

As Siemens strengthens its portfolio for the long term with some 1,000 cooperative projects a year, the company and its partners at universities around the world gain insights from each other's fields of expertise.



Meanwhile, in the healthcare sector, Siemens is working with partners to develop new types of phase-contrast X-ray systems that can render a large variety of soft tissues in minute detail — an improvement that makes diagnoses more precise (see p. 90).

At Siemens Corporate Technology (CT) a specialized department focuses on the vital interface between the company and its university collaborators. The department coordinates the work carried out with partners, including activity parameters. "Together with our strategic project partners, we want to move innovations forward," explains Department Head Dr. Natascha Eckert. "Our principal task in that regard is to work with the Siemens Sectors and Corporate Technology to constantly identify new opportunities and forms of collaboration with universities."

The University as Partner. Siemens thus forges links worldwide with top universities, for example by entering into strategic partnerships with them. The aim is to pursue research together, encourage talent, and establish networks. With this in mind, Siemens has set up so-called "Centers of Knowledge Interchange" (CKIs) on the campuses of a number of universities (see *Pictures of the Future*, Fall 2006, p. 66). "Each CKI is supervised by a Siemens-paid key account manager at the university," says Eckert. "This person coordinates cooperative work locally, identifies partners, organizes workshops, and nominates students for Siemens programs for scholars." Siemens currently operates eight CKIs, which are located at Munich Technical University, Berlin Technical University, and the RWTH Aachen in Germany; at DTU in Copenhagen; at Tsinghua University in Beijing and Tongji University in Shanghai; as well as in the U.S. at the Massachusetts Institute of Technology (MIT) in Boston, and the University of California, Berkeley.

CKIs reflect the technologies and markets that have a promising future for Siemens," says Eckert. In addition to its expertise in renewable energies research, DTU, for example, is also engaged in research with Siemens focused on membrane technologies for water treatment (see p. 95). Munich Technical University contributes its expertise in the field of health care technology for the development of phase-contrast X-ray systems. And scientists at the prestigious Tongji University in Shanghai are working with Siemens on the development of "eco-city" models. It is hoped that these models will help to reconcile the extraordinarily rapid growth of Chinese cities with environmental protection needs (see p. 104).

Of course, these cooperative projects benefit not just Siemens but also its partners. Scien-

Tapping

Potentially, game-changing innovations are everywhere. They are hidden in the minds of employees and customers and in projects at universities and research institutes. Tapping these sources is something employers are doing to an ever increasing extent. As they do so, they are opening the doors of their labs, exchanging ideas with external partners, and creating a world of synergies.

New Worlds of Ideas

Henry Ford was a technology pioneer. He founded one of the most successful automobile companies and was the first to introduce assembly line production, which revolutionized manufacturing industries. Despite his capacity for invention, though, Ford was for the most part unable to develop his ideas alone.

And he recognized this. One of his most famous statements, in fact, was an assertion that "coming together is a beginning; keeping together is progress; working together is success." He took his idea for the assembly line, for instance, from the conveyor belt used in Chicago slaughterhouses, which required each worker to perform only a few tasks. Ford expanded on this idea for his own purposes, and the rest, as they say, is history.

Today "working together" is still an effective way to accelerate the development of new technologies. And this is especially true for companies whose business success depends on innovations. Such companies often have to rely on the expertise of others, particularly when the work

in question involves the latest findings in basic or applied research.

And naturally, this is true of Siemens as well. Every year the company enters into over 1,000 cooperative projects with universities, research institutes, and industrial partners in an effort to strengthen its portfolio of innovations for the long term.

In the Energy Sector, for example, Siemens is developing the technology for carbon dioxide capture in power plants, and is striving to make it ready for commercial use in collaboration with energy suppliers in Germany and Finland and well-known research institutes in the Netherlands (see p. 111).

At the same time, Siemens is testing the integration of electric cars into the power grid with several companies, as well as Denmark Technical University (DTU) in Copenhagen. Here, the objective is to get electric cars hooked up to sockets as soon as possible so they can be used as a storage medium for fluctuating quantities of wind-generated electric power (see p. 92).

tists working on CKI projects benefit from exposure to issues of practical interest to industry, thus allowing them to go beyond purely academic research. What is more, it's not uncommon for young scientists at partner institutions to find jobs at Siemens later on.

The Internet as Research Platform. In addition to cooperative projects, there is another way for companies such as Siemens to broaden their research horizons: a paradigm known as "open innovation" (OI). "In contrast to a classic research partnership with a framework agreement, in this case the developer searching for a solution calls for bids via the Internet and thereby integrates

scribe their problem on an e-broker website, such as NineSigma or yet2com, and offer a cash reward for the best solution. And that solution can come from a large IT company in India or from an amateur developer in Germany. Approximately half of the problems are successfully solved in this way. So it's not surprising that large companies like BASF, Novartis, and Nestlé are likewise using this method of finding solutions.

