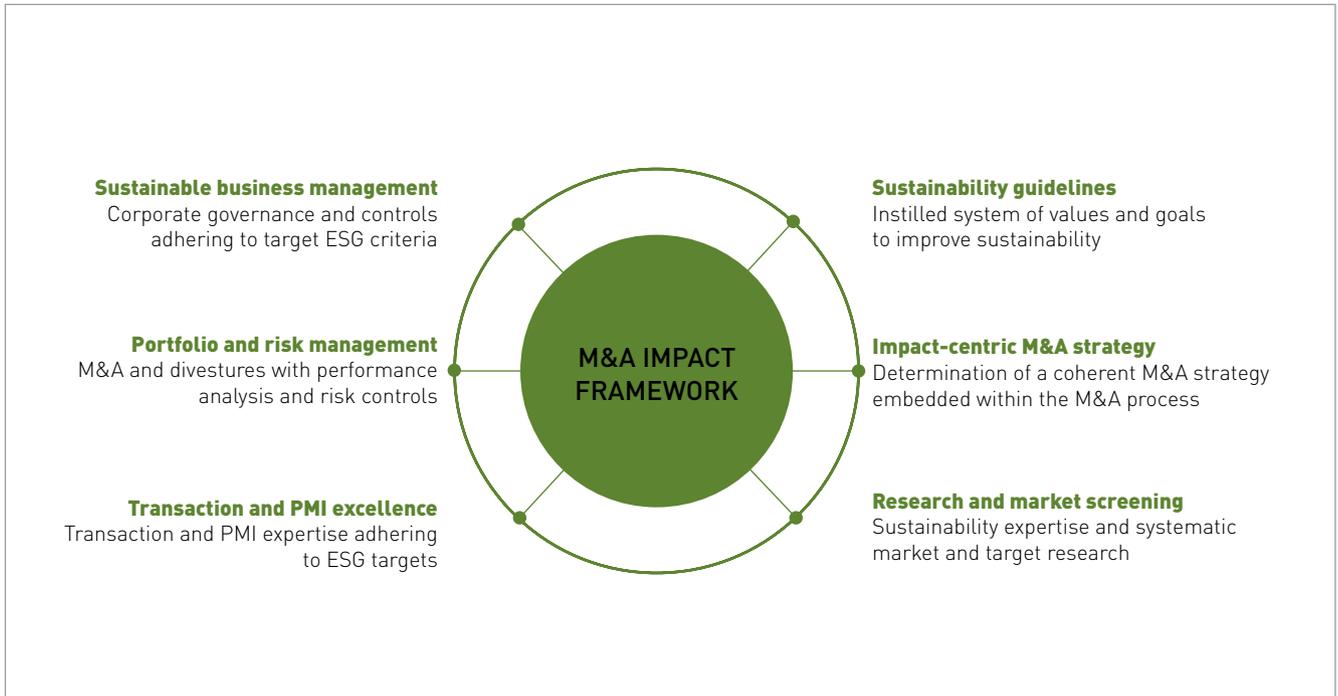
The United Nations laid a foundation for social impact investing at a general assembly in 2015. 193 nationals agreed 17 global objectives – sustainable development goals that would provide guidelines for the use of financial resources for social and environmental

purposes. For example, they demand that poverty and climate change be combated, along with improvements in the supply of drinking water and humane working conditions.

The abbreviation ESG has now become established as a standard of sustainable investment, covering three areas of corporate social responsibility with a bearing on sustainability:

- E (environment) stands for areas such as environmental pollution or ecological hazards, greenhouse gases, and topics relating to energy efficiency.
- S (social) includes aspects such as health and safety at work, diversity, and social engagement.
- G (governance) refers to sustainable business management. This includes aspects such as corporate values and monitoring and control processes

“These days, many investors want more than returns – they also want to do something good for society, so they want



returns that create an impact or deliver ‘social benefit’,” says Lothar Jakob, director of the Steinbeis Consulting Center for Impact Investing and a partner of Steinbeis Consulting Mergers & Acquisitions GmbH (Steinbeis M&A). Martin Schmitt, director of Steinbeis M&A, agrees: “The sustainability-oriented buyers of companies that are involved in our company acquisition projects benefit on two levels – on the one hand from financial returns and on the other from the social, ethical, and ecological impacts. We see major potential in this new trend, since impact-focused M&A transactions are often associated with positive returns in combination with relatively low levels of risk.”

With company acquisitions, which are often entered into by private equity companies, the focus lies not only in risk-return factors but also in the fact that taking a share in a business should also be a reflection of the values and goals of the investor. This form of impact-centric investment is particularly popular with affluent families and so-called family offices. The proportion

of institutional investors now looking into this area is also growing, since more and more insurance companies, major banks, and foundations are becoming interested in the topic of sustainable corporate transactions (impact M&As). The German market is still somewhat small in this area, but it is nonetheless growing rapidly, with momentum picking up in a number of areas of the market. A study conducted by the Research Center for Financial Services, a Steinbeis Transfer Institute, showed that adhering to sustainability criteria when making capital investments by no means implies that lower returns should be expected. If anything it’s the opposite: Giving consideration to so-called ESG criteria can even have a positive influence on the success of an investment.

VALUES AND GOALS INFLUENCE INVESTMENTS

Steinbeis M&A has now developed a structured ESG management method that allows sustainability principles to

be brought into harmony with the revenue expectations of investors. Specifically considering ESG factors during the transaction process should not just reduce costs and risks to a company’s reputation, it should also realize opportunities to increase value and pursue a company’s values. Taking a company acquisition for a major German private equity investor as an example, according to exclusion principles, companies should first be disregarded if they do not justice to certain defined values. The exclusion principles most frequently named in Germany include the production of or trading in weapons, violation of human rights and labor legislation, gambling, corruption and bribery, tobacco, alcohol, nuclear energy, and environmental damage. To complement this approach, there are also positive criteria, which are often based on “best in class” principles. This involves defining the criteria that should be met for a company to be considered eligible as an investment in the first place.

There are a variety of information sources to help when assessing the



Outline concept for an impact-centric M&A strategy

sustainability of different business models and companies. Many firms already write their own sustainability reports, and there have been reporting obligations for European companies with a bearing on capital markets since 2017. As a result, these companies have been reporting annually on key developments relating to the environment, labor law, and social factors, as well as respecting human rights and combating corruption and bribery.

ESG factors have become an important aspect of transaction processes in recent years. Whereas these risks were often considered make-or-break in the past, the focus of impact transactions today increasingly lies in opportunities to enhance value and achieve the sustainability targets that can arise from outstanding ESG practices. This requires a tailored approach placing appropriate emphasis on risk. An initial review of the target company is carried out, for example by using an information memorandum to pinpoint possible risks for the further assessment of the company (due diligence). If a more detailed

assessment is required, this is based on a dataspace or interviews with the management of the target company. The results can then be incorporated in contract negotiations, for example in the form of warranties and indemnity against risks.

SUSTAINABILITY: STANDARD FUTURE PRACTICE

Sustainability issues will be with us for good now. This is not just because of climate change, but also because of strict social standards being laid down by companies and robust business management. As a result, Steinbeis M&A has set itself the goal of helping to ensure that sustainability and impact-centric M&A strategies become standard practice and a benchmark for M&A transactions for years to come. "Impact investors will also be rewarded – by successful transactions and the satisfaction that you've done something good at the end of the day, not just for yourself but also for others," says Haberstock, with conviction.

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THE EFQM MODEL

With the EFQM excellence model, sustainable planning is used with the aim of satisfying the needs of all stakeholders. That means sustainability not only gives sufficient consideration to the environment and natural resources, it also takes into account the long-term interests of other parties involved in areas affected by the company:

- Future-proof jobs for the workforce
- Reliable partnerships with suppliers and other partners
- Long-term customer relationships
- Promotion of public welfare in areas affected by the business
- Long-term returns to shape the future of the company



ACHIEVING EXCELLENCE THROUGH EFFECTIVE SUSTAINABILITY

BUERGOFOL, THE MANUFACTURER OF PACKAGING AND INDUSTRIAL FOIL, IS SETTING NEW STANDARDS IN ITS SECTOR OF INDUSTRY THANKS TO THE SUPPORT OF STEINBEIS EXPERTS

Defining sustainability in business is always subjective, but there is a general tenor that runs through all definitions: Financially viable activities should not be conducted at the expense of future generations, and the natural capacity of used resources to “re-generate themselves” must be protected. Steinbeis expert Dr.-Ing. Günther Schöffner has been supporting BUERGOFOL with its business excellence model as it embarks on a journey to achieve more sustainable production.

There are so many different approaches to sustainability. But it’s a less well known fact that there is already a business excellence model that takes all sustainability factors into account: the model developed by the European Foundation for Quality Management (EFQM). Two of the eight fundamental principles of excellence are “creating a sustainable future” and “sustaining outstanding results.” Taking these aspects into account places greater emphasis on longer-term decision-making as a company rather than trying to achieve short-term gains. The sustainable nature of excellence can be applied to all phases of corporate development, from the moment a firm is set up to periods of growth and restructuring.

The EFQM model allows for all kinds of fair and future-centric methods and approaches, as long as they promote positive outcomes for all stakeholders in the long term, hand in hand with sustainable business excellence. It also covers Economy 4.0 and Industry 4.0 factors, and any other methods that benefit future endeavors in the long term.

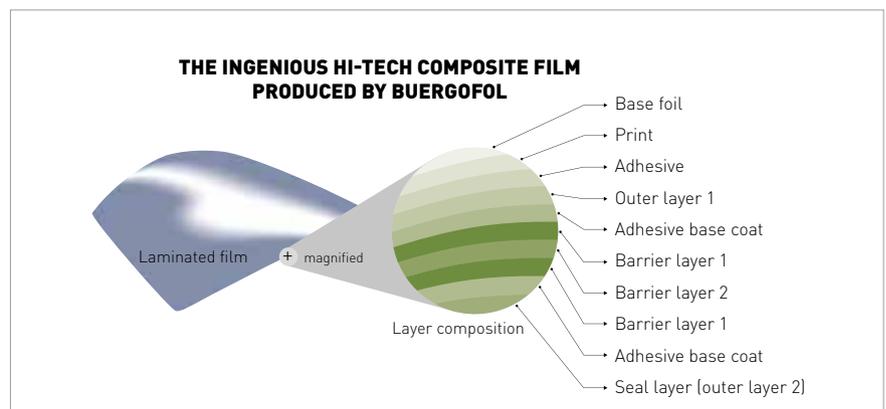
BUSINESS EXCELLENCE: MEDIUM-SIZED BUSINESS DOES NOT EQUATE TO MEDIOCRE STANDARDS

The long-term concepts of business excellence can be adopted by companies of all sizes, in all sectors of industry. Even if medium-sized firms have more limited financial resources than big

companies, they can still achieve sustainable excellence of a global standard thanks to their outstanding know-how, adaptability, and short decision-making paths. This is reflected in sustainable products, highly efficient processes, and exemplary leadership. This is where the Steinbeis Consulting Center for Business Excellence comes in with its consulting and transfer services. The experts at the Steinbeis Enterprise advise companies, introduce them to established methods, and help small and medium-sized businesses maintain their standing in the market.

BUERGOFOL DECIDES TO GO FOR SUSTAINABILITY AND BUSINESS EXCELLENCE

↓ The composition of a laminated film © BUERGOFOL GmbH



↖ High-barrier films produced by BUERGOFOL © BUERGOFOL GmbH

One example of a recent project involved supporting BUERGOFOL, a medium-sized producer of packaging and industry films from the Bavarian city of Siegenburg. On close inspection, a product that initially appears to be a disposable material capable of damaging the environment actually turns out to be a hi-tech solution. PET foils are produced to package and protect perishable foods with the aim of preserving meat, vegetables, and sausages without compromising quality, at the same time maximizing shelf life and making it possible to store products sustainably. The foils are hi-tech because each of the up to seven layers, which are between 2 and 20 micrometers thick, has a special function. They preserve flavor, repel water and oxygen, or provide protection from sudden thermal stress in order to preserve freshness. Accordingly, the manufacturing process is highly demanding, which is why BUERGOFOL has earned a strong reputation in its global, highly price-oriented industry over the last 20 years – despite only running manufacturing facilities in Bavaria.

The aim of BUERGOFOL’s project was to build its pole position, defend its leading role in the long term, and ward off competitors from Europe, Asia, and the United States. A continual stream of new products should be launched rapidly on the market through ever-shortening innovation cycles. As a result, new practices and approaches to innovation management would be needed.

