

# DIGITAL TRANSFORMATION REVIEW

N° 08 OCTOBER 2015

The New Innovation Paradigm for the Digital Age:  
Faster, Cheaper and Open





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## The New Innovation Paradigm for the Digital Age: Faster, Cheaper and Open

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# New Innovation Models for the Digital Age

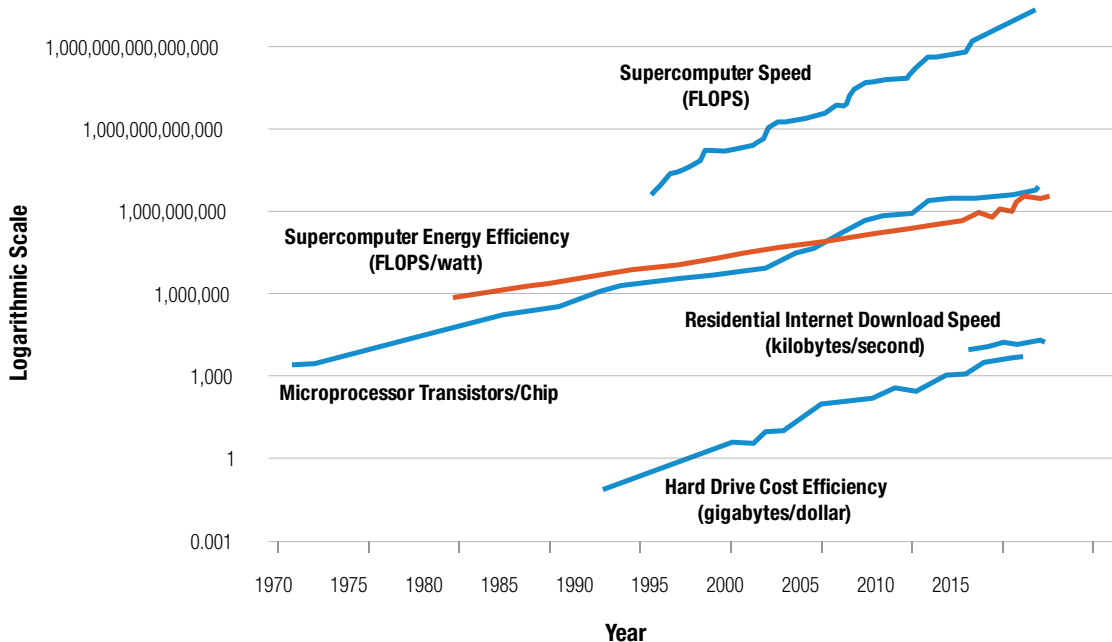
Introduction By Capgemini Consulting’s Editorial Board

One word characterizes our digital era: innovation. Creating a startup has never been easier and cheaper. In our interview with Jon Nordmark, CEO of startup curator Iterate Studio, he argues that “the cost of developing a digital startup has fallen from approximately \$5 million in 2000 to \$5,000 as of 2013.” And this has led to an explosion in the number of startups – a Cambrian age of digital – with Jon Nordmark’s team having identified more than 130,000 active tech startups across the world. And this figure is growing every day.

This fertile environment is fuelled by technology innovation that continues to evolve at an exponential pace (see Figure 1). Take supercomputers – in 20 years, the speed of the fastest supercomputer has increased by an astonishing factor of 419,100<sup>i</sup>. Personal computers are now 99.9% cheaper than in 1980<sup>ii</sup>. Technology’s inexorable march will continue to be a highly significant business disruptor for many years to come<sup>iii</sup>.

In response, companies are investing more in research. R&D spend is reaching historical highs: in 2014, \$1.6 trillion was spent on R&D globally. However, simply throwing money at the issue is not always the right answer, and it is certainly not sustainable. Despite these significant investments, results are often falling short. In certain sectors, more than 85% of new products fail<sup>iv</sup> and 90% of companies consider that they are too slow to market and often over budget<sup>v</sup>.

Figure 1: The Many Dimensions of Moore’s Law



Source: “The second machine age” – Andrew McAfee and Erik Brynjolfsson, 2014

In this edition of the Digital Transformation Review, we examine how organizations can create a sustainable and successful innovation strategy, drawing on our global panel of industry executives and academics (see Figure 2). We focus on four key themes:

- Which digital innovations should be on organizations' radar screens?
- How should companies promote innovation and embed it into their culture?
- What lessons can we draw from organizations that are stand-out innovators?
- What is the role and impact of innovation centers, including the Capgemini Consulting-Altimeter Group report, "The Innovation Game: Why and How Businesses are Investing in Innovation Centers".

## The Digital Innovation Radar Screen

**Adding intelligence to Machines.** We open the Review with **Michael Osborne**, an associate professor at the University of Oxford, and an established expert on machine learning. Professor Osborne explains why this digital innovation wave is very different from previous ones, with technologies now increasingly substituting for human brain labor or human cognitive work.

**When Bots Strike.** Among the very first companies to have made robotics a household name is Rethink Robotics, the makers of Roomba, the robotic vacuum cleaner. While household robots may be a while away, collaborative robots are becoming increasingly common on the industrial shopfloor. And Rethink is the

company that makes two of the most popular industrial robots – Baxter and Sawyer. We spoke to **Jim Lawton**, Chief Product and Marketing Officer of Rethink Robotics to understand Rethink's views of the future evolution of collaborative robots.

**Digital Innovations – Our Top Picks.** Did you know that there is a shoe that grows to adapt to the increasing shoe-size of an adolescent? Or that there is a company that promises to reduce your power bill through smart sensors and software, which does not charge you for doing so? Large companies, startups and individuals are increasingly pushing the limits of digital innovation. We capture a select set of innovations across products, services and business models to inspire you to drive your own organization's innovation efforts.

Figure 2: Guest Contributors to the Digital Transformation Review N° 08



## Promoting and Embedding Innovation

### **Frugal Living: How ‘Jugaad’ Innovation Can Help You.**

Innovation need not always be expensive or long-drawn out, says [Navi Radjou](#), a Fellow at Judge Business School, University of Cambridge and an innovation advisor based in Silicon Valley. Navi Radjou, co-author of the books *Frugal Innovation* and *Jugaad Innovation*, argues that the mainstream innovation model adopted by most large organizations is broken. The answer, Navi believes, is frugal innovation, or *Jugaad*.

### **Starting Up: Working with Startup Curators to Accelerate Innovation.**

It is a daunting task to create, in large organizations, the innovation culture that characterizes startups. To address this issue, we spoke to [Jon Nordmark](#), co-founder of *Iterate Studio*. This is a company that discovers and curates startups’ disruptive technologies for large companies. *Iterate Studio* works with thousands of startups and helps large enterprises conduct rapid proof-of-concept experiments to quantify the impact on their business.

### **Innovating Through Data: How Open Data Can Help Drive Innovation.**

Open data is data that anyone can access, use and share. And leveraging open data for innovation is precisely what a variety of startups and large organizations alike are doing. At the forefront of enabling this innovation is the Open Data Institute (ODI). The organization works to catalyze open data to create economic, environmental, and social value. The institute convenes experts to collaborate, incubate, nurture and mentor new ideas, and promote innovation. We spoke with [Gavin Starks](#), CEO of the ODI.

### **The Innovation Oscars: Lessons from the Pioneers**

We look at three companies from three different sectors, and analyze their approaches to innovation – SAP, Telefónica and BBVA.

### **Innovating the Business Model: SAP’s Self-Disruption Approach.**

One of the biggest challenges for large organizations is overcoming reticence to change. [Claus von Riegen](#), Vice President and Head of Business Model Innovation at SAP, outlines how organizations have a “corporate immune system”

that often kicks in and opposes innovations. This is because the organization is currently set up to protect and optimize the current business model. He outlines how SAP does things very differently.

### **Innovating from Inside: The Telefónica Way.**

For many large organizations, the answers to innovation challenges are already present inside the company. However, identifying and supporting those employees that hold the key to innovation is a bridge too far for many organizations. We spoke with [Pablo Rodriguez](#), Director of Innovation at Telefónica to understand how Telefónica solves this challenge.

### **Networked Innovation: How Capital One Innovates using a Network of Innovation Centers.**

Startups usually thrive in recognized tech clusters across the world, such as Silicon Valley, London, Israel and Boston. For large organizations, getting innovation right is often a question of being in the right spot, and getting the right talent in place. One approach to doing so is setting up a network of innovation centers, which is just what Capital One, the financial services company did. We spoke to [James Patterson](#), Head of Capital One Labs.



## The Innovation Game: Why and How Businesses are Investing in Innovation Centers

We close this eighth edition of the Digital Transformation Review with a [joint-research study from Capgemini Consulting and Altimeter Group](#) on why businesses are investing in innovation centers and

how they are doing so. Analyzing over 300 innovation centers across 200 large organizations globally, we found that innovation is no longer confined to the top few tech hubs. In fact, a number of cities across the globe are emerging as innovation destinations. We also draw on the views of innovation heads at a range of large organizations to understand what it takes to get an innovation center right.

As we noted at the beginning of our introduction, massive investment in innovation does not necessarily lead to massive value. In fact, innovation often remains a frustrating and dispiriting pursuit in many large companies. We hope this edition of the Digital Transformation Review is a helpful guide to making innovation a satisfying endeavor at your organization. Please do contact us if you would like to discuss any of these issues further.

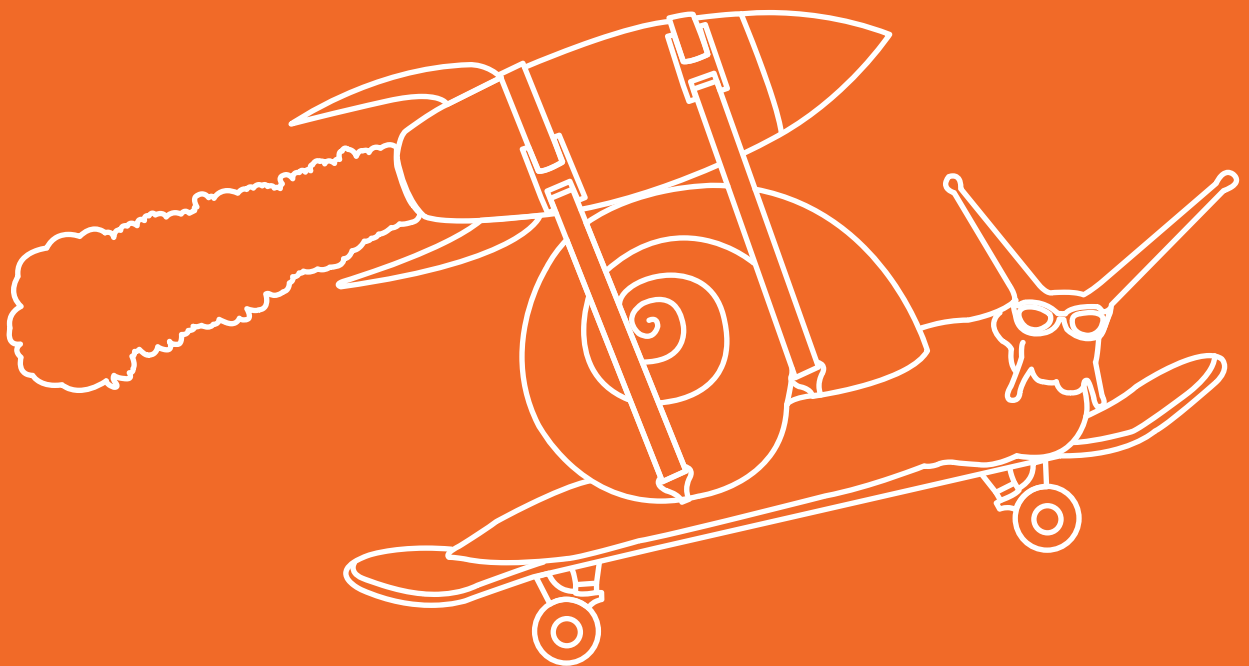
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- i Inside HPC, How to Measure a Supercomputer's Speed?, 7<sup>th</sup> August 2015
  - ii Bloomberg, "Six things technology has made insanely cheap", 5th February 2015
  - iii HBR Press, Leading Digital, October 2014
  - iv Nielsen, "How to flip 85% misses to 85% hits: Lessons from the Nielsen Breakthrough Innovation Project", June 2014
  - v Oracle, "Understanding the Best Approaches and Tools to Manage the Complexity of Innovation", 2013

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# The Digital Innovation Radar Screen





# The New Innovation Wave: Machine Learning and AI



## Michael A Osborne

*Associate professor at the  
University of Oxford*

**M**ichael A Osborne is an associate professor at the University of Oxford. He co-leads the Machine Learning Research Group, a sub-group of the Robotics Research Group in the Department of Engineering Science. Professor Osborne designs intelligent algorithms capable of making sense of complex data through the usage of techniques such as Machine Learning and Computational Statistics. His work in data analytics has been successfully applied in fields as diverse as astrostatistics, labor economics, and sensor networks. Professor Osborne is also the co-author of the widely publicized research “The Future of Employment: How susceptible are jobs to computerisation?” with fellow Oxford academic Carl Benedikt Frey. They concluded in the paper that about 47% of total US employment was at risk of being automatable. Capgemini Consulting spoke with Professor Osborne to understand Machine Learning and its impact on the business world.

**Your latest research with Professor Carl Benedikt Frey and Citi on innovation shows that throughout history powerful interests have hindered innovation. Is history repeating itself?**

History might be repeating itself. Technological progress has always created significant disruptions that powerful interests tried to combat to maintain the status quo. In Ancient Rome, the great author, Pliny the Elder, records the story of an inventor who discovered a way to manufacture glass that was unbreakable. Hoping to receive a reward, the inventor presented his invention to Roman Emperor Tiberius. Unfortunately for the inventor, Tiberius had him sentenced to death, fearing the loss of jobs and creative destruction due to the new technology.

The various innovation waves in history have led to dramatic upheavals in society but we have never seen large-scale technological unemployment. For example, at the beginning of the 20th century in the U.S., about 40% of our employment was engaged in agriculture, whereas at the end of the 20th century, it was less than 2%. There was quite a seismic change in the makeup of employment due to technology. However, none of these changes

actually affected unemployment much; the unemployment rate was about 5% at the beginning of the 20th century and was still 5% at the end of the 20th century.

**Roman Emperor Tiberius, had [an inventor] sentenced to death, fearing the loss of jobs and creative destruction.**

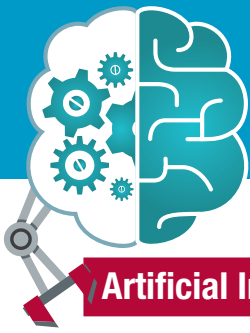
**Is the current digital innovation wave different from the previous innovation waves?**

Yes, in the past technology has largely just substituted the human muscle, whereas now technologies can increasingly substitute human brain labor or human cognitive work. If machines can substitute for cognitive labor, as they have done in the past for physical labor, it's not very clear to what extent there might be any demand remaining for human labor. Another thing that is different this time is the accelerating rate of technological change. It is undeniable that we really are making quite dramatic leaps forwards in designing intelligent algorithms that might be able to substitute for human workers.

**Can you give us your definition of machine learning and artificial intelligence?**

Machine learning is a subset of artificial intelligence (AI) and can be defined as the study of algorithms that can learn and act. It's about the reproduction of some of the most quintessential human characteristics. The boundaries between all these different fields are not very clear. However, you might associate computer vision, language processing and speech recognition as other subsets of artificial intelligence.

**In the past technology has largely just substituted the human muscle, whereas now technologies can increasingly substitute human cognitive work.**



# Making Machines Learn

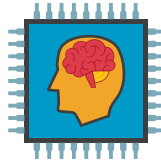
## Artificial Intelligence and Machine Learning

### What is machine learning?



- A subset of artificial intelligence (AI).
- Study of algorithms that can learn and act.
- It aims to reproduce some of the most quintessential human characteristics.

### How big is machine learning?



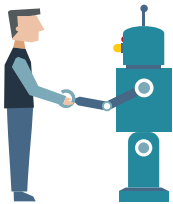
Research on AI constitutes approximately **10%** of all computer science research today<sup>1</sup>.

### How hot is machine learning?



Venture capitalists have invested over **\$300 million** in AI startups in 2014, a **twentyfold** increase from 2010<sup>2</sup>.

## Working with machines

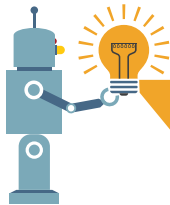


**“We need to equip the next generation of workers with the necessary skills that they will need for an economy that is increasingly automated”.**

- Michael A Osborne



At the same time, organizations need to **protect** themselves **from desking** – loss of human skills due to intrusion of automation in occupations.



No heavy investments needed – a wealth of open-source, state-of-the-art algorithms already available, it costs very little to reproduce an amazing algorithm and it benefits everyone.

<sup>1</sup>Machine Intelligence Research Institute, “How Big is the Field of Artificial Intelligence?”

<sup>2</sup>Bloomberg QuickTake, “Artificial Intelligence”, July 2015

### Could you give us some examples of current applications of artificial intelligence and machine learning in business or non-business environments?

A great example of this is the retail business, where ‘recommendation engines’ are being used extensively. Take Amazon as example. It recommends products to millions of customers on the basis of historic data. Algorithms can process data, characterize the spending patterns of millions of customers, identify latent trends and patterns, and identify clusters and communities for recommendation.

Self-driving cars are another application where machine learning is really playing quite a pivotal role. Cars today have sensors, onboard computing and safety systems, and use intelligent algorithms to render themselves autonomous. These algorithms observe how you drive using the onboard sensors and quietly learn to travel from the current to desired positions on the basis of this data.

Speech recognition is one key application of machine learning. Voice recognition software, such as Apple’s Siri, has been driven by advances in machine learning. Deep learning is becoming a mainstream technology for

speech recognition and has successfully replaced traditional algorithms for speech recognition at an increasingly large scale. Historically, people were trying to induce speech recognition by recognizing speech features like words and phrases. But recently, algorithm designers have turned to massive data that has become available for characterizing human speech. If this trend continues, we are likely to continue to move from the 95% accuracy rate that we’re able to achieve on our mobile devices today to nearly 99%. This would probably make these speech recognition techniques completely widespread.

**Machine learning is a subset of artificial intelligence (AI) and can be defined as the study of algorithms that can learn and act.**

**You mentioned ‘deep learning’. Can you shed some light on this concept?**

“Deep learning” is the new big trend in machine learning. It promises general, powerful, and fast machine learning, moving

us one step closer to artificial intelligence. Deep learning is a set of techniques, inspired by biological neural networks, for teaching machines to find patterns and classify massive amounts of data. It tackles crisp and well-defined problems, such as classifying images as to whether they contain a car or a book, for example. It’s worth noting that deep learning is still not well-understood, or provably robust, and that it is likely unsuitable for safety-critical applications.

### What are the most promising opportunities for both AI and machine learning?

In our recent paper, “The Future of Employment”, Frey and I have identified occupations that we thought were the most susceptible to automation. These are the kind of jobs that would be most easily automated within the near future using machine learning techniques. The model predicts that most workers in transportation and logistics occupations, together with the bulk of office and administrative support workers, and labor in production occupations, are at risk. I think that in all these kinds of areas, there will be an ever-increasing degree of automation using machine learning algorithms.

