QUANTIFYING A CULTURE OF INNOVATION

A RIGOROUS, QUANTITATIVE ANALYSIS OF CORPORATE INNOVATION CULTURES

Is there a best way for companies to innovate successfully? Our research proves there is.

We asked Dylan Minor, Assistant Professor of Managerial Economics and Decision Sciences at Northwestern University's Kellogg School of Management, to analyze five years of data from 154 public companies that have used Spigit's idea management software to generate and evaluate business ideas. Collectively, these companies employ 3.5 million people. Because every element of the Spigit platform – from employee participation to idea selection – is measurable, we were able to conduct a detailed analysis of innovation practices at these companies.

Based on our learning, we see the opportunity to treat innovation as a science. As with a science, there is a core methodology and process that when put in place, followed, and optimized, yields measurable business results. Our analysis correlates success on these metrics with financial returns like growth in net income and profit.

Spigit takes common features of social networking platforms like Facebook to the next level: people can post ideas, vote, deliver or respond to feedback, and develop the ideas into innovations that make a difference

to the company. Innovation teams use the software to evaluate and track all ideas in the pipeline, from their original conception to the moment when the company commits to put the most promising ideas into practice. This method of innovation is called *crowdsourcing*.

We were surprised with what Professor Minor found by analyzing these crowdsourced innovation programs. Traditional business thinking around innovation focuses on distinctions between process innovation and product innovation, or between sustaining and disruptive innovations. In practice, we found these distinctions made little difference. Whether companies used the software for process innovation, new product ideas, or to identify efficiencies and cost savings, the patterns were similar. In a crowdsourced innovation program, one thing matters most: participation. The more people who actively participate, the more valuable ideas come out of the process.

Specifically, our research identified a metric that accurately reflects the level of activity in the crowdsourced innovation platform and predicts measurable results. This metric, which we call ideation rate, measures the productivity

of the program in winning ideas – that is, ideas accepted by management — per thousand active users. Our analysis showed that:

- **There is a significant correlation between ideation rate and growth in net profit.**

  Higher ideation rates and growth go together. While many variables affect growth, the correlation we observed between higher ideation and net profit growth is significant with a 99% level of confidence.

- **Four factors drive ideation rate.**

  These factors are scale (more participants), frequency (more ideation projects), engagement (more active participation), and diversity (participation from people in a variety of roles and departments). The higher a program ranked for these factors, the more successful it was at generating useful activities.

- **Innovation drivers are universal.**

  We saw the same patterns across multiple industries, from healthcare to manufacturing to telecom, and in both large and small companies.

- **Culture is at the root of innovation.**

  Innovative culture is the likely cause of both higher growth in profit and higher ideation rates. In a rapidly changing world, companies that foster innovation through a culture that celebrates, rather than squashes, new ideas are more likely to succeed.

What is innovation?

It's time to take a broader view of innovation.

The biggest, most visible innovations we all think about are new technologies – robots, rockets, self-driving cars, virtual reality, and artificial intelligence. But this view is too limiting.

Innovation happens every day, at all levels, inside all kinds of companies, not just technology companies. Innovation is the outcome of ideation – simply put – having an idea that solves a problem. That might be a big problem like reducing power-plant emissions – or a small problem, like taking too long to consistently solve customer service problems. So long as you have an idea that solves a problem, you are an innovator.

When you consider it this way, you recognize that innovation is a process that starts with people. According to Astro Teller, the executive in charge of the sister company of Google that is trying to solve humanity's biggest problems, "The process of being innovative as an

organization is a cultural thing; it's a habit." If the people within your company develop that habit – and if your culture includes a process to make their ideas into reality – then your company is innovative.

How can you measure a culture of innovation? Until now, no one could. According to McKinsey & Company, 84% of CEOs agree with the statement "Innovation is my top priority." But a survey by Accenture revealed that 66% of CEOs don't have a defined strategy for innovation.

Hundreds of companies now use idea management software to surface, track, and develop ideas in an effort to drive a culture innovation. Through the practice of ideation and use of this software, they're tapping into the collective intelligence of many people rather than a few. The reality is, innovation is happening everywhere inside your company – you can instrument it, measure it, and actually take steps to improve it through ideation.

Crowdsourcing: The Innovation Pipeline

Business processes that once were ruled by emotions are now subject to analytic discipline. For example, marketing is now a science where you can measure which tactics and channels are working and optimize them. The same is true of sales pipelines for companies using sales platforms like Salesforce and Oracle Sales Cloud.

Like marketing and sales, innovation can now be viewed as a pipeline. Properly managed, raw ideas move through stages: ideation, development, prioritization, evaluation, and

implementation. Put software in place to manage that process and you can measure how your company innovates.