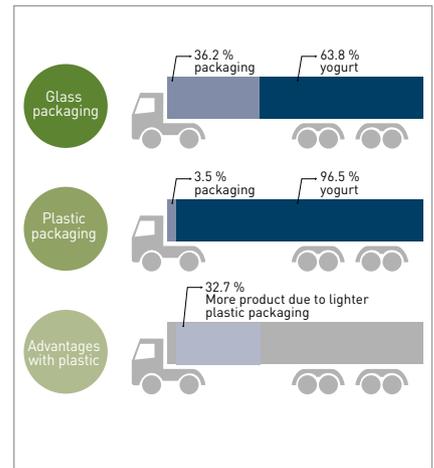
» **GLOBAL WARMING WOULD BE EVEN MORE SERIOUS WITHOUT PLASTICS**

Ultra-efficient processes should be introduced to reduce waste, throughput times, and storage needs, also minimizing energy consumption without sacrificing the firm’s ability to remain flexible when processing orders and innovating. The entire project was supported by the

experts at the Steinbeis Consulting Center for Business Excellence by drawing on EFQM methods, tools used in cybernetic management, and the methods of Management 4.0. The experts also adopted a holistic approach toward changing the company culture in order to instill the changed methods of leadership and collaboration in all areas of the business. Another aim of the project was to reduce waste levels in the long term by 35%, cut specific energy consumption by 20%, and raise recycling levels by 35%. Basing these targets on environmental goals showed that plastic products can also be produced sustainably.

Compared to its competitors in this area, BUERGOFOL is already leading from the front. As well as just producing foils, BUERGOFOL also prints and laminates foils at its plant in Neutraubling using start-of-the-art machinery. In many ways the technology looks simple, but it’s actually extremely complex. Printing on several layers has to be perfect for products featuring barcodes to be legible in an instant at the supermarket checkout. Individual layers have to be joined perfectly to the next layer to protect valuable foodstuffs from environmental influences and prevent contamination. Similarly, another aspect that is not immediately apparent is that plastic packaging makes a significant contribution to environmental protection at every stage of the food and beverage value chain. As Dr. Kurt Stark, director of business development and sustainability at BUERGOFOL, explained at a 2018 packaging trade show: “global warming would be even more serious without plastics.” Stark points out that this is because plastic protects the products it contains and ensures that environmental investments made in such products do not go to waste.

The project conducted by Steinbeis and BUERGOFOL kicked off at the beginning of 2019 and is already bearing fruit. “It is pulling together years of experience and the know-how gathered by our team in



↑ Comparison of packaging scores for transportation of yogurt © BUERGOFOL GmbH

implementing and applying concepts of excellence to other growth and restructuring programs,” explains Schöffner. Following years of expansion and investment in research, development, and machinery, the aim now is to link up the three BUERGOFOL sites in Ingolstadt, Siegenburg, and Neutraubling by dovetailing processes and the business culture, such that the overall performance of the company is outstanding even in global terms. It is known from experience that these things take time, but the foundations for the ambitious project have now been laid and in the long term, it will be worthwhile for all project stakeholders.

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THE IMPORTANCE OF VALUES AND SUSTAINABILITY

STEINBEIS EXPERT WOLFGANG NATZKE SHOWS HOW SUSTAINABILITY AND AUTHENTICITY CAN TAKE COMPANIES TO THE NEXT LEVEL

The so-called fourth industrial revolution is radically changing many of the familiar things we associate with everyday life. A whole host of areas will apparently become even more adaptable, dynamic, agile, and efficient. Machines are now networked so they can talk to each other and optimize entire processes in the long term. Which brings us on to “the big one”: sustainability. Very few words have taken on so much new meaning in recent years. Wolfgang Natzke, director of Business Management and Innovation, a Steinbeis Transfer Institute at the Steinbeis + Academy, examines what lies beneath this term and the implications of sustainability for corporate management.

It's as if everyone has suddenly discovered sustainability, or is rediscovering it. A whole host of topics have come onto the agenda, from climate and environmental protection to bee conservation, urban development, emission prevention, fair trade, QC testing systems, migration, and many more. Hundreds of sustainability project teams are working on these topics in a quest for practical solutions. The general feeling in everyday conversation is that sustainability only needs to achieve one thing: an impact that is long-lasting. But the fact of the matter is, to “sustain” anything, first it has to be “attained” – surely? Which raises the next question: What's motivating us to attain something in the first place? The search for a motive – the actual reasoning for wanting something – means we have to question meaningfulness. Or, thinking broader, it means we have to question the individual values of the “attainers” or owners of this issue. This is because our actions and behavior are guided by values. So inevitably, these values also shape our willingness to attain or own things in the first place – or thinking further, our willingness to sustain anything in the long term.

“As a Steinbeis Transfer Institute, we often get the impression that the majority of our contacts at companies are still ‘gaining their bearings’ when it comes to sustainability,” says Wolfgang Natzke. One thing that really leaps out is the gaping hole between the way they define sustainability and

how authentic their intentions come across. This is completely incomprehensible, because sustainability is an amazing opportunity for a company to differentiate itself from the competition. Commercial success has always been determined by solutions that focus on urgent issues facing society. Ultimately, the key issue is whether a firm has the courage to make the right decisions and work out which innovations it will need in which markets to succeed as a business. When you make these kinds of decisions, you notice right away that doing this is not entering into some annoying risk, but going for something that offers huge potential. Business leaders need to work out “more appropriate” ways to solve society's issues compared to other market players. Sooner or later the market and competition will deal with the other issues anyway. So companies – or to be more precise: management – must think and act sustainably to be successful. This raises a question:

WHAT CONSTITUTES A SUSTAINABLE COMPANY OR SUSTAINABLE MANAGEMENT?

The answer is simple: authenticity. In times of social media, companies and managers are subject to intense public scrutiny. It's becoming more and more easy to lift the veil on anything you think you're keeping under wraps. It's like living in a greenhouse. So either you get used to it or the market will sort you out anyway. So authenticity fundamentally goes back to your



identity. And it's important that every manager thinks very carefully about the following vital questions:

- **WHO ACTUALLY AM I? WHAT EXACTLY MAKES ME THE MANAGER THAT I AM?**
- **WHAT MAKES ME DIFFERENT FROM OTHER MANAGERS?**
- **HOW DO MY COLLEAGUES SEE ME?**
- **HOW DO MY COLLEAGUES SEE ME?**
- **WHY DO I ACT OR REACT THE WAY I DO?**

When challenged by such questions, people typically try to formulate clear responses to "position themselves" more effectively in life – or in their life in business. It's their identity that shapes the things that make them unique, answering this question: Who am I?

Nietzsche once postulated that, "He who has a Why to live for can bear almost any How." People seek meaning. They want to make a meaningful contribution or see the sense in doing something. And they will seek this meaning or sense at or outside their company. So the really relevant question when it comes to sustainability at a company is whether workers will find an answer to the Why or if they are simply bearing the How. At first glance, managing the Why looks quite straightforward – you just need to establish the right setup, provide precise descriptions of what needs doing, check things, and if necessary make adjustments. This can work when everything is running smoothly and it's just about optimizing things. But it's a fact that the world of business is shaped by volatility, uncertainty, complexity, and ambiguity – or VUCA. When things are changing rapidly in the way they do with VUCA, managers will not have the right information (or not enough of it) to work out how to

manage the How by themselves. As a result, all that's left to the manager is Why. Plus confidence in the creativity of their employees in working out the How and planning it.

"We strongly believe as a Steinbeis Transfer Institute that authenticity in business and the trust it engenders are many times more important than certification or an official seal, especially when it comes to this postulated commitment to sustainability. The companies that succeeded in the past were always the ones that had the courage to step back from the mainstream and set their own standards," says Natzke, with conviction. Natzke also knows that people always start to feel insecure when confronted with change, so he strongly advises firms to point to the sense or meaning of change, then sustainability will also fall into place. He also points out that sense or meaning are not something you can impose on people; people have to discover them



© pixabay.com

for themselves. This is why values are the central focus of the portfolio of services offered by the Steinbeis Transfer Institute of Business Management and Innovation, for all players embraced by a world of VUCA – individuals and companies.



**HE WHO HAS A WHY
TO LIVE FOR CAN
BEAR ALMOST
ANY HOW.**

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THE ROLE PLAYED BY SMART CITIES AS INNOVATION HUBS FOR CITIES AND REGIONS

STEINBEIS EXPERTS CREATE INNOVATION PROCESSES FOR EU PROJECTS

Cities and local communities play a central role in the transition to alternative energy sources and climate protection, but they are also key players in innovation, because they hold responsibility for planning and ongoing developments. However, smart cities are not just about clever urban planning and using renewable energy, they also introduce sustainable travel concepts and digital urban solutions. Steinbeis-Europa-Zentrum is helping to create an innovation process in its role as a project partner in two European Smart Cities initiatives: CiTyFiED and REMOURBAN. Its role is to pool expertise and provide support with the market entry based on the project results.

For a city or municipality, taking part in a Smart Cities project is a unique opportunity. It's a chance to exchange ideas regarding a problem with a variety of different parties such as companies, startups, research bodies, associations, financial institutions, citizens, and other European cities. It's also a good way to identify solutions with others and make cities healthier, more sustainable, and greener. When cities start experimenting with new ways to work together and develop creative solutions, they turn themselves into innovation hubs.

The methods that are used to develop innovations and measures are innovative in themselves. One example comes from the EU project CiTyFiED, which involved developing a method for planning energy-efficient urban renovation, introducing the new method, and repli-

ating it in other places. The project included looking at district heating technology and integrating distributed power generation. The CiTyFiED method of sustainable urban renovation is a process spanning seven stages. The first is to capture requirements and, based on this, plan a strategy. The next stages involve working up different scenarios, before testing, implementing, and finally evaluating them. The approach provides useful help in introducing the energy-efficient redevelopment of urban districts to the general public and replicating this. It's also important for adapting sustainable urban development strategies to factors revolving around energy efficiency. The target group for the method comprises other cities and communities.

There are two important innovative aspects of this method: the CiTyFiED

Indicator Tool and the involvement of an External Consultancy Group (ECG). These provide quantitative criteria, which help with decision-making processes required for the method. They give cities an opportunity to conduct diagnostic testing on their energy efficiency renovation programs in three steps before introducing measures accordingly. First, the planners look at the city and its districts (City Level Indicators, L1); second, planned interventions are considered (Project Level Indicators, L2); third, a city can work through different scenarios and evaluate them (Impact Assessment Indicators, L3). Hand in hand with this process, a multidisciplinary consultation group works in close cooperation with the local authority to go through the diagnostic stages, and this makes it easier to pinpoint which strategies to implement. Finally, this method makes "integrated

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thinking” easier, enhancing efficiency by taking a holistic approach toward capturing and assessing results and validating any activities they entail.

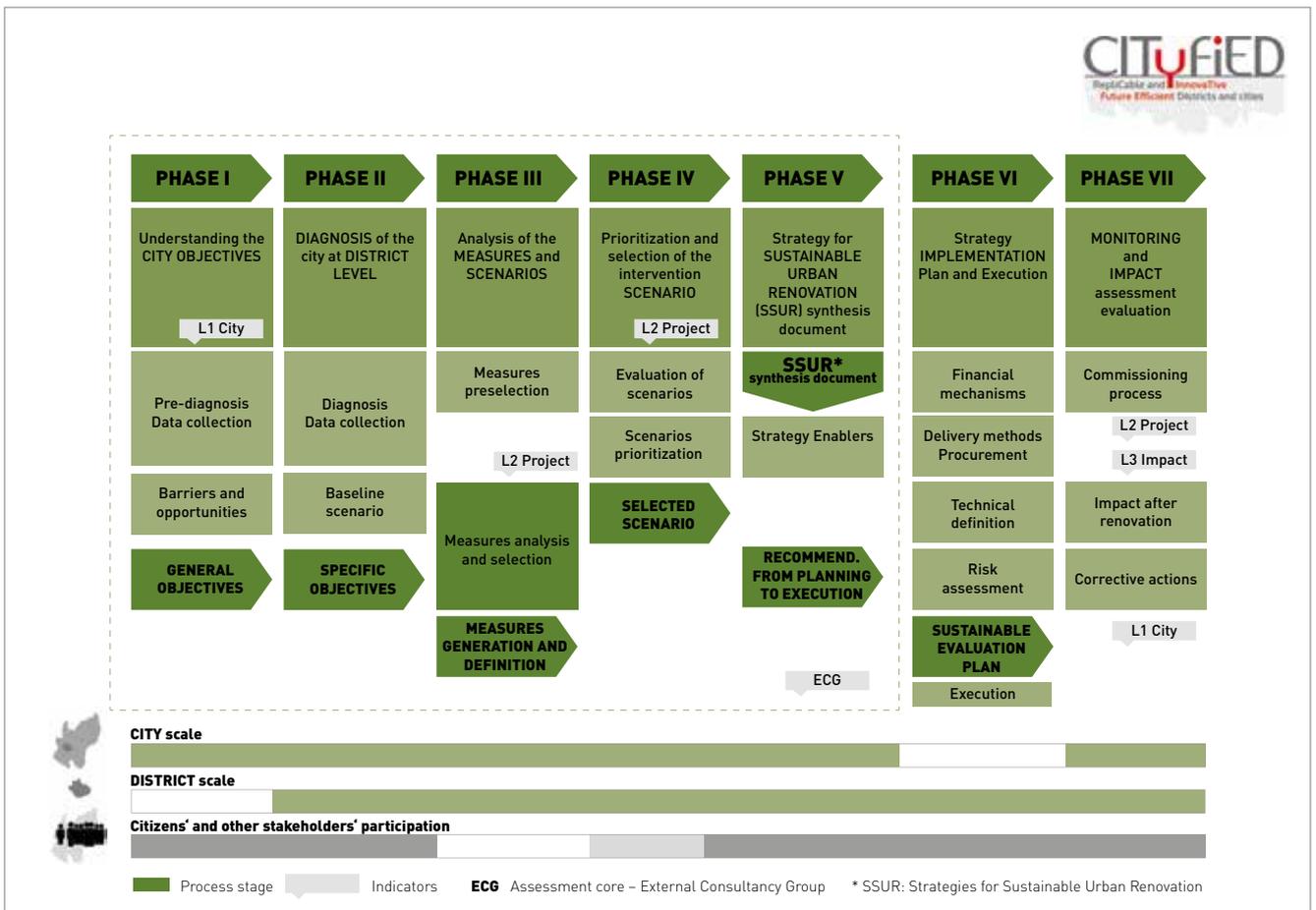
These measures were first implemented in Duero-Valladolid (Spain), Soma (Turkey), and Lund (Sweden). Eleven further city clusters evaluated the measures and the project team also compared notes directly with 50 European cities (“communities of interest”). The cities involved in the project in Germany were Ludwigshafen (city cluster) and four communities of interest: the metropolitan region along the Rhine and Neckar rivers, Ludwigsburg, Hamburg-Altona, and Dresden. Three demonstration cities – Lund, Laguna de Duero, and Soma – are working in close collaboration on the testing and valida-