**More or less anything that does not require one of the three bottlenecks – i.e. creativity, social intelligence and the requirement to manipulate complex objects in an unstructured environment – will be potentially automatable.**

More or less anything that does not require one of the three bottlenecks – i.e. creativity, social intelligence and the requirement to manipulate complex objects in an unstructured environment – will be potentially automatable in the near future. When self-driving cars become a reality, there is going to be an enormous economic impact for taxi and truck drivers. In the near term, self-driving technologies are going to have an impact in the automation of professions, such as forklift drivers, agricultural vehicle drivers, or mining vehicle drivers.

**Are there sectors where you see a lot of potential for machine learning?**

The retail sector, for example, offers tremendous opportunities. We have seen restaurants deploying tablets on tables. These tablets can be used to take orders from customers. They can also recommend customers a set of dessert options tailored to what customers might want based on what they have ordered previously. A customer might even have a profile that's built up over multiple desserts in the same restaurant or even a family of restaurants using the same software. So, you might get to the point at which this tablet can instantly know, as soon as you walk through a door, what your usual order is, and expedite the ordering of it.

Even in the traditional mall, the customer movement around the store can be closely monitored, indicating customer interest in products. The change here is that these intelligent algorithms can become more personalized and gather a lot more data about us as individuals. Therefore, they can make recommendations to us that are more directly targeted at what we want and what the store might actually want to promote.

**Can individual companies invest in artificial intelligence?**

The wonderful thing is that you don't necessarily need to be developing novel artificial intelligence techniques and machine learning algorithms to benefit from the state-of-the-art. It's relatively low cost, an individual corporation can just hire a data scientist or a machine learning PhD. There is this wealth of open-source state-of-the-art algorithms already out that could be immediately deployed to applications. So, the bottleneck is really not investment, it's talent. The challenge is just attracting people with the right skills.

**There is this wealth of open-source state-of-the-art algorithms already out that could be immediately deployed to applications.**



### What are the risks for a company investing in AI or machine learning?

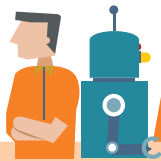
If you rush too fast and hard into automation, there are skills that will be irrevocably lost to organizations. In his book, “The Glass Cage: Automation and Us”, Nicholas Carr explains how automation can separate us from reality and deskill us. One example that is particularly evocative is that of an airline pilot. Carr plausibly makes the case that pilots’ increasing reliance on automated flying reduces their own ability to actually fly a plane in any direct way. The case of airplane navigators is also very interesting – those who have not lost their jobs have been deskilled; more and more of their job is being

handed over to an algorithm. As a result, when something unforeseen happens, when there is a kind of an unexpected event, the algorithm becomes useless, and humans take over, they won’t necessarily have the same degree of understanding and skills that they might have had before the automation. We can argue that there have been catastrophes because of a human skill being lost owing to the intrusion of automation in that occupation. I think this is a real risk for many businesses; automation of labor might result in the loss of softer skills that weren’t necessarily quantifiable but are yet essential.

Automation of labor might result in the loss of softer skills that weren’t necessarily quantifiable but are yet essential.

What would you recommend to CEOs of large organizations regarding machine learning and artificial intelligence?

We really need to develop in-house expertise in these techniques because, fundamentally, the increasing availability of data across a wide range of different industries is going to be



## Occupations vs. Automation



Carl Benedikt Frey and Michael A. Osborne studied 702 detailed occupations to estimate the probability of computerization



About **47%** of total US employment was found to be at risk of computerization

**21% of US** employment and **24% of UK** employment is **highly creative**, involved in areas such as development of novel ideas

Creativity is a hindrance to automation – creative skills cannot be readily replaced by machines

As a result, **86% of US workers** in the highly creative category are **at low or no risk of automation**; the equivalent number for the **UK is 87%**

transformational. If your business is not in the forefront of using this data, there certainly will be another business. The potential value that could be realized is going to develop into a real competitive advantage. I think companies need to be doing a lot more to recruit and hold on to talent such as data scientists and machine learning experts.

#### What are some of the ethics issues that we will face with machine learning or AI?

The big problem here – and one that the machine learning community is spending a lot of time on – is privacy.

Our objective is to have systems that could be verifiably shown to not intrude upon someone's private space. Ideally, you would have an algorithm that would process, for example, medical health records without ever returning to the users of that algorithm any personal details. These algorithms look at this dataset and return aggregate statistics useful to researchers without ever returning to those people, the details of any individual patient. This relies upon the robustness of the algorithm.

Value is delivered to us as customers or as consumers. Let's make sure that all this wealth that is created is distributed in a fair way throughout society at large.

#### How can governments and regulators try to mitigate the adverse effects of machine learning?

I feel the most imminent concern is the effect of machine learning technologies upon employment. People have rightly recommended that these technological events would necessitate the change of education. I think we need to equip the next generation of workers with the necessary skills that they will need for an economy that is increasingly automated. Governments do have a role in investing in the technological research. There are profound challenges here in getting governments to select the right type of technological development.

#### Is there an argument to slow down the progress of machine learning?

I don't think there is. An important thing to note is that all these technologies will be delivering enormous value to society. We have seen in the last 10 years the delivery of amazing technologies. Even the smartphone in your pocket, for example, has a range of apps that would have been unthinkable even 10 years ago. My point is that value is delivered to us as customers or as consumers. Let's make sure that all this wealth that is created is distributed in a fair way throughout society at large. Moreover, the wonderful thing about the technology is that it has very low marginal cost of reproduction. So, at the point that you develop an amazing new speech recognition algorithm, it costs very little to deploy that algorithm on everybody's mobile phone. Everybody benefits from the introduction of those techniques as customers and as consumers. The problem is that some people necessarily will be put out of work by these technologies. I think there is a challenge to make sure that there are jobs created to replace those that are eliminated by new technologies.

# CREATING A CULTURE OF INNOVATION

*“Innovation can’t be done in an isolated way, on an island. The only way innovation can take up firm ground is when it has CEO-level support. There needs to be a requirement coming from the CEO that business units must work together seamlessly.”*

*– Jon Nordmark*

*“I believe relying on one or two programs to create an innovation culture can only have limited results. It has to be a combination of efforts led from the top.”*

*– Pablo Rodriguez*

*“I think changing the culture of the company is absolutely critical. Our research shows that it takes approximately 8–10 years for a company to make the complete transition, which is a long journey. But, companies like Renault have proven that if you can patiently execute the strategy over 10 years, you can become a leader in the space.”*

*– Navi Radjou*

*“At Capital One, innovation is not just for one team, but for the whole company. We have a strong culture of long-term investments in innovation [...] our businesses and the Labs share the same understanding of what innovation truly means.”*

*– James Patterson*

*“The intrapreneurship program is the right channel for out-of-the-box ideas: innovations that would not be considered part of our current product portfolio development.”*

*– Claus von Riegen*



## Rise of the Machine: Forging Ahead with Robots



### Jim Lawton

*Chief Product and Marketing  
Officer, Rethink Robotics*

**R**ethink Robotics was co-founded by Rodney Brooks, the inventor of the popular robotic vacuum cleaner Roomba. Rethink is focused on developing robots that provide manufacturers with the benefits of automation, but without the need to enclose the robots in cages and tied to only one job. The company has, to-date, launched two collaborative robots called Baxter and Sawyer. Jim Lawton is the Chief Product and Marketing Officer of Rethink Robotics. Prior to Rethink Robotics, he was an executive at Dun & Bradstreet. Previously, Jim Lawton had served as Vice President of Marketing for Open Ratings (acquired by D&B), where he transformed a 5-year-old internet company into an aggressive SaaS provider. Capgemini Consulting spoke to Jim to understand his view of where robots are headed and their impact.

### What are the drivers behind the rise of collaborative robots?

Agility and flexibility are the two key factors that have been driving the emergence of collaborative robots. Manufacturers increasingly need to maintain the flexibility and the agility that they get with manual labor, and robots haven't been up to that task so far. Today, I may be standing in front of a sheet metal press brake, and, tomorrow, I will be putting circuit boards into an in-circuit tester. This is the kind of agility and flexibility that manufacturers need and that has been missing. Most industrial robots at automotive factories, for example, perform welding and are typically placed in cages. These robots take a couple of hundred hours or more to program and are then dismantled at the end of the product line. Units like that are difficult to deploy for a particular task and lack flexibility.

Agility and flexibility are the two key factors that have been driving the emergence of collaborative robots.

What has really been at the heart of the creation of this new kind of collaborative robot is to think differently about what could be done with robots. The opportunity is massive – we believe that 90% of the tasks in factories today are not automated.

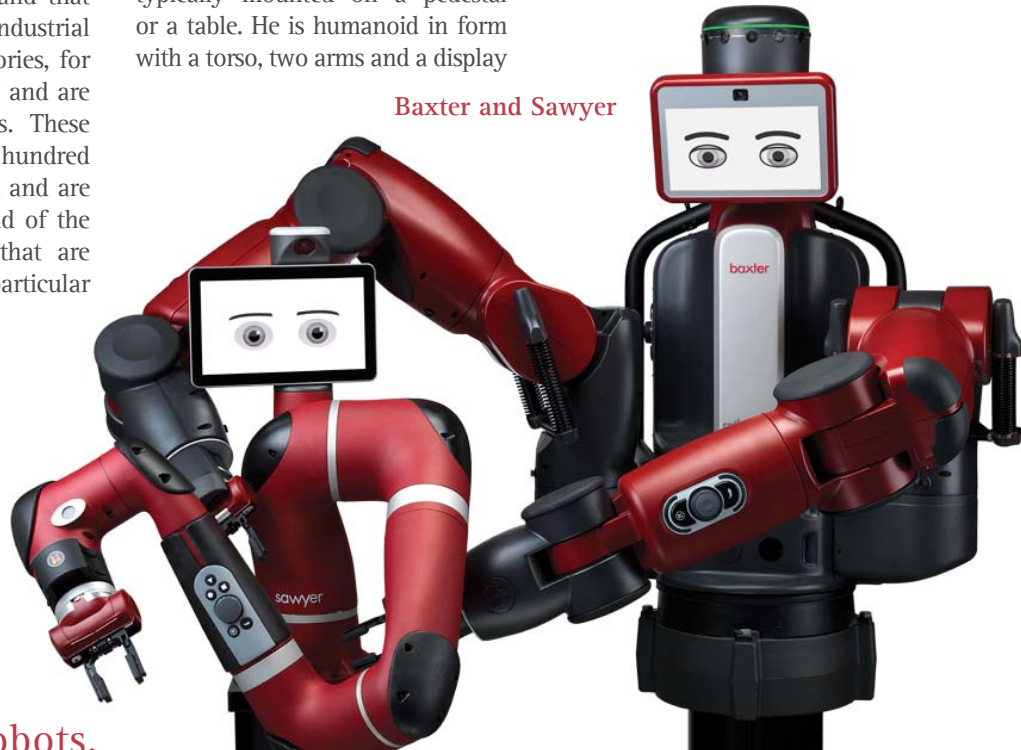
### Can you tell us more about your collaborative robots – Baxter and Sawyer – and their unique features?

Baxter, our first robot, weighs 165 pounds from the waist up and is typically mounted on a pedestal or a table. He is humanoid in form with a torso, two arms and a display

screen acting as a face. Sawyer is smaller, designed to fit a compact environment. It weighs 42 pounds from the waist up, has slightly longer arms, and a heavier payload.

The opportunity is massive – we believe that 90% of the tasks in factories today are not automated.

Baxter and Sawyer



Source: Rethink Robotics

**If the robot bumps into something or something is in a slightly different position, it's able to accommodate for that ambiguity.**

Both the robots have 7 degrees of freedom, allowing them to get into various kinds of fixtures in a multitude of different ways. This becomes very important when you are trying to avoid obstacles.

Both Baxter and Sawyer have learning features. For typical robots, you write some form of script or use a coding language within a developing environment, and you sit down with a computer and you tell it where to go. With Baxter and Sawyer, it's much more like an on-the-job training. They learn the task by having somebody show them how to do it.

When you grab the cuff of either Baxter or Sawyer, they go into what we call Zero-G mode. The robots' motors are compensating for all of the weight of the arm dynamically as it moves through a position. When you are holding onto the wrist

and you are moving it in free space, it feels as if it's weightless. So, you can position, orient, and move it in any way that you want. You grab its arm, you guide it to where the part is, you tell it to close its hands, move it into the CNC machine, release its hand, pull back, close the door, and push the button. You show the robot exactly how to perform a task in the same way that you would show a human how to do so. And, the robot thinks in the context of the task. It's not thinking in the context of position and movement, going from point to point in space. If the robot bumps into something or something is in a slightly different position, it's able to accommodate for that ambiguity because it's not focused on executing commands. It's focused on performing a task.

There is increasing logic and intelligence that's coming into these robots. Sawyer and Baxter automate physical tasks, but there is also an automation of cognitive tasks. Not only will they learn the job and complete the task, but they are using their algorithm to optimize the task assigned and make that job better. Collaborative robots also gain experience from those jobs, and then change not only their operations but also provide insights to other robots.

**Not only will our robots learn the job and complete the task, but they are using their algorithm to optimize the task assigned and make that job better.**

**What is the secret behind the competitive pricing of Baxter and Sawyer?**

The traditional approach for automation has been to build robots that are extraordinarily precise and fast. Deploying precise components into robots at a hardware level is very expensive.

Software, on the other hand – when coupled with cheaper components – can deliver competitive results. We are trying to solve the problem of precision and cost with both hardware and software. We have chosen components that, when coupled with the software, get the job done at a competitive rate from a cost perspective – between \$20K and \$30K. This enables the robot to go after these 90% of the tasks that are currently unautomated.



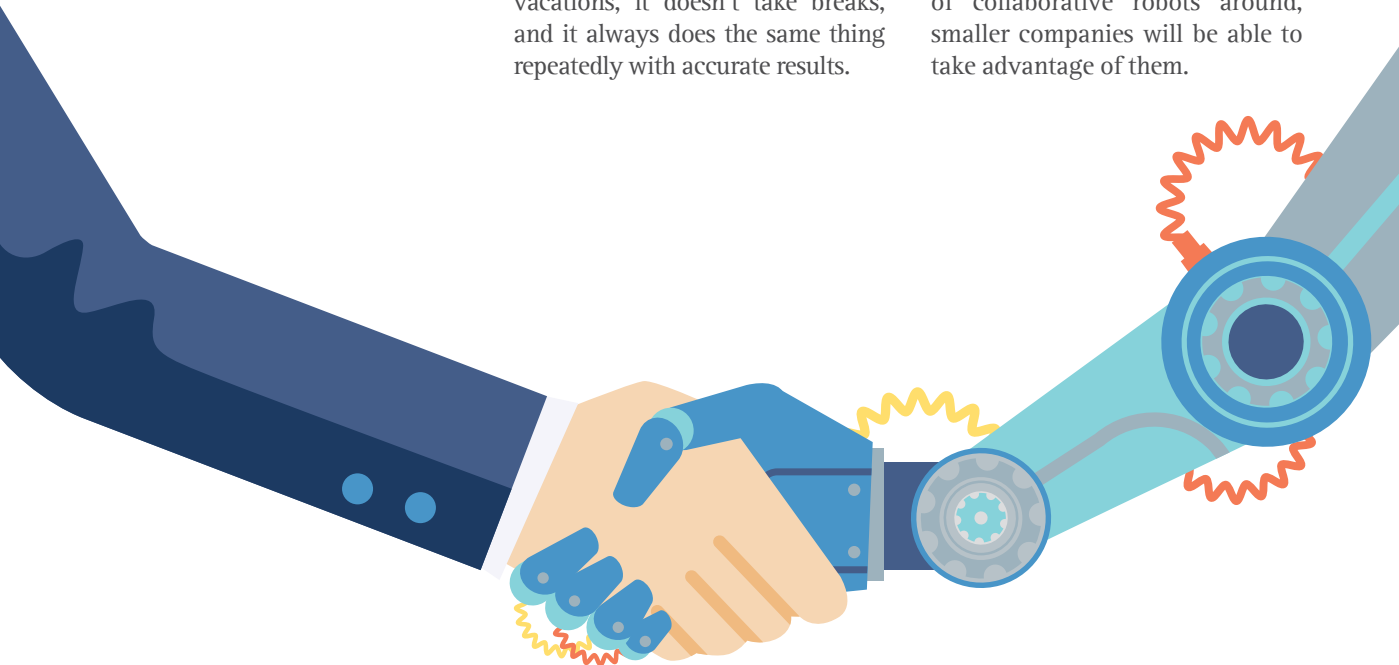
**We have chosen components that, when coupled with the software, get the job done at a competitive rate from a cost perspective – between \$20K and \$30K.**

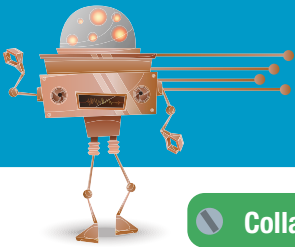
### What is the ROI of Baxter or Sawyer?

Typically, ROI takes 12 to 18 months. Let me give you an example. I've got a tier 1 automotive manufacturer. Traditionally they have people standing in front of a machine, basically tending to the machine. So, you have four people manning this machine, 20 out of 24 hours a day, and they are each paid \$45K a year. This means that you are basically spending \$180K-a-year to tend to this machine. The robot, on the other hand, does it with \$25K. The robots can run 24 hours a day instead of 20, it doesn't need vacations, it doesn't take breaks, and it always does the same thing repeatedly with accurate results.

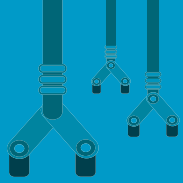
### With this new generation of robots, can we expect the emergence of smaller local factories closer to end users?

Most of the companies that are able to take advantage of traditional automation today tend to be fairly large with high volume operations. If you are one of the small/medium-sized businesses, you cannot afford to use that kind of automation. Small companies have been largely left along the side of the road when it comes to getting the benefits that automation can provide. If we fast-forward into the future, with an increasing number of collaborative robots around, smaller companies will be able to take advantage of them.

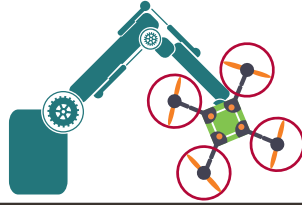
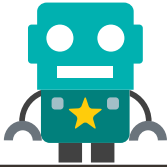




# Rethink Robotics



## Collaborative Robots are Revolutionizing How we Think Robotics



**Traditional robots** usually:

- Take **200 hours** or more to program
- Perform predefined tasks
- Are dismantled at the end of the product line

**Collaborative robots** automate physical and cognitive tasks, **learn on-the-job**, and also **optimize** the task assigned

A massive opportunity for collaborative robots – **90% of tasks in factories** are **currently unautomated**

## Enter Rethink Robotics' Collaborative Robots – Baxter and Sawyer

### Flexible

Baxter, a humanoid bot that can handle tasks from line loading, to packaging and material handling.

Sawyer is designed to automate precision tasks such as machine tending and circuit board testing.



### Easy to Manipulate

They learn a task by having somebody show them how to do it.

