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“The roles of leaders and the modes of innovation are fundamentally changing.”
-Peter Pribilla (1941-2003)
INNOVATION

How can companies use a full range of internal and external resources for current and future benefit?

Competitive settings require the rapid development of new ideas. Well-organized internal structures for generating innovations remain important, but are increasingly complimented by contributions from other sources. The Peter Pribilla Foundation encourages research that increases understanding of how companies can successfully refine current offerings while discovering desirable new products/services/experiences.

LEADERSHIP

How can companies foster individual initiatives that go beyond today’s task requirements?

The need for leadership expands as organizational contexts become more complex and unforeseen events have multiple impacts. Leaders look beyond their current role and responsibilities to cope with unexpected situations and they inspire those around them to do the same. The Peter Pribilla Foundation emphasizes research on effective leadership in complex, transorganizational settings.

Meetings of our network have focused on a set of supportive themes:

COOPERATION

- How can organizations facilitate effective interaction on assigned tasks while encouraging altruistic contributions that go beyond task assignment?
- How can organizations connect with customers and other contributors to leverage innovative capacity?

OPEN INNOVATION

- How can organizations effectively broadcast the need for innovative ideas from outsiders and insiders to improve organizational offerings and managerial processes?

AGILITY

- How can organizations respond more quickly to strategic opportunities?

LEADERSHIP AND ORGANIZATIONAL LEARNING

- How can individual, group, and organizational capabilities be increased to reach desired goals?

Editor’s Summary

The 2009 meeting of the Peter Pribilla Network took a closer look at how open innovation is progressing. The meeting was kicked off by Thomas Lackner, who is responsible for the open innovation program at Siemens. Among other points, Dr. Lackner indicated that

- Open innovation is useful both for developing new technologies and for adapting existing technologies
- Different approaches can facilitate innovation in different operational areas over the innovation life cycle
- New social networking platforms show promise for locating and sharing dispersed information in complex organizational structures.

Open leadership was a central theme in Rudi Gröger’s turnaround story about the telecom company that became Ö2. One of the central points of Dr. Gröger’s presentation is that

- People are unlikely to be motivated at work if they do not have the information and tools they use in the rest of their lives.

As CEO he therefore made all information about market share, performance, and strategy available throughout the company. Gröger indicated that

- As a leader you have to seek support from the five percent who understand new ways of working; one of their tasks is to identify a broader set of supporters.

He also noted that the most difficult aspect of the open leader’s job is that

- There is not one job to do, but a logical chain of interdependent things that must be done simultaneously.

We moved from the findings of practice to research results in a third presentation by Professor Wolfgang Scholl from the Institute of Psychology at Humboldt University, who integrated findings from four major research projects to establish that

- Knowledge growth and coordinating capability support effective cooperation
- Promotive control, which respects differences between people, is the most effective approach to coordination, even though more assertive methods are often assumed to be needed.

Mitchell Tseng, Professor of Industrial Engineering at Hong Kong University of Science and Technology, ended the day with an interesting look at open manufacturing. His primary example was the largely invisible networks of “Shanzhai manufacturers” that produce unbranded mobile phones. Professor Tseng suggested that

- Open manufacturing is becoming a formidable alternative to established ways of working
- Its primary requirements are
  - A means of tracking products, manufacturers, and other attributes of manufacturing
  - Standards that create a common language
  - A common platform to lower transaction costs.

In sum, we were glad to have a more detailed view of open innovation practices, and open leadership. We thank all participants at the 2009 network meeting of the Peter Pribilla Foundation.

Cordially,

Prof. Dr. Dr. h.c. Anne Sigismund Huff
State of the Art and Future Perspectives on Open Innovation at Siemens AG

Dr. Thomas Lackner is head of the Open Innovation Program at the Chief Technology Office of Siemens. He has spent more than 20 years within Siemens in various management positions such as Vice President Transport Telematics at the headquarters of Siemens One, CEO and founder of the Siemens Technology Accelerator GmbH (STA) in Munich, and head of several departments within Siemens Corporate Technology, Siemens Traffic Control Systems, and Siemens Information and Communication Networks. Before joining Siemens he worked for Philips and the Ministry for Science and Research in Vienna, Austria. In 1982 he was awarded the Post Doctoral Fellowship of the Max Kade Foundation which enabled him to work as a postdoctoral fellow at M.I.T. in Cambridge, MA, USA. Dr. Lackner is a frequent speaker within Siemens and to outside groups on innovation-related subjects. He agreed to speak with the Peter Pribilla Network about the portfolio of open innovation projects currently underway at Siemens.

We very much appreciate your joining us today, Dr. Lackner.

Thank you for the opportunity to talk about what we at Siemens are doing in the context of open innovation. Siemens currently has 30,800 R&D employees in 176 locations worldwide, a huge community in itself, with challenges about how to communicate. We spent €3.9 billion on R&D in fiscal 2009, or 5.1% of revenue. We have 56,000 active patents and achieved 4,200 inventions in FY 2008 alone. In 2008, we were number 38 on the Business Week list of the world’s most innovative companies.

We have always had a strong emphasis on innovation. We started 150 years ago with a telegraph line from India to England, which we pre-financed, so we understood the idea of a business model even in our very early days. From that point forward we have known that it is not always easy to innovate, but innovation must be central to the way we do business.

Therefore, when I talk about R&D or innovation in a Siemens context, I am talking about transforming knowledge into money, as shown in Figure 1. We all know that it is not always the best technology that leads to business success. We must always think, “What is the customer value, the business value, behind efforts to innovate?”

We are also good at the top right corner of Figure 2. Our technology for magnetic resonance imaging (MRI) is novel when compared to x-ray and similar devices. We can enter new markets because our new technology displays tissue with greater accuracy and finer resolution than alternative methodologies.

We are also good at the top right corner of Figure 2. Our technology for magnetic resonance imaging (MRI) is novel when compared to x-ray and similar devices. We can enter new markets because our new technology displays tissue with greater accuracy and finer resolution than alternative methodologies.

Moving to the right in the matrix found in Figure 2, Siemens is also strong in taking a new technology to an existing market. LED lights, for example, are based on a new physical principle that generated a new technology. This has brought us new advantages such as developing innovative luminaries that evoke emotions with a continuous spectrum of light colours.

As Figure 3 shows, there are several possibilities of adapting existing technology to new markets. How can companies improve their ability to leverage existing technology into new markets? As Figure 3 shows, there are several possibilities. There is the strategy of being
Open Innovation

Siemens strategy to develop new technologies and to take advantage of technologies developed by others.

Different people mean different things when they say “open innovation.” There is no common understanding, not even at universities. We structure our ideas along the two axes shown in Figure 4. The x-axis follows the innovation process from generation of ideas to selection of concepts, then technical development, to market launch – typical phases in an innovation process. The y-axis shows the level of openness during these steps and there are many options. You can run innovation development within a business unit and typically that is not very open. You can, in our Siemens’ terminology, operate within a sector, say energy or health. You can go cross-sector, that’s company-wide activity. Another option is to develop an innovation within one or more value chains, including customers. Finally, you can go to external communities, perhaps around the world, for help developing a new idea and bringing it to market.

In Figure 4 you see that within Siemens R&D and Sales & Marketing typically run on the bottom line, within a business, and that is not true open innovation. We do have activities here that other companies refer to as open innovation. For example, we are doing a lot to manage ideas generated at Siemens, but not talking as much about it as some other companies do. Still, we are putting strong emphasis on licensing and transaction activities. We do not communicate the figures, but we are getting real value here.

We have a lot of venture capital activities. We also have a huge corporate lab, which is a kind of activity within a big company that facilitates open innovation. We have idea management tools that are generating 100,000 ideas every year. That is not a generalization, it is a real figure.

We also have spin-out activities like STA (Siemens Technology Accelerator), the unit I was responsible for eight or ten years ago. Spin-out efforts commercialize technologies that could not be commercialized internally, and again the goal is to bring them to the point where they add value to Siemens. For example, we started with a battery-free sensor company called EnOcean eight years ago. It was started by three entrepreneurial former Siemens employees. They quickly developed a good business model starting with the building installation sector but with a clear vision to enter other markets like the automotive with a scalable product, in this case a battery-less tire pressure sensor. The start-up company soon acquired venture capital and now they employ more than forty people, expanding their business scope in the United States and other markets. EnOcean has a great new technology, and continues to be important as part of the sustainability movement. Today it has more than 300 interoperable products offered by 70 OEM customers.

Siemens also cooperates with universities and I think we have 8,000 projects with 800 university partners. That is really huge. We have spin-in activities in Berkeley and Shanghai, where we are in a direct three-way relationship with universities and entrepreneurs. These Technology-to-Business programs source the brightest ideas and help found companies at an early stage. We try to bring these companies to a point where they add value to Siemens.

We also have a very long history with company wide idea management called the 3i-program. Ideas developed here range from an improvement suggestion up to a new business idea. They are usually generated by an individual person, sent to a department, and then assessed by some clever people – that’s the process behind it. We also have many programs within Siemens trying to improve integration with suppliers and customers. We have venture capital programs.

What do we not have – and what I am talking about today – is a good collaboration process for generating new ideas. I want to emphasize especially our efforts to generate good technological ideas and improvements by connecting external and internal sources.

What are the most promising open innovation activities at Siemens?

