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Editorial

Dear readers,

"Deutsche Bahn data scandal", "Corruption at bioenergy company" – every day, headlines in the papers announce wrongdoings in business. Of course they are a good way for journalists to capture interest. We even start to wonder where all the meaty headlines have got to when they are not in print – or why there is only good news in the papers. Are our attitudes to news stories and headline grabbers changing?

Modern companies are now introducing compliance departments and recruiting anti-corruption officers. Government commissions are laying down codes of practice on corporate governance. Organizations such as Transparency International have sprung up as part of crusade to put in place preventative measures, avoid areas of risk and eradicate bribery. And all of this is becoming more and more transparent and thus open to public scrutiny.

But what does this all really mean to a civil society that is imposing regulations – on data protection, the fight against corruption, codes of ethics – on itself? Is modern society actually in a position to implement and adhere to practices it expects others to adhere to? What do companies and organizations mean when they say they are "compliant" and in a position to minimize – or even eliminate – risks to business operations? According to the recent findings of reputable studies on corporate (or "white-collar") crime, companies are not at all versed in issues such as governance, risk and compliance. If anything, all we seem to read about is corruptible civil servants and board-level managers, and even compliance offic-

ers ending up in court themselves for "corruption through neglect". Unfortunately, to avoid such malheurs, many companies neither have the specialist knowledge nor the right contacts.

Thankfully, there is a way to solve this problem.

The state-approved Steinbeis University Berlin (SHB) was founded in 1998. Ever since, with each year that has passed, its student body has grown. One unit within the SHB is the School of Governance, Risk & Compliance (or "School GRC") which is affiliated with three Steinbeis Transfer Institutes. Together, they offer courses on Corporate Governance, Risk, Compliance and Fraud Management. Each course comes under a uniform strategic umbrella, matched to the previous work experience and knowledge of both specialists and managers. Participants come on the courses from a variety of companies, associations and institutions with the aim of gaining new qualifications and honing their business skills. Students carry out a mixture of projects and research assignments which go towards a degree or certified course. This provides students, companies and the School GRC with a basis for sharing – or transferring – knowledge, plus a network specialized in business management and rule compliance. We believe this is the only way to help implement and enforce appropriate corporate codices and sustainable corruption controls while avoiding industry risks. To claim it complies to its own rules and remain competitive in the global context, a society needs the right knowledge and to relate this to everyday



practice. This is the yardstick by which School GRC measures itself and its students, in keeping with the overall thought behind the Steinbeis network. As the saying goes – the head is round so that thoughts can change direction.

We hope you enjoy this latest edition of Transfer!

A handwritten signature in blue ink that reads "Birgit Galley". The signature is fluid and cursive.

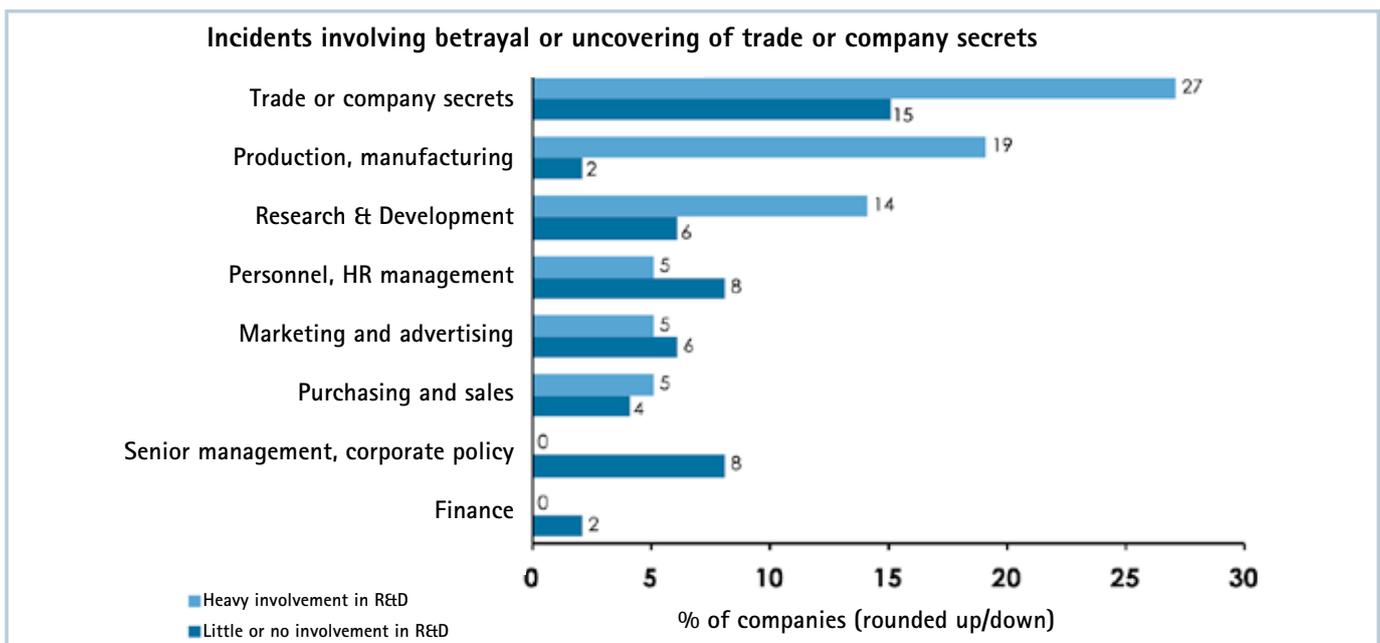
Birgit Galley

Birgit Galley is head of the School of Governance, Risk & Compliance at Steinbeis University Berlin. To find out more about the findings of the study on corporate crime in Baden-Württemberg, which was conducted by School GRC and FSTI for the Baden-Württemberg Security Forum, turn to page 4.

Study on industrial espionage conducted on behalf of the Baden-Württemberg Security Forum

70% of perpetrators come from within the ranks of the company

It takes a great deal of time and money to turn a good idea into a marketable end-product. What if a competitor finds out about a new technology while it is still undergoing development or testing? Everything goes to waste. Especially in Germany, which is home to some of the most innovative companies in the EU, the loss of know-how is a serious security risk that merits close attention. Despite the significance of this issue, until now there have been few empirical studies into the damage and effects of lost know-how. To address the issue, the Baden-Württemberg Security Forum commissioned the "2009/10 SiFo Study" to look closely at intellectual property protection in Baden-Württemberg. The study was conducted by the Ferdinand Steinbeis Institute in cooperation with experts at the School of Governance, Risk & Compliance (Steinbeis University Berlin). It was also backed by the Steinbeis Foundation, the Baden-Württemberg Chamber of Commerce and Industry (IHK) and the Security Forum itself.



For the study, more than 4000 manufacturing and service companies throughout the whole of Baden-Württemberg were written to, using a standardized, web-based questionnaire looking at a variety of topics related to corporate crime. The issues ranged from background information on the company to security measures taken to protect trade or company secrets, the (possible) damage caused by espionage, and experience with or observation of actual instances of industrial espionage. Responses from 239 companies were evaluated, making it one of the largest empirical studies to look into the issue of security risks

within businesses. Due to the nature of business in Baden-Württemberg, the major of respondents worked for small and medium-sized owner-managed companies.

More than 55 per cent of the companies surveyed were involved in research and development at their site in Baden-Württemberg, 30 per cent of them "heavily". More than half of the companies heavily involved in research own a variety of potentially patentable (64 per cent), but not yet protected ideas. From a legal standpoint, part of their intellectual property is thus unprotected. Half of the companies

with unprotected ideas said they are not yet ready for patenting (57 per cent), but also as many small and medium-sized companies view the time commitment (49 per cent), financial aspects (47 per cent) and the legal effort (45 per cent) involved in patent applications with trepidation. Almost half of the respondents complained about the lack of protection outside Germany had prompted them not to patent their products in the first place.

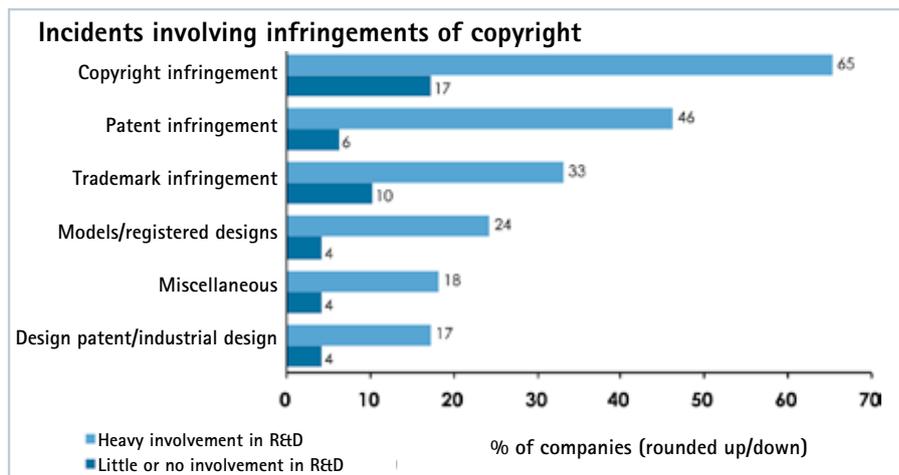
The survey found that just under 38 per cent of companies had been confronted with

copyright infringements in the past four years, and 18 per cent had suffered after trade secrets had been divulged. Product and trademark piracy was more likely to affect companies heavily involved in R&D. Almost two thirds of these companies (65 per cent) had been damaged by an incident in the last four years.

Approximately 40 per cent of companies were affected by copyright infringement, resulting in a severe loss of sales (37 per cent), impaired business relationships (40 per cent), or an unfair strategic advantage for competitors (44 per cent). The financial implications of copyright infringement can be severe. Companies estimate the damage per case as anywhere between less than 10,000 and 2 million euros. Companies heavily involved in research are by far more likely to suffer severe damage: on average more than half a million euros (540,000 euros), with 23 per cent of respondents saying that damage was significantly higher.

Typically, business and industrial espionage involves a trade or company secret being divulged or uncovered. More than a quarter of companies heavily involved in research said they were affected at least once by espionage. It is difficult to estimate the financial effect, but the average figure given by the companies affected was 171,000 euros, with companies heavily involved in research suffering significantly more. One in five affected companies said damage came to more than half a million euros.

Only 58 per cent of the companies heavily involved in research admitted they were doing enough to protect R&D, even though it is so important to them. Seven per cent of companies admitted their protection was "poor". It was also noticeable that not enough attention was paid to the risk of becoming a victim of corruption, fraud, or a betrayal of confidence. Only one in ten respondents believed they could fall victim to such a crime in the next two years.



Most copyright infringements originated in the Far East, followed by Germany and West Europe. This compares to offenses relating to company or trade secrets: more than two thirds of perpetrators or organizations were in Germany – in other words, companies were damaged in their own country by their own employees, competitors, etc.

More than 70 per cent of perpetrators came from within the ranks of the damaged company and had worked there for around 10 years. On average, perpetrators from outside the company had had links to the business for six years. Almost two thirds of companies (64 per cent) thought it was unlikely that their own employees or managers could become involved in espionage. This is an error of judgment, with potentially severe implications – as the study shows. At 44 per cent, the biggest group of perpetrators is within the company.

Some companies could already do more to protect themselves. Only one in two companies surveyed took steps to ensure sensitive information is restricted. A similar percentage had its own ethical guidelines or code of conduct to compensate for poor company values and show employees what to do with sensitive information. Companies affected by espionage frequently fail to uncover malpractice through their own security or monitoring procedures. In most instances (73 per cent) incidents come to light after a tip-off from inside (42 per cent) or outside (31 per cent) the company.

The study demonstrated clearly that copyright infringements, industrial espionage, and leaks present companies with a tangible and still underestimated threat to their business. Companies must do more to protect themselves and their workers from the dangers of know-how losses and industrial crime.

As well as collecting and evaluating data, the "2009/10 SiFo Study" therefore recommended key actions designed to help companies set up networks to protect themselves from damage and optimize preventative measures.

One in three companies affected by espionage in recent years indicates that there is a high risk that they will be affected again by product/trademark piracy (32 per cent) or the betrayal or uncovering of company or trade secrets (36 per cent). Despite this, companies that have been affected tend not to discover incidents through their own security and monitoring processes, and that includes IT and business security processes.