### Accommodate Ambiguity

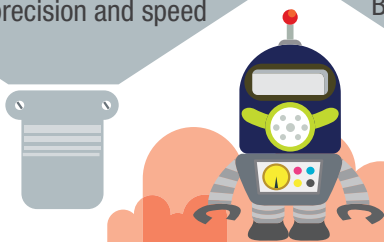
They think in the context of the task, so they can **"feel" their way into fixtures** and accommodate a certain level of ambiguity while performing the task.

## Collaborative Robots Make a Compelling Business Case

Traditional robots = expensive hardware to deliver precision and speed

Collaborative robots = software + cheaper hardware  
Baxter and Sawyer available for **\$20 to \$30K**

Baxter and Sawyer typically take **12 to 18 months** to break even





This next level of automation also allows manufacturers to set up their operations in a much wider variety of places because they don't have to chase low-cost labor around the globe. If you go back 50 years, manufacturing and design were happening near each other. Design could learn from manufacturing, and manufacturing could learn from design. Innovation was happening much more rapidly. We did the worst thing we could do by moving manufacturing off to places where labor costs were low and thus created a big divide between the two. Now, with collaborative robots, we are able to bring innovation and manufacturing back together again. I think it's going to allow manufacturing supply chains to operate in much different ways than they have been operating over the last 20–30 years.

**With collaborative robots, we are able to bring innovation and manufacturing back together again.**

**If the next major driver of success is having smarter, more capable robots, that's not a battle that developed countries want to lose.**

**Do we have some evidence that the automation is helping U.S. or European manufacturers to bring production onshore?**

There are quite a few examples of companies that have started to relocate some of their operations to the United States – such as General Electric, Ford or Caterpillar – with the help of automation. They can hit the ROI and they can do it in a way that doesn't sacrifice flexibility.

What is clear is that we will see much more competition between China and developed nations. However, the rules of the game are changing – success will not be driven by low-cost labor anymore, but by technology. That's a game that a lot of countries can play in. Developed countries are now investing massive amounts of

money in initiatives such as Industry 4.0. However, China has also launched its own initiative called “Made in China 2025” to become the world leader in manufacturing of all products including high and low volume, low and high quality. As an example within the robotics industry, at the end of 2014, there were 400 robot manufacturers in China. At the end of Q1, 90 days later, Q1 2015, there were 700 robot manufacturers.

The key question is whether developed countries are moving as fast as China. If the next major driver of success is having smarter, more capable robots, that's not a battle that developed countries want to lose.

**I do think that in the next five years, you are going to see robots that are deployed with learning systems that are artificial intelligence derived.**

### How intelligent could a robot become and by when?

Traditional robots had a big heyday 30 years ago. Then, the innovations really flattened out over the last 30 years and it has been much more incremental. I think with the combination of physical and cognitive automation and a lot of artificial intelligence, we are going to see another big burst over the next 10 or 20 years.

I think initially we are going to see robots apply greater levels of logic. The complexity of the kinds of problems they are going to solve is definitely increasing, but we are currently overstating how quickly a major transformation is possible. I don't see robots with consciousness any time in the next many tens of years, but I do think that in the next five years, you are going to see robots that are deployed with learning systems that are artificial intelligence derived.

We will also increasingly see robots that learn from each other. Currently, all robots have their brains within themselves. In the future, some of the brain will be located in the cloud, which will enable robots to share insights and reduce costs. We can build at the system level a more efficient operation by not having to double up on so much CPU power inside every robot.

### Inside the home, how do you see the evolution of robots?

I see robots evolving within the home into two broad categories.

The first category is using robots for things that I don't want to do or can't do anymore. For example, from an elder care perspective, if I no longer have the physical ability to perform certain tasks, the robot can take over from me. I think we are going to start to see collaborative robots in not only every manufacturer, but every home and in a lot of service-type opportunities as well.

Another broad category is companion robots. These are robots that will be your buddy and interact with you in a way that's more like a human. I want a robot that I can interact with and can provide me with this sociological-type support and provide with some level of companionship.

“Currently, all robots have their brains within themselves. In the future, some of the brain will be located in the cloud, which will enable robots to share insights and reduce costs.”

The key thing for robots in the home will be to be able to process input of both vocal and gesture to a better job at deciphering. For example, the Echo device designed by Amazon is capable of providing information, answering questions, playing music and reading the news instantly. We are going to start to see Amazon voice services that get embedded into all of these systems.

It's just another place where we are going to see that the technology is coming out to reach the human as opposed to the human having to change the way they do things.



# THE INNOVATION CHALLENGE

*“Technological progress has always created significant disruptions that powerful interests tried to combat to maintain the status quo. In Ancient Rome, the great author, Pliny the Elder, records the story of an inventor who discovered a way to manufacture glass that was unbreakable. Hoping to receive a reward, the inventor presented his invention to Roman Emperor Tiberius. Unfortunately for the inventor, Tiberius had him sentenced to death, fearing the loss of jobs and creative destruction due to the new technology.”*

*– Michael A Osborne*

*“Creating excellence at small scale is relatively straightforward. Doing so at scale is extremely hard. And that’s where most innovation centers struggle”*

*– James Patterson*

*“The challenge is to convince people that something simpler with fewer features can be innovative. The difficulty is to shift the R&D mindset from pushing more technology to really understanding customer needs and focus on delivering value to customers by creating a simpler solution.”*

*– Navi Radjou*

*“Mainstream innovation is rigid and lacks the agility to respond to big changes in the marketplace such as new competition. [...] The innovation engine at large incumbents has to become more nimble and flexible.”*

*– Navi Radjou*

*“The world’s leading companies spend over \$650 billion on R&D every year. In an economic environment that is not very growth-oriented, it is very hard for companies to sustain that level of investment.”*

*– Navi Radjou*

# Digital Innovations – Our Top Picks

**C**reative ideas and innovations can transform the lives of thousands of people, solve critical social problems, and transform companies and markets. Here, we have selected a range of product and business model innovations that offer creative solutions to a range of contemporary issues, from social to consumer applications. This list is offered merely as a conversation starter – share your personal innovation favorites using the hashtags #excitinginnovation and #DTR8.

## Innovation in Products

### Beating Iodine Deficiency Through ‘Bindis’

Deficiency in iodine is the world’s most predominant cause of brain damage and can also lead to other health issues. In India, approximately 350 million people are at risk of iodine deficiency, according to a study from the Indian Journal of Medical Research. The “Life Saving Dot” aims to use bindis - a forehead decoration worn in South Asia - to deliver an essential micronutrient to women who might not be getting enough iodine. The unique aspect of this innovation is that it fits into an established cultural tradition. “There are patch systems for many medicines now, so the bindis are a really cool idea,” says Michael Zimmermann, a nutrition researcher at the Swiss Federal Institute of Technology in Zurich. The iodine-packed bindis have already reached more than 30,000 women in 100 villages in India.



Image Source: Grey

Source: NPR, “How Little Red Dots Could Help Women And Babies Stay Healthy”, June 2015

## Shoes that Magically Expand to Fit Growing Feet

When Kenton Lee was travelling in Kenya, he was surprised to see the number of children either barefoot or cramped into too-small shoes. This drove him to come up with an idea for “The Shoe That Grows”. The shoe uses adjustable buckles and a strap on the toe to expand by as much as five sizes, which is ideal for children aged between 5 and 9 and 10 to 15. Kenton Lee is working with an organization called Because International, which aims to send the shoes to orphanages in African nations.

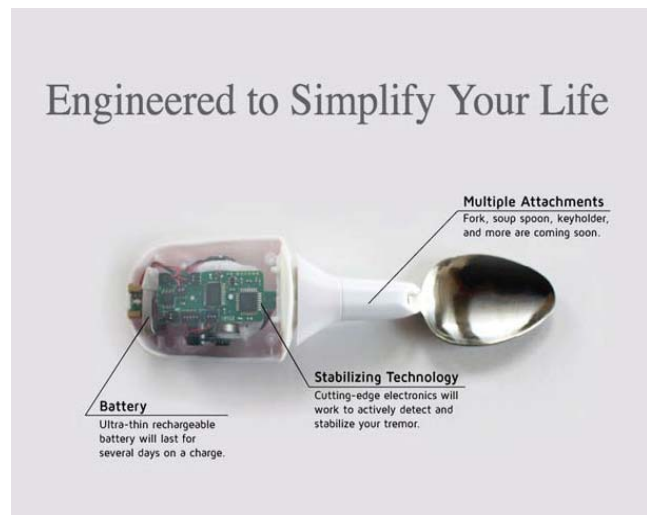
### The Shoe That Grows



Source: [www.theshoethatgrows.org](http://www.theshoethatgrows.org)

## Steadying the Shaking Hand

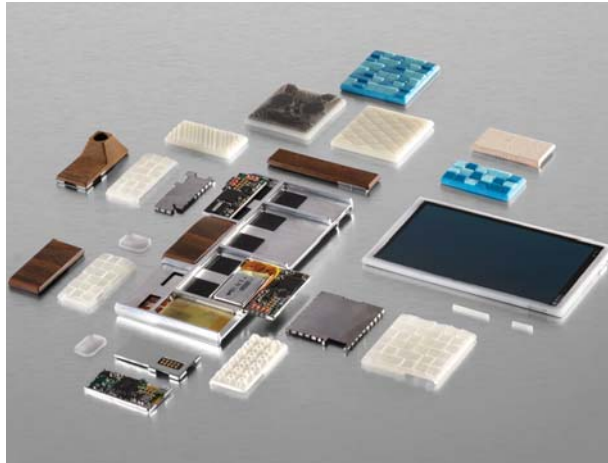
Globally, over 10 million people suffer from tremors or Parkinson’s disease, which can make an essential task such as eating a challenge. The Liftware Spoon is designed to work around the movement disorder in an innovative fashion. It employs complex algorithms to detect how the hand is shaking and makes dynamic adjustments, through motors in the spoon, to stay balanced. In a clinical trial, the Liftware spoon cancelled out over 70% of a user’s tremors. Liftware was recently acquired by Google.



Source: [www.liftware.com](http://www.liftware.com)

## Snap a Feature to Your Smartphone – Project Ara

Most smartphones come with a set of features that are usually upgraded over a period of a year or two through software updates. However, while the software changes, the hardware remains the same. Google wants to change that with Project Ara. The project aims to develop an open hardware platform for creating modular smartphones. The platform will include a basic frame and the user can pick the modules that they want, such as display, battery, camera and so on. The phone would then allow users to swap out modules for upgraded versions, or to replace defective modules without changing the whole phone.



Source: [www.projectara.com](http://www.projectara.com)

## Innovation in Business Model

### Making Your Bulb Pay its Bills – Enlighted

Enlighted is a startup that builds devices that can detect heat, light, and motion and ties these devices with a software solution to control lighting (and soon, heating and cooling). The company innovated its business model by not requiring any upfront payment from companies that implement the solution. Customers only have to pay as much as Enlighted saves them. Enlighted assumes the risk, with the customer not having to commit to any money-down financing or leasing, thereby enabling them to realize instant savings.

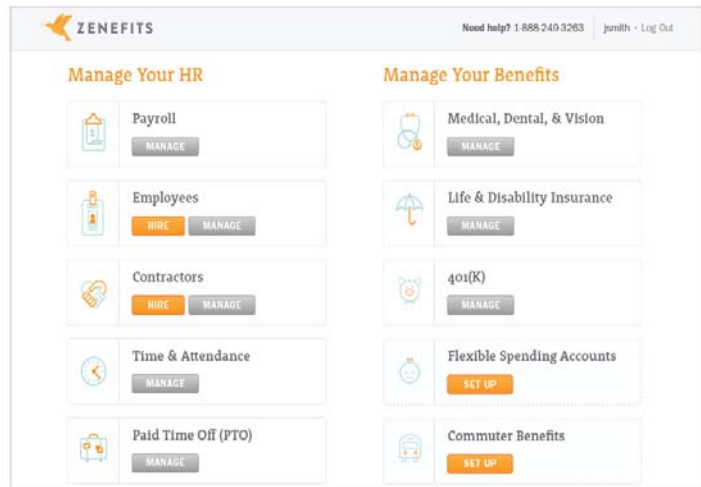


Source: [www.enlightedinc.com](http://www.enlightedinc.com)



## Freemium for B2B – Zenefits

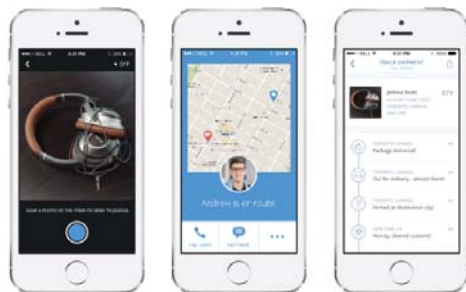
Zenefits, a San Francisco-based startup in the business of HR software provision, has a highly innovative payment model. The company allows small- and medium-sized enterprises to manage all their HR services on a single platform, offering its software free of charge. However, if its clients buy health insurance for their employees through Zenefits' software, it receives a payment from the insurance companies. At May 2015, the company had over 10,000 customers and it recently raised money at a valuation of \$4.5 Bn.



Source: Wall Street Journal, “Zenefits Is Tagged With a \$4.5 Billion Valuation After Just Two Years”, May 2015

## Push-Button Shipping – From the Doorstep – Shyp

Shipping something in the US can be a cumbersome process. Shyp offers a smartphone-driven solution to fix that. The company allows individuals to take a picture of the package that is to be shipped, and within 20 minutes, a Shyp ‘hero’ will come by to the customer’s location, take the product, pack it, and then dispatch it using the best courier option. Shyp charges its customers a flat \$5 rate plus any courier charges at actual.

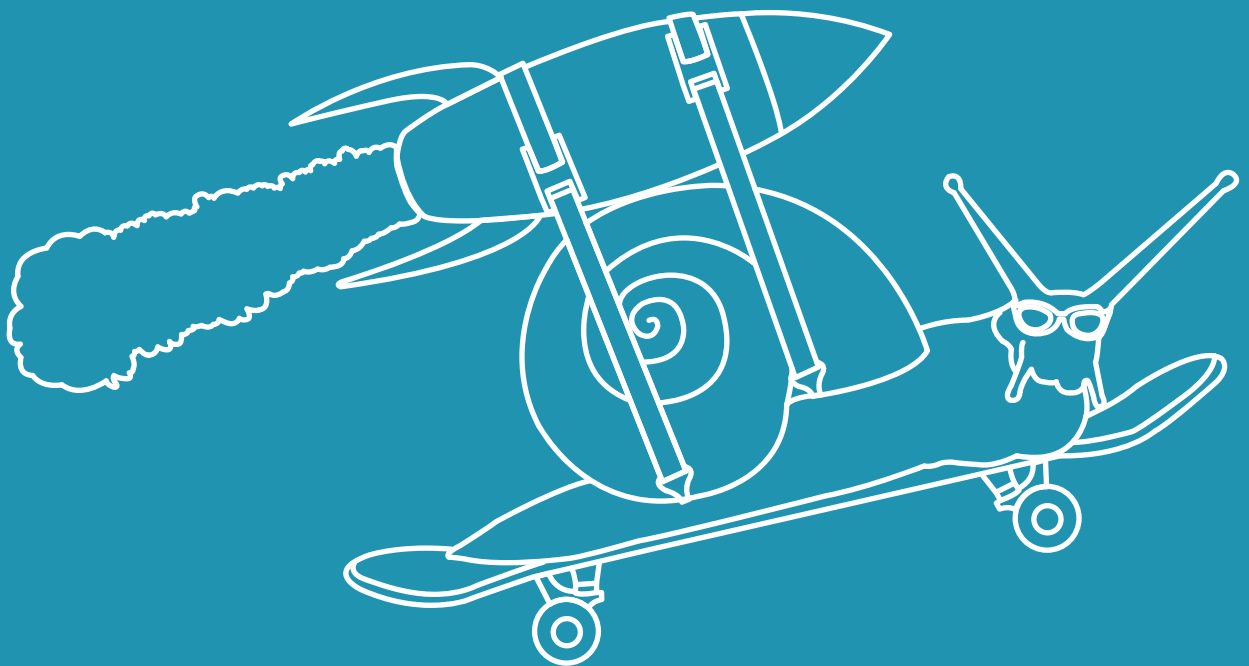


Source: From the Doorstep – Shyp: App Store (iOS)





# Promoting and Embedding Innovation





## Frugal Innovation: Innovating More with Less



### Navi Radjou

*Innovation and leadership  
advisor; Fellow at Judge  
Business School, University of  
Cambridge*

**N**avi Radjou is a Fellow at Judge Business School, University of Cambridge and an innovation advisor based in Silicon Valley. He has served as a member of the World Economic Forum's Global Agenda Council on Design Innovation and is a regular columnist for Harvard Business Review. In 2013, Navi Radjou received the prestigious "Thinkers50 Innovation Award", which is given to a management thinker who is reshaping the way we think about and practise innovation. Navi Radjou is the co-author of a new book – Frugal Innovation – and co-author of the bestseller 'Jugaad Innovation'. Capgemini Consulting spoke with Navi Radjou to understand how enterprises can apply principles of frugal innovation to innovate more with fewer resources and yet deliver greater customer and social value.

## Declining Returns on R&D is Forcing Companies to Rethink their Innovation Strategy

You have argued that the mainstream innovation model adopted by most companies is broken. Can you elaborate why?

The traditional model is broken because of a number of reasons.

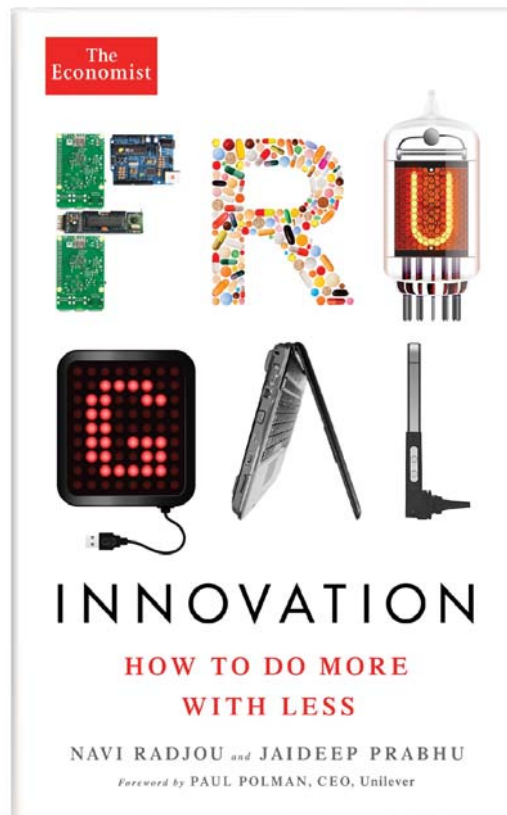
Mainstream innovation is rigid and lacks the agility to respond to big changes in the marketplace.

Firstly, it is extremely expensive. The world's leading companies spend over \$650 billion on R&D every year. In an economic environment that is not very growth-oriented, it is very hard for companies to sustain that level of investment. There are also obvious concerns over generating the right return on this investment. Studies suggest that more than 85% of new product launches in the consumer products industry fail in the market. It is leading to

a situation where companies get lesser returns even if they spend more on R&D.

Secondly, mainstream innovation is rigid and lacks the agility to respond to big changes in the marketplace such as new competition. Five years ago, automakers never thought that Google could become a carmaker. Today, Google is building driverless cars. The innovation engine at large incumbents has to become more nimble and flexible.

Companies cannot handle all innovation on their own. They need to look for partners outside to augment their capabilities.