tion of each step to help develop the CiTyFiED network in more than 50 further cities. As part of the CiTyFiED project, an integrated and systematic strategy and method were developed for planning the smart cities of the future. The idea is to reduce energy requirements and greenhouse gases, at the same time increasing the use of renewable energy.

For the REMOURBAN project, the project partners developed a regeneration model for urban transformation that can be applied to other cities. The aim was to reduce carbon emissions and energy consumption, looking at efficient heating and air-conditioning systems in buildings and different ways to combine smart grids and sustainable traffic management systems using ICT solutions. Three lighthouse cities were

selected, including demonstration districts – Valladolid (Spain), Nottingham (UK), and Tepebasi/Eskisehir (Turkey). The project teams already succeeded in reducing energy consumption in individual districts by between 50 and 53%. The carbon emissions in Valladolid have gone down 80% and in Tepebasi they’re down 63%. In Nottingham, a new delivery service based on electric vans was launched. The last-mile delivery (LMD) service uses electric vehicles to cover the final stages of parcel deliveries. This reduces the burden on the city center caused by trucks, particulate matter, carbon emissions, and traffic jams. The urban renovation strategy also revolves around people, since they are the key to developing smart cities – and of course they are the primary beneficiaries of improvements.

↓ The different phases of the CiTyFiED method © CiTyFiED





FUTURE-PROOF AND EMISSION-FREE THANKS TO SOLAR ENERGY

STEINBEIS EXPERTS TURN THEIR SIGHTS ON THE SOLARAKTIVHAUS^{PLUS}

To make a success of the transition to alternative energy and achieve climate protection goals it will be crucial for buildings to use efficient energy supplies, primarily generated through renewable sources. The most promising concepts at the moment are based on solar energy converted into thermal and photovoltaic power, primarily by combining this with other technologies such as heat pumps or biomass furnaces. Dr. Harald Drück and Dominik Bestenlehner of the Steinbeis Transfer Center for Solar and Thermal Technology (SWT) have been investigating one such housing concept as part of a project called SolSys, which is sponsored by the Federal Ministry of Economics and Technology. The name of the house: the SolarAktivHaus^{plus}.

Supplying buildings with energy both efficiently and sustainably requires concepts that make a significant contribution to the reduction of greenhouse gases. Not only does this affect how buildings are supplied with electricity, it also affects heating. There are a number of conceivable ways to do this. On the one hand, the energy efficiency of buildings can be improved.

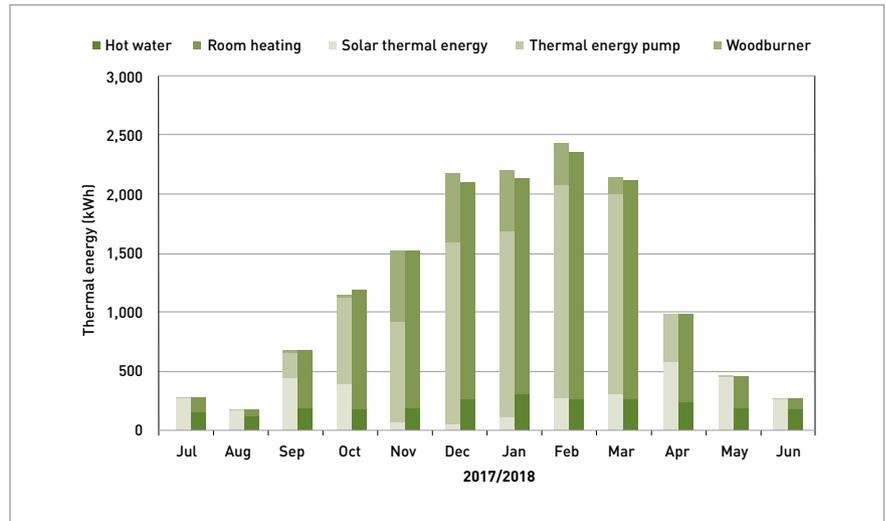
This can be achieved by optimizing building envelopes, fitting windows with triple glazing, using thermal insulation, improving air insulation, or – ideally – introducing several or all of these measures at the same time. Over and above building envelopes, a further important factor is the technology used within a building. This can include comparatively

straightforward measures such as using energy-efficient household devices and lighting. The third important factor is the systems used to run a building, whereby the key question is: Where does the building draw its energy from?

As in other areas, a number of measures are required to enhance efficiency,



The SolarAktivHaus^{plus} home near Heilbronn. The 15 sq m (10.5 kW) of solar thermal panels are clearly visible in the lower left roof section, with 62 sq m (9.4 kWp) of photovoltaic panels on the rest of the south-facing roof. An outdoor air-to-water heat pump stands to the right of the building.
© KHB-Creativ Wohnbau/Marco Jens



Net thermal cumulative energy for the SolarAktivHäuser^{plus} near Heilbronn in 2017/2018. The columns on the right show thermal energy use, broken down into domestic water requirements in dark green and heating requirements in light green. The columns on the left show heating requirements covered by the solar energy system, the heat pump, and the wood-burning stove.

although they are far from sufficient. A new, economical gas heater based on condensing boiler technology is one good way to cut greenhouse gases, especially compared to something like a 30-year-old oil heating system. But modern gas and oil heating systems still require fossil fuels, so they emit substances that contribute to environmental damage. Technologies are therefore needed that are based (as far as possible) entirely on renewable energy sources and thus emit no greenhouse gases at all. One way to do this is to use biomass as an energy source. This option offers limited potential, however, so using biomass to substitute all fossil fuels is not the right solution. This is where using the energy provided by the sun comes in, since it offers significant advantages when supplying buildings with energy. For example, using solar energy also produces zero carbon emissions, zero nitrogen oxides, and zero particulate matter.

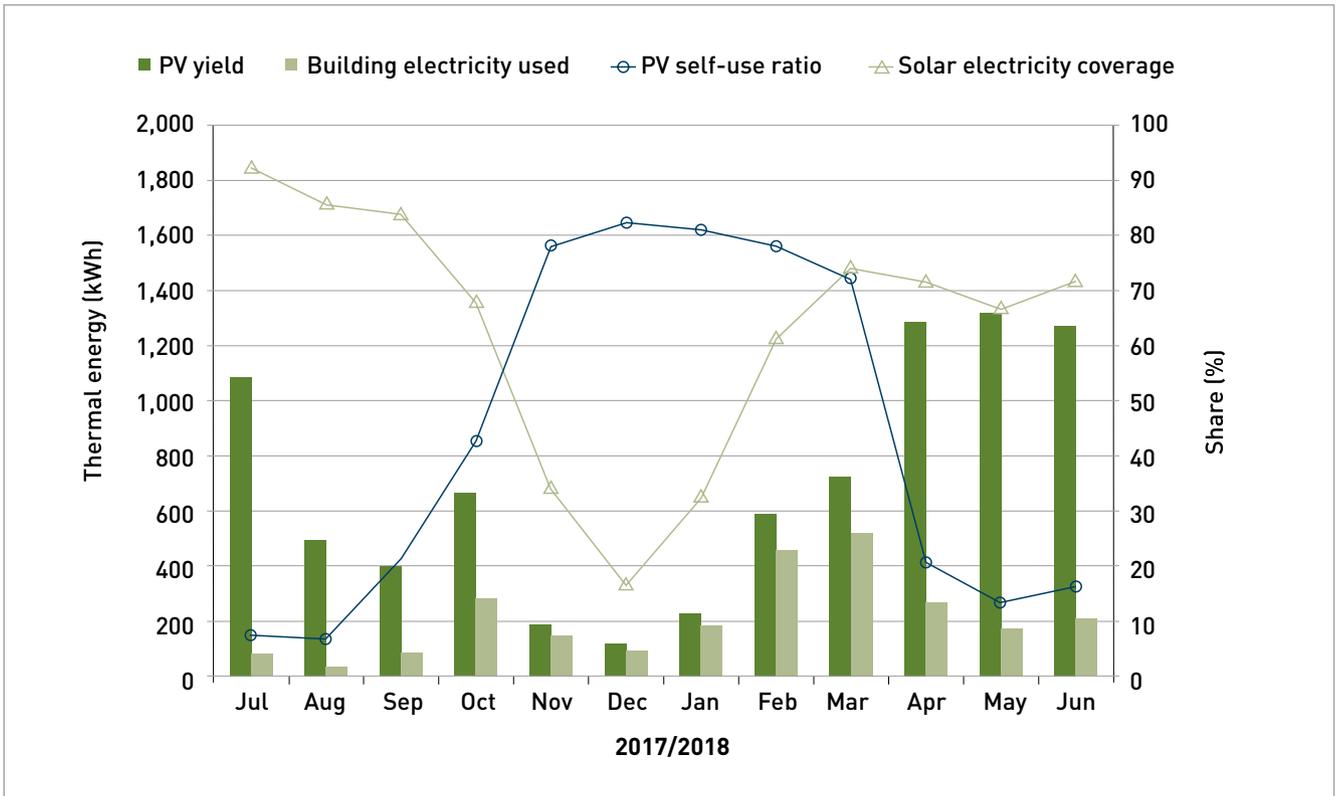
SOLAR ENERGY SUPPLY CONCEPTS FOR RESIDENTIAL BUILDINGS

There are already a number of potential solutions for using renewable energy in residential buildings. Some of these solutions use solar energy, either thermally by using solar collectors or electrically by using photovoltaic modules. These are supplemented by further energy sources such as biomass – typically in the form of logs, wood chips, or wood pellets – or fossil fuels such as gas or oil. The Sonnenhaus Institute (SHI) played a central role in developing the concept for the SolarAktivHaus, which was then scientifically tested and modified as part of a research project called HeizSolar, spearheaded by the Steinbeis Transfer Center for Solar and Thermal Energy in Stuttgart (SWT) and the Fraunhofer Institute for Solar Energy Research. The idea of the concept is to consistently supply as much thermal energy as possible to buildings through solar energy. The SolarAktivHaus therefore usually answers between 60 and 70 percent of heating requirements through solar energy with a minimum of 50 percent of heating covered by solar energy. This means that more than half of the energy required to heat the

building and domestic water is supplied by the solar thermal energy system. Solar energy is thus no longer used to top up a conventional heating system – instead, it’s the other way round: Conventional heating sources are used to support the solar heating.

Extending this concept of the SolarAktivHaus to its logical conclusion turns the idea of such a building into a SolarAktivHaus^{plus}: By adding the right technology, such as a photovoltaic system and a heat pump, it becomes possible to use solar energy to cover more than half of a building’s requirements, not just for the heating but also for electricity. That said, all elements within the system must be precisely coordinated to interact with one another using a smart control system. By carefully planning the share of each technology within the SolarAktivHaus^{plus} so that each element works efficiently and is matched to all the other elements, significant reductions in harmful greenhouse gases are possible.

RESULTS OF THE SOLSYS RESEARCH PROJECT



↑ Net electrical cumulative energy for the SolarAktivHäuser^{plus} near Heilbronn in 2017/2018. The dark green columns show the monthly output of the photovoltaic units; the light green columns show the amount of this electricity that is used by the building itself. The relation between self-used and generated electricity is expressed as a "PV self-use ratio" (blue line on the diagram). The solar electricity coverage (green line) reflects the amount of electricity required by the building that is covered by the photovoltaic system. Note: Electricity fed into the public grid is not considered or "credited" in this calculation, because this electricity is used directly by other consumers and is not stored by the grid.