This is where the principles of social media apply. Social networks like Facebook enable people to post ideas, comment, and vote on or "like" what they see. They create engagement and passion by connecting people with content. Within companies, tools like Slack and Salesforce Chatter tap into the same dynamic, allowing coworkers to create and collaborate electronically from any device.

Apply those principles to the discipline of innovation and you get

crowdsourcing. With an idea management platform that supports crowdsourcing, like Spigit, people post ideas, usually in response to a challenge like "Find ways to operate faster" or "Develop products for the small business market." Ideas come not just from specialized R&D departments, but from all over the company. And every employee has the power to comment on those ideas, suggest improvements or limitations, vote on or rank them, and

recommend them to management. The software automatically surfaces the ideas that generate the most passion, discussion, and votes, so managers can recommend them for further study or implementation. Crowdsourcing takes a pipeline approach to idea development. And crucially, because the software tracks all the ideas, managers can evaluate the health of a company's innovation program just as they might analyze the efficiency of a sales pipeline.

What we learned from watching companies innovate

As the company behind the most widely adopted idea management platform, we're in a position to see patterns in innovation across companies. To do this, we aggregated anonymized data from 154 companies — with an aggregate workforce of over 3.5 million people – using Spigit's idea management platform over a five-year period. The resulting data set and our analysis of it is a comprehensive quantitative study of corporate innovation. For each quarter that any of these companies used the platform, we analyzed over 40 variables including the number of ideation challenges created, the number of participants registered in the platform, and the level of participation of the employees through comments

and voting, and the number of approved and rejected ideas. We combined this with public financial data about the firms: number of employees, valuations, net income, and profitability.

We started with two questions: Can you measure how ideation contributes to innovation? Does mass ideation drive business results?

One metric emerged from this analysis: the *ideation rate*. We define the ideation rate with this formula:

$$\textbf{IDEATION RATE} = \frac{\text{winning ideas}}{\text{active users}} \times 1000$$

The ideation rate for a given company in a given quarter is the number of winning ideas per thousand active users. What do we mean by a winning idea? A winning idea starts when an employee suggests ideas in response to a time-bound challenge – and ideation challenge with a clearly defined ending time – from management to solve a specific business problem. It then develops

as other employees review, comment on, and vote on it. Finally, it becomes a winning idea when management selects it for further study and potential implementation. In this formula, active users refers to the number of employee participants who viewed, voted on, suggested, or commented on ideas during that quarter.

Ideation rate correlates with growth in both profit and net income

We identified ideation rate as a key parameter by analyzing how it correlates with key publicly reported financial data over the time period we were analyzing, between 2014 and 2016. We found a significant relationship between ideation rate and growth in profit or net income: companies with more ideation tended to have higher growth (see Figure below). While many factors affect growth, the relationship here is significant: **you would expect to see this level of correlation only 1% of the time by random chance.**

For example, the company with the highest ideation rate in our sample, a large healthcare company with a highly active ideation program, generated 500 winning ideas per thousand active users and saw 6% growth in net profit over two years. And the highest-growth company among our customers, a semiconductor company, had ideation that generated 340 winning ideas per thousand active users. By contrast, about half of the companies that had ideation rates lower than 100 winning ideas per thousand active users actually had

negative growth. Growing companies need ideas, and companies that generate lots of good ideas tend to have profitable growth.

Correlation is not causation. We cannot show that higher ideation rates directly cause net income growth. It's more likely that both ideation rate and net income growth are a result of a third factor: an innovation-friendly culture. If this is true, it means that a culture welcoming to innovation boosts employee participation in innovation challenges, generates more actionable ideas, and then implements those ideas in a way that generates profitable growth. It also means that the ideation rate is an effective measure of a culture of innovation. By measuring and optimizing the ideation rate over time, executives can now manage a previously intangible phenomenon – a culture of innovation.

Delving deeper into our data set, we identified four factors that drive the ideation rate higher: scale, frequency, engagement, and diversity.