The third kind of shortfall in the existing innovation practices is that they are relatively closed and not open enough to collaborate with external partners. Organizations believe that they possess, in-house, all the resources they need to deal with demand. However, companies cannot handle all innovation on their own. They need to look for partners outside to augment their capabilities.

## Frugal Innovation to Drive the Next Wave of Growth

### Can you introduce us to the concept of frugal innovation?

Frugal innovation is about creating high-quality solutions that are simple, effective, and affordable with limited resources. It may not address all of customer needs, may be 80–90% of them, but it is cost effective, yet of good quality and sustainable for the environment.

### How did you come up with the idea of frugal innovation?

We introduced the concept in 2009. My co-authors and I, at Cambridge University in England, were doing research on how Western companies could crack the emerging markets, which were fast becoming engines of global growth. Emerging markets have a lot of resource constraints.

Many of them struggle with poor infrastructure, access to capital and natural resources. And yet we noticed that there are many entrepreneurs – especially in India and Africa – who are able to use their limited means to innovate and create economic and social value for the communities. They are frugal innovators. We covered this subject in detail in our first book – *Jugaad Innovation* – which came out in 2012. *Jugaad* is a Hindi word that means ‘makeshift’ or ‘make-do’, which is basically the ability to improvise an effective solution in a difficult situation.

“Frugal innovation is about creating high-quality solutions that are simple, effective, and affordable with limited resources.”

### Can you give us some examples of these entrepreneurs in India who came up with interesting Jugaad innovations?

Our book offers a couple of very interesting examples. First is Mansukh Prajapati, a potter in India who developed a fridge that

is made entirely of clay. It does not require any electricity, and it is 100% biodegradable. It uses the principal of evaporation to cool the inside of this so-called fridge, and costs approximately €20–25. It can keep fruits and vegetable fresh for several days. It is a great solution for people living in remote areas who do not get reliable electricity supply.

### *Refrigeration without Electricity*



Another one is in the area of solar energy. Harish Hande is an Indian entrepreneur who founded SELCO, which installs small solar lanterns in some of the most remote parts of India with the belief that even poor people can afford solar energy. SELCO wants

to democratize access to solar lighting and he has been doing it for 20 years. SELCO employs young locals in the villages to charge the solar lanterns in the morning. They then distribute the lanterns in the village houses and shops in the evening, so they can use it at night for reading and—if you are a shopper, you can use it to sell your goods at night. In the morning, they collect the lamps back along with micropayment for the amount of light they used the evening before. With this inclusive approach, SELCO was able to scale out its frugal solution to over 200,000 households in rural areas, in some of the most remote villages in India, while creating many jobs in local communities.

**I believe there is a universal appeal to the concept of frugal innovation.**

**Is the idea of frugal innovation only relevant for emerging markets or does it apply to developed nations as well?**

I believe there is a universal appeal to the concept. Our first book offered Western multinationals best practices they can learn from emerging market entrepreneurs, and companies who were able to innovate more with fewer resources. We then spent the last three years studying frugal innovation in the Western context. From our findings, we published a new book called Frugal Innovation. This book argues that, since 2008, there is a big shift in the Western world – consumers have become increasingly value conscious, looking for products and services that deliver more value for less. Secondly, consumers in the West prefer to buy products and services from companies that are socially and environmentally responsible. A recent study showed that 55% of global consumers want to pay even more for products that are socially and environmentally responsible. And this number has been growing. More interestingly, nearly 70% of future employees want to work for companies that have this kind of social and environmental credentials.

**A recent study showed that 55% of global consumers want to pay even more for products that are socially and environmentally responsible.**

Today, consumers would rather opt for a relatively frugal solution that addresses their basic needs and represents more value(s) as well. Frugality is a lifestyle that connects the need for saving money while doing the right thing for the society and environment. This need is growing especially among young people in the Western world. These trends have been forcing Western companies to rethink their innovation approach to serve frugal customers in their home markets.

## Principles of Frugal Innovation – Working within Constraints to Create More Value for Customers and Society

### What are the key principles underpinning Jugaad or frugal innovation?

The first principle is that you use what is abundant to create what is scarce. For instance, you use clay, a widely available and cheap material, to create something like a fridge that does not use electricity. You employ local people and turn them into your distributors instead of hiring employees. So, the question is 'how do you create more impact using fewer resources', the answer: you don't create new things, you just piggy back and leverage what you already have. Reusing is indeed a sustainable alternative to "reinventing the wheel".

### What does it mean for companies and what is abundance for companies?

Abundance lies in the ecosystem. Companies must take a systemic approach – instead of operating with the sense of scarcity and thinking only about resources under their sole ownership, they must look at what's available in the whole ecosystem that they can access. For example,

today if a company needs truck capacity, it can approach the marketplace called FLOW2. This is a B2B marketplace that enables companies to share idle physical assets, trucks, factory equipment, medical devices etc. In most cases, the system has more resources than you think when you look at it from a single person or a company perspective.

**“Instead of operating with the sense of scarcity and thinking only about resources under their sole ownership, [companies] must look at what's available in the whole ecosystem that they can access.**

### Which other principles reinforce frugal innovation?

Using what is abundant to create what is scarce is our first principle. The second principle is to engage and iterate. Instead of wasting time and money trying to create a perfect solution in an insular R&D lab, companies must directly engage customers, identify their basic needs, quickly produce a

good enough solution, and then iterate i.e. incrementally improve the solution as the customers' needs evolve. This practice is very frugal in terms of resources as well as time.

The third key principle is regarding sustainability. It's not about Corporate Social Responsibility (CSR) but how to make your entire company more sustainable. We have examples of companies like Unilever (its CEO, Paul Polman, wrote the foreword for our book), which is planning to double its revenues by 2020 while simultaneously halving the environmental impact. This is not just for one product or service. They are reinventing their core business model and entire value chain to produce more, and better, with less.

**“I believe that gradually we will see companies sharing their fleet, their factories as well as their clients. This is the B2B version of the sharing economy, and it is just taking off.**



# Innovating More with Less

## The Traditional Innovation Approach is Broken



Expensive and Not Sustainable

Leading companies spend **over \$650 billion on R&D** every year



Declining Returns

Over **85%** of **new** consumer **products** launches **fail** in market



Rigid and Not Open Enough

Organizations need external partners to augment their innovation capabilities

## What is Frugal Innovation?

High-quality solutions that are simple, effective, affordable and created with limited resources

Connects the need for saving money while being thoughtful for the society and environment

## Key Principles Underpinning Frugal Innovation



**Use what is Abundant to Create what is Scarce**

For instance, pooling excess truck capacity and enabling access to it through a B2B marketplace



**Engage and Iterate**

Identify customers' basic needs, quickly produce a good enough solution, and then iterate



**Sustainability**

Reuse, recycle but also up-cycle – creating more social value



**Open Innovation**

Becoming more open and willing to share clients with the external ecosystem

## Frugal Innovation in Practice



**Renault Kwid** – an entry-level car for the Indian market, designed in India, with **97%** of its components sourced from local suppliers. Entry range cars accounted for **42%** of Renault sales volumes in 2014.



**SNCF**, the French railway company, combining services with **Zipcar** and others to provide “door-to-door” mobility.



**Mansukh Prajapati**, an Indian entrepreneur, invented **MittiCool**, a fridge made 100% of clay, 100% biodegradable, consumes no electricity and costs roughly €20–25.



In the process, companies reuse, recycle but also up-cycle – creating more social value as well.

That brings us to the fourth interesting principle, which is about collaborating extensively with other companies – including your rivals – the notion of open innovation and “coopetition”.

### Can you elaborate on the concept of open innovation?

Take, for example, the French Railway Company, SNCF. Their focus was on offering the best possible train services, but customer demands have evolved. People want an end-to-end mobility solution that takes them from point A to B, irrespective of the modes of transport they may have to use – cabs, trains and car-sharing etc. SNCF realized this and has just launched a service aimed at this customer need. They're combining their services with partners – such as Zipcar and others – to provide a “door-to-door” mobility service. They are willing to share their client with other brands and companies. They understand that, by pooling resources together, they can serve the customer better and more comprehensively. Another example is Mars, the chocolate maker. Mars is sharing its fleet of trucks in Germany with other companies. They asked

themselves: “if I am not using my assets all the time, they are sitting idle, I am basically wasting money. So, why don't I share them with other people?” I believe that gradually we will see companies sharing their fleet, their factories as well as their clients. This is the B2B version of the sharing economy, and it is just taking off.

“Renault is a very good example of a company that has been at the forefront of frugal innovation.”

Frugal Innovation can Make Corporations More Competitive

### Can you explain how large organizations have implemented the concept of frugal innovation?

Renault is a very good example of a company that has been at the forefront of frugal innovation. In 1999, Louis Schweitzer, the previous CEO of Renault, set an audacious goal of building a €6,000 car and gave his engineers the freedom to handle the how part. That was the first chapter in the Renault story that led them to launch in 2005 the Logan – a no-frills yet spacious car that used

50% fewer parts than a typical Renault with a minimalist design that met high-quality and safety standards. To capitalize on the demand, Renault developed an entirely new entry-level product line under the Dacia brand. These entry-level vehicles now represent circa 40% of Renault's total sales.

The second chapter, being written in 2015, is the launch of Kwid – an entry-level car produced for the Indian market. The concept of the car was developed to a large extent by Indian designers in Renault-Nissan's design centers in India and very much relies on open innovation and local supplier network. Ninety-seven percent of the components in Kwid come through local suppliers. They involved the suppliers very early on – right from the design phase. So, the whole ecosystem was involved from the beginning until the end, and that is what allowed Renault to pull it off. Overall, Kwid is a very cost-effective solution as it cost them only half as much to take the car from design to dealers. Most Western carmakers cannot copy what Renault is doing because they try to take the existing cars that are being sold in Europe or US and 'de-feature' them for local markets in India and China. That approach does not work. They must learn to build a frugal car from scratch.





### **Do you have a view on an approximate percentage of companies using frugal innovation?**

If you look at the Fortune 500 companies, I would say roughly 5% have adopted frugal innovation in a very aggressive way as they have realized its strategic importance. Approximately 20% are experimenting with it and the remaining 75%, I think, have very little awareness. If we look at Europe only, I would say there is an equal split across the three categories. While in Asia, I would

say nearly 90% of the companies are already using frugal innovation in some way. The US, however, is lagging way behind Europe and Asia in adopting frugal innovation.

### **Overcoming Obstacles to Frugal Innovation**

#### **What are the main obstacles to frugal innovation?**

There are a few obstacles of course. The first one is mindset. Frugal innovation is viewed as an

approach that produces only low-cost output and not necessarily a good quality product. The challenge is to convince people that something simpler with fewer features can be innovative. Actually, it is innovative because it brings more value to customers. So, the difficulty is to shift the R&D mindset from pushing more technology to really understanding customer needs and focus on delivering value to customers by creating a simpler solution.

**The challenge is to convince people that something simpler with fewer features can be innovative. Actually, it is innovative because it brings more value to customers.**

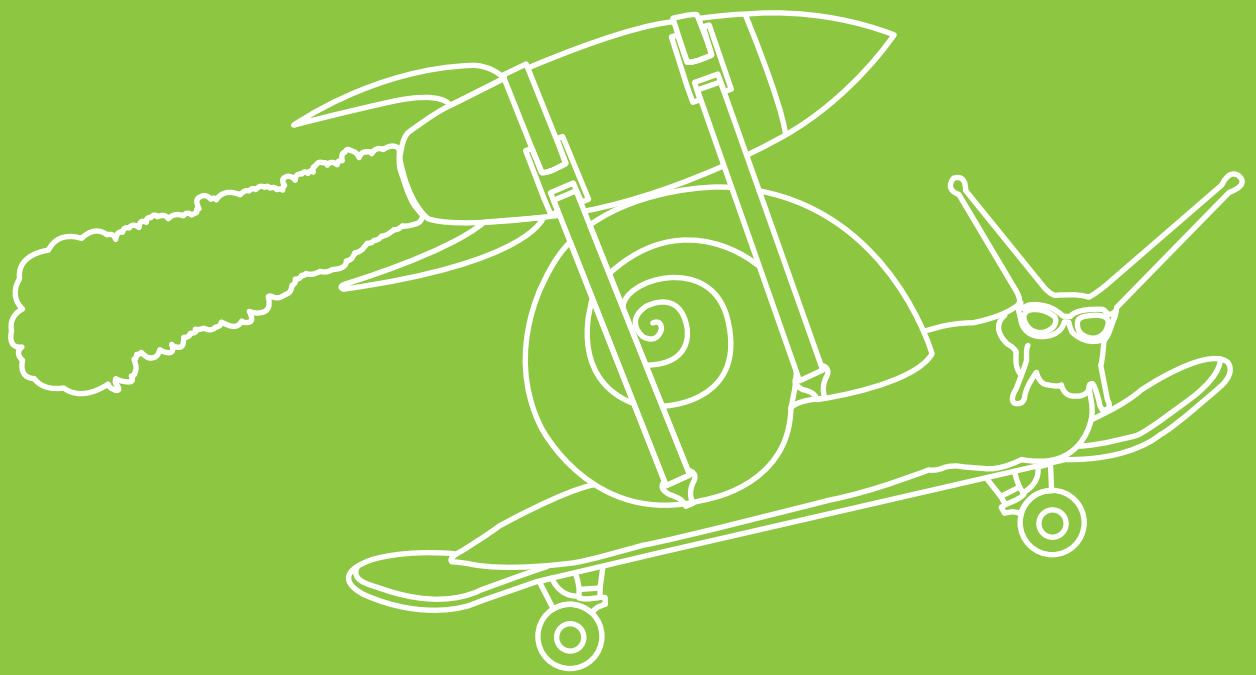
The second challenge is around marketing. How do you market a frugal solution as aspirational? I believe Renault is doing an amazing job in India in terms of marketing Kwid. They are not talking about affordability. They are positioning the car as something aspirational, like the car gives you more freedom and comfort. It is well designed and makes you feel good. Most companies know how to market an expensive product and create a need for it but they do not know how to create a need for frugal solutions.

**How important is it to change the culture of a company for ensuring success with frugal innovation?**

I think changing the culture of the company is absolutely critical. In Renault today, nobody is challenging frugal innovation because it has proven to be successful in Europe and now in India. So, companies need to evolve from “doing frugal” to “thinking frugal” and then finally to “being frugal”. Our research shows that it takes approximately 8–10 years for a company to make the complete transition, which is a long journey. But, if you look at companies like Renault, I think they have proven that if you can

patiently execute the strategy over 10 years, you can become a leader in the space. I believe more companies have to realize that frugal innovation is not just about low cost. It is about combining four attributes – affordability, quality, sustainability, and simplicity. It is about improving people’s quality of life while preserving our precious planet.

**I believe more companies have to realize that frugal innovation is not just about low cost. It is about combining four attributes – affordability, quality, sustainability, and simplicity.**





## Kick-starting Innovation Through Startups



### Jon Nordmark

*Co-founder of Iterate Studio*

**J**on Nordmark is co-founder of Iterate Studio – a company that discovers and curates disruptive technologies from startups for large companies. Iterate Studio works with thousands of startups and helps large enterprises conduct rapid proof-of-concept experiments to quantify the impact on their business. Jon is also Chairman of eBags.com and sits on the boards of Colorado Innovation Network, and one of Eastern Europe’s premier Tech Accelerators. Prior to Iterate, Jon was the founder and 10-year CEO of eBags – an online bags and travel accessories portal which hosts 36 million shoppers each year. Between eBags and Iterate, Jon was an advisor and investor in dozens of startups – many of which were graduates of TechStars (Boulder, Colorado) and Founder Institute (Silicon Valley, California). Capgemini Consulting spoke with Jon to understand how large enterprises can harness the innovation potential of startups.

### How did you come up with the idea of Iterate Studio?

A few years ago, I was working in Eastern Europe with Brian Sathianathan – one of Iterate Studio’s other co-founders – at a startup accelerator. We would review about 300 business ideas every six months and accept approximately 10 countries into the program.

After seeing all these really interesting companies, we thought there needed to be a service that helps large companies discover and validate new digital technologies from all over the world. At the same time, intriguing startups coming out of accelerators would get a quick validation within large-scale environments. After proof-of-concept tests have been run by a third party, individual startups are valued a lot more than when they were just an interesting idea or theory.

### What is your unique proposition compared with startup accelerators and incubators?

Iterate is not a startup accelerator. We are not interested in helping anyone draft a business plan or giving advice regarding how a company should

work. Unlike accelerators, we focus on proof-of-concept tests. We find the startups with the most potential through a discovery process – often they will have 10 customers already, maybe even 100. Once we’ve found a startup with intriguing claims or success stories, we try to get them tested rapidly in an environment we trust – often in a small enterprise where we can be sure experiments are properly operated. Our hands-on oversight helps us determine if the business claims made by the startup are valid or not. We are unbiased and agnostic as far as how we endorse technologies, whereas an accelerator – like a VC – is always going to be biased to the companies that come through their program. We don’t care where a startup is from, how much money it has raised, who funded it, who its founder is; we only care if the technology provides a positive business impact.

**We thought there needed to be a service that helps large companies discover and validate new digital technologies from all over the world.**

**We create ‘digital recipes’ [by combining point solutions from different startups.]**

**Sometimes startup solutions can be too niche compared to the scale of large enterprises. How do you work around this challenge?**

Often, startups produce what we call “point solutions,” because each strong startup tends to be really good at one little thing. However, if you can combine a few of these, you can create a simple, powerful enterprise-level solution that is very difficult to do as a single startup or enterprise. We create “digital recipes”.

### Can you explain the testing process in more detail?

When a large organization subscribes to Iterate’s services, the first thing we do is put an innovative legal agreement in place. That legal agreement provides the large organization with the right to test any startup that Iterate Studio has decided to endorse. On the startup side, if we decide to endorse a

startup for our large company subscribers, we sign an agreement with the startup that gives Iterate an umbrella experimentation license. We can pass that “experimentation license” on to any large enterprise that we are formally working with. The beauty of these agreements is that the large company removes that time-consuming process of writing and signing an individual contract with every single startup they work with. On the other side, for startups, it helps them scale their solution faster than the old way. So, we are trying to remove all the paperwork and make it seamless to get a quick pilot test in place.

