How Much Misery Does It Take to Innovate?

By Henrich Greve , INSEAD Professor of Entrepreneurship

High-tech, opportunity-driven innovation gets the headlines, but this is only one part of innovation as we know it.

When we think about innovations, we usually consider high technologies that change quickly because of research, and we consider them opportunities rather than threats. I wrote earlier about **mobile phones with curved screens**, which has now become possible as a result of improved technologies for screen displays. Nobody is sure how necessary they are, but if people like them they will be a big advantage for the two makers of such phones.

But the high-tech, opportunity-driven innovation is just one part of innovations. Other innovations arise from needs and from shortages. Consider nickel. This material is needed in order to make stainless steel, and its extraction is a decidedly low-tech affair that just breaks a lot of rock and uses a lot of energy. But when nickel prices increased to more than 5 times the original as a result of China's use of steel, anyone making or using steel were facing shortages and price increases.

The Wall Street Journal had an interesting article on how this led to a complete rethinking of how to get nickel. Instead of buying nickel from abroad that was extracted from scarce and high-grade nickel ore, steel producers in China started experimenting with a low-grade ore that has a mix of nickel and iron. Such ore is inefficient for producing pure nickel, but prices became high enough that even this material started to be profitable. And more importantly, steel makers don’t actually need pure nickel. Nickel mixed with iron is perfectly fine for them because they will be mixing the nickel into iron anyway. From this insight they started a gradual process of improving an initially inefficient (and high-polluting) process until it has reached efficiency and cleanliness that is high enough to actually push the nickel prices nearly as low as their beginning. What made the effort successful in the end was the realization that a different kind of furnace was used than the kind had originally seemed best.

This was an innovation born from a need and a shortage. The irony is that this new process could have been used much earlier, but no experimentation was made until the need grew serious. This is something I have written about before, and that has become an established part of our thinking about how firms behave. We do observe them thinking ahead, but there is also a lot of reactions to their experiences and their current needs. Along with Giovanni Gavetti, Dan Levinthal, and Willie Ocasio, I have written **a chapter summarizing much of the current thinking about how firms make changes**. The conclusion is pretty clear: It is well documented that firms respond to problems, which is the kind of innovation people don't think about so much. We know less about firms chasing opportunities, which is the kind of innovation people think about often. Wouldn't it be interesting to know whether this is because "responding to problems" happens more often, or because it is easier to discover?

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Gavetti, G., H.R. Greve, D.A. Levinthal, W. Ocasio. 2012. The Behavioral Theory of the Firm: Assessment and Prospects. Academy of Management Annals 6 1-40.

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