The aim of the SolSys initiative sponsored by the Federal Ministry of Economics and Technology is to analyze and optimize the solar energy supply systems used in residential buildings (the majority of heating and electricity requirements in these buildings should be covered by solar energy). As part of the project, detailed measurements and technical readings were taken in six SolarAktivHaus^{plus} buildings, two of which were supervised by experts at the Steinbeis Transfer Center for Solar and Thermal Technology. "It was found that the heating requirements of the building can be almost entirely covered by solar thermal energy for around six months of the year. In the winter months, the heat pump provides most of the heat required. But as this pump is mainly powered by electricity from the photovoltaic system, this also raises the

total solar energy coverage," says Harald Drück, summarizing the results.

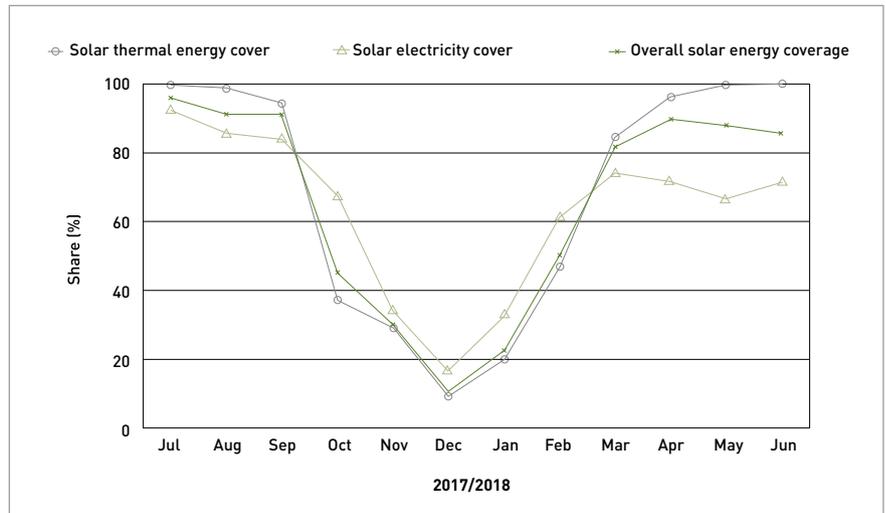
A small wood-burning stove in the living room with a so-called water coil connected up to the room heating covers any remaining heating requirements. This stove can also be used by itself if the occupants simply want to enjoy a cozy evening by the fire, so it's not just for heating requirements. The system was also fitted with an electric heating rod as a backup, but this was never actually used. A detailed analysis of electricity consumption showed similar results. For nine months of the year, the photovoltaic system can cover more than 50 percent of electricity requirements. For four of those months, solar electricity coverage was even as high as 70 to 80 percent. Even in the winter months, when there's

a sharp dip in solar energy and the electricity needed by the heat pump to heat the building is at its highest, solar electricity coverage levels of between 15 and 35 percent can be achieved.

"We carried out the net energy balance calculations by taking readings every 10 minutes. Until now it's been quite normal, albeit no longer the modern approach, to base net calculations on annual readings, for example to define standards for the EnergieEffizienzHaus^{plus}," explains Dominik Bestenlehner, a scientist at the Steinbeis Transfer Center. Taking more detailed readings to calculate the net energy balance is important, however, in order to reflect the fact that the electricity grid has no ability to store energy, so electricity fed into the system is used immediately. As a



Net cumulative solar energy coverage for the SolarAktivHouses^{plus} near Heilbronn in 2017/2018. The calculation for solar thermal energy coverage looks on the one hand at the heating requirements of the building that are directly covered by solar thermal energy and, on the other, the heating requirements that are covered indirectly by the photovoltaic system in combination with a heat pump. As well as looking at the electricity consumption of the heat pump, the calculation of solar electricity coverage also includes household electricity consumption.



result, electricity that is fed into the grid as excess photovoltaic energy in the summer cannot be taken out of the grid again in the winter. Instead, to cover electricity requirements in the winter, fossil fuel power stations have to be used. Calculating net values based on annual values therefore produces significantly lower equivalent carbon emission values than is actually the case.

SOLARAKTIVHAUS^{PLUS} DELIVERS LARGE ENERGY SUPPLIES

Looking at energy coverage by individual month is a good way to spot seasonal variations. It is noticeable that the solar electricity coverage levels are lower in the summer months than solar thermal energy coverage. This is because the building has no ability to store electricity from the photovoltaic system, but the solar thermal energy unit is fitted with a hot water storage system. The relationship between solar thermal energy coverage and solar electricity coverage reverses in the winter months, although this difference is not pronounced. Overall, solar energy coverage lies between the solar electricity coverage and the solar thermal energy coverage. Looking at the numbers for the whole year, solar

thermal energy coverage is around 50 percent, solar electricity coverage is around 60 percent, and overall solar energy coverage is around 55 percent. These results show that the concept for the SolarAktivHaus^{plus} works excellently and large amounts of energy can be self-produced by rigorously using solar supplies. This is particularly remarkable given the fact that a building has no ability to store electricity.

The results of the SolSys research project show that the SolarAktivHaus^{plus} buildings that were erected as single-family or apartment/multiple-family buildings are efficient and reliable, so they make an important contribution to achieving climate protection goals. Furthermore, it became clear that building occupants can have a major influence on the efficiency of the overall system, and the same applies to ensuring as much use as possible is made of sunlight in the winter. As a rule, a Solar-

AktivHaus^{plus} home is extremely comfortable to live in and the premium, sustainable building materials also make a contribution to healthy living.

There are already a whole host of ways to supply buildings with sustainable and efficient energy and thus make an important contribution to the transition to alternative energy sources. These and similar buildings also offer occupants access to a highly secure supply of energy in the long term at a secure price. The most promising concepts at the moment are based on solar sources converted into thermal and photovoltaic energy, mainly by combining systems with other technologies such as heat pumps or biomass furnaces. Also, achieving the German federal government’s target of “zero carbon footprint buildings” by 2050 will only be possible by consistently introducing SolarAktivHaus^{plus} concepts to new and existing buildings.

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SUSTAINABILITY THROUGH SOCIAL RESPONSIBILITY

STEINBEIS EXPERTS DEVELOP CORPORATE SOCIAL RESPONSIBILITY CONCEPT

In business terms, the main benefit sustainability offers to a company is that it provides a long-term business model based on a viable commercial foundation. For some years now, as well as talking about economic factors, business has added considerations relating to social sustainability and environmental compatibility – brought together by the term corporate social responsibility. The United Nations (UN) have established an even broader framework for this with its Global Compact initiative, spanning ten principles ranging from human rights to labour, environment and anti-corruption. The consulting firm zeb has been working with zeb/business.school, a Steinbeis Transfer Institute, to rise to this challenge and has been honored with a gold rating by the rating agency EcoVadis.



Integrity



Sensitivity

The United Nations' "Global Compact" is the world's biggest and most important network for corporate social responsibility (CSR). zeb.rolfes.schierenbeck.associates gmbh, a pan-European strategy and management consulting firm specialized in financial services, joined the initiative in 2015, which also entailed agreeing to integrate the UN Global Compact in the firm's business strategy, its corporate culture, and everyday working practices. For the last three years, zeb has been working continuously with professors and students at Steinbeis University on implementing the goals of the Global Compact within the company and thus living up to its social responsibilities.

A CONCEPT FOR IMPLEMENTING THE UN PRINCIPLES

The UN Global Compact initiative defines a number of core principles. Companies are expected to support respect for and protection of international human rights and ensure that they themselves do not become complicit in human rights violations. They should uphold freedom of association and respect effective recognition of the right to collective bargaining. They should also advocate the eradication of all forms of forced labor, the abolition of child labor, and the elimination of discrimination with respect to recruitment and employment. Companies should support precautionary measures when it comes to environmental issues and pursue initiatives aimed at promoting a greater understanding of the shared responsibility for the environment. They should also promote the development and sharing of environmentally friendly technology. Last but not least, they should help combat all forms of corruption.

In partnership with the Steinbeis Transfer Institute zeb/business.school, zeb

has now developed a concept for effectively implementing these guidelines within the company. Their concept involves identifying four topics, each underpinned by three areas of action:

- Society and the general public: vocational training services, academic training services, voluntary services
- Market and public professionals: ethics and values, transparency, independent assessment
- Employees: excellent employers, individual careers, diversity
- Environment: sustainable procurement, sustainable travel solutions, efficient energy consumption

Based on these factors, individual measures were developed, tried out, and linked to specific objectives. For example,

zeb has expanded its range of vocational education offerings under its "Society" heading and improved the support it gives to apprentices. One specific target zeb has set itself is that 80% of apprentices should be among the top 20% completing their year of training. Academic education is provided with the support of Steinbeis University. Employees at zeb are being offered the chance to do a part-time master's and bachelor's degree or complete a PhD program. They also have the opportunity to participate in scientific studies and research projects. Staff at zeb can work for a day as a volunteer (for example, renovating a kindergarten) and participate in a project called My Finance Coach, which allows them to offer expert advice on financial questions in school lessons. The aim is to organize at least 50 events each year.

CALL FOR PAPERS

SUSTAINABLE FINANCING AND DIGITAL TRANSFORMATION IN THE FINANCIAL SERVICES INDUSTRY

zeb/business.school, a Steinbeis Transfer Institute, and zeb are offering up-and-coming scientists the opportunity to present their research to a scientific advisory board as part of an international science conference. The board will comprise professors from a panoply of European educational establishments. The event is particularly targeted at PhD students. The conference will take place on December 4, 2019 at the zeb offices in Frankfurt. Attendees are also invited to a get-together the evening before the event to get to know other participants.

The key areas being looked at during the conference are current research into digital transformation in the financial services industry and sustainable finance. Presentations can be on a doctoral thesis, scientific essays, working papers, or other research work. Presentations must be held in English. Speakers will have 15 minutes to present their topic followed by 15 minutes for the conference participants and board of professors to ask questions and make comments.

A scientific advisory body will be responsible for selecting applicants for the seminar. Applications can be submitted via email by writing to joachim.hasebrook@stw.de or bhanke@zeb.de.

zeb's "Employees" and "Environment" topics revolve primarily around staff initiatives such as sabbaticals, a "time for you" credit scheme, family services, programs or events aimed at supporting women, sustainable buying practices (e.g. fair trade organic coffee), environmentally friendly travel options, and sustainable supplies for buildings (construction passive cooling instead of air-conditioning).

In the "Market and Public Professionals" area, ethical principles are looked at based on clear rules. Aside from rules already laid down under the UN Global Compact, these include a focus on the German sustainability code in keeping with CSR guideline implementation legislation, corresponding technical standards for professional and safe technology use, and transparency and anti-corruption guidelines. A new code of conduct has also been developed for all employees, for whom it is binding.

INDEPENDENT AUDITS BY ECOVADIS

EcoVadis is a collaboration platform originally from France. It now counts among its members a variety of firms and trade associations across Europe, and its role is to provide independent audits and evaluations of sustainability and transparency. The aspects it assesses include environmental factors, working conditions, fair business practices, and sustainable procurement. Scores are compa-

red to all previous evaluations and gauged by all companies working in the same sector of industry. The concepts and measures developed by zeb and the zeb/business.school Steinbeis Transfer Institute were ranked "outstanding" by EcoVadis, as was their successful implementation over the past three years. They were ranked among the top 19% for "environment," among the top 27% for "working conditions" and "sustainable procurement," and among the top 6% for "fair and transparent business practices." This places zeb among the top 6% of all companies audited to date, earning it a Gold EcoVadis rating at the end of 2018.

The experiences made until now should be useful in maintaining the outstanding levels of achievement and building on them. They should also be transferred to scientific work: The zeb/business.school Steinbeis Transfer Institute and zeb business consulting are issuing an invitation to an international scientific symposium on sustainable financing and digital transformation, due to take place in Frankfurt on December 4, 2019.

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POOLING STRENGTHS AND BUILDING ON THEM!

IN THE LATEST “STEINBEIS SWIPE” ARTICLE, THOMAS R. VILLINGER CALLS FOR MORE URGENCY WHEN IT COMES TO RESEARCH AND TECHNOLOGY

Throughout the land, there is increasing discomfort that Germany is falling behind in the fields of research and technology. The long rounds of discussion regarding the “education pact” and the poor quality of cell phone networks show that there is a need to take action. But there’s little use standing in front of one wailing wall while pointing a finger at another. Mutual accusations don’t solve anybody’s problems. Of course the public sector needs to do its homework in some areas, but until it does, the top performers in business and science must not be allowed to sit back and do nothing.

We need to look beyond the end of our noses. For a number of years, the venture capital fund ZFHN has been working in close collaboration with startups and VC companies in the United States, Israel, and China. What do companies and governments do differently there? What works better? And what can we in Germany do to learn from others?

