Key Principles & Illustrative Case Studies

“Seven Principles In Search of Practitioners”

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I. Introduction: The Simple Logic of Demand-Driven Innovation

In their 1997 book Discipline of the Market Makers, Treacy and Wiersema make a simple point. To achieve market leadership, a goal to which all businesses should aspire, three ‘disciplines’ are required: Product leadership (driven by innovation); operational competence, or excellence, in producing, marketing, delivering and designing the product; and customer intimacy, deep knowledge of the needs, wants and preferences of those who buy and use the product. (See Fig. 1). In other words: Excel in innovation, excel in implementing innovative ideas, and excel in building innovations on real customer needs. These are probably necessary conditions for market leadership, and perhaps even jointly sufficient.

Figure 1. The Three Management Disciplines


Market leadership occurs at the intersection of these three disciplines. Some 14 years ago, the authors could claim that excellence is needed in only one of the three. Today most management educators believe that excellence in all three is
vital. And of course, the three disciplines are closely linked. Customer intimacy should drive innovation, and is also the basis (in part) of operational excellence -- operations should always be tailored with the preferences of the end users in mind. All customer touch points in operations must be smooth, efficient and at the leading edge of best practice.

From this simple framework, then, we see that customer intimacy is the core discipline that underlies both innovation (product leadership) and operational excellence. It is the discipline that drives the other two.

This essay comprises a series of stories, or narratives (a term we prefer, to the term ‘case study’) about market-based demand-driven innovation. All relate, in one way or another, to customer intimacy. Our objective is to attempt to reveal the key success factors in demand-driven innovation, through the stories of those who have implemented it, in a variety of ways.

In this working paper, we attempt to portray the key issues and principles underlying market-based demand-driven innovation through narratives, or stories. In management education, these stories are called ‘case studies’. But we believe the essence of a strong case study is a good story. It is in these stories of innovators who implement demand-driven innovation that we may find the complex truth of precisely how to leverage markets and demand to generate commercially-successful innovations. We caution the reader: These are not conventional case studies, but rather, unconventional narratives about real people, that try to capture the human elements of demand-driven innovation rather than the dry management facts. In many cases, our case studies are based on first-hand experiences, conversations and interviews. Many of the subjects of our narratives are unconventional (such as the pop-rock star Lady Gaga). But none, we hope, are boring, and all, we trust, are vivid and memorable. All our narratives reflect the fact that demand-driven innovation is an art, not a science.

We present seven key principles of demand-driven innovation, and several stories that illustrate each principle, comprising 18 case-study narratives in all, covering many more specific innovations and businesses. In the next section, we discuss those principles, and in the following section, we provide narratives that illustrate each. Our goal is to provide narratives that illustrate the essence of
demand-driven innovation, in the hope that ‘practitioners’ (entrepreneurs and those who seek to foster and encourage them) will embrace and implement innovation that is at least in part pulled by markets, demand and customers, rather than pushed solely by governments and technology.

II. Seven Key Principles of Market-Based Demand-Driven Innovation

A. Bottom-up Market-Based Innovation is Superior to Top-Down Innovation

One of the principles taught to generations of managers and management students is this: The larger the potential market for an innovation, the more attractive it is for investors and corporate backers. This has led to a familiar refrain in many business plans for innovative products and services, claiming that if only 1 per cent of a potential market is achieved, the result will still yield commercial success; 1 per cent of a $1 billion market is still $10 m.

This “top-down” approach is now widely understood to be erroneous. If 99 per cent of customers prefer other products, why should 1 per cent prefer our innovation? A far more persuasive approach is known as “bottom-up” innovation – identify and describe real, specific customers, one by one, who have expressed interest in the innovation and indicated willingness, in principle, to purchase it when available. Often, to launch an innovation, only a single customer is needed. That customer provides invaluable feedback that generates other customers. And in the age of web-based businesses, no more than 1,000 “true fans” (see Fig. 1 in the first case study, p. 8) are often needed to sustain a business.

Even when the ‘top down’ approach is used to estimate potential market size for an innovation, it is still vital to include a ‘bottom up’ estimate, describing real potential customers and their initial responses to the innovation.
B. Open (Crowd-sourced & Lead-User) Innovation Surpasses Closed Innovation

Under this principle, organizations’ innovation process includes, as a key element, the ideas, creativity and suggestions of those who use, like and buy the product or service. This includes: ‘lead users’, or key customers, as well as the general market of consumers.