2 Year Net Profit Growth by Accepted Ideas per 1k Users
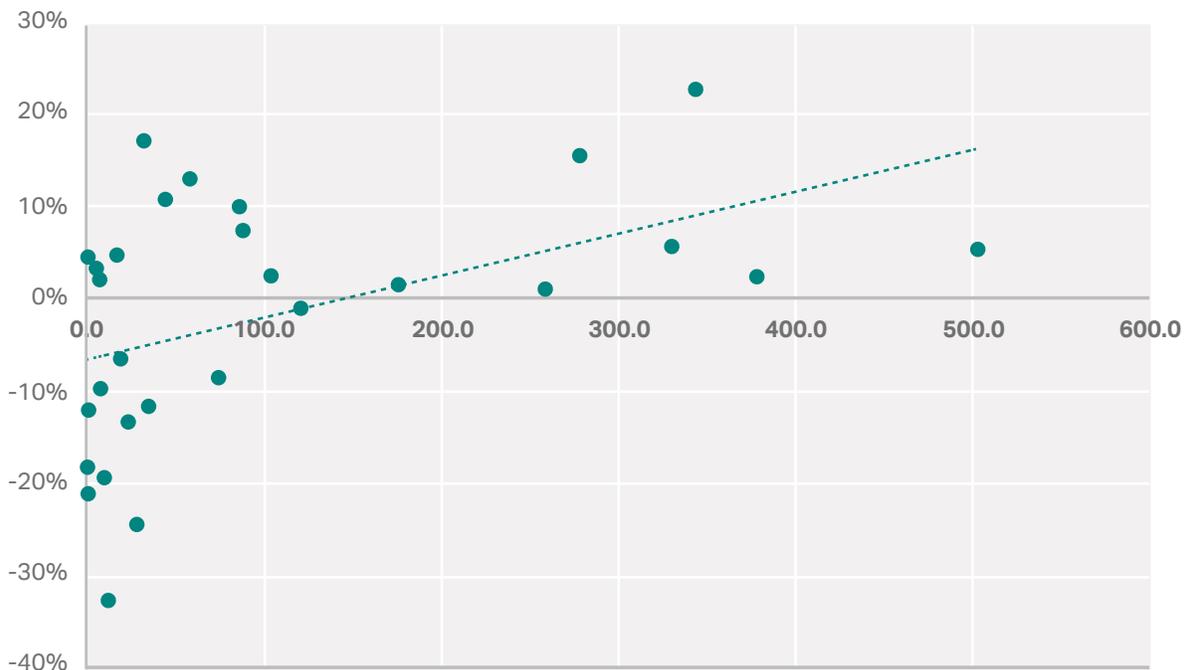
Scale: Higher participation means more ideation

Every social community has a critical mass – the level at which interactions sustain themselves and are productive. This is one reason why scale is crucial in innovation challenges. Crowdsourcing generates more ideas than any small group, no matter how innovative; the more people in a company who participate, the more actionable ideas that result. In fact, for each 20 additional participants in the platform, there are on average five additional ideas suggested and one additional winning idea. We found:

QUARTERLY IDEATION RATE BY ACTIVE USERS
(Outpatient Care Facility)

- The companies with the top 10 ideation rates, which is based on winning ideas, averaged 5,286 active users annually. For example, at one company, an outpatient care facility, as the number of active users rose from 200 to 1400, the ideation rate increased from 10 per thousand active users to more than 140 (see Figure on right).

- Among the top ten companies, 22% of employees across the company participate – vote on, comment on, and share ideas – in innovation challenges. Coming up with ideas in these types of companies is just a part of their business practice.
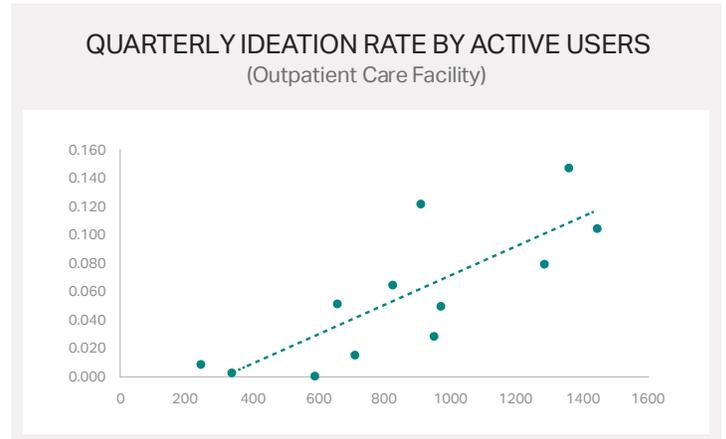
Scale: A Case Study

AT&T has a healthy innovation pipeline: more than half of its employees – 160,000 workers – participate in its institutional innovation program, which is called TIP (The Innovation Pipeline). The program has generated over 40,000 ideas of which hundreds were incubated and spun out for implementation. The company credits 75 patents to the program. Employees present the top 10 ideas for each challenge directly to executives. For example, DriveMode, a first-of-its kind app that silences incoming calls and texts to combat distracted driving, was an idea from a frontline call center worker, Shavonne Nelson, who experienced a personal tragedy due to texting and driving. Today every call to AT&T ends with "don't text and drive." Other revenue-generating ideas included overseas phone-and-data packages that don't require a year-long contract, and Numbersync, a product that allows customers to use one phone number across multiple devices.

