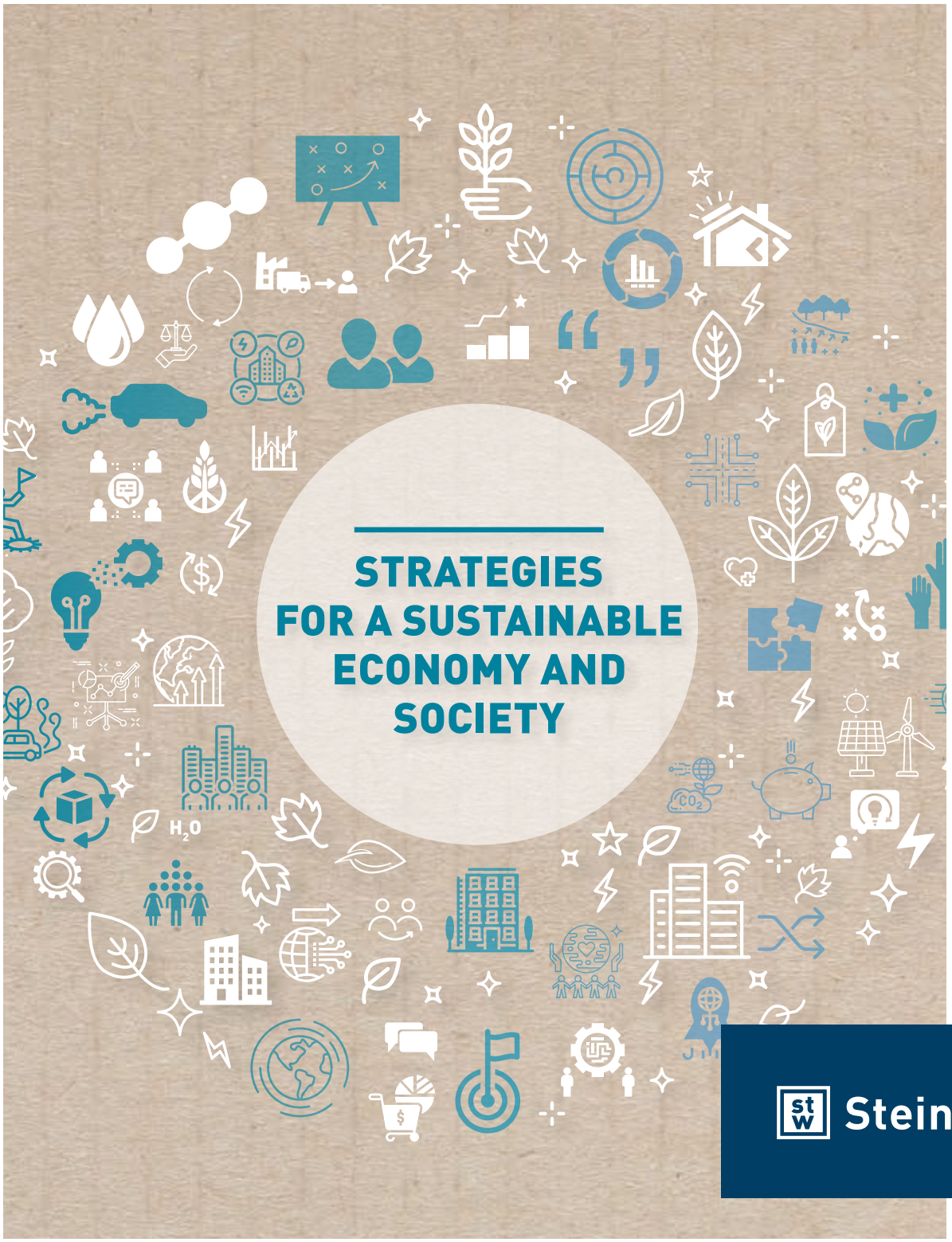
TRANSFER

THE STEINBEIS MAGAZINE **02|21**



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DEAR READERS,

This edition of TRANSFER Magazine focuses on the strategies of a sustainable economy and society – and thus probably the most pressing challenge faced by society, for example in areas such as climate change. Steinbeis enterprises have long recognized the importance of this topic – which is nothing new – and have aligned their focus and activities accordingly. But more recent developments, such as the tragic extreme weather that hit the southern and western regions of Germany, clearly demonstrate to society as a whole that what is needed now is joint action. Sustainability is one of those topics that transcend many areas – not just the three pillars of the environment, the economy, and socio-cultural factors, but all specialist disciplines. As such – whether from an economic, technical, or scientific perspective – it can drive the necessary transformation processes for the required infrastructures.

The transportation transition, the green energy transition, the raw materials transition – words we see in headlines, but they need to be underpinned by strategies and implementation concepts. When you are transferring and sharing technology, this means being able to understand and control complex systems. Let's take modern travel solutions – mobility – as an example: We know that mobility has a significant contribution to make to climate protection, but it also has a major influence on the structures of human settlement. The discussion surrounding electric vehicles and alternative fuels is entirely necessary; but without further consideration – for example, when it comes to changing travel patterns, adapted infrastructures, or further developments in IT systems – it does not go far enough. And ultimately there is also the question of financial viability.

This is just a brief assessment, but one thing it clearly shows is the scope of tasks ahead of us and the complex solutions that are required. The developments we are witnessing may be menacing, but these tasks offer myriad opportunities and possibilities to come up with potential solutions and continue to develop and operate sustainable business models in the future. These processes of transformation will not be easy if we want to establish an economy and society that is sustainable. Transformation also entails saying goodbye to things we have cherished and being open to a future that enables current and, above all, future generations to live in an environment worth living in.

The articles in this edition of TRANSFER magazine show clearly that the projects worked on in the Steinbeis Network have long been tackling the challenges facing society, and that they have the potential to provide us not only with strategic courses of action but also detailed solutions to individual problems. We are on the right path, but we must also remember that a much longer stretch of the journey still lies ahead. The tasks that await us are diverse and touch on many areas – so let us continue on this path with all our might.

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STRATEGIES FOR A SUSTAINABLE ECONOMY AND SOCIETY

A sustainably oriented **ECONOMY** and **SOCIETY** lay a foundation for ensuring future **GENERATIONS** can enjoy a **FUTURE** worth living in. So far, so good. That is the **IDEAL**. But do we currently have the right strategic concepts to adapt and develop in economic, environmental, and social terms? Clearly, we do, according to the Steinbeis authors we talked to at **TRANSFER** magazine. But we face a **PANOPLY** of challenges: the green energy transition, citizen participation initiatives, climate-friendly cities, sustainable teamwork at companies. These are complex **CHALLENGES**, for which synergies between science, business, and society in general now offer some promising **POTENTIAL SOLUTIONS**.

SECTOR COUPLING: THE NEXT STEP IN THE GREEN ENERGY TRANSITION ("ENERGIEWENDE")

VIABLE CONCEPTS OF THE FUTURE NECESSITATE A HOLISTIC APPROACH TO ENERGY MARKETS

Although many are unaware of this, in Germany the energy system transition to alternative energy sources "Energiewende" began as a solution to climate issues more than 30 years ago. For 20 of those years, Steinbeis Professor Dr. Zbigniew Antoni Styczynski has been working on this topic alongside, among others, his former professorial chair at Otto von Guericke University Magdeburg. The issue of climate change is returning with a vengeance to social and political debate and, says Styczynski, it's high time to initiate a phase of "sector coupling."

The energy transition extends over several phases, the last of which should lead to the complete replacement of fossil fuels. In Germany, options will therefore need to be found to answer increased demand for electricity and chemical energy carriers – green hydrogen – through imports from countries offering greater potential to generate wind and solar energy. By the time this phase finishes, the task of transforming energy provision – as an overall energy supply system – should also be completed.

The projected time needed for the energy transition – roughly 80 years – is comparable to the time it took to build the electricity supply system, which started with the first, simple systems in the 1880s and neared completion with the advanced systems introduced in the 1960s. This once again highlights the significance of current endeavors.

The current discussion in society is entirely necessary, and it is important that the energy transition is seen as a global challenge. In other words, all countries will have to pull in the same direction, even if their starting positions could scarcely be more divergent. In many countries, there are simply not sufficiently high living standards to even start thinking about the energy transition. The Human Development Index (HDI), a benchmark system widely used to gauge achievements in key areas, is based on three groups of indicators: life expectancy, education, and gross domestic product (GDP). These are broken down specifically into life expectancy at birth, adult literacy, mean years of schooling, and GDP per capita. The index is published along with a variety of additional economic, social, and political data in the annual reports of the United Nations Development Programme.

HIGH LEVELS OF ENERGY CONSUMPTION DO NOT EQUATE TO PROSPERITY

"If you compare the HDI with energy consumption per capita, you see a direct correlation between the two values: High energy consumption – up to about 100 GJ per capita per year – is already linked to high HDI levels, but further rises in per capita energy consumption don't necessarily equate to an increase in HDI," explains Styczynski. For example, at 0.94 the HDI for Germany (maximum value 1.0) is significantly better than that for Saudi Arabia (0.83).

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But despite this, Saudi Arabia has more than twice the per capita energy consumption of Germany. Nevertheless, the countries with energy consumption levels below 100 GJ per capita are home to the vast majority of the global population. "That's why it's particularly important to push ahead with the green energy transition in the industrialized nations. After massive expansions in renewable energy generation, it's time to initiate a phase of sector coupling," asserts Styczynski.

THE ROLE OF SECTOR COUPLING IN BROADENING HORIZONS

Sector coupling is basically shorthand for the many things that need to happen throughout the economy in the coming years to make everything sustainable and resilient. As such, it points to the networking of different sectors of the energy industry based on the shared goal of slashing fossil fuel use. Now that the term "Energiewende" has become established as the German buzzword for "generating energy from renewables," sector coupling can be understood as extending and transferring this concept to the entire energy industry.

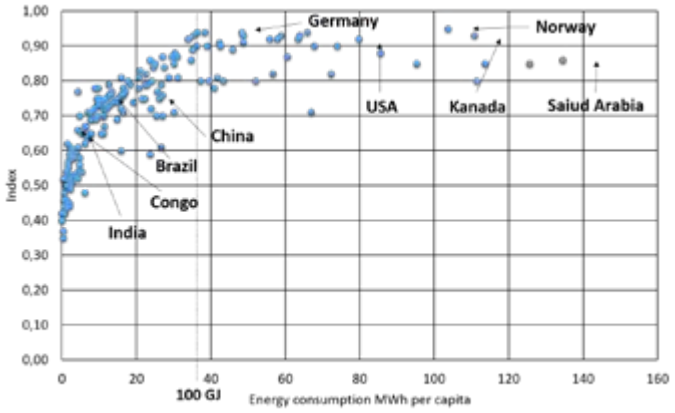
As far as generating electricity is concerned, there can be no doubting that it is possible to base systems exclusively on renewable energy sources. There are already numerous examples showing that by cleverly managing electricity grids, it is possible to integrate renewables 100% into systems, without compromising grid stability and the reliability of electricity supplies. Given plans to phase out nuclear power by 2022 and the decision to phase out coal-fired power generation by 2035 at the latest, it is therefore time to think about all sectors of the energy market, and not just electricity. How will they operate if 100% of energy is supplied as renewable electricity? Or perhaps more importantly, is that even possible? Which other sources of primary energy will be needed to sustain advanced human travel and industrial infrastructures? To answer these and other questions, systematic studies are needed.

There are a large number of national research institutions that have already been conducting such studies for some time, including the German Academy of Science and Engineering (acatech) and the German Energy Agency (Dena). The German Association of Energy and

Water Industries (BDEW) and international organizations such as Cigré (Conseil International des Grands Réseaux Électriques) and the European Network of Transmission System Operators for Electricity (ENTSO-E) focus on different points in their assessments, but clearly point to promising times ahead under a sustainable system. The studies also use mathematical modeling to validate the plausibility of their findings.

THE GREEN ENERGY TRANSITION REQUIRES SPECIALISTS

"One thing we've noticed in recent years is that many approaches to the energy transition are pretty much oven-ready right now, such as electric vehicles, but others, like the hydrogen economy, still require a lot of time and effort. Engineers and other specialists will be needed in these new areas, and in turn this will require new training formats and completely new degree disciplines," says Styczynski, highlighting another aspect of the energy transition. For example, for many years training to work at power plants revolved heavily around the fundamentals of coal power generation and nuclear power plants. These days, such topics are only looked at briefly from a historical perspective. Instruction now focuses on systems powered by wind, photovoltaics, and biogas. To keep up the momentum of this development, Styczynski and his Steinbeis Enterprise, Power Systems and Renewable Energy Resources (ENRE), have devoted the past five years to training the next generation of specialists, also working alongside project partners on a number of specialist publications on the issues faced during the energy transition.



Prosperity index versus annual energy consumption per capita. Source: BP 2019

Zbigniew Antoni Styczynski is the author of several specialist books on the energy system transition (published by Springer Verlag). His most recent publication, part of a series on "Energy in Science, Technology, the Economy and Society," is titled (German Edition 2021, English Edition announced for 2022):

Sector Coupling – The Energy-Sustainable Economy of the Future.

In this book, Styczynski & coauthors outline technical approaches and examine the debate currently witnessed in society from a technical standpoint with the aim of fostering a deeper understanding of the topic, not only among students but also in society in general.

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THE PATH TO SUSTAINABILITY – CHALLENGING, BUT THERE'S NO ALTERNATIVE

THE FUTURE OF OUR PLANET DEPENDS ON STRUCTURAL, TECHNOLOGICAL, AND GEOPOLITICAL CHANGE

In 1992, the Brundtland Commission, named after its chair, former Norwegian Prime Minister Gro Harlem Brundtland, created a term that is still very much in trend today. It came up in Rio de Janeiro during a United Nations Conference on Environment and Development. The commission presented a strategy paper on "sustainable development" at all levels of society. A concept of sustainability was born and defined in a manner that inspired many: Sustainable development is development that encompasses social, economic, and environmental concerns, meeting the needs of the present without compromising the ability of future generations to meet their own needs. Steinbeis expert Prof. Dr.-Ing. Ferdinand Panik outlines the challenges this involves.

The commission described the path to sustainability as both simple and challenging, showing that it would be necessary to switch to the use of renewable energy and climate-neutral recycling processes. In view of the extensive technological and structural changes this involved, initially the Brundtland model gained little acceptance. This has changed in recent years. Companies have recognized that making the required technology shift leads to a variety of opportunities. The global competition to occupy pole position in key technologies is in full swing, especially in the energy and automotive industries. And – more quickly than expected – this will lead to emission-free, highly efficient, and climate-neutral systems and products. At the latest, this could be within one or two decades.

STRUCTURAL CHANGE AND GEOPOLITICAL CHALLENGES

The shift that will probably be more difficult and more protracted will be structural change within public communities. New systems are needed, not just for generating and importing energy, but also for building the required distribution networks, including comprehensive networks of charging stations. And this is all against a background of complex approval processes and the need to gain buy-in from members of the public. This is ignoring a key issue: What funds will be available, and how will everything be financed? Germany will only continue to develop as an industrial nation if it safeguards the success of traditional technologies for as long as possible and thus secures the monetary resources required to bring about structural change. At the same time, it will need to introduce new technologies in order to lay a foundation for sustainable industrial development.

All of this is taking place against a backdrop of intense global competition, involving not only the traditional industrialized nations, but also economies in emerging regions, which are moving into the fast lane by entering into new fields of technology – without having to worry about established structures. Germany has very limited resources when it comes to sustainable energy (solar, hydro and wind power) as well as the raw materials this type of energy requires. Aside from structural and technological change, another force is looming on the horizon: geopolitical change. But if change is dealt with together – and wisely – there should be hope and help for many poorer regions. Instead of exploiting raw materials, it will be important to complete key parts of the value chains in the countries of origin.

Furthermore, most of these countries have an abundance of solar energy, wind energy, or hydropower, so investments must be made in technologies such as machinery for producing and processing hydrogen. Geopolitical change is probably the biggest challenge we face, but arguably it's the most important step in implementing strategies that will genuinely establish a sustainable economy and society.

SUSTAINABLE DEVELOPMENT OF THE ECONOMY AND SOCIETY

One key issue when planning sustainable economic structures is how to share the benefits among different economies involved in restructuring processes. Initial deliberations regarding supplies in Baden-Wuerttemberg point to a number of ways forward. Baden-Wuerttemberg is a highly industrialized state, and it will continue to depend on energy imports in the future. The Rhine Valley plays a crucial role in this. Many goods and commodities are transported into the area – by rail, road,

pipeline, or barge – from the major transhipment ports on the Rhine estuary, from where they are forwarded to the southwest of Germany.

The Port of Rotterdam is considered a gateway for energy supplies in Western Europe – 8,800 petajoules of energy are shipped in and out of the port every year. Over the past five years, intensive work has been underway with shipping customers to convert the port of Rotterdam into a hydrogen hub. The aim is to be able to transport 20 million tons of hydrogen annually by 2040/50. Potential customers along the Rhine River, but also overseas producers and exporters of green hydrogen, have been included in this plan. It is an ambitious goal, but the idea is to make the Rhine corridor a carbon-free area. The first step for the project partners will be to push ahead with the construction of hydrogen production on sites along the Rhine between Rotterdam and Cologne. Capacity should hit 1,950 metric tons of hydrogen by 2025. By 2030, the cost of imported hydrogen is expected to be just over €2 per kilo. This should be the kilo price on arrival in Rotterdam, compared to roughly €3/kg for hydrogen produced in Europe using offshore wind power from the Netherlands. The energy source will be ammonia, transported from overseas by ship. The transportation costs, including the process for converting hydrogen into ammonia and back again, are included in the delivery price of €0.50 to €0.60 per kilo of hydrogen.

Most of this imported hydrogen undergoes further processing in the manufacturing sector. Earlier this year, the energy company Enertrag published figures on anticipated annual sales: fertilizers – €80bn; aircraft fuel – €500bn; transatlantic shipping – €259bn; steel production – €1,500. No comparable volumes are expected in the automotive area before 2035.

What would happen if investments were made now in industrial facilities in African or South American countries to produce fertilizers, or synthetic fuels for airplanes and cargo ships, or if investments were made in steel processing plants? This would significantly raise value creation in producing countries, thus contributing to the develop-

IT WILL BE NECESSARY TO SWITCH TO THE USE OF RENEWABLE ENERGY AND CLIMATE-NEUTRAL RECYCLING PROCESSES

ment of long-term economic structures. It would certainly also reduce overall costs, partly by replacing expensive hydrogen transportation in traditional ocean carriers.

This is similarly applicable to the exploitation of raw materials. Lithium mining in the Andes and cobalt extraction in Central Africa should go hand in hand with investments in manufacturing and recycling facilities for battery components, fuel cells, and electrolyzers. Instead of becoming outraged about child labor in the mines of countries supplying raw materials, investments would provide the means to set up training programs and create jobs, which are in short supply in these regions. This would become an important step in creating a sustainable economy and social structures – worldwide. It is important to include recycling in this process, because most raw material reserves are finite, so as far as possible this should remain the responsibility of producing countries in order to secure long-term supplies of raw materials from their regions.

REGIONAL CONCEPTS BASED ON A SUSTAINABLE HYDROGEN ECONOMY

The cost of hydrogen produced in Baden-Wuerttemberg largely depends on the price of electrical power required for electrolysis. Electricity prices are significantly higher in Baden-Wuerttemberg than in sun-rich importing countries. To nonetheless remain competitive, it will be important to establish smart networks for using energy in the form of sector coupling. The EGS, a Steinbeis Transfer Center based in Stuttgart, has been working on successful projects in this area, including a housing development in the Weststadt district of Esslingen, which is being operated profitably with the aim of becoming climate-neutral and energy-efficient. Electricity is supplied in two ways: Photovoltaic systems have been fitted on the roofs of apartment blocks, and purchasing is managed carefully to access low-price electricity from the grid during off-peak periods. Cogeneration plays a particularly important role in this initiative. Using electrolysis to produce hydrogen delivers an energy efficiency of between 60 and 80%. Thermal energy generated by the process is fed into the heating network of the apartment complex. Hydrogen is an effective way to store electrical energy in the long term, and whenever required, fuel cells can be used to convert it back into electricity. It also offers sector coupling options for mobile applications, such as supplying charging stations used for fuel cell vehicles. Prices start to become competitive in this sector at €4 per kilo of hydrogen. Although work on the project in Esslingen has not yet been completed, the pioneering support provided by the Steinbeis experts in Stuttgart is already paying off in the form of follow-on contracts from the state and federal government. The goal is to continue to drive sustainable developments in the region.

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For further information on the open discussion and instructional guides, visit the project website:
https://balticsmartcity.com/

SMART AND CLIMATE-FRIENDLY CITIES IN A WORLD OF CHANGE

STEINBEIS EXPERTS SUPPORT THE EUROPEAN CLIMATE INITIATIVE (EUKI)

The "smart city" concept offers a vision of urban life in the future. Based on this concept, an increasing number of cities are now developing and testing "smart" solutions, which they later plan to implement on a broader scale. As part of a project called the Baltic Dialogue Platform on Smart Cities for Climate Protection, Technology Management Northeast, the Steinbeis Research Center, has also been helping identify solutions for the cities of the future.

The long-term goal of the EU is to achieve climate neutrality by 2050. This entails achieving net zero carbon emissions (UNFCCC 2020) and will involve a number of big changes for cities, since they are major contributors to climate change. Currently, they emit around 70% of global greenhouse gases due to their energy consumption.[1] To develop and promote climate-friendly and smart cities, but also to hit the EU's climate targets, it will be crucial to share know-how, exchange examples of good practice, and expand capacity in order to transform the sustainability of municipal infrastructures against a backdrop of digital transformation. To this end, a German-Baltic Dialogue Platform was established in 2020, supported by the European Climate Initiative (EUKI).[2] The overall objective of the EUKI is to promote climate cooperation within the European Union (EU) in order to reduce greenhouse gas emissions.

Five partners from four countries participated in the Baltic Dialogue Platform on Smart Cities for Climate Protection project: Kaunas University of Technology (KTU) from Lithuania, the Riga Energy Agency (REA) from Latvia, the Tartu Regional Energy Agency (TREA) from Estonia, adelphi (which was responsible for project management), and Technology Management Northeast, the Steinbeis Research Center from Germany. Several rounds of open discussion were organized for the more than 345 participants and roughly 50 speakers to examine a number of key topics relating to smart city developments aimed at supporting climate protection. A Steinbeis team led by Frank Graage moderated the entire program of dialog sessions, also arranging lines of contact with other stakeholders.

FOUR RECOMMENDATIONS FOR A CLIMATE-FRIENDLY SMART CITY

The findings are pulled together in four recommendations.[3] These are primarily aimed at municipal authorities that are yet to introduce measures supporting climate-friendly smart cities and are interested in implementing climate protection and smart city concepts in their own city. The recommendations are:

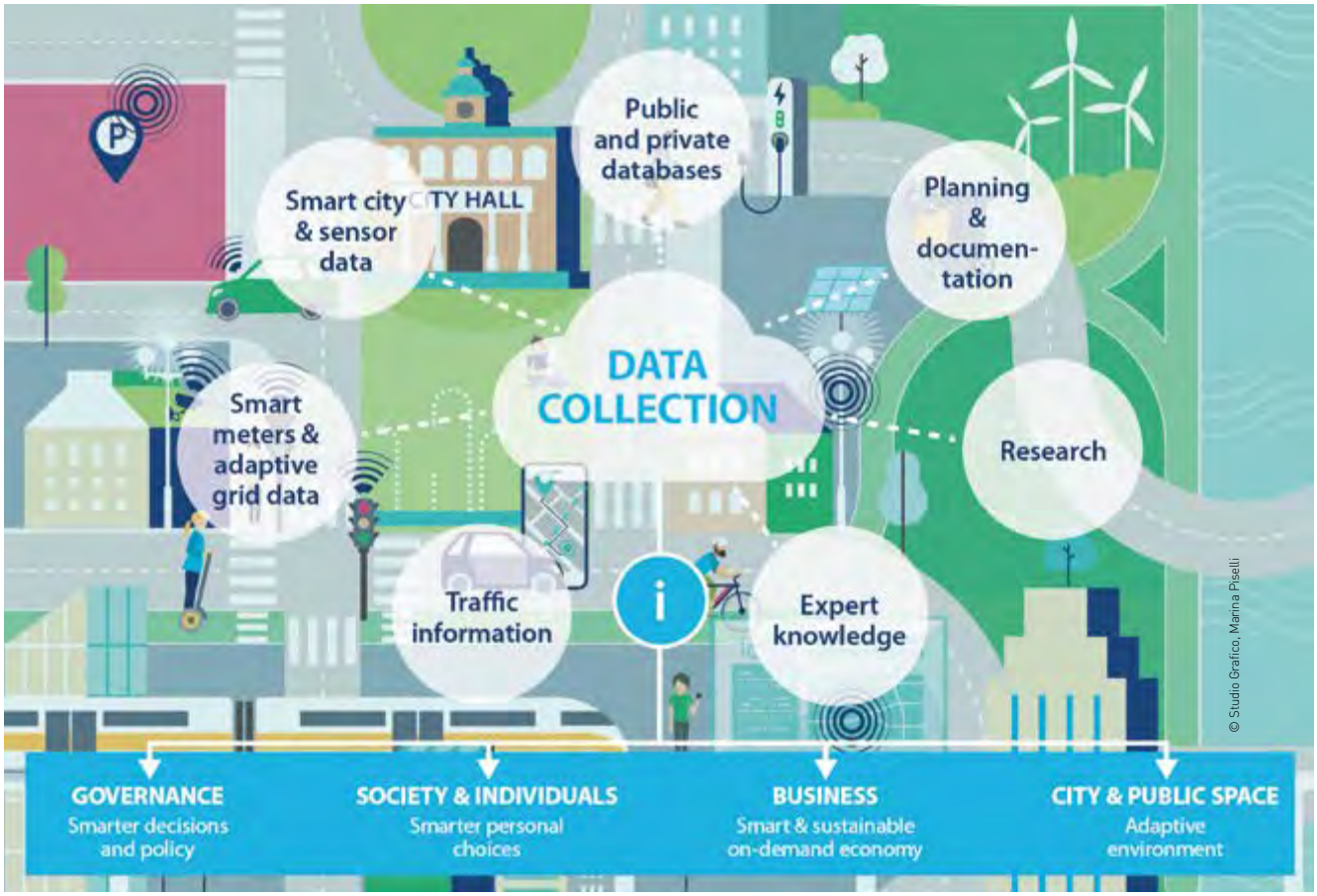
1. Integration of the smart city concept in sustainable urban development and the climate protection measures of cities

The smart city concept should be compatible with urban development goals, the Paris Climate Goals and the Sustainable Development Goals. Cities should set ambitious climate change targets and tackle the main sources of greenhouse gases, such as transportation, heating, and power generation. Ideally, reducing greenhouse gases should not only focus on how emissions are produced, e.g. emissions within a city, but also take into account any emissions that are generated elsewhere in order for a city to consume resources.[4] It is important to minimize impacts on the climate now and not postpone action, as this is the only way to make our cities climate-friendly.

2. Emphasis on climate change mitigation: determination of appropriate processes in cities and integration of climate protection within all phases of smart city development

Climate protection necessitates effective processes and should be an integral part of all phases of smart city development – during planning, project implementation, and repeat projects.

The planning phase typically involves developing visions, future scenarios, strategies, and action plans. It is crucial to analyze a city's environmental and climate footprint and understand where it currently stands when it comes to becoming a smart city. By the end of the planning phase, a dedicated smart city strategic action plan should be in



place taking future developments into account.

Throughout the project cycle, projects will be aligned with climate and urban sustainability goals and the resulting action plan. Projects should undergo climate assessments during the planning phase:

- Do solutions contribute to achieving the defined goals?
- Could there be potentially positive climate effects?
- Do solutions match other infrastructures in the city, and are they integrated into these infrastructures?
- Are there comparable solutions with smaller or similar environmental footprints, or a similar impact on the city?

Two of the most important measures when it comes to gauging progress versus action plans and, if necessary, making adjustments, are continuous monitoring of smart city projects and conducting evaluations. Ideally, a city-wide monitoring and evaluation system should be put in place in such a way that it integrates key climate and environmental indicators. For example, evaluations can track electricity consumption, heating energy, or fuel required for transportation.

3. Environmental protection on a digital level – making climate change data freely available and procurement of sustainable digital technology

Digitech is an essential element of many smart city solutions. In most cases, solutions are based on specially programmed software, sometimes from open sources – such as car-sharing apps or platforms that allow inhabitants to submit their own ideas for making the city more sustainable.

To offer such digital options, information needs to be absorbed and processed and this information should also be made freely available.

This is based on the principle of open data, which emphasizes the public availability of and free access to important information. It is not enough to simply publish data on public websites, however. Instead, making proper use of open data entails improving digital literacy and interacting with potential users.

A key goal of smart solutions is enhanced efficiency, especially in the areas of transportation and energy. However, research on the climate impact of digital solutions shows that there are so-called rebound effects and that stress shifts to different areas. If ignored, these can counteract such efficiencies.

4. Development of a city-wide network – involvement of all key stakeholders in the development of a climate-friendly smart city

To expand the information and communication infrastructure required to use digital technologies and in order to produce and test hardware and software, municipal authorities rely on a variety of approaches to public-private partnerships. Identifying new partnership models involving other stakeholders – such as service providers, partners with certain know-how, members of the public, or contractors – provides a framework for authorities to develop new services that test the boundaries between the public and private sectors. This is important, because climate-friendly urban development needs to ensure everyone is involved.

PLANS FOR GERMANY AND THE BALTIC REGION

The results, plus experiences with the Baltic Dialogue Platform on Smart Cities for Climate Protection, have laid a foundation for moving to the next level of exchange between different stakeholders. The plan now is to offer educational concepts and options for training municipal experts and smart city stakeholders, who should then bridge the gap between theory and practice. They should play a lynch-pin role between pioneers in this area and interested city representatives.

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[1] Fong et al. 2014: 7.
[2] Das Projekt ist Teil der Europäischen Klimaschutzinitiative (www.euki.de) des Bundesministeriums für Umwelt, Naturschutz und nukleare Sicherheit (BMU).
[3] Die Empfehlungen sind entnommen aus Keppner et al. (2021): Building smart and climate friendly cities in a changing world. Policy recommendations.
[4] Consumption-based emissions accounting; Harris et al. 2020.
[5] Walnum et al 2014: 9511.

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SUSTAINABILITY MUST BE LIVED OUT AND BELIEVED IN

THE IMPORTANCE OF SUSTAINABLE DEVELOPMENT FOR THE FUTURE OF COMPANIES

Sustainable development means holding on to a future that is worth living. It is therefore more than just a mega-trend of the 21st century. It will secure the very survival of humanity – not just to vegetate as a gene pool, but to safeguard human culture. Sustainability is becoming more and more important for companies, too – whether out of personal conviction, or worries regarding the future, due to pressure from customers or politicians, or fueled by a desire to convey a positive image among clients or (future) employees. For almost thirty years, Steinbeis Entrepreneur Professor Dr. Ulrich Holzbaur has been working on the approaches towards sustainability and knows their various positive impacts for companies.

Even when the Steinbeis Transfer Center for Applied Management had just been set up, Ulrich Holzbaur and his colleagues found themselves working on sustainability issues. With the topic gaining increasing importance in recent years on a variety of fronts, this focus has paid dividends and the Steinbeis Enterprise can now look back to many years of experience and acquired know-how in consulting clients and delivering projects in this area.

SUSTAINABLE DEVELOPMENT – EVERYBODY'S RESPONSIBILITY

Sustainable development extends beyond the temporal and spatial dimensions of our individual lives. As a result, it is worth every effort for people and companies to think more about this topic in the here and now. Ethical considerations also play an important role in this area, because sustainability is about individuals and organizations "doing the right thing" and taking responsibility. Ethical factors should be an integral part of the actions we take, in order to do justice to mounting public pressure. Every individual member of society should think about the things they can do to make the future more liveable for the generations to follow.

From a company standpoint, sustainable development often goes hand in hand with corporate social responsibility (CSR), reflecting the voluntary contributions made by companies to sustainability, over and beyond complying with statutory regulations. But it is about more than just social commitment; CSR takes into account all social activities and factors, including the impacts of decisions made by companies. Society, the global economy, and international value chains have undergone sweeping changes over the last 18 months, especially given the impact of the coronavirus pandemic.

MANAGEMENT MUST BE READY FOR SUSTAINABILITY

To promote sustainability within a company, one has to evaluate how the company thinks and acts. The Steinbeis Transfer Center for Applied Management helps clients to identify potential starting points, develop strategies, introduce systems for managing environmental and sustainability issues, and optimize processes.

Formulating and implementing a sustainability strategy is about much more than just honing your image. It has to be lived out and believed in. Even if operating sustainably has a positive influence on your image, environmentally friendly policies that promote the preservation of resources also offer the potential to improve business performance. Saving resources in the long term promotes sustainable success and, for example, compensates for rising energy costs. Showing that you are committed to sustainability helps companies with their activities in public areas, boosting team motivation and making it easier to attract qualified workers. To leverage the benefits of sustainability, the management of a company must be prepared to reflect on their own attitudes, to make them concrete, and to promote sustainable action within the company. But it is not only the managers of a company that are in a position to make valuable contributions to sustainable development,

Elements of ISO standard 26000, which provides guidelines on social responsibility

for example through the company vision. Workers are also able to add particular value through everyday actions by focusing on sustainable practices.

Depending on the company and its goals, a number of structural arrangements can be adopted to achieve this. For example, if a company is seeking direction it can look at how it interacts with society, its natural environment, and culture in general; it can use the pillars of sustainability, DIN standard ISO 26000 (which offers guidelines on taking social responsibility); or it can examine how it organizes processes to assess its carbon footprint. The German Education for Sustainable Development (BNE) program also offers a useful template for international training campaigns aimed at empowering individuals to think and act with the future in mind and take economic, ecological, and social factors into consideration. As well as imparting factual knowledge, the BNE program offers training on the values and skills that enable individuals to think with the horizon in mind, to take personal responsibility for their actions, to assume social responsibility, and to acquire interdisciplinary know-how. The aim of the education campaign is to provide individuals – including managers and their co-workers – with the competences they require to play an active role in shaping the future and taking responsibility.

ENGENDERING SUSTAINABLE THINKING WITHIN THE COMPANY

To foster a closer understanding of sustainability, companies can use experiential methods in the form of business simulations. Simulations offer a playful approach to showing employees how they can transfer sustainable development to their area of work. Events revolving around sustainability can be organized in a number of ways, and it is useful to make sustainability tangible, to arouse interest in the topic, and to motivate people – not only internally, but also when it comes to customers and other stakeholders.