In addition, Siemens has developed its own tool to foster networking among employees within the company. "When it comes to the process of finding solutions, our internal Siemens tool, which is called TechnoWeb, more or less corresponds to the e-broker principle," says Lackner.

working platform to take part in a vote arranged by Japanese noodle maker Acecook to determine which flavors consumers like most. In much the same way, fans of automaker Fiat had a chance to contribute design ideas for the new Fiat 500.

Consumer goods manufacturer Procter & Gamble plans to put special emphasis on customer input through crowdsourcing. Over the long term, the company intends to generate half of all new products by means of customer feedback. "With crowdsourcing, companies can take the needs of customers into account more quickly and react rapidly to dynamic market conditions. That leads in some cases to a huge competitive advantage," says Rudzinski.

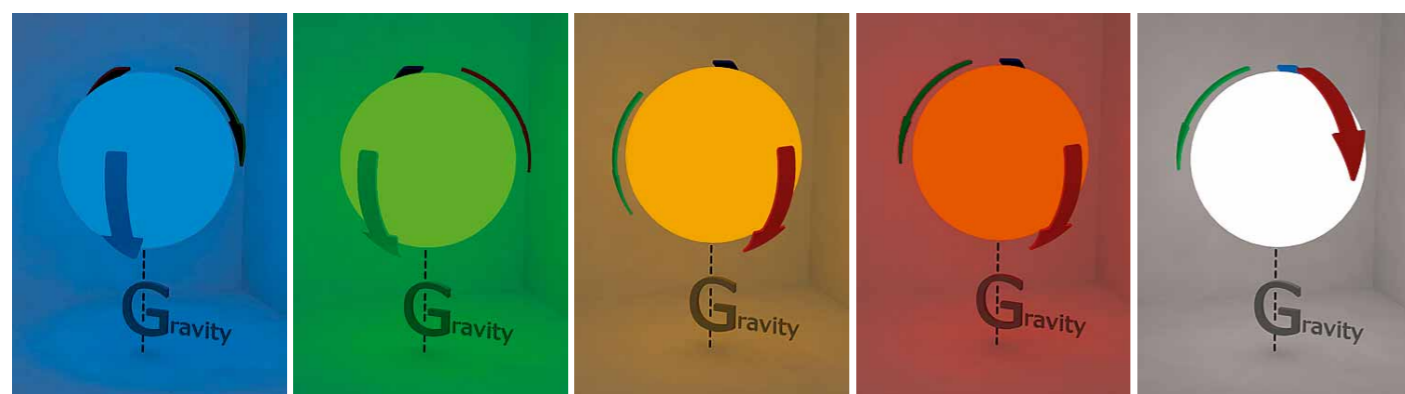
explains Prof. Piller. Nevertheless, he believes that companies will never expose all their expertise to outsiders, in part because of the issue of patent protection. In his opinion, OI will therefore only supplement the classic approach of in-house development instead of replacing it.

OI specialist Lackner is planning to bring about even greater integration of the various open innovation tools at Siemens. The success that Siemens has so far enjoyed with OI makes him confident. In February 2010 the company was ranked second for its knowledge management and its OI activities in the European Most Admired Knowledge Enterprises (MAKE) study by international market research firm Teleos. This marks

the sixth time since 2001 that Siemens has been among MAKE's top finalists. Lackner is now considering organizing new idea competitions at Bosch und Siemens Hausgeräte GmbH, Osram, and at universities. Colleges could submit proposals for research projects, and the one with the most promising concept would then be awarded a partnership with Siemens.

"Whereas idea competitions identify the best new ideas, which are later implemented, e-brokers locate solutions that already exist," says Lackner. "This is especially useful in the case of complex technical problems relevant to the Siemens Sectors that work with power plants, industrial facilities, and medical devices."

Lackner hopes to pursue open innovation methods further within Siemens as well, because they provide a vehicle for discussing future trends with large numbers of employees and to also identify the best ideas. Another two-month idea competition is therefore set to start in mid April, and will be dedicated to the topic of sustainability. Says Lackner: "No matter how different the individual OI methods may be, they have one thing in common. They complement traditional research and development by integrating the creativity and expertise of many people into the innovation process. They therefore broaden the R&D horizon in a relatively simple way." ■ Sebastian Weibel



Open innovation makes it relatively easy for developers to enhance their potential for innovation. Osram, for example, used an ideas competition to garner over 600 proposals for lighting solutions, as was the case with this chromatic ball.

external problem-solvers, and sometimes foreign ones, into its innovation process," explains Prof. Frank Piller, an innovation management expert at RWTH Aachen (see p. 89), a prestigious technical university in northwestern Germany. This strategy of open innovation is already being implemented in various ways by many different companies — including Siemens.