"I think it's great that AT&T is listening to their employees. I don't have the tech background on how to make an app work, but I had the vision and the company not just listened to me but heard me."

Shavonne Nelson, Front-line CSR, Detroit AT&T Call Center

Frequency: More frequent challenges generate more ideas

Based on our data, one ironclad rule of innovation is that the more ideas you generate, the more *usable* ideas result. Quantity is at least as important as quality in generating ideation activity. That's why managers in companies with high ideation rates tend to run a lot of challenges in which they ask employees for ideas around particular problems. They also typically have one or more "always-on" ideation communities. We saw that:

- Winning ideas rose in direct proportion to generated ideas. At the companies with top ideation rates, it was typical to accept one out every four ideas generated (see figure on right).

- More challenges generate more useful ideas. The top two companies in the data set in ideation rate – a healthcare and a technology company – averaged 104 challenges every year. The next eight averaged 24 challenges per year. By comparison, averaged over all companies that have been using Spigit for several years with mature innovation programs, the average number of challenges per year is 18. We also observed that the companies with the weakest ideation rate averaged only one or two challenges a year.

Accepted Ideas by Ideas Created
(All Top Ideators by Quater)
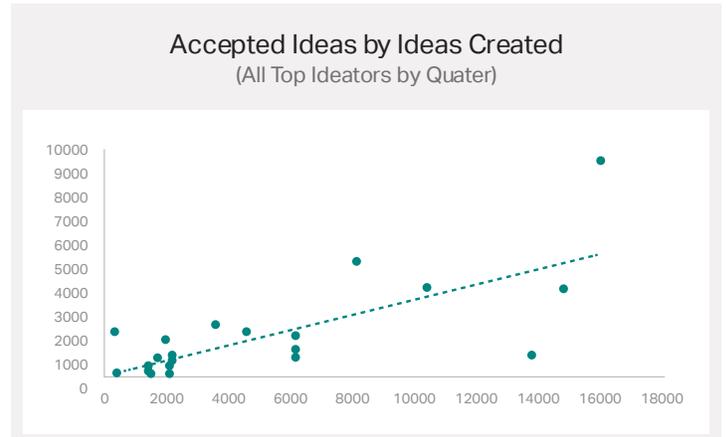
Frequency: A Case Study

UnitedHealth Group is the largest health insurer in the US with 260,000 employees. Innovation is one of the five founding culture points of the business and enjoys CEO-level sponsorship.

This company uses ideation challenges and communities all the time to solve problems large and small across the business, with more than 200 challenges a year around continuous improvement, technology, customer experience, and product development. Ideation is a core part of management decision-making, generating both disruptive and incremental improvements. The frequency of challenges creates an innovation program that's consistently focused on innovative problem-solving even in a large, regulated business.

For example, in UHG's technology development program, all employees must run an innovation challenge – they must involve others rather than just coming up with all the ideas themselves. A recent challenge there focused on the use of drones in healthcare. With suggestions from other employees in the ideation community, even ideas that start with "science fair" thinking mature into implementable innovations.

"Spigit empowers the crowd, and that has been a secret weapon for us."

Dakota Crow, Director IRD, Entrepreneur in Residence, UnitedHealth Group

# Engagement: More user interactions makes for healthy ideation

A healthy ideation community, like any online social community, works well when participants can contribute in diverse ways. Not everyone is suited to creating ideas; others contribute by commenting, voting, or building on others' ideas. The simplest way to measure the engagement rate is through activity, the average number of total votes per user in any given quarter across all the different voting and ranking features that Spigit uses. We learned that:

● **Higher engagement means more ideas.**

The average engagement rate is 5 votes per active user. Our analysis found that on average, doubling that rate will result in an additional winning idea per quarter.

● **The top companies have triple the engagement.**

The ten companies with the greatest level of ideation generated more than 10 votes per active user every quarter. In those with low levels of ideation, there were less than 4 votes per active user (see Figure on right).