SUSTAINABILITY SECURES THE FUTURE

One of the aims of sustainability is to be prepared for the future, to be in a position to satisfy the needs of future generations. As such, there are scientific, technical, normative, and ethical aspects to sustainable development, and in addition to its multifarious potential to fuel conflict, it also offers a variety of potential solutions to different problems. As Ulrich Holzbaur and his team know from experience, implementing sustainable development within companies requires a structured approach revolving around the goals and the given situation faced by every company and its managers. As the Steinbeis Entrepreneur emphasizes: "It's important to create awareness for this topic, because sustainability offers a whole raft of benefits – it enhances corporate image, there's potential to cut costs, and you bolster customer loyalty and staff motivation. Last but not least, and this is the crucial point, the company makes its own contribution to creating a livable future."

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"SELLING NO LONGER WORKS THESE DAYS WITHOUT SUSTAINABILITY"

AN INTERVIEW WITH PROFESSOR DR. RAINER ELSTE AND FRANZ SPEER OF THE SALES AND MARKETING INSTITUTE (VMI), A STEINBEIS CONSULTING CENTER

For companies and society in general, it is crucial to become truly sustainable. The entire value chain must be made sustainable, starting with raw materials and finishing with the end consumer. In this interview with TRANSFER magazine, we asked Professor Dr. Rainer Elste and Franz Speer of the Sales and Marketing Institute (VMI) about the role of sales and marketing in this context. Both marketing and sales experts, they explain how sales and marketing have to adapt when it comes to sustainability, the role of pricing in this context, and why all stakeholders should invest in this transformation exercise.

Hello Professor Elste, Hello Mr. Speer. People primarily think about resources and raw materials or even manufacturing when you ask them about sustainability, but your focus lies in the sustainability of sales and marketing. Can you tell us more about this?

Franz Speer:
You have to think sustainability holistically, about all stages of the value chain. One key factor in achieving the global sustainability goals will be to make consumption more sustainable. To , there are three sets of questions. The first is: What do we consume? This is about the raw materials that end up in finished products, sustainability in production, the social circumstances under which products are made, the length of transportation routes, and how products are designed to meet the criteria of the circular economy. The second set of questions deals with how we sell. A lot of the topics have to do with B2B relationships between producers and their customers, so that's mostly manufacturing companies and retailers. Retail and industry have to think about logistical issues, such as making optimal use of trucks, reusing shipping cases, and, in addition, questions relating to category management, i.e. planning sales assortments, shelf designs, etc. The last set of questions is about what we communicate and how we dispose of products. This covers important issues such as "green communication," nudging (which is about stimulating consumers to change habits), and how goods are disposed of at the end of the product life cycle. As you can imagine, the sales department plays a crucial role in this, since it identifies the client needs, it translates these into required internal actions, and finally – working with the client – it proposes and works out concrete solutions for the consumer.

Rainer Elste:
A particular challenge still lies in pricing. Some leading retail chains have already discovered the advantage of conducting market research with consumers and they say they'd be willing to pay more for sustainable products, but in reality they decide differently. Lidl tried only offering fair-trade bananas, but they lost a huge amount of market share to other discounters. As a result, they had to go back to offering cheap bananas. For consumers, it's difficult to make sustainable decisions. Here's an example from one of our consulting projects: If a supplier of plastic films provides something like a film for fresh cucumbers, it gets brand-

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ed as unsustainable. But compared to an unwrapped product, the packaging significantly lengthens the shelf life of the cucumber. So if the cucumbers were offered without packaging, consumers would always have to consume the fresh produce immediately, in line with the quantity available. Under normal circumstances that makes things a bit difficult, unless you're willing to find the shelves empty. Also, in terms of the environmental footprint, destroying a cucumber is even worse than disposing of the film.

In what ways can companies, but also their customers, benefit from sustainable sales and marketing solutions?

Franz Speer:
Selling no longer works these days without . In concrete terms, there are three ways customers can derive benefit from sustainable selling: The first is low product footprints when it comes to material use, such as using recyclates, but also in terms of energy use in production as well asstandards. The second is about lower carbon emissions in logistics. And the third is about sustainable consumption by creating less waste, not wasting food, and using circular economy processes such as circular packaging solutions.

Rainer Elste:
As far as sustainable marketing is concerned, it's essential to be in greenwashing, i.e. don't try to hide things behind a fig leaf of sustainability. Consumer organizations, the press, but also switched-on consumers soon find out what you're up to; then the boomerang comes flying right back to you and your credibility suffers. If, however, a company is able to manage its sustainability properly, it can still turn this into a competitive advantage. Why do I say "still?" Because for the foreseeable future, sustainability will be the new normal in some industries or price ranges. It shows you're clean, and those that lag behind will lose. It's much more difficult to sell sustainability in classic B2B marketing, where international competitors fight over every cent for commodities, by which I mean goods that are easily interchangeable.

Franz Speer:
Some time ago, the United Nations Environment Programme issued some useful guidelines on communicating sustainability. They're worth reading.

Sustainable selling requires a change in thinking, not just on a management level but also in the workforce. What do you think will be the biggest challenge in context?

Franz Speer:
People have already started to rethink things because of political pressure, which is also a result of the EU Green Deal. But also, we've already reached the point whereby most products and services wouldn't be marketable if they didn't meet minimum sustainability criteria. Selling already underwent a rethink a number of years ago, because clients – including retail customers – were already raising sustainability issues and pushing them. The biggest challenge in my view is giving staff appropriate training so they know, understand, and are able to talk about relevant sustainability issues. But also companies are realizing that it's not enough to have your own sustainability strategy, your strategy has to be challenged and, if necessary, adjusted as part of the relationships you enter into with customers and . And the last thing I'd like to mention is the challenge of balancing out the three pillars of sustainability – ecology, business, and social issues.

ONE KEY FACTOR IN ACHIEVING GLOBAL SUSTAINABILITY GOALS WILL BE TO MAKE CONSUMPTION MORE SUSTAINABLE

Rainer Elste:
I think this is where things overlap with corporate social responsibility. Companies don't have to translate investments in sustainability into like-for-like profits just because senior management sees things that way. In any case, a variety of studies have shown that young professionals are attaching increasing importance to this issue. So a firm's ability to do business more sustainably can be a differentiating factor in the "war for talent."

What other services do you offer customers to help them sell sustainably?

Franz Speer:
The Sales and Marketing Institute has developed a four-step approach for making sustainability an enshrined aspect not just of sales, but also of marketing. The first step involves getting to know relevant stakeholders and understanding their sustainability strategies. In the second steps, you pinpoint sustainability issues at each stage of the value chain and assess their relevance. Thirdly, you conduct a risk assessment of the company's business model. Last but not least, you work out marketing and sales solutions focusing on product packaging, logistics, category management, marketing, and waste disposal.

Rainer Elste:
In addition to that, we also conduct market research with and on behalf of our customers to better understand their perception of sustainability and identify price acceptance and approaches to sustainability. We create strategies, tools, and finally also guidelines on selling arguments, which can also be particularly useful for medium-sized companies and companies in industrial markets. We've been working with the Vogel Media Group on the development of an open seminar, which we warmly recommend to anyone interested in these issues.

How important are collaborative consulting services from networks such as the Steinbeis Consulting Group for Marketing & Sales?

Franz Speer:
Consulting services offered by company networks are extremely important if you want to offer customers all kinds of solutions they require on this complex topic. You can't have all competences in house when you're a small consulting firm, but a network allows you to remain adaptable and responsive to all kinds of potential requests. Also, every consulting project is different. That's why we believe in the networking approach, and our Steinbeis Consulting Group – Marketing & Sales – means we have excellent partners for almost any kind of topic.

Rainer Elste:
Absolutely. We have some experienced experts in the Steinbeis network, specialized in a variety of detailed areas – from PR, to tendering for business, and even highly specific selling practices.

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"COSTS DON'T RISE – IF ANYTHING, THE OPPOSITE TENDS TO HAPPEN"

AN INTERVIEW WITH STEINBEIS ENTREPRENEUR AND LOGISTICS EXPERT JENS-JOCHEN ROTH


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In logistics, there are often only two things that really count: speed and low costs. Can this doctrine, despite everything, take us along a path of sustainability? In an interview with TRANSFER magazine, Jens-Jochen Roth, Steinbeis Entrepreneur at two Steinbeis Centers for Logistics and Sustainability, says yes – it can.

Hello Mr. Roth. Every day, your work involves a combination of logistics and sustainability. What does this entail for you in concrete terms?

The term "sustainable logistics" sounds a bit clunky at first and people like to use the term for image purposes. But if you look more closely into the subject, implementing logistics solutions that are based on sustainability principles opens the door to a whole host of different ways to look at things. Combining sustainability and its three main pillars – environmental, economic, and social factors – with logistics offers companies a number of starting points for differentiating themselves from other market players, and this also opens up new markets. Key to this are the people who take action. The bedrock of my work is supporting those people with the right tools. And the key to that is sensitizing people and providing the right training. In terms of the main topics this touches on, one priority is to ensure the different modes of transportation dovetail and network efficiently with one another – the carbon footprint.

Your Steinbeis enterprise has been helping customers with logistics and sustainability issues since 2010. To what extent has awareness changed during this time – and with that, the issues your customers face?

Shipping and logistics companies attach greater importance to sustainable management these days. This is partly because an increasing number of potential customers turn to them for sustainable logistics solutions, but it's also due to the fact that logistics service providers are now actively looking into ways to make logistics services sustainable – they're already virtually considered standard. Also, innovations happening in vehicle technology are helping to ensure that sustainability becomes more established in all parts of a company.

Digital transformation is everywhere now. What opportunities does digitalization offer to sustainable logistics?

Digital transformation offers a multitude of opportunities to proactively push sustainable logistics. So for example, it would be impossible to imagine the logistics industry today without tracking and tracing. The term Logistics 5.0 is now used to describe the networking and integration of logistics processes inside and outside companies and production facilities, right through to the decentralized real-time control of logistics networks. Digital transformation, especially when it comes to networking logistics processes, makes things more transparent within process chains, so it enhances supply chain management.

And the last, but perhaps key question for both companies and end users: Does more sustainability in logistics lead to higher costs – so higher prices?

The transportation and logistics industry is subject to constant change. It's the interface between consignors and consignees, so its job is to set up efficient transportation channels and ensure as much use as possible is made of vehicle capacities. And that's the key point: Costs don't rise – if anything, the opposite tends to happen. That's not just good for logistics, but also for the end consumer.

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HOW THE CIRCULAR ECONOMY BOOSTS INNOVATION AND SUSTAINABILITY

INTRODUCING CIRCULAR FLOW CONCEPTS TO THE ECONOMY

Sustainability, digitalization, and resilience play a pivotal role in driving transformation – not only in the economy, but in society overall. If anything, the current pandemic has accelerated this process. The issue of sustainability now transcends all areas of technology and is receiving growing attention within the context of the goals laid down under the European Green Deal, as are the opportunities offered by the circular economy. The Steinbeis Europa Zentrum is tackling these challenges and is currently involved in a number of projects aimed at creating new value chains.

A circular economy focuses on the value of products, materials, and resources with the aim of preserving them for as long as possible. The fewer products we throw away and the more we return to the cycle of usable products, the less material has to be reclaimed. This is also good for our environment and supply chains, offering major potential and opportunities to innovate and develop new business models. The Steinbeis Europa Zentrum currently demonstrates the circular economy potential with three projects.

RECYCLING RARE EARTH ELEMENTS

Many hi-tech products – but also everyday systems such as washing machines and heating pumps – use permanent magnets based on rare earth metals. Although these can be mined in Germany, the majority of these elements have to be imported. Extracting materials has an enormous impact on the environment and entails a number of complex processes. Processing ores extracted from surface mines results in the production of large quantities of problematic waste such as alkalis, acids, and radioactive by-products. China virtually holds a market monopoly in this area and with almost no environmental regulations in place, Chinese companies have been allowed to extract materials without competition, a source of concern for European industry. To bolster the European market, in the fall of 2020 the EU established the European Raw Materials Alliance (ERMA). Its priority is to secure raw materials for permanent magnets. The ERMA plans to improve the reliability of magnetic material supplies through strategic collaboration with more dependable partners such as Canada and Australia. It is also focusing on recycling the 20,000 metric tons of permanent magnets currently in circulation in the European market.

Pforzheim University is making an important contribution to this initiative as part of an EU project called SUSMAG-PRO. Professor Dr. Carlo Burkhardt of the Institute of Strategic Technology and Precious Metals is working with

The RECLAIM concept for modernizing and re-engineering large industrial machinery and equipment

the Steinbeis Europa Zentrum and 16 other European partners from science and industry to develop a recycling supply chain for rare earth magnets. This project involves a shorter recycling system that uses a patented HPMS process to embrittle and pulverize magnetic materials (HPMS stands for hydrogen processing of magnetic scrap). Powders can be directly reprocessed into magnets, resulting in energy savings of over 90% compared to primary production and 98% lower levels of toxicity. By 2024, the aim is to be in a position to recycle 110 tons of magnetic waste per year at four pilot plants in Sweden, the UK, Slovenia, and Germany. Among others, this will benefit offshore wind farms, electric cars, and water pumps. By systematically recycling components with a high magnetic content, it should be possible to achieve recycling rates of 15-25% in the medium term. The initiative is receiving around €13 million of funding from the EU. Of this, €3.4 million will go to the state of Baden-Wuerttemberg, where it will be invested at Pforzheim University, the ZF Group, the Steinbeis Europa Zentrum, and MIMPlus Technologies.

The Steinbeis Europa Zentrum is helping with scientific coordination of the project, also taking care of the European network of research and innovation stakeholders and extensive PR work. In addition to developing and assessing commercialization models, it will also provide support on sharing and disseminating research results.

THE CIRCULAR ECONOMY IN INDUSTRIAL MANUFACTURING

Companies involved in industrial manufacturing also need circular economy strategies. Manufacturing plays a key role in innovation and growth in Europe, since outdated machinery and unplanned downtime can cause significant losses. To help in this area, as part of an EU-funded project called RECLAIM, the Steinbeis Europa Zentrum is working with a consortium of researchers and industrial enterprises from nine countries. One of those companies is Harms & Wende, based in Hamburg and Karlsruhe. The aim is to reduce the obsolescence of industrial plants and strengthen the economy and the environment. By digitally retrofitting machinery, malfunctions and production downtime can be prevented, also improving net energy and material consumption. The EU is providing around €13 million of funding for the project, which involves 22 partner companies. The focus of the project lies in the use of digital analytics, the internet of things (IoT), and circular economy strategies in order to improve maintenance procedures and modernize aging machinery.

At the heart of the technology lies a novel decision-support concept that can be used to manage optimum modernization and the reconditioning of large machines and robotic systems. The concept is based on IoT sensors and innovative forecasting and process optimization techniques, the aim of which is to extend machine life and thus raise productivity. The solution combines fog computing and augmented reality techniques with condition monitoring and fault diagnosis methods to improve material use, energy efficiency, and maintenance options. As one of five pilot sites, Harms & Wende will test the application in welding technology. Other sectors of industry involved in the project include timber processing (Switzerland), textiles (Turkey), robots (Slovenia), white goods (Czech Republic), and shoe production (Spain). At all sites, great attention is being given to close collaboration with industry to develop technologies based on a bottom-up approach.

The responsibility of the Steinbeis Europa Zentrum as a partner in the project is to make optimum use of the re-

Magnet recycling using hydrogen in the patented HPMS process

sults and nurture synergies with national and European projects and initiatives, such as the European Factories of the Future Association for Research (EFFRA).

LIGHTWEIGHT COMPONENTS FOR ELECTRIC VEHICLES

Because electric cars are powered by heavy batteries, automotive manufacturers and their suppliers have to compensate for the extra weight by finding new lightweight vehicle components. Such components can contribute directly to vehicle efficiency – not only in terms of energy consumption per kilometre and vehicle range, but they can also help alleviate environmental impacts. For this reason, the LEVIS project, which is receiving EU funding worth €4.9 million, is working on the development of cost-efficient lightweight components for electric vehicles.

The Steinbeis Europa Zentrum is also involved in this project, supporting 12 industrial and research partners from six countries in the development of lightweight components for electric vehicles using eco-design and circular approaches. Three demonstrators will be used to validate the technical and economic feasibility, and prove the reduction of environmental impacts. These demonstrators are a suspension control arm, a battery holding set, and a cross-car beam. To do this, multi-material solutions based on thermoplastic composites made from carbon fibers will be used. The idea is to identify the best way to integrate this multi-material solutions into metals and to manufacture them using cost-effective and scalable production techniques.

Circular design plays an important role in the project as recyclable resins and biologically produced carbon fibres will be used to manufacture the target components. In addition, the component life will be maximized and all structural parts will be designed to allow easy and effective disassembly and reuse. The aim is to launch these innovative electric vehicle components by the end of the project. The Steinbeis Europa Zentrum is responsible for the commercialization aspects and sharing project results.

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"IT'S KEY TO RAISE AWARENESS OF THIS ISSUE AMONG MEMBERS OF THE PUBLIC, POLITICS, AND INDUSTRY"

AN INTERVIEW WITH MAËVA PRATLONG, PROJECT MANAGER FOR RESOURCE EFFICIENCY AND CLOSED LOOP RECYCLING

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Hello Ms. Pratlong. The circular economy concept is not exactly anything new, so why is it suddenly receiving so much attention?

There is growing awareness at the moment that raw materials are not inexhaustible, and sometimes they're difficult to get hold of – for example when extraction and processing are difficult for environmental or social reasons, or when a country virtually has a monopoly and uses it to exert political pressure. We see further obstacles coming if prices become exorbitant, if war breaks out in a country producing materials, or if a pandemic interrupts supply chains. The circular economy points to a number of ways to deal with these problems. First, by extending the service life of products as much as possible – for example by making them easier to repair, or improving their repairability, or by augmenting reutilization levels, but also by promoting recycling, for example by making it more attractive to collect waste. Another way to do this is to record raw material volumes and capture how they're used at each stage of the value chain, regardless of the number of stakeholders and their locations, for example by using digital technology. It's also important to maximize the reuse of by-products, waste, and material residues created by processing raw materials at each stage of the value chain.

What can companies – but also society as a whole – do to derive benefit from the circular economy?

The circular economy makes an important contribution to more dependable supplies and the robustness of our value chains. At the same time, it dovetails with the principles of sustainability and inclusion. It helps rethink our structures – by which I mean buildings, cities, industrial zones, commercial areas, or supply chains – in order to bring about a strong symbiosis when it comes to using resources. It creates new jobs and professions. And it helps enhance our capacity to provide training and retraining. It also allows new business models to develop in such a way that they enable companies to introduce their own sustainable processes and products, and thus remain competitive. In some cases, the circular economy even makes it possible to succeed in new markets or sectors, or it creates access to new private, public, or participatory sources of funding based on strong, long-term criteria.

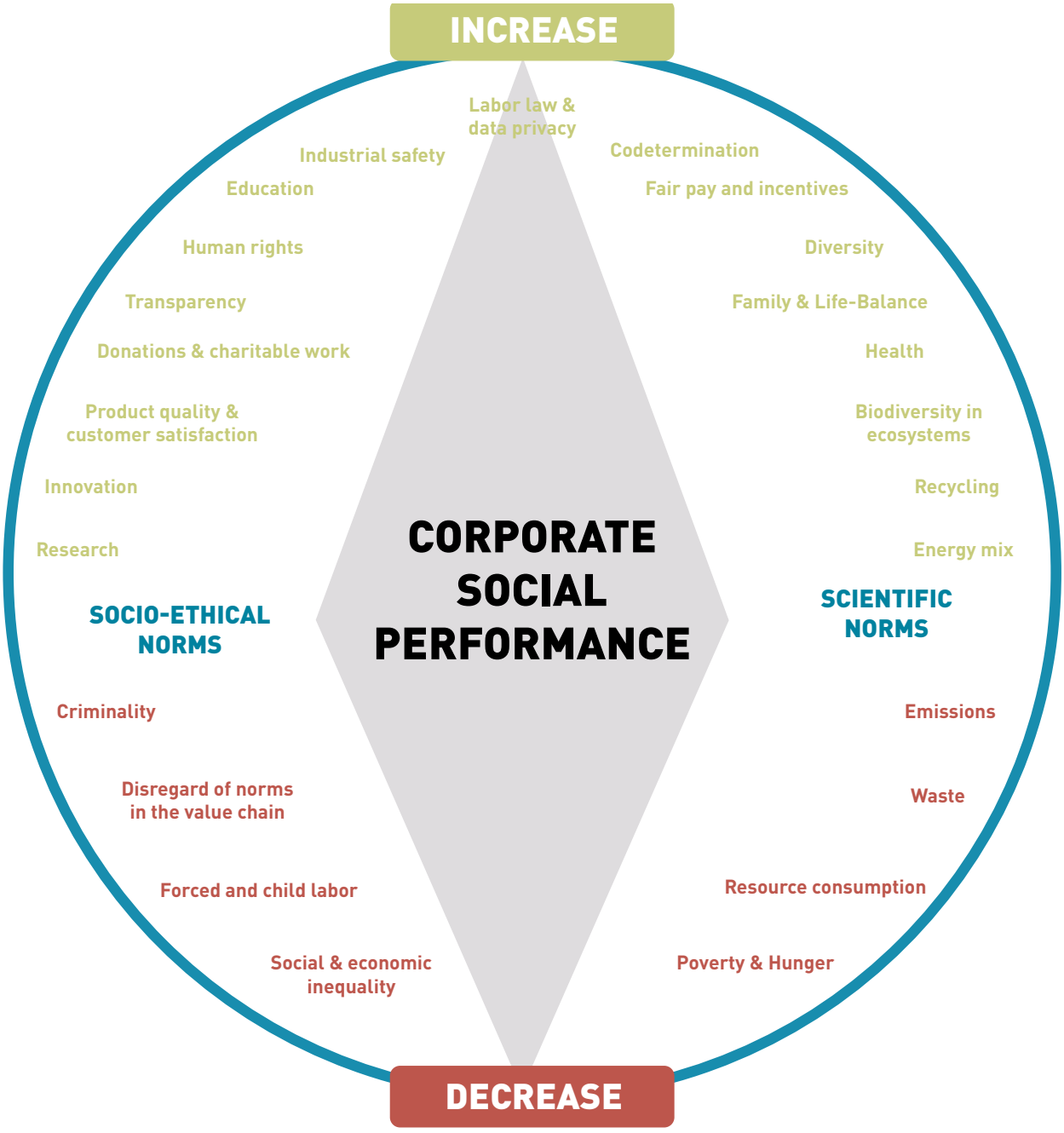
Among other things, you're working on the circular economy of rare earth metals. What are the biggest challenges in this area?

Rare earth metals are recognized in all parts of the world as critical materials, not because they're genuinely rare, but because they're difficult to get hold of. We already use them in a variety of strategic areas, such as renewable energy, defense, telecommunications, and aerospace, but also in everyday products. I'm currently involved in the SUSMAGPRO project, which focuses on the recovery and reuse of rare earth metals used to manufacture permanent magnets, such as neodymium and dysprosium. Presently, European production of rare earth-based permanent magnets covers less than 10% of European demand. The production and processing of these rare earth materials takes place almost exclusively in China, and most magnet production has followed this trend.

Recycling rates in this area in Europe are extremely low – less than 1% – and there are a variety of reasons for this. I'd say the biggest challenges we face right now are that it's difficult to trace materials; that it's difficult to pool spent rare earth metals in quantities that make it attractive to recover them from an economic standpoint; and that there aren't enough eco-design options, i.e. not enough things are designed to be recycled. We're tackling these challenges as part of the SUSMAGPRO project, and we're already working on further ways to establish more sustainable and robust value chains for permanent magnets in Europe. One thing that's key is to raise awareness of this issue among members of the public, politics, and industry.

A NAVIGATION SYSTEM FOR CORPORATE SOCIAL RESPONSIBILITY

STEINBEIS EXPERTS HELP CREATE A RADAR SYSTEM THAT ALLOWS COMPANIES TO IMPROVE HOW THEY MANAGE THEIR CONTRIBUTIONS TO SOCIETY



The rising cost of climate change, increasingly tighter requirements laid down by legislators, and higher expectations from investors – these demands all highlight the role sustainable action plays as a guiding principle of modern times. Many people have high expectations of companies, which now consider sustainability an established key success factor for their strategies. Small and medium-sized enterprises are particularly likely to struggle in this area. How can they translate social responsibility into measurable, actionable goals? It's known that ignoring sustainability poses a risk to your reputation, but in a number of ways the regulations – which are complex and difficult to fathom – depend on voluntary action. A team of specialists at zeb/business.school, the Steinbeis Transfer Institute, has joined forces with experts at zeb management consulting and the Funk Foundation to develop a system that will help companies systematically work out targets for required areas of action, each underpinned by KPIs that will be accepted by regulatory authorities and investors.

Ignoring public expectations poses a major risk to any business. On April 18, 2017, the German CSR Directive Implementation Act (CSR-RUG) came into effect, laying down comprehensive reporting demands with respect to corporate social responsibility (CSR). These now affect all companies with an average annual workforce of 500 people or more and a capital market orientation, activities in banking, or insurance business.

This poses a number of challenges for companies. On the one hand, there is still a great deal of uncertainty regarding definitions and meanings. For example, where is the demarcation line between sustainability and CSR? Is sustainability more to do with environmental protection and cutting greenhouse emissions? Yet there are no uniform statutory regulations that go beyond the CSR-RUG. Instead, it is entirely up to companies as to which of the many guidelines, guiding principles, codices, policies, official seals, or ratings they wish to use in order to break down their responsibilities as a company into measurable and manageable goals. Most KPIs and parameters are expressed as rigid frameworks, and the different elements within those frameworks generally stand alongside one another, seemingly unconnected. In addition, they are often not broken down into tangible measures or mutual interdependencies.

CSR AND SUSTAINABILITY – WHAT'S THE DIFFERENCE?

Sustainability refers to the ability of an economic or ecological system to regenerate itself and thus maintain its existence in the long term without overall systems breaking down. Safeguarding sustainability is thus a task for society as a whole and something businesses can only contribute to. CSR refers to the extent to which a company takes responsibility for the impacts of its actions on society and acknowledges societal norms. When companies fail to meet the entirely justifiable expectations of society, they risk losing access to resources – for example clients and suppliers will walk away from them, or there will be public scandals that harm their reputation.

USING THE CSP RADAR TO GAIN A BETTER OVERVIEW

Funded and closely supported by the Funk Foundation, the experts at the Steinbeis Transfer Institute zeb/business.school are currently developing a radar for corporate social performance: the CSP Radar. The Steinbeis experts use CSP to refer to the difference between assuming corporate social responsibility (CSR) and assuming corporate social irresponsibility, which they call CSI. For instance, a firm may choose to invest in social projects but still be paying bribes to industrial clients. The factors shown on the radar have not simply been positioned next to each other, they overlap and influence each other. For example, a technical innovation could offer improved energy efficiency and simultaneously reduce greenhouse emissions and resource consumption.

One problem with available guidelines and performance indicators is that the factors they are based on appear to have unavoidably been chosen at random. "We try to solve this problem with AI-based text analysis. By using computers to sift through different topics – so-called topic modeling – we've pulled together and categorized nearly 4,000 pages of relevant sources for describing sustainability and ESG standards," explains Steinbeis expert Professor Dr. Joachim Hasebrook. Based on the

WHAT'S THE DIFFERENCE BETWEEN SUSTAINABILITY AND CSR?

quantity of hits and matches, a number of key concepts were identified before being whittled down to those that relate to specific corporate action. To do this, all concepts were extracted that, for example, correlate strongly with terms like activity, measure, aim, performance indicator, etc. The project team also interviewed experts at the Funk Foundation and Steinbeis University to filter over 260 actionable concepts down to 26 core areas of action, which can also be clearly described and assessed in measurable terms. These were summarized on a radar screen that allows companies to plan courses of action.

The process was underpinned by an evaluation of existing key indicators used to measure CSR and environmental social governance (ESG) – such as the ratings used by all DAX 30 companies and the guidelines of the European Banking Authority (EBA). Overall, more than 300 key indicators were examined. Out of this information, the project team identified 70 KPIs, which were then categorized according to different areas of action. The CSP Radar thus helps companies navigate the jungle of different specialist terms when it comes to sustainability and concepts such as CSR, CSP, and ESG. It also enables firms to determine goals based on specific actions, and these can also be managed by using the KPIs.

SIMULATION AND SYSTEM DEVELOPMENT

The identified areas of action and corresponding KPIs are currently being modeled with the help of an AI simulation method that takes into account 26 areas of action, 70 KPIs, and more than 600 correlations between different factors. This will be used to ascertain the effectiveness of different areas of action in the short, medium, and long term. The process also involves understanding influences that mutually amplify or even hamper one another over time. Based on these methods, areas of action can be identified with strong influences on each other, such as resource consumption and greenhouse emissions.

The ultimate goal is to produce a tool that works via a standard browser or app and to provide user access to the areas of action, complete with KPIs and explanations. This will make it possible to establish the CSP status of individual companies and use scorecards to produce structured reports.

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"THERE'LL BE COLOSSAL CHANGE!"

AN INTERVIEW WITH PROF. DR. MARIO SCHMIDT OF THE STEINBEIS TRANSFER CENTER FOR MARKETING, LOGISTICS, AND COMPANY PLANNING AT PFORZHEIM UNIVERSITY

Sustainability, industrial ecology, the circular economy, resource efficiency – topics that occupy many a day for the Steinbeis expert Professor Dr. Mario Schmidt. In a recent interview with TRANSFER magazine, he talked about these topics and highlighted why sustainability is not possible without efficiency – and why it is important to put good thought into changes on the horizon.

Hello Professor Schmidt. You work in the field of industrial ecology. Could you start by explaining what's so special about this topic?

The term was first used in the United States, but it's not really known in Germany. We look at the metabolism of our industrial society. The issues we deal with are which materials and sources of energy are needed by production and consumers, what kind of emissions and waste this causes, and how this should be evaluated from an ecological standpoint. A number of methods, software tools, and databases have been developed in recent decades, some of which we also helped develop and now teach to students in special courses at Pforzheim University. We're also thinking about ways to place less

WHAT CAN WE DO – ESPECIALLY AT COMPANIES – TO REDUCE THE BURDEN ON THE ENVIRONMENT?

strain on the environment, especially by companies. Our special feature is that we do not talk vaguely about sustainability, as is usually the case, but we focus on quantitative aspects. For us, facts and figures count.

How important are the circular economy and resource efficiency to this?

Resource efficiency looks at two things. On the one hand, we'll still need products and services, because our economy and society revolve around them. But on the other, we want to achieve this by using as few natural resources as possible and making a contribution to sustainability. This is also how we formulated it in VDI Guideline 4800, which covers resource efficiency. In environmentalist circles, people are quick to discredit efficiency. Yet sustainability is inconceivable without efficiency – anything else would be wasting things, which is no use to anyone.

As far as circular economy is concerned, that term has now entered common usage. The idea is to highlight that these days it's not just recycling that counts – in Germany it was still the central idea of the waste management in the 1980s and 1990s. There are other factors, too, such as reduce, reuse, repair, or refurbish. It really is an important strategy, probably the most important of all aside from the energy transition, and it will bring about substantial change in our society and the way we go about business.

But we have to be careful. I'm not a fan of the battle cry you hear about "closing the loop." I'm too much of a scientist to go down that route, and I know it's simply nonsense. You get to a certain level of recycling whereby the collection and processing costs go off the end of the scale. And the same happens in terms of environmental impacts! The outcome is then more negative than the primary extraction of raw materials from mines.

But aren't the raw materials on Earth finite? Shouldn't we be trying to keep everything going round and round again?

Well, if you look at the facts, it's just narrative, or it's even a myth, something that was important to get the global environmental movement off the ground. But it can't be substantiated. I know of no real geological scarcities – anywhere. The bottlenecks are man-made, caused by geopolitical or economic factors. What worries me more are the social and environmental conditions of mining. But they can be improved. Extracting raw materials – metals, construction minerals, but also biotic substances – accounts for half of all global greenhouse emissions.

So where do you see the biggest obstacles when it comes to the circular economy, not just in business but also in society?

A bit like the energy transition or climate protection, it's mainly a pricing problem. Primary raw materials are too cheap; secondary materials are expensive.

Of course this is something that has to be regulated on a global level, which is why individual states struggle in an interconnected global economy. But also, everyone's blinded by the "end-of-history illusion." People think nothing will change much in the future. But that's a huge misapprehension. There'll be colossal change.

What do you think can be done to overcome these obstacles?

The key is to think about these things early on, to be bold and step forward – so if you're a company, be one of the trendsetters; don't get left behind as one of the trend-followers. We're currently seeing an explosion in the number of people asking what companies' carbon footprints are like. React too slowly and you end up in difficult terrain versus the competition, because doing the sums on the climate impact of your actions will soon be standard practice.

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THE MULTIFACETED NATURE OF SUSTAINABLE DEVELOPMENT

THE CLICHES OF ENVIRONMENTALISM HAVE LONG GIVEN WAY TO ACCEPTANCE THAT IT DOES OFFER VALUE TO THE ECONOMY AND SOCIETY

In the 1980s, sustainability – especially environmental sustainability – was often considered tantamount to making sacrifices. Views have changed considerably since then, and it is now accepted that sustainable practices are needed in very different areas of the economy and society. In fact things have gone even further, such that know-how in the field of sustainability management is equated with competitive advantage. Widespread coverage in the media – not least fueled by climate change, environmental disasters, and the 2030 Agenda – is a testament to just how urgent sustainability now is for society and the economy. Nicole Weber-Kaiser has been working alongside the Steinbeis Consulting Center for Sales Analytics as a freelance project manager to highlight the potential that lies in achieving sustainability.

Thinking first about the word sustainability, the United Nations does not talk about sustainability as something like a status that can be achieved, it refers to sustainable development. It does this to highlight that we are on a journey. Because business forms a link between people's purchasing decisions and the consequences of their decisions for the environment and society, companies have a strong influence on our rate of progress when it comes to sustainable development.