Many companies call the activities I have already described open innovation. I want to focus instead on the yellow bubbles in Figure 4 – the use of idea generation processes, open expert networks, and technology e-brokers. We started open innovation activities in these areas almost a year ago. We did some benchmarking. We asked a lot of other companies what they were doing. In summary it became clear that every company has to develop its own open innovation strategy. Open innovation is not an approach you can duplicate and move from company to company. Procter & Gamble was really the first, I would say, to emphasize an open innovation strategy. Today Hewlett-Packard is doing something different with universities. BMW is doing idea generation with external partners. Everybody has to develop their own approach. We are just beginning to develop open
innovation activities based on web 2.0 technologies at Siemens. We have – simply speaking – a question, a challenge, a business question – that is posed to a huge community that we do not specify in advance. That is the heart of open innovation. It is not ‘simple’ cooperation with a university, or with a partner, where we make a contract. It is open cooperation. We are working to complement our existing, relatively open processes to address unsolved business challenges.

**Open innovation projects are designed to complement existing development efforts and meet unsolved business.**

You might ask why we are developing these new activities. There is a lot of knowledge, a lot of good people, and a lot of brainwork outside of Siemens and we have to access some of it. By reaching out we can access not just 30,000 Siemens R&D workers, but 1.3 million in the U.S. and many more around the world, as shown on Figure 5. In the bar chart on the left you can see the worldwide trend toward proportionally more R&D spending in smaller companies and less in big enterprises.

At the same time we must remember that innovations are no longer the product of small solitary workshops. Instead innovators are working with networks. There are new means to access global talent, both through the internet and with the help of searching technologies, but as I said before, using these resources requires a strategy.

If you raise the issue of open innovation in a big company, you usually get the response that “We are doing everything already.” But if you discuss a little bit more, if you ask management, “Do you really exploit the creative potential of your employees? Really exploit?” they get a little unsure. Because, of course, we have good top management and we communicate everything, but do we really address all 30,800 employees, asking them to be more innovative? And...do we always develop technology in the most effective way? I don’t think so.

There are other key questions where new open innovation approaches could give an answer:

- Do we always develop technologies in the most effective way?
- Does our corporate culture promote a spirit of openness and create a desire for proactivity?
- Do we have a corporate innovation identity?
- Can we separate our core business and the information we can share?

As I said, a strategy is needed. For example, if Procter & Gamble wants to develop something new, they first look internally and ask is it available? If not, the second aspect of the P&G strategy is to look externally to see if what they want is available. Why look externally? There are millions of bright people out there; what is wanted could easily be available already. But if Procter & Gamble cannot find what they want internally or externally, then they start internal development. It is a very simple strategy. I can imagine that if departments within Siemens would pursue this strategy, they could be more focused.

But at Siemens, we have a special challenge: “Wenn Siemens wüsste, was Siemens weiß.” Very simply, “If Siemens only knew what Siemens knows.” It’s a true challenge.

**Do open innovation projects pose potential problems for Siemens?**

Of course. Open innovation is a strategic opening of the company. It moves from the idea “the lab is our world” to the idea “the world is our lab.” This is an important idea we are using to communicate needed change in Siemens. It sounds very reasonable, but it means, in depth, a culture change in our company. In “the lab is our world” view you have people who are renowned and rewarded for doing R&D on their own. A change to “the world is our lab” means you need people who find a solution as fast as possible, wherever available. It is a different mindset.

You have to have both in a company. You have to have people who are really doing in-depth work and people who have real fun in finding something very fast. But it is not so easy to bring these two parties together.

You have to have people who innovate in a company, but you also need people who have fun finding innovations.

There are good examples of open innovation practices where the focus is on finding business ideas or technology externally. For example, IBM has an open innovation approach to discuss certain topics within a big community. They call it a jam. They pull together perhaps 150,000 people in a three-day event to contribute and develop new ideas.

Procter & Gamble had the goal of 50% externally sourced technologies within five years. They achieved it and brought down their R&D expenses considerably while doubling their innovation success rate. Of course, if you are telling these stories to an R&D department, they are not very happy, but nevertheless, if management is talking about these examples, R&D will pay attention.

The details help people who are oriented toward internal processes start thinking. For example, Procter & Gamble was looking for a technology that would allow them to print on Pringles, a potato chip, because they thought it would allow them to expand their market. First they looked internally for a process, but it is complicated to print on dough, and they did not find a good solution. Then they partnered with a printer company. That did not succeed either. Finally, they used an open innovation approach. They asked worldwide: Who has a technology that can print on food? They found a professor in Bologna who had developed a technology for a bakery that could print on cookies and cakes. P&G sourced this technology, made modest changes in it, and succeeded.

The critical mindset is always: What is my core business? What is my core R&D and what is not? These are the questions you have to ask yourself and that is only possible on a very low, deep, level in a business unit. On a company level, like Siemens AG, these are stupid questions. We have to go down and ask the business unit: What is core and what is not core.

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Figure 5: An increasing amount of innovation is generated outside of large enterprises
one of these open innovation approaches?"

What kind of open innovation projects are now underway in Siemens?

I’ll start with an external idea contest. Two years ago Fujitsu-Siemens had a question: What services could be offered by the next generation of the IT-Center? If you are posting such a question you have to ask yourself: Is it a good question? Whom do I address? Do I want to post a question with the branding of Fujitsu-Siemens? Would I be selling a secret if I sent it to an open community? What would I do with the ideas that come in? Is my organization prepared to digest super ideas? And so on, and so on. What does an innovation idea contest cost? How do I approach an open community?

How should I ask this question? That is always a very, very challenging problem. If you ask business development people who want to find very interesting services for an IT-Center, you have to ask what they are really looking for. If you try to nail them down to formulate a precise question, then you will run into difficulties. But that is precisely what you have to do. Once you have a good formulation of the question, then you can ask a wide community to give you some answers.

Here is another example. OSRAM is seeking input from a large external community to help them emotionalize light, what might be called “mood lighting.” The company wants to know how people would use light to make them feel better, energizes them, whatever. They don’t want to develop these ideas just within OSRAM, they want to involve and invite a lot of people, and I invite you, or your students, to get involved. We are approaching universities, and other communities to participate. You simply state your ideas, and rate ideas and designs suggested by others. It is a very simple process. The winners are rewarded and – hopefully – enter into business with OSRAM. These are external idea competitions. They require a concrete business idea, where you can specify what you want. The business idea has to address the market, has to address customer benefit. The unit specifies criteria and then awards the winners.

This is not the only way to develop ideas. During an innovation jam, a form of internal idea generation, we do not specify criteria; rather we conduct an open online discussion. A jam is not something that you have on bread, the word is a musical term. Sometimes an ad hoc group of people come together to play jazz. That is exactly what we intend to do across different business units: specify a topic that is interesting enough to draw a wide variety of people to talk together. Jams have been run by other companies with perhaps 500 to 150,000 people. Our strategy so far has been to involve around 1,000 people from Siemens worldwide.

We put a lot of work into communication when setting up a jam – making people aware of the topic, inviting them to participate. We ask some clear questions on a specific topic, and invite responses that are typically 50 to 500 word posts. As one comment leads to others, categorization may come from pre-defined forums, but user-generated tags are also helpful. Typically the jam is limited in time to around 3-5 days.

We had an anti-piracy jam last month. We knew before we started that piracy is a huge issue for industry and for Siemens. For example, sometimes parts of our high tech products and solutions are sold in a secondary market. That means that intermediaries can take some of our parts and replace them with cheaper ones. But the customer expects the entire product to have our proven quality! An exchange can damage our business. In a worst case scenario, perhaps people are hurt.

The online discussion across all sectors of the company, worldwide, asked people to bring up piracy problems they were encountering and ideas for solution. Collectively, we have a lot of experience. We have expertise in IP law protection and IP rights enforcement. We wanted to bring this expertise together with our technology skills to solve current problems and prevent future problems, future piracy.

The jam was very successful, and we intend to run more on other topics. For example, our next jam will discuss business ideas for services in the health care environment. We are also thinking about running a jam on cooperation beyond our firewall. We can use open innovation tools to develop precompetitive ideas, for example in the area of robotics. We can imagine developing a lot of ideas, but it is not so easy to get them implemented. There are a lot of legal issues if you go beyond the firewall.

Now let me address the right-hand side of Figure 6, where we are using open innovation to develop technologies. For example, a unit with special applications was recently looking for a decentralized energy storage system, another for a special sensor system. We assumed that there was a huge group of people outside Siemens working on relevant ideas who might offer a solution, a product, maybe even a prototype. We are using expert networks to find these things rather than to spend more money on new internal solutions.

In addition, we are partnering with InnoCentive, Nine Sigma, and Yet2.com. The benefit of using this kind of company is first the large, large communities they help us access. Second, they have the experience to customize our questions to reach a certain group. If you are asking a high level question but addressing it to many, many people, usually you get junk back. So, the trick is to specify your question, and address the right people. For example, Nine Sigma has a target group of two to three million people. We might post a question through them that they target to approximately 100,000 and get feedback from perhaps fifty or one hundred. Then we can select the best three or four. These are just typical figures of course.

We already have some performance indicators that via these market-places we can increase our speed of innovation. I have an example from a company in the automobile sector that was looking for oil sensor technology. Through an e-broker, they found the technology they needed in the Ukraine. It came from a supplier to the food industry. The cross-sector contribution is typical.