Voting Rates of Top and Bottom Ideators

	Value
Top 10 Ideators	10.31
Bottom 10 Ideators	3.43
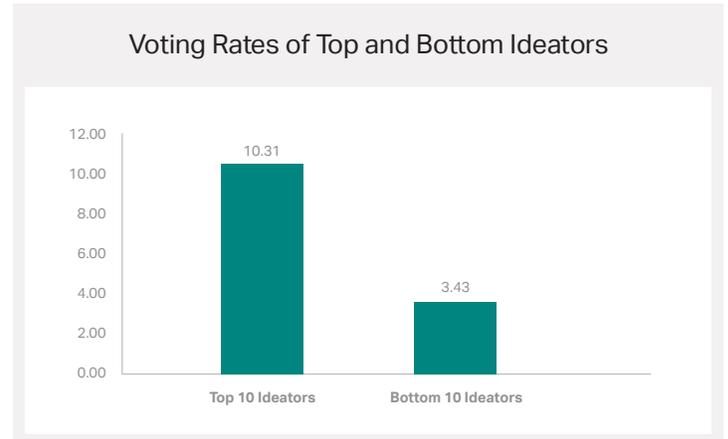
Case Study: Engagement

At Pfizer, one of the world's largest pharmaceutical companies, the employee base of 77,000 employees represents a wealth of industry knowledge and passion to solve problems. Until they implemented a Spigit-based idea community called Dare to Try, there was no way to turn all this talent loose on company-wide problems. Working together, employees have not only created new therapies for deadly infections, new antibodies for lupus and high cholesterol, and targeted cancer therapies, they have also solved business problems, like finding ways to amplify and simplify patient communications, reducing costs in this area by costs by 20%.

"Everyone has a creative bone within them . . . we really encourage colleagues within all aspects of the business to bring forth that creativity, to have that bravery to tell us their ideas."

John Klick, Senior Manager of Worldwide Innovation, Pfizer

Diversity: Go broad and deep for innovation to generate better ideas

You might expect that the most productive ideation community would be full of engineers or other technical or creative problem-solvers. You'd be wrong. A successful pipeline needs contributions from all over the organization, especially staff who are close to the front lines: sales staff, support workers, or people in close touch with the company's manufacturing processes, for example. The easiest way to measure this effect is by looking at *idea concentration* – the number of ideas suggested per thousand active users.

Examining this metric further, we found that higher idea concentration – ideas from a small group of people – has a negative effect on a company's ability to create a culture of innovation over time.

Going a layer deeper, we found that:

Quarterly Accepted Ideas by Idea Concentration
(Top 10 Ideators by Quarter)
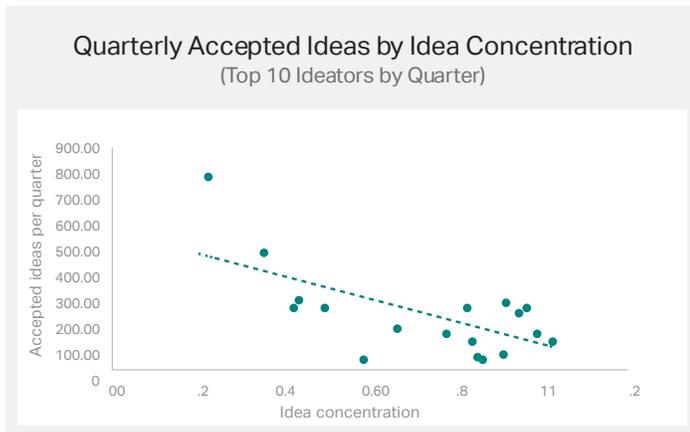
- **Successful companies have participation from all parts of the business.**

  Companies who engage employees from all parts of the business in ideation projects decrease their idea concentration, which increases the number of ideas accepted. Idea concentration is 3x lower for top performing companies in our study.

- **There is a significant correlation between ideation rate and growth in net profit.**

  Higher ideation rates and growth go together. While many variables affect growth, the correlation we observed between higher ideation and net profit growth is significant with a 99% level of confidence.
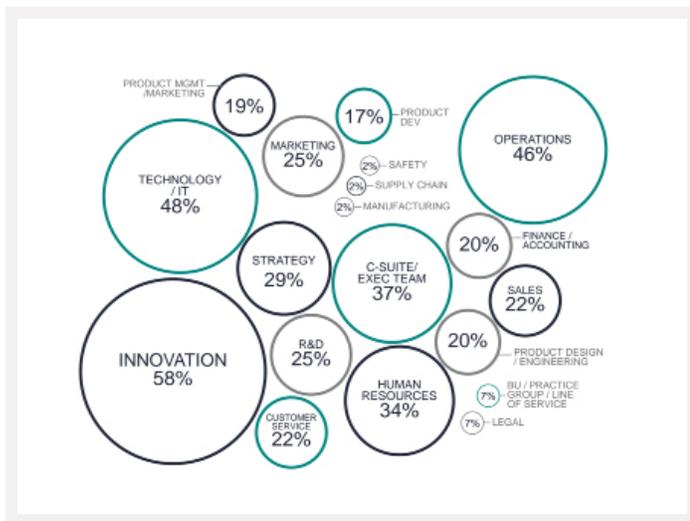
- **Successful companies ideate in many different areas of the business.**

  While many challenges arise from or are sponsored by the innovation department or team, successful companies also run challenges and create idea communities across the business in order to solve problems large and small. Spigit customers run innovation challenges in diverse parts of their businesses (see Figure on left – percentages in each bubble indicate percent of customers running challenges in that area).