THE CHALLENGES OF SUSTAINABLE DEVELOPMENT

The challenges we face as a society can be broken down into four areas:

- **The ecological challenge:** The gap between, on the one hand, us as human beings, and on the other, nature all around us – and how we treat other living beings, crops, food, and finite resources – must be bridged in order to form a closer connection.
- **The socioeconomic and economic challenge:** This is about bridging the gap between each one of us as individuals and others around us, but it is also about our responsibility to others, for example by reducing deprivation in areas like education and public participation, by closing the gender pay gap, or by developing sustainable economic and financial systems.
- **The health challenge:** This involves shifting the emphasis away from physically and mentally disadvantaged individuals to move toward healthier individuals, for example by consciously addressing physical and mental ailments.
- **The spiritual challenge:** This sets out more open approaches to the search for meaning – as distanced as possible from dogma, religious influence, and esotericism. Essential aspects of this include mindfulness, an awareness of our interconnectedness with all beings, genuine presence, and deeper inner peace. These are also issues with a bearing on companies and the economy.

We will find sustainable solutions not by considering these four challenges in isolation, but by understanding their underlying interdependencies. In parallel to this, there is a further, three-pronged challenge posed by sustainability: On the one hand, it is important to appreciate individuality and diversity by respecting people's freedom and uniqueness. Moreover, we will need to develop a collective sense of responsibility such that it does not result in unilateral dictation or even coercion. And finally, we must all acknowledge and accept that things long held as certainties began breaking down many years ago.

ADOPTING AN INTEGRAL APPROACH TO LAY A FOUNDATION FOR SUSTAINABLE DEVELOPMENT

One method that lends itself to sustainable development in society and the economy is to adopt an integral approach. This concept, which began to gain momentum during the last decade, is basically a model for systematically understanding and explaining the world we live in. One thing that makes it special is its integral approach to life and its focus on life-friendly and practical ideas. In other words, it's not just "pie in the sky."

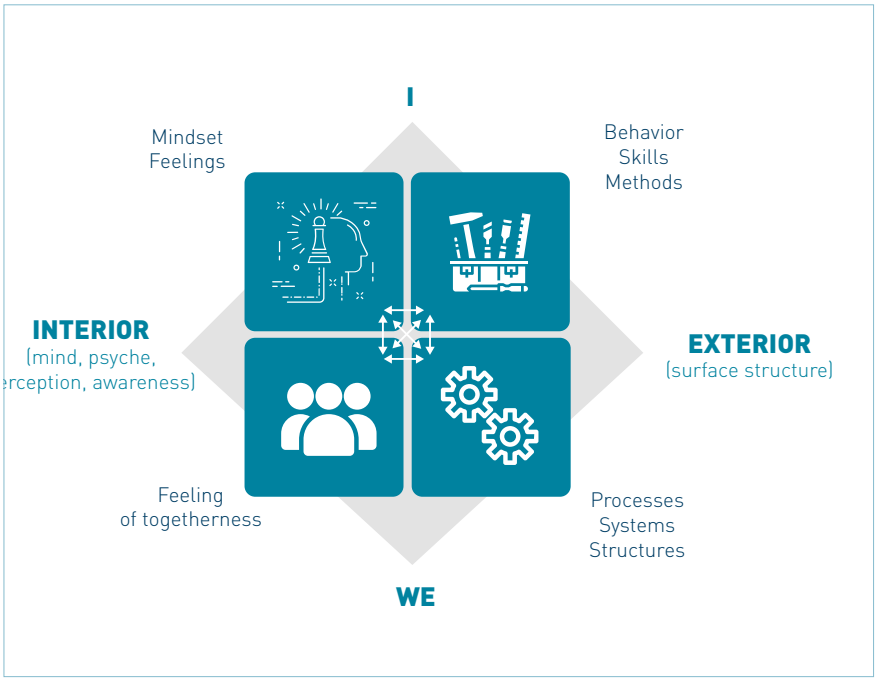
As an approach, it has already found its way into various fields of modern life – including consulting – and is being applied to everyday practice. Experience in areas and disciplines where this approach has already been applied shows that the model makes it possible to reorganize things more comprehensively, effectively, and efficiently. An important pioneer of this method, known as Integral Theory, is the American author Ken Wilber.

Integral Theory is based on four dimensions, or quadrants, which reflect all areas of social experience:

1. On the Exterior, there is the visible and measurable, for example in the form of changed processes and

structures, environmental conditions, and objectively visible behavior, skills, and abilities. This reflects external sustainability.

2. In the Interior, there is internal sustainability. This addresses changed individual awareness and collective cultural issues pertinent to sustainability, such as: "How do we want to, and how can we live together sustainably and in peace in the future and enjoy greater freedom and justice?"
3. The I area reflects all individual aspects on the path to sustainability, in terms of both mindset and objective behavior.
4. The We area refers to collective aspects, both on an interpersonal level but also between tangibles (processes, structures, procedures).



The four quadrants of sustainable development

The resulting four quadrants show the levels on which change occurs. If people, firms, or organizations want to develop sustainably, they would be advised to keep all four quadrants in mind and should strive for and shape development on the personal and system level, both externally (structures, processes, behavior, skills) and internally (individual mindset, shared culture). This is certainly a challenge, because there can be major differences between development rates in different areas.

BRINGING TOGETHER SUSTAINABILITY AND ENJOYMENT IN LIFE

Moving on from the view at the end of the previous century – that sustainability is tantamount to making sacrifices – we now know that ecological sustainability actually can have a lot to do with enjoying life! Addressing positive feelings and combining sustainability with enjoyment in life and fulfilling experiences can inspire and motivate people. Such positive emotions also have a massive impact on our ability to learn. Yes, worst-case scenarios and negative emotions such as anxiety and fear can also be used to teach people lessons quickly – but only in a negative sense. We know this from brain research and educational psychology – fear, pressure, and stress inhibit our thinking and thus stifle creativity. But we need creative solutions to make proper use of our knowledge, our insights, and our ability to engage in dialog, so that we can solve the most pressing problems of our society and economy quickly and sustainably. So it's important to inject life into sustainability by drawing on positive experiences, stories that come from within, and issues that are tangible for all involved. What this means for organizations and companies is that staff, customers, and other market stakeholders need to be offered novel experiential spaces.

SUSTAINABILITY MANAGEMENT – A CORE COMPETENCE OF COMPANIES

At best, investing time and energy in environmental management and sustainability management in the broadest sense will result in systems (individuals, the economy, or society in general) acquiring genuine meta-competencies – know-how that will also enhance (competitive) skills and resilience in "non-environmental" areas. Unlike most planning and decision-making processes, such meta-competencies are not just about the usual rational approaches of Western society, they also entail emotional intelligence and a process of developing integral awareness. And this is of benefit to society, our children's children, the Earth we live in, and its finite resources.

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A REGIONAL AND LOCAL APPROACH TO SUSTAINABILITY

STEINBEIS EXPERTS DEVELOP A REGIONAL CONCEPT FOR THE STATE OF MECKLENBURG-WEST POMERANIA

Global economies currently face challenges on three fronts – two megatrends (globalization and urbanization), plus the impacts of climate change. In many countries, business and housing infrastructures are characterized by industrial agglomerations and megacities, and many regions are witnessing migration away from rural areas. When the entire ecosystem and regional value chains become more volatile, politicians and scientists face difficult questions, such as how much importance should be attached to the regional economy, particularly when it comes to sustainable business and social structures, but also what can be done to bring living conditions in rural and structurally weak regions on a par with others. To tackle these issues, a team of experts at the Stralsund-based Steinbeis Transfer Center for Project Planning and Evaluation has been working on a project called the MV Location and SME Offensive.

There are no silver bullets – i.e. strategies or concepts – when it comes to comprehensive regional development. Instead, regional decision-makers have to find ways to work together and develop local and regional development strategies that are not just viable and sustainable, but also take location factors into account. They also have to implement a whole variety of projects with a bearing on three factors that complement each other: economic, social, and ecological sustainability.[1]

THE ISSUE: EQUAL LIVING CONDITIONS

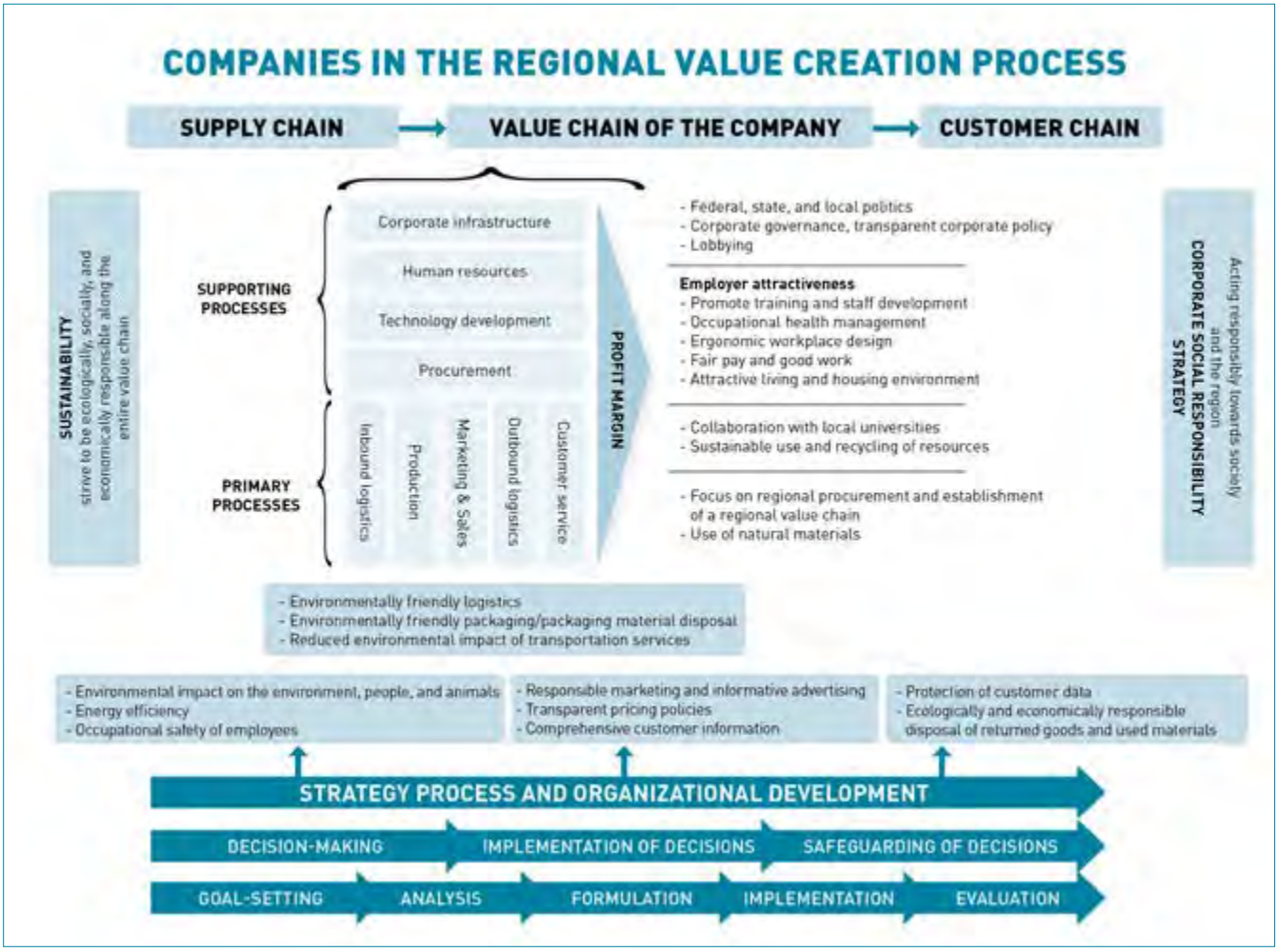
The aim of the European Union and the German federal government is to introduce strategies and concepts that promote "equivalent living conditions."[2] Establishing corresponding framework conditions is a crucial element of strengthening social cohesion and affording people in Germany equal opportunities, regardless of where they live. This is because living conditions in Germany are anything but equal. More than 30 years after the peaceful revolution in Germany, there is still room for improvement when it comes to economic infrastructures and the income levels of the population in the east of Germany.

In the new federal states (former East Germany), decision-making and production conditions are driven by a concept called the "extended workbench," and wages in many sectors are still not equal to those in the west. To come closer to achieving the goal of equivalent living conditions, the onus is on stakeholders at all levels of government – from the federal government and state governments, to local authorities and regional decision-makers.

A VISION OF THE ROAD AHEAD FOR MECKLENBURG-WEST POMERANIA

Mecklenburg-West Pomerania is a largely rural state, in which traditional companies face many challenges. "In addition to the multi-faceted issue of corporate succession, business has to deal with digital transformation, it has to attract skilled workers – in a market currently favoring jobseekers – and it has to compensate for global challenges," explains Professor Dr. Bernhard Stütz, who has worked alongside his team at the Steinbeis Transfer Center for Network Planning and Evaluation in Stralsund in planning and designing the MV Location and SME Offensive. "The societal issues and people's willingness to participate transparently create new areas of overlap for stakeholders in regional politics to start working on. This covers a diverse number of challenges and topics, but the central question for us was how in concrete terms Mecklenburg-West Pomerania can be successful in the future," adds Professor Dr. Norbert Zdrowomyslaw.

As part of the offensive, the state government is now seeking answers by forming networks, business clusters, and partnerships within politics, business, and civic society. Initiatives and bodies such as The M-V Future Council, the Digital MV state project, the Economy and Science Strategy Council, but also individual stakeholders such as digital transformation ambassadors and business ambassadors will allow different parties to identify more closely with the project and find answers to future questions. There are close links between environmental sustainability and the decentralized infrastructures of renewables, smart power distribution, sustainable travel solutions, resource-saving land and marine management, and future technologies such as machine learning and green hydrogen. At the same time, offering a wide range of support options and sharing examples of best practice makes it easier for traditional industries to effect change. With its established local research landscape and direct channels of personal contact, the state is an ideal region for model projects in the fields of e-government, autonomous systems, and smart cities.



↗ Regional value creation and corporate strategies

Local and regional development strategies and implemented measures must lay particular focus on optimizing regional economic cycles and extending regional value chains by encouraging companies to introduce sustainable strategies.[1] This became abundantly clear with the supply chain issues witnessed both before and during the coronavirus crisis. Nonetheless, it is people who create a sustainable regional economy.

Regional stakeholders must think globally and in terms of networks, but action is needed on a regional and local level. It is also important to ensure that different groups of stakeholders identify with the state, formal infrastructures, and the local population. For the sixth Kondratieff wave, cooperative strategies are needed.[3] After all, active collaboration should not be something that stops the moment you step over the county border, and it should not run into communication barriers between different stakeholders. If regional decision-makers want the regional economy to develop, the motto should be "The future is now – let's get on with it!"

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THE PATH TO SUSTAINABLE LEADERSHIP

WHY LEADERSHIP NEEDS RETHINKING TODAY – FROM THE BOTTOM UP

The issues dealt with by managers have become more demanding over the years – leadership is now more time-consuming, increasingly challenging, and overall: more important. But instead of questioning outdated practices, experienced managers try to revive leadership based on old patterns with new methods and organizational models. Time and again, they fail. Steinbeis consultants Dr. Peter Becker and Dr. Regina Brauchler know from their own day-to-day work why a fundamental change is needed in the way managers both think and act – and the importance of sustainability in this.

It's becoming apparent that leadership is increasingly unattractive to the younger generation. Young people sense the price many pay in management, which is particularly high for older managers due to strong demands on their time, little time for spouses, children, and friends and, ultimately, strains on physical, emotional, and mental health. It's like sacrificing everything on the altar of a career. Given this burden, what is happening to leadership in the new working environment: Working World 4.0? Is time running out for leadership? Will people actually need leaders in the future, and if so, what kind of leaders? There can be no doubt that we need to rethink everyday leadership, which will entail a new portrayal of the human being, based on the premise that personality develops autonomously, requiring an extended understanding of the goals and motives of leadership. This will be the only way to manage staff sustainably and efficiently.

CHANGES IN THE LABOR MARKET

Change brought about by digitech has turned the labor market on its head, simultaneously with changes in demographics. Managers currently have to approach Generations Y and Z through active sourcing, portraying themselves as amazingly appealing employers in order to court favor. In fact the demands of Gen Y and Z go far beyond the sense of duty of the baby boomers, most of whom still hold management positions in companies today.

This sense of duty felt by employers and having to play things safe in legal terms, especially when it comes to HR processes and occupational health and safety, has become more intense over time to the point where it is now entrenched in everyday management in European companies. This prescribed corporate responsibility is even prevalent when going international or outsourcing production to the Far East or Eastern Europe, even if it may not always be applied to all employees.

The sustainability reports of stock-holding companies and SEs show that social, environmental, and economic corporate responsibilities are taken seriously. But with outdated laws still in place, district courts bursting at the seams, lengthy court proceedings, and a judicial system that is based on power imbalances between employees and their employers, closer and more detailed attention is required from all stakeholders. In addition, Gen Y and Z virtually expect the companies they intend to work for to show outstanding corporate responsibility in the long term. Firms are expected to rethink along the lines of the school climate strike movement and Fairtrade, but also when it comes to desk-sharing, working from home, and – not least – the work-life balance.

HEALTHY PEOPLE: A KEY TASK OF MANAGEMENT

Healthy employees are good for business because they perform better, they adopt a positive attitude when dealing with customer inquiries, and they are therefore more productive overall, which pays off in financial terms.[1] Nevertheless, even this concept of promoting health at the workplace as part of day-to-day management – with healthy-living events, free drinks, or seminars from health insurance companies on relaxation or nutrition – is sometimes not enough.

Speaking from experience, Regina Brauchler, Steinbeis Entrepreneur at the Steinbeis Consulting Center for Demographics-based HR Management, says, "Even at such companies, occupational health management that actually minimizes hazards or stress at the workplace – or even eradicates it by introducing new technology or ergonomic work design – is rarely on the agenda of occupational health and safety committees." The same is true for risk assessments aimed at understanding mental health: Companies often spend five years planning and updating assessments – and may even conduct them – but they are never actually followed up on by introducing measures in day-to-day management and improving identified shortfalls within the organization or management.

IT'S BECOMING APPARENT THAT LEADERSHIP IS INCREASINGLY UNATTRACTIVE TO THE YOUNGER GENERATION

There is a correlation between the health of employees and how they are managed. "Health must be seen as a task of management and made a tangible part of everyday life. After all, the core objective of leadership must be to bring out the full creative power and dignity inherent in every human being," asserts Peter Becker, a project manager at the Steinbeis Consulting Center for Healthy Organizations.

LEADERS WITH A HEART

Summoning up courage and playing to inner strengths requires opposite numbers who are genuinely interested in the well-being of others and their personal development. If the strong potential inherent in every human being is allowed to unfurl, and can be invested to the benefit of the individual, also to allow the workplace to develop, a stable environment can be established, thus creating a sense of order that promotes good health – even in times of upheaval.

Managers can become this opposite number for their employees and be a "leader with a heart".[2] This also involves developing an "inner compass," a term used by the neurobiologist Gerald Hüther. Within the context of social systems, leadership can thus be seen as a dynamic relationship of cause and effect.

LEADERSHIP IN "WORKING WORLD 4.0"

Changing our thinking and acting in different ways in everyday management will typically require the support of an experienced systemic coach. It is important to be able to help managers individually to underscore their strengths and deliberately highlight weaknesses so they can be guided as they explore the options of more effective and sustainable leadership. The ideal leader of Working World 4.0 has a highly pronounced propensity to adapt behavior in all respects, but such leaders do not exist and they never will do.

It is utopian to think that people can be fully conscious of their own dignity and be altruistic in serving employees and the organization. But continuing to do things the way they were until now will not be enough. This was clearly reflected in a survey of several thousand family-owned businesses conducted by the consulting firm PwC before the current pandemic. The German introduction to the survey highlighted that "digital technology is challenging established business and leadership models, such that some are even becoming completely superfluous [...]" and that "family businesses are totally aware that 'keeping going' will not be enough."[3]

What Working World 4.0 needs – particularly in the post-COVID era – is a blend of two types of leaders: the generation of the younger managers that have grown up with digital technology, but also the "old" generation of managers who are in a position to make valuable contributions based on their experience in the "old economy." Both should take a number of things to heart: Thoughtfulness and a soupcon of self-doubt are not signs of weakness; personal development as a business leader is a lifelong process; and employees are not machines that require optimizations, but beings with dignity, an identity, and a sense of responsibility. Embodying these ideas offers tremendous potential to make leadership more sustainable.

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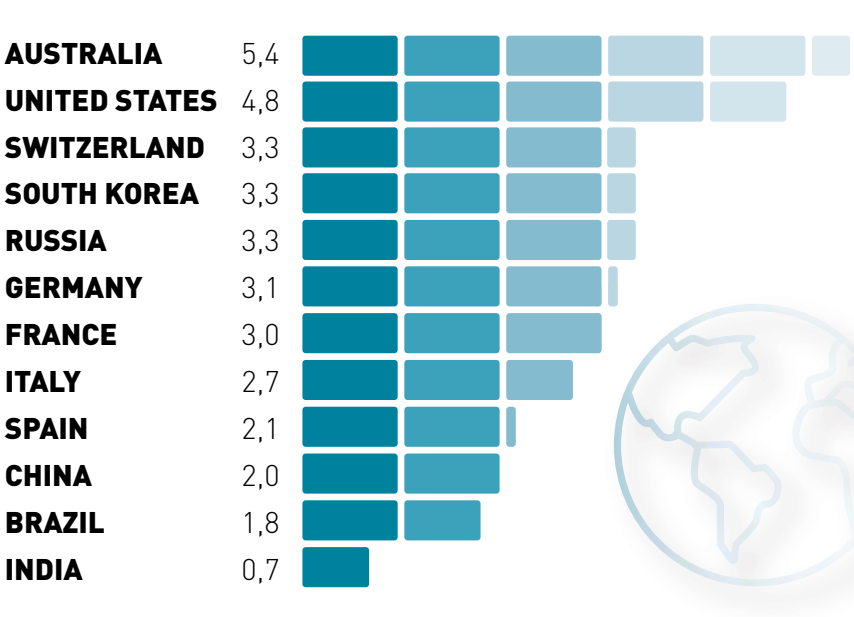
THE MANY THINGS THE ECONOMY AND SOCIETY CAN LEARN FROM EVOLUTION

COLLABORATION, ADAPTIVE RADIATION, AND OCCUPYING NICHES OFFER THE POTENTIAL TO IMPROVE SUSTAINABILITY AND FAIRNESS



Resource consumption by selected countries (source: Global Footprint Network)

Learn from evolution – and make economic and social processes more sustainable and fair. If we look back at how living systems have developed over time, we find a whole host of established underlying principles that can be transferred to society and the lives we lead today. Over the course of millions of years, nature has developed mechanisms that result in plentiful, diverse, stable, and yet still dynamic ecosystems. This raises a question: What can we learn from this? If he's not concentrating on medical electronics, this is a question Professor Dr. Bernhard Wolf of the Steinbeis Transfer Center for Medical Electronic and Lab on Chip Systems is thinking about when dealing with overall medical systems.

One of the first insights we gain by looking back at evolutionary history is that it's better to act collaboratively than to adopt a confrontational or competitive stance. Agreed, competition has always been an important aspect of evolution – but it didn't take long for it to become obvious that it's much better for protozoons (single-cell organisms) to form simple organisms with other protozoons, because it's a better way to protect themselves from attacks.

As organisms became bigger, division of labor – i.e. even close collaboration – soon became necessary. Cells more exposed to the outside specialized in fending off the enemy and taking in nutrients, while those on the inside con-

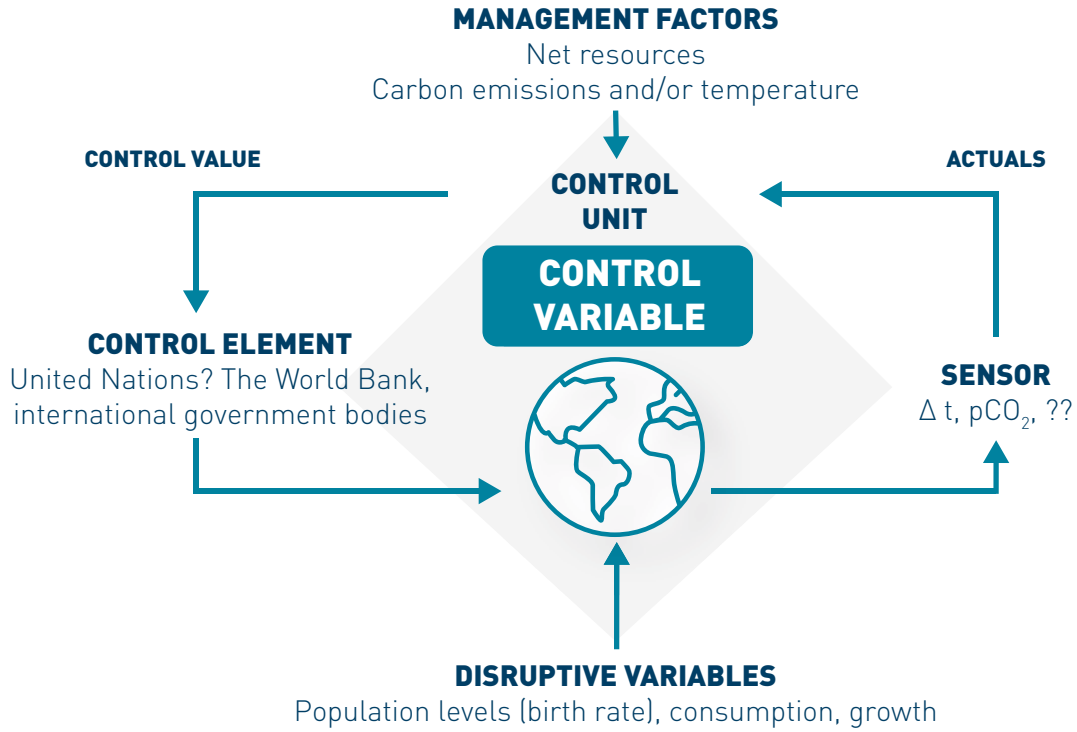
centrated more on processing those nutrients and on reproduction.

A BRIEF JOURNEY INTO THE REALMS OF WILDLIFE

This principle of successful collaboration can be seen in modern times in insects and the way they form colonies. For example, bees and ants live in highly complex social structures in which work is delegated; they are even able to provide social support, by transporting an injured comrade back to base so it can be cared for. Fish form shoals and protect themselves from the mouths of marauding enemies by merging into tight swarms, at the center of which is a critical mass of individuals capable of reproduction. We also know from penguins that the prospect of individual birds surviving would be very bleak if the other members of their group did not shield them from the biting cold and enemies. As these examples show, cooperative behavior keeps populations stable and helps each respective species to safeguard the natural foundation of life.

Another key mechanism of evolution is adaptive radiation. This is where living beings can adapt themselves to the conditions of their environment by acquiring special capabilities and developing morphological attributes. This enables plants and animals to live in all kinds of conceivable places. No niche is left unoccupied. Occupying niches promotes creativity and diversity, offering an opportunity to the overall population to react quickly and adaptably to changes in the availability of food or other conditions. If a species or population lacks this ability to adapt, its fate can be quickly sealed. For example, the dinosaurs were possibly the most successful and powerful vertebrates of all times, but they were unable to adapt quickly enough to changes in their environment and find new places to feed themselves.

The transferal of known control principles to a proposal for resource-based, sustainable global governance



COLLABORATION AND ADAPTIVE RADIATION IN SOCIETY AND THE ECONOMY

Are we also doomed by our modern systems of society and the economy? "The fact of the matter is, there are aggressive competitive structures in many areas of the world which are resulting in dire changes in society," explains Steinbeis Entrepreneur Bernhard Wolf. The structures of liberal markets are doing everything within their power to grant the owners of private property maximum advantage. The rapid rate of technological development in recent decades has dovetailed with a rise in psychological and psychosomatic disorders. Some specialists are now pleading for a cooperative approach to competition. Civil societies could form cooperative alliances as part of voluntary arrangements to offer mutual services, suggests political scientist Johano Strasser. This would allow people to occupy relevant niches in keeping with the concept of adaptive radiation.

As the development of life on Earth has demonstrated, cooperative behavioral patterns in combination with the principle of adaptive radiation offer essential development potential in the long term compared to confrontational, aggressive behavior. But there is a further principle of evolution that is also crucial in all of this: You should not use more resources than you have access to. In the early days of human development, this concept was a given, but with the advent of industrialization and the emergence of transportation systems, an era of global resource exploitation began – even though day in, day out, the sun provides us with much more energy than we actually need. If we could use that energy, we could quickly restore the equilibrium between energy consumption and energy generation.

All in all, resorting to growth structures based on the examples provided to us by evolution could prevent defensive battles, wars, and economic migration, and avert severe social rifts – cooperation and adaptive radiation in order to avoid social and economic conflict. But to do this, we would have to manage our economic systems globally, based on methods that consider resources and sustainable practices. This is utopian and still a long way off from where we are now. But: Nature has always found new functional approaches and lifestyle patterns when coming up with life forms; it has continually developed new concepts and simply tried them out. "If we manage economic development by occupying niches, we could sidestep lots of problems from the outset and establish healthy, efficient, socially viable, and economically successful structures," says Bernhard Wolf, combined with an appeal: "Let's look up what Darwin said!"

IT'S BETTER TO ACT COLLABORATIVELY THAN TO ADOPT A CONFRONTATIONAL OR COMPETITIVE STANCE.

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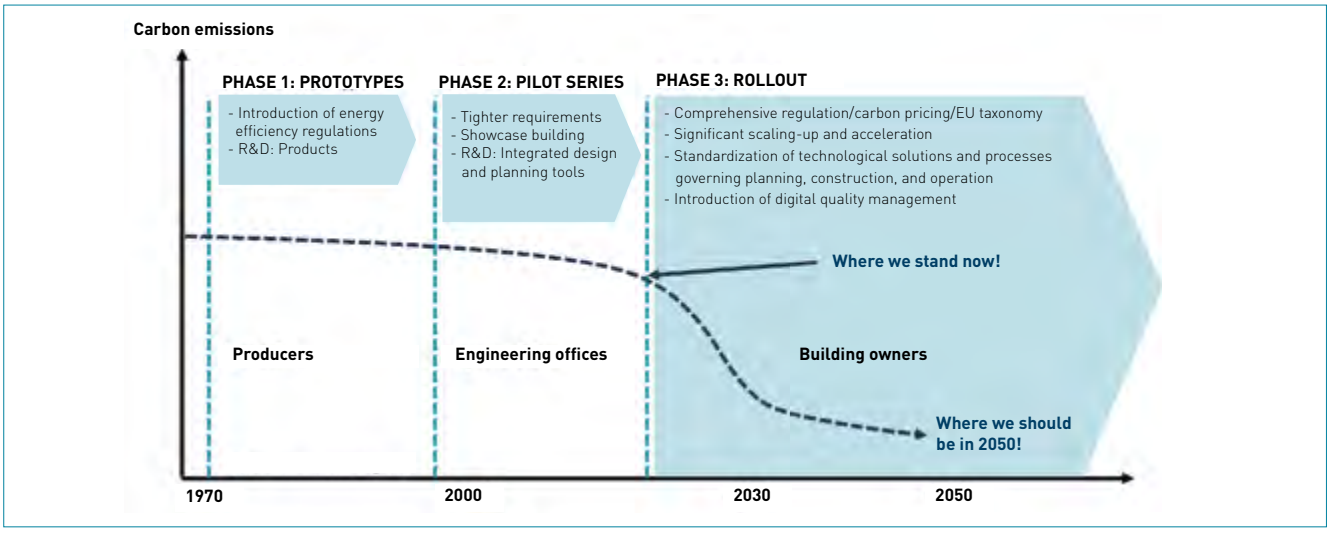
CLIMATE-NEUTRAL CONSTRUCTION AND RENOVATION – ALL MADE POSSIBLE BY BUILDING STANDARDS

STEINBEIS EXPERTS DEVELOP SYSTEM STANDARDS FOR IMPLEMENTING THE GREEN DEAL

Significant progress has been made over the past 30 years when it comes to energy-efficient and resource-saving construction, with innovative products like insulating materials, which offer the potential to improve efficiency without limiting design options. Then there is coated glass, which reduces heat loss by more than 70% and improves living standards. Progress with technology such as ultra-efficient pumps, LED lighting, and building automation systems also make it possible to save energy. Incorporated in buildings, all of these individual elements can be pulled together to create holistic building concepts based on the new process of integrated design. Experts at energieplus, the Steinbeis Innovation Center, have already demonstrated in numerous showcase projects how to use these new solutions to construct highly efficient buildings.



The challenge: progression from pilot production to mass production (Source: synavision GmbH and the energieplus Steinbeis Innovation Center)

One of the goals laid down by the European Union as part of its Green Deal is to ensure existing buildings are climate-neutral by 2050. To achieve this, the vast majority of existing buildings in Europe will have to be renovated over the coming 30 years – or significantly modernized and then used more efficiently. Therefore, the big challenge now will be to scale up from individual showcase projects to serial volumes in higher numbers.

This will mean raising the current renovation rate of approximately 1% to at least 3% of existing buildings per year – in other words working at three times the pace! Wherever possible, renovations should be prioritized over tearing down or constructing new buildings. This is because in addition to the energy needed to run new buildings, you still have to compensate for primary energy invested in construction. The infrastructure required to supply energy also plays a role in this and has to be decarbonized.

ONE POTENTIAL SOLUTION: STANDARDIZATION

Aside from improving performance, to accelerate implementation it is also imperative to significantly improve the quality of their implementation. Translating sustainable concepts into tangible action has shown that energy-efficient buildings are becoming increasingly complex and sensitive. They are also vulnerable to the negative impacts of poor planning, construction methods, and operation. To scale up potential solutions, individual projects providing showcase examples must be used to develop serial production concepts. In doing so, it must be

The Sponsor Center in Bult project, which was funded as part of the Eneff.Gebäude.2050 research program initiated by the Federal Ministry for Economic Affairs and Energy (FKZ: 03EGB0003A) and the proKlima Fund in Hanover.

The Strong Owners – Good Buildings project, which is being funded by the German Federal Environmental Foundation (DBU) (Ref. 37104/01) and the proKlima Fund in Hanover.

For more information, go to **www.starkebauherren-gutegebäude.de**

ensured that it will still be possible to cut energy consumption and reduce emissions in high volumes, without compromising functional standards.

The Special School Center On the Bult project has enabled the energieplus Steinbeis Innovation Center and the Region of Hanover to develop standards for nearly-zero-energy buildings in anticipation of regulations laid down under EU Directive 2010/31/EU, which affects the overall energy efficiency of buildings. The goal was not to experiment or try out new technologies for a beacon project, but instead to develop standards that would enable building owners or construction companies to erect sustainable buildings and carry out sustainable renovations in the required volume. This allows the Region of Hanover to systematically translate innovative technology aimed at transforming climate-neutral buildings into the required political framework.

