



## Innovation Thrives Among German Firms, Though Hurdles Persist

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On the face of it, the idea that Germany could improve its capacity for innovation seems almost ludicrous. Germany is already the world's number-one exporter -- and few of those exports are anything but complex, high-value goods. The country already registers more patents per capita than any other nation. It spends as much on research per capita as anyone. In certain fields, particularly alternative energy, the country seems on track to gain global recognition as a center of innovation and excellence.

"It's absolutely certain that there is no other country with as many (global) market leaders as Germany," says Hermann Simon, chairman of Simon-Kucher & Partners, a global marketing and pricing consultancy headquartered in Bonn.

[Christian Terwiesch](#), a Wharton professor of operations and information management who grew up in Germany, agrees. "If you think about the auto industry, if you think about the chemical industries, if you think about ERP software, and more recently, if you think about alternative energy ... in most of these, Germany is actually cutting edge," he says.

In a way, it's not surprising. Like Japan, Germany has no other way to excel but through innovation. As Manfred Perlitz, a professor of international management at the University of Mannheim, puts it, Germany's only natural resource is rain. "At the end of the day, the German economy can only survive through innovation."

Yet, as global competition grows, Germany's tried-and-true formula of developing excellent products and then improving them relentlessly appears to be increasingly vulnerable. Critics point, first, to the fact that Germany largely missed the dawn of the digital age. With a few important exceptions, such as SAP, the information technology revolution was not a made-in-Germany boom, even as Taiwan and Korea grew into major technology powers. The Internet, too, was created largely abroad, not just through the work of such technology giants as the United States and Japan, but from places that were once economically obscure, such as Estonia (Skype) and Israel (Instant Messenger).

Knowledge@Wharton interviewed several German business innovation experts and professors at Wharton about the substantial promise of continued German innovation, and obstacles they perceive that stop it from becoming even better. The picture that emerges is of a country with many important advantages in terms of skills, geography and business culture. It is a tradition that remains strong and vibrant. Yet, there are areas of concern, particularly in how this rich inheritance fits with a changed world in which research and manufacturing are distributed all over the globe.

### A Tradition of Excellence

Historically, perhaps the most important driver of German innovation is its high standard of technical expertise. Since the middle ages, Germans have developed high standards of craftsmanship in many fields, a tradition that continues today. "It's an outstanding history of craftsmanship that I think is very important for innovation," Terwiesch says.

In Germany, workers in a number of industries still study as apprentices for three-and-a-half years, during which time they work three days a week and earn a modest salary, and then go to school the other two days. The workers who come out of this system, says Simon, are highly qualified. Nor does the technical



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focus stay only on the shop floor. Unlike the U.S., where the most ambitious engineers are often drawn into business school and later sent into general management, in Germany, engineering excellence alone is still the best way to get ahead, according to Terwiesch. Simon, who has written a book titled, *Hidden Champions of the 21st Century*, about 500 of the "world's best unknown companies," notes that half the CEOs on his list are engineers.

"The way you establish leadership in a German company is through deep domain expertise," Terwiesch notes. "I have family members who are still working in Germany. If I look at the way they have built their careers and the level of product knowledge they have, it's absolutely amazing. But you need it. You become an executive primarily because you know what you're doing."

Even at the very top of the company, he says, domain experts are still likely to be in charge. "You could take any board member from BMW and they could, by hand, take a car apart and put it together again," he says.

### **Stability First**

Respect for expertise leads to a high degree of loyalty between workers and their companies. Longevity at a company is seen as a key competitive advantage -- both for the company and for the worker.

Many people stay with the same company their whole career -- and in some communities, families will have worked for two or three generations with the same firm. "It's an emotional advantage of German workers that they can be even relatively assured that they won't lose their job," says Bernhard Wendeln, president of WEGA Support, the family investment company of the entrepreneurial families Wendeln and Kläne.

Since German workers tend to spend more time at a particular job than those in the UK or the U.S., they learn a great deal about their products. As a result of long years of experience, they develop deep expertise and a long-term focus on trying to do the right thing for the company.

Recalling a stint at BMW, Terwiesch remembers meeting many extremely skilled workers and being amazed at the depth of their product insights in the prototyping laboratory. Although they had not been to college, he says, they had an incredible amount of tacit knowledge about the product. "These people were bright like I had not seen before."

This effect may be even more profound in the *Mittelstand*, Germany's fabled midsize companies, the kind of publicly unknown but highly profitable firms profiled by Simon in his book about hidden champions.

Terwiesch agrees. "People working there, even people without academic degrees, get really outstanding expertise in metallurgy or some very specific detail of a technology. That creates deep knowledge and an enormous competitive advantage that has, over the ages, made the *Mittelstand* a very important part of the German economy and also a significant driver of innovation."

