

# Borrowing Innovative Manufacturing Technologies from Other Industries

*White Paper*

## Introduction

Breakthrough innovations can sometimes come from unlikely sources. It may seem counter-intuitive, but recent examples in food manufacturing demonstrate how borrowing technology and solutions from other industries can oftentimes be the best way to unearth new discoveries.

### Meat Packing and Eggplant Skin

Henry Ford is often lauded as an American hero for dividing labor into small specialized tasks to maximize output and lower production costs. Many don't know that Philip Danforth Armour was the one who revolutionized assembly line and mass production techniques at his Armour and Swift meat packing plants in Chicago. Ford decided to use a moving assembly line to build cars only *after* he toured Armour's plants. The automotive industry led the way for modern manufacturing by borrowing techniques commonplace in the meat packing industry.



*photo credit: www.chestofbooks.com Courtesy of Armour & Co.*

Recently, PPG announced a new type of heat-deflecting coating technology for airplane exteriors. The paint allows solar heat to pass through topcoat pigments to a white primer coat that reflects heat. This keeps aircraft skin up to 25 degrees cooler, reducing cabin temperatures by 5 to 7 degrees and dramatically reducing air conditioning costs. The key innovation in this discovery? Mechanics borrowed from the biology and structure of eggplant skin!

### Borrowed Innovations

The concept of borrowing innovations from other industries is often described as the “diffusion of technology”. This societal trend is frequently studied – the propagation of mobile phones, the adoption of the internet, and the widespread use of nanoparticles are great examples of a diffusion of technology. However, diffusion is a naturally passive process often describing consumer behaviors. We need a new framework to describe the behavior of actively seeking technologies and intentionally borrowing them for new applications.

Professors Poetz, Franke, and Shreier from the Vienna University of Economics and Business and Copenhagen Business School published a study in the Harvard Business Review in 2014 which looked at this exact question. Specifically, they were investigating whether new innovations and ideas are more likely to come from within an industry, from a similar industry, or from an unrelated industry.

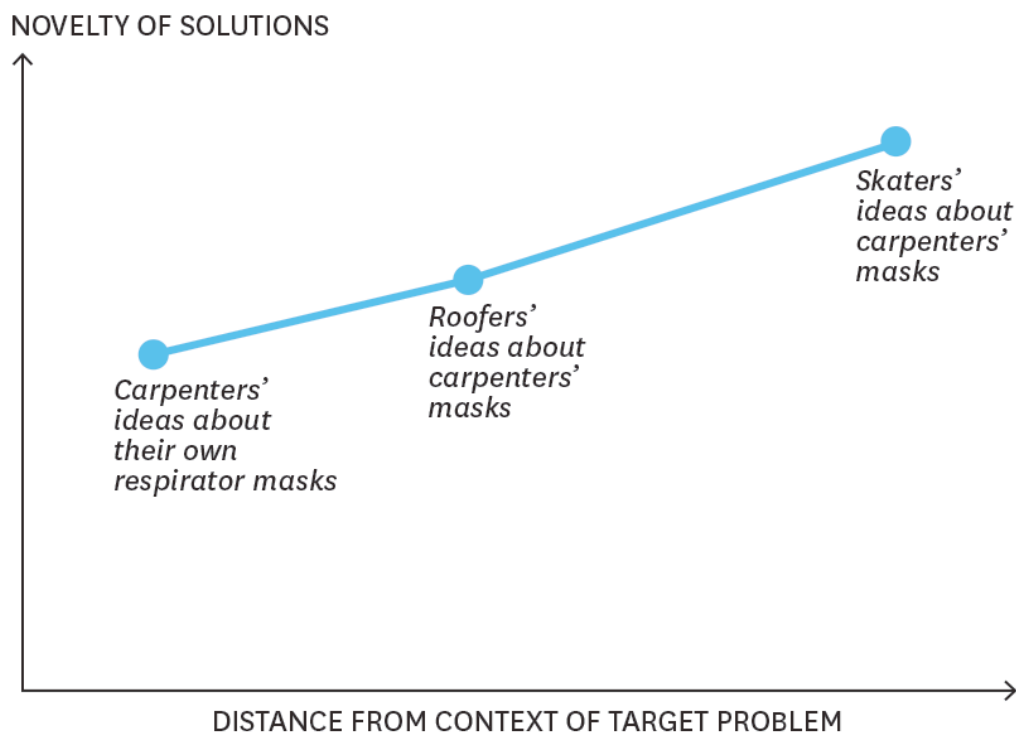
## Carpenters, Roofers, & Skaters

They recruited hundreds of roofers, carpenters, and inline skaters to contribute their insights to the problem of workers' reluctance to use safety gear because of discomfort. The professors conducted standardized interviews with the participants, presenting the problem of lack of safety-gear compliance as it pertains to each of the fields (essentially they asked how roofers' safety belts, carpenters' respirator masks, and skaters' knee pads could be redesigned to increase their comfort and use). Participants had a few minutes to suggest solutions and a panel of experts evaluated the suggestions on novelty and usefulness.