Reliable and financially scalable standards were developed for the project, as well as a matching quality management system for introducing nearly-zero-energy buildings, thus providing a new building standard for the Region of Hanover, which was then applied to the Sponsor Center in Bult project. An important priority when it comes to construction practice was how documentation is dealt with. There is plenty of potential to standardize processes for building owners/construction companies:

- Improved technical understanding among stakeholders working for the authorities
- Consolidation of internal and external know-how and knowledge-sharing
- More specific formulation of requirements for architects and specialist planners
- Accelerated projects in accordance with quality standards
- Standardized monitoring, less compliance-bureaucracy
- Lower engineering, building and operation expenditures
- Improved building performance
  More satisfied occupants
- Faster "transformation rate" for existing buildings

The last stages of the project coincided with the publication of the Green Deal by the European Union and the initial drafts of the EU taxonomy. Political decision-makers are thus establishing a framework for the comprehensive and sustainable conversion of existing buildings in Europe. The results of this project can now be used as a building block for the ambitious practical implication of standards, especially in the public domain.

THE TRANSFORMATION PROCESS IS GATHERING PACE

For the next step in the transformation process toward climate-neutral buildings, in February 2021 the energieplus Steinbeis Innovation Center joined forces with the Lower Saxony Climate Protection and Energy Agency to work together with the Region of Hanover and a variety of other local authorities and cities in Lower Saxony and embark on a follow-on project. Its aim will be to develop a tool for applying technical standards and introducing a quality management system for public building authorities. The main focus of the project (title: Strong Owners – Good Buildings) will support owners, who are seen as the official provider of the mandate, the party that "places the order" for a building based on their defined standards. The project has aroused strong interest among public building owners. The scale of the positive response has galvanized the resolve of the Steinbeis experts in applying technical standards and effective quality management processes to climate-neutral buildings.

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SUSTAINABLY OPTIMIZED INFRASTRUCTURE

STEINBEIS EXPERTS SHARE MULTIFACETED KNOW-HOW

Ambitious climate goals mean that it will be necessary to implement radical restructuring measures not only in the energy sector, but also in urban infrastructures. Motivated by this insight, in 2018 a group of scientists at Stuttgart Technology University founded LOCASYS-Innovations as a Steinbeis Innovation Center. The Steinbeis experts are currently working on a research project called NeqModPLUS, funded by the Baden-Wuerttemberg Ministry of Economic Affairs. To conduct the project, they are using holistic methodologies.

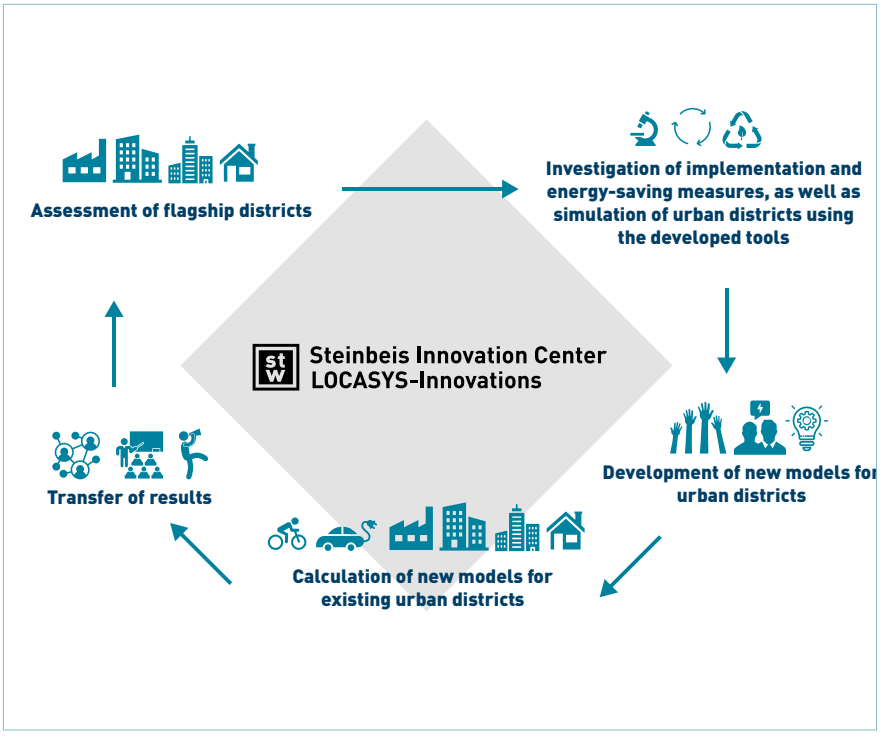
According to Steinbeis Entrepreneurs Rafal Strzalka and Dietrich Schneider, the goals of the green energy transition in Germany and the cornerstones laid by the Green Deal initiative launched by the EU will only be achievable by adopting a holistic approach to methodologies. This spans all aspects of comprehensive transformation, from an analysis of data right through to technical measures, thus extending far beyond currently propagated analytical tools for urban districts. Motivated by their goal of understanding the potential of made-to-measure restructuring programs, efficiency improvements when it comes to the actual use of renewables, and the introduction of innovative and adaptable supply models to the technical infrastructure, the Steinbeis Enterprise wants to conduct the R&D required to achieve the goals of European energy policy. This includes meeting sustainability criteria, safeguarding the stability of energy supplies during the ongoing expansion of volatile generation capacity, and becoming less dependent on fossil fuel imports.

To implement the results of the project, partnerships will be arranged with commercial stakeholders and scientific bodies, also in order to secure the direct sharing of experience and know-how between the business community on the one hand, and science and academia on the other.

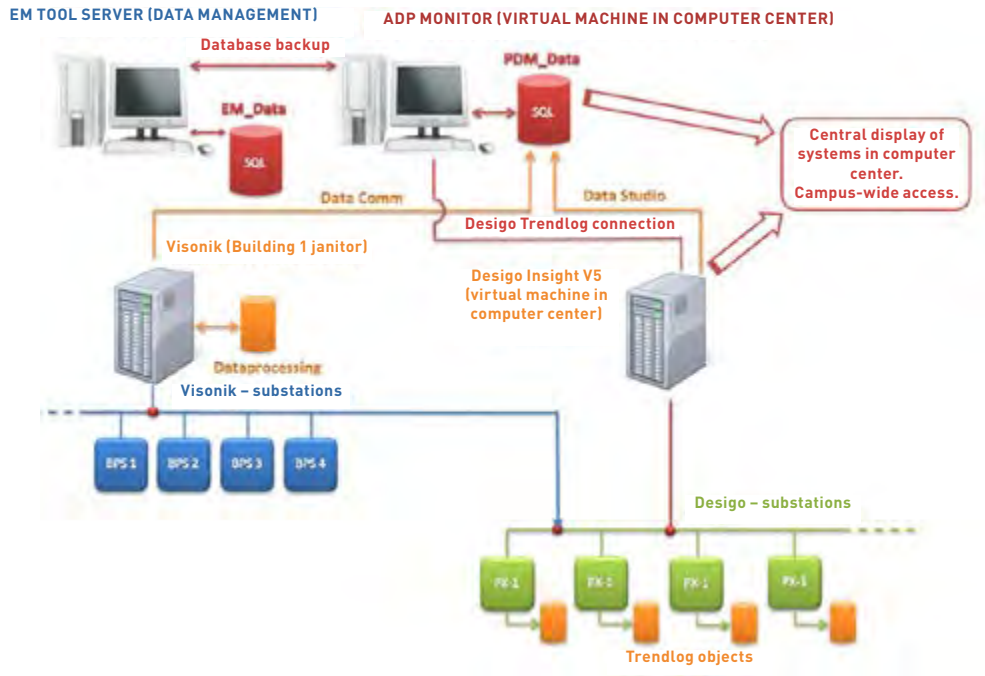
ONE TEAM, DIVERSE EXPERTISE, AND MANY PROJECTS

As a Steinbeis Innovation Center, LOCASYS-Innovations has a wealth of experience when it comes to integrating sustainable supply concepts into future-oriented low-energy infrastructure. Its main focus lies in the development of methodologies and instruments to support decision-making processes and the establishment of low-energy districts. Strzalka and Schneider are currently applying this know-how to a research project called NeqModPLUS. The remit of the project, which is funded by the Baden-Wuerttemberg Ministry of Economic Affairs, is to develop methodologies and modeling tools for low-energy districts. These would make it possible to improve the net primary energy consumption of urban infrastructures by up to 70%.

The approach adopted by the Steinbeis experts includes communication within the network of involved stakeholders, the introduction of new collaboration concepts, and the development of



The development of methodologies for optimizing technical infrastructure



Concept planning for the technical monitoring of building control technology

new initiatives. This creates favorable conditions for pooling expertise and research output, which can be applied to national, bilateral, and international projects as part of sustainability research. Any R&D expertise acquired as a result of the scientific initiative can be shared on a broader scale under the auspices of projects in industry. The initiatives the Steinbeis experts are working on place emphasis on actual application, spanning everything from optimizations made to public infrastructure used by the municipal utility of Weinstadt, to energy assessments with Bosch, technical monitoring and analytical evaluations of urban campus buildings, and the planning of automated processes used to design energy grids for municipal heating plans. The know-how gained through the different showcase projects will make it possible to plan and implement the sustainable transformation of major district infrastructure systems and deliver significant benefit in terms of energy efficiency and economic viability.

The work being carried out by LOCASYS-Innovations also revolves closely around the development and implementation of system applications to be used in urban infrastructure, which can then be optimized in terms of energy consumption. Working out the patterns of user behavior and the parameters of conditions affecting technical infrastructures also makes it possible to quantify how such factors influence energy consumption and the distribution of resources. Based on these insights, scenarios can be worked out for reducing primary energy consumption and the use of valuable resources. Alternatively, fossil fuels can be replaced by renewables.

One of the main challenges perceived by the Steinbeis experts from Ludwigsburg when it comes to urban infrastructure development lies in the current dearth of suitable tools for tracking things like the greenhouse emissions of major sections of technical infrastructure. Possessing such tools would make it possible to derive measures for cutting emissions. Based on their conclusions, Strzalka and Schneider are currently looking into ways to merge different software approaches and integrate the resulting software into urban transformation strategies such that the methodologies can be applied to actual infrastructure projects.

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SIMPLE, SYSTEMATIC, SUCCESSFUL – TEAM STRATEGIES WITH SUSTAINED IMPACT

METEOR – A STRATEGY PROVIDING USEFUL TIPS ON SUCCESSFUL PROJECT IMPLEMENTATION

Sound familiar? You're working in a team on a new project at your company, or at university, or in the local community. To kick off the project, often a simplified list of topics is provided on what are actually complex topics, and you go off to discuss the topics "in more depth" in smaller groups. And what you then tend to get is a "hodgepodge of specialists." What comes out at the other end has little to do with networked thinking. And then there are those meetings where the project managers – put in place top-down – exploit their position of power to determine the direction things should go in, often laid down by those above in "briefing sessions." By the end of the meeting, there's often heated discussion, rounds of ripostes, people digging in, and even lasting animosity. Not only that, but the results are often worse than was expected and looking back, no-one is even sure where some of the good ideas actually came from. The minutes, which were written after the event, often include things that make you wonder if they were based on the same meeting. In a nutshell: how frustrating! After working for decades with Steinbeis at Mannheim University of Applied Sciences, Professor Dr.-Ing. Klaus-Jürgen Peschges knows of a way to develop team processes that will be effective in the long term: the METEOR strategy.

Experience with projects like the ones described above inevitably led Peschges to wonder if there has to be a way to develop the optimum approach to sustainably effective strategic projects. "Sustainably effective" means that all measures used in the course of a project must be contextually compatible in terms of social expectations, fairness, and lasting impact. Measures solely introduced for economic reasons – and therefore incompatible with such criteria – are out of the question.

To develop and implement sustainably successful strategies, a number of very different approaches exist, usually involving processes dictated by hierarchical methods and elaborate project management methods. Peschges has used the METEOR method for many years, applying it to teams of all sizes involved in end-to-end, interdisciplinary strategy development. He uses the method at Steinbeis workshops by introducing a free selection of project examples. This is always subject to a fundamental rule of teaching practical skills: simple first, complex later. For example, one effective and motivating way to introduce people to this method is to look at optimal and sustainable ways to crack open a coconut.

WAYS TO ACHIEVE GOALS – FINDING POTENTIAL SOLUTIONS

Finding answers when it comes to solving sustainable strategy projects raises another question: How do you ensure all participants are treated equally or involved equally in the result, especially in the long term? Compared to working individually, when people develop methodical approaches to strategic planning and project development in teams, and those teams are interdisciplinary and heterogeneous, there will be different levels of experience and know-how. Also, there will be a close correlation between the quality of results and the overall age of participants. The most important factors to think about if you want to establish the best conditions and make full use of potential are:

- Methodical approaches, from start to finish
- Setups that are independent of hierarchy
- Accurate/faithful documentation of ideas

Is there an easy and sustainable way to crack open a coconut?

- Decision-making based on democratic and anonymous methods
- Heterogeneous groups (in terms of gender, age, nationality, field of expertise, etc.)
- A "large enough" number of participants to match the problem
- Methods that discourage competitiveness
- Systematic use of aids
- Any other adaptations that help projects succeed compared to conventional project management

It is particularly important to involve a specialist team moderator, with unrestricted involvement in processes, something also made possible by adapting methods.

TANGIBLE SUCCESS

A defining feature of the METEOR method is that it can be applied to any kind of project or problem. It revolves around a small wonder based on straightforward "fractal" methods (similar and recurring patterns), which are applied immediately by the team members working on a project, broken down across ten systematic steps. METEOR is a German acronym for "people-oriented design of techniques and organization" (MEnschenorientierte Gestaltung von TEchnik und ORganisation).

It was only after using the METEOR method that, for example, a way was found to run continual training courses involving projects. Those courses have now been organized for almost 3,000 students at universities. For the projects, between 10 and 40 students work together on a topic that they select themselves. For example, by using simple creativity techniques, usually between 200 and 400 ways can be found to come up with new constructs, out of which several concepts offering strong potential can be worked up in order to come up with the best possible concept, which is then developed together in a way that participants can sign on to.

For those who place importance on meaningful, consensus-oriented interaction – involving different disciplines, life experiences, personalities, etc. – in order to develop truly sustainable strategies, more insights can be gained into these methods and their use at in-depth Steinbeis workshops.

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NO GREEN ENERGY TRANSITION WITHOUT THE INVOLVEMENT OF PEOPLE

STEINBEIS EXPERTS HAVE DEVELOPED A PARTICIPATION CONCEPT AIMED AT PROMOTING PUBLIC DIALOG.

In 2011, the German federal government passed legislation to put an end to the use of atomic energy. In July 2020, it was decided that using coal-fired power stations to generate energy should be phased out in several stages by 2038. Simultaneously, the central government is going full steam ahead with programs to bring more electric vehicles to the roads. A prerequisite for all of these ambitious initiatives is a powerful high-voltage electricity grid capable of providing all regions of Germany with a reliable electricity supply, in a way that is both economically and environmentally friendly, but still takes changes in other areas into account. One factor that is rarely included in such considerations, however, is people. Steinbeis experts Professor Dr. Gernot Barth and Jonathan Barth explain why this can cause problems and describe how the companies that operate the infrastructure should react.

High-voltage electricity grids involve many imponderables and challenges, and not just on a technical level. Place insufficient emphasis on people factors with such developments and things can become even more problematic – for the transformation process brought about by the green energy transition to work, it also needs support from communities.

A COMMON PROBLEM: PEOPLE TALKING AT CROSS PURPOSES

Decision-makers responsible for energy policies should always aim to meet three criteria: environmental compatibility, the reliability of energy supplies, and economic viability. Deciding which goal takes precedence and prioritizing which factors should be considered for legal reasons is often based on a process of dialog, which tends to be a one-way street: the different stakeholders "talk at cross purposes." Sometimes it goes like this: The engineers working for the network carrier offer their assessment of a situation, based on technical and financial feasibilities. Attorneys dealing with the construction of technical infrastructure come at projects from a more abstract angle, weighing up commodities based on legal considerations. This contrasts with affected members of the public, who tend to react emotionally and call on additional input from experts – worst case scenario, this ends up in a lawsuit against the planned energy project. From a personal perspective, nobody involved in the process is doing anything wrong. But when it comes to the overall result – negotiating an outcome that is acceptable to all parties – talking at cross purposes can be quite harmful.

For example, lawsuits during the planning phase either result in urgently needed electricity infrastructure suffering severe delays, or if the claim is won, the infrastructure may not be put in place at all, resulting in even more uncertainty regarding electricity supplies. It's important to prevent this happening, not only for the sake of society overall, but also for the operators of technical infrastructure.

INVOLVING PEOPLE FACILITATES DIALOG

This challenge is being tackled by a Steinbeis team spearheaded by Gernot Barth. He has developed public participation concepts that are aimed at striking a healthy balance not only between the interests of members of the public and communities affected by projects involving expansions in the grid, but also the interests of grid operators. "The key success factors of citizen participation are not just showing appreciation and remaining transparent when communicating externally with members of the public. In parallel to this, the infrastructure operators also need to adopt a different approach," says Barth. The industry has been operating in a market driven for many decades by regulations. Over the years, a strong customer focus has developed, not only on a formal level

with respect to the Federal Network Agency, but also when it comes to infrastructure users.

From an economic and organizational standpoint, this focus is entirely understandable and rational. But within the industry, especially if you are a company subject to government regulation, it is not necessarily obvious that you will need to communicate completely transparently and proactively towards other stakeholders. The societal trend toward more and more individualization has resulted in a shift in public attitudes that will need to be considered by the energy network operators, especially if they want to implement their projects sustainably. Because these structures have developed over many years, an all-encompassing approach to change is needed, going all the way back to the organizational hierarchy of the network carrier.

The idea of the public participation concept that was developed by the Steinbeis experts for infrastructure providers is to facilitate this change and address factors both inside and outside the organization. First, a task force should be set up, as well as interdisciplinary working groups. Also agile working methods should be introduced, as well as a conflict management system for infrastructure construction projects. Factors that need to be considered outside the organization are a stakeholder analysis, a mediation team, a rethink when it comes to communications with all stakeholders, an ongoing coaching program for people working in communication, de-escalation techniques in communication, and maximum transparency. Only by bringing together all of these aspects does it become possible to engage in successful dialog, expand the high-voltage grid in the long term, and thus make a successful contribution to the green energy transition.

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"WE'LL NEED A DIFFERENT KIND OF CURRENCY FOR TRANSPORTATION INFRASTRUCTURE"

AN INTERVIEW WITH PROFESSOR DR.-ING. MARKUS STÖCKNER, PROFESSOR DR.-ING. THORSTEN CYPRA, AND PROFESSOR DR.-ING. CHRISTIAN HOLLDORB, STEINBEIS ENTREPRENEURS AT THE STEINBEIS TRANSFER CENTER FOR INFRASTRUCTURE MANAGEMENT IN TRANSPORTATION (IMV)

Being able to move around is freedom – something we are made acutely aware of by restrictions such as those imposed under the current pandemic. In addition to much-discussed modern forms of travel, a pivotal role in the development of future travel solutions is played by other types of transportation and transportation infrastructure itself. Experts at the Steinbeis Transfer Center for Infrastructure Management in Transportation, which is based at Karlsruhe University of Applied Sciences, are intensively looking into the sustainable transportation infrastructure of the future. In an interview for TRANSFER, they shared a number of their insights.

Hello Professor Stöckner, Hello Professor Cypra, Hello Professor Holldorb. What role does sustainability currently play in transportation?

Markus Stöckner:
Perspectives on the sustainability of transportation vary widely. Presently, much discussion revolves around the different forms of travel, such as how to promote cycling, electric vehicles, or alternative fuels. It's what society is focusing on at the moment and the subject of continual debate. Yet travel is also about infrastructure, which hasn't yet become the focus of the overall discussion. This infrastructure should be sustainable and independent of the mode of transportation or different propulsion systems. Consideration should also be given to the construction, operation, and maintenance of transportation infrastructure, which has a significant impact on issues such as life cycle assessments, the circular economy, and the carbon economy. So for example, thought is already being put into a number of concepts, from planning to construction and the operation of transportation infrastructures from a sustainability standpoint. In the future, transportation, telematics-based user control, and the infrastructure will link everything together as part of an overall picture.

Christian Holldorb:
If sustainability means considering ecological, economic, and social factors

CONSIDERATION SHOULD ALSO BE GIVEN TO THE CONSTRUCTION, OPERATION, AND MAINTENANCE OF TRANSPORTATION INFRASTRUCTURE, WHICH HAS A SIGNIFICANT IMPACT ON ISSUES SUCH AS LIFE CYCLE ASSESSMENTS, THE CIRCULAR ECONOMY, AND THE CARBON ECONOMY.

from an integral perspective, this is an extremely important issue. There's been a tendency in the past to come at projects and concepts selectively, whereas now the focus is shifting toward a holistic, sustainable view. Adopting this systematic approach – simultaneously giving the entire life cycle the consideration it deserves – is becoming increasingly important, especially when evaluating transportation infrastructures. For a long time now, a number of factors have been central to the planning process when assessing different options and alternatives. There's no such thing as "optimal" planning. When you're evaluating different options, you're always weighing things up – it's a trade-off. With construction, maintenance, and operation, the focus usually lies in monetary considerations, whether it's about awarding construction contracts, maintenance management, or the cost efficiency of operating roads. Other aspects are often only considered afterward. This is where there'll be a change in thinking. In addition to evaluating different factors in euros, we'll need a different kind of currency for transportation infrastructure, such as carbon emissions or resource consumption. Since there's generally no actual "market" for transportation infrastructure, sustainability issues haven't moved forward as much as they have in other industries.

Thorsten Cypra:
This issue is also becoming increasingly important on a national, regional, and municipal level. Constructing and operating transportation infrastructure sustainably, alongside buildings and vehicles, is being given corresponding attention when it comes to decision-making and the planning process. These developments are accelerating as the overall circumstances change, such as meeting climate protection targets by 2045 and the potential this offers to buildings and transportation. But they're also good for portraying and maintaining a positive image, which results in attractive living environments and places to work. For example, in the IMV team at Steinbeis we advise states and municipal authorities on how the buildings that are required to run the transportation infrastructure can be designed and used sustainably, or how to transform vehicle fleets in the coming years with a view to meeting climate protection targets.

What challenges still lie ahead for transportation if it's to become truly sustainable?

Christian Holldorb:
For a transportation system to be sustainable, it's not just crucial to think about technical and financial issues; you also need to assess social factors, since travel is a key aspect of our everyday lives – starting with the global exchange of goods, to areas like long-distance journeys and local transportation. These are the kinds of issues that society can only answer through political discussion. Transportation, i.e. the technical side, can provide the information you need for objective discussion.

We also face some major challenges when it comes to the travel infrastructure, not just in terms of the materials and processes we use, but also with respect to identifying the best solutions. A current example of this is a research project looking into the economic implementation of environmentally friendly countryside management, which we're working on at the IMV Steinbeis Transfer Center on behalf of the Federal Ministry of Transport and Digital Infrastructure. One issue we're looking into is how to strike the right balance between the legitimate need to protect species with the immense challenge of maintaining roadside greenery. This is where it helps to have new technology and optimized processes, although ultimately, you have to weigh up different goals in terms of sustainability.

How does digital technology help you with this?

Markus Stöckner:
In principle, all areas of sustainable transportation require control processes supported by IT systems. All necessary procedures, applications, and technologies require a foundation of solid data. What this means for the travel infrastructure is that you need a digital twin equipped with relevant information on various applications, which

has to be up to date and valid. If this is the case – and all such information is available in an accessible, i.e. manufacturer-independent and readable format – different application areas (from planning to autonomous driving and the management of traffic infrastructure assets) can be furnished with the required information. Currently, this kind of information is stored in distributed systems based on different spatial referencing, but also using differing ontologies. So the aim should be to identify the information that's needed, and to ensure that it's kept available for the various applications within a digital twin and can be made accessible whenever required. That's still a long way off, but the methods of building information modeling, or BIM, will help us get there. The IMV team is involved in a research project in German-speaking countries aimed at establishing a basis for a BIM model to manage the assets of traffic facilities on behalf of road construction authorities. It's only a small step, but it's essential to make this information available so that other applications have the data they require in the first place. In mathematical terms, you could say that digital technology is necessary, but not sufficient. This is a clear reflection of the basic function performed by digital technology.

Safety is an important issue with transportation, and sustainability plays a big role too. What does sustainable road safety actually mean, and how can it be safeguarded?

Thorsten Cypra:
Safeguarding and improving road safety is a primary rule of thumb when planning and operating traffic infrastructure. The number of people killed in road traffic accidents each year has been dropping for years and it's currently at an all-time low. Despite this, serious road accidents cause personal suffering and result in social damage with far-reaching impacts. Under the EU's Vision Zero, European countries are pursuing the long-term goal of zero fatalities or serious injuries caused by road traffic. This requires action on a variety of fronts – the general public, society, vehicles, road infrastructure, and legislators. Measures aimed at improving road safety thus play an important role when it comes to the sustainability of road traffic, with positive effects from an economic, ecological, and social perspective.

But if you consider this from the perspective of the shift to alternative travel solutions – aimed at achieving climate protection goals – this aspect becomes all the more important. For example, many municipal authorities are now developing and introducing new transportation concepts. Support is being given to cyclists, pedestrian traffic, and public transport, and this is resulting in changes on the roads. Particularly the number of bicycles in road traffic has increased sharply in recent years. When you're redesigning the infrastructure along these lines, it's particularly important to maintain a focus on the traffic safety of all road users.

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CARBON FOOTPRINTS: THE PATH TO CLIMATE NEUTRALITY

LOW ENERGY CONSUMPTION MUST BE WORTH IT, SAYS STEINBEIS EXPERT JÜRGEN GACKSTATTER

The shocking reality of extreme weather once again highlights the fact that the days of greenwashing are over (greenwashing: trying to look environmentally responsible but not actually doing what is required to be green). What's needed now is public policy that takes climate change mitigation seriously. This is the opinion held by our author Jürgen Gackstatter, an entrepreneur at climate solutions, the Steinbeis Consulting Center. Gackstatter calls for climate impacts to be reflected in prices, based on hard facts.

There are now exchanges where carbon certificates can be traded to offset emissions. It is here that you really see the price of environmentally harmful gases. Certificate prices, which reflect emission budgets, have been rising for months. In May, a ton of carbon dioxide was valued at €50. Put simply, political commitment to serious climate protection does have an effect. European politicians are planning to restrict permissible carbon dioxide budgets, a move that would push prices up even further.

Electricity, the future form of energy, is still determined by the costs of fossil power plants. If you want to secure electricity supplies starting mid-2022, you currently pay roughly €64 per megawatt-hour. Prices in Germany for such deals have virtually doubled since 2017 and continue to rise. Aside from Denmark, Germany has the highest end customer electricity prices in Europe – entirely in keeping with the logic of climate neutrality.

But it is also clear that if you want to bring about the required changes in environmental protection, it will not be enough to limit carbon budgets – not by itself. German climate protection legislation is continuing to reduce carbon emissions, but without defining how targets will be achieved in concrete terms. Emission trading is mainly driving developments in the electricity market, as will be seen in the fall of 2021 with further price rises.

THE SOLUTION: REDUCED CARBON FOOTPRINTS IN ALL AREAS

Why does this economic mechanism only work in the electricity market, and not across the whole energy industry? The prices for heating energy and gasoline have not doubled over the last four years. The answer is simple: The other sectors of industry are not subject to emission trading. Carbon taxes were not set until late 2020/early 2021. At €25 per ton of carbon, they are half the cost of carbon certificates traded on exchanges – nothing other than perplexing, given that it is the same carbon dioxide doing the same damage to the climate. The sobering explanation for this is that higher prices would not go down well among members of the general public. But that does not

GUTEX, from Baden-Wuerttemberg, is a manufacturer of environmentally friendly insulation materials made from wood. The climate solutions Steinbeis Consulting Center has been working with GUTEX since 2019.

change the fact that there is only one constructive solution: reductions in the carbon footprints of consumers, housing, and transportation.

So what does sustainable behavior on the part of consumers look like? For every decision, rising energy prices should be factored in and more emphasis should be placed on less consumption, i.e. improved efficiency. What we need are carbon footprints for products, so consumers or anyone using deliveries and services have clear information. Our open and democratic society must make climate protection integral to its actions. The best way to do this is to set prices for the aspect of climate impact – based on facts. The alternative would be to put the well-being of future generations at risk.

The climate solutions Steinbeis Consulting Center helps customers determine their corporate carbon footprint (CCF) based on the guidelines of the Greenhouse Gas Protocol. Understanding your CCF lays an important foundation for the development of a more far-reaching climate protection strategy. It also makes it possible to identify potential to make savings, to decide which levers to pull, to develop measures accordingly, and ultimately to define climate protection targets.

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A SUSTAINABLE APPROACH TO APPLICATION-BASED MATERIAL TESTING

MATERIALS MAKE A KEY CONTRIBUTION TO THE ENERGY-EFFICIENCY OF PRODUCTS

Materials are an important stepping stone on the journey to more sustainable process chains. Ceramics in particular are often underestimated, mainly because they are "invisible, but indispensable." Experts at the Application Center for Sustainable Materials, Technologies & Processes, a Steinbeis Research Center, are systematically and methodically analyzing systems and technologies – as well as how such factors interact with one another. This is making it possible to work out research methods that should lead to sustainable, resource-saving, and energy-efficient processes and products.

Due to their special properties – such as resistance to high temperatures, corrosion, and wear and tear – ceramics are suitable for a wide range of applications. For example in the chemicals industry, ceramics are used as lining materials for gate valves; in wind turbines, ceramic hybrid bearings are making a contribution to the green energy transition. Under the German federal government's hydrogen offensive, renewable energies will lay a foundation for future technologies such as electrolysis cells used in hydrogen production. High-performance ceramic materials are indispensable for fuel cells, as well as temperature-resistant thermal insulation in gas turbines.

OXIDE CERAMICS ARE USED IN HYDROGEN PRODUCTION

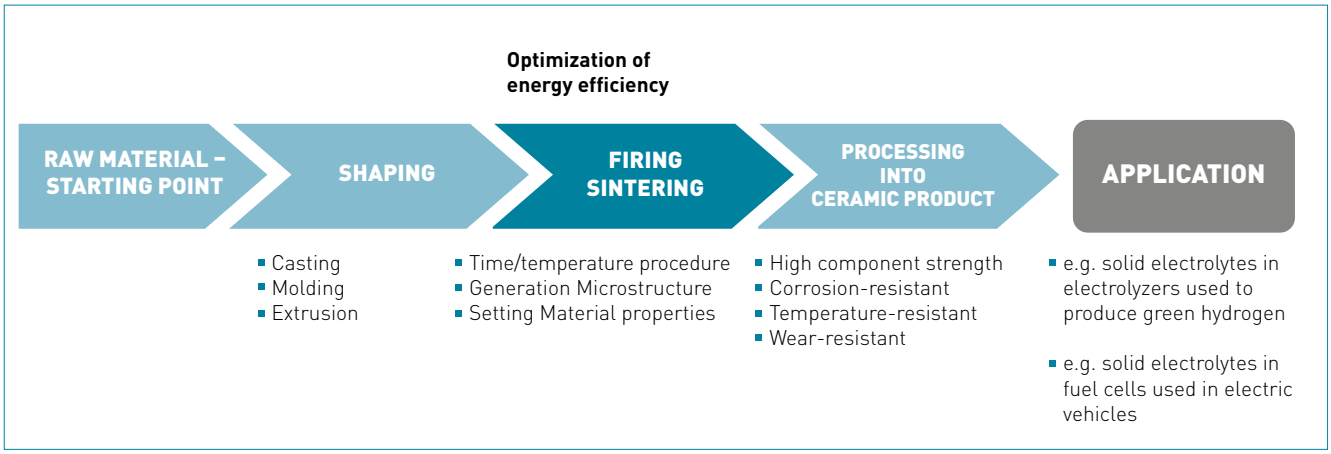
Energy transition strategies therefore not only address the use of hydrogen in fuel cells, but also consider the transportation of energy in the form of hydrogen. It is therefore particularly important to produce green hydrogen. The technology required to make hydrogen is a solid oxide electrolysis cell. The role played by the electrolysis process is to decompose water into H2 and O2. The design and operating temperatures are equivalent to those of solid oxide fuel cells. The high operating temperatures of between 500 and 1,000°C therefore require solid electrolytes consisting of dense ionic conductors. An oxide ceramic made of yttria-stabilized zirconia (ZrO2 and Y2O3) is suitable for this purpose, due to its high melting temperature and high stability levels.

An essential factor with ceramics is temperature control during the firing and sintering process. This is important for determining material properties and defining product qualities in combination with the raw material. It is also central to forming materials, which involves high levels of energy. For this reason, it is important to save large amounts of energy in the manufacturing process. The challenge is to safeguard or even enhance the required product standards while at the same time lowering energy consumption. Using the example of yttrium-stabilized zirconia, this would mean that crystal structures can be set to cubic, tetragonal, or monoclinic by means of suitable process controls, cooling, and tempering processes, whereby desired or undesired quantity fluctuations can occur due to phase transformations.

It is therefore common to use higher firing and sintering temperatures in the manufacturing process to achieve good product quality. One way to optimize materials and improve sustainability is to regulate temperatures in the heating and cooling cycle. To make kiln processes more energy-efficient while maintaining the same or higher product quality, the method of choice is a holistic approach that involves modeling kiln processes and material properties in combination with applied material testing. High-performance ceramic materials are often subject to thermal shock during use, or they need to be highly resistant to thermal shock, so suitable material properties are required as a critical design feature of components. To assess the quality of optimized furnace processes, one suitable method is to evaluate thermal shock resistance in the produced ceramics. The challenge when doing this is that existing material testing methods for thermal shock resistance only provide qualitative information. It is not possible to apply such qualitative findings to simulation-based models used to design components or predict service life.

MODELING AND SIMULATION IN MATERIAL TESTING

What is the best way to come up with reliable material parameters in settings that closely resemble actual applications? To find out, the Steinbeis team led by Steinbeis Entrepreneur Prof. Dr.-Ing. Verena Merklinger from the Department of Mechanical Engineering at the HTWG Konstanz uses modeling and simulation (based on digital solutions) in combination with



Schematic representation of the manufacturing process of ceramics based on the example of material properties

application-based material testing. Their aim is to design components and products with a strong focus on practical application, but also to optimize kiln processes to make them energy-efficient.