These results of the "2009/10 SiFo Study", and more, will be published in a Steinbeis-Edition publication (Q1 2010).

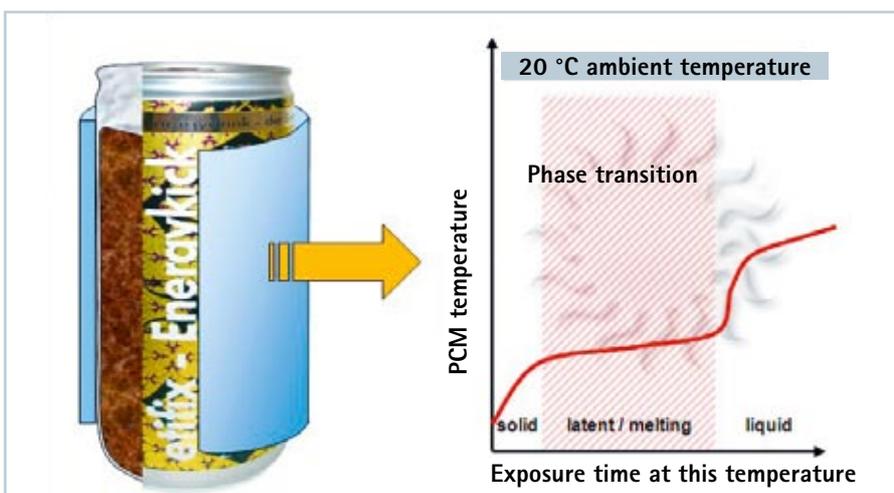
⇒ www.steinbeis-edition.de

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Intelligent labels that keep liquids cool by controlling the temperature

A “cool” label...

For label and packaging producers, the food and beverage industry represents an enormous market – and one of crucial importance. Almost every product needs a label, whether integrated into the packaging or placed directly on the product. For most beverage companies, the labels on bottles and cans need to do much more than identify the product. A label is a brand's calling card. In a research project sponsored by the German Federation of Industrial Research Associations, etifix and the Steinbeis Innovation Center for Application-oriented Material-, Production-, and Process-Technology have joined forces to develop a new kind of label which actively controls the temperature of liquids. Labels of this kind open the door to a variety of applications in the beverage and automotive industries, as well as in medicine.



PCM for heat storage on a 330 ml beverage can

Many soft drinks and alcoholic beverages are kept in chilled cabinets at the point of sale. This ensures consumers enjoy the drink's taste and aroma at the right temperature, and gives the beverages their trademark cooling, refreshing effect. Soft drinks are normally consumed at temperatures between 8 and 14 °C. As almost every chilled drink needs a label, etifix and the Steinbeis Innovation Center for Application-oriented Material-, Production-, and Process-Technology are developing a new two-in-one technology which combines labeling with cooling. The high-tech labels must fulfill all the requirements of existing labels and be able to cool drinks, or at least keep their temperature constant for extended periods.

Fulfilling the different properties of the label requires a range of materials. The research project is focusing primarily on latent heat storage (LHS) materials, as they can absorb

heat without becoming warmer. They are also able to store almost 15 times more heat than sensible heat storage (SHS) materials. Latent heat storage materials make use of a phase transition which allows the material to store energy without increasing in temperature. Because of this, these materials are sometimes also called phase change materials (PCM).

In the research project, the team is using these materials to develop labels which absorb energy and heat from the environment, keeping the liquid inside cool. Another requirement: once labels have absorbed energy, they should be able to release it again at a later time. And to cool drinks at a selected time, the team will also experiment with integrating frigorific mixtures into labels.

As well as creating innovative label materials, the experts from the Steinbeis Innovation Center and etifix are also developing new

production technologies to manufacture the labels. Not only that, the two partners are also working on ways to adapt existing production methods to the new materials.

Functional labels

The key properties of functional labels with latent heat storage:

- able to store latent heat (material boasts high energy storage capacity with little change in volume; specific heat capacity, thermal conductivity)
- resistant to corrosion
- poses no health hazard
- extremely low flammability
- recyclable
- printable (rough finish)
- high adhesion (resistant to peeling)
- firm yet flexible (Young's modulus)
- stable (durable)

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TRANSFER catches up with Nadine Jetter and Volker Plesse, graduates of SHB's Business School Alb-Schwarzwald

Theory, transfer and time to reflect: a win-win situation for father and daughter

Mr. Plesse, you're the managing director of Neher Multiraum, a company based in Frittlingen, Germany. What made you want to pursue the IndustrialBBA?

Our growth and concomitant expansion dictates that we stay on top of our business and professional development; these skills will allow us to remain successful in the years to come. Mastering this challenge takes more than getting behind the wheel. We have to be able to steer our own course. This realization is what prompted us to investigate options for employee development. We found that the program offered by the Business School Alb-Schwarzwald, part of Steinbeis University Berlin, was exactly what we needed.

Ms. Jetter, you were enrolled on the same degree program as your father. You don't see that kind of generational mix in educational programs every day.

At Neher Multiraum, I'm an assistant to the executive board, so I have a very solid grasp of what goes on at our company. Employee motivation and commitment plays such a large role in a company's success, so I thought it made sense to enroll on the same program as my father. It was very well received by our employees, especially since they're involved in their own professional development and can take advantage of educational opportunities, too.

What did you think of degree program, and what did you gain the most benefit from?

One thing we'd like to emphasize is how well the topics were covered in the program and how it was all organized. Each module clearly plugged into the others. Underpinned with real-life examples, theory came to life – it

wasn't just notes on a page. We also enjoyed some very lively discussions. And we can't leave out our excellent supervisors and the informal atmosphere throughout our studies.

Mr. Plesse, what benefits has this program brought to you and your company?

You know, we've all reaped the benefit; by that I mean the company as a whole, along with all of our employees. Just one example: there was project and transfer work focusing solely on Neher Multiraum, so we gained fresh insight into useable methods and models. We incorporated this new knowledge into employee training sessions to help our people share information throughout the company. There were also targeted analyses on our company and competitors and these opened up new avenues that will lead to more projects. What's more, we had the opportunity to hold in-depth conversations and this helped students from other industries cement new professional contacts. When we weren't exploring theory, we visited some very interesting companies abroad and got to see first-hand different ways of doing things. This program also put our personal abilities to the test and helped us discover new forms of entrepreneurial thinking.

Would you recommend this program? If so, to whom?

We'd definitely recommend the degree because we've seen how we've changed in the last three years, both professionally and in the way we see things. Having time to reflect on things and concentrate on transfer has prompted us to change our relationship with Neher Multiraum and ourselves. The degree is an excellent choice for people who want to become entrepreneurs or hone their skill sets – especially if they'd like to find better ways of



Volker Plesse and Nadine Jetter

working and managing people while making their companies more successful.

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The latest round of prizewinners and projects

The 2009 Lohn Award

They came in wonder to see technology transfer in action – this year's Lohn Award was bestowed during the Steinbeis Day on 25 September 2009. The prize for transfer excellence was awarded to three Steinbeis Enterprises and their project partners. Two honorary prizes were also awarded. The jury announced the awards to an audience of 500 invited guests at Stuttgart's Liederhalle arts and convention center. The annual award, which was introduced in 2004 in honor of the lifetime achievements of Prof. Dr. Dr. h. c. mult. Johann Lohn, recognizes outstanding transfer projects in fields using competitive technology along with knowledge transfer between science and business. The prize money is up to 60,000 euros.

The success of projects is measured by two key criteria: the quality of the actual transfer process, and discernible transfer potential. This is reflected in commercial usefulness for both the "know-how provider" (the Steinbeis Enterprise) and the "know-how recipient"

(the customer). The jury awarded the prize to three project teams in 2009. First there was the Steinbeis Research Center International Vision Correction Research Centre, which was recognized for a joint project with EyeSense focusing on micro-implant

sensor development for non-invasive blood glucose measurement in diabetic patients. Second, a prize was awarded to the School of Management and Innovation at Steinbeis University Berlin and its project partner, PSD Bank Berlin-Brandenburg. Their project



Prizewinners with the name-giver of the Löhn Award (left to right): Tim-Enno Janssen (PSD Bank Berlin-Brandenburg), Bernhard Soeken (PSD Bank Berlin-Brandenburg), Prof. Dr. Dr. Helmut Schneider (School of Management and Innovation, Steinbeis University Berlin), Alexa Luksch (School of Management and Innovation, Steinbeis University Berlin), Dr. Jens Engelmann (School of Management and Innovation, Steinbeis University Berlin), Carsten Rasner (School of Management and Innovation, Steinbeis University Berlin), Matthias Fischer (Steinbeis Consulting Center Regional Development and Economic Development), Johann Keller, Town Mayor (Bad Peterstal-Griesbach), Prof. Dr. Dr. h. c. mult. Johann Löhn (Steinbeis University Berlin), Dr.-Ing. Hans-Jörg Domhardt (Steinbeis Consulting Center Regional Development and Economic Development), Prof. Dr.-Ing. Nikolaus Kappen (Steinbeis Transfer Center Computer Applications), Dr. Achim Müller (EyeSense), Dr. Peter Herbrechtsmeier (EyeSense), Prof. Dr. med. Gerd Auffarth (Steinbeis Research Center International Vision Correction Research Centre).

looked at ways to improve the effectiveness and efficiency of the PSD Bank customer magazine and thus improve overall bank communication. A third prize was awarded to the Steinbeis Consulting Center for Regional Development and Economic Development and the township of Bad Peterstal-Griesbach, whose joint efforts resulted in a community development concept for coping

with demographic change. Apart from the project-based prize winners, two honorary prizes were awarded as part of the 2009 Löhn Award. Professor Dr.-Ing. Nikolaus Kappen was honored for his outstanding contributions as head of the Steinbeis Transfer Center for Computer Applications. Finally, Professor Dr. rer. nat. Dr.-Ing. E. h. Max Syrbe was honored for his outstanding

personal contributions to know-how and technology transfer as long-serving member of the Board of Trustees and Chairman of the Steinbeis Foundation Committee. The following pages provide more detail on the prize winners and their projects.

Submissions for the 2010 Löhn Award can be made by going to www.loehn-preis.de

A micro-implant sensor for non-invasive measurement of blood glucose levels

It is important for patients with diabetes mellitus to be able to monitor blood glucose levels by themselves. Until now, glucose levels were measured by examining droplets of blood, which patients place on sensors on a blood glucose meter. EyeSense, a company from the Bavarian town of Grossostheim has developed a special hydrogel implant which is implanted under the conjunctiva of the eye to measure glucose in the blood. Based at the University Eye Clinic of Heidelberg, the Steinbeis's IVCRC (International Vision Correction Research Centre) conducted a series of laboratory experiments to ascertain the ideal measurement position between the sensor and the photometer, subsequently managing clinical testing.

The bio-chemical implant sensors work by emitting fluorescent light, depending on the concentration of glucose within the tissue fluid. Thanks to small photometers positioned in front of the eye, the sensors detect and evaluate the glucose optically, i.e. non-invasively. EyeSense ran compatibility checks on the implant with frequently prescribed medicines. The IVCRC initiated development of the injector used to insert the implant in the ideal position. Results from

the first cohort studies are highly promising. They point to a good correlation between measurements made by the mini-sensor and reference methods, with few adverse reactions to the implant.

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PSD Bank Berlin-Bra makes its communica

Customer magazines are becoming increasingly important as a core marketing communication instrument. Despite this, there are no empirical studies on the potential effect of magazines and their key criteria. One of the key communication instruments used by PSD Bank Berlin-Brandenburg is its customer magazine "GELD + GEWINN" (in English: "Money and Profit"). A joint project with the SVI endowed chair of Marketing and Direct Marketing at Steinbeis University Berlin's School of Management and Innovation examined ways to optimize the effectiveness and efficiency of "GELD + GEWINN".