We have already seen that open innovation increases the speed of innovation.

We call the intermediaries we work with “e-brokers.” Nine Sigma for example is running a typical M&A business with focus on technologies. They provide links primarily to small and medium enterprises, universities, and R&D organizations. They are running a non-confidential process. They very professionally help to write the request for a proposal, then they provide excellent and confidential feedback from the solution providers, but they leave it up to the seeker to decide how he wants to enter into a contract with the selected solution provider. The commercial terms between the seeker and the solution provider are elaborated after non-disclosure agreements have been signed. InnoCentive, in contrast, runs a confidential process; they are acting as an Escrow agent which
is a little bit more complicated legally.

What is your ideal picture of Siemens as an open innovator?

My message to Siemens and to you is that the world is changing. We want to be, and I hope can be, a networked company. There is hard work to be done in opening doors while maintaining some control, but this work is much easier than changing culture. Still we believe that culture change is necessary at Siemens and we hope that in five years we will see some success.

One picture I show at Siemens is Figure 7. I hope that our people look at it and wake up a little bit. I hope they say: “We can do a better job of bringing our brains together. Let’s do something different.”

I would say. Information is being exchanged which we haven’t directly measured, but it has value. Clearly, we already are networked, even though I can’t claim we would find a similar picture in all sectors of Siemens.

Hopefully, we end up with another picture. Figure 8 was a present to a manager within SIS, our Global IT Solutions and Services unit. He was leaving, and about 3,000 people were asked: “Just send an e-mail and write down who has helped you considerably within the last twelve months. We would like to give this picture as a present to our leaving boss.”

This is a real picture of part of Siemens’ brain,

Learning Resources


Challenge for Practice and Research: Knowledge Management

In the middle of this talk I bluntly said, “If Siemens only knew what Siemens knows.” That is a huge problem for us, and I believe for almost all companies of any size. There is relevant knowledge in different sub-organizations within Siemens.

Figure 9 illustrates the complexities involved. Knowledge can be found in different business processes, different projects, and different geographical locations. It is a function of different languages and cultures. As a result, “what we know” is fragmented. Our challenge is how to bring this knowledge together. I hope the challenge will also attract researchers.

Social networking may be part of the solution. We did a study and found out that presently more than 10,000 people in Siemens are exchanging information on social sites, but we don’t know what they are exchanging. We believe that a social network site within Siemens would facilitate exchange of knowledge with respect to technologies. We developed such a platform ten years ago in a web 1.0 technology for SIS, so we know what we are talking about. We want to develop something like that for the company as a whole, with web 2.0 features like tagging. It is no longer necessary to start with a big predefined structure for technologies. Today there are rating mechanisms that allow the most important technologies to emerge. We also hope that people will be able to establish their own profiles. IBM has done that and we hope we will get the momentum within Siemens to do something similar.

I believe that companies can learn from each other as they improve their knowledge management capacity in this and other ways. I hope that academics with an interest in this area will also be involved and share the outcome of their studies.
Vision, Culture and Open Leadership

From 2001 to 2006 Rudi Gröger was CEO of O₂, the fourth and initially the smallest mobile phone service in the German market. Open information was a key aspect of turning O₂ around and Gröger won many awards for the effort. In 2006, the year O₂ was acquired in the largest all-cash takeover ever experienced in the telecommunications industry, the company was listed as one of the top 100 places to work in Europe. A member of several scientific and advisory boards in Bavaria, Mr. Gröger was awarded an honorary doctorate from the Technische Universität München in 2006. In December 2009, Dr. Gröger became the president of the Munich Business School.

Thank you for describing your achievements at O₂,
Dr. Gröger.

I’m glad to be here. I want to describe a couple of core beliefs I have about leadership, then a couple of examples from the O₂ case that shaped my understanding. In conclusion, I’ll focus on points that I think apply to other relatively successful companies.

A good place to start is to recognize that as a company CEO I can get all of the technological expertise I want. If I need fifty A-rated electronic engineers, it is easy to hire them. If you need 500, you just hire 500. And if we want more, we go to China ... not a problem. Obviously, if these resources are available to everybody, the difference between an ok company and a very successful company is not technology, it is due to the “soft factors” that leadership must provide.

The critical competitive difference between companies is not technology, but “soft factors” that leaders must provide.

The iPhone is not a product of the 21st century in terms of technology, there is something else going on. There is a new touchscreen, but the phone has poor quality and poor service. The battery life is not good. You can’t fold it. You can’t change the loudness of the ringtone, et cetera. But everybody says “I have to have one!” Just like everybody says “I drive a BMW!” or “I drive an Audi!” Nobody is saying “I drive an Opel!”

As I begin to talk about the main tasks of leaders, I suggest that if you want to be a leader, the only thing you have to do, logically, is bring your company into a position where it has the competitive advantage of people wanting to buy what you have to offer. This must be the reason why you go out of bed in the morning.

How did you become the CEO of O₂?

I worked almost twenty years in Siemens. At the end I was the German boss of the information and communication business, and my biggest customer was Deutsche Telekom. Of course I visited my biggest customers by myself twice a year just to make sure that everything was ok. After my second visit, the head of Deutsche Telekom called my boss and said, “I want to hire that guy, and we’ll pay him this much. Don’t make him a counter offer. Then you will have somebody with a Siemens heritage in Deutsche Telekom, which is as good for you as for us.”

So the two made a deal and I was sold like a football player to Bonn. If you are based in Munich you are not too excited to go to Bonn, but I did it and I was relatively relaxed, because I thought after eighteen years in Siemens, I understood the culture of big organizations. I thought, if I went from Siemens to Deutsche Telekom there would not be a big problem. In fact the differences could not have been bigger.

After six months in Deutsche Telekom, I founded the company that is called T-Systems today. To make that happen, we tried to acquire a big IT systems house. In the end we decided to buy DaimlerChrysler’s IT-arm, a company that had 25,000 people working in 22 countries. And again, I was sitting in Bonn and I thought to myself, if we bring a company from Mercedes into Deutsche Telekom, the culture must be similar, but again the differences were very big.

In all of these businesses, and again when I went to Viag Interkom, which soon became O₂, I thought that the network was the asset and would make the difference. No. In all of those businesses, the only differences involved people! My lesson was: if you run an infrastructure business, the infrastructure is not a competitive differentiation. The people make the difference – the engineers planning the network, the people in the shops, your employees being an ambassador for you. Or not.

Therefore, I say – a bit provocatively, I agree – forget about innovation! There is no customer who wants to buy your innovation, as your innovation. If you go to a coffee machine, most of you will push the cappuccino-button, the more creative may be drinking latte. Nobody drinks coffee. The innovation in that machine is not the technology that is able to bring milk and coffee together. The innovation is demand for cappuccino which was not there five years ago. That alone is the innovation.

Forget about innovation!
What matters is what your customer wants.

What are the most important characteristics of leadership in your opinion?

If people make the difference in any business, the core competence of leaders must be managing people. I feel the biggest problem in our education system at the moment is that we are teaching a lot of theory, but we have to move the emphasis to training people who are able to deal with situations, change companies, and find innovation, whatever the innovations may be. I’m hanging around...
business schools, giving lectures and saying to professors, “Guys, all the people I got from you were worth nothing. I had to train them a second time. I had to drill the importance of working with people into them.”

The core competence of leaders throughout a company must be managing people.

The most important thing we must train for is how to be authentic as a leader. I mean by that authentic not only as a person, but also as a person who is part of an authentic company culture. One of my first lessons about leadership was that people were watching me. Even if they are at the lowest education level, they feel whether you are authentic in what you are doing. They know whether there is a difference between brain and heart.

Interesting enough, all very successful companies have leaders. Especially the deutsche Mittelstand, the middle sized companies that dominate our economy. These companies tend to have leaders you have never heard of, but they are leaders by birth. They have authenticity in their genetic code.

In bigger organizations, I think there are three things that must be given attention, as shown in Figure 1. The first has to do with vision, the second with culture, and third, leadership. These are the things that shape a leader’s behavior, more general orientation, and motivation.

Figure 1: Basic beliefs about leadership

What does “vision” mean to you?

When I starting work for Siemens, the American business school message that “you should have a vision” was beginning to affect ordinary working people. Some innovative person said, “Can somebody in my office write a vision, please?” The result was very nice sentences, very heavy words. They were printed and then hung in meeting rooms so that everyone knew the company vision. This is not my understanding of a vision, or how it is achieved.

If vision is authentic and seriously meant, you must describe every single word and what you mean by it. You have to break down what it means in terms of behavior. The process gives people an example of whether top management action is consistent with the logic of the outlined vision.

Authentic leadership is demonstrated in how vision is developed and turned into measured behaviors.

After vision one has to think about culture. How are people dealing with each other? How open are people when you deal with each other? This tells people what is okay and what is not. I learned from being in Siemens, Deutsche Telecom, and then O2, that different companies have very different cultures. Linking vision and culture is, therefore, not simple, but it must be done.

By the end of the day, you have leadership, which allows you to bring motivation into the system. And if you can make these things work together, you have a race car that can win the race. But, don’t forget, every Formula-1 car at the moment has 850 horsepower. The winning car must have something more. It must be able to transmit thoughts about the normal world into something better.

Is market position important?