"The first step is to use modeling and simulation to plan and design test specimens for materials testing. This goes hand in hand with the use of fewer materials in order to optimize the design of test specimens, to invest less energy and effort in testing, and to cut development time. This targeted and efficient approach to test specimen design also optimizes material testing," explains Verena Merklinger. The next step is to ascertain data and material properties by conducting material testing in scenarios that closely resemble actual applications and to feed this information into the simulation model, thereby optimizing it. Subsequently, material testing is repeated to validate the simulation model.

This iterative approach gradually improves the quality of the model, resulting in more accurate simulation models that are much more reliable. At the same time, this data lays a foundation for creating reliable designs and, based on this, upscaling to larger components. Transferring results to similar components also significantly shortens subsequent development times, underpinning material testing and the component design process with methods that are energy-efficient and save resources. This approach is also suitable for optimizing firing and sintering processes based on more energy-efficient temperature controls.

The Steinbeis Enterprise owns a thermal shock test rig which has been specifically designed to determine thermomechanical properties. Integrating the device into quality assurance processes makes it possible to improve the characterization and definition of the potential impact of changes on production processes. This approach also lays an important foundation for optimizing manufacturing processes, for example when lowering processing temperatures to save energy or when using hydrogen in furnace processes, changing temperature profiles but maintaining product quality requirements.

For the experts at Steinbeis, the project with VM&P marked the beginning of a partnership with an expert company in the modeling, simulation, and optimization of furnace processes. Material testing at the Steinbeis Research Center is based closely on actual application, adapted as required to the needs of each customer. The center also evaluates and interprets results in order to derive recommended actions.

SUSTAINABILITY REQUIRES THE HOLISTIC ANALYSIS OF PROCESS CHAINS

The oxide ceramics project highlights the fact that ceramics are essential for future green technologies. It also shows that sustainability affects the entire process chain, right through to quality assessment and materials testing. Adopting a systematic and holistic approach in order to take the entire process chain – including application – into account not only plays an essential role in the sustainability of ceramic materials, it is also important for metals, polymers, and composites. As a result, in addition to observing and assessing thermomechanical properties, an important part of sustainable systems and technologies is considering and analyzing stress imposed on component systems by corrosion and wear. The sustainability methods used by the experts at the Application Center for Sustainable Materials, Technologies & Processes are therefore not limited to materials, but also encompass and support innovation and development processes, including modeling and simulation in combination with applied materials testing.

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SYSTEMATIC RECYCLING

SYSTEMIC METHODS OF RESOURCE-EFFICIENT MANAGEMENT

The Green Deal marks an important move by the EU to do more in terms of sustainability: The EU Member States want to be climate-neutral by 2050. One important element of this is the circular economy, which entails turning waste back into recyclable materials. Sounds like a good idea, but it usually requires practical measures to convert materials. Waste materials are only really recyclable if they are easy and inexpensive to process and convert back into usable products. The extent to which waste is also of value after use basically depends on the quality of waste materials and the methods used to process them. Resource Technology and Management, the Steinbeis Transfer Center in Halle, is working on a number of issues relating to recycling, renewable raw materials, and regenerative energy systems.

A genuine zero-waste strategy keeps a variety of factors in mind – how products are developed, how they are made, but even before that: how they can be recycled after use. It must be possible to estimate the effort required to reprocess materials, and this should be one factor that is considered when designing products.

Under the German Packaging Act, 63% of packaging plastics must be recycled by 2022. Currently, however, more than half of all collected plastic waste is still recycled for energy production or simply exported. This means that each year, roughly 5.35 million metric tons of post-consumer plastic waste is collected.[1] 2.06 million tons of these materials enter the recycling chain. This does not mean that they are used to produce new materials, however. After exports, some of which end up in unknown places, 1.33 million tons of post-consumer waste goes to recycling companies each year. They use the materials to produce 1.02 million tons of recyclates (materials or objects made from recycled materials).

It's worth mentioning PET bottle recycling at this point. Because bottles are collected through the store recycling system in Germany and sorted by type, almost 100% of PET bottles can be processed into recyclates. The same applies to post-industrial waste (e.g. offcuts from production lines), providing access to a further 0.93 million tons of recyclates. Achieving the high recycling rates of dedicated PET waste bottle systems is impossible for most forms of post-consumer waste, such as household waste collected through the German "yellow garbage can" program.[1]

Because of the large number of impurities – from use, collection, or plastic being comprised of an unmanageable mixture of substances – it is difficult to

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A GENUINE ZERO-WASTE STRATEGY KEEPS A VARIETY OF FACTORS IN MIND – HOW PRODUCTS ARE DEVELOPED, HOW THEY ARE MADE, BUT EVEN BEFORE THAT: HOW THEY CAN BE RECYCLED AFTER USE.

produce clearly defined, single-variety recyclates. It takes a great deal of effort to sort and clean waste, yet processes still result in large volumes of residual materials that cannot be recycled. In certain areas – such as packaging that comes into contact with food and products subject to tight technical requirements or warranty issues – it is rare for recyclates obtained from waste to be considered for use in materials.

Currently, one option for sidestepping this is chemical recycling, which makes it possible to convert contaminated plastic waste into virgin plastic. Even ignoring this option in the recycling rates stipulated under the German Packaging Act, many companies are trying to adopt international approaches to thermochemical processes.

SO IS CHEMICAL RECYCLING A UNIVERSAL SOLUTION?

As part of a study funded by the German Federal Environmental Foundation (DBU), Merseburg University of Applied Sciences has been examining these issues in collaboration with Resource Technology and Management, the Steinbeis Transfer Center. The project team examined two processes in order to investigate the extent to which they also deliver good products using real waste.

The study highlighted major technological challenges. Among other things, interference is caused by all kinds of deposits, corrosion, and waste processing. Processes are significantly more complex than mechanical recycling, and technical and commercial risk should not be underestimated. Experiments showed that even low impurity levels can have a major impact on the chemical recycling process, jeopardizing the economic viability of operating a plant based on thermochemical conversion.[2]

In addition to robust, technical processes, the actual composition of plastic waste will also play a decisive role in establishing a resource-efficient circular economy and achieving economic viability. In the same way that single-variety plastic waste makes it easier to achieve effective mechanical recycling and produce high-quality regranulate, being able to determine the makeup of plastic waste makes it possible to operate chemical recycling efficiently.

Access to (ideally pure) plastic waste streams for mechanical and chemical recycling can be improved by ensuring products are produced according to design requirements aimed at enabling efficient recycling (design for recycling [3, 4]) and by ensuring waste is subsequently collected and sorted as extensively and as carefully as possible. There are also other measures that would help promote the Circular Economy (e.g. [5, 6]).

The Steinbeis experts were not surprised by the results of the study – they are generally applicable to any aspect of doing business and saving resources. If you run an orderly household and keep things neat and tidy, it's a lot less effort looking for things and cleaning them when you need them. If it's easy to distinguish one item from another and keep items separate, ideally it just takes one motion of the hand to reuse things. This is a trite comparison based on everyday life, but it is tremendously important when it comes to establishing a circular economy.

Under certain circumstances, recycling rates can be improved by adapting existing product and process requirements, such as changing the appearance of products or functional aspects, by optimizing cost structures in manufacturing, or by offering the convenience of one-for-all garbage cans.

On a fundamental level:

- The simpler a product in terms of fabrication (few components or substances) and the easier it is to take products apart according to component type, the easier it is and the less effort is required to clean, separate, and reuse them
- The higher the quality of waste, the more effectively residual value can be preserved through recycling
- Reusing materials, for example through repair and deposit systems, is preferable to recycling (waste hierarchy)
- The easier it is for consumers to distinguish between and dispose of different types of waste and the more incentives there are to do so properly (money-back programs), the fewer materials are disposed of incorrectly or illegally
- The more accurately materials are collected and/or sorted by type, the more uniformly materials can be processed, traded, and made available to recyclers and processors in order to establish closed-loop material cycles

Recycling and production companies can thus confidently draw on a broad and defined selection of materials in order to make more recyclable products out of materials again, as is basically already the case with PET bottle recycling. This would mark an important step in achieving a genuine circular economy.

FURTHER READING

As part of the study conducted for the DBU, Merseburg University of Applied Sciences and the Resource Technology and Management Steinbeis Transfer Center have published a list of recommendations for the chemical recycling process in Steinbeis Edition:

Mathias Seitz, Valentin Cepus, Markus Klätte, Dirk Thamm, Martin Pohl
Evaluation under Real Conditions of Thermal-Chemical Depolymerization Technologies (Decomposition Processes) for Recycling of Plastic Waste

2020 | E-book (pdf) | ISBN 978-3-95663-234-1 | free

Available at **www.steinbeis-edition.de/shop**

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"WE NEED TO BUILD A BRIDGE BETWEEN THE GLOOMY AND THE GOOD."

AN INTERVIEW WITH PROFESSOR DR. TORSTEN SCHÄFER, STEINBEIS ENTREPRENEUR AND AN EXPERT IN SUSTAINABILITY AND CLIMATE COMMUNICATION

There is broad consensus among politicians, the business community, and society in general that sustainability is an important issue. But noble words should be followed by action and this, in turn, should be communicated to others in words. TRANSFER magazine spoke with Steinbeis expert Professor Dr. Torsten Schäfer about the importance of communication in achieving sustainability goals, about credibility, and about the fear of being dictated to. Professor Schäfer also told us what doughnuts have to do with sustainability.

Hello Professor Schäfer. One area of focus in your work lies in sustainability and climate communication. Could you tell our readers what that actually means?

As a professor of journalism and text production at Darmstadt University of Applied Sciences, my work with students involves conducting critical assessments of digitech, how it reflects on society and, above all, how it relates to environmentalism, i.e. sustainability. On the one hand, my work is about teaching others the tools of stylistics, storytelling, research, and language, but on the other hand I also teach climate communications and climate journalism. It's a highly interdisciplinary role and I also write quite a lot of papers and publications. But of course, we're a university of applied sciences so the

POLITICIANS AND THE BUSINESS COMMUNITY STILL HAVEN'T INTERNALIZED THE IMPLICATIONS OF THE SITUATION WE'RE IN RIGHT NOW, EVEN IF A NUMBER OF THINGS ARE NOW MOVING TOWARD CLIMATE PROTECTION AND SUSTAINABILITY.

skills of the trade are important: How do you write reports, features, or essays dealing with climate issues? We also discuss the practicalities of climate, climate protection, and climate communication, as well as sustainable development and its normative ethical function, within the underlying ethical context.

I've been blogging on environmental journalism for 13 years and have been watching how it's evolved for some time now. It's developed into a scene where there's a lot happening right now in terms of climate communication. A really important thing about this is that we need to establish an ethos for communication and journalism, one that creates a framework of values for climate change, climate action, climate communication, and – underpinning that – sustainable development: universal values that should apply to everything we do. I deliberately say "should" because this is about normative motivations. This is about understanding that sustainability and climate protection, but above all the protection of species, are no longer isolated issues. They must be given genuine priority in every form of business, communication, and society.

What role does communication play in developing and implementing the strategies of a sustainable economy and society?

There's an extremely broad spectrum of strategies when it comes to sustainable business and society. Environmental communication provides a basis for society to understand the current environmental situation it finds itself in: the Anthropocene, a new geological epoch, part of the sixth great period of species extinction in the history of the Earth. Politicians and the business community still haven't internalized the implications of the situation we're in right now, even if a number of things are now moving toward climate protection and sustainability. Sure, media and communication are an essential part of understanding this change, but they can't instigate change. To do that, different things are needed to create impact, such as role models and incentives, but also much stricter legislation and significantly tighter restrictions. We need to choose different starting points and start much earlier – in education, at schools, in new curricula. That's why communication is very important, but it's not everything.

In your opinion, what constitutes successful communication, especially when it comes to sustainability topics?

It's tremendously important for companies to approach things from a holistic angle; there mustn't be any greenwashing in external communication. So that means entire processes within companies – from the production chain and resourcing to marketing and sales – should genuinely revolve around sustainability. The Supply Chain Act is already providing the right pointers for this, even if it doesn't give much attention to the environment. There is also a strong social vein running through sustainability. It's important where resources originate from and the conditions they're procured under.

A really crucial aspect for business is that you no longer follow the now-outdated three pillars of sustainability. The never-ending triangle of business, the environment, and social issues led to so much greenwashing and it's now been superseded in research. We should focus more on the concept of planetary boundaries, which was developed by environmental scientists in Sweden in 2009. Their model shows that the Earth has a framework in which we live and do business, and that there is a clear list of priorities: from the biosphere, to the sociosphere, and finally to the technosphere. In doing so, we should take guidance from the sustainability model developed by British scientist Kate Raworth. This is also

known as the Doughnut Model, because it's formed by rings. There's a clearly defined development framework, which is determined by the Earth's limited resources and comprises human needs, social aspects, and economic factors.

In my view, there's so much angst in society – especially in Germany – that maybe we're being patronized when it comes to sustainability issues. I believe it stems from a false understanding of liberalism, that communication shouldn't in any way try to educate or parent people. Sure, communication can't be too strict – like a know-it-all. But communication can and in fact should in some ways help us move forward and be educational. If people wag a finger, it shouldn't be in isolation – we need communication to point more to the potential to succeed, we need role models and more constructive content. And then comes the big "however": The danger with journalism, just like corporate communication and scientific communication, is that we only produce nice, quick, upbeat stories. We need to build a bridge between the gloomy and the good, and this should work in harmony. Between destruction and beauty. Between what we're losing and what works.

Are there any things companies should be particularly wary about in their sustainability and climate communication?

The most important thing is credibility. You should only communicate what's really happening behind the veil, and ideally there shouldn't be much of a veil at all, you should be really transparent. Of course there are some things that need protecting, when you're dealing with advantages in know-how or protected information. But despite this, transparency is something that's strongly expected now by the general public and consumers. There are strong overlaps between authenticity and credibility on the one hand, and, on the other, how sustainably a company goes about its business. As I said, if a firm starts greenwashing, or only picks a few areas to be sustainable in, it'll have problems communicating credibly because that gets noticed by members of the general public, who understand these things. A critical consumer base has developed over the last four or five years, especially when it comes to sustainability and procurement practices. Resources, production and supply chains, sustainable consumption – these are big issues, even if, for example, still less than 10% of all German food and drinks consumed are organic.

Companies can't change all their processes in a couple of few years. So I think it's important to remember the context. Look at electric vehicles: If it's not obvious where the electricity you need actually comes from, you're leaving out a really important piece of contextual information. Then there's the credibility issue regarding how you'll make cars in the future and use different materials. Rare-earth elements are a huge issue in this respect. We've reached a point in the current climate debate where it's time to lay a course: We're learning a great deal at the moment about ourselves as a society, but also about environmental interdependencies and how easy it is for a society to be thrown out of kilter. And to understand all of this, it's also important that the debate regarding the climate, nature, and the environment doesn't just come back to technology the whole time.

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SUSTAINABLE AND EFFECTIVE: VENTURE CAPITAL INVESTMENTS IN COMPANIES WITH A FOCUS ON THE FUTURE

STEINBEIS CONSULTANTS OFFER SUCCESSFUL SUPPORT DURING THE SERIES B FUNDING ROUND OF A VENTURE STUDIO SPECIALIZING IN THE DEVELOPMENT OF BASIC TECHNOLOGY

Innovation is crucial for any company, market, or society to move forward – the very lifeblood of growth and prosperity. And technology is a pivotal part of innovation. For example, emerging technology has the potential to accelerate trading based on machine technology, or open the door to new approaches to value-sharing, or improve access to innovations, developments, and financial services. Next Big Thing (NBT), a venture studio for deep tech companies, is helping to drive the development and commercialization of basic technology, thus supporting the long-term generation of value-added in the economy and society. The Frankfurt-based Steinbeis Consulting Center for Corporate Finance and Investments has owned a stake in NBT since 2018.

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The Steinbeis Consulting Center works alongside new and expanding enterprises like NBT by offering smart money, a hybrid approach to providing capital and business development support. NBT is a venture studio from Berlin. Since 2016 it has been working as a co-founder alongside business start-ups and entrepreneurs to develop ventures in the so-called machine economy. This is an area of industry comprising technology such as the internet of things, artificial intelligence, and distributed ledger solutions. Bringing such forms of technology together raises the curtain on completely new business

models, such as models revolving around automated production. The goal is to pool the experience of thought leaders and technology experts in order to drive long-term transformation on behalf of companies, up-and-coming business founders, and investors. Its portfolio currently spans 15 deep tech ventures, from a variety of sectors of industry.

The venture development experts at NBT have developed their own method for using risk capital to set up companies, offering a variety of high-impact solutions to the challenges of the contemporary and future economy. The support they provide to their new B2B companies is based on long-term perspectives, offering development toolkits, innovation strategies, technical know-how, mentoring, and smart funding. Leveraging synergies between venture companies, business partners, and other collaborative stakeholders makes it possible to create an ecosystem for global leaders, tailored to the needs of future markets.

SUSTAINABILITY – AN IMPORTANT ASPECT OF MODERN INVESTMENT

The team at the Steinbeis Consulting Center successfully pulled together €19 million for the company in the latest funding round. 90% of capital from this round of funding was sourced through the network of Steinbeis Consultants and their contacts to institutional investors. "For us, but also for the majority of institutional co-investors – such as family offices, foundations, and affluent private individuals – it's not just important to look at the business model of the new and expanding company; sustainability factors also play an important role," says Steinbeis Entrepreneur Christian Schulte, explaining the logic behind the investment. According to Schulte, aside from meeting so-called exclusion criteria and a long list of key performance indicators relating to sustainable development, NBT and its portfolio of companies also meet other key criteria with a bearing on innovation and the setting up and establishment of ecosystems.

"For Europe and Germany, it's quite clear that this currently represents an opportunity to develop new digital basic technologies in the B2B area. American and Asian platform providers have already been working the soil in the areas of e-commerce and most B2C applications," explains Harald Zapp, founder and CEO of NBT. "The area we really stand to gain in is the up-and-coming machine economy and the classic areas of business to business. Bold and disruptive innovation in this area will ensure that as a business location we will remain at the forefront in Germany in the future – with a clear focus."

WIN-WIN FOR INVESTORS AND CAPITAL BORROWERS

One aspect that is particularly important in this respect is collaboration between NBT and its investors, which is by no means a one-way street or merely restricted to financial commitments on behalf of investors. Many of the institutional funders see strategic benefit in this arrangement. Being able to exchange ideas and work alongside the venture studio allows investors to benefit sustainably and in the long term from know-how and knowledge-sharing within their own companies.

There is another aspect to this, however, since the ongoing profitable expansion of new ventures or business models is only one side of the coin. NBT has a clear area of focus: Their starting point for setting up and establishing companies and platform technology in the long term is Germany and Europe. This also makes it possible to generate long-term economic and societal value from deep-tech innovation in the machine economy.

The Steinbeis experts will continue to collaborate closely with NBT in the future. The Steinbeis Consulting Center is opening its doors to a variety of C-level executives at companies, in addition to offering contacts to institutional co-investors, which also helps the companies in the NBT portfolio with sustainable and long-term expansion.

SUSTAINABLE INVESTMENTS CONTINUE TO GROW

Sustainable cash investments and other forms of investment are not just a global phenomenon; significant money flows into this area in Germany. According to a study conducted by the German Forum for Sustainable Cash Investments (FNG), in late 2020 the overall value of investments in these asset classes in Germany amounted to roughly €335 billion. That represents a rise of 25% on the previous year. These investments are not only a reflection of sustainable funds and mandates, but also of sustainably managed client and proprietary investments. 82% of cash flowing into sustainable investments comes from institutional investors. For the financial and investment experts at the Steinbeis Consulting Center for Corporate Finance and Investments, sustainable forms of investment are an important asset category. Every year, a significant number of successfully expanding European B2B companies are also taken over by firms and investors outside Europe. This protects the future interests of companies, but it also poses a challenge for Germany and Europe because this is not just about intellectual property and know-how, but in tangible terms: jobs.

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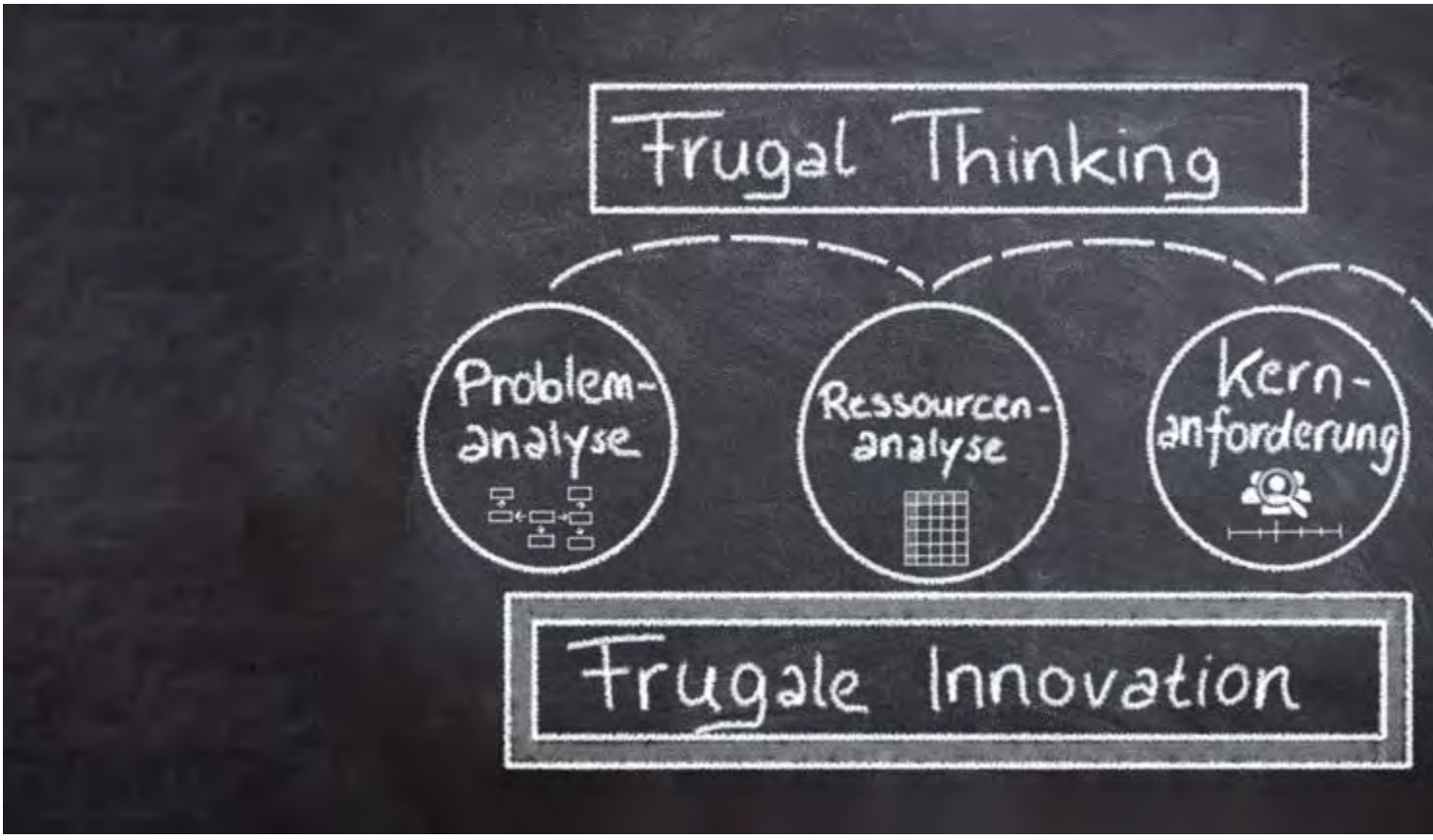

A NEW AND SUSTAINABLE UNDERSTANDING OF INNOVATION

STEINBEIS EXPERTS HELP COMPANIES TO (RE)THINK FRUGALLY

Innovative products, innovative concepts, innovative thinking. Innovation has become one of those magic words of modern business processes, a concept that – applied rigorously – will apparently never fail to result in growth and advancement. A team of experts at the Steinbeis Consulting Center for Frugal Technologies has been examining whether that really is the case, also investigating the social benefits of innovative products. The focus of their work lies in the concept of frugality. What sustainability actually means – and the role it plays – have been pulled together for TRANSFER magazine by Steinbeis experts Rebekka Reichert and Wolfgang Heisel.

In 1934, the economist Joseph Schumpeter defined innovation as the implementation of "new combinations."[1] If you dig deeper into the term "innovation" in a modern context, it quickly becomes evident that it often cannot do justice to the challenges of everyday life and that a realignment in thinking is needed, particularly in the direction of climate change and its devastating impacts, or the shortage of natural resources and fair allocation. The modern market economy has no choice but to adopt an agile reaction to global developments, and innovators need to find ways to turn novel ideas into innovations that add social value against a backdrop of continually changing circumstances. A recent example of this is the pandemic caused by Covid-19, which has completely thrown value chains, demand, and supply into disarray.

TIME TO RETHINK AND INNOVATE FRUGALLY

Conventional approaches will no longer solve this problem. Things become interesting when you look at outsourced production and services. From an economic standpoint, the factors that speak in favor of such approaches are obvious. Labor costs are low, production requirements are minimal, and transportation costs are generally negigi-

ble. But in the meantime, wages in China are too high to produce in high volumes and still save money. In many cases, German business is in China for the Chinese. As a result, for years German firms have been striving to shift production to other Asian countries, particularly Vietnam, Thailand, and Malaysia. By adopting a so-called China Plus One strategy, they can also avoid the risk of becoming completely dependent on one country. The idea is to spread the production of important (or crucial) products – such as medicines – across several countries, to increasingly work with local partners within each country, and to extend product lines to include regional commodities and delivery hubs.

That said, this is not the only strategy. "The time has come to think again and develop a new understanding of innovation," says Wolfgang Heisel, Steinbeis Entrepreneur at the Steinbeis Consulting Center for Frugal Technologies. The concept of frugal innovation puts an exciting new light on business, pulling together seemingly irreconcilable aims such as economic growth, sustainability, and low costs by focusing on the essentials. Looking forward, rethinking processes, and applying frugal criteria are an opportunity to forge partnerships beyond domestic boundaries. The aim and aspiration of frugal innovation (often referred to as a hack, or jugaad in India) is to keep things simple. Add-on functions that offer no significant benefit can be left out, and basic functions can be adapted, improved, or added. The outcome is a product that is sustainable and a better match for each market than the alternatives.

SO HOW DOES FRUGAL INNOVATION WORK?

There is no uniform list of criteria that need to be met to engage in frugal innovation. The most commonly named factors are a substantial reduction in costs, an optimized level of performance, and a focus on core functions. [2] Firms of any size can engage in frugal innovation. For both profit-oriented companies and end customers, but also for other stakeholders, it offers a tremendous opportunity to develop products that will become successfully established in the market. To enter emerging markets, such as India, it is crucial to respond to customer needs. It is also important to focus on the sustainability of innovations. Incorporating these two factors into interpretations of frugal innovation offers clear benefits.

Thinking again can also help you offer a diversity of options yet still respond to customer needs in different countries. Adopting this approach can also make it easier to overcome the kinds of restrictions encountered during the lockdown phase of the Covid-19 pandemic. It becomes possible to produce within one country if simpler technologies and equipment can be designed and used in such a way that they combine basic functions with optimized performance, and are designed to be inexpensive. "More simple" doesn't necessarily mean "worse" or technologically outdated. Quite the opposite: "More simple" means that end products can be downscaled to exclude expensive and often complex components – or parts that are expensive to import – so they can be replaced by locally available and cheaper components that match application scenarios – which would also significantly reduce costs. Frugal thinking leads to a whole host of products and services, resulting in unique solutions that – due to how resources are assessed and used – can also be sustainable. And that is something that is urgently needed, even if it happens in small steps.

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[1] Schumpeter 2013, S. 100–101

[2] Weyrauch und Herstatt 2017

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SUSTAINABLE SUPPLY CHAINS – A KEY PREREQUISITE FOR SUCCESS

STEINBEIS EXPERTS SUPPORT THE EUROPEAN CLIMATE INITIATIVE (EUKI)

Developments on an EU and national level regarding sustainability issues are unsettling for companies, who can only ask themselves what will happen next – will we still be able to run our business profitably? How high will carbon levies go in the future? Emerging technology is not the only factor considered the main driver or safeguard when it comes to "clean" economic growth or sustainable development. The future will also increasingly depend on how raw materials are sourced. Steinbeis Entrepreneur and raw materials expert Dr.-Ing. Alexandra Pehlken offers an insight into the European Green Deal and how it affects raw material supply chains.

Alexandra Pehlken from Resource, the Steinbeis Transfer Center, states: "Company supply chains are particularly efficient, secure, and resilient if they meet sustainability criteria (social, economic, ecological) and avoid unnecessary carbon emissions." Investing more money in this area in the short term pays off in the form of long-term success. Assuming carbon levies will probably rise in the future rather than fall, it would be impossible for companies to ignore emissions – especially when it comes to primary materials from mining, which are energy-intensive enough just to extract and process, and therefore already arrive with a huge backpack of emissions even before being processed into usable products. One measure that should be considered when planning in this area is recycling, since processing secondary (i.e. recycled) materials consumes less energy. One often cited example is secondary aluminum, which only requires 5% of the energy to recycle compared to primary aluminum. [1]

A recent study by the Federation of German Industries (BDI) and Deloitte puts the savings in greenhouse gas emissions that can be made by using circular economy methods at 5.5 million tons of carbon per year. [2]

RAW MATERIAL TRACEABILITY AND THE EU GREEN DEAL

Examples taken from the German Supply Chain Act [3] and the SCIP database (substances of concern in articles as such or in complex objects (products) [4]) confirm that knowing which materials are being used and ensuring they are traceable will be an issue many companies will have to face in the future. Whereas the Supply Chain Act mainly focuses on duty of care obligations, particularly when it comes to human rights violations, the SCIP Database lays down clear expectations regarding quantitative evidence of used raw materials. Since January 5, 2021, companies supplying the EU with products containing substances of particular concern in a concentration of more than 0.1 percent by weight must provide this information. This makes such information available to recycling companies and should ensure greater transparency in product recycling. Time will tell whether this process really works.

The developments in the EU show very clearly that production must adapt. Achieving climate and environmental goals in line with the Green Deal requires new industry policies based on the circular economy. Recycling will become increasingly important, because the priority now lies in the value offered by raw materials and no longer in how waste is dealt with. According to EU criticality assessments, many materials found in products are already considered "critical raw materials" due to their importance to the economy and the risks involved in sourcing them. Some are classified as "conflict minerals" due to severe human rights violations or issues related to interna-

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A CLOSER LOOK AT SUSTAINABLE SUPPLY CHAINS AND MATERIAL PRODUCTION

- EU RMIS (raw materials information system): **https://rmis.jrc.ec.europa.eu**
- The German Mineral Resources Agency (DERA): **https://www.deutsche-rohstoffagentur.de**
- The EU Green Deal: **https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_de**
- EU Criticality Assessment **https://ec.europa.eu/growth/sectors/raw-materials/specific-interest/critical_en**
- Conflict minerals: **https://ec.europa.eu/trade/policy/in-focus/conflict-minerals-regulation/regulation-explained/index_de.htm**

tional humanitarian law due to the way they are extracted and traded. The European Commission has already placed an action plan on the agenda for critical raw materials, which has been published on an information portal called the raw material information system (RMIS) [5]. This plan places particular emphasis on returning raw materials to production. "Using secondary materials offers companies significant benefits because they're rarely used as political footballs. This is because we have too much waste," explains Pehlken. Meaningful collaboration between producers and recyclers – starting with product design – results in secondary materials of a better quality, reductions in emissions, shorter journeys, and ultimately more efficiency along the entire process chain. This is not just about sustainability factors, it also affects company image and employee loyalty.

The experts at Resource, the Steinbeis Transfer Center, are advising and helping companies not only to plan sustainability strategies, but also to determine internal material flows in the short and medium term and pinpoint the potential to cut carbon emissions. They also conduct risk assessments on existing supply chains and associated materials.

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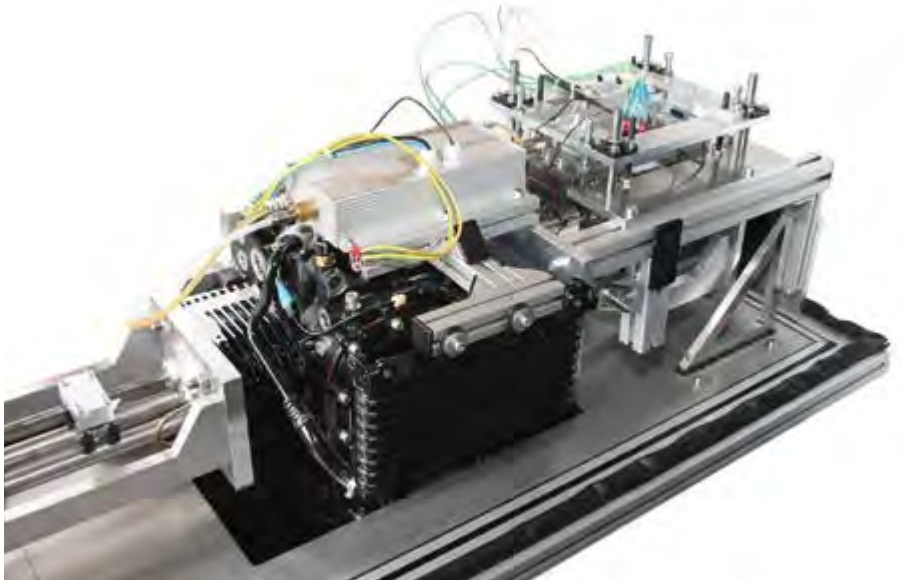
LESS FRICTION, MORE EFFICIENCY

STEINBEIS TESTING SYSTEM HELPS COMPANIES OPTIMIZE ENERGY EFFICIENCY

Funded by the German federal government, the PROMETHEUS project aims to reduce friction caused by tribological contact in engines. Experts at the Steinbeis Innovation Center for Materials and Surface Technology in Friedrichshafen have taken up this challenge by developing an innovative testing system based on a physical model of a oscillating long stroke tribometer. A number of leading manufacturers and automotive suppliers stand to benefit from the results by improving the energy efficiency of their products and systems.