As part of a field study, research was conducted to analyze the potential of the magazine to stimulate readers on a visual and sensory level, its contents, the publication timing, and readers' involvement in different product categories. By matching scores of

Innovative IT networking in development and production

Prof. Dr.-Ing. Nikolaus Kappen was bestowed the Löhn Award for his outstanding contributions as head of the Steinbeis Transfer Center for Computer Applications, his commitment to the Steinbeis network, and for his contributions as a university professor. Nikolaus Kappen embarked on his career at AEG where he became head of factory automation. He is now Vice Dean at the University of Esslingen, Director of studies for the computer engineering program, and is responsible for running the embedded systems laboratory.

Nikolaus Kappen founded the Steinbeis Transfer Center for Computer Applications at Esslingen University in 1986. For more than 20 years, the center has played a highly successful role supporting automotive companies and their suppliers in the Stuttgart area. These clients bank on the wealth of experience offered by Nikolaus Kappen and his department in designing and managing

heterogeneous development and production IT networks, as well as technical software development – from microcontroller applications to virtual 3D system simulation. Nikolaus Kappen also develops tools used in the network maintenance of vehicle test beds, as well as simulation systems used in vehicle cockpit MMI.

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ndenburg tion more effective

different criteria (visual, sensory, content-based) eight test versions were written. In total, 32,000 adapted customer magazines were sent out followed up by a random survey of readers. Based on the results, the university chair laid down guidelines for optimizing the effectiveness of the customer magazine – and cutting costs. The joint project was the first time general insights had been gained into the effectiveness of customer magazines and key criteria affecting their performance.

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Town development in Bad Peterstal-Griesbach

Many communities in Germany are feeling the effect of the aging population and declining inhabitant numbers. The small town of Bad Peterstal-Griesbach has decided to act early and do something about population shifts and their effects on the standard of living and housing. The Steinbeis Consulting Center for Regional Development and Economic Development, which is based at the University of Kaiserslautern, has developed a town development plan for structural changes in the community – addressing demographic, social, and economic issues.

Following a survey of local residents, businesses, holidaymakers and short-term visitors, a roadmap was written complete with goals for the future development of the community. Based on this, specific actions were worked out, encompassing projects and potential ways to manage community projects. The concept catalog ranged from project ideas relating to housing, the standard of living, local transport, transportation networks, day trips, and the area as a day's getaway. Based on the town development plan, cooperation will now be in-

tensified with project partners to translate ideas into tangible actions over the years to come.

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Paving the way in research management

The Löhn Award jury has honored the outstanding personal contributions made to knowledge and technology transfer by Prof. Dr. rer. nat. Dr.-Ing. E. h. Max Syrbe, long-serving member of the Board of Trustees and Chairman of the Steinbeis Foundation Committee. After completing a PhD in applied physics and control engineering, Max Syrbe worked for Brown Boveri & Cie in Mannheim. In 1968 he became head of the ISF (Institute for Oscillation Research) which was renamed the IITB (the Fraunhofer Institute for Information and Data Processing) in 1970. Max Syrbe was first appointed to the Senate of the Fraunhofer-Gesellschaft in 1966. In 1983 he was appointed president.

Syrbe held this responsibility until 1993 and it was his initiative that shaped the underlying direction of further developments at the Fraunhofer-Gesellschaft. It was Max Syrbe who pushed ahead with performance-related contractual research for industry and the public sector as a cornerstone of Fraunhofer and as a driving force of applied research in Germany. Syrbe has been a member of the

Steinbeis Foundation Board of Trustees since 1983 and has been heading up the Foundation Committee since 1991. Most of his scientific work focuses on the field of automation, the interdisciplinary field of "anthropotechnics", research policy, and research management. Max Syrbe is a winner of the "Fraunhofer Sculpture", the German Federal Cross of Merit and the Bavarian Order of Merit.

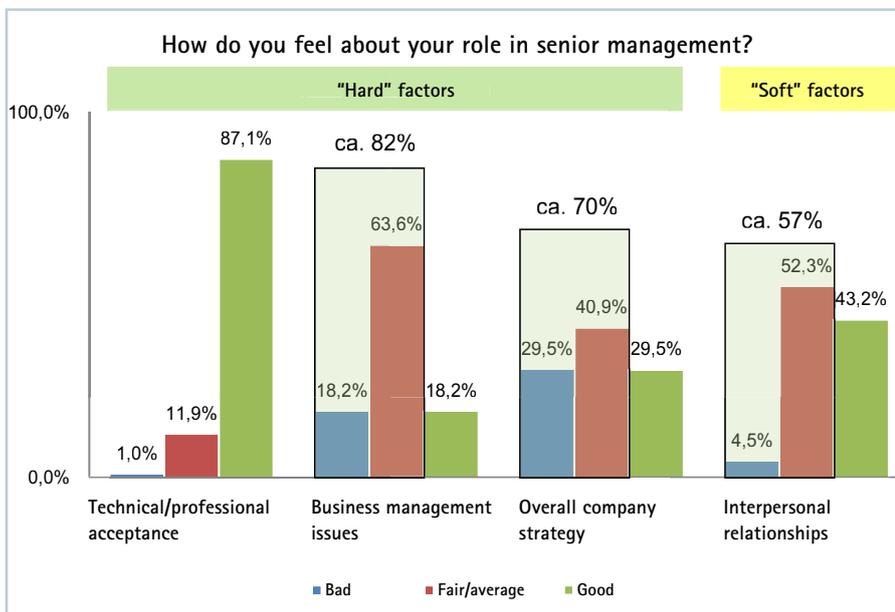


Professor Dr. rer. nat. Dr.-Ing. E. h. Max Syrbe
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Steinbeis study on work in development and design

Are heads of development and design still “on the ball”?

This was the burning question posed by the Steinbeis Transfer Institute for Development and Management at Steinbeis University Berlin to 275 managers working in development and design. The findings: it's high time they start thinking differently about their role within companies! Over the past two decades Development and Design departments (D&D) have become one of the most important critical success factors within companies. The old tendency to think reactively on projects, assignments, and their departmental role must be done away with – in favor of a more proactive attitude towards their role, becoming more directly involved in senior management activities.



Personal feelings of D&D heads as a member of senior management

It would be safe to assume that the process of adding value is shifting more and more away from production, and sales and marketing, towards development and design – especially in product-oriented and small and medium-sized (SME) manufacturing companies. Their aim should be to gain – and safeguard – competitive advantage by coming up with innovations and new products. Heads of development and design are increasingly expected to act as managers of their D&D department, which entails a broad range of methods and management issues. At the same time, they are expected to know about leading from the front, managing people, and even thinking entrepreneurially. Their role in modern business is less about the tra-

ditional aspect of inventing things and more about acting as a coordinator and moderator, working within a team. They also have to keep people motivated and well trained. Heads also need to actively shape their “upward” responsibilities as a member of senior management. To achieve this, certain prerequisites have to be fulfilled and managers need the right attitude, i.e. “willingness to lead” and “willingness to implement”.

The study carried out by the Steinbeis Transfer Institute for Development and Management sheds light on the current situation affecting many heads of development and design in SMEs. The study focused mainly on the following issues:

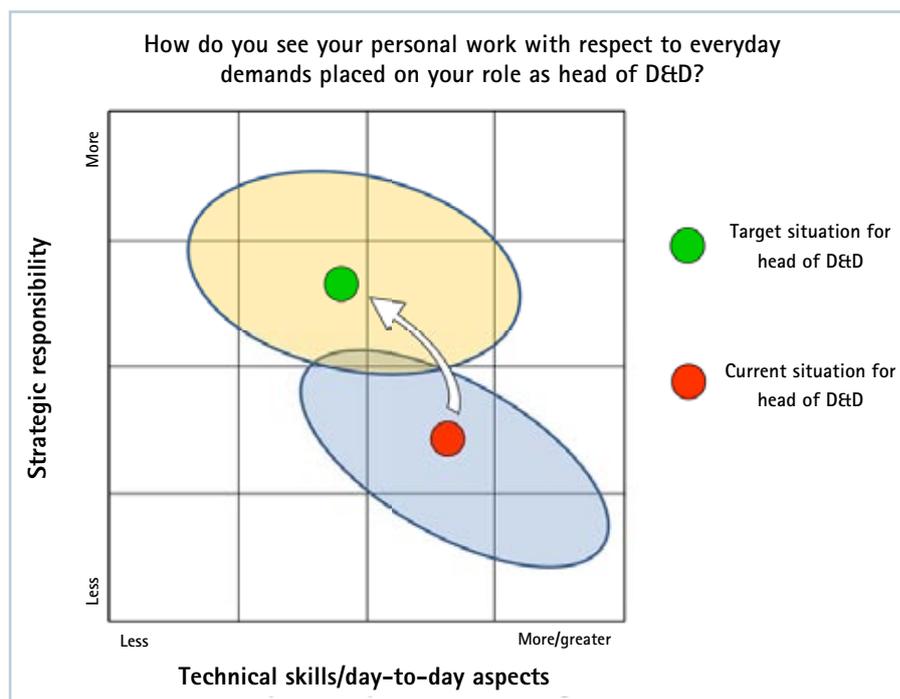
- The extent to which D&D heads are included in the “senior management circle” of the company
- Management activities of D&D heads within their area of responsibility
- D&D heads' personal skills and prospects

Design and development is the area of the business most likely to be “officially” represented at the senior or board level of a company. Despite this, according to the survey, D&D heads at a senior level are more “receptive to passive”, or “adapt their behavior”. Only to a lesser extent are they “active to dominant”. It is therefore interesting to find that only just over 50 per cent of D&D management respondents are “not” or “not satisfactorily” prepared for senior management meetings, or that preparation is “enough to get by”. Anybody attending a board meeting with enough preparation to get by, adapting their behavior or acting passively is highly unlikely to seize the opportunity to promote the interests of their area or other issues, or input with (or even push through) ideas. D&D often sees itself as a “reactive innovator”. At only 18 per cent of companies do D&D heads see their role and their department as one that initiates innovation. Given the need for D&D to see itself as a “driver of innovation” within the company, this low percentage could be considered quite alarming.

The findings of the study show clearly that D&D heads are heavily involved in the day-to-day running of the business and dealing

with live projects, as well as detailed product issues. The day is dictated by fire-fighting rather than managing opportunities. Extrapolate this insight to the whole area of responsibility, and other aspects of business management (management responsibility), and heads of D&D are only left with a relatively small amount of time: 12 per cent. This does not look like much time, given the significance of the activities a manager has to carry out. An analysis of the numbers also highlights an astonishing "Proportion of time put aside to think about the future of the D&D department": 4 per cent. The fact that around 44 per cent of D&D heads answered this question with zero per cent speaks for itself. If heads of D&D are spending almost 90 per cent of their time on the day-to-day running of the business and are spending little or no time thinking about the future of their own department, then it is hardly surprising that their role in senior management circles is considered more "passive" – and that other senior managers perceive things the same way. This situation is far from ideal, for the company and the personal standing of the head of D&D.

Not one of the D&D heads questions felt "bad" about the recognition they gain for technical expertise. This reflects the considerable technical knowledge and self-confidence of D&D heads working in their roles. However, the respondents always felt "bad" or "average" when it came to business management issues in senior management circles. The picture was similar with overarching strategic issues. Examining the causes for this at a professional level points to deficits with issues such as "goal setting and strategy planning", "business management knowledge" and "negotiation techniques". The extent to which these deficits could be crucial can be demonstrated by looking at the nature of goal setting and strategy planning: technological strategies, technology management, strategic product planning etc – these are all part and parcel of setting goals and planning strategies, and thus exactly the sort of topics D&D heads are there to talk about in senior



Assessment of personal work with respect to everyday demands placed on the D&D head (current and targeted)

management. This turns into a daily tight-rope walk between the day-to-day running of the business and the challenge of being a senior manager within the business.

Heads of D&D should be able to stand back, to a sensible degree, from the day-to-day running of the business and detailed technical issues, to free themselves up to fulfill strategic obligations. If time is short, the only solution would be to shift the responsibilities of D&D heads from the bottom right area of the matrix shown in the diagram to top left. Plotting technical or specialist skills against strategic responsibility is not supposed to show that managers assuming "more" strategic responsibility will lead to "less" skills. It is more about highlighting how "technical (detail) aspects" dominate D&D's everyday work.

The study resulted in a number of "missed opportunities" being identified. The study findings clearly indicated that most D&D heads fail to use (or only partly use) the opportunity presented by the important position D&D holds within the company – and

the role D&D heads play as a member of the business's senior management circle.