One of my rules is that there is no Olympic ideal. I do not agree with the belief that being part of the Olympics is more important than winning. That’s nonsense. Everybody, everybody wants to be the winner. What if I had said, taking over the company that became O2, “We are the smallest in Germany and the latest in the market, number four out of four”? What is the message? “This is the future, here we go”? Never! People want to have targets. Therefore, forget the Olympic ideal. If you cannot change your number four position to number three position, change the focus. Say you want to be number one in the American segment, if you can’t improve your overall place.

Towers Perrin, a global consultant company specializing in salary schemes, did a survey in 2004. I remember that they asked people, “What is important for you in your company?” Money, salary, was number ten. The most important for employees was something like, “Senior management interested in what I am doing: in me. They should ask me how I feel. They should motivate me.” If you are able to give these things to people, they go to every fight you ask of them. If you have a vision, if you know what your targets are, there is no need to say, “I’ll give you a hundred bucks more.” They would, of course, take the money, but this is not the real motivation.

What was the situation when you first became CEO?

To understand even the very short version of the case, you must know that in Germany there were four mobile licenses awarded in 1998. In those days, we were all sitting on piles of money, having no idea what to do with it going forward. And everybody thought if we enter the mobile industry we have a license to print money. When the new company was formed, the market was already five years old. The two clear market leaders were T-Mobile and D2 Vodafone, each with about 40 percent market share. There was no need for a fourth network, because we had three already. That meant by definition, by birth, nobody needs you - a tough, tough thing. This was still the starting position for me in 2001. We had a market share of 6 percent. We had 3,400 people, revenue of 1.1 billion Euros, and earnings before interest, taxes, depreciation and amortization [EBITDA] of minus 270 million Euros.

Even worse, a couple of days after I joined the company, on the first of October 2001, our shareholders said they wanted to close and sell the company. My boss, the CEO of British Telecom, gave this news to the press, not to me. When I found out I called and said, “Was this really necessary? You bring me out of my comfort zone in Deutsche Telekom and then you say close the company. That’s not fair.” And he said, “Rudi, business is not always fair. You have two weeks. Calculate what it costs to shut down the whole company.”

The number came to 500 million Euros: letting 3400 people go, getting out of contracts, and so on. But then my boss said, “No, sorry, I cannot give you 500 million.” That was the opportunity for me to propose a deal: I would try to improve the business, quarter by quarter. If that happened and for at least one of the first four quarters the EBITDA was positive, we would be allowed to survive.

It was not an easy game. In the first stage of this kind of business companies put as much as they can – money-wise – in infrastructure. Then the next step is to get customers. Otherwise the infrastructure doesn’t make money. But when the first early adopters, the people for whom price is not so relevant (let’s say the business people), have already been absorbed, this stage is over. Then market share goes to brands. The brand becomes extremely important because the customer cannot really decide whether the Vodafone network is better than T-Mobile or something else. So you buy a brand. And with the brand, you buy trust, quality, good feeling,
We entered the market at exactly that point. Branding had started. But we had financial difficulties. Even though an extremely high investment had been made in the company, we spent 1.8 billion Euros a year after year on the network because in an infrastructure business, you can’t say, “I’ll do it in two years.” You have to have a network, or you are out of business.

There were some bright spots. We were a startup company. We had startup processes, structures, and mentality. If something was not working, it was, “Hey we’re a young company. You competitors can’t do what we do. You’re a hundred years old; we are two years old!”

There was, however, a lot of uncertainty around new technology. The 3G services were really taking off, but it was not clear if it was worthwhile to go there, market-wise, especially for us because we had poor market position. And this was late 2001; do not forget the financial crisis. The internet bubble had burst six or nine months earlier. A lot of people had really lost a lot of money.

How did you develop a vision in this difficult situation?

To improve all this, we started with the question of why we were in the market. Finally we arrived at the sentence, “Be an innovative company!” That sentence cost me 48 hours of continuous meeting, boxes of Weißbier, and six dictionaries. I was reading the dictionaries to find out what innovative means. And the word innovation, what does it mean for us?

What happened after targets were established?

I had agreed on some targets with British Telecom, including profitable growth [EBITDA] improvement quarterly, one quarter of which had to be positive. That was the basic thing we looked at first. But I discovered you never have one problem alone.

I went, first, to the sales department and said, “Guys, why are you not selling enough?” They said, “Rudi, we are great salespeople. But, to be honest, our network is not the best. We know that already.

indicators that we could measure. What should it mean if we said, as we did, “We want to enrich our customer’s lives, whatever they do, wherever they are”? This is not church, where everybody loves everybody, this is a measurement. We had to set targets. And we did. We concluded, for example, that we wanted to have a hundred percent network coverage. Because, if we want to enrich your life wherever you are, we have to be there with our network.

The basis for the O₂ turnaround was the structured set of statements shown in Figure 2. If you do not work exactly this way your vision is: We all want to be young forever, rich and healthy, and bring in the next cigar.

Figure 2: V4AG Interkom challenges

No wonder people do not buy us.”

Then I moved to the network department and said, “Hey, network department! The guys in sales said you are responsible for our underperforming in sales because the network is not okay.” The network people said, “Huh! We are okay! We build a wonderful network.” “Who is it then?” I asked.

“I tell you what, the real problem is IT. Our planning tools are not okay. We sometimes build a network where no customer is sitting and on the other hand, where customers sit we do not have something to offer. You know, it’s IT.”

But IT said, “Pff! We are running the best CNO ever and everything is okay.” So I said, “Who the hell is it, then?”

Then all three groups agreed: it is the new shareholder. They said, “We have a British shareholder, you know. They drive on the wrong side of the street. They have their own currency. They are hard to understand. The Brits are guilty.”

What I concluded is that you can’t save a company by saying “The coffee break is now to be paid by the people and there will be no more cookies.”

Forget all that! This is not your problem as a leader. Your problems are that your production is too slow and too expensive. Your people are demotivated. Your sales force is targeting the wrong customer. You have many problems at the same time that you must focus on. And therefore, you have to deal with everything at the same time. This is the leadership challenge.

In our turnaround case – and I think, in all the other cases as well – leadership requires that everything has to be repaired at the same time. I mean product roadmaps, quality, technology streamlining – everything. You can’t say, “Hey, this or that is a priority.” Because everything has to be addressed tomorrow.

How did you communicate a complex agenda to people in the company?

Some people say there is complexity reduction for decision making at the top, but this is wrong. Every complexity reduction leads you in the wrong direction. You have to learn to deal with more complexity. Also, going forward, what you deal with today does not become easier, it becomes more complex. You have to think about processes and methodologies to deal with more complexity, not to reduce it. This is fundamental.

You have to think about processes and methodologies to deal with more complexity, not try to reduce complexity.

The biggest problem I faced as a leader is shown in Figure 4, a slide I used at O₂. As boss, I had to come out of a secure office, stand in front of three or four thousand people, and say, “I have a plan. I’ll tell you what you and I will do.” You have to do that, because otherwise why should people trust you if you don’t explain what you want them to do?

And once you have a plan, you have to do it. The biggest problem in dealing with complexity is to learn how to deal with complexity. And you have to do it now, you can’t put it off. I have to communicate that you can’t say, “I’ll do it in two years.” You have to do it now. And you have to make it clear what your company is doing, what you will do, and where you will be. This is the leadership challenge.”
May, 2002, we will do cost-cutting, and this will mean some jobs lost.” I said that, but then I said “I swear to you that nobody will be fired on the 1st of June. That is my commitment. Commitment number two: the money we are saving in cost-cutting is not a hundred percent contributed to the bottom line. So, you have to save money, but you can reinvest some in the future survival of the company.”

That is what we did at O2. We took one third of the money we saved and spent it in the market, on our future. The big problem was that the slide shown in Figure 4 was shown to everybody. From a leadership perspective, this is quite an uncomfortable situation because everybody in the company knows your exact deadlines. And everybody in the company knows, therefore, whether the boss is working according to what has been promised, or not.

Leaders are too often presented as a miracle, somewhat mystic. They think they can say, “I am the boss. I’ll tell you tomorrow what I think.” Why should people trust that kind of a leader? Isn’t it better to say, “This is my plan; I think.” Why should people trust that kind of a leader? Isn’t it better to say, “This is my plan; I think.” Why should people trust that kind of a leader? Isn’t it better to say, “This is my plan; I think.”

People are unlikely to be motivated at work if they do not have the information and tools they use in the rest of their lives.

This sounds like “open leadership.”

It is. I gave people all of the tools they were used to using outside the company and then said, “There is no information in this company that you do not have. Nobody has more information than anyone else.” Then I said, “Using this information, I’ll tell you exactly where we are. Whether you like it or not this is the next step.”

If you do this kind of thing as a leader, however, one interesting consequence is that it tends to trigger what I call the perestroika phenomenon. Mikhail Gorbachev used the idea to describe what happened during the mid-1980s restructuring in the Soviet Union. The perestroika phenomenon goes like this: In big organizations there is a tendency for middle management to have more information than the people beneath them. Therefore, they are more powerful. Not top management, but some levels of middle management.

This is of eminent importance because, especially in developed countries, the work force is quite well-educated. They are not silly. And the younger ones, who have grown up with the Internet, expect that all information is available at any time, at any place.