Climate protection targets set by policymakers should result in long-term reductions in greenhouse gas emissions of 80 to 95%. Cars and commercial vehicles cause a significant share of these emissions, but they also account for a major proportion of the economy, so they represent an important point of leverage when it comes to implementing measures aimed at improving energy efficiency. Since it will still be some time before all vehicles are converted to electric engines, further development work needs to be carried out on existing systems to improve energy efficiency. Given the design of combustion engines, both transmission systems and bearings play a particularly important role when it comes to environmental and financial factors. In specific terms, optimizing friction within piston assemblies not only makes it possible to reduce direct consumption; it also allows improvements to be made when it comes to thermal loss and wear.

THE GOAL OF PROMETHEUS: REDUCING FRICTION

These challenges are now the focal point of the PROMETHEUS project funded by the German Federal Ministry for Economic Affairs and Energy (BMWi). The aim of this project is to optimize friction in engines by making use of tribioactive high-performance carbon and iron-based coatings and lubricants. The project will be carried out by a consortium, pooling the comprehensive know-how of OEMs, suppliers, and related institutes in order to arrive at a holistic solution to the project brief.

The overarching aim of PROMETHEUS is to reduce the friction caused by tribological contacts, especially on piston rings and cylinder walls. The idea is to cut CO_2 emissions and energy costs by significantly improving friction properties. Another priority will be to use wear-reducing coatings to extend the service life of components, which will also make it possible to maximize energy efficiency across entire systems.

THE MODEL OSCILLATING LONG STROKE TRIBOMETER – AN INNOVATIVE TESTING SYSTEM

The Steinbeis experts from Friedrichshafen are supporting the goals of the PROMETHEUS project by developing an innovative testing system. Their model of a oscillating long stroke tribometer is being combined with novel evaluation methods aimed at characterizing tribological properties on a test specimen level. Their work has shown that conventional testing based on short-stroke oscillation or rotation tribometers only provides limited insights into systems. To conduct comprehensive assessments of tribological systems in combustion engines, fundamental development work is still required on the testing systems used to investigate individual specimens.

To determine relevant parameters, among other things, combustion chamber pressure, piston speeds, lubricant properties, and the condition and morphology of surfaces are being looked at. Because pressure inside the combustion chamber changes over time, as does the piston speed, tribological behavior between the piston assembly and the cylinder wall is transient. To single out optimized tribological systems, it is important to ensure they have

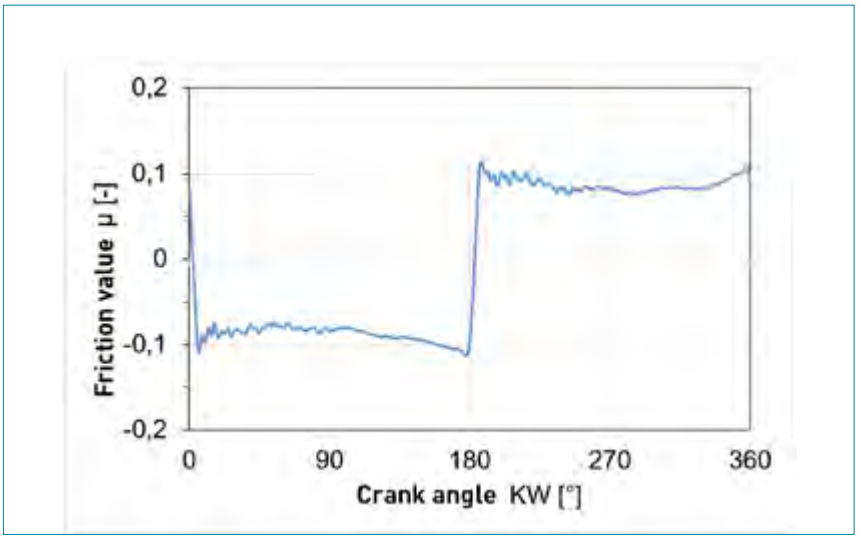
no negative impacts on other system components, particularly when it comes to wear. To check this, selected tribosystems are being examined for friction and wear properties.

The drive system being used for the oscillating long stroke tribometer is based on the conventional crankshaft drive of a serial engine with a stroke of 73 mm. The drive is powered by an electric motor, and a coupling system is being used to reduce torsional vibration. The cylinder heads are removed and a linear bearing system is fitted horizontally onto the crankshaft drive with the lubrication circuit left intact on the crankshaft drive. The axial force exerted within the measurement system is gauged by using two force transducers. The position of the piston ring in relation to the cylinder liner is determined by an inductive speed sensor installed on the crankshaft. To measure friction force, a piezoelectric sensor is used. In addition, a piezoelectric accelerometer is positioned to detect inertial forces.

To lubricate the test assembly, it is fitted with a separate, heated oil supply unit, which has a nozzle aimed dead-center at the bottom of the cylinder liner. To ensure lubrication is uniform, a twin-substance nozzle is used. Being able to adjust the lubricant flow precisely as required makes it possible to apply lubricant at a rate ranging from 10 ml/min down to a minimum of 1 µl/min. To prevent the temperature from dipping, the lubricant and compressed air are heated. The heating system, which is controlled by thermocouples, regulates the temperature of the entire system up to 130°C.

THE POTENTIAL OFFERED BY THE STEINBEIS TESTING SYSTEM

The innovative oscillating long stroke tribometer makes it possible to individually characterizing serially produced components or materials such as piston rings, cylinder liners, and engine oils. Combining the oscillating motion kinematics of a crank mechanism with a long stroke makes it possible to assess operating factors with a bearing on energy issues within the tribological system of the piston group. The PROMETHEUS project can thus investigate the friction coefficients and wear potential of newly developed piston ring coatings. Examples of the results are shown on the graph.



An example of results after investigating the potential coefficient of friction and wear on newly developed piston ring coatings.

The design of the test rig allows friction values to be displayed as a function of the crank angle. This also allows friction values to be assigned to individual functional areas of the components. For example, the top and bottom dead centers have higher friction values than the areas of maximum piston speed.

The results from the model tribometer lay a foundation for, among other things, pre-selecting cost- and energy-intensive single-cylinder and full-engine tests. Furthermore, correlations in terms of transferability to other areas can be investigated, combined with the simulated mapping of different abstraction levels (tribometer/single cylinder test/full engine test). Being able to transfer findings to other areas could prove to be of benefit when it comes to future optimizations made to tribological systems. In principle, it is also conceivable that testing could be carried out on other tribological systems subject to rapid oscillating movements.

The end users who will benefit from this include the BMW Group, MAN Truck & Bus, and Rolls-Royce Power Systems. This has been made possible thanks to close collaboration between the component and system suppliers Fuchs Lubricants, Schaeffler Technologies, Tenneco, and the equipment manufacturer VTD Vacuum Technology. The team led by Steinbeis experts Prof. Dr. Reinhold Holbein and Benjamin Kröger is acting as a research and development partner alongside AVL Deutschland, Fraunhofer IWS, Fraunhofer IWM, Fraunhofer LBF, and TU Dresden, thus pooling expertise in tribological fundamentals, coating development, component testing, and simulation.

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NO CHANGE WITHOUT CHANGING YOURSELF

STEINBEIS EXPERT DR.-ING. JÜRGEN JÄHNERT DISCUSSES SUSTAINABILITY AND ITS ROLE AS A NEW LEITMOTIV OF BUSINESS AND POLITICS

Our economy is in the midst of a transformation process, primarily driven by the availability of digital technologies. But "going digital" doesn't automatically result in sustainable development. True transformation requires both individuals and companies as a whole to rid themselves of old habits and entrenched paradigms. Doing so will be the only way to seize opportunities in the future, writes Dr.-Ing. Jürgen Jähnert (bwcon GmbH), the author of this latest Steinbeis Swipe.

From a systemic standpoint, transformation requires a system to move on from its established states in order to seek a new state of equilibrium. This period of instability – i.e. the phase of transformation – is stimulated by the availability of emerging technology hand in hand with new social dynamics. Together, these factors place pressure on a system and initiate a transformation process. As a rule, the technologies that come into effect during this process are not necessarily new, but they have reached a certain stage of maturity or readiness and are available on the market for an attractive price. This paves the way for technologies to converge and be used economically in a variety of fields of application. New social challenges also act as catalysts for change, as witnessed for example with global warming, which stems from the fact that we have spent 300 years establishing an economic system that is proportionally over-dependent on the mining of natural resources. After a delay of a number of decades, our tremendously high consumption of natural resources has resulted in global warming.

A SPANNER IN THE WORKS OF SUSTAINABILITY

The race is on to reach consensus under a banner entitled sustainability, which has become a kind of leitmotiv for a new and stable system. Typically, reaching consensus requires broad-scale change on a societal level. When pressure mounts to make changes, there is always resistance and a moment of inertia among organizations and individuals, who fear that (compared to the current situation) things will get worse for them after the transformation process. As a result, transformation generally takes place against a backdrop of defensive battles, the root cause of which lies in fears for the future harbored by a whole host of stakeholders. Their aim is to put a stop to the transformation process, or at the very least slow it down.

On a fundamental level, if there's one thing that holds true for the process of transformation, it is that there can be no change without changing yourself. Every individual, every industry player, and every stakeholder that was part of the previous system – and thus contributed to the established state of equilibrium – must change themselves if they want to remain relevant stakeholders within the new system. The alternative is to quit the system, which for companies would mean disappearing from the market. Former giants like Kodak, Alacatel-SEL, Loewe, and Nokia have tasted the bitter pill of experience in this area. For whole economies, this can mean relinquishing relative strengths in global markets and sliding back into mediocrity.

One thing that is noticeable during a transformation process is that people are quick to notice that something needs to change, but many stakeholders either lack the ability to self-reflect or this ability was lost during a period of success carried forward from "the old days." People often preach about change, but they still don't do enough to affect that change. Why? Because there's no change without changing yourself.

OLD PARADIGMS SHOULD BE THROWN OVERBOARD

So what does this all mean when it comes to sustainability? I consider a system to be sustainable if it can keep itself stable over an extended period of time. The term sustainability often comes up within the context of how re-

sources are used. This results in stakeholders in business, science, academia, and politics establishing a system along the lines of a circular economy, only converting resources and merely "managing" – without significant net resource consumption.

The critical issue here is that there is a particular tendency among politicians – but also numerous companies – to use sustainability as a collective expression and think too much in linear terms; the complexity fueled by this transformation process is only grasped on a rudimentary level. Investing too little energy into discussing paradigms that will no longer play a role in the future system only leads to people clinging on to outdated ways of thinking. That thwarts future potential, resulting in things like companies defining digital competences for departments that will no longer exist after the transformation process – or arguments about whether the organization needs a digital transformation unit or a digital transformation officer.

Such models are only effective if people are given a mandate to drive change across the entire organization and they're in a position to assert themselves, despite resistance, and overcome the ability of established departments to dig in. If this doesn't happen, digital transformation is positioned "alongside the existing organization" so that wherever possible, everyone within the organization can keep doing things the way they always have done. And the digital transformation unit is allowed to work with them "in an advisory capacity."

TWO INSEPARABLE CONCEPTS: SUSTAINABILITY AND DIGITAL TRANSFORMATION

Sustainability, digital solutions, and digital transformation have to be discussed and tackled as part of one and the same process. When it comes to politics, this affects everything from sustainable approaches to taxation law to new arrangements affecting healthcare, social services (pensions, sickness), and even establishing clear definitions for infrastructure services offered to the nation by the state – upon which an economic system can then establish itself. Currently, there is no prospect of this happening in Germany – neither on a federal nor on a state level – although a number of moves have been initiated on a European level (namely in areas that individual states play no active role in).

It is a similar picture in business. For example, for the automotive industry, "sustainable" could mean that an organization will have to step back from the paradigm that customers want to own cars and thus the number of vehicles sold will nosedive – reflecting a leitmotiv that creates a different identity and is inward-looking. Companies would no longer talk about how many cars are sold. Instead, they would focus on things like the number of miles driven during the lifetime of a vehicle. A paradigm shift of this nature would place tremendous pressure on companies to change, across all areas, but maybe after making that change carmakers would even be more profitable.

The state government of Baden-Wuerttemberg has made a somewhat clearer commitment to the issue of sustainability than it did until now. It remains to be seen, however, whether it possesses the power to embrace and embody this transformation process within internal structures such that it transfers to the economy in Baden-Wuerttemberg and triggers the corresponding impetus to affect change. If it does, enterprises in Baden-Wuerttemberg could succeed in becoming key stakeholders in future value creation networks and thus attract strong forces of value creation to the state. If it does not, value will be created in other parts of the world. Whatever ultimately happens – there can be no change without changing yourself.

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LIFETIME CONTRIBUTIONS TO "BEST PROMOTION OF INNOVATION"

PROFESSOR JOHANN LÖHN AND STEINBEIS FOUNDATION HONORED WITH THE RUDOLF-DIESEL-MEDAILLE

On May 5, 2021, Germany's oldest innovation award, the Rudolf-Diesel-Medaille, was presented in four categories. This year, the award for Best Promotion of Innovation went to Professor Dr. Dr. h.c. mult. Johann Löhn and what is now the Steinbeis Foundation, which he was responsible for establishing. Since 1983, the foundation has made significant contributions to the promotion of innovation.

Each award winner receives the Rudolf-Diesel-Medaille, a certificate, a lapel badge, and an official memorandum.

It felt like a nice coincidence that the bestowal of the 2020/2021 Rudolf-Diesel-Medaille – in acknowledgement of Johann Löhn's lifetime achievements – should take place on the 214th birthday of the man to whom the foundation owes its name: Ferdinand von Steinbeis. The Honorary Trustee of the Steinbeis Foundation accepted the award for Best Promotion of Innovation during a virtual online ceremony. Praising his contributions, Armin Olbrich, journalist and head of the Learning and Knowledge Lab editorial team at BR ARD, offered some particularly appreciative words: "A close and long-standing comrade-in-arms describes him this way: 'Johann Löhn has true grit – not just as an authority in methodical skills, not just as an entrepreneur, but also in terms of being a totally human human-being.' Apparently, Johann Löhn does this by always focusing on the goal – and sticking with it." In celebrat-

ing his achievements, Olbrich also paid particular tribute to the Steinbeis Network, which has seen the foundation of more than 2,000 enterprises since 1983 and currently includes more than 1,100 enterprises.

THE KEY TO SUCCESS: THE CONCEPT, THE PEOPLE, AND THE GOAL

In his acceptance speech, Johann Löhn thanked the presenters at the event, Dr. Heiner Pollert, first chairperson of the German Institute of Invention, and Prof. Dr. Alexander J. Wurzer, spokesperson of the Rudolf Diesel Board of Trustees, referring once again to the crux of his success: "You need a coherent concept, you need the people to learn the routines, then you need to pursue the goal. Then there's nothing you can do to prevent success." This was also a reference to the final sentence of the laudatory speech made by Armin Olbrich: "Nothing succeeds like success!"

AWARD-WINNING INNOVATIONS

The winners in the other categories are Harald Lesch (Best Media Communication for Terra X Lesch & Co), Roland Arnold of PARAVAN (Most Sustainable Innovation), and Ortwin Goldbeck of GOLDBECK (Most Successful Innovation).

Professor Johann Löhn

The Rudolf-Diesel-Medaille.
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Germany's oldest innovation award, the Rudolf-Diesel-Medaille has been bestowed since 1953 in recognition of entrepreneurial contributions to innovation that deliver economic success. For more information (in German only), go to **rudolf-diesel-medaille.de.**

Youtube: „Verleihung der Rudolf-Diesel-Medaillen 2020/2021"

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HOW A STRONG CORPORATE CULTURE HELPS FIRMS SUCCEED WITH DIGITAL TRANSFORMATION

STEINBEIS EXPERTS EXAMINE AGILE TEAMS AT SMES AS PART OF A PILOT PROJECT

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The Ferdinand Steinbeis Institute (FSTI), Steinbeis 2i, and bwcon have joined forces with a variety of business partners as part of a project called Agile Teams – Factors Driving the Success of Cross-Company and Cross-Industry Collaboration in Digital Transformation. The pilot project is being funded by the Baden-Wuerttemberg Ministry of Economic Affairs. The focal issue of the project is how companies should support a corporate culture that allows them to succeed not just within value creation networks, but also with business partners in other industries. As part of the pilot project, an agile team has been providing insights not only into the corporate culture at d-serv, but also the firm's successful partnership with the Stuttgart-based company Koenig & Bauer MetalPrint.

The era of closed commodity cycles ended many years ago and the world of business is becoming increasingly complex, networked, and digital – as is life outside work. But how should companies deal with this complexity? Or indeed are there ways for firms to use complexity to create new value? When a company is finding it difficult to unleash innovative capabilities for itself, under its own steam, it makes sense to turn to networks. Value creation networks are cooperative ventures that allow their members to pool strengths, individual resources, and innovation capabilities in order to create value as an alliance.

THE INFLUENCE OF CORPORATE CULTURE ON THE SUCCESS OF ALLIANCES

This all sounds simple in principle, but it is fraught with obstacles. Organizations are idiosyncratic by nature, i.e. they have their own culture. As a result, corporate cultures can prove to be an obstacle when it comes to collaborative projects, although they can also act as a catalyst. To find out how to foster the right culture within companies for partnerships to succeed in value creation networks, bwcon joined forces with the Ferdinand Steinbeis Institute, Steinbeis2i, and the Baden-Wuerttemberg Crafts Congress. Together, they organized and conducted a pilot project which is being funded by the Baden-Wuerttemberg Ministry of Economic Affairs and goes by the title Agile Teams – The Success Factors of Cross-Company and Cross-Industry Collaboration in Digital Transformation. The aim is to determine different ways to promote the development of corporate cultures at SMEs such that people are enabled and motivated not only to enter into cooperative ventures in times of digital transformation – even with heterogeneous partners from outside their industry, sector, or field of technology – but also to develop complex products and services within networks.

D-SERV – AGILE TEAM, COMPATIBLE CORPORATE CULTURE

One of the agile value creation teams involved in the project is d-serv. For the experts at Steinbeis, it was clear from the moment the project kicked off that the culture of the company was characterized by mutual trust and a shared interest in identifying the best possible solution to what was a challenging task. To lay a foundation for successful innovation and collaboration, it is crucial for companies working together to have compatible corporate cultures, especially in heterogeneous value creation networks. "We see corporate culture as the link between individual employees at our company and the people at the organization acting as a vehicle in enabling delivery. Among other things, the corporate culture includes values, communication, people's understanding of quality, aspirations, and collaboration," say Ugur Cetin and Pietro Triscari of d-serv. When opening up new fields of business it is

important to be able to draw on a solid foundation of trust and a common language that fosters openness with other team members, partners, and customers. The aim is to forge networks between customers and experts in order to come up with new solutions. How this works in practice, and the role played by corporate culture, are demonstrated by the actual example of an alliance with the Stuttgart-based company Koenig & Bauer MetalPrint (KBA).

WHEN A PROBLEM BECOMES A SOLUTION

KBA is an international machine and equipment manufacturer. Its production lines are used to coat and print sheet metal packaging, such as food cans and chemical containers, and its solutions are used in factories worldwide. A crucial aspect of installing and commissioning production lines is how well information is logged by service technicians on site and how this information is managed and administered after installation. For example, one key challenge is that production lines are often set up in locations with unsuitable IT infrastructures. In other cases, there is no access to computer systems due to corporate guidelines laid down by the customer.

A workshop was organized with KBA in which the d-serv experts worked up the requirements for a tool that would support service technicians in carrying out their work. The tool had to be capable of working independently of head office and without regular internet access, based on a standard process that would allow project and site data to be shared as efficiently as possible with central systems. Using a process chart, critical process steps were identified and agreed with different user groups. After analyzing requirements, the team decided to introduce IQM Platform, a web-based database that has already been used for years in construction and plant engineering and could be adapted to KBA's requirements. The pilot system has already been used for existing projects and introduced to new projects involving different user groups and locations.

The Steinbeis experts and their project partners have compiled a catalog of measures based on insights gained during the Agile Teams pilot project. Their catalog also includes different tools and concepts so it can be used during subsequent projects in areas beyond the field of corporate culture.

The catalog of measures compiled for the pilot project can be found at

https://bit.ly/2ThPR7m (German only).

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"SKILLS ARE NOT THE ONLY BOTTLENECK WHEN IT COMES TO CHANGE; THE MORE CRITICAL ISSUE IS SMES' WILLINGNESS TO EMBRACE CHANGE."

AN INTERVIEW WITH TOLGA TURAN, DIRECTOR OF PROJECT MANAGEMENT AT KOENIG & BAUER METALPRINT

Hello Mr. Turan. How important do you think digital platform solutions are for SMEs in general, but also in particular for machine makers and plant engineers?

Digital platforms are an opportunity for SMEs to participate in the development of different business models and processes, or to tap into new models. The charm of digital platforms is that solutions evolve through in-depth collaboration with large, financially powerful enterprises; they merge with the standard product of the platform provider and this makes them available to any other company. This is particularly valuable for medium-sized machine makers and plant engineering companies. The processes and tasks are highly complex at industrial enterprises, although there are also similarities, so the requirements when it comes to digital technology are comparable. But also, in this era of information the knowledge firms require can be found in lots of places, so when it's needed, it can be bought anywhere. The next big boost to the international competitiveness of medium-sized enterprises will be increased efficiency through platform solutions.

Have German SMEs prepared properly for change? What skills do companies need to cope with this change?

Just like any change, you need to reach a critical mass of 15 to 20% to open the door to others. The impression I get is that for change to happen, it's not skills that are the bottleneck – you can buy in know-how from consultants. The much more critical aspect is the willingness of SMEs to embrace change, because without changing setups and organizational procedures within companies, digitalization usually results in information not being captured on paper anymore but simply being disseminated around the company in PDFs or automatically generated emails. Digital transformation only brings out hidden potential by making sweeping changes.

How important is corporate culture in this respect, especially when introducing digital platform solutions?

Extremely important. It's only when corporate culture focuses on making things better and there's a culture of failure that staff are able to explore new avenues when it comes to thinking about things, expressing things, and trying things out.

Would this concept also be suitable for other businesses or platforms?

I strongly believe that this solution would be desirable for other companies, and we're noticing this from discussions in our own industrial networks.

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"IT'S ABOUT MAKING THE NEXT STEP"

AN INTERVIEW WITH DR.-ING. PETRA PÜCHNER AND DR. JONATHAN LOEFFLER, ENTREPRENEURS AT STEINBEIS EUROPA ZENTRUM

Turn three into one – this was the goal of a transformation process that has now been successfully completed by a team spearheaded by Dr.-Ing. Petra Püchner and Dr. Jonathan Loeffler. In an interview with TRANSFER magazine, Püchner and Loeffler discussed the activities that will come under the Steinbeis Europa Zentrum umbrella brand in the future and explained how both customers and employees will benefit.

Hello Dr. Püchner. Hello Dr. Loeffler. Steinbeis-Europa-Zentrum, Steinbeis 2i and the Steinbeis Institute of the Commissioner for Europe of the Minister for Economic Affairs, Labor and Tourism have reorganized under a new umbrella brand: Steinbeis Europa Zentrum. What was the thinking behind this decision and what are your goals with the move?

Petra Püchner:
Steinbeis-Europa-Zentrum was founded in 1990 and we expanded as such until 2016, when Steinbeis 2i came along. When I was appointed Commissioner for Europe in 2018, the idea of an independent Steinbeis Institute came up, with a dedicated team of staff for forging networks and making Baden-Wuerttemberg and Europe even more hard-hitting, also on a political level. But as the years went by we discovered that having three separate units can make things a bit complicated – complicated for customers, and complicated for staff. At the same time, we noticed that having three different units can be beneficial when it comes to know-how and skills. So we put more thought into ways to keep hold of each unit but make the processes more simple, and we thought about the umbrella brand that would be most suitable for this. As a result of this transformation, we decided to use the term Steinbeis Europa Zentrum as an umbrella brand, but not as a name.

Jonathan Loeffler:
Our background is in EU research funding but just like the economy and society in general, we're in the middle of a transformation process. Our services and areas of expertise have moved forward. Steinbeis 2i has more of a business focus and Steinbeis-Europa-Zentrum under Steinbeis Innovation gGmbH is more oriented toward society, whereas the focus at the institute lies more in innovation policy. This was really difficult to explain to the outside world, so we wanted an umbrella brand. The "new" Steinbeis Europa Zentrum is in a position to offer expert advice to customers and partners across three areas.

So what's different now?

Petra Püchner:
We have a new logo and a new website. This allows us to bolster the three units, because they're operating under one umbrella brand. But we're also renaming two of the three units. We'll call our non-profit unit – which works for society – "Steinbeis EU for You" to make it clear that now, we're not only involved in technology, but also deal with topics like sustainability and social innovation. As for the Steinbeis Institute of the Commissioner for Europe of the Baden-Wuerttemberg Minister of Economics, Labor, and Tourism, it has evolved into a kind of think tank, which we're going to call "Steinbeis IDEA Europe." IDEA stands for Innovation – Development – Europe – Accelerator. Our aim is to bridge gaps when it comes to public policy and come up with ideas for the public sector, which could be for governments or local authorities, but actually also for companies. The triangular setup we've adopted is quite unique and we want the new umbrella brand to strengthen it and make it visible.

What does this realignment mean for existing customers?

Petra Püchner:
We want to be customers' first port of call when it comes to all European issues relating to innovation, internationalization, and other topics such as sustainability and funding. They should know that we can offer a very wide portfolio of services and that we have access to partners in Europe and the

rest of the world. But for us, it's not just about our customers, we also want a feeling to evolve internally that we're one Steinbeis Europa Zentrum and – in the way we work together – we're not separated by the three units. At the end of the day, we're all work hand in hand, and that's exactly what we want to strengthen and pool the skills of individual employees. This will enable us to provide our customers with more comprehensive services.

Jonathan Loeffler:
We can now say that we're one Steinbeis Europa Zentrum and we span numerous areas of expertise and services. We want to offer more clarity in how we portray ourselves to the outside world and make it easier for our customers to access services and funding opportunities. To customers, we're the people to contact when they require expertise and experts from other areas of competence. There's another aspect I'd like to touch on: The transformation processes we're currently experiencing have also motivated us to adapt our services. The topic of social innovation was just mentioned; another example is the In-Connect Index, which was developed by a team of experts at Steinbeis.

We also have a number of other tools that will help companies, startups, universities, local communities, and city authorities to position themselves within the transformation process. It's also against this background that we want to showcase our services more clearly.

Do you also have new target groups in mind for this new concept?

Petra Püchner:
One important target group – which we've already carried out projects with, but is currently expanding – is startups, especially in disruptive areas. This is one of the target groups we want to do more to support. We're already working on initial projects that involve bringing together startups with large companies. It's important that these startups acquire their first customers, although it's equally important that they can expand in Europe. On the one hand, this affects the Commissioner for Europe and the overall setup, but on the other this also means forging contacts with other innovation ecosystems in Europe – maybe they can also offer backing or ways to grow, especially in this area.

Your new tagline is "Enabling Innovators to Grow." In what way should they grow?

Jonathan Loeffler:
We spent a lot of timing talking about this slogan. The first word, enabling, is really important to us because we want to work with people, we want to provide support, we want to make things possible. Making things possible is precisely the area we help with, and in doing so we want to be open to everyone. That's also why we use the term "innovators," who can also be everyday people; they don't just have to be startups or universities. And as you rightly mention, growth is crucial. But it's not just about numbers, it's about more: How do you move from an idea or an initial project to actually taking the next step? You need partners for this, even from abroad, or financing. Or you need an assessment to plan next steps. So it's about making that next step. If we think about the transformation process again, and the value chains it affects, the question that's raised is how companies or innovators should position themselves within those value chains. Ultimately, transformation will furnish us with new value chains and these need to be identified. And the question we help people answer is what role will be played by startups or companies in the future. You can't go out onto the playing field by yourself; you need networks, you need to become integrated into a value chain and offer new services or new products. And that's our concept of growth in the future.

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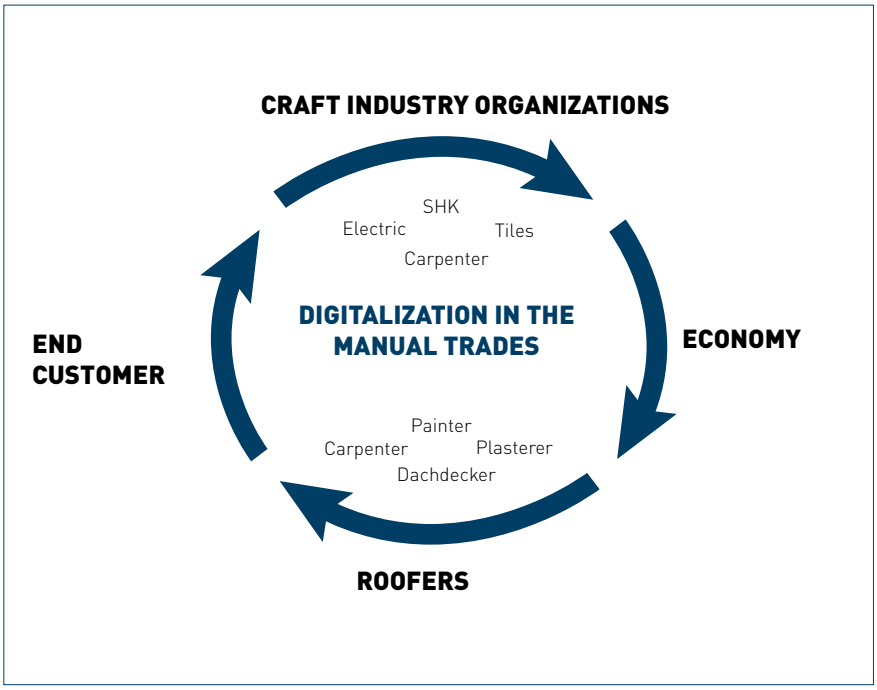
"A HOLISTIC DIGITALIZATION STRATEGY IS NEEDED"

AN INTERVIEW WITH ANDREAS OWEN, FOUNDER AND MANAGING DIRECTOR OF WIRSINDHANDWERK

When you hear the terms construction and skilled craftsmen, you inevitably think of the analog world of construction machines. But even the construction industry cannot avoid the topic of digital transformation and it will inevitably have to find new ways to remain competitive. But to what extent have the manual trades "gone digital" – particularly in the construction sector? This is the question Andreas Owen, founder and managing director of wirsindhandwerk, asked himself before developing a digitalization barometer, the first instrument of its kind for assessing the degree to which the skilled crafts sector has introduced digital technology. In an interview with TRANSFER, he tells us how his project came about, how it was implemented, and the kinds of changes it will bring about for the manual trades.



360° model © wirsindhandwerk gmbh

Hello Mr. Owen. Your digitalization barometer for construction and interiors is part of a Germany-wide research project, the first of its kind to look at the progress made by the manual trades in introducing digital technology. How did you come up with the idea?

The idea of the digitalization barometer came up when I launched the recommendation website wirsindhandwerk.de. The question I found myself asking at the time was, "How 'digital' actually are the manual trades?" There were plenty of studies, but none looking at things across the board when it comes to craft industries. So the idea of a 360-degree assessment was born, not only to examine skilled craftsmen and manual trades themselves, but also to cover the overall industry, end customers, young people, experts involved in the manual trades, and craft industry organizations. The aim of the study was to make it possible to measure the degree of digitalization among skilled crafts companies, but also to have points of comparison for different trades. The study allowed us to achieve both of those objectives.

What was your approach for implementing the project, and what were the biggest challenges you faced?

We started with two kick-off workshops, the aim of which was to establish a structure for digitalization in the manual trades so we could determine the dimensions of digital transformation. For each dimension, we then selected different indicators of digital transformation, and based on these we could determine the "degree of digitalization." We then went into a phase of qualitative research and organized group interviews with home owners and the younger age group, half of whom were planning to buy at some point. We then conducted structured telephone interviews with the owners of companies involved in construction and interiors. In parallel to this, there were telephone interviews with digital transformation experts working in industry, science and academia, and craft industry organizations. For the quantitative phase of research, we determined the relevance of certain fac-

tors so we could weight the digital habits of business owners. Later on, this made it possible to calculate the final "degree of digitalization." This quantitative part of the research involved a telephone survey of 1,800 business owners in the manual trades and skilled crafts, plus an online survey of 1,000 end customers and 900 young people – and then finally we analyzed the results.

The biggest challenges were selecting the right indicators and ensuring they're highly relevant, meaningful in terms of topics covered, easy to understand, relevant right now, and that they reflect actual habits. But on the other hand we also wanted to include businesses that still haven't gotten far with digitalization. Although deciding to use telephone interviews as the survey method made things much more resource-intensive, it was an essential building block in determining actual habits and behavior regarding digital technology.

Can you summarize for our readers the most important insights you gained? And are there any results that can be applied to comparable companies – beyond the manual trades?

One thing that can be said overall is that digitech is definitely here to stay in the manual trades. That said, the overall degree of digitalization stands at 37%, so there's clearly still room for improvement. Most construction companies and tradesmen involved in building interiors are positively inclined when it comes to digital solutions, and the changes triggered by digital transformation are largely welcomed. The major differences you see when it comes to attitudes toward digital transformation and actual implementation in operational terms are to do with the age of the business owners and the size of the business. With younger age groups – i.e. people under 50 – people are more likely to consider digital transformation important if they are more educated, and it's the same the bigger the company gets. Looking at the individual dimensions of digitalization – things like management practice, business development, market communication, business systems, administrative processes, and front-line service delivery – there's not a single dimension with satisfactory levels of digitalization. The most progress when it comes to digitalization has been made with business processes and administration.

But there's still a lot of catching up to do when it comes to planning overarching digital transformation strategies. Until now, it seems – if anything – digitalization has been taking place on an ad hoc basis. As a result, there are often difficulties dealing with the different interfaces. But if you're going to be rigorous in the long term when

Overall level of digitization
© wirsindhandwerk gmbh

2020: N=1.200 Owners of craft enterprises of construction and finishing (weighted)

implementing the different options offered by digitalization, a holistic digitalization strategy is needed.

Looking at the specific trades, it's primarily electricians, plumbing, heating, and air conditioning experts – but also carpenters and joiners – that score above average when it comes to digital transformation. As for new business models, there's not much momentum, but an increasing number of models are now being integrated into portfolios. Currently, there's not much importance given to using digital technology to help skilled craftsmen provide their services. As for artificial intelligence – and its future role as a fundamental technology behind lots of emerging digital applications – it hasn't yet registered consciously enough with business owners. Looking at digital solutions in business or in companies by using the value chain, i.e. the individual dimensions, is also interesting for comparable companies beyond the skilled crafts sector. The finding that you need a digital transformation strategy to make a success out of digitalization in the long term is also something that can be applied to other companies.