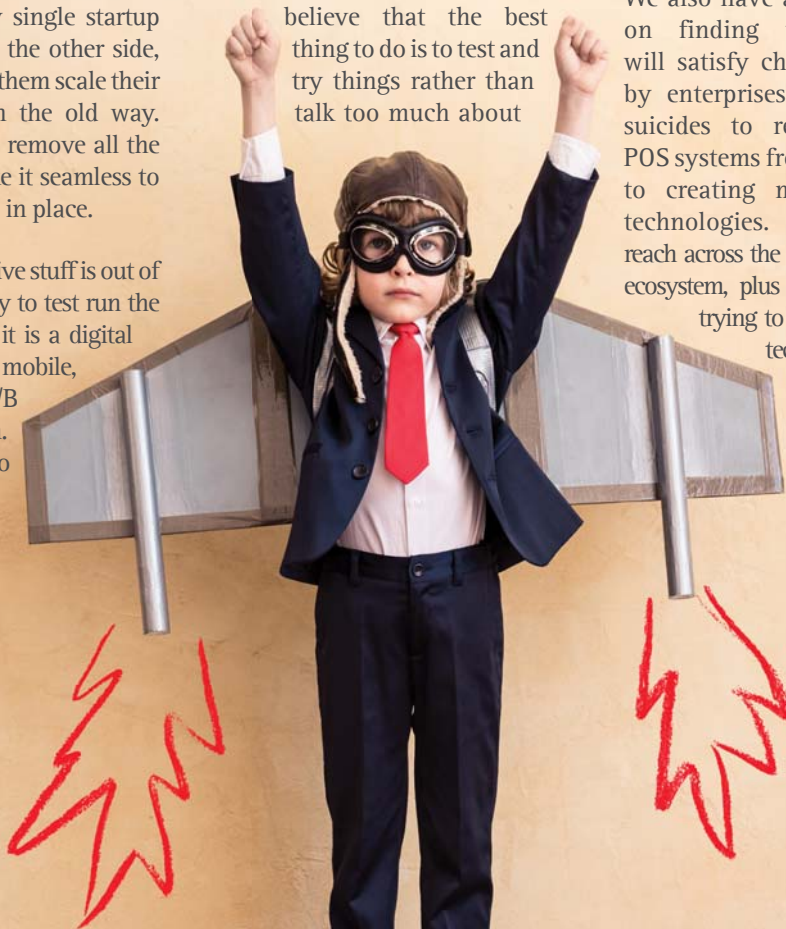
Once the administrative stuff is out of the way, we get ready to test run the startup’s solution. If it is a digital test for the Web or mobile, we turn on an A/B split test platform. Within a day to two

weeks, we usually know whether the business impact is positive, neutral, or negative. If the test worked, we’ve found a great match for the enterprise. It also gives us great confidence in recommending the startup technology to other clients. If we see the test works for one website, we know that there is a high likelihood that it will work in sites that are similar. We really believe that the best thing to do is to test and try things rather than talk too much about

technology. The methodology is a bit different for tests in physical environments, but the philosophy is the same.

### What is the percentage of innovations that make it from proof-of-concept?

Our success rate is above 80% for testing online technologies. We also have a high success rate on finding technologies that will satisfy challenges presented by enterprises – from stopping suicides to removing standard POS systems from retail checkouts to creating mashups of video technologies. We have a broad reach across the emerging technology ecosystem, plus spend a lot of time trying to find the right startup technology that could solve a company’s problem – hence the high success rate.





**Our success rate is above 80% for testing online technologies.**

Startups in the Digital Age

**Do you think innovation in today's age is very different from 10 or 15 years ago? Is the nature of innovation changing?**

Yes, it is vastly different. Research has shown that the cost of developing a digital startup has fallen from approximately \$5 million in 2000 to approximately \$5,000 as of 2013. There are a number of factors behind this. When I started eBags in the 90s, we had to buy, provision, and supervise tons of hardware. And then, we had to write all our software from ground up, in fairly difficult languages. We had to hire people with the specialized skills to configure those servers and write that code. We built our own fulfillment systems, our own A/B test platform, our own Content Management System, our own product review system. So, 10 years ago, it was heavy commitment to labor and hardware expenses.

Much of that has just evaporated with the advent of the cloud. Now those systems are readily available through SaaS services, off the shelf. Access to speed has increased. Automation has also removed a lot of technical work. All these things in combination have significantly brought the cost down in the last ten years. Lower costs combined with explosion of angel and crowdfunding networks has also helped create a global baby boom of digital startups and a potpourri of opportunity for agile enterprise executives.

**The cost of developing a digital startup has fallen from approximately \$5 million in 2000 to approximately \$5000 as of 2013.**

**Our new website – Iterate.ai – has indexed more than 130,000 startups.**

How Startup Communities can Help Large Enterprises Innovate

**Often we see innovation departments that are quite isolated in big organizations. How do you foster a culture of innovation throughout the organization?**

Innovation can't be done in an isolated way, on an island. The only way innovation can take up firm ground is when it has CEO-level support. There needs to be a requirement coming from the CEO that business units must work together seamlessly. Take the case of Jeff Bezos. He is a big supporter of innovation and he talks about innovation all the time. But, he does not just talk about it – Amazon committed \$15.4 billion to R&D in 2014, ran 1976 website tests in 2013, and they tend to acquire 2 to 6 startups each year. It is outspoken and loud.



# Kick-starting Innovation through Startups

## Digital Startups are Blossoming

The cost of developing a digital startup has fallen from approximately **\$5 million in 2000** to approximately **\$5,000 as of 2013**.

There are somewhere between **100,000 and 400,000 digital startups** around the world.

## Companies need startup curators, to help them...



• **Discover** new digital technologies from all over the world



• **Validate** business claims made by the startups in an unbiased and technology-agnostic way.



## How Companies can Compete with Tech Giants – by Leveraging the Combined Potential of Startups

Google, Apple, Facebook and Amazon together spend over **\$35 billion** on R&D annually, up **79% from 2013**

Large organizations can compete with such heavy investments by tapping into the distributed startup community.

“We are trying to organize this disorganized startup community, so they can be engaged and embraced a lot easier by large enterprises.”

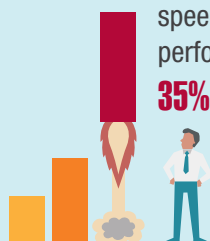


“We create ‘digital recipes’ [by combining point solutions from different startups].”

## Bringing Startups and Enterprises Together



Iterate works closely with **45 startups**, semi-closely with 100 and is aware of hundreds more.



Iterate’s new website — Iterate.ai — has indexed more than **130,000 startups**.



## How can companies compete with giant companies who spend billions of dollars in R&D?

The most effective way is through the startup community and I'm saying this from my experience. Companies should take their own route when it comes to innovation including the startup community. Tap into it. On Iterate.ai, a new innovation service our company just launched in alpha, we have indexed more than 130,000 digital startups around the world. The investment going into those startups – money, time, effort, and knowledge – is in the billions of dollars. Equaling or exceeding the \$10 billion R&D budgets operated by each of the GAFA companies (Google, Amazon, Facebook, Apple). It is just that the global community of startups needs to be organized, tested, and deployed quickly, as if they are initially created within an in-house lab. If you embrace this distributed startup community, you are embracing an R&D effort on the level of GAFA. The startup community can be your digital lab or greatly enhance it. What we are trying to do is organize this disorganized startup community, so they can be engaged and embraced a lot easier by large enterprises.



**If you embrace this distributed startup community, you are embracing an R&D effort on the level of GAFA.**

**Finding Right Startup Partners for Large Enterprises**

**Can you give us some examples of great startup solutions you've found for large companies?**

We are working on everything from IoT initiatives to POS and supply chain projects. But some online experiments we've done quickly demonstrate successes.

Take the case of a Silicon Valley based startup that we work with – which has \$3 million in funding. It is a big-data-based dynamic couponing company that helps retailers and travel sites deliver offers in real-time on websites. We have a 100% success rate with them. Across the 14 tests we've run for them, their solution has delivered an impressive 19% increase in conversion rate on it's addressed audience.

One of our Boston-based startups, which has raised nearly \$50 million, increases the speed of websites and mobile sites by 35% on average. This translates to about a 16% revenue per visit increase. In May 2015, our tests helped the startup replace its primary competitor – a \$10 billion incumbent – in three large enterprises. Now, many more tests are lined up based on those results.

“One of our Boston-based startups, which has raised nearly \$50 million, increases the speed of websites and mobile sites by 35% on average.”

Another bootstrapped Indian startup that we endorse created a malware-removing software. The startup blocks e-poaching, where malware secretly takes over a shopper’s browser, trying to move shoppers to competitive websites. We are finding that 6% to 11% of shoppers seem to have malware infections, causing almost 4% to 8% of their total websites revenues to be lost. Last month, we determined this malware blocker would deliver a \$6 million revenue lift for one of our enterprise clients. This startup had a solution to that problem and a technology that could be plugged-in in minutes, and many of our clients want to test this new brand-protection technology.

#### How many entrepreneurs and startups do you work with?

Over the years, we have been exposed to thousands of startups, but Iterate Studio now works closely with approximately 45 startups. We work semi-closely with another 100, and we are

aware of hundreds more. Our new website – Iterate.ai – has indexed more than 130,000 startups, and we can dive into that database in search of digital solutions. We are also beginning to use Iterate.ai to automatically pair enterprise challenges with startup solutions. For any executive trying to work on the cutting edge or even remain relevant in today’s fast moving digital ecosystem, it is critical to be aware of the startup landscape, to be able to connect dots on the fly, and to do it in a scalable way. Those are services we are trying to provide for all the companies we work with.

“Iterate Studio works closely with approximately 45 startups, semi-closely with another 100, and we are aware of hundreds more.”

# SUCCESSFUL INNOVATION APPROACHES

*"I think it is important not to just think about product innovation; you always need to rethink your business model. Eventually it is the business model that will determine whether you are commercially successful."*

*– Claus von Riegen*

*"Innovation ultimately is a delicate balancing act between improving the legacy and driving radical innovations."*

*– Claus von Riegen*

*"There are a number of parameters [for measuring the success of innovation]. The most important one is the satisfaction of my internal customers."*

*– Claus von Riegen*

*"The key is to bring the right people along for the journey at the right time – not too soon, not too late – and having the right integrated teams that include the business working on ideas together."*

*– James Patterson*

*"To thrive in the digital age, organizations need to evolve from hierarchical and process-centered structures to being talent-driven. They must empower people to propose and defend innovative ideas, and give them autonomy to execute these ideas."*

*– Pablo Rodriguez*

*"If you embrace the distributed startup community, you are embracing an R&D effort on the level of GAF A. The startup community can be your digital lab or greatly enhance it. What we are trying to do is organize this disorganized startup community, so they can be engaged and embraced a lot easier by large enterprises."*

*– Jon Nordmark*

*"Large organizations should think about releasing their data and rely on third parties to innovate on their behalf rather than trying to innovate internally. Large organizations have a pivotal role to play in the innovation ecosystem by publishing their data as open data. Today, having an open innovation strategy without open data makes no sense."*

*– Gavin Starks*



# Innovating Through Open Data



## Gavin Starks

*CEO of the Open Data  
Institute (ODI)*

**G**avin Starks is the CEO of the Open Data Institute (ODI). Founded by inventor of the Web Sir Tim Berners-Lee and Sir Nigel Shadbolt, the ODI is an independent non-profit, non-partisan organization partly funded by the UK Government working to unlock the value in open data. The Institute supports and promotes open data in business, governments and society, and convenes experts to collaborate and nurture innovation through open data. Capgemini Consulting spoke with Gavin to understand the role of open data and how it can drive innovation. Gavin is also a musician and a Fellow of the Royal Society of Arts.

## Understanding Open Data

### Can you define the concept of 'open data'?

It is important to look at the overall data spectrum in order to understand what we define as 'open data'. Open data is data that anyone can access, use, and share. The key difference between open data, shared data or closed data is the licensing conditions that accompany them. We define open data as data that is licensed openly.

At one end of the spectrum, you have national security information that is rightly closed. Then we have shared information which refers to data that is shared between different organizations. Datasets in this category could be your health records that are shared between doctors and health services. And lastly you have open data which encompasses information such as bus schedules and prices.

**Open data is data that anyone can access, use, and share.**

**Open data touches on every part of our lives. We now have an increasing amount of open data produced by the private sector.**

### What kinds of open data are available?

Open data touches on every part of our lives. The current data available ranges from transport timetables and routes, weather data, pollution levels, to geospatial data, company and land registries or government accounts. We now have an increasing amount of open data produced by the private sector.

### Open Data in Practice

#### What are some of the most exciting innovations you have seen that have been built on open data?

Let me give three examples from our startup community.

An interesting example is that of TransportAPI – a startup that seeks to create a single, comprehensive source of UK transport information. Transport data is scattered across lots of different providers

and TransportAPI consolidates timetables, routes, live running and performance history information for a wide range of transport types, including cars, buses, trains and bicycles. They have already gathered 70% of UK's transport data from open sources – for example, data on 360,000 British bus stops and 2,500 rail stations. It's a perfect example of an emerging supply chain, where transport providers publish their data, TransportAPI picks it up, cleans it, and turns it into a better format, combines it with other data, and provides it as their API. Businesses can use TransportAPI's transport data for a range of commercial purposes, from advertising to journey planning. It has already fostered a network of over 1,100 developers and organizations that work with the data to create apps and other services. Their business model is based on the number of hits that the app receives every month.

**Large organizations should think about releasing their data and rely on third parties to innovate on their behalf rather than trying to innovate internally.**

Another interesting startup is Open Utility. They have created a platform for energy trading – an “ebay” for electricity. The peer-to-peer trading service lets renewable generators set the price for their electricity and make it available to local commercial energy consumers to buy. This marketplace was made possible thanks to the availability of energy data as open data. Their business model is based on a transaction fee.

Finally, OpenSensors.io offers real-time data access, data security and storage, analytics and machine learning via its IoT platform. OpenSensors.io’s real-time messaging engine can process millions of messages a second from any internet-connected device, such as a sensor or camera. Businesses can use the platform for many purposes – from automating networks of car parks through license plate recognition cameras and motion sensors to optimizing office spaces by configuring devices such as thermostats, lights and locks to respond to the preferences of the people working in them. Anyone using the Opensensors.io platform to publish data can use it for free, providing their device publishes their work as open data. Paid plans are offered for private users. As a result, the platform provides access

to valuable real-time and historical open data generated amongst thousands of projects and their connected devices. This enables other individuals and businesses to use the data to experiment, innovate, and incorporate it into their own products and services.

### What is the role of private organizations in open data?

Large organizations should think about releasing their data and rely on third parties to innovate on their behalf rather than trying to innovate internally. Large organizations have a pivotal role to play in the innovation ecosystem by publishing their data as open data. Today, having an open innovation strategy without open data makes no sense.

### Can you give us some examples of private organizations opening up their data?

Syngenta is a good example. They have released data collected on 3,600 farms in 41 countries across Europe, Africa, Latin America and Asia Pacific, representing about 200 crop-climate combinations. It is the first time information at a crop level, including resource efficiency, has been made public in this way by a commercial organization. The data will be very valuable to

farmers, enabling them to increase productivity sustainably. This initiative is part of Syngenta’s Good Growth Plan commitment to help improve the fertility of 10 million hectares of farmland.

**Today, having an open innovation strategy without open data makes no sense.**

Arup – an engineering organization with 11,000 employees – is also a strong advocate of open data. They conduct large scale infrastructure projects around the world. In the course of such projects, they obtain huge amounts of information about the environment, from soil quality, designs and plans of cities to underground infrastructure such as water cables. The company releases most of this data as open data and they are collaborating with startups to build great insights and innovative solutions.

Syngenta and Arup are not isolated examples. Pharmaceutical companies, for instance, are starting to share information as open data and are working together to solve big questions, such as the next antibiotic.



**[Syngenta] have released data collected on 3,600 farms in 41 countries across Europe, Africa, Latin America and Asia Pacific, representing about 200 crop-climate combinations.**

#### **How about public organizations?**

Even if large amounts of open data have already been published, public organizations need to be encouraged to release more open data, that is most needed by society. Geospatial data, address data, meteorological data or land valuations data all hold immense potential if released as open data. For instance, in Denmark, in 2002, the Government made the national address file available for free; since then it has calculated a 30 to 1 ratio of direct financial benefits to cost. Governments need to be more aware of the significant social, environmental and economic benefits of open data.

At the ODI, we have worked extensively with the World Bank on international development in places such as Burkina Faso, helping them to map where schools are located and their proximity to services, transport and sanitation. Open data is being used across the world to help better target responses to disasters and wars. In Ukraine, for example, journalists collaborated to crowdsource locations of shelling to then geotag pictures of the damage. The local government joined in and started using the data to prioritize and mobilize the reconstruction process. In the aftermath of the Haiti earthquake, OpenStreetMap collated open mapping data and crowdsourced data about the physical damage caused, later becoming the default map for rescue organizations.

**In Denmark, in 2002, the Government made the national address file available for free; since then it has calculated a 30 to 1 ratio of direct financial benefits to cost.**

**Our key challenge is to make organizations realize that open data is actually core to their business, to innovation and not peripheral.**

#### **Are more organizations aware of open data?**

We have over 250 members of the Open Data Institute from the commercial world. We have trained over 2,000 people in the last 18 months including executive leadership teams, policymakers, procurement officers, and lawyers. We have reached over 900,000 people in the last two years since we started, but it is still a drop in the ocean from where the potential is. Our key challenge is to make organizations realize that open data is core to their business, to innovation and not peripheral. The major barrier for organizations to open up their data is cultural. This is valid for big and small organizations, universities, the public sector, local authorities and central government.





# Innovating through Open Data

## Open Data is Widening its Footprint and Value



The web of data will soon dwarf the web of documents.

The UK has published more than **15,000** government datasets as Open Data.



Open Data helped uncover **£200 million per year** in potential NHS<sup>1</sup> savings.

Open Data research has helped tube stations plan service delivery and staffing.

<sup>1</sup>NHS - UK National Health Service



Startups are increasingly innovating with Open Data in – healthcare, property, energy and agriculture.

## Exciting Innovation Spawned by Open Data is Augmenting Social and Customer Value



**TransportAPI** – seeks to create a single, comprehensive source of UK transport information.



**Open Utility** – a platform for energy trading between people.



**OpenSensors.io** – offers real-time data access, data security and storage, analytics and machine learning via its IoT platform.

## Organizations are Warming up to Open Data's Potential



**Syngenta** – released crops data from **3,600 farms** in **41 countries**.

ARUP

**Arup** – an engineering organization that conducts large-scale infrastructure projects around the world, releases most of the data it collects on **environment, design and plan of cities**.



**Pharmaceutical companies** are starting to share information as open data and working together to solve big questions, such as **the next antibiotic**.

### How do you convince large organizations that open data is a key building block for innovation?

We start with data literacy; we hold executive workshops and train different parts of the organization, such as the legal team or the CTO office. We then network the organization with startups or other large companies, which are generating significant benefits by releasing or leveraging open data. Most companies understand the importance and value of open data but they are overwhelmed by the volume of data they possess and are not sure how to start.

### What kind of innovation would you like to see emerging from open data?

I would like open data to help solve some of the major challenges our society is facing. For example, in agriculture, how do we distribute the food we are producing more effectively or how do we double production and have the inputs in farming for livestock, so that we can meet growth and demand.