Case Study: Diversity

EDF Energy is one of the UK's largest electricity and gas utilities, employing over 13,000 people. It launched a challenge to improve the company's focus on the customer and the connected home. Employees from all across the company generated hundreds of ideas; the innovation lab selected ten for review by company executives. One winning idea came from a call center worker in the customer complaints division. Customers would often call to complain about electricity costs that had suddenly spiked, not realizing that new appliances they had purchased were responsible. The call center worker's idea was an app that would help consumers evaluate appliances when purchasing, so they could understand and estimate electricity costs before buying.

"We had a spectrum of people . . . a real mix of employees with a real mix of ideas who had come forward to present [ideas] to us."

Shetal Edwards, Head of Innovation Partnerships, EDF Energy

# These rules are universal across industries and company sizes

Innovation varies greatly across industries. For example, healthcare companies using Spigit software average 70 winning ideas per 1000 active users, compared to only 21 winning ideas for telecom companies (see Figure below). But the same patterns apply across all these industries: profit growth is higher when ideation rate is higher, and lower when ideation rate is lower (see Figure). Similarly, in both large and small companies, what drives ideation rates higher are the same variables: scale, frequency, engagement and diversity.
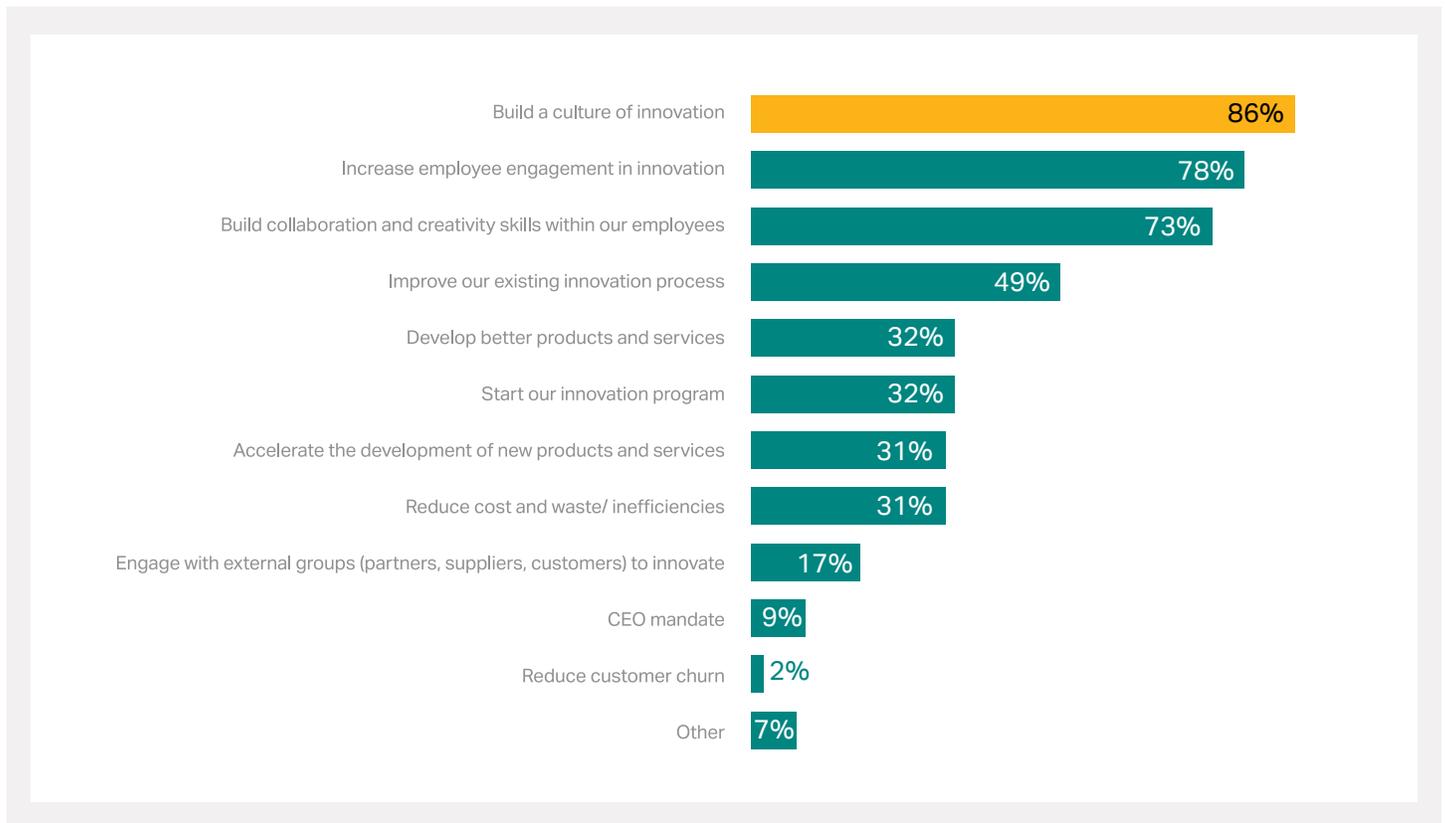
Benchmark Ideation Rate by Industry