The study discussed in this article is also printed in the "Steinbeis-Edition", under the German title "Verpasste Chancen" (Missed opportunities). More www.steinbeis-edition.de

Verpasste Chancen? Zur Situation des Entwicklungs- und Konstruktionsleiters in kleinen und mittleren Industrieunternehmen
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Steinbeis researchers investigate the potential of solar energy

German Solar Prize 2009 goes to Sun-Area

Eurosolar, the European Association for Renewable Energy, bestowed the annual German Solar Prizes in Karlsruhe in October 2009. One of the award winners was Prof. Dr. Martina Klärle, head of the Steinbeis Transfer Center for Geoinformation and Land Management and professor of geoinformation and municipal technology at Frankfurt University of Applied Sciences. This is the first time a German Solar Prize has been bestowed to a geoinformatics project.



Laudator Franz Alt, award winner Prof. Dr. Martina Klärle, and Eurosolar president Hermann Scheer (MdB) at the awards ceremony. Photo: Roland Fränkle, Karlsruhe City Council

The Sun-Area research project led by Martina Klärle won the German Solar Prize 2009 in the category of Education and Research. Klärle received the award from Hermann Scheer – president of Eurosolar, member of the German Federal Parliament, and a past winner of the Right Livelihood award, also known as the Alternative Nobel Prize. In his address, Scheer described how the award winners are now role models: their work accelerates the transition from fossil fuels and nuclear energy to the exclusive use of renewable energy sources. "Renewable energy is more than just a vision – it's being put into practice all around us. The proof? Not just the award winners, but the number of submissions we received – over 200. People everywhere are finding both conventional and innovative ways to drive the energy rev-

olution forward," said Scheer at the awards ceremony.

Sun-Area uses high-resolution laserscanning data to analyze all roof surfaces in a given area. This makes it possible to determine the best locations to install photovoltaic systems and thermal solar energy systems. The method automatically calculates the energy potential of a city or district, showing every suitable roof surface as part of a "solar land registry".

Klärle and the Sun-Area team have developed a practical tool for combating climate change which encourages the use of renewable energy. The city of Osnabruck was the pilot region for the project. Since then, seven more German cities have made use of Sun-Area, including Wiesbaden and Gelsen-

kirchen. But it's not just major cities that are showing interest in the new technology: rural areas also want to get on board and do their part to combat climate change. In 2009, the LEADER campaign groups for the Central Black Forest and Neckar-Odenwald-Tauber districts commissioned the Sun-Area team to create a solar land registry for 82 municipalities in the state of Baden-Württemberg. Sun-Area analyzed over 123,000 buildings in the Neckar-Odenwald-Tauber district alone – an enormous amount of data. The study revealed that 22% of roof area in the district was suitable for generating solar power. If this area were fully equipped with photovoltaic systems, it could generate 180% of the district's private energy consumption. The analysis for the Central Black Forest region revealed similar results. At the moment, less than 1% of energy used in Germany is generated from solar power.

To determine the potential solar energy gain, Sun-Area analyzes the roof's angle of slope, alignment, and the amount of shade. For each subsection of the roof, Sun-Area then calculates its suitability for solar power generation, its potential energy yield, the resultant CO₂ saving, and the investment required to install a photovoltaic system. Using a web-based geographic information system (GIS) application, the results are then displayed on an interactive map which is available to both the general public and local government authorities.

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Steinbeis Symposium: Electronics in automotive engineering

Turning the spotlight on electric automobiles

In just over 20 years, the Steinbeis "Electronics in automotive engineering" Symposium has established itself as a key event for professional exchange between leading experts in automotive development, production, and service. Launched in 1988 as a practice-oriented forum for sharing expertise, Steinbeis invites to the symposium for the third time from 27–29 April 2010 in Stuttgart's Haus der Wirtschaft (House of Commerce). This year, the symposium will focus on electrics, electronics, and the switchover to electric vehicles.

The upcoming symposium will highlight the role of electrical, electronic and mechatronic systems as key factors for adding value to innovative automobiles. The automotive world remains in flux and there are many different roads ahead. Electrically powered vehicles are one of the most promising, and today they represent an extremely significant field for research and development. The European automotive industry is driven primarily by developments in the USA and East Asia. Electrically powered vehicles which store energy in an onboard battery will be available in niche markets within the next two years. And vehicles powered by hydrogen fuel cells should hit the market by 2015. Despite these developments, many assume that even by 2030, petrol and diesel-powered automobiles will remain widely used – people will fill up their cars just as they do now.

The first of the symposium's three days will focus on current technologies and the future of automotive electronics. The main event will be a guest lecture by Member of the German parliament Prof. e. h. Dr. Hermann Scheer, entitled "The next electronic revolution". Day two of the symposium is dedicated to the complex role of electrical and electronic systems in the development of electrically powered automobiles, with an emphasis on high voltage components and architectures. In the evening, representatives from politics, business and science will take part in a panel discussion chaired by Markus Schöttle, editor of the trade journal ATZ. The debate will address electric automobile topics from a variety of angles. On the final day of the symposium, speakers will approach the issue of electric automobiles



Photo: © iStockphoto.com/Christopher Pattberg

from the perspective of vehicle requirements and infrastructure. In the afternoon, the symposium will come to a close with excursions to automotive suppliers. A trade exhibition will accompany the symposium on all three days.

The symposium program committee includes a number of leading industry experts, who have selected an engaging variety selection of speakers and topics to keep visitors on their toes. Dr. Dirk Walliser of the firm MB-technology is responsible for the symposium agenda. Media partners are the trade journals ATZ, ATZelektronik and MTZ, all published by GWV Fachverlage, part of the Springer Automotive group.

Visitors unable to attend all three days of the event can also register for individual days. Students and university staff receive a special discount. The guest lecture and panel discussion is open to all-comers.

To find out more and register for the event, visit:
www.steinbeis-symposium.de

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Filming in the botanical gardens at the University of Freiburg: a bamboo tree with mechanical reinforcements

Steinbeis film for the Baden-Württemberg State Ministry for the Environment

How the environment benefits from bionics

PatenteNatur – NaturPatente: that's the title of a new DVD produced by the Steinbeis Transfer Center for Audiovisual Media at Stuttgart Media University. Commissioned by the Baden-Württemberg State Ministry for the Environment, the film aims to get people interested in bionics – especially schoolchildren. Using engaging examples of "natural patents", the 20-minute mini-movie shows how the environment benefits when scientists, technicians and engineers join forces.

What do a sheep's leg bone and the Eiffel Tower in Paris have in common? Watch the DVD and see for yourself. The film zooms in on a cross-section of a sheep's leg bone, revealing countless tiny cavities separated by fine strands of bone. These strands act just like support beams, stabilizing the bone wherever it is subject to stress. The rib-like design of the Eiffel Tower is based on the same natural principle of lightweight design. Gustav Eiffel was one of the first architects to recognize the potential of applying the latest biological research to design. As a result, the Eiffel Tower is a successful example of bionics: where biology and technology meet. And the environment benefits, too, as bionics helps reduce the consumption of natural resources, materials and energy.

Commissioned by the State Ministry for the Environment and created by the Steinbeis Transfer Center for Audiovisual Media, the film demonstrates how fruitful interdisciplinary collaborations can be. The film is part

of the ministry's campaign to educate people about the environment, as part of the UN Decade of Education for Sustainable Development. Accompanied by a set of cards and various exhibitions, the film teaches the basics of bionics using an interdisciplinary approach, making it ideal for use in schools and among the general public. Tanja Gönner, Minister for the Environment, explains: "We want to show people that nature is home to all kinds of 'patents' and innovations of its own, which we can use to develop ingenious products and contribute to sustainable development. Bionics is about building mutually beneficial bridges between people, technology and the environment."

The film crew at Stuttgart Media University visited a wide variety of research sites during shooting. Experts from the Competence Network Biomimetics at the University of Freiburg were also on hand to provide scientific guidance. "The film's mission was to illustrate the complex, interconnected nature of research

and the environment in an understandable way, using images and words. We wanted to make natural innovations more visible – literally!" reflects Professor Stephan Ferdinand, the film's director and a professor of journalism at Stuttgart Media University. "Transferring this knowledge was a key criterion for all parties. For our transfer center, the project was a rewarding challenge which enriched us in every area," comments Professor Eckhard Wendling, the film's producer and head of the transfer center. For the first time, the team worked almost entirely in a high definition (HD) workflow. So the film is not only innovative in terms of its content, but also its production – showcasing the technical talents of both the transfer center and the university.

The Steinbeis Transfer Center for Audiovisual Media has worked together successfully with the State Ministry for the Environment for several years, making innovative use of media to generate public awareness of environmental issues. This ongoing development work has already won awards. The jury of the national committee of the UN Decade of Education for Sustainable Development, bestowed awards on two of the transfer center's DVD productions in 2007.

The DVD "PatenteNatur – NaturPatente" is available from the Baden-Württemberg State Ministry for the Environment in Stuttgart (in German only).

The **Steinbeis Transfer Center for Audiovisual Media** is one of the oldest transfer centers in the Steinbeis Transfer Network. Since its founding, it has specialized in producing films using the latest media technology and developing innovative media production concepts.

The center is characterized by its power to innovate in every area – technology, entrepreneurship and not least in content. Films created by the center feature a narrative, journalistic style – whether promotional, educational or industrial in nature. From state-of-the-art computer animation to animated cartoons and high definition formats, the goal of every film remains the same: to communicate clearly with the audience and present topics in an easy-to-understand fashion with visual appeal.

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Guidance for a healthy future

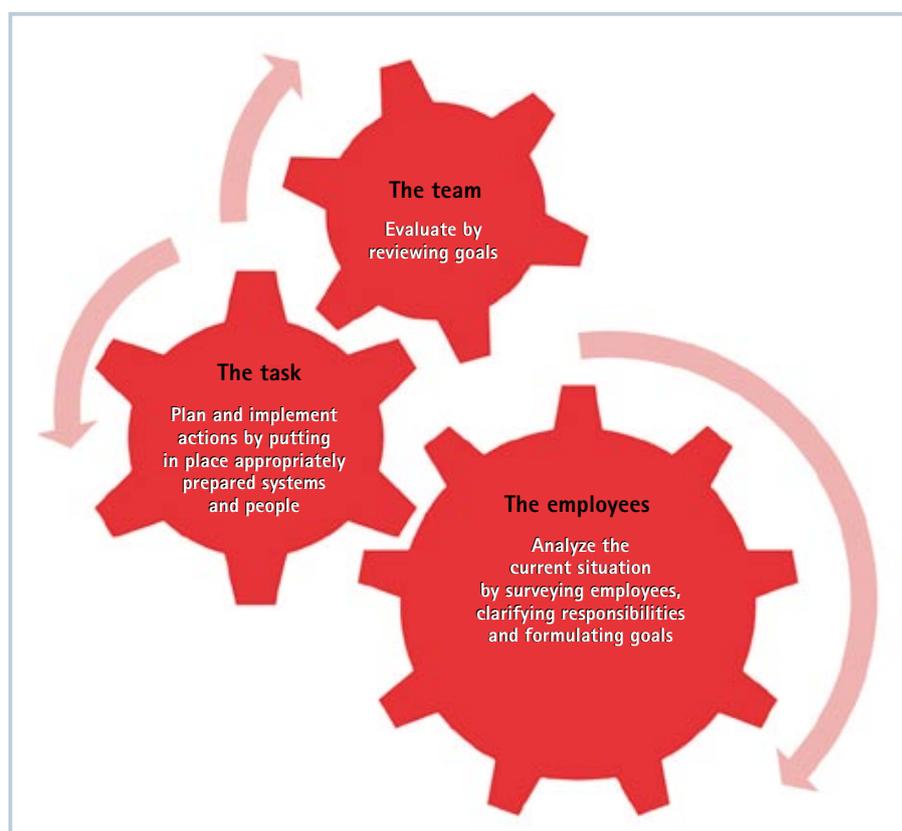
Health management in the workplace – a luxury or a necessity?