Why do we think that when these people walk into a company, they will switch off and say, “Now I’m spending 40 hours a week in my company. I’m not educated. I’m not informed. I don’t have access to relevant data, but I am motivated 40 hours a week.” Why do we think that? It is impossible.

If you say you want to have the kind of democracy in a company where everyone has every number, then what’s going to happen? Middle management worries that you want to kill them. Not personally, but you take them out of the system, because everybody knows what’s going on. And then, the perestroika effect: people go out on the streets and say, “This is crazy!” Just as they did in Moscow.

Many people who resisted were a kind of elite. You destroy that elite if you inform everybody in an organization. But, again, you need open leadership if you want everyone’s motivation, everyone’s commitment. People grow up having information available outside of their office. Which means the most important thing for leaders is communication, communication, communication.

I believe this is a fundamental change for leaders going forward. We have put so much educational effort into our work force. We must deal with them accordingly. We must respect them. We must inform them. We have to present deeper approaches where we say, “I’m one of you. I’m the boss, yes. I get more money than you do. But only if we work together will we be able to change the things that block us.” The old attitude that I have more information and so you will always do what I say is nonsense. Absolute nonsense. Maybe this attitude worked in the 1960s or 1970s, but not in the type of business I am talking about today.

What did you do about people who resisted change?

The toughest job is cultural change. There is no Excel sheet helping you, there are no rules. It’s only you and the people. And you have to go through a roller coaster. It will happen; like it or not. You tell people, “I have a new vision. There is a better place than we are today.” First, they love it; they follow you. Then, to a certain extent they become inactive, decline, are angry, want to negotiate. They ask, “Is this really true?” and you have to work through that curse. To decide that we need a culture change next month simply will not work. That is extremely important.
offices. We also put it on trays in the canteen where people put their dishes every day. It shows 44 very familiar arguments. If somebody suggests a change, you will hear these things: “We need to have a working group to study it. We are too small for that. We tried that a year before. This is out of our authority. This is too complex. I don’t think the British – who are our shareholders – will like it.” And on and on. As a leader you have to help the five percent understand this process.

You need these people in a snowball system. You take the first five, train them and make sure that they think and behave in a way that supports the turnaround. Then you send them out in the organization. As you do that you say, “I need five more people who are very similar to you. Enlist the guys you know or find someone else who is like you.” In that way five people become twenty-five and then a hundred and twenty five.

Many more things happened that I do not have time to tell you about. We broke all the rules on branding. We changed our name over night. We switched Viag Interkom off on the 1st of May. In the beginning most Germans said, “Oh Zwei” or “Ooh Zwei.” Nobody said O₂. But from the beginning we intended our name to be pronounced in English. This is against the ‘rules’ of branding, which say you should choose a name that is easy to say and we broke another rule when we chose a name that might seem more like mineral water than a mobile operator. We also used celebrities; it was the first time that had happened since the second World War – so it went relatively well.

Soon we were the fastest growing mobile operator ever for sixteen consecutive quarters. We were growing, quarter on quarter, by at least 25 percent and at the same time improving our financial performance from -270 to +800 million, which had never happened before.

We were awarded any prize that was available, and the best prize was that Telefonica, the biggest telecom outside China, said, “You are so great, we want to buy you.” We sold the company for 26 billion Euros, in cash, within one week. It was the biggest cash-deal ever done, at least in Europe, maybe on a larger scale.

I have summarized some key learnings in Figure 8, which Ralf Reichwald always tells me is his most beloved slide.

Leaders must walk. You must lead by example. You can’t push people into behaviors you are not doing. You must get out of your office, out of your safety zone, out of a lot of things. Everybody is in charge! You must alert the whole organization. You need self-directing teams, people who are taking over the responsibility.

You need emotions! There is no energy in human beings without emotions. And you must allow people to push these emotions on other companies, if you want to survive and win. This energy, of course, needs direction. I have said that you have to have mission statements, et cetera. You must look at your processes. And I do not accept processes that do not start with the customer and end with the customer. An innovation process in particular must start with the customer and end with the customer. If this is not the case, we have a kind of broken process.

Never start to be happy, because if you are not cannibalizing yourself, somebody else will. You have to deliver low-hanging fruit, because motivation means saying, “Hey, look, we are on the right track.” And, finally, you must allow your people to be the stars. As a leader, you must work to grow the employability of your people. You want your people to be so attractive on the right track.” And, finally, you must allow your people to be the stars. As a leader, you must work to grow the employability of your people. You want your people to be so attractive on the right track.” And, finally, you must allow your people to be the stars. As a leader, you must work to grow the employability of your people. You want your people to be so attractive on the right track.” And, finally, you must allow your people to be the stars. As a leader, you must work to grow the employability of your people. You want your people to be so attractive on the right track.” And, finally, you must allow your people to be the stars. As a leader, you must work to grow the employability of your people. You want your people to be so attractive on the right track.” And, finally, you must allow your people to be the stars. As a leader, you must work to grow the employability of your people. You want your people to be so attractive on the right track.” And, finally, you must allow your people to be the stars. As a leader, you must work to grow the employability of your people. You want your people to be so attractive on the right track.” And, finally, you must allow your people to be the stars. As a leader, you must work to grow the employability of your people. You want your people to be so attractive on the right track.” And, finally, you must allow your people to be the stars. As a leader, you must work to grow the employability of your people. You want your people to be so attractive on the right track.” And, finally, you must allow your people to be the stars. As a leader, you must work to grow the employability of your people. You want your people to be so attractive on the right track.” And, finally, you must allow your people to be the stars. As a leader, you must work to grow the employability of your people. You want your people to be so attractive on the right track.” And, finally, you must allow your people to be the stars. As a leader, you must work to grow the employability of your people. You want your people to be so attractive on the right track.” And, finally, you must allow your people to be the stars. As a leader, you must work to grow the employability of your people. You want your people to be so attractive on the right track.” And, finally, you must allow your people to be the stars. As a leader, you must work to grow the employability of your people. You want your people to be so attractive on the right track.” And, finally, you must allow your people to be the stars. As a leader, you must work to grow the employability of your people. You want your people to be so attractive
Open Collaboration and Its Problems: A Causal Model

Wolfgang Scholl is head of the Organizational Psychology and Social Psychology group at the Institute of Psychology at Humboldt University, Berlin. He is interested in general theoretical developments concerning the processes of power and social influence in groups and organizations. As noted on the website for his institute (http://www.psychology.hu-berlin.de/staff/4483), one particularly important objective of his research is to theoretically explain factors that influence the success of innovation processes. He has written many articles and book chapters, in German and in English, on these issues.

Professor Scholl, thank you for sharing your research evidence on successful collaboration.

I am very glad to be here, because I see collaboration as one of the key problems within innovation processes. It is very helpful to have open collaboration bringing together ideas from many wonderful people and projecting them into successful innovations. And sometimes it is successful and at other times it is not. The important question is: what are the reasons for successful or unsuccessful collaboration in innovation and other organizational processes?

Yet collaboration is such a broad topic that it is very difficult to find relevant research. Much social-psychological research on groups is very distant from the reality of organizational practice. Often there are few variables relevant to innovation processes, and often laboratory research involves unusual surroundings, and/or unusual tasks. Other research on teamwork and groups does not cover collaboration within the team as well as collaboration with people outside of the team. Then there are field studies of groups, yet often they do not deal with complex surroundings and complex problems.

Because the assumptions, causal models, and hypotheses of many studies are unsophisticated, I try to develop more complex, definite models of collaboration and teamwork with clear causal specifications. I also try to integrate findings from different strands of group research, including for example, research about groupthink by Irving Janis. Janis looked at several decision processes of the American government, especially big failures. Perhaps his most famous case was that of the unsuccessful 1962 U.S. invasion of the Bay of Pigs in Cuba. Janis asked why such stupid decisions were made by perhaps the brightest group of people ever brought together in the American government. Along with studies of other decisions, including some very good decisions, he identified the importance of conformity pressure.

The assumptions, causal models, and hypotheses of many research studies are too unsophisticated to explain important organizational outcomes.

At the time of the Cuban Crisis the CIA made the proposal to invade and President Kennedy at once said, “Okay, we should support it.” All subsequent consultation continued under the assumption that “we should do it!” There were big conformity pressures. Afterwards, some people said, “In fact, I always felt that invasion was not a good idea.” But they did not dare to say that in the open. This is one aspect of how collaboration is likely to come up with unsuccessful results.

Many people feel that collaboration involves cooperation, not competition. One reason is that rewarding the performance of individuals does not work well; competition splits the group. The system should reward the whole group of people who collaborate. Otherwise, people won’t share their bright ideas with potential competitors.

Unfortunately, however, there is not a coherent body of evidence to combine and specify these and other ideas about successful collaboration. This inspired me to ask: How would management practices and management techniques about cooperation be reformulated if they were based on scientific evidence? I had two general assumptions: The first was that the evidence had to focus on managing complex tasks, where it is particularly important to gain more and better knowledge from many people. The second assumption was that it is very important to pay attention to how the collaborative activities are coordinated.

My model assumes that managing complex tasks requires

(a) gaining more knowledge about the problem, and
(b) effectively coordinating activities.

I furthermore focus on the two basic dimensions of interaction. The first is affiliation, the tendency to either be friendly and sympathetic or hostile and unsympathetic to specific others. The second dimension is about relative power. It is interesting that we draw conclusions about both issues even when there is no face-to-face interaction. Some years ago I worked on computer-mediated communication and found that there are always slight indicators of whether the other person likes you or doesn’t like you, or is trying to dominate your or not. People pick up on these cues, or what they interpret as cues, and act on them.