One type of open innovation is known as the "innovation jam." Web-based, and usually in-house, these moderated discussions with hundreds or even thousands of participants are designed to find and evaluate new ideas. "Toward the end of 2009 we set up a jam, where we asked our employees in what ways future IT and communications technologies such as cloud computing could change the way Siemens does business," says CT researcher Dr. Thomas Lackner, who is responsible for open innovation issues at Siemens. "Thanks to roughly 1,000 contributions from those who took part, we were able to develop some initial concepts for responding to these evolving trends."

Siemens is making use of OI methods in research as well. When faced with particularly tricky problems, Siemens researchers sometimes turn to "e-brokers," who team up with external problem-solvers. In such cases, developers publicly de-

er. "Put simply, it works like an Internet forum in which any registered employee can post a specific problem. Whether it's a complex technical matter or just a question about how to use Microsoft Word — every user can see and answer these questions. That speeds up the work routines of individual users an awful lot."

The Customer as Development Partner. The most widespread method of open innovation, however, is called "crowdsourcing." "In this case, companies outsource their inventiveness, as it were, by getting customers actively involved in the innovation process through networking platforms or idea competitions, for example," says Caroline Rudzinski from Management Zentrum Witten (MZW), which has been dealing with the subject of collective intelligence for some time now and is analyzing the use of open innovation in the business market.

The list of companies now using crowdsourcing is long. In 2008, for example, approximately 4,000 people used a dedicated net-

Siemens lighting subsidiary Osram has also gained experience in the OI field. In 2009 Osram set up its "LED — Emotionalize your Light" idea competition. The competition gave professional designers and amateurs alike an opportunity to submit, inspect, and discuss their lighting ideas online. The overall goal was to identify practical and affordable lighting solutions that are easy for users to operate and install. Prizes were awarded for the best ideas.

Entries included a floating scallop lamp that provides relaxing hues of light in the bathtub, and the "chromatic ball" (see images above), which uses acceleration sensors to change the color of its light when rotated. "More than 600 ideas were submitted during the competition, and most of them are technically feasible," says Lackner, who is confident that Osram will implement one or more of these ideas in the not-too-distant future.

Despite these successful scenarios, many companies are still reluctant to open up their innovation processes, because they fear a loss of intellectual property or worry that it may not be possible to patent OI products. "But OI takes place entirely within the existing patenting process if the rules are defined properly — such as with a non-disclosure agreement or a waiver of rights,"

Open Road to Innovation



Prof. Frank Piller, 40, has held the Chair in Technology and Innovation Management at RWTH Aachen, Germany, since 2007. Prof. Piller received his doctorate in business administration in Würzburg and led the Customer Driven Value Creation research group at Munich's Technical University. Until his appointment in Aachen, he was a Research Fellow at the Sloan School of Management at the Massachusetts Institute of Technology in Boston, Massachusetts.

| Interview

What is open innovation?

Piller: "OI" represents a completely new way to organize the innovation process. Instead of a company relying exclusively on its own R&D capabilities, it calls upon the assistance of external problem-solvers and integrates them into the innovation process. As a result, developers use the outside world to enhance their potential for innovation. In this way, companies acquire expertise and solutions without huge expenditures. This applies to B2B as well as to consumer products. Companies use OI to ensure that their products meet the needs of customers, thereby lowering the risk of flops. They specifically ask what customers want, or they might even actively include them in the development of a product — for instance with traditional idea competitions.

Doesn't OI endanger the intellectual property rights of the developer?

Piller: OI operates within the existing patenting process as long as the rules of the procedure are properly defined, such as with non-disclosure agreements or waivers of rights. But companies aren't the only ones to have these concerns. Today most amateur inventors are glad to be actively involved in the development of a product, in exchange for waiving rights. But over time, they will become more assertive, and a company will then have to allow them to enjoy a share in the success of a product.

Who practices open innovation?

Piller: Often it's companies that lack a large corporation's development capacity. But big companies have discovered OI too. Hewlett Packard (HP), for example, runs its own OI platform on the web — the "Idea Lab." With its "Emotionalize your Light" idea competition, Osram generated new design ideas for lamps and created a best practice in Germany. But even if used internally, OI can represent a great opportunity, especially for companies that operate worldwide and have lots of in-house expertise — like Siemens. In this case there aren't any problems with confidentiality or patents because everything stays within the company. Researchers from a wide variety of departments who might otherwise never meet can use OI to pool their knowledge and quite easily create synergy effects. At present, only a few companies are making use of this OI potential in a systematic way.

Can OI replace the traditional in-house approach to development?

Piller: No, OI will complement the traditional approach by offering very efficient development alternatives. It will probably take several years before it becomes firmly embedded in innovation processes. It's the same as with many new approaches to management — they're discussed with great enthusiasm and then not implemented on a broad basis for five or ten years.

■ Interview by Sebastian Weibel