“Each group was significantly better at thinking of novel solutions for the other fields than for its own.”

- Poetz, Franke, & Shreier, Harvard Business Review 2014

People versed in analogous fields can draw on different pools of knowledge, and they're not mentally constrained by existing, “known” solutions to the problem in the target field. The greater the distance between the problem and the analogous field, the greater the novelty of solutions.



## Engaging Other Industries

Gathering insights from other industries is often difficult for managers. It requires assembling focus groups, calling experts, forming partnerships, or crowdsourcing. Luckily, the field of crowdsourcing or “open-innovation” has accelerated at a rapid pace in the last 10 years. Online platforms give a voice to individuals who were previously difficult to reach.

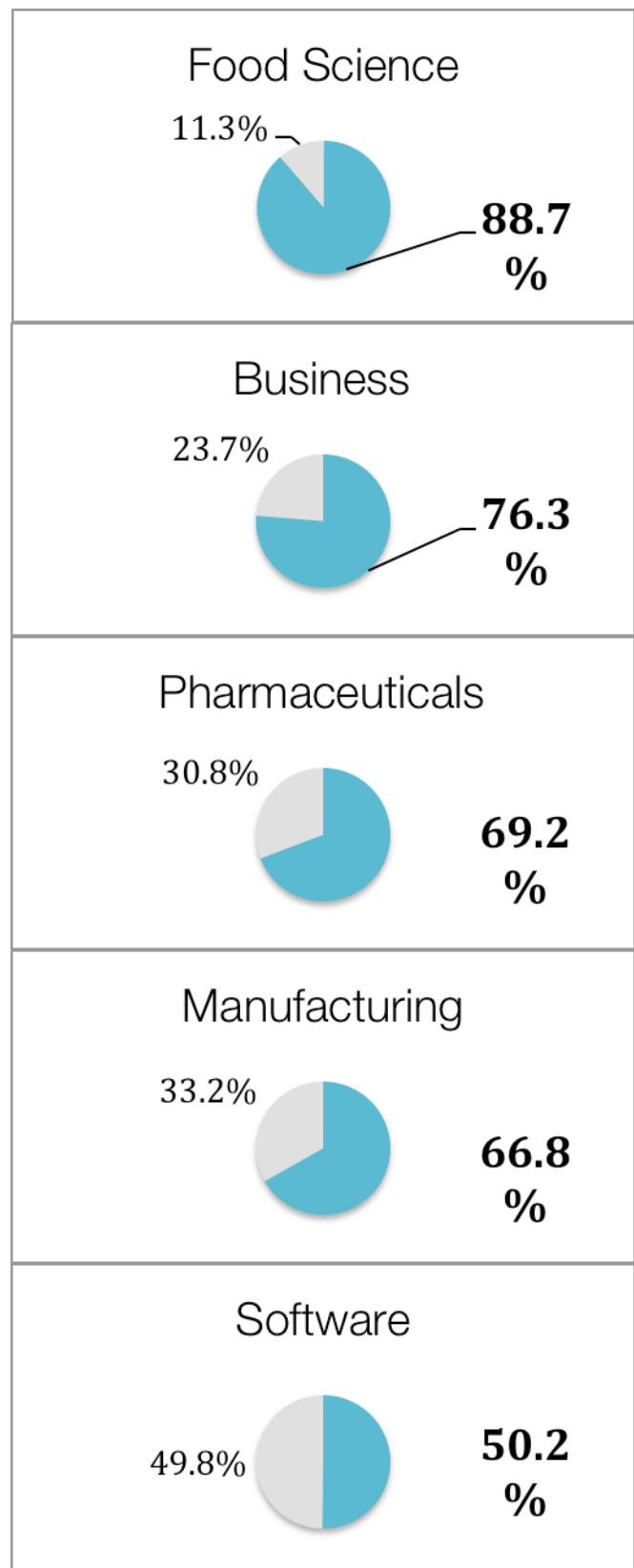
MindSumo is a unique online service, in that it focuses on the millennial demographic, and specifically university students. This group of young innovators approaches problems from the perspective of a curious academic not yet tainted by industry. Just like Poetz, Franke, and Shreier described, these individuals are not yet mentally constrained by existing, “known” solutions.

MindSumo has worked with nearly 500 companies to launch close to 1,000 projects called “challenges”. Since each challenge is a competition, dozens and sometimes hundreds of university students are competing for recognition and cash. On average a single project can generate 75-200 concepts in 30 days.

One interesting finding has been that the best solutions do not necessarily come from students who are studying the field associated with the project content. As MindSumo CEO Trent Hazy explains, “When we first started launching projects on MindSumo, we expected a strong correlation between a project’s subject matter and the academic discipline of the students who had the best solutions. However, we found that oftentimes the best solutions come from students that are studying a completely different field.”