I will present the model of collaboration that I have developed in successive stages, because it emerges from a set of research projects and is too complex to be understandable at once. The first set of research evidence I drew on in developing this model comes from a study done by myself, with Lutz Hoffmann and Hans-Christof Gierschner. It is a field study of successful and unsuccessful innovation cases based on a combination of interviews and questionnaire data. The second study is a complex laboratory experiment on the consequences of cooperation and competition by Joachim Wetzell. The third study, by Ulrich Klocke, is a complex laboratory experiment on modes of using power in a computer simulated business game. The fourth, a field experiment by Alexander Schimansky, manipulated aspects of Metaplan, a decision-support and facilitation tool. These four studies used very different methods and measurements of the same theoretical variables. When presenting data in the following discussion, I averaged the correlations. However, not every study used all variables of the complete model, and sometimes only two or three correlations can be averaged.

What is the standard of successful collaboration in your model?

I focus on effectiveness, e.g. the market success of a product innovation or the efficient use of a process innovation or the solution of a wicked problem by a group of technicians. Companies promote collaboration to gain new knowledge. So, the resulting growth of knowledge should be a prime determinant of effectiveness. Often this knowledge is discovered by bringing together resources from different members of a collaborating team, who come either from different parts of the organization, or perhaps from different organizations. This necessitates proper coordination.
In German, I use a term defined by Werner Kirsch, a former senior colleague of Ralf Reichwald, “Handlungsfähigkeit,” to describe what is needed. Sometimes I translate it into “action capability,” but I think it is better translated as “coordination capability.” That means collaboration requires the capability to complete action cycles. Companies must pursue problems until final decisions are made and then implement those decisions in a meaningful way. Of course, new problems always come up. If people stick strictly to the decision made, it often means failure. Meaningful implementation requires that they adapt their plan to new problems, drawing on the spirit of the former decision.

In Figure 1 you see the first hypotheses used to build the model. The numbers next to the arrows show that my colleagues and I found a significant correlation between the amount of growth in task-relevant knowledge and the effectiveness of teamwork, but effectiveness also depends on the extent of coordination capability. These are quite strong correlations for this kind of research.

Of course, sometimes a group already has some knowledge relevant to their cooperative task, while at other times they have no idea what to do. We see that in our lives as individuals too; there are big differences in pre-existing knowledge when we face different problems. It makes sense that the more pre-existing knowledge, the less impact a growth of knowledge will have on the decision made, it often means failure. Meaningful implementation requires that they adapt their plan to new problems, drawing on the spirit of the former decision.

Can you say anything about the causes of knowledge growth and coordination capability?

Figure 1: Determinants of effectiveness

I believe, and have quite a bit of evidence to show, that knowledge growth and coordination are influenced by the two most fundamental and ubiquitous aspects of human behavior: the level of “friendliness” or “affiliation” and the amount of dominance or relative “power” between collaborating persons and social units. When you meet other people, you implicitly or explicitly ask yourself: are they friendly or hostile to me and to what extent? A second important question is: are they going to try to dominate me or are they submissive? These questions help determine whether you should approach or avoid these people and whether you should be cautious, or can relax. Of course there are mixtures. We ask ourselves, is the other person generous? Perhaps he is dominant because he has more money, more experience, higher status, and so on. But if he is friendly to me, I do not have to worry so much about dominate behavior, on the contrary, I can even look for help if I need some.

What I call the “affiliation axis” is most important here. If people are friendly, I want to affiliate with them. I don’t want to affiliate with a hostile person. The options are shown on the horizontal axis of Figure 2. I don’t mean a hostile person to everybody, but hostile to me. The vertical, domination axis is also a little infiltrated by questions of friendliness or hostility. Perhaps you are submissive to the other person because you trust him or her, or you appreciate what they have done in the past. In other encounters you say, “Hmm - I don’t know! I get suspicious. I don’t know whether the other will blame me for something. They seem ruthless. They offend. They are manipulating things against my interest.” All of this is summarized in the “interpersonal circumplex” shown in Figure 2, which provides a lens for categorizing, communicating, and interacting with other people.

The categories shown are very important in organizations. They coordinate and control the activities of many individuals. Some team leaders try to use friendly dominance, or what I call “promotive control.” And on the other side, where there is hostile dominance, there is what I call “restrictive control.” These options are mapped on the Interpersonal Circumplex in Figure 3.

Now you are talking about power?

We are talking about using power, but of a certain sort. In German, I usually describe it as “Machtausübung,” because in German “Macht” has a negative connotation. But in English, and especially in America, the word power is neutral. It is also used, for instance, in the term “power plant.” Electricity current is produced in these facilities, which is used to get work accomplished. This gives quite a different meaning to social power, too.

So I do not use the word power when describing this model in English. I talked to Bertram Raven, one of the great masters of research on the bases of power. In the end, he asked, “And why would you call what you study power?” He said what I was looking at was not really what English-speaking psychologists describe as power. So, in German, what I am interested in is “Machtausübung” versus “Einfussnahme”. But in English, I differentiate the two modes of using power into “restrictive control” and “promotive control”. A key difference between the two involves autonomy given to other people. There is a lack of respect and denial of autonomy if people try to restrict others and push their own interests against the interests of others. That is what happens in restrictive control. Promotive controllers, on the other hand, respect others and accept that they might have different interests.

Promotive control may sound weaker, though really it is not. And this is a major problem. When it comes to really important issues in organizational affairs, there is a tendency to use restrictive control. It sounds harder, tougher, because you can force people to abstain from doing what they like to do, while promotive control sounds weaker. But on the basis of our research the effects are the other way around! If you really want to get results then you do it with other people, using promotive control. This is positive, cooperative leadership of the sort that Rudi Gröger talked about earlier.
Promotive control, which respects differences between people, is often assumed to be less effective than assertive restrictive control. In fact, research shows restrictive control is less effective.

Are there other complications for leaders?

Yes, there are. I look at affiliation in three different ways: affect, cognition, and intention. A friendly person is a sympathetic person, a nice person. I like that person and I want to affiliate with him or her. It is an affective thing, an emotional thing, which affects positively the inclination to cooperate. In addition, if we have similar opinions, share similar world views, we are likely to have consensus and that makes collaboration easier. That's a very clear result in many research studies. We like people who have the same opinions. And, usually, we don't like people who have different opinions.

But, of course, even if we don't like the other person, and even if we have differing views, we still can intend to cooperate. We do so because we have a general attitude of cooperativeness or because we find ourselves in a tit-for-tat situation and know that in the end we are better off with cooperation. So, liking (the affective aspect of affiliation), consensus (the cognitive aspect), and cooperativeness (the intentional aspect), should be dealt with separately.

In line with these separate considerations, my next hypothesis is that the stronger the cooperativeness, or the inclination to cooperate, the better the growth of knowledge. Because if we want to cooperate, we really exchange opinions, we hear what the other person says, and we learn from each other. Cooperativeness is also very important for the capability to coordinate because there are always problems with coordination. Time, resources, work pace, other obligations, whatever: if people want to cooperate, they are likely to surmount all the barriers, all the problems that are in the way.

Another hypothesis is that sympathy, the affective aspect of affiliation, is also good for knowledge growth. If I like a person, I am more inclined to reflect on what the person says. The opposite side is antipathy: characterizing the other as unfriendly or even hostile, which impedes knowledge growth.

Finally, the model includes a more complicated curvilinear effect, as shown at the top of Figure 4. It feels good if people think the same way, if we have high consensus, but if consensus is too strong we cannot learn very much from each other; that is the important lesson from Iivari Janis’ work on groupthink. On the other side, if we think very differently, we could learn a lot, but it is very difficult for us to understand each other. So I assume that the best condition for knowledge growth is to have a medium amount of consensus/dissensus (disjoint). That means we have consensus on some things but disagree on other things. Our research results support this idea, but as you can see, more weakly than other effects.

Can you link your model more specifically to open innovation?

Yes. I will begin with the idea that power is a potential that is to some degree present in any relationship. It can come from status, from position, from experience, from expertise, from norms. It can be legitimate, or not. The big question is how this potential is used. In developing my model I had the idea that promotive control furthers collaborative growth of knowledge, because if a leader or any other member of a team respects the others, then they are inclined to talk to each other, to hear what others have to say, and to have an intensive and open information exchange. Restrictive control impedes an open exchange. Those who restrict others do not want to learn from them, though they may use some obtained information to put through their own interests.

We found evidence to support these suppositions, as shown in Figure 5. Restrictive control has a negative correlation with knowledge growth and promotive control has a positive. And from our innovation studies, we could show that this is a causal relationship, because in the case studies we have sequences. Of course, it was not a longitudinal study, but the main direction of the effect was clear in several cases. In addition, restrictive control lowers, or at least does not raise, the capability to coordinate. Yet this is one of the most prominent justifications for so called ‘strong’ leadership. People say, “Das Gegenatsche muss sein Ende haben! Wir müssen entscheiden.” That’s a special German saying, it is rather Teutonic, but it basically means “The chatter has got to stop! We must decide.”