Ideation Rate and Net Profit Growth by Industry
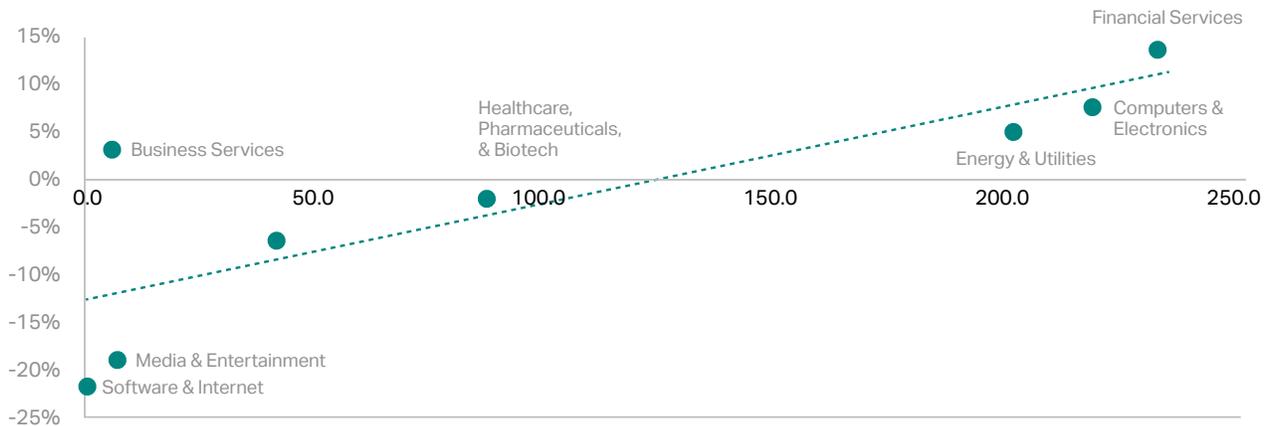
Creating an innovation culture

We surveyed all the managers using Spigit idea management software, including the public companies analyzed earlier and other companies as well. Data from over 500 respondents showed that 86% had chosen to implement an ideation program to build a culture of innovation. Similarly, 78% were hoping to increase employee engagement in innovation and 73% to build collaboration and creativity skills in their employee base (see Figure below).

Build a culture of innovation	86%
Increase employee engagement in innovation	78%
Build collaboration and creativity skills within our employees	73%
Improve our existing innovation process	49%
Develop better products and services	32%
Start our innovation program	32%
Accelerate the development of new products and services	31%
Reduce cost and waste/ inefficiencies	31%
Engage with external groups (partners, suppliers, customers) to innovate	17%
CEO mandate	9%
Reduce customer churn	2%
Other	7%

These companies recognize that innovation is an imperative that extends well beyond the imaginations of venture capitalists in Silicon Valley. The most successful innovators using our software included companies in the insurance, construction, and manufacturing industries. They ranged in size from 400,000 employees down to 4,000. What they shared was a commitment to a culture of innovation.

An innovation culture is not one that puts technology on a pedestal, but one that has made innovation a systematic and measurable part of each employee's workday.

At these companies, **innovation is not a once-a-year moonshot project, it is a business discipline.** And it applies not just to huge billion-dollar ideas, but also to solving problems of all sizes. Companies with an innovation culture recognize that contributions can be new products, improved processes, cost savings, or ways to reach new markets. But what matters is that the **employees who are closest to the problems – those that interact with customers and processes – are often those most able to see where it's possible to make valuable improvements.**

Crucially, these companies do not limit innovation to a small team of creative people. Our research shows that **concentrating innovation is less effective than inviting everyone to participate.** Often employees outside of a particular business area can solve problems in that area, because they can see solutions that are not visible from inside the problem.