WE NEED TO GET FASTER

The Chinese are much quicker than the Germans at making a success out of new

products and getting them onto the market. “The fast ones eat the slow ones” – especially in times of Industry 4.0, automation, and artificial intelligence (AI). To a certain extent, we should get a move on in Germany and start thinking “speed first, then thoroughness.” We could also push developments without having to be 100% sure that products are really going to last 50 years. Product cycles are getting shorter, leaps in technology are getting bigger, and customers are quick to lose interest. This is not meant to be a call for sloppiness and more production faults, but there are so many products that could be developed with the help of customers yet still made market-ready quickly.

Another thing we can learn from the success of many Chinese firms is “mobile first.” Major parts of the everyday value chain in China are now taken care of with smartphones. These little helpers in our pockets can be used for shopping, reservations, banking, and lots of other everyday tasks. Desktop PCs and laptops are becoming a thing of the past. This is another area where there is still “plenty of room for improvement” in Germany, so we need to do more to push the right business models.

A key feature of new companies in Israel is their almost childish curiosity: People always seem to want to get to the bottom of things: Do we really have to accept this problem, or isn’t there another way of doing things? This innovative anarchy drives progress and does so at great speed. Furthermore, the Israelis have learned from “being cut off” and make do with the resources that are available to them. They would rather improvise than wait for a new, expensive machine. It’s almost like their motto is “impossibility is an irrelevance.” This accelerates the speed at which new technologies are developed. There’s even an idiosyncratic word for this Israeli mentality, which is even used in business: chutzpah. Chutzpah means audacity, a certain shrewdness, agility, and willingness to take risks. And that could certainly provide us with a role model.

THE KEY TO SUCCESS: MORE EDUCATION

They particularly value education in Israel, especially in math, IT, science, and engineering. Access to mathematics and science in early childhood lays a foundation for a solid understanding of modern

technology. This is one area in which Israel is most definitely on the right track by providing people with a renewable “raw material” in the long term: education. Giving our schools modern tablets and WiFi, paid from the new pot of money provided by the German digital pact, is surely a good start – but here, too, we must keep up the momentum.

By pointing to the advantages of young companies in China and Israel, I’m not trying to sweep those famous “German

virtues” under the carpet. The right way forward will be to pull together the best of both worlds. This will be possible by getting new companies from China and Israel to work alongside established firms from Germany. One recent example of this is the AI startup INSPEKTO from Israel, which ZFHN invested in more than a year ago. The company is now working in close collaboration with manufacturing companies in southern Germany. ZFHN would like to become involved in more such partnerships.

Thomas R. Villinger has more than 25 years’ experience in venture capital. Before co-founding and becoming the CEO of ZFHN in 2006, he held a variety of national and domestic positions. His focus lay in mergers and acquisitions, venture capital, and the procurement of private equity for expanding companies in Europe, the Gulf States, and the United States.

Thomas R. Villinger is a supervisory board member of a variety of early-stage equity holdings and is a sought-after expert in the financing of tech startups. Most recently, he lent his support (as founder and director) to the setting up of Innovationsfabrik Heilbronn GmbH, an important business incubation center. For years, Thomas R. Villinger has been personally involved in international tech startups himself, primarily as an active investor.

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DEEPTECH4GOOD: START-UPS COMING TO THE FORE

STEINBEIS 2I REMAINS IMPORTANT PARTNER OF EUROPEAN UNION ACCELERATOR PROGRAM



It's all in a name. Deep tech start-up is the new term for a start-up founded on the basis of a breakthrough technology or science. The start-up's product or service often revolves around a disruptive innovation. The development cycles they are involved in are often longer and more capital-intensive than with the products found in other sectors of industry. The European Union

has spotted this and is now funding a European accelerator programme called DeepTech4Good. The initiative is part of Horizon 2020, the European Union Research Framework Programme, and the aim is to help start-ups raise their market profile and become a driving force in the Internet of Things (IoT) market. Five European start-up events will be organized under the

programme, each resulting in the selection of eight start-ups to receive coaching on growing their business from the project partners of DeepTech4Good. The first finalists have already been chosen at the first two events called DeepTech4Good#Paris and DeepTech4Good#Stuttgart. DeepTech4Good#Stuttgart was organized by the project partners, S2i and Photonics BW.

aDeepTech4Good is being coordinated by Cluster Systematic. Under the initiative, eight partners from Germany, France, Austria, and Spain will receive approximately €1.5 million from the EU and will be charged with acting as official EU ambassadors for the Startup Europe initiative. Based on a vision that deep tech is good for society, the program focuses closely on four IoT sectors: Smart Cities, Smart Mobility (modern travel solutions), Industry 4.0, and Health & Well-being. In total, 200 high-potential start-ups from four European hubs will be helped to forge networks with relevant stakeholders with the aim of initiating innovation projects. This should make it easier for them to access funding and gain further support in raising their profile. One of the overarching aims of the programme is to network and connect up hubs within Europe.

EIGHT START-UPS RECEIVE AWARDS AT THE PITCH IN STUTTGART

The DeepTech4Good#Stuttgart event in late 2018 was an opportunity for 23 young European enterprises to make a 5-minute pitch and inspire investors with their ideas. Eight winners were chosen after winning over the jury: Adlatus Robotics, AScon Systems, HD Vision Systems, INERATEC, skinmade, and vialytics (all from Germany), Mobility Work from France, and EET from

Austria. The winners are now eligible to receive personal coaching and may progress to the accelerator programme. Gaining access to a Europe-wide network and receiving input from experts will help the start-ups scale up their business and provide welcome support with innovation initiatives – ideal prerequisites for evolving into future deep tech unicorns in Europe.

THE ROLE OF BADEN-WUERTTEMBERG AS A START-UP HUB

“Deep tech start-ups will increase in significance for Baden-Wuerttemberg in the coming years. It’s particularly important to recognize and promote the scale-up potential. Events like DeepTech4Good#Stuttgart make a crucial contribution in this respect. With powerful sponsors like bwcon, Start-up BW, Agorize, VentureZphere, the Stuttgart stock exchange, and the StartupEurope initiative organized by the European Commission, the event provides an ideal network and it’s sponsors like these that will secure Baden-Wuerttemberg’s position as a future hub for start-ups,” says Dr. Petra Püchner, Commissioner for Europe of the Minister of Economic Affairs, Labour, and Housing Baden-Wuerttemberg, summarizing the exceptional importance of the event. “This support already starts on the doorstep at our events. For example, the start-ups re-

ceive specific training on the best way to sell themselves and different ways to network and embark on a collaboration with partners from industry,” adds Samantha Michaux, who as a project manager and Startup Europe Ambassador at S2i is responsible for supervising the project.

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<http://startupeuropeclub.eu>

A MANAGEMENT CULTURE LIKELY TO LAST

STEINBEIS EXPERTS MODERATE MANAGEMENT DEVELOPMENT PROJECT

These days, market survival as a technology leader requires tremendous technical know-how and professionally organized processes. This mostly goes without saying. But a company also needs managers who stay in control not only as each challenge intensifies but also as they face increasingly high demands. An organization needs to develop as part of an ongoing process and a company must not lose sight of personnel development. This may entail difficult meetings and solving certain conflicts, but at the end of the day managers must also not forget about themselves. These are the sort of issues Stein Automation helps its managers with. To do this, they brought the Steinbeis expert Ute Villing on board, and with her a wealth of experience at Business School Alb-Schwarzwald, the Steinbeis Transfer Institute.

Stein Automation is a specialist in smart transportation systems and has worldwide operations spanning the automotive industry, medical technology, white goods, and even home electronics. The firm employs approximately 50 people and is based in the Baden-Wuerttemberg twin town of Villingen-Schwenningen. Its focus lies in conveyance systems for workpiece support solutions, which are typically found in assembly areas in production. Products such as the Thermomix brand, automotive sensors, and engines are produced on lines made by Stein.

The family that owns Stein has always found it important to base management of the business on certain values and they feel they have a responsibility to employees and clients, and well as the local community. This philosophy is reflected in their sponsorship of a whole

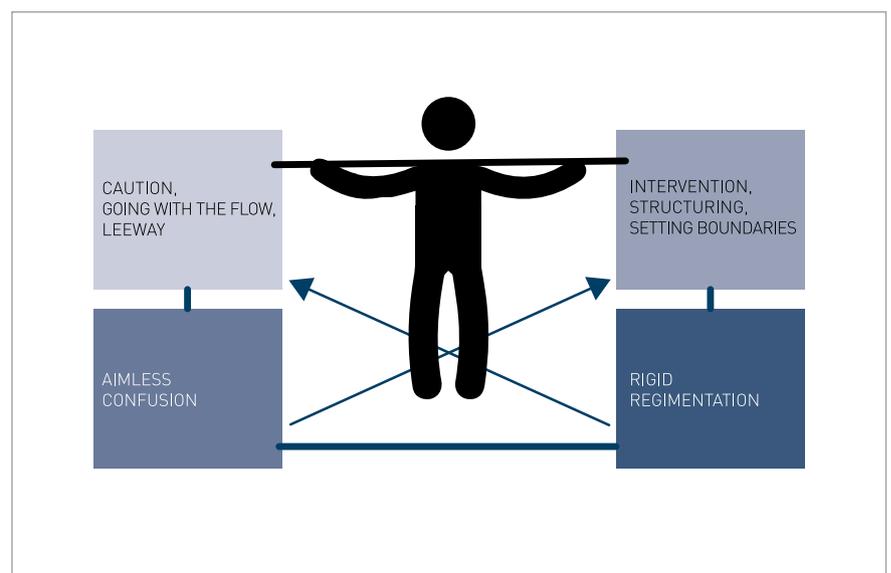
host of projects in the area. The company also provides non-monetary support through its involvement in social causes.

FOSTERING LEADERS AND SPECIALISTS, AND CREATING LOYALTY

Managing Director Jürgen Noailles places a great deal of emphasis on long-term relationships based on partnership, not only with customers and suppliers, but also with staff. Interpersonal communication is particularly important in today's fast-moving times and there are occasions when it dictates success or failure. Most managers and specialists at the medium-sized company have been working there for years, so the firm wants to support its staff so they enjoy working at the company and feel contented. Stein Automation would also like to appeal to future skilled workers, especially given the



A fundamental balancing act: The Value and Development Square provides useful help in identifying solutions during conflict situations





The team of Stein Automation GmbH & Co. KG. The medium-sized company is a specialist for intelligent transport systems.

competition, which includes a large number of hidden champions in this highly industrialized area.

Jürgen Noailles, managing director of Stein automation and an alumnus of Steinbeis University with a bachelor degree from the Business School Alb-Schwarzwald himself, turned to Steinbeis expert Ute Villing for support. Villing joined the firm's HR and organizational development project and designed a series of workshops with managers. Together, they discussed the management culture and HR development measures that would make sense at an expanding company.

"In a world shaped by permanent change, you don't need an inflexible list of rules; you need senior management and managers who are in a position to adapt to evolving challenges, in terms of technology just as much as how you deal with people," says Ute Villing, outlining the overall idea of the training project.

The team of Stein managers worked with Villing on a systematic approach toward personnel development revolving around the business strategy, which is to maintain and build on global market leadership in conveyance systems and logistics. Broken down into

key goals, this equates to high quality, long-term growth, customer focus, an ability to deliver reliably on time, a passion for the company's own products, and a passion for customer satisfaction.

A WORKING ATMOSPHERE REFLECTING FUTURE PROSPECTS

Managers also have to recognize the talent of their colleagues, allow them to work in the right positions, and promote their technical expertise and interpersonal skills accordingly. They should spot the causes of conflict early, be able to de-escalate it, and know how to run meetings constructively. Noailles summarizes



AN ATMOSPHERE IN WHICH PEOPLE FEEL WELL DESPITE THE HIGH REQUIREMENTS.

THE RIEMANN-THOMANN MODEL

Everyone “ticks” differently. In everyday situations it helps to understand how others tick, since this reduces the potential conflict of dealing with one another. The Riemann-Thomann model describes people’s needs and limitations, the things they strive for, the things that hold them back or make them feel under pressure, and the motives or fears that underlie their actions. It also helps to support others with specific aspects relating to personal development and forming effective teams.

THE SCHULZ VON THUN COMMUNICATION SQUARE

How do misunderstandings happen? How can it be that I say one thing but it’s understood differently by the receiver? Which unspoken messages are perhaps just as important as what is said? The Communication Square is the best-known model developed by the communication psychologist Schulz von Thun. It offers an effective tool for revealing unspoken messages.

DISCUSSION GUIDELINES FOR DIFFICULT CONVERSATIONS

Going into a meeting well prepared with a clear and systematic approach in mind makes it easier to stay in control and manage complex situations involving two-way communication, even if initially they seem daunting. An effective way to do this is to prepare a discussion guide – a kind of roadmap, which, once internalized, can be used at any time even in the most diverse kinds of meeting situations.