If you go to Sweden, you find a totally different idea. I once heard a manager from Siemens in Sweden talking to other German managers. He described decision-making in Sweden as being talk and talk and talk to seek consensus. If they don’t find consensus, they say, “Okay, next time,” and later they talk and talk some more. At that point a German manager said in disbelief, “Do they make a profit?” To which the Siemens’ manager said, “Well, yes - but I can’t really understand it!”

We all laughed, but this is an example of using power as promotive control. Restrictive control leads either to resistance and fighting or to antipathy. We don’t like people who use their power against us. Why should we? And so we are less involved. On the
other hand, we like people who respect our interests. That feeds the cooperative process I have described. Promotive control furthers an open exchange of information and opinions, whereas restrictive control impedes such an open exchange.

More complete development of the model can be found in a paper titled “Grundprobleme der Teamarbeit und ihre Bewältigung - Ein Kausalmodell” (Scholl, 2005), which is listed in the References. I do not have time today to give you details of other relationships studied, but basically:

- cooperativeness raises the probability of promotive control. If people are really inclined to cooperate, they are likely to use their power in a promotive way.
- if they do not want to cooperate, if they want to compete, restrictive control spoils all the useful, necessary processes of collaboration. It brings too much unnecessary dissent. It lowers sympathy; it lowers cooperativeness. I hope I have convinced you that these are very important things.

We also did an experiment comparing the use of promotive and restrictive control. It was not very complex, but it showed that teams under the promotive condition, on average, came nearer to the correct task solution than under restrictive control. This a direct bit of evidence that promotive control has better effects than restrictive control.

Most interestingly, the experiment showed that the more powerful persons in the restrictive control condition learned least from discussions, whereas the more powerful persons in the promotive control condition learned as much as the less powerful and less informed people (Scholl & Riedel, in press). There is a saying: “Power is the chance not to learn.” This is true only if power is used restrictively.

Figure 6: The developed model

Key Research Issue: The Need for Further Research on Dissent

I began by suggesting that collaboration is one of the key problems of innovation. The path model in Figure 6 shows how the intention for open communication (friendly, cooperative, and controversial) can positively affect knowledge growth and coordination capability. Looking at future research, more work could be done with longitudinal studies that can better test and establish the assumed causalities. Another interesting area for further research is on the use of dissensus, or dissent. The studies summarized here show that dissensus is good for knowledge growth but it may lower cooperativeness, stimulate restrictive control, stiffen dissensus, and lower effectiveness via both direct predictors. More research is needed to explore these complexities in groups working on innovative tasks.

Learning Resources


Challenge for Practice

All of the four studies reported here involved groups working on complex tasks. Though my intention was to build a causal model, I am also interested in the training implications of the findings I have reported. The question is whether you can train leaders, and indeed all participants in groups, for better collaboration. The question is whether even a person who does not tend to be cooperative could become more cooperative after such an intervention.

I think you can train people ... a little bit. But it is best to have leaders who have a lot of social competence already. In a sense, social competence means to be a promotive, cooperative person. Of course, sometimes it makes sense for the cooperative person to say, “I don’t want to cooperate with this guy. It’s of no use, he always gets into fights – and I don’t want fights. So just leave him out.” But in many other cases the recommendations found in Figure 7 are in accord with the research reported today.

Figure 7: Recommended intervention techniques in practice
Open Manufacturing

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We are delighted to hear your thoughts about open manufacturing, Professor Tseng.

First, I want to thank Frank Piller, Anne Huff, Kathrin Möslein, and Ralf Reichwald, who brought this interesting idea to me. Honestly, I have been working on manufacturing issues my entire career, and of course I have read about open innovation. But I had not connected these two areas until they invited me to discuss open manufacturing in this forum. I treasure very much the friendship and intellectual stimulation they have given me over the years.

As introduction to the new idea of open manufacturing I will start with Figure 1. Many professors use this chart, first presented by Michael Porter from Harvard Business School, to talk about manufacturing. There are so many components in manufacturing. We need inbound logistics, outbound logistics, “operations” (which for us primarily means manufacturing), technologies, human resources, IT infrastructures – we need all kinds of different capabilities. And then, in the end, hopefully, the manufacturer gets some margin when final goods are delivered.

If you want to open manufacturing, conceivably you have different players from inside or outside the firm doing or contributing to these elements, right? Many players have expertise at least with some aspects of the process outlined in Figure 1. Some have expertise with inbound processes, some with outbound. Some organize and deliver goods and services to end-users. This will be the frame of our discussion. We have to start by thinking of multiple players who have multiple talents and unique capabilities. One of the challenges is how to orchestrate them.

Conceptualizing open manufacturing requires thinking about coordinating interactions among multiple players with multiple talents.

But what is open manufacturing? Let us start with many companies in the Fortune 500 – companies like Nike, Cisco, and Liz Claiborne. What do they have in common? They all outsource manufacturing: they don’t do many manufacturing operations themselves.

A similar case is IBM. You probably know that most of the different peripherals and components of the many different computers they sell come from various suppliers around the world. Some of them are even assembled, tested, shipped, and serviced by suppliers.

Conceptually, then, we can see manufacturing as a network of nodes where value-added activities occur. Activity at these nodes can be done by whoever is the most capable in providing the results with the lowest cost. If entry barriers are relatively low, the possibility of participating in the network is determined by the economic value provided, i.e., the value of capabilities offered, instead of other factors such as relationships or alliances.

But, in my opinion, companies like Nike or IBM, which stand for the very large number of organizations that outsource many of the activities in Figure 1, are not involved in open manufacturing. Their supply chains engage a limited number of selected participants; they are moving toward what we might call open manufacturing, but they are not really open yet.

Can you give us a good example of open manufacturing?

I am happy to share with you an example that could be at the forefront of what I see as a coming sea change. It involves a group of companies, each of which consists of a small number of employees; most of them only have 5 to 10. These companies form ad hoc networks to pursue business opportunities. The opportunities can be an underserved niche market, or a customer base with desires that normally are not served. Together they have been called “Shanzhai Manufacturing” in China.

The term “Shanzhai” originated in a Chinese classic, Shui Hu Zhuan, commonly translated as Water Margin or Outlaws of the Marsh. The story is derived from events that happened in China around the 12th century. It portrays a collection of folklore legends about one hundred and eight men and women who band together on a marsh-girt mountain. They connect with the oppressed masses in small units. However, these seemingly independent groups are able to work together to become an outlaw army of thousands who fight bravely and resourcefully against well-equipped but heartless tyrants. Their stories have been a popular theme of story tellers and enjoyable readings directed at all ages in China for generations.

Before I tell you about Shanzhai manufacturing today, I have to tell you a few things about the Chinese market for cell phones. We have around 200 million people who can afford to buy Nokia, Sony Ericson, and similar phones, including some local brands. Yet, there are more than 1 billion people who need mobile

Figure 1: Manufacturing value chain

Mitchell Tseng
Figure 2: Shanzhai cell phones

The relationships that today's big cell phone brands rely on are simplified in Figure 3. These companies find market needs, do their own product development, verify requirements, get order commitments, and then turn around to arrange their supply chain and order fulfillment with a network of small companies.

Shanzhai manufacturing works in a very different way, as shown in Figure 4. First, they sell the phone before they manufacture it. The purchase includes the number of units, specifications, industrial designs (perhaps to look like model xyz of a certain brand), usage, displays, special applications, etc. Based on these inputs, similar products or prototypes may be shown to customers to ascertain their final selections.

Because the business is run with a very thin margin, everything has to be done with tight cost control. In particular, the small company in charge of the customer interface and doing the selling has to make the selection of other players – specifying who will be in charge of making the phone case, who will make the printed circuit board, where to buy other components, who will assemble, and so on. The company arranging the deal has to be responsible for quality, delivery, and overall cost control. All this is done very quickly. Normally customers expect delivery within weeks and final payment will not be made until products are delivered.

These companies are increasingly formidable competitors in the global cell phone market. They engage in a type of warfare.

Shanzhai manufacturers are small but formidable competitors that tightly control a limited amount of capital and work together to respond to firm customer orders.

What is the quality level of these phones?

Although they take a lot of shortcuts, at the end they have to deliver “good enough” quality. Typically, performance is quite reasonable. Most Shanzhai groups cannot afford to retain many kinds of expertise. Players rely on information about which companies are very good at making circuit boards, who writes good software, who is good at injection molding to make the outside case, where to find good batteries, speakers at a good price, and so on. Weaker players do not last long.
Is it just piracy? Are they efficient because they copy existing phones?

Customers often do specify products based on similarity to existing phones. When someone wants a phone their idea may be based on a Nokia Model 2100, but (since they can specify their needs and wants) customers often ask for a different color, perhaps they like some capabilities but do not care about others.

The Shanzhai are also motivated to cut less desired features to keep their costs down. This is not a personalized product. Shanzhai orders have to be large enough to justify costs. Another saving is that companies do not have to worry about long term customer relationships in the way that the big cell phone companies do. They walk away from untenable requests. They have to.

A key point, however, is that Shanzhai negotiation to reach a product is very different from what the name brands do – companies that normally take the position of “take it or leave it.” In some ways, Shanzhai are closer to customers than the big brands because they are more aware of demand.

**Do they advertise?**

They don’t have commercials. Branding is not that important for their consumer group. But obviously word-of-mouth is important among those who are consolidating demand and making commitments on orders. Don’t forget there are hundreds of players in China involved in the Shanzhai manufacturing of cell phones. Reputation matters. If companies are not doing good jobs, they are likely to be dropped from the next value chain, either as integrators or capability suppliers.