In a crisis, what keeps a company and its employees going? This was a question posed by Ulrike Niethammer, Gabriele Wagner and Ralf Elsner – all based at the Steinbeis Consulting Center for Company Health Management. Their aim: to establish a framework for companies to foster "health". The team consults companies, government agencies and organizations on helping their people remain healthy.

Beleaguered by demographic change, talent shortages and increasing absence caused by burnout, small and medium-sized companies, government agencies, institutes of education, and public health bodies all find themselves asking a similar question: what is the connection between corporate efficiency and employee health? This raises many issues, such as: What instruments actually promote health? And what long-term steps can be taken to relieve the psychological burden on employees?

Every consultation the Center offers and every process it supports is based on a model called "salutogenesis", which was developed by the sociologist Aaron Antonovsky. The model, which is based on empirical evidence, turns the spotlight on the relationship between job satisfaction and people's willingness to work. Company health management (CHM) is an all-embracing corporate strategy consisting of several steps: needs analysis, action planning, execution, and evaluation. The outcome: fine-tuned, sustainable strategies – quite different from conventional health promotion methods such as exercise, relaxation and nutrition. Employee participation in surveys and health teams is the foundation of the CHM process, in which companies learn to approach health in separate steps and establish infrastructures that foster health. Support is provided by Steinbeis experts.

Practice demonstrates that investing in employee health pays off. According to the public German health insurance provider AOK, in 2005 it had 3 times the payback on



money invested in healthcare. The federal government also offers employers tax relief – up to 500 euro per employee. Up to 50 per cent of consultation fees are paid out of the European Social Fund by the German Federal Office of Economics and Export Control.

To showcase the success of the CHM process, Steinbeis experts point to an educational institute with 13 employees that took part in a project called "Developing Infrastructures that Promote Health". As they embarked on the project, a new senior manager had just taken up their position. Lots of issues were up in the air. There was obvious friction, new areas of work had to be managed, roles and

responsibilities had to be redefined, communication channels and information flows had to be made more transparent with more involvement. To top it off, the project had to tie in with an upcoming EFQM recertification process.

Lasting two months, the CHM process lays down a variety of steps. First, employees are informed of the process. Then, they take part in an on-site survey, which is evaluated. Finally there is a kick-off event and project hand-over. At the kick-off a presentation is made of the survey results. Employees then write down their personal goals, set priorities and form work groups that will begin

to take steps towards those goals. This is as much about clearly delineating roles, tasks and responsibilities as it is about clearly agreeing ways to channel information effectively. During the project, employees craft quick-win solutions that guarantee efficient work as they minimize breakdowns in communication and information-sharing.

Aaron Antonovsky's salutogenic model

Antonovsky's central question is "What underlies health?", not "How can illness be prevented?". His research reveals that health hinges on comprehensibility, manageability, and meaningfulness. Applied to business, his model raises the following issues:

- How clearly are tasks and projects worded and assigned?
- If employees are experts in their fields, to what extent are they allowed to shape working procedures?
- How are employees involved in what the company aims to achieve?
- What are the hallmarks of management that fosters the health of employees?
- How could the running of daily business be improved?
- How satisfied are employees with their work?

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Steinbeis supports regional development in Göppingen

The future? This way...

District development and economic prosperity, now and in the long run – that's the goal that the Association for Economic Development (German abbreviation: WiF) Göppingen envisioned for the German district of Göppingen. The result of their efforts is a textbook example of leveraging synergies with the Steinbeis Transfer Network. In keeping with the agency agreement, all WiF employees are also Steinbeis employees. Also on board: the Steinbeis Consulting Center for Regional Growth and Economic Development, which won the tender to assess the district's economic situation and subsequently worked out an action plan.

Part of the flourishing greater Stuttgart metropolitan area, the district of Göppingen lies conveniently close to the A8 and B10 highways, which also makes it a very business-friendly location. It is home to a variety of traditional manufacturing companies and medium-sized enterprises - many of the latter already global market leaders. The area beckons with attractive countryside and a lively arts program, offering plenty of leisure activities. All the initial hallmarks of a thriving community and an appealing place to work. Yet the rankings and statistics say something else: compared to other regions, Göppingen often comes near the bottom of the list; within the state, it is two thirds of the way down the list. Compared to the whole of Germany, the town is about half-way down the list.

Confronted with these results, district representatives decided to commission consultants to investigate the causes. The findings were intended to shed light on what led to the rankings and opportunities to help the district's economy grow in the long term. The WiF was charged with managing and supervising the process.

By June 2008, the results were ready. Alexander Fromm from the Steinbeis Consulting Center for Regional Growth and Economic Development presented the district council with the findings of the "Analysis of the Economic Situation in the District of Göppingen and How to Position and Bolster It". One important point was the recommendation

to look further into six separate issues, all with a common denominator: help steer the district – as quickly as possible – towards sustainable growth and change. As a result, the council established one "interdisciplinary task" and five "lighthouse projects".

The interdisciplinary task revolved around how the district shares information. One, the public should be told more about the district's positive attributes. Two, communication must detail what the five lighthouse projects are expected to deliver. The two-pronged approach would boost awareness of the town and give it a more positive image – crucial, as it was in this area that the district had most catching up to do.

The five lighthouse projects were defined and prioritized:

1. Focus on innovation and research while developing and managing business clusters
2. Promote industrial zones and acquire investors
3. Support education and professional development
4. Promote Göppingen as family-friendly
5. Attract more tourists to the area

Once actions had been defined and projects proposed, it was time to set up working groups to realize these aims. Taking the suggestions outlined in the review, the groups adapted the ideas to match precisely with the district's specific needs. The working groups were also able to tap into project

groups made up of a high-caliber coordination committee of more than 40 members, all captains of industry, administration, politics and the community. Some committee members also volunteered to mentor the project groups.

During the final session in the summer of 2009, representatives from each working group presented their findings to the coordination committee. When evaluating each report, the committee also considered the priority each project should be given and its impact on the overall development of the district.

All in all, 20 outstanding projects were drawn up and submitted to the district council for review. Regardless of how district politicians choose to implement and finance the projects, the WiF will launch five of them with its own funds. As a result, areas such as innovation management and communications will benefit from twenty-first century insights and help the district of Göppingen look forward to a brighter, more dynamic future.



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New Steinbeis Enterprises

Abbreviations:

SCC: Steinbeis Consulting Center
SRC: Steinbeis Research Center
SIC: Steinbeis Innovation Center
STI: Steinbeis Transfer Institute
STC: Steinbeis Transfer Center

The following Steinbeis Enterprises have been founded as of end of August 2009:

STI International Management, Herrenberg
Director: Dipl.-Region.-Wiss. Stefanie Kisgen

SCC Strategy, Management, Innovation (SMI),
Nagold
Director: Dr. Hartmut Feucht

SIC Project Management and Business Corporation,
Ulm
Directors: Prof. Dr. Bernard Wagemann
Prof. Dr. iur. Kai-Thorsten Zwecker

STC Smart Polymer Solutions (SPS), Reutlingen
Director: Prof. Dr. Günter Lorenz

STC Agile IT-Management, Konstanz
Director: Prof. Dr. Ralf Schimkat

SCC Energy Industry and Management, Rhede
Director: Prof. Dr.-Ing. Aron Teermann

STI Cer-Chemical Economics Research, Zürich
Director: Prof. Dr.-Ing. Rolf Jakobi

STI Institute of Complementary Medicine (INCOM),
Berlin
Directors: Dr. Rolf Schneider
Prof. Dr. Michael Brucksch

Steinbeis-Institute Schwäbisch Hall GmbH, Stuttgart
Director: Prof. Dr. Dr. h. c. mult. Johann Löhn

STI Business, Engineering and Technology, Berlin
Directors: Dipl.-Ing. (BA) Walter Beck, MBA
Prof. Dr.-Ing. Ulrich Günther

STI Consulting in Management and Technology,
Filderstadt
Director: Dipl.-Ing. (FH) Peter Schupp

STC Institute of Technology, Marketing and Service
Management (ITMS), Aalen
Director: Prof. Dr. Arndt Borgmeier

STC Institute for Technical Sales Management, Aalen
Director: Prof. Dr.-Ing. Jobst Görne

Hochschule Schwäbisch Hall GmbH, Schwäbisch
Hall
Director: Thomas Hilbert

SCC Mediation of Business - Wien, Wien
Director: Bernhard Böhm

The eBusInstand development project and the application of renewable energy Industrial maintenance standards

Maintenance, servicing, inspection, and overhauls – not the sort of issues industrial enterprises debate any more; they're an everyday reality. Until aspects such as eProcurement and eBusiness start entering into the equation and it suddenly becomes necessary to integrate them into existing IT solutions. eBusInstand is a development project backed by the Federal Ministry of Economics and Technology. Its aim is to define the prerequisites and options for standardizing and optimizing electronic business transactions at all stages of the process chain in industrial maintenance. Steinbeis has been asked to look at photovoltaics – known by many as solar energy.



An intelligent automation terminal (iAT) developed by iPLON to aggregate energy yield data from large solar parks

The eBusInstand project is designed to foster the application of standards and the optimization of eBusiness processes in maintenance service provision. eBusiness has yet to filter through to all areas of the service industry. Until now, not enough solutions have been based on uniform standards, which would make it possible to harmonize processes for invitations to tender, proposal submissions, and processing.

As part of the eBusInstand project, end-to-end eBusiness processes and interfaces are being identified and tried out in the area be-

tween customers and suppliers. Coordinated by FZI, the Karlsruhe-based computer science research center, eleven German companies are working together with standardization specialist eCl@ss to pinpoint the prerequisites and options for applying standards to the management of assembly, maintenance and repair services. The remit also extends to materials needed to carry out such activities.

Nine example projects were drawn on to identify and test uniform, systematic eBusiness processes and the types of interfaces needed in service and maintenance. The

aim: to provide reference cases for further standardization of service procurement and management. As well as classic services – such as machine maintenance – emphasis was placed on industrial maintenance services in the field of renewable energy.

Very little attention has been paid until now to the (remote) maintenance and monitoring of photovoltaic systems as a field of industrial servicing. Services relating to buildings or plants, such as maintenance and inspection, are normally arranged on an individual basis (plant by plant). For such fields, it was therefore decided to select a process based on tried and tested methods, which would capture the scope and intensity of maintenance on such plants.

Solar power installations are a major investment. Economic viability depends on ongoing high performance and fault-free operation – lasting at least for the period covered by subsidies under the German Renewable Energy Sources Act (EEG). This need for reliable performance thus applies equally to maintenance and monitoring processes. It also has a bearing on the hardware used to measure and capture data. Faults and downtime have an extremely detrimental effect on the potential overall yield of photovoltaic equipment, especially in the more lucrative summer months if faults are not identified quickly and insufficient remedial action is taken to eliminate errors.

As a result, it is essential to carry out regular servicing hand-in-hand with technical mon-

itoring. Remote surveillance of equipment makes it possible to capture data needed to plan and execute proactive maintenance schedules. Armed with a comprehensive arsenal of data, it is even possible to detect gradual deterioration early and document it. This is particularly important for guarantees provided by equipment manufacturers and is thus what plant operators focus on first.

In cooperation with Infracore Höchst and Schwäbisch Hall-based iPLON, the Steinbeis Consulting Center Development Renewable Energies and Energy Efficiency worked with its standardization partners on a series of possible solutions to monitor and standardize the process of (remote) maintenance of photovoltaic equipment. The interesting aspect in this field is not so much the commonalities with maintenance process in the rest of industry, but the differences: it is rare to find classic supply chains or the types of service providers found in industrial settings. After an intense period of project planning and scheduling, it is quite normal to jump straight to implementation on the photovoltaic plant. Maintenance and monitoring generally have to be organized and carried out by the operator.

Thermal power stations already have a comprehensive catalog of maintenance guidelines, with corresponding sets of rules. The project team is currently working on comparable standard processes for tasks such as the "Maintenance", "Remote maintenance", and "Technical monitoring" of photovoltaic equipment.

Once these services have been mapped out and documented, they will be transferred into eCl@ss standards and made available to the whole sector for improving electronic data exchange. The starting point of the study is to identify the typical formats of equipment used and resulting dependencies and limiting effects these may have on individual tasks. Practical considerations will be just as important as the theory in this respect. For example, data might have to be

stored for a long time – up to 20 years. Also, processes will have to account for changes in legal requirements at any given time. The eBusInstand project draws to a close at the end of 2010. Top-line results and information on the project are available on the internet.