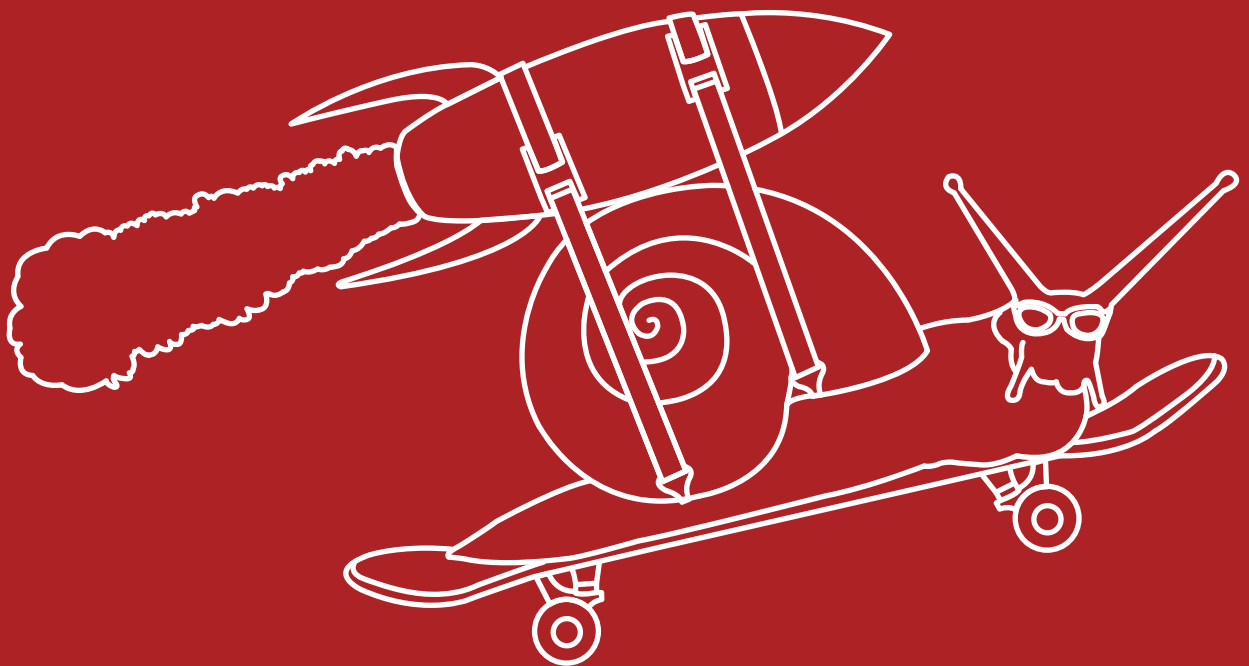
Ultimately, I would like to see a change in company mindsets in regard to open data. 'If we start sharing our information, we will benefit too' – this cultural shift is needed to innovate in the twenty-first century.

“If we start sharing our information, we will benefit too” – this cultural shift is needed to innovate in the twenty-first century.





# The Innovation Oscars: Lessons from the Pioneers





**Claus von Riegen**

*Vice President and Head of  
Business Model Innovation (BMI)  
at SAP*

## Innovating at SAP – the Delicate Balance between Incremental and Radical Innovation



**C**laus von Riegen is Vice President and Head of Business Model Innovation (BMI) at SAP. He chairs the BMI Service Center that designs and implements new business models across the organization. Previously, Claus von Riegen held various management positions in product development where he most recently was responsible for SAP's industry standards and open source strategy. Capgemini Consulting spoke with him to understand how a large organization such as SAP manages innovation.

### Can you describe SAP's innovation approach?

The majority of today's economic transactions go through an SAP system at some point, so we have an important responsibility to ensure that this infrastructure runs in a seamless and consistent manner and is not disrupted. Therefore, we continuously implement incremental innovations to improve the efficiency and value of this infrastructure.

**Innovation ultimately is a delicate balancing act between improving the legacy and driving radical innovations.**

However, this is not sufficient in itself, and we always have to keep thinking of new types of products, customers, markets and revenue streams. Innovation ultimately is a delicate balancing act between improving the legacy and driving radical innovations. SAP HANA, which currently has more than 6,000 customers, is

a good example of a successful, radical technology and business innovation we introduced a few years ago.

### What is the role of business model innovation at SAP?

Product innovation on its own is not sufficient, so we are placing increasing emphasis on business model innovation. Actually, we have realized that many new technologies and products can't really take off without a truly new business model. Same is true with our customers - there is, for example, a clear trend towards a digital transformation. Currently, we see CIOs being challenged by their boards. If CIOs don't embrace the transformation, they'll just be "keeping the lights on".

### Can you explain how you govern innovation throughout the group?

We have SAP Labs pretty much on all continents. These labs focus mostly on incremental innovation - their mission is to concentrate on the standard portfolio and the new versions of our products by co-innovating with our customers and partners.

**Many new technologies and products can't really take off without a truly new business model.**

Independent from the standard development organization, we have our innovation center network. It focuses on mid-to long-term research and innovation. These innovation centers are very open to the outside world and tap into the ecosystem of startups and academics.

### Why did you decide to have a separate innovation center network?

We started our innovation center network a few years ago. Innovation was obviously happening at SAP in the past, but it wasn't structured that way. What we have seen over the years is that it's really important to keep incremental and radical innovation separate. The investment horizon is completely different and you need different resources, different partners and a different environment. The application of SAP HANA in healthcare, especially in the treatment of cancer, is a good example of a long-term play that would have not been considered part of our standard portfolio in the past. People in the innovation center network should feel that they have a long-term horizon to develop breakthrough innovations and not feel like they have to move to a different project every six months.

If you want to be successful in both core and disruptive innovation, you have to keep them separate organizationally.

**It's really important to keep incremental and radical innovation separate.**

**Your team looks at business model innovation specifically. Can you give us some background into its creation?**

We created this team around 2.5 years ago. One of the reasons we started it was because people with great ideas ran into what you might call corporate boundaries. There were many challenges: the types of legal contracts we accept, the types of revenues we want to generate, the types of licensing agreements we have in place, among others. What we saw was that even when a great idea emerges, the corporate 'immune system' tries to prevent innovation from happening. The reason for that is clear. The organization is currently set up to protect and optimize the current business model. So that's why we created this team with an explicit mandate to amend or sometimes even disrupt our current business model.

**Is the business model innovation service center a fully dedicated team or do you have people from across the organization who dedicate part of their time?**

Our team is mostly virtual – we rely extensively on local organizations and teams and work with them virtually on innovative business models. When we created the team, we thought about whether we should create a large central organization. It may have worked quite well at the start, but domain expertise is lost over time because a lot of innovation also occurs at the local level. Obviously, the challenge now is to make sure that our virtual team members are able to dedicate enough time to our work because they all have their day jobs.

**The organization is currently set up to protect and optimize the current business model. So that's why we created this team with an explicit mandate to amend or sometimes even disrupt our current business model.**



# SAP



**74%** of the world's transaction revenue touches an SAP system



SAP's customers include **98%** of the 100 most valued brands and **87%** of Forbes Global 2000



SAP is a leading cloud vendor with **82 million** subscribers and a market leader for mobile business apps with over **130 million** mobile users



## Innovating at SAP



HANA is a good example of a successful radical innovation – now has **over 6,000 customers, 850,000 active users** and **2,100 startups** developing on HANA platform



### SAP's innovation footprint



**21** research locations



**14** SAP Labs around the globe – focus on a standard portfolio and the new versions of products by co-innovating with customers and partners



Partner network with over **13,000 SAP partner companies** around the world



Sapphire Ventures, operates independently from SAP, invested in **over 150 startups** globally since 1996, with **US\$ 1.4 bn** capital under management

The intrapreneurship program is the right channel for out-of-the-box ideas: innovations that would not be considered part of our current product portfolio development. We have recently selected five winners out of more than 400 cases that were assessed as part of the first wave of the program. The people behind these ideas can now go into a fellowship that runs over three months, and dedicate up to 100% of their time to further validate their idea. We believe it needs to be these people, who are behind the idea and really believe in its value, who then also need to validate it and demonstrate its potential in front of customers.

### **How do you establish a link between the innovation teams and the rest of the organization?**

It's been one of my key priorities for the past 2.5 years. After we established my team in early 2013, we have always focused on building bridges with the rest of the organization. We now work very closely with our sales teams, our support and services units, the development organization and obviously our partner organization. By creating strong connections with the business early on, we have realized that we can create more value faster.

### **How do you measure the outcome of your innovation initiatives?**

There are a number of parameters. The most important one is the satisfaction of my internal customers, that is, the teams and their sponsors who want to drive new business models. That's the first and foremost KPI. I need satisfied customers and success stories so that we can get more traction with other parts of the business.

Another key parameter is the number of cases that we support in the team. We need to demonstrate that SAP overall becomes more innovative and agile. The last KPI that we use is the commercial success of the innovations we have delivered. Sometimes we only see the revenue opportunity materialize after a period of two to three years. In such cases, it can be challenging for me and my team to be measured by such KPIs. But still, this is something that we track.

### **What would be your advice for other large organizations?**

First, I think it is important not to just think about product innovation; you always need to rethink your business model. Eventually it is the business model that will determine whether you are commercially successful.

**Disrupt yourself before being disrupted by others. But to make this happen, you have to create a separate team with the explicit mandate to disrupt the business and make it a priority.**

Second, you need to understand when to adapt your business model. You need to be constantly on the lookout for any leading indicators or trends in the market that could indicate that you have to revamp your business model.

Third, disrupt yourself before being disrupted by others. But to make this happen, you have to create a separate team with the explicit mandate to disrupt the business and make it a priority. Otherwise, this team will be fought against and be killed in the corporate battlefield.

### How can your team work around the ‘immune system’ that tries to thwart innovation?

Let me give you an example. A number of teams have proposed that SAP leverage the value of the data that flows through our applications and networks. The idea is that SAP should move into the data business and eventually anonymize, aggregate and analyze data. And through such an aggregation, we can then provide services to our customers that weren't possible before. For example, as a chief procurement officer you would then be able to manage your spend based on benchmarks you get across your industry. Now, if you raise this idea, the first thing that many people will ask – which is part of the corporate immune system – is: ‘how can we comply with all the data protection and privacy regulations?’ Others would say, ‘good luck, but we will never support you, and the SAP board has no interest to move into the data business’. And the idea would soon be shelved.

However, with the arrival of our team – the business model innovation service center – we can make a case, and try to find a middle ground. We might see whether we could start in markets where we can comply with data protection and privacy regulations. We can then launch some pilots and, if customers accept and trust the security and usefulness of our solution, we can consider rolling it out in other markets. The business model innovation center effectively provides an environment that lets in-house entrepreneurs experiment with new types of business models until their market readiness is proven.

**By creating strong connections with the business early on, we have realized that we can create more value faster.**

### What are the other channels of innovation within SAP?

Innovation is not solely steered centrally – anyone can voice new ideas. But it creates the obvious challenge of prioritization as we are a large group of over 75,000 employees. We have an environment that we created last year called the intrapreneurship program. The idea is to leverage all the great ideas about new products and value propositions directly from our employees. We have a set of coaches who help employees formulate their ideas and jury members who assess and evaluate these ideas to eventually pick those which we as a company want to invest into.



## Unlocking Innovation through Intrapreneurship



### Pablo Rodriguez

*Director of Innovation at  
Telefónica and Head of  
Telefónica's Barcelona R&D lab*

**P**ablo Rodriguez is Director of Innovation at Telefónica and Head of Telefónica's Barcelona R&D lab. He also serves as adjunct Professor at the Department of Computer Science at Columbia University (New York) where he teaches Social Networks and Distributed Systems. Capgemini Consulting spoke with Pablo Rodriguez to understand how companies can look to 'intrapreneurship' as a tool to foster innovation. In 2014, Telefónica invested nearly €7 billion in research, development and innovation programs and it is the world's second largest operator in terms of investments in R&D.

## Innovation in the Digital Age

**Do you feel the need for a different approach to innovation compared to, say, a decade ago?**

Perhaps the most important element that needs a rethink is the diversity of talent. Diverse teams are better able to spawn innovative ideas. Realizing this, we are adopting an entirely different way of setting up our innovation teams. For instance, our innovation lab in Barcelona has nearly 300 people from varied backgrounds, such as technology, psychology, design, political science and big data.

**Our innovation lab in Barcelona has nearly 300 people from varied backgrounds, such as technology, psychology, design, political science and big data.**

To thrive in the digital age, organizations need to evolve from hierarchical and process-centered structures to being talent-driven.

They must empower people to propose and defend innovative ideas, and give them autonomy to execute these ideas.

**To thrive in the digital age, organizations need to evolve from hierarchical and process-centered structures to being talent-driven.**

**Beyond talent, how have you evolved your approach to innovation?**

We have become much more open. We derive our insights and inspirations to innovate from many external forums, such as startup ecosystems, universities and collaboration with other industries. Telefónica is the founding partner of the European Commission's Startup Europe Partnership initiative, which aims to connect Europe's best startups to corporates. We're also part of the European Digital Forum, a think-tank dedicated to empowering tech entrepreneurs and growing Europe's digital economy. I believe that opening up innovation, working more

with partners, and being agile enough to include everybody's contribution represents a big shift in innovation in this digital age.

**The 'Intrapreneurial' Approach to Innovation**

**How is Telefónica fostering innovation throughout the organization?**

Our innovation team – Telefónica I+D – coordinates the global strategy for digital innovation across the group. We set it up in 1988 with a mission to make the group more competitive through technological innovation. We have about 650 employees as part of this group, with a majority of them being university graduates, representing 18 nationalities. From its inception, the group has been instrumental in churning out innovative products. For instance, it contributed to our public phone booths in 1990, internet access services in 1996, connected cars in 2000 and interactive digital TV in 2004.

We have been a pioneer in adopting the Lean Startup approach for our internal entrepreneurship, or 'intrapreneurship' initiatives, where we promote our own employees to become entrepreneurs. It allows us to create opportunities that are not necessarily 'low-hanging

fruit' and grow them to become sustainable businesses. Our intrapreneurs have helped us launch initiatives in some revolutionary areas, such as software-defined networking, machine learning, cyber security and privacy.

**I believe that opening up innovation, working more with partners, and being agile enough to include everybody's contribution represents a big shift in innovation in this digital age.**

This approach is in stark contrast to the more conventional approach. That demanded elaborate business plans and years of investment, yet often the end result was a product or service that didn't meet customer expectations.

**How does your 'intrapreneurship' initiative work? How does it nurture innovation projects from inception to reality?**

We seek to promote employees who have a start-up 'mentality' and a determination to create new things. Any employee can participate in the program by proposing ideas at any time of the year. We pick up the ideas that demonstrate the potential to create future business for Telefónica over the next one to five years. We also encourage multi-disciplinary teams to come together and form a 'start-up' that can take their idea from concept to reality. The teams then need to mature their ideas into sound project proposals before they can secure resources.

**Our intrapreneurs have helped us launch initiatives in some revolutionary areas, such as software-defined networking, machine learning, cyber security and privacy.**

**How much time can they dedicate to "intrapreneurship" activities at the different stages from ideation to design and implementation?**

We run the intrapreneurship program several times per year depending on our need to fuel new projects into the innovation funnel. Each time we start the program, we select ideas from intrapreneurs and we let them work in their project full time for three months. During this time, we implement a safety net mechanism that encourages people to participate in the program: once the three months' period is finished we allow them to return to their original position if their idea doesn't succeed. But if they succeed they will continue working full time in the project during its whole life.

**How do intrapreneurs secure resources for their projects and what happens to successful ideas?**

Once an innovator's idea has been refined to a certain level, a venture-capital setup decides whether to invest in it. If funded, the project is executed by first testing its attractiveness among a set of customers. For this, innovators run two to six 'test-

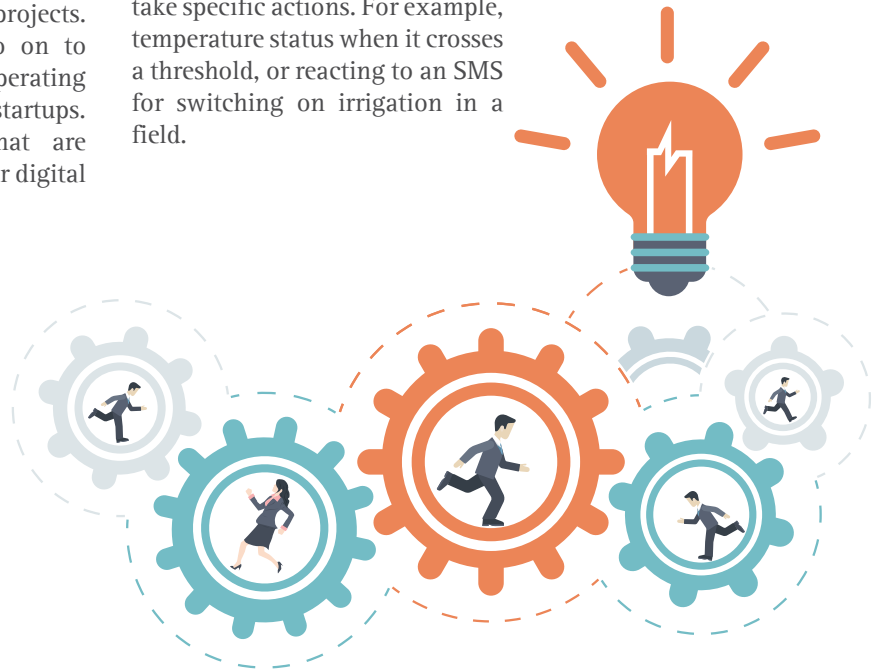
and-learn' cycles. Each cycle involves designing and building a prototype, followed by testing it in selected markets by working with local sales and marketing teams, and measuring the success. The key output of these cycles is the learnings from the market. At the beginning, projects work with minimal resources and then investment increases as projects validate their key hypotheses.

These projects start generating meaningful insights in one-and-a-half months or less. We have been able to accelerate innovation cycles by up to two-and-a-half times while using only half the budget required for usual projects. Some of the projects go on to become Telefónica's operating businesses or internal startups. Those are the ones that are defining new roadmaps for digital innovation at Telefónica.

### Can you give us an example of a successful intrapreneurship project launched in the market?

One of the intrapreneurship projects that we launched in the Internet-of-Things (IoT) space is called "Thinking Things". It is a simple product for enterprises to help build their own IoT solution. The 'Things' in Thinking Things are modular devices such as sensors, actuators and a core module that helps these sensors connect to any telecom network. Like Lego bricks, customers can attach these devices to their machines or systems to remotely monitor their performance and take specific actions. For example, temperature status when it crosses a threshold, or reacting to an SMS for switching on irrigation in a field.

**We have been able to accelerate innovation cycles by up to two-and-a-half times while using only half the budget required for usual projects.**





### Can you tell us more about Telefónica's external forums for innovation, in particular – the Open Future\_ initiative?

Telefónica has been very active in integrating with the entrepreneurial ecosystem through accelerators, venture capital funds and the Open Future\_ program. Open Future\_ is our global entrepreneurship and open innovation network, involving 62 public and private partners, entrepreneurs, startups and investors. Our aim is to encourage entrepreneurship in local talent, promote the growth of that talent with tools to accelerate their business, and provide necessary investment to those projects with the greatest potential, thereby helping them scale up.

**We have, along with our partners, committed to invest €300 million in the [OpenFuture\_] program.**

Open Future\_ operates in 17 countries and is very closely connected with the key technology hubs and countries where we operate. We have, along with our partners, committed to invest €300 million in the program.

**I believe relying on one or two programs to create an innovation culture can only have limited results. It has to be a combination of efforts led from the top.**

### Creating a Culture of Innovation

#### Beyond intrapreneurship, what are the other initiatives that you launched to create a culture of innovation?

I believe relying on one or two programs to create an innovation culture can only have limited results. It has to be a combination of efforts led from the top. First, we have defined our way of working at the group level with three key attitudes: discover, disrupt and deliver. These attitudes also embrace a spirit of innovation that all employees are encouraged to embrace. Second, we have set up an innovation

committee composed of very senior leaders and board members that meet several times a year to monitor and guide innovation projects across the group. Third, we organize major events, such as TEFcon, which is an annual conference to bring together more than 350 engineers, developers and designers involved in innovation projects from most of our group companies. Fourth, some of our young millennial employees are also intrapreneurs and they actively participate in forums, such as One Young World, to spark a discussion on how a young workforce can change a corporate using intrapreneurship. All these elements have helped us percolate a culture of innovation through the organization. It made people feel that they are part of accelerating our transformation into a digital company.