End users are concerned about value, but they are not interested in paying for brand names. Normally, companies do not provide after sale service on a Shanzhai manufactured phone. Since branding is not emphasized, and the configuration of players changes rapidly, service would be difficult to carry out anyway.

**How does innovation play out in this setting?**

That is a good question. For example, someone might come up with a solution for extending battery life, and it might be cheaper or last longer. Luckily the market for a new battery is not limited to a few big companies. There are a lot of small companies that are willing to try new components in order to be more competitive. An inventor is therefore more likely to find a buyer in the world I have just described.

It might be said that Shanzhai are closer to customers than big brands that offer products on a take it or leave it basis.

Interestingly, a key player in “normal manufacturing” is missing. Typically distributors of name brand phones buy a substantial number of a certain model, often thousands – the number depends on price and volume negotiation. These middle men are responsible for selling the units they purchase. If they cannot sell them in a reasonable period of time, they have to take a loss and sell them at fire sale prices. Shanzhai do not need these middle men because they do not start manufacturing until they know how many phones of a certain kind to produce.

Openness here means there is a lower entry barrier for a vast number of potential buyer-supplier relationships. These involve not only component suppliers but things like assembly.

**Do you have other examples of open manufacturing?**

Another case involves a company providing living space design. Many people who buy a house or an apartment want to hire an interior designer. Most designers are very creative, but many are not very good in implementation.

The innovator in this second case is working with interior designers but then turning around and lining up a bunch of component sources for curtains, lights, chairs, and so on. Customers can go to the middleman’s website and select what they want, working with an interior designer to decorate their house.

It is even possible to customize, and here is my third example of open manufacturing. For example, Frank has a very beautiful desk that is custom made. A customizer could just cut the wood for him and he could assemble it himself. Alternatively, the company could assemble it for him. In my case study the customer works with a designer provided by the customizing manufacturer who comes up with CAD drawings of desired furniture; these are then given to a satellite fabricator.

Another effort I just heard about is called builditwith.me. The focus of this company is on web development, but the “build” logic is very compatible with what I have been talking about. Their website says:

> Build It With Me is a tool that connects design & development entrepreneurs. It exists to make creating apps easier by connecting you with like-minded designers & developers with the same goal: create cool & useful apps.

Getting funding for your app idea is hard and often unrealistic. Most of the time you may just need to connect with a partner who has a skill set you lack to finish off your app. This is where Build It With Me comes in, connecting you to those people.

Skip the funding. Build It With Me will help you bootstrap your ideas into actual apps. (http://builditwith.me/about)

What is interesting about these examples is that they are based on very simple business ideas. The interior designers already exist. The companies that transform raw materials into products exist. There are many computer programmers. Entrepreneurs have always existed and are increasing in number around the world. What has happened recently is that new, open interfaces are becoming available to connect these players and then link them with much larger groups of customers than they could reach before.

Perhaps it is better to say that “more open” interfaces are becoming available. Few companies are targeting every user. They are targeting users who have specific capabilities. In my third case the designer has to use CAD software to create new solutions. Today there are more and more of users with these skills. The reason is that in the last few years it has become possible to access manufacturing platforms that allow people to directly realize new ideas that were much harder, if not impossible, to finalize in the past.

The underlying driver is important. It used to be that a big part of the cost of production was in fixed costs dominated by equipment and set up costs. Now economies of scale are changing. Flexible manufacturing equipment is becoming more available. It is more and more possible to charge the same amount of money to set up for 20,000 units as to set up for 200,000 – they cost the same. Let me use the analogy of a copy machine; now you don’t need to pay for the cost of typestes, stencils etc. The cost of printing the first copy is more or less the same as printing the thousandth copy. This is drastically different from what used to be.
Greater access to manufacturing platforms with enabling technologies reduce economies of scale and make open manufacturing increasingly feasible and attractive.

Perhaps the future role of manufacturing is to be a simple copy machine. If you can follow the manufacturers’ formats, you can create a product virtually, transmit the specifications, and then download to a machine to get the physical reality you desire.

Are you concluding with what we have long been able to do in a traditional craft shop, now computerized?

Not really, though there are some overlaps. In open innovation the discussion is primarily about 3 players:
- Who has the problem?
- Who provides the solutions?
- Who operates the market?

In open manufacturing, it is very similar. You have a vast number of customers who have needs to be fulfilled. There are vast numbers of manufacturers and suppliers who can provide solutions and then vast numbers of operators who are willing and eager to compete to operate the market.

The numbers involved point to one important difference between craft operation and open manufacturing. Further, the difference between open innovation and open manufacturing appears to be in the hierarchy of provider-customer relationships.

The hierarchy, vast choices, constraints of time, and limit on costs, may lead to mission impossible because of complexity. In the Shanzhai case, a common platform, a critical mass of players, and a very strong entrepreneurial spirit, quickly organize and reconfigure to overcome complexity and potential transaction costs to make it all work.

The key question seems to be who selects players. In true openness, we can imagine that almost anyone could be the coordinator of open manufacturing. Whoever I am, wherever I am, whatever role I played in the past, does not matter much if I have done a good job. What matters is that a critical mass of other players are convinced that I will bring the best value to the network. Therefore, if my capabilities are coordination and orchestrating, and I have ambition, someday I may become a market coordinator. This is a very interesting extension of what has been said earlier today about open leadership.

Open manufacturing offers successful participants the opportunity to coordinate, or lead, later offerings.

What does Open Manufacturing Require?

Let me quickly talk about three factors. First, somebody has to find a way to identify the product. Then, who will make what? Who will be responsible for what? Today, many markets are confused. We don’t know who makes what components or sometimes even who assembles what. What happens if my cell phone explodes? How do I trace it down? In order to facilitate accountability, there needs to be some means of tracking products, players, and other attributes of manufacturing such as time and place of activities.

For open manufacturing to move forward, I think we need systems to facilitate tracking. As a result, I am thinking more about RFID as an important element of open manufacturing.

We need a tracking system like RFID for open manufacturing to expand.

The second requirement of open manufacturing would seem to be some language about standards to help people communicate better, so just-introduced neighbors can understand each other. These standards include product specification, business protocols, and basic processes. They are not trivial. To specify a cell phone so that there are no misunderstandings among various players can be a monumental task.

Take the simple dress shirt I am wearing as an example of what standards involve. More than 1500 speciation points might be defined to manufacture such a shirt. People developing a new shirt are very likely to use some existing object, such as a model from a name brand manufacturer, as the starting point when getting their new design manufactured. With cell phones, one Shanzhai is likely to talk to another with a global brand model as a reference point. This often invokes some intellectual property rights issues. But if we want more open manufacturing, how can we facilitate talk about specifications, about delivery dates, about material costs?

Standards creating a common language among disparate players are needed to help open manufacturers quickly respond to market demands.

The third requirement has to do with platforms. Shanzhai companies rely on a common platform to facilitate participation. The platform manufacturer, Mediatek, sold more than 120 million chipsets with a “turnkey” total solution design guide and software for Shanzhai phones last year and the company makes a lot of money. Without that common ground, these phones would not have been made.

A common platform, like the cell phone chip set, lays the foundation for open manufacturing to work without substantial transaction costs.

Obviously no one company can pull all of these three requirements of open manufacturing together by itself, and this is one of the most important lessons from Shui Hu Zhuan. Like open innovation, open manufacturing is a collective effort. Both behave organically. Both involve self selection, self organizing, and self motivation without control and contracting. It is a very different framework than used by traditional manufacturing.
Open from whose perspective?

I hope I have prompted some researchers in the audience to think of new research topics. At the beginning of this talk I said big companies that outsource are only the beginning of open manufacturing. The question is how open does a company have to be to participate in this new way of operating?

I have been developing a definition that is a big change from today’s manufacturing. For example: No capable entities are excluded. If I want to play and I’m capable, you cannot kick me out. Everyone has a fair chance and will be treated fairly.

For companies, the issue may become more and more how to attract capable players into the value chain. One issue for research, then, involves when the selection (and de-selection) takes place. Second, who makes the decision—the coordinators or the market?

Open manufacturing offers opportunities to all capable entities, but how are they attracted and selected?

Then there are issues of market dynamics. Today as you all know, we can’t all sign on with the Deutsch Telecom network. If I brought in my Shanzhai phone they would say, who is this guy? And throw me out. So phone coverage, the size of the market for an open manufacturer, has to do with market forces and economic forces but also with political and regulatory agreements. These are very interesting issues. How far can I go as a manufacturer? Who decides what is fair?

Finally, I have suggested that the role of the market coordinator is becoming much more important. If the coordinator is not doing a good job, the customer is going to get out. If other players may get out. The market dynamics may not be easily understood. More research is needed on how the invisible hand in the market is played out as players in a node are selected, organized, coordinated, and then goods are delivered to a market.

The “coordinator” making these moves is playing a new role that is critical to the entire value chain in open manufacturing. What kind of function and responsibility do market coordinators need to be effective? How do they conduct transactions so that players feel they are treated fairly? How do they divide the profit with other players? I think there are a lot of interesting research questions about the emerging world of open manufacturing.

Open manufacturing also raises new questions about regulation, equity, and leadership.

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