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Steinbeis summer courses International knowledge transfer in the automotive sector

The Steinbeis Transfer Center for Automotive Engineering Esslingen has been offering annual summer courses at Esslingen University since 2001. To date, 385 students from the Mexican Instituto Tecnológico y de Estudios Superiores de Monterrey have attended the courses.

Apart from lectures, the program encompasses a variety of excursions (frequently to Bosch, Daimler, Eberspächer, Festo and Porsche), interim exams, final exams and a graduation – not forgetting local sightseeing. Courses have been running since 2001 on "Integrity of car structures", "Feedback controls", special topics related to automotive engineering, and mechanical systems. In 2010 there will also be a number of special topics from the field of automotive and mechanics. The plan now is to extend invitations to the program to other students and representatives of industry.

All seminars take place in English. Courses take place in July and last around two and half weeks. Course fees depend on the number of participants and seminars.

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Seminar program for design and development management

Engineers, wearing a development manager's hat?

Performing better, adapting to changing requirements, adjusting to new frameworks in professional education: the traits that make senior managers, who want to perform and stay ahead.

Management and leadership training has to do more than impart selected bits of information and knowledge within distinct areas. It was this firm conviction that prompted Steinbeis University Berlin's Steinbeis Transfer Institute Development and Management to set up a degree and seminar program called "Design and Development Management". Engineered especially for managers and business leaders in design and development, the ekmMethode® is a central component of the course.

The Design and Development Management (ekmSTL) course gives students an overview of emerging fields within a general context. The aim is to provide capable employees with more broad-ranging insights that goes over and beyond traditional specialized knowledge – and thus equip them for their future role as sen-

ior managers. Geared to full-time employees, the Development and Research Management MBA (ekmMBA) instructs students in strategy, leadership and management. Managers learn and refine the soft skills they need for their position, and all students reap the benefits of real-world tools and methods tailored to the demands of design and development. Aimed at heads of design and development in SMEs, the seminar entitled "The Design and Development Director in the Interplay Between Leadership and Management" (ekmTOP) provides a business-oriented forum to learn from renowned experts and share experiences with colleagues.

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DEKRA certification

Marburg SBA Study Center successfully certified

Steinbeis Business Academy's Marburg-based Study Center – an academy of Steinbeis University – was officially approved by auditors DEKRA Certification in July 2009. Working in partnership with Steinbeis Business Academy, the academy provides bachelor degrees. Certification effectively means that courses are approved under German regulations governing "Recognition and Approval for Further Education and Training" (AZWV).

Given the growing importance of vocational staff training, the Federal Employment Agency has announced a variety of sponsorship programs aimed at fostering the education of people in full-time employment. Take a project called WeGeBau. Now that it is ap-

Re-accreditation successfully gained

SteinbeisMBA exceeds required standards

The SteinbeisMBA degree offered by Steinbeis University Berlin (SHB) has been reaccredited by the Foundation for International Business Administration Accreditation (FIBAA). On several criteria used by the FIBAA for masters programs, the program actually exceeds quality standards.

The appraisal experts highlighted the following strengths of the SteinbeisMBA program:

- The positioning of the degree on the education and employment market
- Partnerships with industrial enterprises
- The selection process
- The combined approach towards theory and practice
- The focus on skills and qualifications
- The teaching of management theory
- Vocational empowerment
- Practical insights provided by teaching staff

- Supervision given to students by teaching staff.

The SteinbeisMBA was formed by combining previous compulsory attendance MBA programs offered by SHB departments and providing different in-depth topics as compulsory electives. The FIBAA auditors see this as a positive move: offering MBAs "under one roof" in the future will bolster the profile and standing of SHB. "With the figures we examined, the university successfully proved the

positioning of the in-depth topics already audited in the first round of accreditation – sometimes most impressively."

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proved and certified, the Steinbeis University's academy in Marburg can offer courses which are eligible for support.

Once they have successfully fulfilled eligibility criteria, participants can redeem their education vouchers at the Federal Employment Agency. There is also the possibility for employers to receive an allowance on staff costs while people are outside the place of business to attend courses. Another agency that gave the Steinbeis University academy its stamp of approval for the training courses was Weiterbildung Hessen e.V.

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Seminar in Korea

MBE students discover Korean culture

As part of the overseas study placement, 80 participants on the Steinbeis University Berlin's MBE masters program took a 5 day intensive course at partner university SKK University Graduate School of Business in Korea. The aim of the program is to provide students with insights into the business world of Korea and Korean management strategies.

Apart from attending lectures on Buddhism, management, strategy, and marketing, the course participants were also given the opportunity to take cooking courses, watch traditional musicals, and go on sightseeing trips. It was all part of a program to get know Korean culture. Other cultural highlights on the agenda included traditional tea ceremonies, a visit to the country's biggest book shop, the Kyobo Book Center, and an evening's karaoke singing with Korean students.

The aim of the partner university's trip to Korea is to promote business synergies be-

tween Korea and Germany, fuelled by the students who become acquainted with Korean culture and ways of doing business in the country. The visiting MBEs received good coverage in the media, including a variety of newspaper articles and even an appearance on Buddha TV.

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Discover the past to shape the future

Germany 20 years after the wall fell

November 9, 1989 – a monumental day in world history. To commemorate the 20th anniversary of the fall of the Berlin Wall, Professor Dr. habil. Frank Keuper, professor at the School of Management and Innovation, Steinbeis University Berlin, and Professor Dr. Dieter Puchta have published a book: "Deutschland 20 Jahre nach dem Mauerfall", or "Germany 20 years after the wall fell".

With their peaceful protests against the political, economic and social situation in their country, the citizens of the GDR not only paved the way for the end of the Cold War, they initiated the reunification of two social systems – a process that is unique to date in terms of its complexity, dynamics, and effect on all Germans. In this compen-



diversity – politics, economics, and society – and its authors, were specifically selected

to shed light on a wide range of topics. Thus, the volume addresses decision-makers and scientists dealing with political, economic and social issues, as well as general readers interested in contemporary history.

politics, culture, science, and economics report on the exciting times before, during and after the fall of the Berlin Wall. Some contributors recount very personal experiences and events. All outline the lessons to be learned from the past and show how these could shape the Germany of the future. The book's

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TRANSFER talked to Martina Siefert, who recently attended a Steinbeis training course “Thanks to the course I feel much better prepared!”

Market-oriented research and development is now a pivotal part of corporate strategy at Herrenknecht, a Schwa-nau-based maker of tunnel boring machines. This involves thinking beyond national boundaries, which is now an accepted reality for the company. One example: “Tunconstruct”, a European research project which Herrenknecht has been involved in since 2005, along with 42 partners from 11 EU countries. Its aim: to investigate all aspects of modern tunnel and cavern construction. EU projects are often a huge challenge at an administrative level. Martina Siefert, who is responsible for data analysis and patent research at Herrenknecht, attended a course run by the Steinbeis-Europa-Zentrum on submitting applications and project coordination. TRANSFER magazine interviewed her about the experience.



Martina Siefert

Ms. Siefert, how much experience did you have before the course on submitting applications to the European Commission?

Last year, we actually helped one of our European subsidiaries submit an application successfully. We also have an application in the pipeline under the European Commission's 7th Research Framework Programme.

Did you meet any difficulties or face any challenges on that occasion?

The main challenges we had concerned the scheduling. There are some application guidelines that have to be adhered to, and coordi-

nating everyone involved in the project is time consuming enough. But at the same time you have to stick to submission deadlines. Pulling together a project of this magnitude takes quite a bit of practice, especially at the beginning.

What was your main motivation for taking part in the course at the Steinbeis-Europa-Zentrum?

Once you've made the decision to submit an application to the EU, you realise that it's not easy picking your way through the jungle of provisions and forms. And that's ignoring the actual work involved in the research project. Not knowing enough about application requirements can quite easily have a negative effect on the evaluation of your application. We went on the course to head off any issues in advance.

So have you been able to apply any of the lessons learnt on the course to everyday practice?

Thanks to the course I feel much better prepared to coordinate everything for submitting an application. And I've got a much clearer understanding of the criteria the EU places on such a kind of projects.

The course covers off all the theory, but you also did some exercises, role-play, and group tasks. Did you find you learnt as much through this interactive approach as you would

have with more classroom-style lecturing?

If I think back, more than half a year later, I reckon I could describe the individual part played by each participant in the role-play, and do that in more detail than recall the learning content. Indeed, it's more tangible. In my eyes, the experience reaffirmed the benefits of less structured teaching.

Herrenknecht AG

Herrenknecht is the technological and market leader in tunneling. It is the only company worldwide to deliver state-of-the-art tunnel boring machines for all types of geological conditions – spanning the entire range of diameters from 10 cm to 19 meters.

The product range includes made-to-measure machinery for traffic tunneling and all types of utility tunnels. Herrenknecht also makes modern vertical drilling equipment capable of penetrating to a depth of 6000 meters. Its recently established subsidiary, Bohrtec Vertical, provides smaller drilling devices for the field of shallow geothermal energy. Herrenknecht technology is making it possible to build the longest railway tunnel in the world: under the Gotthard mountain range in Switzerland – 2 x 57 km. The tunnel is opening to trains in late 2016.

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Steinbeis provides technological and financial consulting support to a start-up company

Using resources efficiently

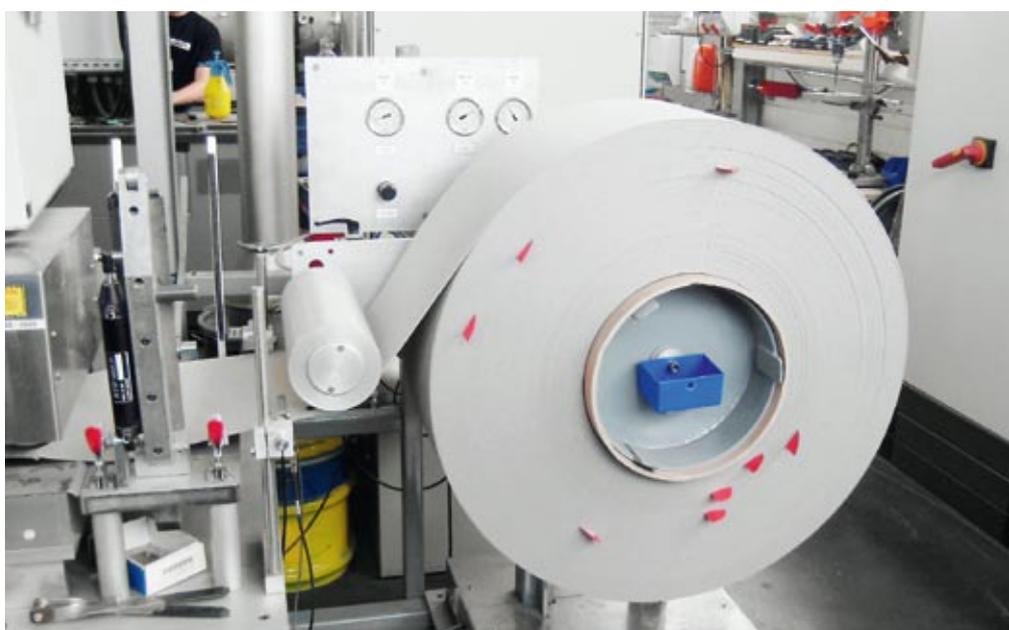
The Steinbeis Transfer Center for Energy and Environmental Process Technology and Eco-Management has been helping a new start-up company make more efficient use of its resources. The partnership is part of a project on material efficiency sponsored by the German Federal Ministry of Economics and Technology (BMWi). The Steinbeis team pinpointed a variety of potential savings the new company could make. Now, the center is helping the company put these measures into practice to enable expansion and boost production.

The medium-sized business, a metal-working company that makes nickel and iron-based metal alloy foam materials, was trying to find a way to reduce material waste in production. The previous production process had recently been overhauled but was still in the pilot stage with the associated high volumes of rejects.

As part of the VerMat program sponsored by the BMWi, the Steinbeis experts from Munich started by systematically pinpointing all costs resulting from material and energy use. Their method adhered to Cleaner Production guidelines (VDI 4075); the main focus was material usage and the corresponding costs. The assessment: potential six-figure savings, especially with the use of nickel alloy powder.