**We have been largely focusing on predicting human behavior, IoT and privacy of identity.**



# Unlocking Innovation through Intrapreneurship

## Telefonica



Invested nearly **€7 billion** in research, development and innovation programs in 2014



**Open Future** is Telefonica's global entrepreneurship and innovation network



**World's second largest operator** in terms of investments in R&D



Committed to **€300 million** investment along with its 62 partners, invested in **over 550 companies**

### Telefonica is Redefining Three Key Aspects of Innovation for the Digital Age



#### Open Innovation

Founding partner of European Commission's *Startup Europe Partnership* initiative, aims to connect Europe's best startups to corporates.



#### Diversity of Talent

Barcelona innovation lab: 300 researchers from very diverse backgrounds – technology, psychology, design, and hacking.



#### Startup Methodologies

Internalizing startup methodologies such as – Lean Startup, Failing Fast, Test-and-learn etc.

### Telefonica is Using Intrapreneurship to Foster Innovation

Intrapreneurship helps **accelerate** innovation cycles by up to **2.6 times** compared to usual projects, at nearly **half the budget**

Set up in 1988, **Telefonica I+D** coordinates group's global digital innovation strategy  
Has nearly **650 employees** from **18 countries**

### Innovation Sprouting Future Businesses

- I+D launched the "TU Go" app – allows users to make calls from any device and over WiFi
- Thinking Things – allows enterprises create their own Internet of Things (IoT) solutions using simple blocks of sensors and connecting devices

### What are the key innovation themes that you are currently working on?

We have been largely focusing on predicting human behavior, IoT and privacy of identity. Predicting human behavior is opening up new opportunities by analyzing massive amounts of data, such as helping launch big societal initiatives. We funded one of our innovation projects in the area of ‘Smart Tourism’. The project analyzes mobile network data to better distribute economic benefits of tourism among residents while helping tourists enjoy a high-quality experience. In the realm of privacy of identity, we have partnered with MIT, and the Open Data Institute run by Tim Berners-Lee and Mozilla Foundation, to launch the Data Transparency Lab. It seeks to advance transparency of online personal data.

### What level of success have you seen with your innovation initiatives?

We have had a good track record of innovation successes during these years. The main difference from the past is how efficient we have been in using our innovations funds that has led to a high number of successful

products launched to the market. As I’ve mentioned before, we have reduced our financial needs by half which, in the long term, will mean to double our success rate.

**We have reduced our financial needs by half which, in the long term, will mean to double our success rate.**

One example is the “over the top” television solution of Telefónica that has been developed internally within the innovation program. It started with the work of only three engineers and ended up with a solution that, at the end of 2014, has been deployed in 4 countries and has more than 400 million users.

Recently, we became the first telco in the world to launch a browser-based calling product using WebRTC technology. This product – TU Go – is the result of our in-house innovation program. TU Go is an app that allows people to always stay connected and use voice calling and texting features through any mobile device, such as tablets and laptops, not just their mobile phone. We have found that

TU Go users communicate more, have longer calls and are more loyal to Telefónica. After its initial success in the UK, we launched it in Argentina last year.

Through our Open Future program, we have invested in more than 550 companies and created new digital employment for more than 5,000 people. We have also been a part of successful funding rounds for Sigfox, which raised \$115 million, and Cyanogen, which raised \$80 million.

**We have partnered with MIT, and the Open Data Institute run by Tim Berners-Lee and Mozilla Foundation, to launch the Data Transparency Lab.**





## Bringing Ideas to Life – the Core Principles of Innovation Centers



### James Patterson

*Managing Vice President and  
Head of Capital One Labs*

**J**ames Patterson is Managing Vice President and Head of Capital One Labs, the experimental product and technology arm of Capital One. Capital One Labs is a network of innovation centers located in San Francisco, New York and Washington D.C. Over the past four years, the network has involved over 100 entrepreneurs in reimagining the way 65 million people interact with their money. Established as a credit card company, Capital One is now a Fortune 500 company and one of the top 10 banks in the US. James Patterson is also involved in driving digital transformation efforts across the organization, with Capital One a recognized digital leader. 75% of its customer interactions are digital and it conducts over 80,000 Big Data experiments a year. Capgemini Consulting spoke with James Patterson to understand more about the core building blocks of innovation centers in large enterprises.

## What was the rationale behind the creation of Capital One's innovation centers – Capital One Labs?

Capital One Labs was set up nearly four years ago. We're a group of just over a hundred product managers, designers, design thinkers, engineers and data scientists across three offices. We serve as the experimental product and technology arm of the company and our priority is to accelerate Capital One's product and business agenda. We conduct experiments and test new products and concepts that we know will be important for our business, but don't yet deliver revenues or returns on investment. We focus on areas that are disruptive or radically different from our current offerings. We take a 24-month horizon and spot potential disruptors that will have an impact on the areas where the business wants to grow in that timeframe. The business focuses on near-term improvements with relatively predictable, short-term results, while we concentrate on less predictable – yet potentially far-reaching – returns.

**We're a group of just over a hundred product managers, designers, design thinkers, engineers and data scientists across three offices.**

**We concentrate on less predictable – yet potentially far-reaching – returns. Capital One Labs is a natural extension of who we already are as a company.**

**Many innovation centers fail to make an impact because they are disconnected from the rest of the business. How are you tackling this issue at Capital One?**

Capital One Labs is a natural extension of who we already are as a company. There is no disconnect between our team and the rest of the business because we share the same culture of entrepreneurship. Capital One is the largest founder-led bank in the country and is operating at this scale – over 65 million customers. At Capital One, innovation is not just for one team, but for the whole company. We have a strong culture of long-term investments in innovation and as a startup in the 1990s we transformed the industry by becoming the first bank to create mass customization of credit cards with a personalized APR. So our businesses and the Labs share the same understanding of what innovation truly means.

## How do you work with the business?

Business teams reach out to us whenever they have an insight or an idea that they feel we can help them grow. And vice versa, if we are working on something that can be a potential breakthrough for the business, we involve them at the right time. The key is to bring the right people along for the journey at the right time – not too soon, not too late – and having the right integrated teams that include the business working on ideas together.

## How is Capital One Labs placed within the broader Capital One organization?

We are in the technology and digital division that falls under the Chief Enterprise Services Officer, who runs all of enterprise technology and operations. Being in a centralized division versus being within any one line of business (LOB) gives us a unique advantage. It allows us to take an enterprise view and focus on holistic consumer experiences that may not fall neatly into any single LOB.

**The key is to bring the right people along for the journey at the right time – not too soon, not too late.**

“**Creating excellence at small scale is relatively straightforward. Doing so at scale is extremely hard. And that’s where most innovation centers struggle.**”

#### **What is your level of investment in Capital One Labs?**

I think the key here is more about independence than the absolute investment. We have the complete, independent budget to pay for all of the resources and people required to run alpha and beta tests and experiment with technology. Even if the business is integrated into an alpha test, we can self-fund it, so we do not have to ask the business for anything that we start.

“**We are very careful and selective about who we bring in.**”

#### **What are the key challenges you are facing in running Capital One Labs?**

I think the biggest challenge is to scale something that’s really compelling. Taking something from a prototype or market pilot to scale is extraordinarily hard to do. That’s primarily because you are involving a totally different and expanded cast of characters to get to scale compared to just getting to pilot. It’s not good enough to just have an idea and to get it in the hands of a few hundred people. I keep myself accountable to making sure that the ideas that go to pilot actually get to production. And that involves an enormous amount of coordination and collaboration across the company.

Creating excellence at small scale is relatively straightforward. Doing so at scale is extremely hard. And that’s where most innovation centers struggle.

Another key challenge is obviously talent. We are very careful and selective about who we bring in. We have incredibly talented people in our Labs but it takes a very long time to recruit the right people.

#### **Are Capital One Labs helping create an innovation culture within the company?**

As you bring new ideas into the company, you have to model what it means by doing as opposed to talking. The highest calling we have is to demonstrate the power of an idea or an insight through actually bringing that into reality rather than just talking about it. I think our ‘learn by doing’ approach versus what you might call a ‘learn by PowerPoint’ philosophy is getting a lot of traction across our business. Building a true ‘maker’ culture has been our most important impact on the organization.

“**The highest calling we have is to demonstrate the power of an idea or an insight through actually bringing that into reality rather than just talking about it.**”



However, I question whether we would have had the same success in a different bank, even if we had exactly the same people and initiatives. I think our success is very much due to who we are as a company – an organization obsessed with innovation.

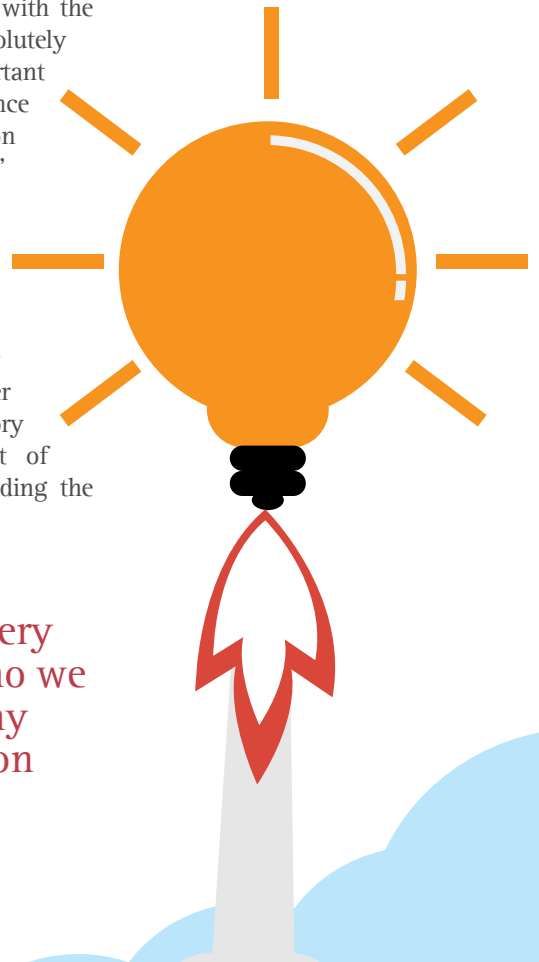
### Could you share some success stories?

One very good example is the launch of the Capital One Wallet that works with Apple Pay. This app helps you quickly verify your account balances and details and keeps you connected to your spending. The initial elements of this product were developed in Labs and served as the foundation for the product that was ultimately delivered by the enterprise. Another example is Second Look, which is a service that combs transaction data to look for anomalies in our customers' spending, such as an unusually high tip or a cable bill that is well beyond what it has historically been. The customer is alerted to the charge via a text message or email. It's one way we are looking out for the customer using information we already have available. This capability was incubated in Labs in partnership with our Card team.

### What are the key ingredients for making an innovation center a success?

Great talent, great culture, great ideas, and great relationships across the company and with the tech community are absolutely essential. It is also important to know the difference between true innovation and “innovation theater,” or shiny object syndrome. True innovation is unglamorous, incredibly hard to do, and requires persistence over many years. When we deliver a beautiful consumer experience, the bigger story is the immense amount of work that goes into building the capability under the hood.

**Our success is very much due to who we are as a company – an organization obsessed with innovation.**





# Capital One Labs - Manifesting the Core Principles of Innovation Centers



Capital One is a **Digital Leader**, conducting more than **80,000 big data experiments** a year and processing **75%** of customer **transactions digitally**

## Capital Ones Labs...



Is a network of innovation centers across **3 locations: San Francisco, New York and Washington D. C.**

Set up nearly **4** years ago



A team of just over **100** product managers, designers, design thinkers, engineers and data scientists



The experimental product and technology arm of Capital One

## Getting the Basics of Innovation Centers Right



Focuses on a **24-month** horizon and **spot** potential disruptors with **less predictable** yet **far-reaching returns**



Has the **complete** and **independent budget** to pay for all **resources** and **people** required to experiment with technology



Fosters **connections** with the tech community by selectively working **with startups** to **accelerate** their product agenda

## Key Success Stories



**Capital One Wallet**, a payment app that seamlessly **works with Apple Pay**



**Second Look**, a service that helps customers **spot anomalies** in their **spends**

Great talent, great culture, great ideas, and great relationships across the company and with the tech community are absolutely essential.

Fostering connections with the tech community is also a key function of Labs. We selectively work with startups who can accelerate our product agenda. There are a lot of interesting startups out there. The important thing is to have a sound judgment as to which ones to spend time with. Not all startups are created equal. You have to strike the right balance between the talent that you have internally and the need to rely on startups.

#### Has Capital One acquired startups to kickstart innovation?

We have made several acquisitions. They have been smaller companies – we don't try to acquire companies with really high valuations. We are particularly strong at integrating startups into our company and giving them the space, time, and resources to do their best work. Capital One is a mission-driven company and we are careful to engage only startups who believe in our mission and who complement our culture.

There are a lot of interesting startups out there. The important thing is to have a sound judgment as to which ones to spend time with.

We partner closely with our ventures team, Capital One Ventures, which is led by the former CEO of a startup that we acquired. We sit in the same offices and they help us identify and connect with the right companies

I think that is actually the best scenario when the business units themselves are asking for your capabilities and funding it.

#### How have Capital One Labs evolved since they opened?

The Capital One Labs team has been growing fast – we have doubled in size over the past three years. This is due to the pull we are getting from the business units. I think that is actually the best scenario when the business units themselves are asking for your capabilities and funding it. Also, many of the founding members of Labs have moved into the business and are driving major impact across the company.

# The Innovation Game: Why and How Businesses are Investing in Innovation Centers

By **Brian Solis, Altimeter, Jerome Buvat and Subrahmanyam KVJ, Capgemini Consulting**

## Why Should Companies Launch Innovation Centers?

We live in an era of digital Darwinism. As technology and society evolves, it becomes imperative that organizations also evolve their business models. Companies that don't invest in counter-disruptive measures will learn that evolution doesn't wait. 52% of the Fortune 500 have merged, been acquired or have gone bankrupt since 2000<sup>1</sup>. Over the last ten years, there are myriad examples of established corporates that have fallen on difficult times. How can companies avoid this fate? The answer is innovation.

**52% of the Fortune 500 have merged, been acquired or have gone bankrupt since 2000.**

## Innovation Has Never Been More Important...Or So Difficult

In today's highly competitive economy, innovation is more critical than ever. A recent survey of large corporations found that 65% of senior executives face increased pressure to innovate<sup>2</sup>. However, the challenges of innovation continue to defeat many. In 2014, around \$1.6 trillion was spent on R&D globally<sup>3</sup>. Despite this significant investment, the results are falling short. In consumer goods, for example, research shows that more than 85% of new products fail<sup>4</sup>.

To excel in these times requires innovation, to protect against external threats and create new competitive advantage. But many R&D teams at large and traditional corporations seem ill-equipped to respond. They can be constrained by legacy organizational models, risk-averse cultures, and a rigidity of approach. A recent study revealed that only 5% of R&D staff feel highly motivated to innovate<sup>5</sup>. This is a worrying tendency given the urgency to innovate.

## Enter the Innovation Center

The weaknesses of traditional innovation approaches have led a number of ambitious organizations to seek new inspiration. These organizations have launched innovation initiatives or full-blown innovation centers in major technology hubs with the explicit mandate to accelerate digital innovations. Innovation centers achieve this by rethinking customer experience, improving operational efficiency and testing new business models through the use of digital technologies such as Big Data, the Internet of Things, Social, Mobile, Robotics, Augmented Reality and 3D Printing.

These innovation centers, comprising teams of people and often physical sites, are established in a global tech hub. The goal is to leverage the ecosystem of startups, venture capitalists, accelerators, vendors, and academic institutions that these hubs provide.

Debbie Brackeen, Citi Ventures, says that the mission of their innovation centers is to *“pioneer and test new disruptive solutions for customers, testing new business models and technologies that advance our position on the market... We’re looking at making significant impact to the overall business and not just incremental changes.”*

Over the last year, we interviewed leaders of innovation centers and also conducted extensive Web-based research of the 200 largest companies in the world by revenue. The research probed a number of key issues:

- What kind of companies are investing in innovation centers?
- Where are the preferred locations for setting up these centers?
- What are their mission and purpose?
- What are the challenges and critical success factors?
- How are outputs and results measured?

The research methodology at the end of this paper provides further detail on our approach.

### The Size of the Innovation Center Prize

Innovation centers offer a range of benefits. They:

- Accelerate the speed of innovation
- Provide a fresh source of ideas
- Enhance risk-taking ability
- Attract talent
- Drive employee engagement
- Build a culture of innovation

### Accelerate the Speed of Innovation

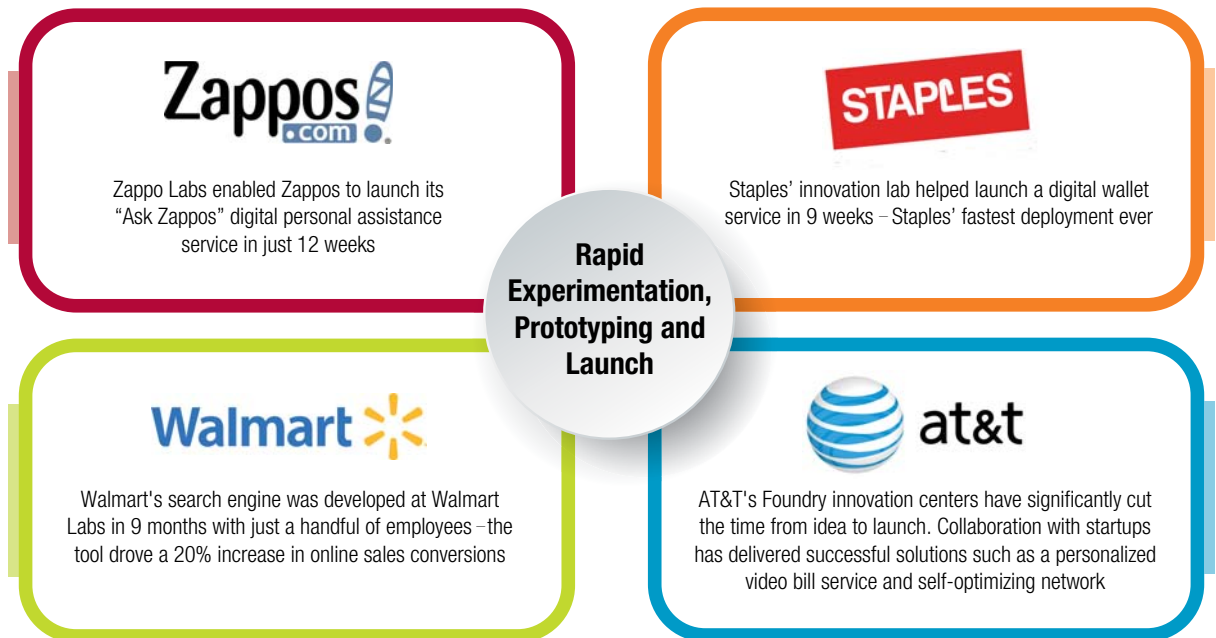
An alarming 90% of companies believe that they are too slow to market and often over budget<sup>6</sup>. Innovation centers can help resolve this issue. Walmart’s innovation center – Walmart Labs – helped develop an internal search engine in just nine months, driving a 20% increase in online sales conversions<sup>7</sup>. Staples’ innovation lab helped launch a digital wallet service in nine weeks – Staples’ fastest deployment ever<sup>8</sup> (see Figure 1).