THE VALUE AND DEVELOPMENT SQUARE

Time and again, we witness extreme reactions from people or extreme situations. Our task as a coach or manager is to spot when things might escalate and restore an appropriate sense of equilibrium. The Value and Development Square helps to turn an either/or situation into not-only-but-also. It also helps solve dilemmas and encourage people to move forward.

his goals: “In a nutshell, atmosphere should develop in which – despite the demands placed on them every day – people feel comfortable, enjoy coming to work, and feel there are good prospects for the future!”

Villing provided the know-how required for this in a series of workshops and seminars. These involved different techniques and analytical tools based on management psychology – for example, a compass for understanding different personalities (the Riemann-Thomann model), the Value and Development Square, which is a communication model developed by Schulz von Thun, plus a discussion guide for difficult meetings. Workshops were arranged to allow any insights gained to be applied systematically to the everyday situations faced by managers, with a focus on sustainability. Aiming to “lead through partnership” and apply the new psychological insights to everyday work also helps managers to react calmly and flexibly to the typical kinds of challenges encountered in management.

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MEET ME AT MEDIWA: SHAPING DIGITAL TRANSFORMATION IN THE WORLD OF MEDIA

A LOOK BACK AT THE 2018 NETWORK EVENT

Digital transformation is now affecting all areas of the working world as well as society, pushing change in all directions. It brings with itself numerous new tasks and roles. Reason enough for four Steinbeis experts to initiate a networking event called *Media in the Digital Transformation Process – Shaping Change! Together with the partners working on the event – Digital Media Women (DMW) from Stuttgart, and Women in Film and Television Germany (WIFT) –*, they pulled together an exciting program of events on November 29, 2018. Around a hundred people came to the event to take part in workshops, exchange ideas and know-how, and establish contacts in the Steinbeis House of Management and Technology in Stuttgart.

Teams from the Steinbeis Network work in all areas of technological transformation, as well as research and innovation. This includes looking at impacts on the world of work and employees. The media play a central role here, a factor that was examined in more detail at the event. The aim was not so much to discuss which new media now exist, nor the vocational possibilities they present. Instead, the emphasis laid on the roles opened up by new working environments, the challenges this presents, and in particular how to overcome these challenges by looking at things in a different way. "The thing

about transformation is that women's skills and their way of looking at things are often neglected – not only in how they shape the media but also in how they use media," highlights Beate Wittkopp, director of the Steinbeis Transfer Center TransferWorks BW, who was part of the team who planned the event.

WORKSHOP INSPIRATIONS AS A BASIS FOR EXCHANGING IDEAS

The event got underway with an entertaining and interesting talk by Christine Regitz, Vice President and Member of the

Supervisory Board at SAP and a Steinbeis Trustee. Regitz provided a number of insights into modern working practices at SAP, where digital technology has had a major impact on all areas and the work environment has changed dramatically in recent years. Six workshops followed where experts shared ideas and inspiration as a basis for some intense rounds of discussion and sharing.

The workshop run by Kristin Maier-Müller (G. MAIER Electrical Engineering/Electrical Guild of Reutlingen) was titled *Tackling Change: Digital Worlds of Work and Analog Corporate Culture*. The workshop focused on her experiences in business, showing concrete examples. Maier-Müller provided an impressive illustration of how a company's identity and culture lay foundations, not only for collaboration but also for a willingness to bring about change. A further opinion was offered by Dr. Birgit Buschmann, representing the department of Business and Equal Opportuni-





ty at the Baden-Wuerttemberg Ministry of Economic Affairs, Labor, and Housing. Buschmann outlined the state's strategies and activities aimed at supporting companies. These include focusing on opportunity in order to encourage more women to see change as a way to shape the future.

In a workshop on New Media and New Diversity in PR and Social Media, Birgit Nüchter examined the challenges managers face in trying to actively help shape change. As the director of the Steinbeis Consulting Center for Leadership Competence, Nüchter shared her personal expertise not only during the actual workshop, but also beforehand when planning the event. During the workshop, she was supported by Simone Wieland (DMW, BHSG/Continental), who shared her practical experience as a social media manager and showed which trends and emerging technology to follow and take heed of. The study groups engaged in an enthusiastic discussion and a lively exchange of experiences on current issues, the opportunities they present, and potential threats.

The workshop on Gaming and Game Thinking offered guests an opportunity to share their ideas and think up different video game concepts with experts from the business and gaming industry. To help with this, Misti Frantzen (Meister Cody) and Liliya Ivanova (KI Group) were on hand. "Our workshop created enthusiasm among the participants for the overlaps between systems, design thinking, agile methods, the lean user experience, and game design – and this stimulated discussion on the potential and pitfalls of gaming and business. At the same time, it made lots of people curious about new and creative ideas!" concludes Nathalie da Silva, who, as the project manager for Innovation Management and an expert in gendered innovation at Steinbeis 2i, was also part of the concept development team and moderated the workshop.

The focus of the workshop on Augmented Reality and Animation laid on the broad field of video animation. For this workshop, Stefanie Larson, head of the Animation Media business cluster for the region of Stuttgart, joined forces with Regina Welker, creative director and a director at Woodblock.tv and a

director of the film production company EAGLE EYE. Together, they provided a glimpse behind the scenes of the working world of animation, also illustrating how omnipresent animation now is in our everyday lives and how much the industry is now changing. Her conclusion: The field is expanding, roles and responsibilities are becoming more specific, and the borders of reality are becoming fuzzier.

One workshop stimulated a lively discussion on a serious and fundamental topic: Digital Transformation as a Challenge to Ethics – Privacy and Responsibility. Dr. Uta Müller and Laura Schelenz, experts at the International Center for Ethics in the Sciences and Humanities (IZEW) at the University of Tübingen, started with background information and an overview view of international and intercultural scenarios. The subsequent discussion showed that the issue of education in dealing with digital media is tremendously important. The anonymity of the internet must not result in fundamental rules of communication being simply swept aside, such that people are widely inapt to stop humiliation, insults, and defamation. Considering the diffe-



rent concerns regarding the world of digital technology – but also its potential – it became evident that further debate is needed in order to clarify aspects such as responsibility. “Society needs to speak up to understand and help shape change, which is a shared task beyond the context of Germany. This is where the social sector can provide important impetus,” says Gerburg Joos-Braun, director of the Steinbeis Consulting Center for IT Service Management working as a consultant in this area who also helped organize the networking event.

Kerstin Heiligenstetter (She’s Mercedes, Daimler), representing the automotive and travel industry, and Nicole Ackermann (WIFT), representing the film industry, looked at The Diversity of Role Models. Despite progress in some areas, there is still much work to be done in both industries to offer a contemporary and suitable platform to women – but something is happening! She’s Mercedes offers events and numerous channels to provide a network for successful women to exchange ideas, develop new concepts, and find new contacts. At the same time, they can address their needs regarding tra-

vel solutions. There are more and more women in the film industry working as directors, camera operators, and heroines in front of and behind the camera, and this creates new role models and provides inspiration to others.

After discussing experiences in the workshops and the challenges of different fields of work and aspects of human culture within the digital and media industry –, and after noticing how the abundance of ideas inspired everyone at the event – the get-together moved on to the second key part of the event: networking, especially between people from different backgrounds and fields. A variety of new contacts were made as people exchanged their personal experiences – thus laying a foundation for new partnerships!

INTERESTED IN FINDING OUT MORE? THE EVENT AS AN E-BOOK

If you’re interested in finding out more about the event, an e-book for browsing through different topics online will shortly be available at www.steinbeis.de/mediwa.

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FINDING DEFECTS ACOUSTICALLY

A STEINBEIS TEST MEASUREMENT SYSTEM CAN DETECT WELDING DEFECTS USING ACOUSTIC EMISSION ANALYSIS

Welding is applied as a production technique in many areas of industry. The advantages offered by the method are often tarnished, however, by one major disadvantage: Quality testing is complex, because welding defects are so difficult to detect. This even applies to gas tungsten arc welding (GTAW), a process in widespread use in industry and a method that enjoys particular popularity because of the quality of the weld seam. This type of welding is typically used when speed is not as important as quality requirements – for example when making pipelines, or equipment for power stations or the chemicals industry. Conducting quality checks on weld seams can be expensive when they are carried out after production, so to find a way to avoid high outlays the Steinbeis Innovation Center for Intelligent Functional Materials, Welding and Joining Techniques, Implementation (Dresden) has been working with the welding machine producer Merkle as part of a sponsored research project. Together, the experts have developed a testing measurement system capable of preventing weld defects in the first place by carrying out quality inspections during the actual welding process.

Monitoring welding processes is not only advantageous when it comes to avoiding welding defects. It also improves the quality of seams, raises productivity, reduces production costs, and enhances automation levels. At the same time, monitoring is an important instrument of profes-

sional quality management – a crucial activity in most sectors of industry.

KEY PROBLEM: CORRECTING ERRORS IS EXPENSIVE

Until now, checking for welding defects has been based on the DIN standard ISO 5817. This standard is applied to determine whether it will be possible or even necessary to correct a defect after the welding process. Making such decisions has been an extremely expensive part of quality inspections until now. There are a number of non-destructive and destructive testing options for conducting checks. The non-destructive methods range from straightforward visual inspections to dye penetrant inspection, magnetic particle examination, X-ray testing, ultrasonic testing, and eddy current testing. The destructive examination procedures include metallographic tests, strength testing, and notch impact bending tests.

KEY SOLUTION: AVOID ERRORS DURING THE PRODUCTION PROCESS!

All of these testing methods have something in common: They are conducted downstream after production, so they do not actually prevent errors, they (at best) rectify them and this is extremely costly. This is where the research alliance comes in between the Dresdner-based Steinbeis Innovation Center Intelligent Functional Materi-

als, Welding and Joining Techniques, Implementation and its partner in industry, Merkle Schweißanlagen-Technik GmbH. The test measurement system they have developed controls and monitors the welding process in line, thus avoiding potential welding defects and safeguarding the required seam quality and welding properties. Their innovative system detects welding errors by spotting correlations between acoustic emissions and process phenomena.

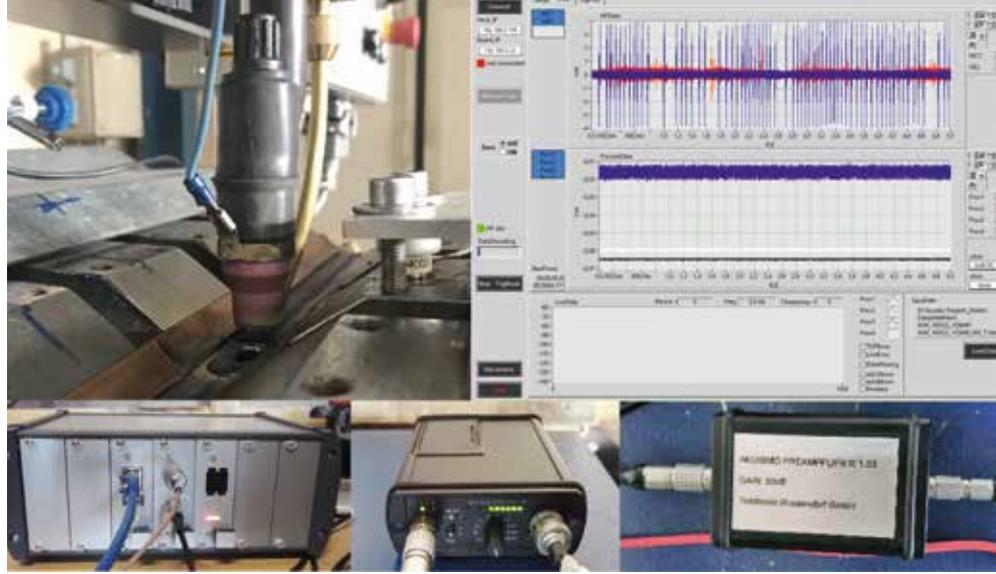
“We’ve developed a measurement concept with our project partner Merkle and a prototype for a test measurement system. This has made it possible for us to detect and assess seam weld defects like pores, incomplete joint penetration, internal shrinkage, cracks, and other faults affected by the process parameters and the materials used,” explains Associate Professor Dr.-Ing. habil. Khaled Alaluss, who is co-director of the Steinbeis Innovation Center alongside Dr. Lars Kulke and Prof. Dr.-Ing. Gunnar Bürkner. The measurement modules on the prototype provide process data on the defined seam lengths and volumes in more detail than was previously possible. This has now made it possible for the project team to examine and analyze different factors affecting the welding process.

PUTTING THE SYSTEM TO USE

The measurements provided the team with important confirmation that the



The developed test measurement system and hardware – a control module for acoustic detection of welding defects



new system makes it possible to detect welding seams using non-contact measurement methods and match the resulting signatures to detected weld defects. The airborne sound detector – a microphone – works from 0.005 to 200 kHz and the structure-borne sensor from 0.1 to 500 kHz. The current state of technology will only work to a maximum of 20 kHz. Irrespective of sensor positions, the welding experts now have a method for detecting sound signals during processes with measurement times of up to 30 seconds per measurement. Airborne and structure-borne sound detectors can be mounted in any kind of position on welding equipment and welding samples. This makes it possible to determine and identify welding defects with greater accuracy and sensitivity.