What implications do you think this all has for companies and craft industry organizations?

The significant structural changes that are already taking effect in the skilled trades sector are having a particularly marked impact on small, family-run skilled crafts companies. They will be handing over their businesses in the medium term or they won't be able to afford the investments that will be required in the future. This could result in crafts and manual skills that have been built up over generations being lost. To keep these businesses going, it will therefore be hugely important to combine the craftsmanship that has evolved over time with the modern opportunities presented by digital technology. But there's one particular cause for concern in this: the extremely skeptical attitude toward digital technology among business owners. It will be extremely important to offer additional support and put measures in place to motivate people through the craft industry organizations so the digital divide doesn't continue to widen in the future. The degree of digitalization these firms have achieved really has to be raised to a higher level – not just in terms of service delivery, but also when it comes to market communication, management, and business development. One thing that really stands out is that certain indicators of digital transformation – the ones the experts believe will be particularly pertinent in the future – are very rarely even looked at by the companies, or are very rarely available to them. This could be due to the fact that some applications are more complex than others, so they revolve around a level of digitalization that very few companies have achieved until now. But maybe the thing that's missing is a holistic take on what digital transformation actually implies.

These days, it's clear that end customers also expect craftsmen to be up to speed on digital technology. This starts the moment they go looking for something. We ascertained that 89% of end customers prefer to work with craftsmen that have positive reviews on the internet. Digitech is a central aspect of social interaction among young people. It's a fundamental part of the world they live in. So in this respect, a company's "digital impression" also plays a key role in recruiting young talent and skilled workers, even if it's not the key factor when it comes to making a career in construction and building interiors more attractive. This is where other aspects will need to be looked at, such as the extent to which careers are compatible with people's private lives and the family, or other factors relating to the world they live in.

So what comes next? Will you continue to develop the digitalization barometer?

The aim when we set up the digitalization barometer was that we'd be able to keep updating the study. The results we have now can be a kind of point zero; for the first time we have empirical evidence of what certain people already suspected or sensed from personal experience. Of course our aim and aspiration is to continue with the study. To keep going, we're looking for support and backing again, people who want to get involved in running the study and join us in moving the manual trades to the next level.

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SAFEGUARDING MUNICIPAL AUTHORITIES BY ESTABLISHING MORE DIGITAL PRESENCE

SYNTOS, THE STEINBEIS CONSULTING CENTER, PROVIDES SUPPORT WITH THE DEVELOPMENT OF A REGIONAL NETWORKING PLATFORM

As the Covid-19 pandemic has shown us, many small and medium-sized enterprises dependent on physical presence – stores or offices – can quickly run into existential problems in a crisis, especially during a lockdown. To secure the future viability of local authorities and SMEs, the Steinbeis Consulting Center Syntos joined forces with S-Public Services to develop an online forum called Regio-Plattform to enable local stakeholders to network with one another.

The major digital platforms are draining more and more purchasing power out of the regional economy, and many customers are changing their buying habits permanently and shifting towards online shopping. DStGB (the German Association of Towns and Municipalities) estimates that up to 100,000 stores in Germany will be forced to go out of business as a result of the coronavirus pandemic.[1] This will have an impact on local self-administration and municipal finances. As the pandemic has shown, strong and transparent communication is important in securing trust and a feeling of community in civil society, i.e. among the general public. "Our conclusion from this is that small and medium-sized companies in regional areas – but also local authorities – will need an appealing profile in the digital world in the future, and by adopting a hybrid approach to marketing – combining digital and personal methods – they can even gain a clear competitive advantage," says Steinbeis expert Dr. Ralph Bürk, with conviction. It is therefore important for regional businesses to be in a position to engage in the digital world of marketing and trading without anonymous global platforms. They also need to share know-how and resources with other regional stakeholders, to solve local challenges together, and to safeguard the innovation capabilities of all parties. Developed with the support of Steinbeis, the Regio-Platform set up by S-Public Services, a center of competence for e-government and part of the Sparkasse financial group, will lay the foundation for a new communication infrastructure.

FOCUS OF THE PLATFORM: COMMUNICATION AND INNOVATION

The goal of Regio-Platform is to allow stakeholders in the region to tap into useful communication and innovation tools and thus not only drive communication and innovation on a regional level but also strengthen collaboration between business, local authorities, and civil society. The platform offers digital communication tools (text, audio, and video), which are available to all registered users and come with a guarantee that data will be secured locally. This offers an everyday option for associations, NGOs such as churches, volunteering organizations, social services, and members of the public to

THE MAJOR DIGITAL PLATFORMS ARE DRAINING MORE AND MORE PURCHASING POWER OUT OF THE REGIONAL ECONOMY,

The regional platform: an initiative from the Sparkasse financial group, accessible to all players in a region.

communicate through their own regional network. There is a special innovation arena within the Regio-Plattform dedicated to the topic of regional innovation. In an increasingly digital world, events, projects, and collaboration between companies, local authorities, and motivated citizens help safeguard the future viability of regions. The Regio-Plattform also offers an array of tools for citizens to communicate with the administration, the district authority, and the local community. For example, some visits to government offices are now superfluous thanks to video conferencing. The local authorities also have ways to quickly keep specific citizens informed in person. The regional media can also use the platform to share online offers.

The Regio-Plattform set up by S-Public Services is an initiative of the Sparkasse financial group. It is based on an open concept to make it accessible to all stakeholders in the region. To maintain neutrality under public law, the platform should be funded and owned by county authorities. The joint project between the Syntos Steinbeis Consulting Center and S-Public Services is based extremely closely on platform concepts found in digital ecosystems. Aside from the counties acting as funders, numerous partners also offer support "as a service." Users can register for a variety of digital authentication processes on the platform, making it possible to make use of all services through a single sign-in. "The Regio-Plattform is an appealing market place in the world of digital technology for business as well as cultural, community, and social interests in the regions," summarizes Bürk.

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THE EARLY INNOVATORS BUSINESS PLAN COMPETITION

STEINBEIS EXPERTS PROMOTE ENTREPRENEURSHIP AMONG YOUNG PEOPLE BY RUNNING A BUSINESS PLAN COMPETITION FOR YOUNG ROMANIANS

Biodegradable protective masks, wooden bicycle frames, telemedicine – just three examples of the multitude of business concepts developed by young Romanians as part of the Early Innovators Business Plan Competition. Organized by the Steinbeis-Donau-Zentrum, the Steinbeis Innovation Center, the aim of the competition was to give 15- to 18-year-old students the chance to develop their own ideas over a period of several months. They were also asked to make their ideas more concrete and capture them in a business plan.

The final of the competition

The Steinbeis team from Deggingen was taken aback by the strength of interest in the Early Innovators Business Plan Competition. Roughly 680 young people – 70 percent of whom were female – took part in the business plan competition, the first of its kind to be organized by the Steinbeis-Donau-Zentrum. The experts from Steinbeis attached great importance to diversity among the participants, as Jürgen Raizner explains: "The Early Innovators Business Plan Competition is the only contest in Romania open to students from any school. We made a conscious effort to ensure it wasn't just business school students who participated."

FROM INITIAL IDEAS TO PROJECT IMPLEMENTATION

Originally, the plan looked quite different. The initial idea was to organize the contest as a kind of pilot competition at three schools in the county of Dambovita. The organizers anticipated having between 60 and 80 contestants. Then came the coronavirus pandemic, so the Steinbeis team decided to adapt their concept to allow the competition to be held online. This made it possible to reach out to schools throughout the whole of Romania. The project received support from nearly 100 teachers, who also integrated the competition into their lessons. To foster an understanding among the teachers that merging entrepreneurial thinking with expertise in different topics offers tremendous educational potential, they were also provided instruction by the team at the Steinbeis-Donau-Zentrum. The project also benefited from the know-how of Steinbeis Transfer Management S.R.L. – STM, a Bucharest-based company, which also provided access to its network of contacts. Financial support came from the Baden-Württemberg Foundation as part of a funding program called Perspektive Donau ("Prospects for the Danube"), without which it would have been impossible to manage the complexity of the business competition. Technical and planning support was provided by Banca Comerciala Romana, the most important financial group in Romania.

INSPIRATIONAL IDEAS FROM YOUNG ENTREPRENEURS

In total, the contestants submitted 162 business plans, each of which received individual feedback including descriptions of how they were evaluated. Importantly, they were also offered concrete advice on moving forward with the business idea. The Steinbeis-Donau-Zentrum invited 16 teams and individual applicants to the finals of the Early Innovators Business Plan Competition. At the closing event, which was broadcast live across the country through a variety of social media channels, a jury of 20 leading Romanian entrepreneurs made a final announcement of the winners. The first prize of €800 went to a student who developed a concept for renting out storage space complete with a delivery service that can be managed by an app to make it easier to administer the storage and retrieval of stocked items. Second place and a prize of €600 went to a student who developed a business plan for reusable face masks, which not only deliver highly effective protection but are also produced from coffee-based textiles making them biodegradable. The third prize of €400 was won by a team of students that decided to look more closely into the design of telehealth applications for the disabled. An additional innovation prize of €200 was awarded to a student who investigated an idea for offering fair billing for waste disposal and more efficient collection of household garbage in different regions of Romania. Two special prizes were also awarded on the spur of the moment for the best financial plan and the best description of a technology.

THE EARLY INNOVATORS BUSINESS PLAN COMPETITION IS THE ONLY CONTEST IN ROMANIA OPEN TO STUDENTS FROM ANY SCHOOL.

HIGH PRAISE FOR THE STEINBEIS PROJECT

In his address to all contestants, Ion Sorin, Secretary of State for Pre-University Education at the Romanian Ministry of Education, praised the wealth of opportunity offered by the competition: "Not all of the three million students in Romania will go on to become businesspeople, but that doesn't mean that any one of them should forego the right to imagine becoming an entrepreneur themselves at some point. And that is why we're very excited about this project. We would like it to continue and intend to support it as much as we can." Romanian students from tenth grade and higher are entitled to receive instruction on entrepreneurship. By organizing the Early Innovators Business Plan Competition, the Steinbeis-Donau-Zentrum is able to add weight to this education. "We'd really like to motivate young people to look into this form of career development," explains Jürgen Raizner, who plans to keep the project going in the future.

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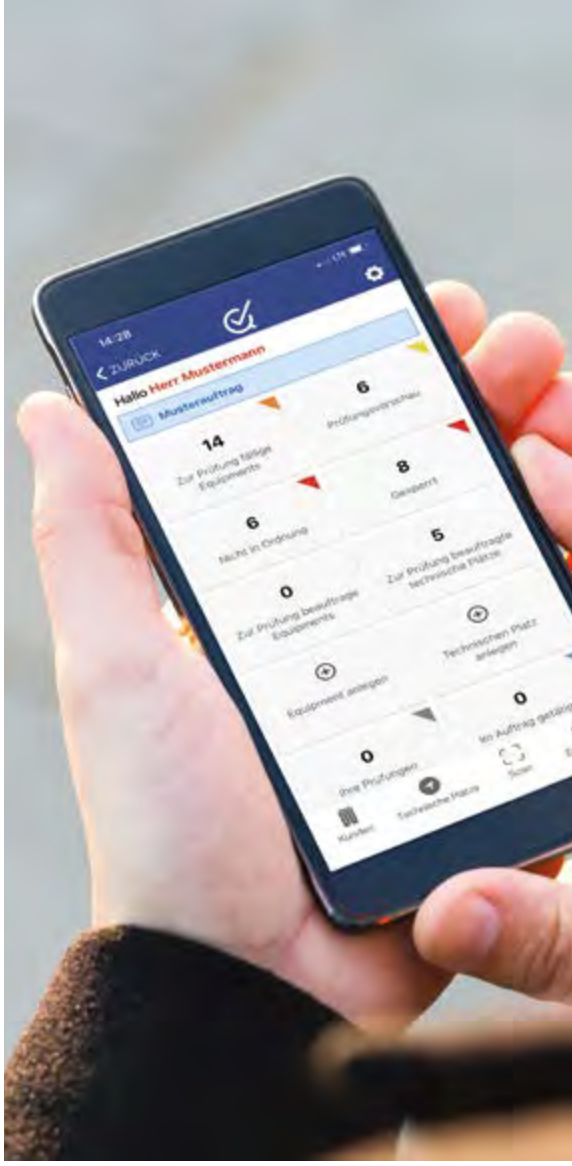
QUALITYCIRCLE – A CONVERSATION TURNS INTO AN IN-DEMAND SOFTWARE SOLUTION

TWO STEINBEIS ENTERPRISES SUPPORT THE SUCCESSFUL DEVELOPMENT OF A SOFTWARE-BASED PLANNING TOOL



It all started with a conversation between Reiner Lohse, Steinbeis entrepreneur at the Göppingen-based Steinbeis Transfer Center for Technology and Innovation Management as well as Managing Director of WIF – Göppingen (the organization for the promotion of economic development and innovation within the administrative district) and Stefan Aubele, Managing Director of IT-Kompass GmbH in Donzdorf. Their conversation was sparked by a request from the IT entrepreneur for support in researching funding for the further development of "QualityCircle", an innovative software solution for planning. Since then, Reiner Lohse and Martin Ritter, both entrepreneurs at the Steinbeis Consulting Center for Corporate Safeguarding, have accompanied the project on its path to success.

Some time has passed since that initial conversation and QualityCircle has now become a much sought-after tool for industry. But what does it take for a software solution to become a success? To understand this, it helps to take a look at the full scope of features and applicable possibilities based on user requirements.

WHAT DOES QUALITYCIRCLE DO?

QualityCircle is a business tool for capacity planning, competency development and equipment management. It provides a quick, up-to-the-minute overview of all internal resources that are critical for sustainable competitiveness. Staff training can also be organized through QualityCircle: Whether in-person, online, or in the form of e-learning, training as well as all processes from tendering, registration, planning, documentation, attendance and certification are mapped by this management solution. In addition, QualityCircle manages all resources and equipment available within the company that is subject to regular maintenance or associated with specific qualifications or required instruction.

This software-based approach saves internal resources and reveals answers to important questions: Where is your company well positioned? When is further staff training necessary?Which skills and qualifications are already covered, which need redeployment or should be considered when filling positions? What equipment is available? When is the next audit due?

A FLEXIBLE TOOL FOR DIFFERENT NEEDS

QualityCircle is suitable for mid-size and large companies and is available as both a web version and as a mobile app. The software can be individually adapted to the needs of the respective company through three interconnected modules: qualifications matrix, seminar management and equipment management. Additionally, the system provides valuable insights, correlations and analyses of all data within the system to provide a comprehensive overview. Tamper-proof validation is ensured through blockchain technology.

THE ROAD TO SUCCESS CONTINUES

Thanks in part to the support and expertise of the two Steinbeis companies

The web version of QualityCircle

The mobile version of QualityCircle

involved, more and more companies are investing in IT-Kompass GmbH's software to save even more money with QualityCircle. Reiner Lohse can report first-hand results: "The users who are employing the software are more than satisfied." To all companies that care about forward-thinking employee training and have recurring certifications to go through, he recommends taking a look at the software. "Many advantages in simplifying complex processes, the software's protection against forgery, easy integration and, last but not least, an attractive price framework are the reasons for its growing success," summarizes the Steinbeis expert.

More information on the QualityCircle planning software:
www.quality-circle.com.

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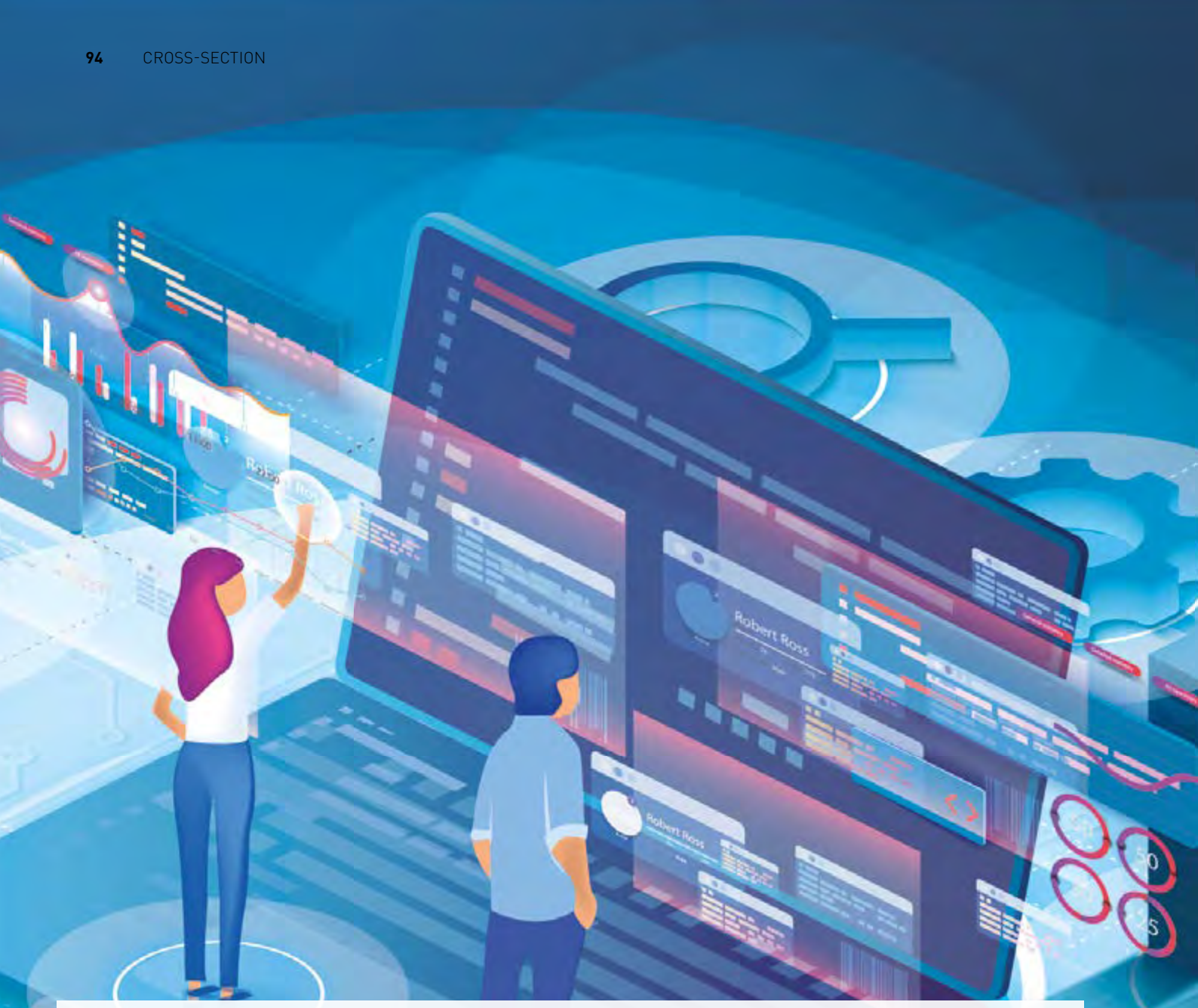


#TECHOURFUTURE – GRASPING TECHNOLOGY

The #techourfuture initiative was launched in November 2018 after a need was perceived to highlight how the future of technology affects everyone in society. The Technollprogram is being funded by the Baden-Wuerttemberg Ministry of Economic Affairs, Labor, and Tourism. The word Technologie* in the German title of the initiative (Technologie*Begreifen) is about combining any number of technologies to come up with new applications – resulting in different societal and business models.

COUNTERACTING LOSS OF CONTROL

The defined goal for the pilot project initiated by the Ferdinand Steinbeis Institute was to develop a "forum of trust" in addition to an intermediary vehicle for all members of society to find out more about future technologies – in a neutral setting revolving around everyday situations – in order to understand, experience, and discuss technology. Aside from sharing knowledge and discussing people's practical experiences with new technology, one of the main ideas of the sessions was to conduct a scientific assessment of technology acceptance. Reservations about new technologies often originate from concerns about a perceived "loss of control."

LOSS OF CONTROL DURING THE DIGITAL TRANSFORMATION PROCESS FACTORS INFLUENCING AND SHAPING TECHNOLOGY ACCEPTANCE IN BADEN-WUERTTEMBERG

AS PART OF A STUDY, THE FERDINAND STEINBEIS INSTITUTE INVESTIGATES THE IMPACT OF LOSS OF CONTROL ON ATTITUDES TOWARD NEW TECHNOLOGY AMONG THE GENERAL PUBLIC

In 2018, the Ferdinand Steinbeis Institute (FSTI) launched its #techourfuture initiative with the aim of giving fellow citizens a chance to find out everything they need to know about future technologies, but also to exchange ideas in order to better understand and discuss technology. "Fellow citizens" means everyone from schoolchildren to retirees, from the tech-savvy to those less familiar with technology. A good two and a half years later, the FSTI team has been conducting a follow-up study to determine the extent to which the defined goals have been achieved.

Shortly before the initial project draws to a close, the #techourfuture team looks back at the successful series of events – which focused on three carefully chosen tech topics: the future of autonomous flying, the future of healthcare, and the future of nutrition, each organized in a different event format using a variety of communication channels. The people who participated in events were chosen to form the sample of an empirical quantitative survey aimed at underpinning the study with scientific evidence.

ARE PEOPLE BECOMING MORE SKEPTICAL?

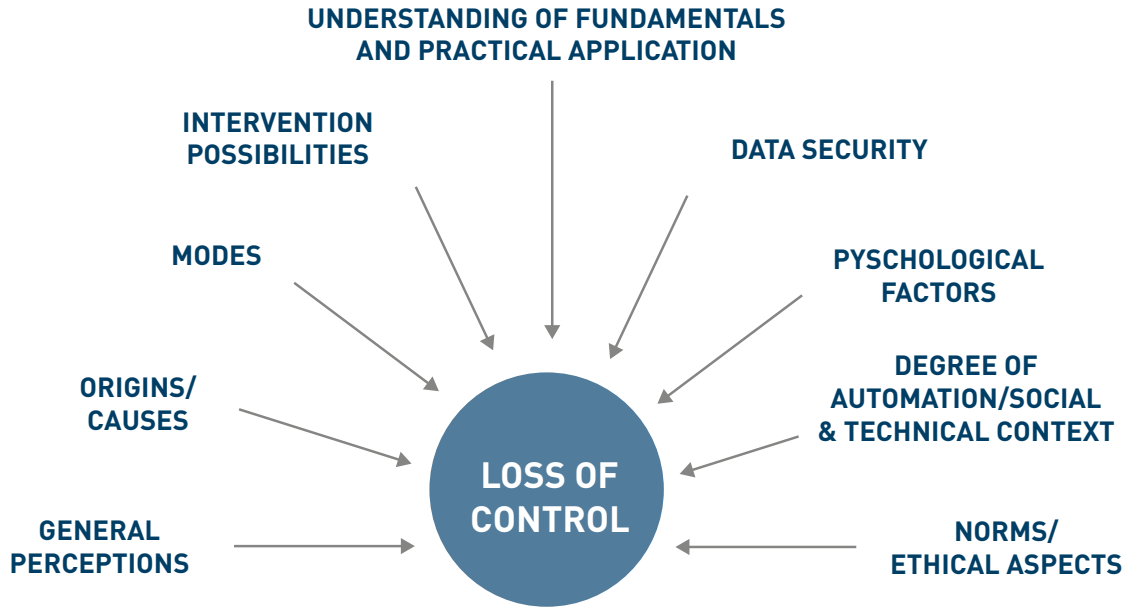
The results of the study underscore the importance of coming at issues from different angles when trying to understand not only perceived losses of control, but also users' acceptance of new technology and technical systems. Previous studies looking at technology acceptance among the general public mostly made somewhat vague references to loss of control as a possible explanation for attitudes toward new technologies. The FSTI study shows that the attitude held by the population toward technologies – for the most part, consistently positive for decades, albeit ambivalent and differentiated depending on the type of technology – could quite feasibly shift toward increasing skepticism as a result of intensifying digital transformation and networked systems, not only within the economy but also in society as a whole. One of the main factors fueling this trend is concern regarding the increasing loss of control hand in hand with digitally networked, increasingly converging, and autonomously controlled technology.

Until now, empirical studies have indicated that new technology acceptance in Baden-Wuerttemberg is invariably high, and that open-mindedness toward technology is generally strong among the population. Critical stances toward technology – especially among certain stakeholders, trade associations, and public organizations – are often mooted in public debate and political discussion, typically resulting in strong media coverage. The ambivalent attitude toward new technology is particularly noticeable with different types of technology – everyday technology, technology found in consumer products, and technology used by industry are generally well received by users, whereas more alien forms of technology are seen much more critically. Quite possibly, differences between the various types of technology are gradually evaporating as an increasing number of technologies "go digital," form networks, and converge – providing new points of concern regarding the loss of control.

LOSS OF CONTROL HAPPENS ON A NUMBER OF LEVELS

The study identified the key dimensions of losing control, based on a heuristic model. These are: the general perception that people are losing control, its

Number of levels of Loss of Control



origins, its different manifestations, the nature and quality of potential interventions, the cyclical relationship between understanding technology use in terms of fundamental theory and practical application, data security, psychological factors, the degree to which technology runs autonomously, the social and technical context of technology within a system, and normative aspects. The non-representative, empirical quantitative analysis conducted as part of the #techourfuture forums reveals key statistical correlations between the chosen dimensions. The study also indicates that there is a general perception that control is indeed being lost among the population, although this is by no means universal. The perceived loss of control primarily stems from a sense that new technology cannot be monitored properly and that individuals cannot adequately test or control certain forms of technology, nor do they have sufficient say in how technologies work or are designed. Looking at different sociodemographic groups points to a rise in the general perception – particularly as people age – that control is being lost, i.e. older users are more likely to feel they do not have sufficient control of a new technology and that they will not be able to master it. They also perceive this more intensely. Women also tend to say they find it more difficult keeping pace with new technology.

The survey respondents were more likely to say that this sense that they are losing control was a result of handing over control to other forms of technology – rather than surrendering control to other people – and this loss of control is more likely to be perceived as involuntary. Concerns that control could be lost quite suddenly, across the board, are marginally stronger than the fear of gradually relinquishing control, and there is an indication that this correlates positively with the respondents' age and marital status.

In addition, users are noticeably more open to new technologies and technical systems if they are offered ways to control them and intervene. If technical systems are in control, approval levels drop; if other people have control, there is slight approval; if control lies with a digital intermediary, this is especially likely to result in user rejection. Safety and reliability form an essential precondition of being open to new technology, particularly among younger people.

There is also a clear indication that understanding a new technology and gaining an overview goes a long way toward reducing reservations, and that fundamentally understanding and experiencing new technology influence each other. Understanding and having

an overview of new technology is especially important for older and more educated people, whereas it is more important for younger people to gain hands-on exposure to a technology.

The survey also confirmed that the assumed correlation between data security and loss of control does exist. People are more likely to be open to new technology and technical systems if the information they submit is kept secure and it can be ensured that third parties are unable to gain access to or use their data.

Negative psychological influences such as fear, anger, and resistance – when a new technology takes control of certain functions under certain circumstances, and users are forced to become more passive – could not be identified among all participants. Nonetheless, older users are significantly more likely to state that they have such negative feelings than younger persons.

It is more of a mixed picture when it comes to the correlation between loss of control and the degree of autonomy offered by new technologies, as well as their integration into social technology. There were mixed feelings when it came to new technology becoming actively involved in decision-making, unlike technology providing support to users in certain situations, which was viewed positively. There are negative reactions when technology that is otherwise considered helpful and is accepted comes into play during critical situations and in high-risk areas. When it comes to the norms used by technology to make decisions, the study clearly confirmed that the same values should be applied as they would by people.

LOSS OF CONTROL INFLUENCES TECHNOLOGY ACCEPTANCE

"A number of conclusions can be drawn from these results when it comes to managing digital transformation and figuring out a corresponding political frame of reference. The sense that you're losing control is a relevant factor that influences technology acceptance, especially when introducing and disseminating new technology and technical systems. The providers and developers of these technologies will increasingly need to take such influencing factors into account, and policymakers should also include this in support and regulatory processes," concludes Dr. Michael Ortiz, who authored the study.

The idea should be to ensure new technologies and technical systems can be adequately monitored, that institutional measures are in place and, above all, that they are made transparent to the general public. Institutions and agencies should pay closer attention to this challenge. In addition, the subsequent users of new technology should be more closely involved in development processes, so they can provide early input on design and function. New, digital, and/or autonomously controlled technology should be designed in such a way that it can undergo sufficient testing and be shaped by users. One way to lay a useful foundation for this could be to organize workshops and forums involving a broader spectrum of people during development, such as end users, providers, developers, and researchers, and this could reveal concrete options for planning further in-depth #techourfuture formats.

When losing control is primarily perceived as involuntary and users feel the ability to manage technology is being transferred to other systems, one has to wonder if providers could extend their launch strategies to include other ideas and whether suitable advice and support could be provided by politicians. Not only is it important to assess if there are alternative ways to manage the process of designing new technology, more must be done to highlight the safety and reliability of applications. In doing so, the focus surely has to lie in data security and the objective of designing digital and virtual spaces based on security standards that are comparable with analog spaces. Not only will this depend on wider and more detailed regulation, but – perhaps more importantly – the pace at which legislation is passed will be important.

GIVING CONSIDERATION TO SOCIO-DEMOGRAPHIC FACTORS WHEN SHARING TECHNOLOGY

The results of the FSTI study also indicate that future methods aimed at helping users understand new technology will increasingly also have to take the individual requirements of various sociodemographic groups into account. These could quite conceivably include certain event formats for introducing people to technology, certain approaches to market introduction, and political discourse to address the key factors that drive users' perception that they are losing control. For example, it would be possible to organize specific event formats targeted at seniors, young people, and women, but also people with stronger or weaker academic or professional backgrounds. The chosen formats could place special emphasis on theoretical understanding, hands-on experience, trying things out, security issues, and privacy.

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TWELVE EXPERTS WITH ONE GOAL: TO MAKE FUTURE TECHNOLOGY RELEVANT FOR THE WHOLE OF SOCIETY

THE #TECHOURFUTURE INTERACTIVITY COUNCIL MAKES TECHNOLOGY EASIER TO UNDERSTAND

To keep up the momentum of the project – which is called Technologie*Begreifen in German, meaning "Grasp Technology" – the #techourfuture team is being helped by an Interactivity Council, which was set up in April with the aim of pooling different opinions from various sections of society.

Functioning as an advisory body, the expert members of the Interactivity Council deal with one core question: What can we do to keep raising tech awareness among the general population, improve technological literacy, reach out to more people in all segments of society, and simultaneously preserve the Forum of Trust? The council members want to tap into their personal areas of experience when it comes to technology in society, not only to support future technology concepts initiated by the #techourfuture team, but also to uphold further ideas for the Forum of Trust and promote networking. The Interactivity Council members may also convene so-called Topic Consultation Councils. To summarize its goal, the council has written a mission statement:

"New technologies make a contribution to solving current challenges and will play a pivotal role in shaping our future. To actively shape this future as well and take a stance, society needs transparent information in the form of knowledge and experience regarding technological developments, how technology works, possible applications, opportunities, and risks. We are committed to establishing an objective and neutral process of dialog within society in order to promote technological solutions that closely reflect the reality of people's lives and contribute to solving the challenges faced by society. Accordingly, we support the #techourfuture team at the Ferdinand Steinbeis Institute in its purpose of making technology tangible and understandable to people from all sections of society through multidisciplinary endeavor."

THE FIRST SIGNPOSTS ARE IN PLACE

"We're delighted that we were able to attract such well-known and renowned experts to participate in the #techourfuture Interactivity Council, not only from the overall region but also from the Steinbeis Network. The first meetup underscored the importance of our endeavor, from a variety of angles, and at the same time it fueled a number of ideas for further topics and different ways to reach out to people from all parts of society. We look forward to continuing our work together and firming up on those topics and ideas in the coming meetings," said Professor Norbert Höptner, Chairperson of the Interactivity Council and head of the #techourfuture project.

Attention will then turn to the key topics covered by further areas of collaboration. This will also determine how #techourfuture should seek dialog among members of the general population in the future and which tech topics to look at.

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MARGRET MERGEN	Mayor of Baden-Baden
DR. STEFAN SENITZ	Karlsruhe Chamber of Industry and Commerce (lead management for technology in Baden-Wuerttemberg)
MANFRED SPALTENBERGER	Owner of three companies: MS-Consulting, TT-SIUS Technology Transfer, and Innovum-Innofilt
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SENATOR E.H. WOLFGANG WOLF	Managing Board Member, UBW (the Baden-Wuerttemberg association of business leaders)

ENTERING THE FUTURE STRONGER AND WITH RESILIENCE

THE STEINBEIS+AKADEMIE TRAINS RESILIENCE COACHES TO ACT AS COMPANY EXPERTS

Resilience – currently one of the most important aspects of coaching and therapy: Originally developed for prophylactic reasons to help individuals deal with domestic situations, it is now becoming increasingly clear that companies and other kinds of organizations – and their employees – stand to benefit from bolstering their resilience. The Steinbeis+Akademie is providing support in this area by offering certified training to become a resilience coach and mentor.

RESILIENCE IS THE ABILITY TO DEAL WITH ADVERSITY – WITHOUT LONG-TERM DETRIMENT, OPTIMALLY COMING THROUGH A SITUATION STRONGER.

But what does resilience mean for individuals and companies? Is it just another fad? If you are "resilient," you have an ability to deal with adversity without long-term detriment – and optimally come through a situation even stronger. And resilience is not a fixed characteristic, it can be strengthened.

A GOOD STARTING POINT: INDIVIDUAL RESILIENCE

Within companies, there are three levels of organizational resilience. The first is individual resilience. Many individuals have the potential to be resilient, a quality they can draw upon. But sometimes their ability to make use of this resource is stifled by a fear of loss, stress, or imbalances, and when something bad happens, accessing strengths is impeded or even rendered impossible. Using methods aimed at developing individual resilience helps strengthen people's perception of their personal resources, releasing blockages and leading to a change in everyday life. One method that has proven highly effective in this respect is self-reflection.

Reflecting on the personal strengths that have helped you make it through a crisis in the past allows you to visualize existing potential. In addition to recognizing different ways to improve, coworkers increasingly notice where things are actually going fairly well already. Studies show that the right mindset when it comes to building resilience is a healthy dose of optimism. Fear and negative attitudes never get you anywhere.