The second step for the Steinbeis experts was to evaluate possibilities for saving money. The team consciously chose two completely different approaches. One was the conventional approach: optimize processes. The other was to find new ways to use products coming out of production. To optimize production, the team worked closely with production and development staff, looking systematically at all parts of the process to identify the cause of rejects. They also looked at measures already introduced to improve operations – before evaluating each option.

In addition, the Steinbeis Transfer Center worked out and assessed new ways to produce metal alloy foam materials, examining each approach from a technological and financial point of view. To apply nickel al-



loy powders more efficiently, a subsequent project worked on by Steinbeis looked more closely at ways to reconfigure processes, with a view to integrating any changes identified into the production process. Doing this plays to one of Steinbeis's key strengths: multifaceted technological know-how, throughout the entire Steinbeis transfer network. By entering into new application areas, the Munich-based transfer center was able to tap into the wealth of experience offered by its experts.

The medium-sized company involved in this project was founded as recently as 2005. The metal foam materials it produces are mainly used in the automotive industry for making filters and catalytic converters used in diesel engines. Tolerances are so tight in this field that almost 50 per cent of produced materials have to be thrown away. Some rejects could be avoided by optimizing production

or tweaking processes. Sintering materials at over 1200 °C causes materials to warp. Inevitably, a significant proportion of the products fall short of requirements laid down by today's target customers. So the project team decided it would be important for everyone involved in the project to look at other possible application areas for the products from a technological and financial standpoint, especially in large-scale industrial applications.

One highly attractive application for the material turned out to be as a catalyst support in a variety of industrial applications, ranging from emission controls – such as removing hydrocarbons, nitrogen oxide and heavy metals – to use in various production reactors. This would draw specifically on the thermal resistance, the large inner surface area, or the actual structure of the metal alloy foam.

A conservative estimate of the company's optimization potential would be revenue growth between 40 and 55 per cent. Based on the existing capacity of the pilot plant, that would already equate to 290,000 to 385,000 euros. In the medium term the company plans to expand production volumes by a factor of five, with corresponding optimization potential.

For this initial project two thirds of the costs involved in carrying out the detailed analysis were funded by the BMWi. The cost of upgrading production has been estimated at no more than 300,000 euros. For a highly acceptable financial investment, the company could thus adopt several specific ideas from the Steinbeis transfer project: as well as optimizing its production, it will be able to start selling its products to new customers. So the time has come to implement ideas and start translating them into actions. The investment needed, which will probably be recouped in less than a year, will make it possible to improve revenues significantly, to diversify, and to establish a broader customer base for what is still a young company.

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SHB student develops award-winning lab system

ResoScan wins Focus Open 2009 award

Hans-Jörg Merath is co-owner of merath metallsysteme, where he is also head of sales. After completing a university degree in manufacturing engineering and gaining several years' professional experience, he began an Executive MBA in General Management at Steinbeis University Berlin. Merath is currently working on his master's thesis, which concerns issues such as business development and strategic focusing. As part of his MBA, Merath also helped to develop the ResoScan lab system, which won the Focus Open 2009 International Design Award Baden-Württemberg.

merath metallsysteme, based in Waiblingen near Stuttgart, develops and manufactures mechanical systems for industrial electronics and data processing technology. Forming win-win partnerships with SMEs is a promising avenue which the company is keen to continue pursuing in the future. In close collaboration with industrial designers and electronic engineers, merath metallsysteme develops new end-to-end solutions which offer customers major added value. One example of this is the ResoScan project which Hans-Jörg Merath helped to develop. ResoScan recently received an early round of applause when it won the International Design Prize Baden-Württemberg "Focus Open 2009".

merath metallsysteme collaborated on the project with TF Instruments in Heidelberg and the agency bgp design in Stuttgart. Protected by over 60 patents, the ultrasonic resonator technology developed by TF Instruments represents a new, highly sensitive method for characterizing liquids and the compounds dissolved and suspended in them. This innovative technology has applications in the chemical, pharmaceutical and cosmetics industries, and forms the scientific basis for the ResoScan lab system. While bgp handled initial conceptualization, draft and design, merath metallsysteme transformed the design blueprints into a functional prototype, acting as an all-in-one supplier by creating the housing and every



ResoScan prototype

component in the system. By collaborating so closely, the three firms were able to perfectly translate ResoScan into reality quickly and inexpensively.

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Steinbeis designs Web portal for Rheinfelden Alloys

Solidifying customer relationships and driving up revenue

Situated on the Swiss–German border, Rheinfelden Alloys has been in the aluminium cast alloy business for over a century. In years past, the company served almost exclusively large or industrial customers; today, the client list includes plenty of small and medium-sized enterprises. To see this change in business strategy through, Rheinfelden Alloys turned to staff at the Management Cockpit Steinbeis Transfer Center for guidance and support during implementation.

Maintaining the momentum of the new strategy required a two-prong approach. First, the company had to purchase production equipment that could also produce small batches efficiently. Second, Rheinfelden Alloys needed to invest in a web-based sales and marketing portal that would serve a variety of purposes, especially pinpoint new customers and cement loyalty. Steinbeis helped Rheinfelden Alloys arrive at a portal that was a perfect fit with the new strategy.

At the outset, the experts run a number of exploratory workshops to help the company determine what the new B2B portal should do. The first key criterion: the site had to be designed around customers. It also had to be easy for employees to keep the site up to date. And lastly, tying the portal into the company's mid-term IT strategy was crucial.

At a later stage, the site should provide selected customers with information held on

the Rheinfelden Alloys ERP system. Another aim of the site was to feature software that would allow users to manage interoffice documents themselves.

After considering their requirements, Rheinfelden Alloys chose software called Liferay, a market leader among professional open source business portals. The decision was made after the Steinbeis Transfer Center scrutinized a total of seven software products. Once the software had been chosen, the team developed a style guide and storyboard in parallel – both essential to meet site requirements in an actual software environment.

The style guide captured all aspects of corporate design with an impact on the portal. Here, the Steinbeis employees joined forces with an advertising agency. The storyboard illustrated how visitors would use and navigate through different pages. It was even possible to click around: users were sent PDF files with links in to browse just as they would on a live site. Using the style guide and storyboard as a basis, the team fine-tuned the software and began adding content to the portal. Another Steinbeis Transfer Center, object-IT, then worked on what was by now a more menial programming and set up the site infrastructure. Live since the late summer of 2009, the site is an all-round success.

Rheinfelden Alloys

Founded in 1898, Rheinfelden Alloys has production in Rheinfelden, Germany. In 1994, a management buy-out transferred ownership from the Aluisse Corporation to family ownership. Like Carbon Products and Semis, Rheinfelden Alloys is a wholly-owned subsidiary of the Aluminium Rheinfelden Group.

Rheinfelden Alloys designs, manufactures and distributes aluminum cast alloys in a number of sectors of industry, such as the automotive industry, mechanical engineering, and plant and equipment construction.



The Rheinfelden Alloys marketing and sales portal

Some of the requirements for the new Rheinfelden Alloys portal:

- Make it easy for visitors to get their bearings
 - Let employees speak as individuals and avoid "corporate speak"
 - Reach out to the people working at companies, not the faceless organization that's on their business cards
 - Design the portal to be interactive, organic and always up to date – not like a brochure. Pepper the site with the latest information from third-party websites
 - Allow visitors to review online content
 - Integrate rendezvous points into the portal and try to forge a "social connection" between purchasers and technicians
 - Provide registration-free access to a certain amount of content so that search engines and Rheinfelden Alloys can pick up on it
 - Encourage potential customers to bookmark the site and share it with colleagues (viral marketing)
 - Allow for proactive web analytics
 - Make updating the portal a standard part of employees' workdays (in marketing, sales, technology, etc.)
 - Remember that the portal can also be adapted to provide information from our proprietary ERP system and manage interoffice documents

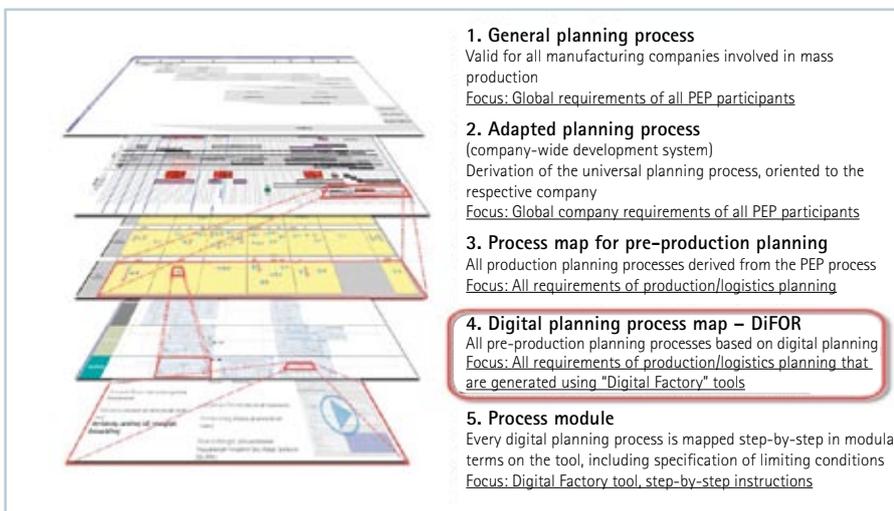
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SHB doctoral candidates develop standard methods for Digital Factory

Digital tools for pre-production planning

Task parallelism and frontloading in pre-production planning, lean serial production applying the zero-defects principle – a driving force in modern technology companies. The world of business is changing – a challenge to production planning, as well. However, given the large number of variants and very short development and planning cycles, it is difficult to achieve key objectives on schedule. These objectives include: ensuring that assembly lines are productive from the moment production is ramped up; keeping product manufacturing costs down; attaining a high level of product quality early in the product life cycle. "Digital Factory" makes it possible to meet the rising number of demands that will be placed on production planning in the future. As part of a joint project with Daimler, Steinbeis University Berlin's transfer institute for Production & Engineering has developed a method for designing efficient planning processes using digital planning tools. The partners also created an implementation method that ensures successful use of Digital Factory in the long term.



DiFOR – interpretive views of the product development process

Tobias Riegmann and Mathias Engel, doctoral candidates at the Steinbeis Transfer Institute, asked themselves two questions. One: how can "Digital Factory" be used in production planning and facilitate standardized, efficient planning processes? Two: how can we subsequently ensure long-term use of Digital Factory?

Once at Daimler, the experts designed a planning process built on three underlying principles. Used in combination with Digital Factory tools, these three principles – the model, the method and the system – became the basis of a standardized, universal planning method, also known as DiFOR (Digital Factory Operating Reference).

The reference model DiFOR is based on is a process map showing the workflows and structures of core production planning processes. Users throughout the company can take advantage of digital tools to carry out these processes. Thanks to a company-wide standardized database, cooperating planning departments can now be synchronized, resulting in a variety of other synergy effects.

This is supported by an integrated planning method that makes it possible to match the DiFOR process map to company requirements, based on a criteria list. This method thus provides a "roadmap" for working with the reference model and tailoring it to company needs.

The DiFOR process map, adapted and instantiated for the specific project, is provided by the system via a web-based front-end application, based on Microsoft Sharepoint. The personal login to this in-house Web 2.0 application controls the view and the provision of required, project-related data. The process screen can be scaled individually to adjust granularity. Process training documents, which are based on modules, can be matched to needs. Feedback and inquiries can be managed by subject. Overall, this boosts the benefits of partnership between users, in both directions.

To define DiFOR parameters and pinpoint barriers to Digital Factory implementation, the team interviewed experts. These experts were end-users at European automotive companies, system suppliers, and consulting firms. The interviews with experts revealed that certain barriers crop up when Digital Factory is implemented in distributed in-house production planning departments. These barriers were first categorized by four basic areas of influence (each a different "view"): the people, the organization, the processes, and the technology. Within each view, the barriers were then clustered into design areas. Finally, with various elements now bundled (four views, 51 barriers, 13 design areas, and 33 tools), the interrelationships were mapped on an "operational network of Digital Factory implementation".