**Walmart’s internal search engine, developed by Walmart Labs in 9 months, drove a 20% increase in online sales conversions.**

### Provide a Fresh Source of Ideas

Innovation centers, by virtue of their location and extensive engagement with the local community, can be a rich source of ideas. Many innovation centers actively reach out to startups, venture capitalists, academics, and other industry stakeholders for regular events. One executive from a major European financial services firm said: *“We have a stated goal to host over a million external people for different events, from big data to social media and emerging payments or peer-to-peer lending. We host hundreds of people in these events every day. The idea is that if you become sort of the epicenter of the velocity of ideas and innovation in the space, you will benefit from that.”*

Figure 1: Innovation Centers Accelerate the Speed of Innovation



Source: FastCompany, “How Zappos uses one-week work sprints to launch big projects fast”, July 2014 ; Adweek, “How an Office Supply Brand Stays On the Cutting Edge of Retail”, November 2014 ; Walmart, “Welcome Adchemy to @WalmartLabs!”, May 2014 ; Capgemini Consulting and Altimeter interviews

“  
**Our innovation center lets us take on risks that the rest of the organization may be unwilling to take on.**

– Ruth Yomtoubian,  
business innovation lead at AT&T Foundry

### Enhance Risk-Taking Ability

Unlike their larger, risk-averse parent organizations, innovation centers are inherently “risk-seekers”. In being so, they move the entrepreneurial risk away from the parent organization. This ability to take on risks is crucial for delivering innovation. In the words of AT&T’s Ruth Yomtoubian: “Our innovation center lets us take on risks that the rest of the organization may be unwilling to take on.”

### Attract Talent

Organizations can use their innovation centers to showcase their brand strength and startup culture, and attract top talent at universities. Also, in large organizations, the innovations developed by centers have the opportunity to see mass adoption, unlike most startups. This can be a key proposition for the parent company to pull skilled individuals who are willing to experiment their ideas at scale.

“We went to campus placements right after the announcement of our innovation lab and our ticket was hotter than Twitter and Facebook, which was shocking.

– Innovation executive at a leading retailer

### Drive Employee Engagement

The positive impact on employee engagement is an often-overlooked benefit of innovation centers. Engaging with the latest technologies and new ideas excites and motivates employees, even those in industries that are slow to change. An innovation executive at a large bank says, *“If we never graduated a single concept from the labs into production, we would still get a ton of benefit just from employee engagement. That gets overlooked a lot.”*

### Build a Culture of Innovation

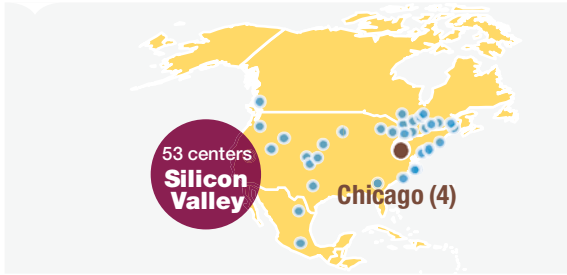
The greater positive impact of successful innovation centers includes the development of an innovation culture within the larger organization. The head of innovation at a leading bank says: *“If your company is counting on your innovation center to do all your innovation, you will fail. It should be one of the tools that help, and it is a sort of catalyst for serving the business.”*



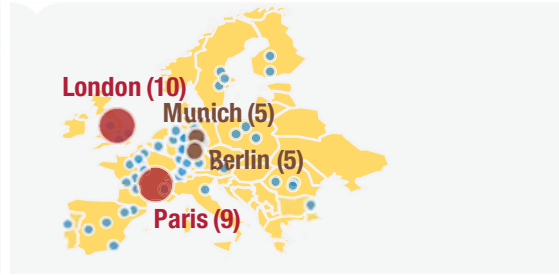


# The Innovation Center Heat Map

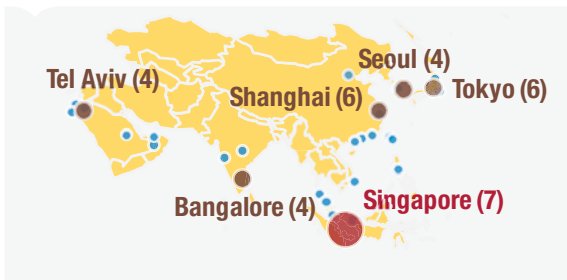
## North America



## Europe



## Asia



## Top Ten Cities

Ten Cities	Number of Innovation Centers
Silicon Valley	53
London	10
Paris	9
Singapore	7
Tokyo	6
Shanghai	6
Berlin	5
Munich	5
Tel Aviv	4
Chicago	4

**Legend**

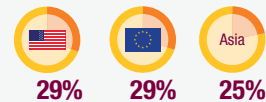
- 1-3 centers
- 4-6 centers
- 7-10 centers
- > 50 centers

**38%** of companies have set up innovation centers

**61%** of companies with centers have a presence in the Silicon Valley...

...But other hubs are also emerging – top 10 locations represent only **35%** of total centers

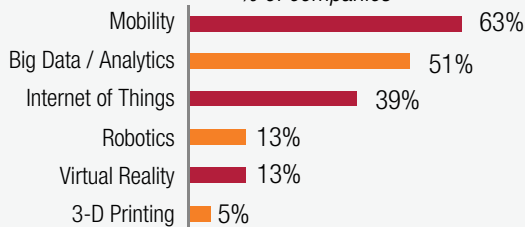
## Breakdown of Innovation Centers by Region



N=309  
Source: Capgemini Consulting and Altimeter Analysis

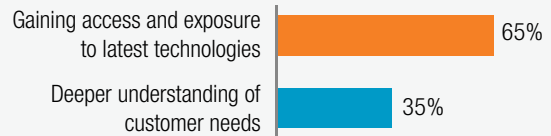
## Focus Area

% of companies



## Main Mission of Innovation Centers

% of companies



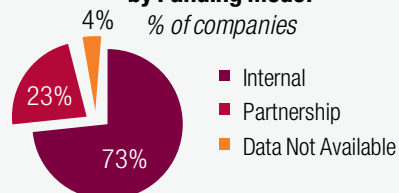
## Single Center Vs Network of Innovation Centers

% of companies



## Distribution of Innovation Centers by Funding Model

% of companies



N=75  
Source: Capgemini Consulting and Altimeter Analysis

How can Innovation Centers Successfully Scale the Slippery Slope of Digital Innovation?

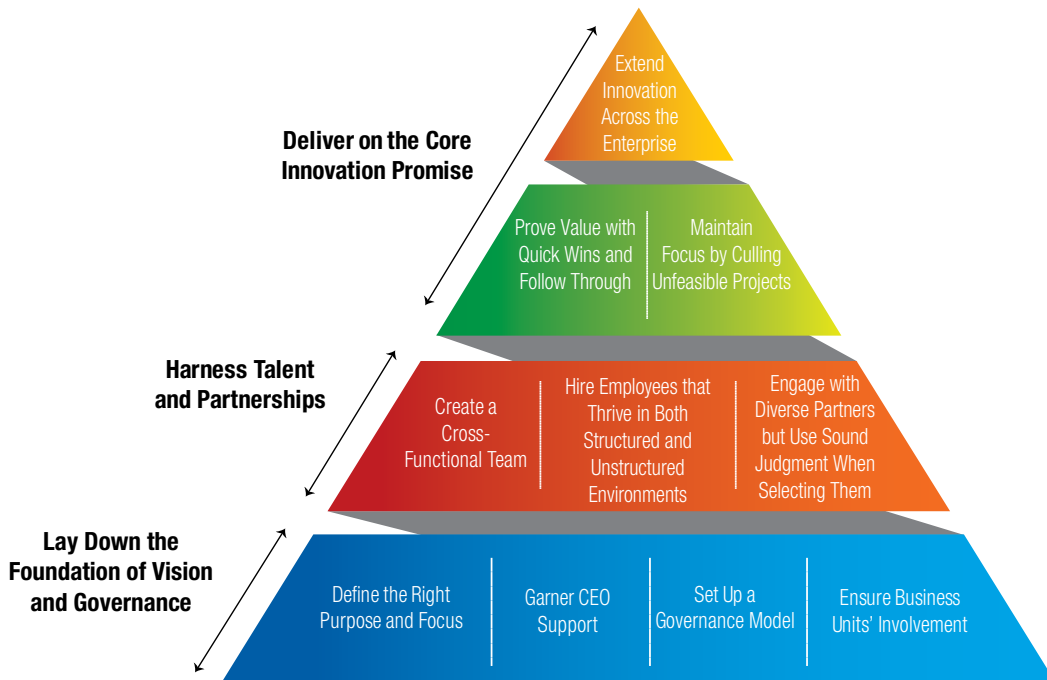
It is extremely challenging to make a success of innovation centers. A seasoned innovation expert and senior executive at a leading global bank told us: *“About 80 to 90% of innovation centers fail, and end up being a massive waste of resources.”* Such high failure rate results from

a slippery slope of challenges that innovation centers must overcome to succeed at digital innovation. Leading companies avert these challenges by factoring critical success factors into their journey. These factors broadly fall into three phases – laying down the foundation of vision and governance, harnessing talent and partnerships and delivering on the core innovation promise (see Figure 2).

“Most innovation centers commit one of two cardinal sins. Either they think too far out into the future, or they get involved in routine projects.

– Seasoned innovation expert

Figure 2: Critical Success Factors for Innovation Centers



Source: Capgemini Consulting and Altimeter Analysis

## Laying Down the Foundation of Vision and Governance

### Define the Right Purpose & Focus

Defining the purpose of the innovation center is critical. Different approaches will deliver different results, with an innovation outpost not delivering the same benefits as an in-house innovation lab. An innovation executive told us: *“Most innovation centers commit one of two cardinal sins. Either they think too far out into the future, or they get involved in routine projects.”* Successful innovation centers establish clear space between themselves and everyday operations yet ensure their breakthrough innovations can be turned into commercial reality.

### CEO Support is a Must to Nurture Innovation Centers

Innovation should be a top-down approach where the CEO/leadership team looks to entrench a culture of innovation throughout the organization. It is imperative that the CEO/leadership team nurture the innovation centers and champion its initiatives throughout the organization. Kevin McKenzie, Chief Digital Officer of Westfield, says: *“If companies truly do want to innovate, it’s got be sponsored by the CEO... Our Co-CEO has personally gone*

*out and had a conversation with the CEOs of just about every major retailer in our category of retail about this topic and about our mission. Ultimately, that’s ended in a go-to plan with the management teams.”*

### Set up a Governance Model with Stakeholders from Across the Business

A common challenge cited by many respondents in our research is the need to identify the ‘right’ set of stakeholders from across the business. An innovation executive from a global financial services firm says: *“It’s not a good answer to have one or two champions for an innovation center. You need a governance body where you have a number of stakeholders at a senior level. This will help avoid dependence on people and move it to a process. This way, you also help innovation permeate throughout the enterprise.”*

*“About 80 to 90% of the innovation centers fail and end up being a massive waste of resources.*

– Senior executive  
at a leading global bank

*“It is important to know the difference between true innovation and “innovation theater,” or shiny object syndrome.*

– James Patterson,  
Managing Vice President  
and Head of  
Capital One Labs

### Ensure Business Units’ Involvement

One risk that innovation centers face is that, by working in an autonomous fashion, they can get disconnected from the larger organization. It is crucial that business units are closely involved in the selection, scoping and execution of innovation center projects. In certain cases, innovation centers are directly managed by the business and, as a result, are in sync with the business requirements.

## Harness Talent and Partnerships

### Create a Cross-Functional Team

The composition of the innovation center needs to be diverse. James Patterson, Managing Vice President and Head of Capital One Labs, confirms this. Capital One Labs is the experimental product and technology arm of Capital One. He says: *“The key is to bring the right people along for the journey at the right time – not too soon, not too late – and having the right integrated teams that include the business working on ideas together.”*

### Hire Employees that Thrive in both Structured and Unstructured Environments

Shortage of digital skills is an issue, but attitude is as important as aptitude. The lead at a telecom innovation center said: *“The people element cannot be underestimated. It takes a certain kind of person to work in any innovation center, where half your time is spent in a very open-ended and ambiguous environment working with startups, and the other half with the traditional and risk-averse side of the business.”*

### Engage with Diverse Partners but Use Sound Judgement in Selecting Them

Engaging with the tech ecosystem is integral to the mission of an innovation center, but it is equally important to not waste too much time. As James Patterson, Managing Vice President and Head of Capital One Labs puts it: *“It is important to know the difference between true innovation and “innovation theater,” or shiny object syndrome. There are a lot of interesting startups out there. The important thing is to have a sound judgment as to which ones to spend time with.”*

**“We bring all sorts of best practices and tools and techniques across the business to help make people more creative, more engaged, more innovative.”**

– Head of innovation labs at financial services major

## Deliver on the Core Innovation Promise

### Prove Value by Demonstrating Early Wins and Following Through on the Promise

Innovation centers, by virtue of being standalone units, must constantly prove the value that they add to the business. Leading innovation centers overcome this challenge by demonstrating early wins. When Walmart set up Walmart Labs in 2011, it made several key acquisitions upfront to build momentum. One of its early acquisitions, Kosmix, proved instrumental in developing a new search engine to power its e-commerce website<sup>9</sup>. They accomplished the task in just nine months and the updated website also increased the conversion of visitors into buyers by as much as 20%. Today, Walmart Labs continues to be a driving force behind digital innovation at Walmart.

### Sunset Programs and Ideas that are Unfeasible... But at the Right Time

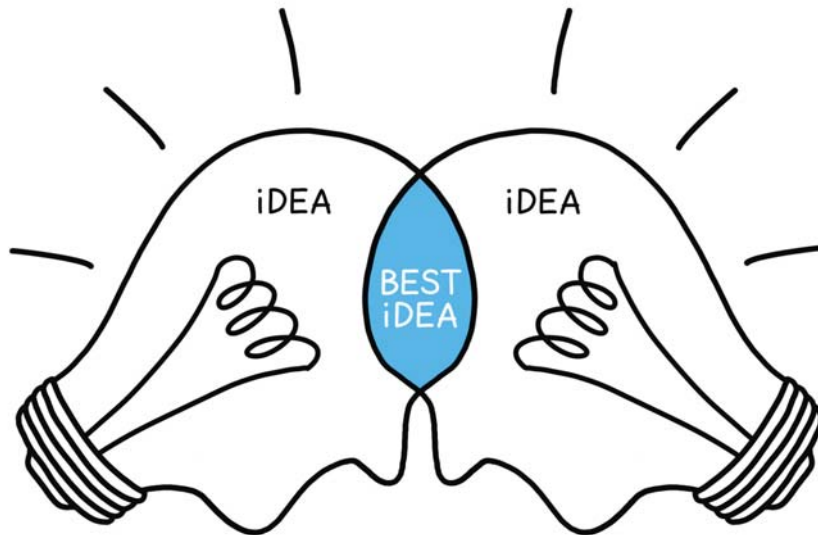
Innovation centers are all about experimentation, and a trial-and-error approach is one of its defining features. At the same time, it is crucial to focus resources and energies on the most feasible and viable projects. Hence, projects that are unfeasible need to be terminated, and quickly. The VP at the innovation lab of a leading fashion retailer said: *“You need to be honest with yourself about what is working, regardless of the amount of time, money, or personal capital you have spent.”* At this retailer, ideas are tested in 1 to 2 stores and, based on feedback, a prototype is created for a pilot in 10 to 15 stores.

### Extend Innovation Across the Enterprise

An innovation center can be said to have reached its pinnacle when it is able to extend the innovation practices far beyond its walls and deeper into business units and functions. One way of doing this is to ensure that learning from innovation centers is constantly routed back to the business. The head of innovation labs for a financial major confirms this by saying: *“We bring all sorts of best practices, tools and techniques across the business to help make people more creative, more engaged, more innovative”.*

### The Next Innovation Wave

The digital economy offers a solution and an inspiration for the perennial challenge of successful innovation. The advent of thriving technology hubs, and the appetite of new digital entrants to relentlessly disrupt and innovate, has created an innovation ecosystem that traditional organizations can tap into. By combining the culture and approach of innovation centers with the budget firepower and access to customers that they enjoy, traditional organizations have an excellent opportunity to re-energize their innovation capability.



## Research Methodology

- For the purposes of this research, we considered a company to have an innovation center only if at least one of its centers was located in the following tech hubs:

Silicon Valley, Tel Aviv, Los Angeles, Seattle, New York City, Boston, London, Toronto, Vancouver, Chicago, Paris, Sydney, Sao Paulo, Moscow, Berlin, Waterloo (Canada), Singapore, Melbourne, Bangalore and Santiago (list based on a study of global tech ecosystems conducted by Telefónica and the Startup Genome in 2012- Telefónica Innovation Hub, “Startup Ecosystem Report”, 2012)

- We adopted a comprehensive research methodology leveraging both Primary and Secondary approaches:
  - **Focus interviews** with executives from leading organizations, overseeing innovation related activities. Representing diverse industry sectors, all of these are large organizations with most having revenues greater than \$5bn (see below for list of executives who agreed to be named).
  - **Web-based research** of the largest 200 companies by revenue based on the Bloomberg list. We covered the following sectors – Automotive, Financial Services, Consumer Products & Retail, Manufacturing and Telecom, and picked the forty largest companies by revenue within each sector.

The research explored innovation centers along multiple dimensions:

- **Mission** behind the centers (e.g. increase innovation output, form relationships with eco-system partners)
- **Focus areas** for the centers (e.g. mobility, Internet of Things, Big Data)
- **Collaborative relationships** forged (e.g. with large companies, startups, universities)
- **Governance models** adopted (e.g. centralized, decentralized, autonomous)
- **Challenges** faced
- **Results** delivered

## Acknowledgments

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You can find an unabridged version of this research on Capgemini Consulting website or on SlideShare:

<https://www.capgemini-consulting.com/the-innovation-game>

<http://www.slideshare.net/capgemini/the-innovation-game-why-how>

1. HBR, “Making Sense of Digital Disruption”, May 2015
2. Lithium, “Corporate America Under Pressure From Consumers’ Rising Expectations”, June 2015
3. Battelle, “2014 Global R&D Funding Forecast”, December 2013
4. Nielsen, “HOW TO FLIP 85% MISSES TO 85% HITS: LESSONS FROM THE NIELSEN BREAKTHROUGH INNOVATION PROJECT”, June 2014
5. Forbes, “Why U.S. Firms Are Dying: Failure To Innovate”, February 2015
6. Oracle, “Understanding the Best Approaches and Tools to Manage the Complexity of Innovation”, 2013
7. Walmart, “Welcome Adchemy to @WalmartLabs!”, May 2014
8. Adweek, “How an Office Supply Brand Stays On the Cutting Edge of Retail”, November 2014
9. Fast Company, “Walmart’s Evolution from Big Box Giant to E-Commerce Innovator”, November 2012





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# Digital Transformation Review

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