Now that the project has been completed it is becoming obvious just how much value the new test measurement system is delivering. The system can already evaluate airborne and structure-borne sound signals during the welding process, making it much easier to detect, analyze, and assess existing welding defects. This has resulted in a new measurement process for use in inline welding process monitoring, one that has also been evaluated in terms of process technology. The project team has built on the modular system to come up with an innovative control technology for the GTAW process, and this allows the process to be monitored for possible welding defects. Extensive ex-

amination of welding technology has shown that the desired functionality of the prototype has clearly been achieved, also thanks to the control module for detecting weld defects using airborne and structure-borne noise sensors. Detecting and identifying welding defects using the detected acoustic emissions worked without any problems with gas tungsten arc welding. The monitoring system is also capable of using detected acoustic emissions to determine the specific nature and location of welding defects. The developed error prevention strategies were used afterwards to determine and show the impact that certain process parameters (welding current, welding speed, filler metal, shielding gas flow, surface texture, contamination, grease, swarf, etc.) have on welding defects and quality.

Once a correlation was worked out between acoustic emissions and process parameters, the team also developed the control strategies that will be required, in a format that will be suitable for the market, and this was also evaluated in terms of process technology. How suitable the monitoring system prototype is in actual practice was then tested by Merkle by putting the solution through its paces. The company used the system successfully with its own control module on a GTAW machine. It had no problems detecting weld defects by looking at the correlations between acoustic emissions and process phenomena.

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AN EXCELLENT NOTION OF EROSION

STEINBEIS EXPERTS DEVELOP MEASUREMENT-BASED PROCESS FOR GRINDING PROFILES USING SPARK EROSION

No matter how complex technical units, machines, or devices are, they always share the same core function: They convert physical processes into hands-on items that can be used. To do this, they have surfaces with active properties and kinematic effects – so what could be more natural than to make components as efficient as possible and give them multi-functional features that are also economical. This can be made possible by combining several active surfaces within a single workpiece, typically produced in a non-cutting high-precision process. Prof. Karl Schekulin of the Reutlingen-based Steinbeis Transfer Center for Process Development has now developed a profile grinding technique based on measurement-controlled spark erosion.



Merging different components into a single part offers a number of important benefits. Not only does it make it easier to organize production, there are fewer or perhaps no longer any surfaces requiring joining and this can significantly improve functional performance. The ideal candidates for producing precise parts without cutting or machining are tried-and-tested manufacturing processes such as investment casting, die casting, fine casting, fine forging, and sintering. To increase the degree of molding, semi-hot processes can be used followed by cold calibration to improve accuracy.

THE CHALLENGES OF FINISHING

Despite these manufacturing options, depending on accuracy requirements it is inevitable that some degree of post-process machining or subtractive finishing will still be required. One big problem comes with hard-to-reach areas and undercuts, which make it impossible to machine the active surfaces of a multifunctional part at will due to processing parameters. In such cases, the favored option is to use conventional drilling, turning, milling, or grinding, but often this is also not possible due to workpiece complexity.



THE SOLUTION: SPARK EROSION GRINDING

This was the underlying motivation for Karl Schekulin to start working on a solution to this problem and develop a process called measurement-controlled spark erosion form grinding. His process involves using a three- or five-axis spark erosion machine, with one axis programmed to act as the main axis for oscillating the electrode. Explaining the technology, Schekulin says, "Actually the erosion process is quite simple: You specify the grinding depth, for example based on a certain target measurement, and the electrode senses the starting point and keeps taking readings until it determines the required machining result." If reworking is required to com-

pensate for electrode wear, this can be carried out automatically.

Compared to CNC machining, the spark erosion process is extremely slow. This can, however, be compensated for by arranging workpieces and electrodes in multiples, thus making it possible to use the procedure economically in mass production. To test whether the new process could be suitable for production, Schekulin converted a commercially available spark erosion machine and equipped it with additional moving axes. His machine is currently undergoing testing at the Steinbeis Transfer Center for Process Development in Reutlingen with the aim of determining process parameters for industrial application.



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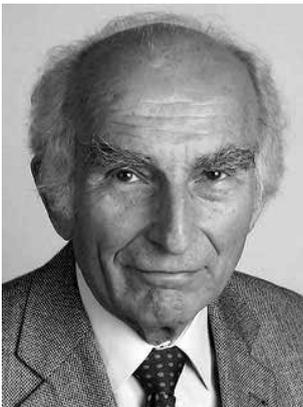


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STEINBEIS IN GRIEF FOR ONE OF ITS PIONEERS

OBITUARY: PROFESSOR KARL SINN



Steinbeis mourns the death of Professor Karl Sinn, who passed away on January 4 at the age of 88. Karl Sinn was the founder and long-standing director of what is now the Steinbeis Transfer Center for Technology Consultancy at Heilbronn University.

He counts as a pioneer in the implementation of the Steinbeis model. Sinn first launched an industrial technology center in 1970, at Heilbronn School of Engineering (now Heilbronn University). In 1971, the center was integrated into the Steinbeis Foundation as a technology consultancy service. For 25 years, Sinn was extremely successful in spearheading the work of to-

day's Steinbeis Transfer Center for Technology Consultancy at Heilbronn University, which he handed over to his successor Prof. Dr.-Ing. Klaus Boelke in 1995.

Karl Sinn was a trained foundry technician. His professional career was closely intertwined with the expansion of Heilbronn University: As head of the department of production engineering and subsequently prorektor, he played a central role in ongoing developments at the university and was highly regarded for his leadership. His expertise also played an important part in his role as chairman of the University and Science Association (VHW).

Our deepest sympathy goes to Karl Sinn's relatives and the bereaved.

Prof. Dr. Michael Auer | Manfred Mattulat
Steinbeis Foundation Board of Directors



BRINGING FAMILY AND A CAREER UNDER ONE ROOF!

MASTER'S THESIS BY LOUISA MADU OF STEINBEIS UNIVERSITY POINTS TO THE BENEFITS OF FEMALE EMPOWERMENT

In a society that believes in equal opportunity, everyone should be open about the paths they would like to tread. Women should be in a position to decide for themselves if they want to go back to work after having a baby or not. Similarly, men should be allowed to decide – without judgment – if they want to take on the task of running a family. In a society that has moved beyond conventions imposed on us through expectations, men should not hesitate to become kindergarten teachers if they want to; women should not hesitate to become engineers. These are all things that Louisa Madu advocates. She is conducting a project for her master's degree at Steinbeis University. Her topic of interest: female empowerment. Madu has been examining how women can be supported with their management aspirations as they work their way up to the top.

An increasing number of women aspire to study subjects or pursue professions in areas that until relatively recently were considered "typical male" – and vice versa. In Germany, nearly 30 percent of students in the so-called MINT topics – math, IT, (natural) science, and technology (engineering) – are now female. This development can be considered a first step in the right direction. There are numerous examples in politics and business of women successfully spearheading organizations – women who have achieved what they aspired to. Nonetheless, family life often has to be put on the back burner for women with high career ambitions. This is because there are no other options within the social framework in Germany. An example: According to the Tagesspiegel newspaper, there is a shortage of 2,500 kindergarten places in Berlin alone.

SOCIETY NEEDS TO CHANGE – WORKING MODELS NEED TO CHANGE

"Even today, there's still general acceptance that a woman can consider herself lucky if she can focus exclusively on child care and household duties after the birth of a child. And then a working mother is looked at skeptically if she's putting her own interests before those of the child," criticizes Madu, a mother of a young girl herself. Madu is concerned by the fact that it seems to go without saying that women count as a human resource in business, but there appears to be a general lack of understanding regarding the need to change family models. For

society to become more child- and family-friendly, a shift is needed such that fathers are put in a position to reduce professional commitments – without worrying. Men who would like to be more closely involved in running a family should not be discriminated against in their careers. Instead, they should actually be supported in their efforts. Madu believes that one way to improve the current situation would be to offer flexible working hours and reduce workloads – without this affecting people's career chances. There is also a need to offer a flexible model which values family and careers equally. "On top of that, women also need to work on themselves. There's nothing stopping them feeling a bit more confident about themselves, learning to be more assertive at work, or making their own needs clear. They should do more to support each other, because if women aren't in an ideal position to understand the situation facing others, who is?" asks Madu, also challenging her female counterparts. To boost each other's confidence, women should share their experiences with others. Women should give each other tips and set up networks, and mentors are needed to provide recommendations. Ultimately, this is about being more courageous and believing in oneself. And this is exactly the angle Madu comes from in her degree project.

As a student on the General Management degree program, which is run by the Graduate School (itself part of the Leadership & Management faculty at Steinbeis University), Madu is receiving

scientific support on her project from experts at the School of International Business and Entrepreneurship (SIBE). Her master's thesis is on the topic of Female Empowerment. This involves looking at different treatment of women and men when it comes to work and family commitments. From Madu's point of view, there are a number of ways that improvements could be made on a political level.

PLATFORM FOR SHARING EXPERIENCES

The master's student would like to set up a forum, primarily targeted at women with management ambitions who would like to exchange views on a variety of topics. She is examining the skills, (ongoing) training, networks, and other factors that are important to women aiming for or already fulfilling a role in management. Her analysis also looks closely at the strategies that women can pursue in achieving their career goals. This primarily involves assessing intrinsic and extrinsic motivational factors, as well as requirements when it comes to succeeding in a management position. Madu is also identifying and analyzing the communication patterns of women. For example, which online communication platforms do they use – especially women striving for a position in management.

Her results until now have shown that women are not only impeded by external setups in achieving their goals, there are also a number of social influences dating back to early childhood and these have a decisive impact on their current attitude toward careers. Madu has a number of insights and suggested improvements when it comes to the actions that politicians, companies, men, and women could take to improve the situation. These include investing more in education for families and schools on the possible con-

sequences of stereotyping social roles, promoting young female talents in industries dominated by men, and raising salaries and investments in the social sector. She also finds it important to provide an infrastructure of improved children's care facilities and offer flexible working hours. More must be done to raise awareness of such flexible working models and the role they play in shaping women's careers. These models make it possible for people to develop their own skills, advance in a career, bring everything under one roof with a family, and thus share responsibility for a family. This can be of particular interest for women with high career aspirations who still do not want to miss out on starting a family.

QUALIFICATIONS RATHER THAN QUOTAS

Women are just as qualified to pursue a career in senior management as their male colleagues, and wanting to start a family should not be tantamount to closing a door, demands Madu, vehemently. "Unfortunately, making the senior management of German companies more female hasn't worked in the past without political pressure. The proportion of women on the supervisory boards of German listed companies after the introduction of the gender quota rose from 27.4 percent in 2016 to 30.1 percent in 2017. It's questionable as to whether you can call that a success, because this rise wouldn't have happened if there hadn't been the threat of sanctions – so it's not a rise because more women are qualified, it's more of a forced increase in order to meet a quota," she says, clearly on a critical note. There is nonetheless one highly positive development: Some companies exceed statutory requirements by a long shot. This indicates that they have recognized the potential of female managers and promoted

women based on their capabilities. And there's one thing Louisa is absolutely convinced about: More women in senior management will lead to more opportunities for other women to follow suit.

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SUCCESSFUL SUCCESSION IN THE MAKING!

AFTER 30 YEARS, GÜNTER WILLMERDING IS CLOSING DOWN HIS STEINBEIS CENTER AFTER SUCCESSFULLY HANDING THE BATON TO JAKOB HÄCKH

The move to the new Steinbeis premises in Langenau (in the district of Alb-Danube) marks a successful transition to the next generation of center management as Prof. Dr.-Ing. Günter Willmerding hands on to Jakob Häckh. Every reason to look back (and forward) during a celebratory event and honor the achievements of Günter Willmerding with a Steinbeis award.

In 1988, Günter Willmerding founded a Steinbeis Transfer Center called New Technologies in Traffic Engineering. To retain the know-how gathered at the center in the long term, his successor Jakob Häckh also founded a Steinbeis Transfer Center as a collaborative startup in 2010. His center is called Traffic Engineering.Simulation.Software. The aim was to establish a long-term succession process and systematically transfer all know-how and resources from Willmerding's center to the new enterprise set up by Häckh.

This process has now come to a successful conclusion, also reflected by a Steinbeis Foundation Transfer Award – the Lohn Award – won in 2018 by Häckh and his colleagues alongside a team of experts at Daimler. After more than 30 successful years running his enterprise, Willmerding is now closing down his Steinbeis Transfer Center for New Technologies in Traffic Engineering. Despite this, he will continue to work on behalf of the Steinbeis Transfer Center for Traffic Engineering.Simulation.Software. His focus will lie in service life calculation, also on a scientific level, looking in more detail at the



Prof. Dr. Michael Auer (left) and Prof. Dr. Dr. h.c. mult. Johann Lohn (right) honor Prof. Dr.-Ing. Günter Willmerding with the Steinbeis Award

theory behind service life and advancements. Another area close to his heart is the series of winLIFE seminars, which he will continue to spearhead. This will ensure that for customers, the transition is more or less seamless. In essence, nothing should change for clients. All projects previously worked on by the transfer center will now be taken on by Häckh and his colleagues.