Finally, an innovation culture is not one where everyone contributes ideas, because some people are simply not comfortable creating ideas. But all those employees can contribute effectively by suggesting improvements and voting. This feedback is crucial for

turning raw concepts into winning ideas, and its multiplier effect creates a cultural sense of participation that extends to a much broader swath of the workforce.

For these elements of the culture to thrive, **companies must run many challenges and involve many employees**. Senior managers must not only tell employees how they are committed to innovation, they must prove it by selecting the best ideas for implementation, recognizing those who suggested them, and publicizing the results. These actions will ensure that the workforce sees innovation as part of what they do, not just what senior managers talk about.

"The democratization of innovation is how we future fit our organization. We need every employee to be curious, to understand customer needs and develop creative confidence. The culture of innovation touches all areas of our business and all employees."

Tiziana Bianco, General Manager, Innovation Labs, Commonwealth Bank of Australia

The cost of a failure to innovate

Innovation culture isn't free. Employees who spend time participating in innovation programs are taking time away from other tasks. So why bother?

Because the pace of innovation in every industry is relentless.

Disruption is sweeping across the industrial world. Media companies like newspapers and TV networks have had to adapt to rapidly spreading digital consumption behaviors that undermined their business models. Index fund investors have obsoleted much of the investment and mutual funds industry. Retailers are closing stores in droves as business moves online. The consumer electronics business has imploded as margins on items like TVs have shrunk and products like stereos and DVD players have become obsolete.

Is your business next?

Regardless of what you do, somebody else is figuring out how to do it faster, more conveniently, more cheaply, or with cheaper labor and automation.

An innovative culture is the only way to stay ahead of these changes. Your workers have the knowledge of what's working and what's not in the showroom, on the factory floor, and on the phone with clients. Individually, they may not have the solutions to the problems you face. But harnessed collectively, they're the only force that can keep you competitive in a world of rapid change.

"The enterprise that does not innovate ages and declines. And in a period of rapid change such as the present, the decline will be fast."

Peter Drucker

Methodology

Spigit requested that Dylan Minor, assistant professor at the Kellogg School of Management, study data from a panel of 154 firms over 5 years to understand how innovation and financial outcomes might be related, as well as to identify any factors found to help increase innovation. Spigit supplied all innovation outputs and inputs based on the data from its platform that its executives identified as most likely to matter in practice. However, the executives did not specify ahead of time which factors would matter most; that was determined statistically.

To explore these factors, Prof. Minor's primary analysis involved estimating a random effects linear panel model. That is, each firm was assumed to have an idiosyncratic effect on outcomes across time. In particular, we specified:

$$Y_{it} = \beta X_{it} + \alpha + u_{it} + \varepsilon_{it}$$

Where Y_{it} was our outcome of interest, X_{it} was our input factor of interest, α was an intercept, u_{it} was our firm-specific effect, and ε_{it} was a standard error term. Input factors also included industry and firm size, for which we used number of employees as a proxy. In general, standard errors were clustered at the firm level.

For financial outcome models, Prof. Minor used a linear OLS model, collapsing the panel to a cross-section consisting of average panel values over time. Financial outcomes were available as a cross section outcome for the final year of analysis. Financial variables were provided by Hoover's INC. Robust standard errors were also used for the OLS models.

The general approach of analysis was to first analyze the entire set of potential factor variables. When the metaset yielded some potential important variables, based on statistical significance, smaller sets of analyses were examined to determine under which situations the factors mattered. Several factors persisted through multiple analyses and are provided in this document as helping to explain innovation outcomes. Similarly, we found innovation output, as measured by ideation rate, correlated with increases in profitability and net income.

About Dr. Dylan Minor, Assistant Professor of Managerial Economics & Decision Sciences, Northwestern University's Kellogg School of Management

Dr. Minor started professionally in the field of investment management. After a number of years at Morgan Stanley and then Wells Fargo, he decided to start his own private wealth management firm, which still operates today. All the while, Dr. Minor became increasingly interested and involved in investment research. He soon started investigating Socially Responsible Investing, intrigued by the challenge of integrating financial and ethical choices. This led to his desire to acquire greater tools for such analysis, which soon meant completing a PhD program at UC Berkeley. Through his process of becoming an economist, Dr. Minor became interested in the question of how to integrate financial and ethical choices more generally beyond simply investment decisions. Now at Kellogg, he researches and teaches in this growing field more generally dubbed Business & Society.