In total, 33 tools were developed, each based on individual design areas. These help overcome barriers to implementing Digital Factory in a distributed production planning network.

The team decided that the implementation strategy must be flexible enough to evolve at each stage, progressing step by step, based on the process applied. This sometimes involved users early on, also allowing for continuous improvement and learning during implementation. The 33 tools can be used flexibly at each stage.

In designing the implementation process, this "evolutionary approach" was maintained. The result was a four-phase procedure. The first phase involves setting up pilot projects to ensure high availability of Digital Factory methods and show benefits quickly. During this phase, the digital planning process map is essential as it not only makes it

possible to identify the planning activities that can be supported digitally, it also enables a largely standardized planning process. After software has been selected, the consolidation phase begins. The objective of this intrinsically iterative phase is to establish specific best-practice approaches as standard Digital Factory methods throughout the entire production planning network. Here, the planning map is a shared element that serves to safeguard continuity between individual planning disciplines and the planning activities. The next phase, horizontal integration, networks all planning departments and plants that are planning the same product or stage of value-added (and thus have similar IT infrastructures). The final phase, vertical integration, ensures that even if a plant has only recently been incorporated, or it is working on higher levels of value-added, it can still be integrated into planning using digital tools.

The two methods developed by the team, DiFOR and iDIFA, address the key Digital Factory issues regarding implementation and subsequent use in industry. The methods have already proven suitable for practice in the planning departments of Daimler's major assembly plants.

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There's a lot more to information management than keeping data private

Data privacy is playing an increasingly important role in today's business. Misused, manipulated, or lost data can threaten the very existence of a company. To prevent this, the TQU Akademie offers executive education courses to train people as information security management system (ISMS) officers and auditors.

An "act of God" can damage hard drives and IT systems, even block access to servers. But what happens when, after an update, applications don't work or data has been changed? Is data shielded from viruses, wiretapping, and theft? An ISMS can prevent exactly these kinds of catastrophes. Deployed properly, the system prevents problems from occurring, simultaneously slashing costs. Employees deliver better work; trust flourishes. The IT landscape and organizational processes are

improved upon, and even existing structures benefit from the synergies generated from ISMS integration. Like many other processes, information security management systems are dictated by international standards: ISO 27001, ISO 27002 and ISO 27005. There are also clear management principles that must underpin information security: resources need to be freed up, and employees require training. Security processes have to become an integral part of company practice. The ISO

standard stipulates that these processes are based on the PDCA model – or planning, doing, checking and acting (such as making adjustments or improvements). The course for ISMS officers offered by the TQU Akademie covers two modules, with an additional one training participants to become ISMS auditors. Companies looking to use ISMS in their management system will benefit from TQU Akademie's special training session on integration.

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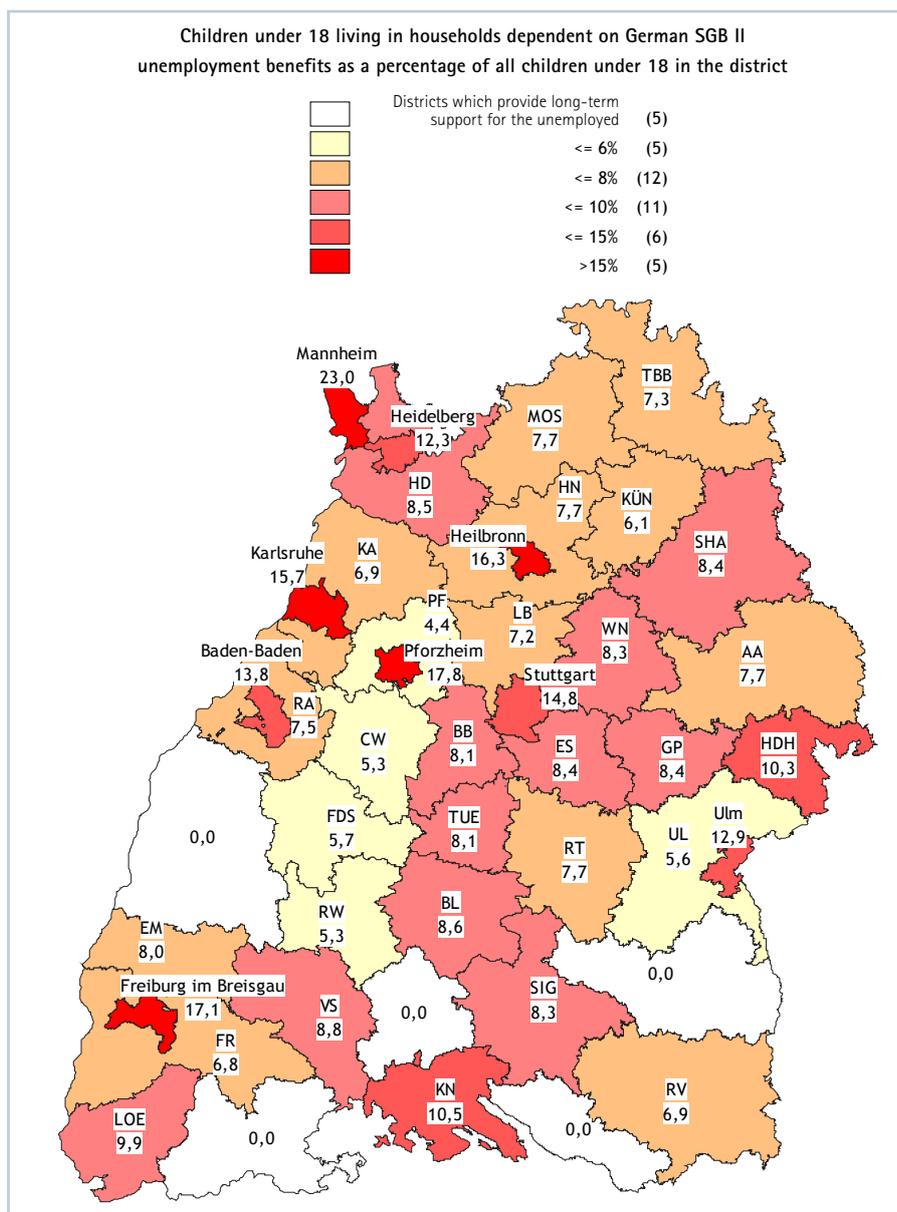
Study of child poverty in the German state of Baden-Württemberg

The people behind the statistics

The nature of poverty in Germany has changed. This is clearly demonstrated by a study presented by the Steinbeis Innovation Center IfaS – Institute for Applied Social Sciences. Social scientists have long been talking of an “infantilization of poverty”: children are increasingly subject to new dimensions of poverty. The study approached child poverty from a social science perspective, individually examining problematic situations and processes of social exclusion. Based on the results, the study recommended courses of action on three levels.

The study, entitled “The People Behind the Statistics”, was commissioned by the Caritas organizations of the Roman Catholic Diocese of Rottenburg-Stuttgart and the Roman Catholic Archdiocese of Freiburg im Breisgau, in partnership with the Rottenburg-Stuttgart Diocese Committee. Its aim was to investigate the degree of child poverty and its effects in the German state of Baden-Württemberg. To achieve this, the IfaS designed the study along original lines by combining research into childhood with research into poverty. So the study did not focus solely on the affected households' lack of financial means, but rather the extent to which children in poor households are impaired in achieving their goals in life and excluded from participating in various social systems. This is due to a lack of vital commodities, income, influence, developmental opportunities, or any combination of these factors. This complex, multidimensional understanding of poverty is central to the study's framework. Using quantitative and qualitative research methods, the IfaS analyzed the effects of extremely low household income on five different areas of childhood development, and on three separate planes of references (the child, the family and the social environment).

Like similar studies, this study initially used income as a basic measure of poverty, examining statistics concerning benefit claims (German ALG II unemployment benefits) and information provided by the German Socio-Economic Panel. The results were clear: in the “rich” state of Baden-Württemberg, poverty is increasing in a number of social environments. In five cities, over 15 per cent of children under 18 live in households dependent



Children under 18 living in households dependent on benefits (German SGB II unemployment benefits) in Baden-Württemberg

on benefits. This figure is highest in Mannheim, at 23 per cent. Another key insight gained from this part of the study is that younger children are more likely to grow up in poverty. For example, 27.8 per cent of pre-

school children in Mannheim live in families dependent on ALG II unemployment benefits; the state-wide average is 12 per cent. In other words, approximately one in every eight children under the age of seven in Baden-

Württemberg lives in a household dependent on financial help from the state.

For the qualitative field study, the IfaS conducted interviews with 24 parents and 19 children from four different types of social environment in Baden-Württemberg. Access to these families was provided via Caritas facilities, with which all interviewees were in regular contact.

In the area of physical development and health, the study highlighted a range of risks to children's emotional development. These risks are greater if parents or guardians are overwhelmed by the effects of poverty and are suffering from psychological problems. Other health risks which children in poor homes are subject to include physical and emotional neglect, a lack of structure and socialization, and being the victim of violence. In addition to this unhealthy social environment in the home, psychosocial stress factors have a strong negative effect on childhood development. The many indications of social withdrawal as a response to poverty are especially concerning.

In the area of cognitive development, education and learning, the results of the study helped to explain the often catastrophic educational development of children from poor households. The lack of basic development opportunities for poor children plays a major role here, especially at the end of primary school, when children in Germany are separated into different schools according to academic ability. Here, the interest which adults take in their children's education is critical, as is the extent to which they provide their children with the support they need to learn. This means that children from poor households tend to be excluded from educational opportunities – and older children are increasingly likely to experience problems in school and conflicts at home. Poorer families often see their children's education as the sole responsibility of external institutions. Factors like these have a significant impact on the educational, professional and per-

sonal development of children growing up in poor households.

"I can't afford to say 'Invite a couple of friends round'...". This was how one mother expressed the critical deficit that poor children face in social development, social skills and social contact. Poor families have a strong tendency to isolate themselves. As such, many children growing up in poor homes have extremely limited opportunities to develop healthy social relationships. Although some poor families cope through solidarity and by supporting each other, it is far more common for poor families to isolate themselves or ostracized by others. Despite these families facing similar social and financial challenges, each situation remains distinct and is often marked by high levels of exclusion. As a result, children from poor households experience social ostracism at an early age, and soon come to realize that they are disadvantaged and have low social status – which, alarmingly, they only rarely escape from during their lifetime.

Just as in education, poor children also experience deficits in the area of cultural development and leisure activities: children in poor families are under-stimulated when it comes to leisure and play. In the urban areas with the highest levels of child poverty, there was a lack of public leisure facilities (such as playgrounds, sports areas and parks) close to the affected households. Critical and controlled consumption of electronic media is rare; rather, use of these media tends to be frequent and overwhelmingly passive. The study determined that the deficit in this case is an excess of stimuli, which children are essentially beholden to. The study also indicated that children from poor homes made very little use of public cultural facilities. Common family activities were rare: children rarely leave the social environment of the home, and for the most part, each day is near-identical to the next.

Children growing up in poor households experience critical deficits when it comes to

developing stable personality traits. In the area of personal development, self-respect and self-esteem, many of the results discussed above have a cumulative effect. Every interviewee raised the issue of being (un)able to consume goods. Parents and children experience stress as the ever-present financial barrier and inability to make purchases lead to disappointment, accusations, jealousy and shame. There is often a tense atmosphere in poor families, and children are allowed little say. In many cases, children are also forced to perform tasks and adopt roles which are well beyond their years, and for which they are not yet emotionally ready. Most children had little or nothing to say about themselves or their own strengths.

Children from poor households who are denied these critical opportunities for development and participation (and who live in manifest or extreme poverty) require the support of everyone. The poverty of children and their families is a challenge facing all of society. One of the most oppressive aspects of manifest or extreme poverty highlighted by the study is the "social cocooning" of poor families.

Young people in particular are in extreme danger of spending their whole lives trapped in poverty. For these children to have a brighter future, society must take steps to ensure that low income in families does not negatively impact children's development and opportunities. It is time for society to take an unvarnished look at poverty and appreciate how complex this phenomenon is – especially the dramatic and shocking developments presented in this study, which characterize the problematic nature of child poverty today. It is time to communicate this state of affairs to the politicians and public authorities in charge, and demand that they take appropriate action.

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