The roots lie deep in German culture, experts say. "It has to do with the German lifestyle and career patterns," suggests Terwiesch. "In the U.S., it's all about change. People change jobs all the time: They do a startup, it doesn't work, they do another start up, or they go work for a company. They're constantly moving. Germany, on the other hand, is a society that favors stability."

### **A Limiting Focus**

Some critics see risks in this inward focus, and argue that the kind of technical perfectionism that a corporate culture can instill sometimes results in economically unproductive activities. This includes solving problems that don't matter to customers or creating an economically inefficient level of vertical integration.

For example, some of Simon's hidden champions insist on manufacturing virtually everything themselves. Enercon, a leading wind power technology firm, makes 80% of its equipment in-house while other wind power companies make only 20% of their own equipment. "It's very different from the typical strategies of large corporations," Simon says.

Enercon succeeded despite this degree of obsession, but some critics have argued that being overly

focused on technical or product expertise can also blind a company to game-changing developments. One leading slide projector company noted by Simon in his book kept on making high-quality slide projectors even after digital projection began to take over the market. Eventually, customers slipped away, but the company did not evolve. It lost its market simply because it couldn't adapt to the digital era.

But that failure may be the exception, at least for small- and medium-sized German companies, which typically stay close to their customers and remain small and agile enough to respond to their changing demands. One reason for the outperformance of some *Mittelstand* companies is that they talk to their customers more often than do larger companies, where engineering sometimes goes on for its own sake, Perlitz says.

Although German executives are changing places more often now than in the past, the risk aversion of many talented German engineers and other professionals endures. Often, even the most promising young companies have difficulty recruiting capable engineers. Much of the country's best homegrown talent is locked inside the country's great corporations, leaving young companies hard-pressed to find qualified employees. This might not be the case in a different kind of business culture.

Demographics are also taking their toll, as more and more of the country's technologists retire. "If you do a body count, the country is losing a lot of engineers and scientists," says Terwiesch. "There's a big demand for highly qualified engineers that is currently unfilled, and German immigration laws are not making it easy to bring in people from the outside. Over the last 10 years, there has been an enormous demand for good scientists and engineers, way more than the universities can produce."

Even when working permits are not an issue, it is difficult to attract talent to Germany. Many of the graduates of the German section of Wharton's Lauder program, for example, don't end up working in Germany. The barrier? "My impression is that, in most cases, it's salary. The students feel they earn more in an American company, and most of my students stay in the United States after they have the Wharton degree," says Susanne Shields, director of the German culture and language program for Wharton's Lauder Institute. Some also shy away because they hear rumors about long days in the German branches of the biggest consulting companies.

Without sufficient homegrown talent and with limits on immigration, perhaps the only other option is outsourcing. In his positioning of Tata Consulting Services, Ananthanarayan Padmanabhan, director of central European operations, is careful to speak of his company, not as a firm that outsources jobs, but as a firm that is importing innovation -- a good spin, certainly, and given the shortage of engineering talent within Germany, probably more accurate.

Yet in spite of the shortages, Germany's high-priced engineers seem to be competing well in this brave new world of low-cost talent. One case in point: Although trade is often seen as a zero-sum game as far as labor is concerned, Germany's engineering *wunderkinder* are finding ways to profit from the new world order without losing their own advantage. Already, China and India have both proven an important market for Germany. For example, 40% of Tata's Nano -- the revolutionary \$2000 "people's car" -- is sourced from German parts, according to Simon. Nor do the contributions end with parts. Chinese factories may supply the world, he adds, but it's German companies that supply the Chinese factories.

## **Fear of Failure**

The hierarchical nature of German companies may be another barrier to innovation, at least in some rapidly changing industries. Compared to America, the German company tends to be much more hierarchical, says Shields. "The organization is very structured, which can be a good thing. But on the other hand, Germans are not very flexible so it takes a long time for new ideas to come through. There is no open door policy. They cannot just walk in and talk to the boss and say, 'This is what I observe and what I suggest...'"

German education, too, tends to favor knowledge over creativity, says Dietmar Grichnik, a professor of entrepreneurship at the WHU Otto Beisheim School of Management. "This hinders entrepreneurial activities later on."

Ultimately, perhaps, it's a fear of failure that may limit innovation most. According to Grichnik, the legal obstacles to starting a business are not too high in Germany. It's the social norms, he notes, that stop them

-- particularly the fear of failure. More than 50% of Germans polled say that fear of failure is a big reason they would not want to start their own company.

But slowly, things are changing, Grichnik adds. A few universities are now offering entrepreneurship courses. Some government agencies offer seed capital, which was once difficult to find. Students are also trying their luck at startups while they are still in the university, taking advantage of their school years as a low-risk time to start a business.

"It's a kind of chicken-and-egg problem," says Jurgen Hablicher, the head of venture capital fund Mountain Cleantech. "There haven't been enough successes that people can look to for inspiration, but without those examples, no one will try."

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