The reshuffle was celebrated in style on January 26. Guests at the event included current and former employees, PhD students, Prof. Dr. Michael Auer

(Chairman of the Steinbeis Foundation Board), and Prof. Dr. Dr. h.c. mult. Johann Lohn (former Chairman of the Steinbeis Foundation Board). Lohn and Auer presented the award to Günter Willmerding together. His center won the Steinbeis Foundation Transfer Award with the company Voith back in 2004. The award is bestowed in recognition of outstanding services to Steinbeis, for particularly successful projects, for a person's special character or underlying attitude, or even for acting as a role model.

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HESSIAN CLOTH WAS YESTERDAY: SUSTAINABLE FASHION AND FAIR PRODUCTION

STEINBEIS COACH HELPS STUTTGART BUSINESS FOUNDER TO SET UP HER OWN COMPANY

Introducing a new lingerie label from Stuttgart: Coco Malou – women’s underwear with an interesting difference. Produced according to fair trade principles in Europe, this lingerie is made from innovative wood fibers with an emphasis on feminine design. For every lingerie set sold, the startup will plant a tree in Zambia in Africa. Coco Malou was set up in November 2018 following a successful crowdfunding campaign through the online platform Startnext. It has now entered production. The new firm received hands-on support during the startup phase from the Steinbeis coaches Mario Buric and Doris Deichselberger.



CROWDFUNDING

The crowd is not some sort of anonymous body of users in the internet. It has to be uncovered in the immediate surroundings of campaign initiators. As a result, one of the most important tasks when preparing for a campaign is crowd-building. Another fundamental component of a campaign is communication planning. This captures which channels will be used to communicate through. Communication can be online or offline, through the social media, a company’s website or newsletter, the press, linear or non-linear (on demand) TV, or radio. A key principle is that less is more, since communication channels have to be fed with the right news at the right frequency. And it can be especially time-consuming generating your own content.

The time needed to prepare for a campaign generally depends on the crowd available, how much explanation a product or service requires, and the level of funding a startup is hoping to attract. The smaller the potential crowd, and the more explaining a solution needs, and the higher the envisaged amount of funding – the more energy will be needed and the longer the preparation time. Ideally, preparations should take six months.

2018 turned out to be the year of crowdfunding for many Stuttgart business founders and startups. In the summer, two startups – smoope and ello – successfully grabbed the attention of crowd investors. Buric also stood by them as a Steinbeis consultant. Both companies ran an amazing campaign which won over a large number of investors. smoope offers messaging-based communication infrastructures for companies and its campaign. It successfully convinced 501 investors to stump up €550,000. ello is an electric walking frame produced by the startup eMovements. Its campaign captured the imagination of 474 investors resulting in funding of €500,000.

Too “green,” too plain, not the right contours – Corinna Borucki spent years looking for fair trade lingerie that also looked good. But she searched in vain. So now she’s producing her dream lingerie herself under a label called Coco Malou. “The fashion industry is not just one of the muckiest in the world in terms of pollution, unfortunately it’s also extremely unfair,” says Borucki. Sustainability has been a heartfelt issue for the young entrepreneur for a long time. Borucki is committed to fair working conditions and wherever possible uses environmentally friendly, skin-friendly materials – first and foremost Tencel, which is made from wood. Tencel is a fiber extracted from wood and converted into a silky soft textile in a special circular production process. The textile can be processed using much lower volumes of water compared to other basic materials. It also performs excellently when it comes to wearing comfort. The fibers have antibacterial properties because they are good at absorbing and releasing moisture, which significantly inhibits the formation of bacteria.

Because Tencel is extracted from wood, for every set of lingerie it sells, Coco Malou gives a tree back to nature. Coco Malou works with an organization called WeForest to reduce its carbon footprint, support reforestation projects, fund jobs in Zambia, and create new habitats for wildlife. The startup is being backed by the Social Impact Lab in Stuttgart, which has been providing advice on the project and access to co-working facilities.

Support was provided by Doris Deichselberger, director of the Steinbeis Consulting Center for Change Management and Business Coaching. Deichselberger offered a wealth of experience in purchasing and online textile retailing to the innovative project. She advised Borucki on the buying strategy and range policy. “To make sure you’re in the best possible position to deliver and keep customers satisfied, and at the same time optimize stocks, the best approach

is to make sure you don’t use up all your resources at the beginning. This leaves you in a position to react quickly to individual customer needs,” explains Deichselberger. “Sustainability is an important topic that’s being asked about more and more by end customers.”

Mario Buric, a coach at Business Start-up (the Steinbeis Consulting Center), also helped set up the new business. He has been working with crowdfunding as a source of alternative financing since 2011, has set up his own online platform, has attracted a variety of leading events to Stuttgart, and he’s part of the “crowdfunding family” in Germany. He also advised Corinna Borucki as she prepared for her crowdfunding campaign. It didn’t take long to decide to focus first on the German platform Startnext, which is primarily targeted at Germany, Austria, and Switzerland. With a track record spanning 6,600 successful projects, over a million supporters, and more than €60 million in funds through the crowd, it was a clear-cut decision. To prepare for the campaign, Buric and Borucki turned the spotlight on the important topics: The target group, the campaign plan, thank-yous, and a communication plan. In November 2018, Coco Malou finally launched a crowdfunding campaign and within weeks it had already raised two thirds of its finances. In the meantime, the campaign has been successfully completed. Production got underway in early 2019 with a brand launch planned for May. Coco Malou also has its own online shop and sells through selected fair fashion stores. The idea is to offer women fair, sustainable, and fashionable clothing.

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To line up the best opportunities for startups to attract funding, a number of factors need to be considered. The process begins with working out how much capital will be required, considering the possible sources of capital, and drafting a workable funding concept. It’s important to find good advice, particularly when it comes to crowdfunding. This is where the Exi startup voucher program sponsored by the state of Baden-Wuerttemberg comes in. Under the program, up to eight hours of free advice are available in the form of short consultation sessions. These are followed by fast-track consultation sessions, for which the business founder makes a contribution of €160 per day of consulting. This allows entrepreneurs to benefit from the problem-solving skills of all Steinbeis consultants. Most crowdfunding campaigns are organized through specialist websites in the internet. For crowdfunding to work properly and the project to succeed, the usual approach is to define a minimum required value of funding before the campaign and the date by which it is required. It would be wrong to think that crowdfunding competes with other financing options. If anything, it’s a sensible complement to other approaches. “Launching the crowdfunding campaign was pretty emotional and time-consuming, because you have to prepare so much – from shooting a video to writing texts and organizing a shoot,” concludes Borucki, “but it was worth it. I managed to start the new year with successful funding!”

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MEDIATION – QUARTER I EDITION, 2019

Generations: How Our Inheritance Dictates Our Being
GERNOT BARTH, BERNHARD BÖHM (ed.)

→ WWW.STEINBEIS.DE/EN/SU/0941

Our society is multilayered, individual, and heterogeneous. Aside from gender differences, people are often differentiated from one another based on age. People to whom this happens at a similar time belong to the same generation. It is common to find that people who belong to one and the same generation have similar ideologies, desires, and visions. However, the overall population is composed of people from many different age groups. Nevertheless, the challenge for everyone is to work together and resolve conflicts as a community in order to shape society as positively as possible.

The Quarter I/2019 edition of the specialist magazine *Mediation* looks at “Generations,” examining what people actually mean when they refer to Generation X, Y, and Z, the role elder mediation can play in solving societal problems, and what defines responsible people management in a (working) world dictated by digital technology.



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MEDIATION – QUARTER II EDITION, 2019

The Power of Money
GERNOT BARTH, BERNHARD BÖHM (ed)

→ WWW.STEINBEIS.DE/EN/SU/0941

Money plays a major role in modern society. As an internationally accepted bartering tool, it is a basic prerequisite for every kind of business interaction and shapes the very existence of individuals, enterprises, and entire nations. Yet money affects the life of people in totally different ways. For some, it is the root of all evil. For others, it is a source of great joy. One reason for this is that the gulf between rich and poor has never been wider, and there is little sign that this will change.

The Quarter II/2019 edition of the specialist magazine *Mediation* looks at “The Power of Money,” examining how money came to exist in the first place, why money should be put aside for subsequent conflict resolution when building a house, and the extent to which money affects human behavior.



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THE 14TH SYMPOSIUM ON BUSINESS INTELLIGENCE

→ WWW.STEINBEIS.DE/EN/SU/0818

The Status Quo – Opportunities and Challenges

ANDREAS SEUFERT, PETER LEHMANN, KLAUS FREYBURGER, THOMAS BECKER (ed.)

Business Intelligence (BI) is increasingly developing into a critically important component of future-oriented strategic management. As a result, the Institute of Business Intelligence (IBI) conducts an annual stocktaking exercise by posing important questions in direct dialog with users, manufacturers, and university representatives. The IBI offers this symposium as a platform for sharing experiences.

The central topic of the event in 2018 was “Digital Transformation – Competitive Advantage Through Business Intelligence, AI, and Advanced Analytics.” The proceedings contained in this publication provide a summary of the presentation charts used by speakers at the symposium.



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TRANSPARENCY AND TRUST

→ WWW.STEINBEIS.DE/EN/SU/1274

How information sharing in annual reports influences trust among institutional donors.

BEATRICE MEYER

Charitable non-profit organizations are often partly funded by donations. Competition for donations has become more intense. In Switzerland, institutional donors make charitable donations of approximately 0.7 billion Swiss francs every year. Their decision-making is typically driven by rational considerations. Rational decisions are based on information; aside from donation requests, the annual report is a key source of information.

The author therefore investigates whether and how sharing information in an annual report has an impact on the extent to which an institutional donor trusts the organization it is supporting. She also examines whether trust has a positive impact on a donor's willingness to donate. Drawing on recent research, she uses this to derive certain hypotheses. These are then modeled by using partial least squares regression (PLS regression). The information used for this modeling was gathered in a survey of institutional donors. The author's hypotheses are largely confirmed. Drawing on the insights gained from her work, the author derives recommended actions for writers of annual reports.



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FREE

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A QUALIFICATION FRAMEWORK FOR ENGINEERING AND MANAGEMENT

→ WWW.STEINBEIS.DE/EN/SU/0273

THE INTERNATIONAL COUNCIL OF ACADEMIC DEPARTMENTS IN ENGINEERING AND MANAGEMENT (ICADEM), ASSOCIATION OF GERMAN INDUSTRIAL ENGINEERS (VWI) (ed.)

The specialist qualification framework for business engineering is used as a guideline and quality assurance instrument. The framework establishes the minimum standards that must be fulfilled by industrial engineering degrees at universities in German-speaking countries, and its aim is to provide orientation when developing and modifying curricula. Defining detailed minimum standards for weighting degree content is important in order to make clear distinctions between other degree concepts, based on the need to ensure that a degree in interdisciplinary business engineering and management comes with a “seal of quality” – confirmation that opens the door to excellent career opportunities for all graduates.

PREVIEW

EDITION 02|2019

Feature topic: Industry X.0

Planned publication date: late September 2019

The 4.0 phenomenon that originated in manufacturing has spread out into a variety of sectors of industry and is now affecting the manual trades, retailing, local authorities, healthcare, the energy industry, and other sectors. Topics that transcend all sectors such as working practices, training, and knowledge transfer are a core ingredient of the changes being fueled by digital technology. Not only are the principles the same, this trend is breaking down traditional barriers and causing hitherto separate areas to converge. It is this interplay and convergence that is reflected in the term Industry 4.0. But it's a development that is continuing and now becoming "Industry X.0". In the next issue of TRANSFER, you can find out what is behind this phenomenon, as well as the challenges and opportunities it is creating for companies.



SCHEDULE OF EVENTS

Our Steinbeis events for specialists are an opportunity for experts from the fields of science, academia, and business to discuss current issues relating to business competence, engineering, and consulting.

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→ [STEINBEIS.DE/ONLINEVERTEILER](https://www.steinbeis.de/onlineverteiler)

STEINBEIS ENGINEERING DAY

May 8, 2019 | Sparkassenakademie Baden-Wuerttemberg, Stuttgart

MAX SYRBE SYMPOSIUM

June 25, 2019 | Stuttgart Literaturhaus

STEINBEIS DAY

September 27, 2019 | Stuttgart Hospitalhof

STEINBEIS COMPETENCE DAY

December 5, 2019

For further information, go to [WWW.STEINBEIS.DE/VERANSTALTUNGEN](https://www.steinbeis.de/veranstaltungen).

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