TEAM RESILIENCE IS GOOD FOR THE WORKING ATMOSPHERE

There are also benefits when it comes to team resilience, ideally resulting in a wide range of resources thanks to team diversity. Training entire teams empowers people to arbitrate when conflicts arise, or work out solutions as a team and learn new things together by applying solutions to situations in everyday life. When we feel safe and appreciated, not only as a team member but also within our social environment, we find it easier to tap into our own creativity and agility. Appreciative and open communication based on a healthy culture of feedback strengthens teams from within and – on a subliminal level – prevents simmering conflict from taking hold. And in all honesty, who doesn't want to work for a successful company based on a healthy working atmosphere?

ORGANIZATIONAL RESILIENCE STRENGTHENS PEOPLE'S ABILITY TO WITHSTAND ADVERSITY

In turn, organizational resilience benefits from the resilience of every individual within the organization; it is measured in terms of the resources required for a company and flexible structures. Effective crisis management and flexible responses to a crisis are part of a circular process that facilitates anticipation and thus better resilience. It is also helpful to use the "appreciative inquiry" method, which was developed by David Cooperrider and Diana Whitney, both experts in organization development. This method revolves around posing questions in such a way as to encourage people to focus steadfastly on positive things in the past, present, and future. Often, this involves developing a "purpose" or object for the company. This purpose gives employees and customers ways to identify with the company on an emotional level. Since most of our basic needs have already been met, many people find it important to find meaning in their work.

If you dig deeper into this area, it soon becomes obvious that organizational resilience needs a mandate from above.

Senior executives and all other managers need not only to stand behind measures that help build resilience, but also to consider these measures in decision-making. Strength – fueled by close interaction and togetherness – then forms a backbone for the entire company, says resilience expert Professor Dr. Jutta Heller.

As many medium-sized companies now recognize, occupational health management is a good thing, but by itself it is not enough to strengthen a company from within. Introducing resilience specialists to the organization offers essential benefits:

- Offering personal development options makes a company more attractive as an employer
- Building psychological strength results in lower levels of sick leave
- The work carried out by resilience experts fosters a positive working atmosphere
- Employees identify more strongly with a company based on the communicated business purpose

As part of a 21-day course spread over 12 months, Steinbeis+Academy now offers training to become a certified resilience coach/mentor. Aside from imparting knowledge, training places emphasis on practical application: Theory is put into practice between modules, and participants are expected to develop a resilience concept for their companies by the end of the course. Resilience coaches learn which levers to pull in the future within the company to build crisis-proof resilience. The training culminates in a Diploma of Advanced Studies at the Steinbeis+Akademie.

CERTIFIED RESILIENCE COACH

- Participants learn the fundamentals of coaching and apply these principles in individual or group coaching sessions.
- You learn scientific training methods and are in a position to communicate these methods during training sessions.
- You can develop and implement training concepts based on actual needs.
- You learn the fundamentals of systemic work and apply these techniques during training sessions.
- You develop tools to secure the long-term benefits of resilience training.
- You know how to introduce the acquired methods within the company in order to strengthen individual employee resilience, team resilience, and organizational resilience.

For further information and registration, go to:
→ **www.sti-kiu.com/resilienz-coach**

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COACHING SUPPORT PROGRAM HELPS SMALL BUSINESSES GET OFF TO A FRESH START

TACKLING REALIGNMENT AND BUSINESS DEVELOPMENT WITH THE HELP OF STEINBEIS EXPERTISE

In June 2021, the Baden-Wuerttemberg Ministry for Economic Affairs, Labor, and Tourism launched a new funding program under the title Coaching on the Realignment of Business Models for Small Companies of up to 50 Employees. The program is being funded as part of a financial package set up by the European Union in response to the COVID-19 pandemic (REACT-EU). As accredited consultants, the experts at the Steinbeis Consulting Center for Business Coaching are also offering support in the form of coaching sessions, also covering all steps of the administration process. The following provides an overview of key funding facts:

WHO IS ELIGIBLE FOR FUNDING?

Small firms based in Baden-Wuerttemberg
- Up to 50 employees
- Sales last year of no more than €50 million
- Total assets last year of no more than €43 million

HOW IS FUNDING PROVIDED?

- The allowance is a flat rate of €800 per day.
- Up to 15 days are funded per coaching project.
- Maximum allowance €12,000.
- Multiple funding is possible.

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WHAT CAN BE FUNDED?

Coaching on business realignment, business development, and the adaptation of business models, including detailed definition of concepts and support during implementation, such as:
- Product and process innovations
- Diversification to include new business models; entering new markets
- Networking of products and services ("servitization")
- Innovations based on digital technology such as cloud platforms, the internet of things, artificial intelligence

Further information on the funding program:
www.steinbeis-uc.de.

The Steinbeis Consulting Center for Business Coaching operates a recognized quality management system and has DIN ISO 9001 certification. It thus fulfills the requirements for registration and accreditation as an approved consulting agent. Steinbeis consultants with no in-house quality management system can offer and provide clients with subsidized consulting services through the Steinbeis Consulting Center for Business Coaching.

OUR MISSION

Reimagining location marketing.

Our mission is to make Baden-Württemberg even more visible, attractive and resilient in the face of global competition as a location for business and science, to attract companies and international scientists and students and to strengthen, support and assist local companies and scientific institutions on their internationalisation journey. We see the linking of business and science as a success factor that benefits the region as a location for business and science alike. Incorporating art and culture in our activities also contributes to achieving this goal.

"UNTIL NOW, WE'VE MARKETED THE SOUTHWEST OF GERMANY AS A REGION RATHER THAN TALKING ABOUT THE TOPICS THAT WILL BE IMPORTANT IN THE FUTURE"

AN INTERVIEW WITH DR. CHRISTIAN HERZOG, CEO OF BADEN-WÜRTTEMBERG INTERNATIONAL

In April, the 2020 Innovation Index once again confirmed that Baden-Wuerttemberg achieved the highest innovation performance in the EU, an accomplishment Dr. Christian Herzog – who originally hails from Berlin and was appointed CEO of Baden-Württemberg International (BW_i) a year ago – described as "fantastic" on his LinkedIn account. But despite his enthusiasm, the experienced specialist in economic development knows that remaining competitive in the long term requires even more effort. This is the issue Herzog now wants to tackle with his team at BW_i following a joint planning process. He talked to TRANSFER about the changes and challenges he foresees for the future.

Hello Dr. Herzog. Rethinking the promotion of local economies – that's the mission of BW_i. What exactly does that mean, also within the context of so-called Location Marketing 2.0?

Our aim at BW_i is to break new ground in the promotion of local economies by establishing guiding principles based on customer-centric services and shaping the future. But before I explain how, I'd like to touch on why. Not only is the world changing, Baden-Wuerttemberg is, too. Digital transformation, change within key sectors of industry, the strong dependence on exports, sustainable business, etc. – our local economy is facing major challenges. These changes in the business environment have been rapid for some years now – and they've now been accelerated by the pandemic. Given this, it's entirely logical that we also have to change at BW_i. We've been thinking about services as part of a planning process and discussing what the state and our customers need from an organization like BW_i. I'll use the example of regional marketing to add more detail to what is meant by Location Marketing 2.0. Until now, we've marketed the Southwest of Germany as a region, but it would be more expedient to define it in terms of the topics that will be important in the future – such as artificial intelligence, or AI. So for example we're currently in the process of forging an AI alliance with regions in Canada, the USA, Switzerland, the Netherlands, and France, and we want to position ourselves with them as relevant worldwide AI hubs. By forming an alliance based on certain topics, we're becoming highly visible. At the same time, we're bolstering our contacts and ties outside Germany.

Have the core tasks of BW_i changed in the course of the planning process you initiated?

Internationalization remains an important pillar within our portfolio. Our clients can continue to rely on us to take them into foreign markets of interest, by accompanying them on delegation trips or participating in trade shows. We want to strengthen how we manage new businesses settling in the area, which has also been one of our core tasks until now. As the one-stop agency in the state, we're the first port of call for investors from home and abroad. In the future, we also want to recruit international talent for scientific institutions in the state. We want to drive the issue of innovation as a new area of focus. To do this, we're focusing on topics and technologies that transcend different areas, forging links on an international level by lining up collaboration or setting up more broad-scale alliances such as the previously mentioned AI alliance. This involves close collaboration with our partners, such as Steinbeis and other agencies in the state.

Are you offering any new services to your partners and clients to do this? And is the current pandemic having any impact on this?

With our internationalization services, hybrid methods will be the new normal,

especially given the impact of the coronavirus pandemic. In the future, we'll prepare and follow up on delegation trips by using digital technology; the actual trips to each country will be shorter and more efficient. We're in the course of pulling together a package for our customers so we can pitch professionally through our new studio at the BW_i offices or hold matchmaking meetings. For trade shows, we've pulled together a remote service package for the coronavirus period so that companies from Baden-Wuerttemberg can exhibit their products at on-site trade shows in China with support from our office in Nanjing. It went down so well with our customers that we're thinking about keeping the service going. Here's another example, this time relating to helping companies settle in the region: One problem companies often run into in Baden-Wuerttemberg is that it can take up to five months for work permits to be issued for non-European skilled workers, which is disastrous for lots of businesses. Because of this, we're involved in discussions with the government employment office and the Baden-Wuerttemberg Chamber of Commerce and Industry to look into accelerating the process with the support of BW_i.

Thinking about Baden-Wuerttemberg as a region of innovation – in your opinion, what can be done to promote and push innovation skills in the state?

The science and academia landscape is outstanding here. KIT in Karlsruhe and Cyber Valley have a worldwide reputation in the field of AI; we have universities in Heidelberg and Tübingen with a strong focus on healthcare and medicine. We're world-class in lots of areas when it comes to fundamental research and development, but the biggest hurdle is still there – not just in Baden-Wuerttemberg but actually in the whole of Germany: translating all this into application. What we lack here is places to test and pilot technology. In 2016, why did Daimler unveil its model for self-driving vehicles at the Consumer Electronics Show in Las Vegas? Because there's no testing ground here. We need to pool the joint resources of all players in the region – including Steinbeis, which has been working successfully in the area of knowledge and technology transfer for decades – and make Baden-Wuerttemberg a showcase area for innovation and technology. We also have some catching up to do when it comes to selling our innovation skills – we're still too Swabian about this and lying low. As someone who was born in Berlin, I know that doing business involves blowing your own trumpet, so I'd appeal for more self-confidence when we go out there.

What role is "still" played by science and business in internationalization, especially given the rate at which things are currently going global?

It's been more than 35 years since BW_i was set up as an export foundation in Baden-Wuerttemberg, so we also have to rethink the topic of internationalization. In the meantime, science and academia are generally well connected on an international level, so we're increasingly focusing our attention on recruiting international "high potentials" such as students, PhD students, and post-docs, to come and work at universities and research institutions in Baden-Wuerttemberg. This also entails bringing researchers back from abroad to boost scientific excellence in Baden-Wuerttemberg. As for our clients in industry, big companies and hidden SME champions are already doing international business, but we still feel there are lots of small and medium-sized enterprises in the state that need support in making the move abroad. They're planning the next stage of growth in expanding the global reach of their sales channels, and they like making use of our delegation trips and partnership fairs, and appearing in trade shows.

DR. CHRISTIAN HERZOG
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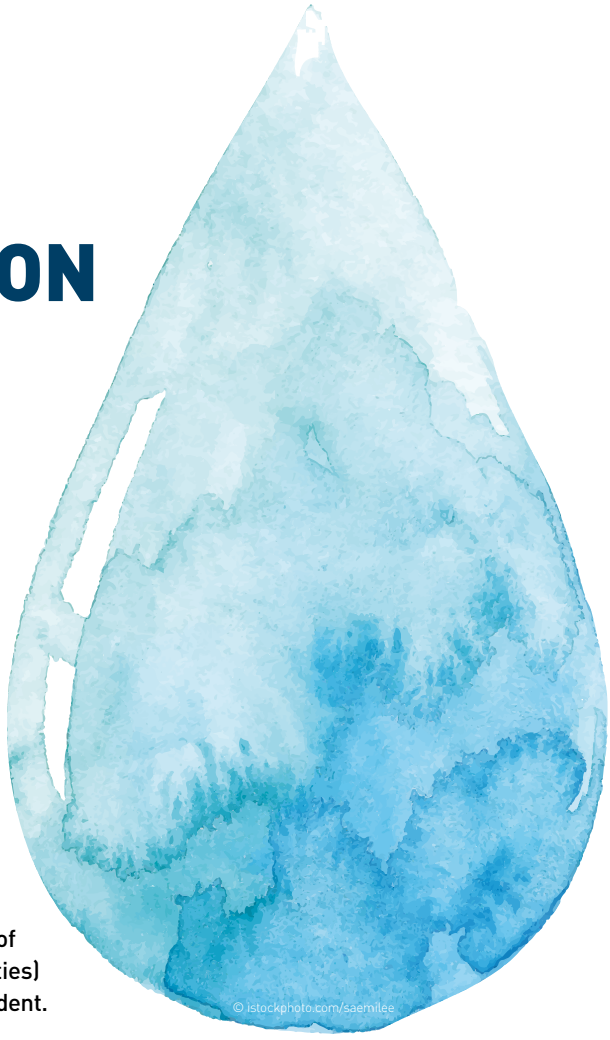
www.bw-i.de

"TO THIS DAY, THERE IS NO OBLIGATION TO TEST DRINKING WATER FOR PFAS"

AN INTERVIEW WITH WILFRIED LUDWIGS AND OLAF KASPRYK



The human organism is unable to clear perfluorinated compounds (PFAS) from the body – or only after many years. They accumulate and, above certain concentrations, can potentially trigger diseases. In the summer of 2012, the executive board at Rastatt Utilities discovered PFAS in the raw water used to produce drinking water at Rauental waterworks. TRANSFER magazine spoke to Wilfried Ludwigs (Steinbeis Transfer Center: Consulting of Medium-Sized Business) and Olaf Kaspryk (Managing Director of Rastatt Utilities) about the specifics of damage control and the consequences drawn from the incident.

Hello Mr. Kaspryk. How exactly were the PFAS discovered at the waterworks in Rauental?

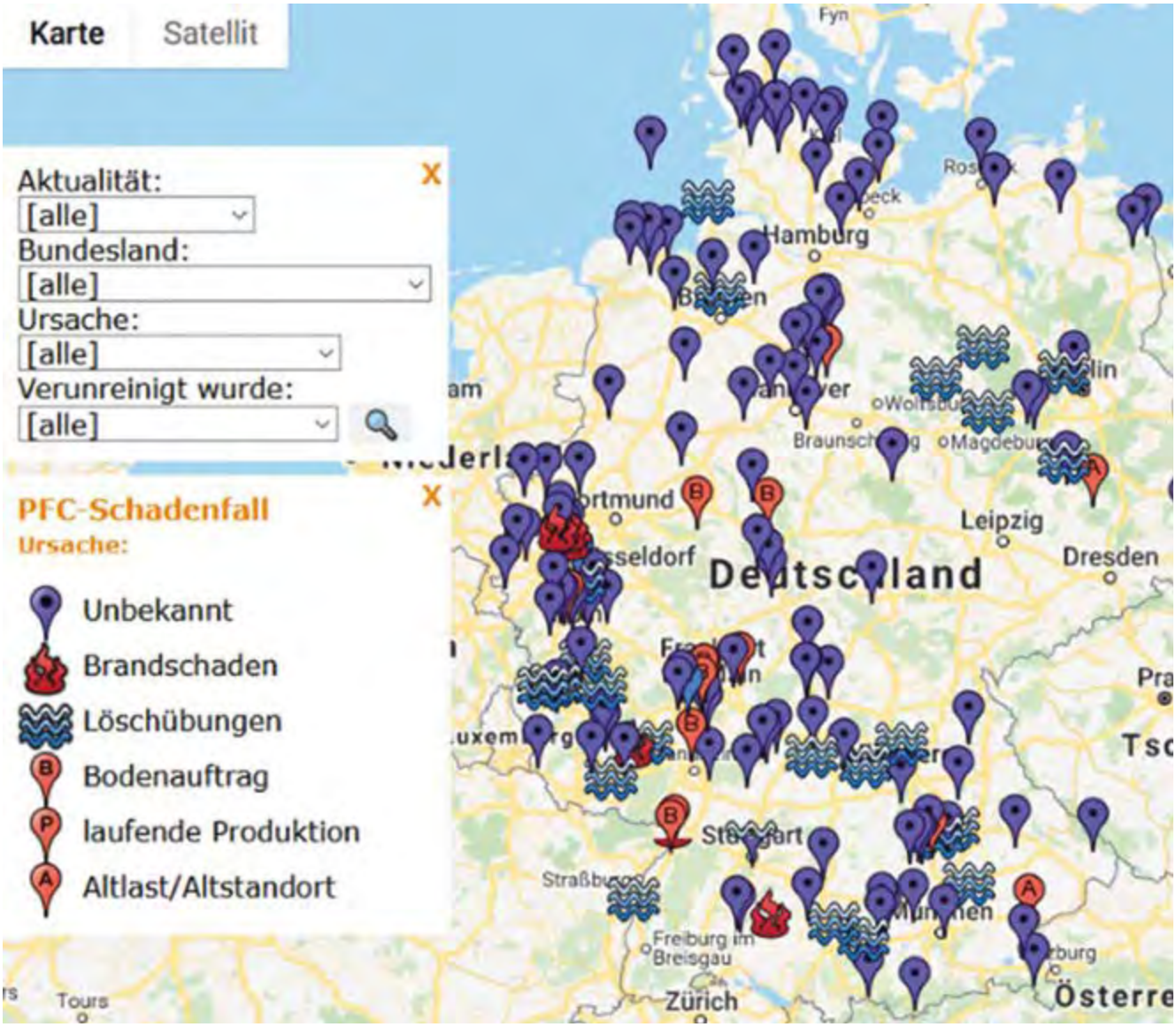
They were discovered by chance since so far there was no obligation to test PFAS in drinking water. Our experts were performing a detailed analysis of the raw water that was used to produce drinking water. Afterwards, hazardous high concentrations were also found in raw water samples from the neighboring waterworks in Niederbühl. It is only at the main waterworks in Ottersdorf where PFAS pollutants have not yet been detected in relevant concentrations. As a consequence, the two waterworks in Rauental and Niederbühl were closed as a precautionary measure and a significant danger was posed to drinking water supplies for the population of Rastatt.

The presumed cause was large-scale dispersion of a mixture of biocompost and waste containing PFAS from paper production. Currently, around 1,200 hectares of agricultural land are affected by PFAS in the districts of Baden-Baden and Rastatt. If we had not discovered it in time, the local population would have continued to absorb hazardous amounts of PFAS chemicals in their bodies for years.

What did you do about it?

Rastatt Utilities has significantly increased the number of raw water measuring sites and carried out regular raw water analysis upstream of the waterworks to establish a basis for a suitable groundwater model. As part of a research project, a technological concept has been developed and tested to remove PFAS from raw water at the waterworks in Rauental. A special groundwater model was created for the land in Ottersdorf so that cause-and-effect relationships could be observed and analyzed specifically on site. The first issues were when and to what extent contaminated raw water would flare up and reach the only waterworks that was still fully functional at the time in Ottersdorf. As mentioned before, we immediately closed the PFAS-concerned waterworks in Rauental and Niederbühl. Our strategy revolved around self-help and taking the initiative. We focused on researching contamination and getting in touch with anyone affected by incidents. Thanks to the support of Consulting of Medium-Sized Business, the Steinbeis Transfer Center, we came up with a concept: an expert forum with experts in this topic to discuss in detail the proposed actions and better technologies for PFAS removal.

A question for you, Mr. Ludwigs. What were the biggest challenges with the first PFAS expert forum?



The online system showing the nationwide threat posed by PFAS contamination; a Europe-wide overview would be very useful. (www.stadtwerke-rastatt.de/pfc-schadensfalluebersicht)

The initial idea was to share information on the current situation with forum members and then consider upcoming decisions. This made it necessary to switch from a conference format to a workshop format. The more than 25 experts from all over Germany showed strong interest in regional factors and they endorsed the concepts that had been developed, i.e. regional networking, a systematic monitoring of groundwater and drinking water and new facilities for cleaning raw water.

And now one for you, Mr. Kaspryk: The idea of a "contamination overview" came up during the forum. What's that about?

The guests who took part in our first expert forum in 2016 appealed to all waterworks in Germany to carry out PFAS tests on their own initiative to end uncertainty regarding a possible threat posed by PFAS. The discussion carried out during our first PFAS Forum allowed us to have more information regarding further cases of PFAS contamination sites, chemistry of these pollutants as well as new concepts for treating raw water.

While we were preparing the second expert forum, we ascertained that still not enough was known about the threat posed by PFAS on a national level. So we asked Mr. Ludwigs if the forum members would be able to discuss the structure of the contamination overview. It soon became clear that as trace elements, PFAS are a continual challenge in terms of water quality and safety.

During the second expert forum that took place in 2017, it became apparent that providing a contamination overview would create transparency and make it

THE PRESUMED CAUSE WAS LARGE-SCALE DISPERSION OF A MIXTURE OF BIOCOMPOST AND WASTE CONTAINING PFCS FROM PAPER PRODUCTION

easier for affected stakeholders to systematically share their experiences.

We were so pleased that the Steinbeis Transfer Center had supported us with the design of a contamination overview and the creation of a basic data.

In the run-up to the third expert forum in 2019, we decided to introduce a PFAS contamination overview as an information service provided by Rastatt Utilities. We commissioned Steinbeis to check the underlying data used for the PFAS contamination overview and complete it. The online system was implemented by WebSmart-Ware to show the nationwide level of threat and various causes, such as fire drills, fire damage, contaminated compost, or industrial production. The Steinbeis experts then researched and published this information. Rastatt Utilities provided the PFAS contamination overview in the form of consumer information, as a supplement to technical communication on its website.

The patterns within the data were discussed with the Federal Environment Agency (UBA) and the Federal Ministry for the Environment. The database was handed over to the UBA during the forum and an interactive database was published online alongside geodata.

In the meantime, the EU Water Framework Directive has been extended to include further limits on trace elements. This meets key concerns expressed at the PFAS forums. What will be achieved now with a European contamination overview for trace elements?

Ludwigs:
Further to bilateral activities with France, we quickly realized that what was needed was a European overview of trace element contamination. Under the new regulations, we anticipate that – just like Rastatt Utilities – many water providers will have to act and look for solutions in Europe. From experience we know that many private individuals and commercial enterprises with their own water wells will need quick answers as to whether they face a threat. Offering multilingual information should appeal to different user groups. The way we see it, the priority is to protect consumers and provide water suppliers, the responsible authorities, and administrative departments with technical information. An online reporting system could post the results of water samples, show how much progress has been made with remedial measures, and publish fire damage reports. Offering practical support – such as taking samples and analyzing them, or providing expert advice online – would add appeal to the service.

Kaspryk:
One key takeout of our forums was that providing finance through foundations, funds, or insurance – in conjunction with an international center of excellence for trace elements – could be a quick and viable solution. Given the monumental investments and additional operating costs, the question is who picks up the tab if there is PFAS contamination. In Rastatt, it is the drinking water customers who foot the bill, even though they are not responsible for the damage caused by PFAS contamination. Protecting our environment – in this case groundwater quality – is also about fairness.

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MEDIATION – QUARTER II EDITION, 2021

→ WWW.STEINBEIS.DE/SU/941

COHESION

GERNOT BARTH (ED.)

Human beings are social beings. As the unique bond between a mother and her child shows the moment it is born, we would not be able to survive without contact to other people. The coronavirus pandemic has also highlighted just how indispensable cohesion is for society. Only when people show respect, concern, empathy, and mutual esteem for others is it possible to establish positive and constructive relationships. People also benefit from this on an individual level through social inclusion, learning important skills and abilities that allow them to define their own identity.

No matter where people meet – within the family, in a relationship, at school, at work, or in society in general – where there is contact with others, there is friction. And sometimes the sparks fly. This issue of Mediation focuses on the topic of cohesion, showing readers how to ensure that people pull together and find meaningful solutions in the interest of all parties, even when there is conflict.

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MEDIATION – QUARTER III EDITION, 2021

→ WWW.STEINBEIS.DE/SU/941

THE GREEN ENERGY TRANSITION AND CITIZEN INVOLVEMENT

GERNOT BARTH (Hrsg.)

Climate change is clearly happening. And it is a development that was caused by humankind. In Germany, Austria, and Switzerland, measures are now enshrined in law to promote the transition to alternative energy sources. Switching to power generation options based on renewable energy sources – such as wind, sun, and water – is closely intertwined with the issue of citizen involvement.

Wherever energy projects have to be implemented, resolving the sometimes conflicting interests of residents, companies, and communities is a fine balancing act. Citizens want to have their say, make joint decisions, and become involved – as early as possible. This is not to everyone's liking, because it involves time and effort. And despite intensive communication, there will be clashes in opinions, ideas, and expectations during civic involvement programs. The third issue of Mediation in 2021 focuses on the green energy transition and citizen involvement, also examining how to make a success out of civic participation.

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HUMAN CAPACITY DEVELOPMENT FOR MIGRATION GOVERNANCE: LESSONS LEARNED

→ WWW.STEINBEIS.DE/SU/2056

ALEXANDER LOCH, ANNA OTT

Safe, orderly and regular migration requires good migration governance.

Various international developmental organisations and UN agencies are committed to supporting their partners around the world developing the necessary capacities to successfully implement the Global Compact for Migration (GCM) as well as achieving all 17 Sustainable Development Goals (SDGs).

However, policy makers, facilitators and program managers report numerous challenges: capacity development is more than simply the provision of trainings – and it requires more than theoretical knowledge about the "migration-development nexus" and "triple win approaches". What is increasingly needed are state-of-the art participatory (online) didactics for migration governance, approaches to address subnational stakeholders (multi-level governance) and the integration of megatrends into capacity development measures at the individual and organisational level as well as in international migration regimes.

By means of participant observation and the analysis of narratives, case studies and workshop materials from pilot trainings in the context of German development cooperation, the authors elaborate five "lessons learned" and outline innovative approaches for future capacity development programs for international migration professionals.

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FUNDAMENTALS OF GEOMETRIC TOLERANCING

GEOMETRIC PRODUCT SPECIFICATION (ISO GPS)

→ WWW.STEINBEIS.DE/SU/1449

WILLI TSCHUDI | VOLKER LÄPPLE (ED.)

The GPS system of standards used by ISO is now one of the most comprehensive standard projects in the history of the organization. It is a rule-based, medium-independent, generically structured set of rules aimed at providing unambiguous and indisputable descriptions of micro- and macrogeometries of components and assemblies used in technical product documentation (e.g. technical drawings, CAD data sets).

The rules are a mandatory prerequisite for the next evolutionary step in the product development process in coming years: entire digital descriptions of products using CAD models, which are sometimes also known as model-based product descriptions or model-based definitions (MBD) and are an essential ingredient of the Industry 4.0 (connected manufacturing) philosophy. The standards system is the recognized state of the art and provides a contractual basis for customer-supplier relationships. It has already been introduced to operations at a large number of companies (worldwide) and should be an integral part not only of vocational training and staff development, but also of technical degrees, particularly in the fields of mechanical, plant, and vehicle engineering.

Drawing on current GPS standards laid down by the IPO, this textbook provides insights into the most important rules and modifiers when it comes to geometric tolerancing – in keeping with requirements regarding function, production, testing, and costs. Using systematic and practical methods to teach the topics covered by this textbook makes it possible to reliably identify obvious tolerance problems and work with all areas involved in product development processes in a partnership of equals. Particular emphasis is placed on describing complex topics in a clear manner. Drawing on examples based on business practice and a large number of practical tips, it is shown how to implement methods constructively, and function-oriented geometric tolerancing is described in a way that makes the topic accessible to the reader. The main norms on which this publication is based are the GPS standards ISO 1101, ISO 1660, ISO 5458, ISO 5459 and ISO 17450-1 and 3.

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COMPETENCE-BASED LEARNING FOR MEDICAL PROFESSIONALS

DEVELOPMENT OF A TECHNOLOGY-BASED DIDACTIC CONCEPT AND EVALUATION IN CARDIOLOGY

YVONNE GREIPL

→ WWW.STEINBEIS.DE/SU/1778

In recent years, hospitals have undergone rapid technological changes in the fields of diagnostics and therapy. To continue to function competently in this highly structured environment, the roles and responsibilities of physicians and nurses must adapt accordingly. In light of these developments, it is becoming increasingly important to conduct research into human factors and look at the diverse patterns of human behavior when interacting with other people and systems.

An education concept supported by technology can help to train medical staff working in hospital environments and equip them with required competences. This dissertation provides a comprehensive overview of issues in this area. Giving consideration to current scientific literature, it describes the development of a new staff development concept based on modern teaching and learning methods. The concept was subsequently evaluated in terms of applicability to the field of cardiology.

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SELECTIVE DEMARKETING

A PARTIAL EXPLANATION OF CUSTOMER BEHAVIOR AND REFLECTIONS ON MARKETING ETHICS

JASSIR QUSHTA

→ WWW.STEINBEIS.DE/SU/1811

In this dissertation by Jassir Qushta, a theory is developed based on a specific object of discussion in order to derive an explanatory model for consumer behavior within the context of selective demarketing. The research also offers initial reflections on selective demarketing based on theories of marketing ethics and actual practice in the form of a "higher road stage" model of reflection.

It thus provides companies with a variety of valuable recommendations as well as groundbreaking ideas for efficient demarketing based on ethical principles.

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THE FUTURE OF THE EUROPEAN GENERICS AND BIOSIMILARS INDUSTRY, 2030 ONWARDS

HEIKO VON DER GRACHT, STEFANIE KISGEN, NICK LANGE, JESSICA JALUFKA | SIBE (ED.)

→ WWW.STEINBEIS.DE/SU/1249

What can industry do to gain insights into its own future? It must delve deep into this future in such a way that it can work out different scenarios and important ideas – without qualification and entirely open in terms of expected outcomes. In addition, the future is never driven by individual players. Instead, it is a collective effort and it never turns out the way it was hoped for by individual parties. The future is volatile and disruptive.

As a result, for this study, interviews, workshops, and surveys were conducted with established experts and thought leaders in three sequential phases of research. To provide a basis for four potential scenarios of the future, a survey was conducted using the Delphi method, an extensive analysis of the business environment was conducted, and eleven thought leaders were interviewed. This painted a picture of the generics and biosimilars industry in 2030 and beyond, thereby offering decision-makers an overview of potential areas of action, also providing impetus to look into their own future.

2021 | E-Paper (PDF)
ISSN 2748-1484

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DF&C – MAGAZINE FOR #DIGITAL #FINANCE & #CONTROLLING

→ WWW.STEINBEIS.DE/SU/818

ISSUE 1/2021 – DIGITAL TRANSFORMATION

STEINBEIS TRANSFER INSTITUTE BUSINESS INTELLIGENCE (ED.)

Published by the Steinbeis Transfer Institute for Business Intelligence in cooperation with the Business Innovation Lab at Ludwigshafen University of Business and Society, the new digital DF&C – Magazine for #Digital #Finance & #Controlling is issued twice a year. Its aim is to offer ideas and inspiration aimed at promoting innovative developments in the field of corporate management/financial control by providing regular updates on trends and recent developments. An official publication for members of the XING CONTROLLING community, which currently boasts over 43,000 members, the magazine aims to offer an active network of know-how, with access to interesting contacts, innovative topics, and exciting events in combination with a program of events and training organized by the DF&C.

The focal topic of the first issue is digital transformation. Digitalization is not a fundamentally new phenomenon, but for far too long it has mainly been seen as a topic for startups in Silicon Valley. For the most part, people only began reconsidering the topic after the initial impacts of disruption became unmistakable in core areas of industry. Nevertheless, both the magnitude and pace of change are still vastly underestimated. It is therefore little coincidence that this phenomenon is called digital "transformation." This reflects the profound upheaval of entire industries and companies. It will radically change companies and, with this, corporate management/financial control. The first issue examines the complexity of this topic based on articles of a theoretical nature and reports on actual experience in practice.

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TECHNICAL INNOVATIONS IN THE CONTEXT OF SOCIAL AND ECONOMIC CHANGE

→ WWW.STEINBEIS.DE/SU/1289

RÜDIGER HAAS, MAJA JERETIN-KOPF, UWE PFENNING, CHRISTIAN WIESMÜLLER (EDS.)

The third volume in the Technology and Technical Education series examines an important and fundamental pillar of functioning communities: the economy. While the first volume was dedicated to connections between cultural development and technical education, the second volume focused on technical creativity (particularly interdisciplinary aspects of creative technology design), and the third deals with technical innovations within the context of societal and economic change.

In this volume, authors from various disciplines offer their opinions, ranging from social scientists to engineering scientists, industrial engineers, and experts involved in technology education. Each highlights the interplay between societal and economic change and technical innovations in their respective area of specialism, focusing on digital transformation, rationality, visions of the future, radical innovation, and social technology.

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PREVIEW

EDITION 03|2021
Feature topic
Humans and AI – Intelligence in Tomorrow's Artificial World (and Environment)
Planned publication date: December 2021

It's 1956 again and scientists at a conference at Dartmouth College in New Hampshire believe that aspects of learning and a number of other characteristics of human intelligence can be simulated by machines. The term "artificial intelligence" is born, a concept whose earliest beginnings go back to 1936 and a machine invented by the British mathematician Alan Turing. Fast forward 85 years and we find ourselves in a new millennium of autonomous robots, smart homes, and self-driving vehicles – by no means visionary concepts but developments that have thrust artificial intelligence upon everyday life. In the next issue of TRANSFER magazine, Steinbeis experts show what is already possible in this area and explore the challenges that await us in the future.

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. Want to make sure you don't miss a future event? Simply add your details to our online distribution list:

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STEINBEIS ENGINEERING DAY
October 13, 2021 | Steinbeis House of Management and Technology, Hohenheim, Stuttgart.
Also online: www.steinbeis-engineering-tag.de

MAX SYRBE-SYMPOSIUM
November 3, 2021 | online
www.max-syrbe-symposium.de

For further information, go to **WWW.STEINBEIS.DE/VERANSTALTUNGEN.**

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CONCEPT AND DESIGN
Julia Schumacher

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The platform provided by Steinbeis makes us a reliable partner for company startups and projects. We provide support to people and organizations, not only in science and academia, but also in business. Our aim is to leverage the know-how derived from research, development, consulting, and training projects and to transfer this knowledge into application – with a clear focus on entrepreneurial practice. Over 2,000 business enterprises have already been founded on the back of the Steinbeis platform. The outcome? A network spanning over 6,000 experts in approximately 1,100 business enterprises – working on projects with more than 10,000 clients every year. Our network provides professional support to enterprises and employees in acquiring competence, thus securing success in the face of competition.

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