## Challenge Winners from Academic Disciplines Unrelated to Challenge Topic

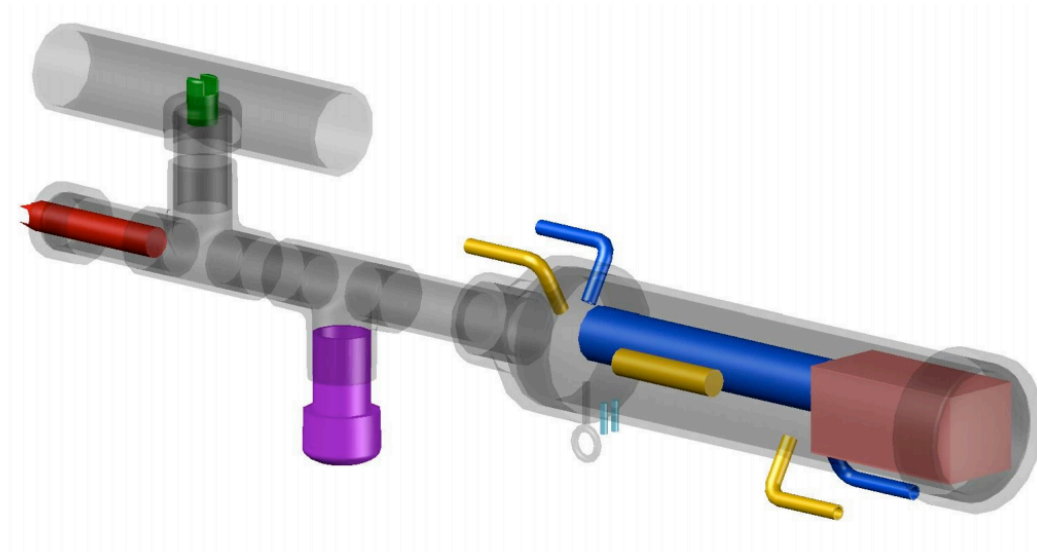
■ Unrelated ■ Related



## Sensors from Dishwashers

A recent challenge on MindSumo asked students to think of creative ways to remotely measure water quality continuously in a specific river location. Michael Sotiriou from Suffolk County Community College was able to use his familiarity with household appliances to come up with a creative solution. An excerpt from his solution reads:

“Since every modern dishwasher and laundry machine has a turbidity sensor, it would be cost effective to use these for this project. Since a turbidity sensor requires flow between its LED and photocell, the ideal placement would be along the side of the enclosure. This would ensure undisturbed flow for measuring both turbidity and temperature. To shield the sensor from the ambient light, it will be necessary to put a shroud over the sensor. This does not have to be more than a section of pipe with a hole in the middle to fit over the sensor. The pipe should be oriented such that ends are inline with the flow of water. To prevent light from reflecting in, the inlet/outlet inside area should be sprayed black to absorb stray light.”



Ken Durand, VP of Innovation at Ericsson, shared his perspective: “[Michael’s] solution suggested something in his design that no one had ever thought of in using washing machine sensor that tell whether clothes are dirty, which should help Riverkeepers know when and where to go look at the river... By engaging the MindSumo community, we gathered new ideas that we may never have considered on our own.”

## Applying Prosthetic Materials to Ice Cream

In another recent challenge on MindSumo, a student studying Biomedical Engineering at the University of Utah applied a unique material used for prosthetic limbs to an ice cream mould design for Unilever.



The student, Joseph, recounted his experience: “They gave us something that seemed almost impossible at first. I had to go to my knowledge of material sciences, I had to pull out a material we use for artificial muscles and prosthetics and apply that to food manufacturing. I can’t think of any other place where I would have had to make that jump or would have been able to.”

“Students have no preconceptions in any of the spaces that we’re looking” said Teresa Belmar, Director of Open Innovation, Refreshments at Unilever. “We are thinking of those people who can come up with solutions that are not mainstream. It’s very intriguing to see people taking a business or non-technical course and come up with something great.”



*photo credit: [www.iceco.it](http://www.iceco.it)*

## Conclusion

The evidence from Ford’s manufacturing line, PPG’s recent paint innovation, and the results from numerous MindSumo projects point to the same conclusion – borrowed innovation is here to stay, and should be embraced by those not just in food manufacturing, but across all industries. Looking to external communities for a fresh perspective can help eliminate the “known solutions” bias described by Poetz, Franke, and Sheier, and lead to new solutions that otherwise would remain undiscovered.

## About MindSumo

MindSumo helps organizations crowdsource innovative solutions from bright college students. Companies post challenges for MindSumo's community of 200,000 undergrads, masters, and PhDs to solve. Since 2012, the company has hosted nearly 1,000 challenges from companies like General Mills, Coca Cola, Kroger, Unilever, Kelloggs, and many others. We are backed by top tier investors, including Google Ventures, and work with over fifty Fortune 500 clients.

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