User-driven and crowd-sourced innovation are examples of market-driven innovation, because it scans the world to find solutions already in use and in place in the market, to meet R&D challenges that otherwise might take years and millions of dollars to resolve. And it addresses one of the key stumbling blocks of innovation – the NIH syndrome that has R&D departments defending only innovations that emerge from their own ‘shop’. At the extreme, when companies receive innovative ideas from outside sources, and forward them for evaluation to their R&D experts, the NIH syndrome has been known to kill a great many potentially-revolutionary innovations. The logic here, underlying NIH, is simple. Why should a company insist that all innovations come from its own R&D department, if outsiders can come up with innovations that are sometimes superior? Lefley implemented a major change in P&G’s culture, in order to replace NIH with PFE. (See below, “connect and develop”).

Modern ICT technologies has enabled a phenomenon known as ‘crowd sourcing’ – using the knowledge, creativity and at times funding of a vast number of individuals, linked and networked by the Internet. Organizations are now leveraging this key capability, to radically alter innovation processes, and transform them from closed (held within the boundaries of the organization) to open (to all who can provide creative feasible solutions).

C. Even Supremely Demand-Driven Innovation May Require Market Education

The essence of innovation is identifying, and meeting, an unmet need or want. This places the understanding of markets and market demand at the core of innovation. But very often, consumers are so accustomed to overcoming challenges, difficulties or needs with what is available, that they do not perceive the enormous advantages that pathbreaking innovations convey. In this situation,
the innovator must not only meet an unsatisfied need, he or she must educate consumers and explain, communicate and teach how and why the innovation is superior to what is currently available, overcoming the inertia of habit that leads consumers to buy what they are accustomed to, rather than what is new and unique. More than one innovation has had the potential to create immense value, yet has failed when introduced to the market because the innovators were unable to help consumers perceive the added value created by the innovation. For this reason, market-based innovation often must include not only a differentiated product that satisfies unmet needs, it must also contain clever strategies to communicate the value-creating differentiators in order to alter customer perceptions.

D. The Individual Entrepreneurs Themselves are Often the Most Powerful Market-Demand Research

Innovators often face a bitter dilemma. They require extensive market research, to validate the commercial viability of their innovation, but lack the resources to acquire such research. The vicious circle is: Market success generates resources that can fund market research, yet that market research itself is often a precondition for market success. One solution is to create ‘minimum viable product’ prototypes and introduce them to the market, to get customer feedback even though the product is far from perfected. For this reason, ‘time to market’ is a crucial element of successful innovation. Another solution is that of ‘markets of one’. The innovator himself or herself becomes the market research. The reasoning is, the innovator is like many other persons with similar age, income, background, culture and needs. If the innovator believes he or she wants and needs the innovation, objectively, chances are good that many others will feel the same way. Thus, introspection and self-empathy are key tools for market-driven innovation. A great many successful innovations have been created, when a single creative innovator brought into the world a product or service simply because he or she himself wanted and needed it – and many many others, it emerged, had the same want and need.

In today’s global economy, multi-national corporations frequently produce their innovative products in Asia. But in general, they create and design those products in the West. Apple, for instance, has designers of its iPad in Silicon Valley, but factories in China. The result is that often, products are designed for rich persons, in rich countries, and are then manufactured by the poor.

Suppose, however, that this logic were reversed. Suppose innovative products were created by those in poor countries, for the poor, and then adapted for rich persons. This is known as reverse innovation.

Why would one choose this approach? In increasingly price-sensitive markets in the West, value-for-money is becoming increasingly important. Cost-effective low-price innovative products developed for those with low incomes, in poor countries, can achieve major success in Western countries, at a time when marketing efforts increasingly stress value for money and cost saving.

F. Demand-Driven Process Innovation Often Surpasses Product Innovation

There is a fundamental fallacy in many innovators’ efforts. It is to assume that innovation is solely about new products or services. In fact, research shows that process innovation yields a higher rate of return than product innovation.¹ For this reason, innovating in processes – for instance, in the processes with which products are manufactured, distributed, packaged, serviced, maintained, advertised and financed – can yield high returns even when the products themselves remain conventional. In particular, innovation in business designs – the way businesses are run – can create massive competitive advantage. The basis of process innovation, in general, is the intimate knowledge of customer needs, so that innovation in processes can create value and satisfy unmet needs stemming not solely from the product but also from the way the product is made and delivered.

¹ However, Segerstrom (2000) argues that government support for process improvement (by improving product quality) is a vertical growth engine that creates slower growth than government support for product R&D.
G. Startups Require a Strategic Partner with a Strong Market Presence

In general, large organizations struggle to sustain innovativeness and creativity, as they leverage the advantages of scale but suffer the stultifying tangle of bureaucracy and operational discipline. This is in part why many large companies seek to acquire innovative ideas through acquisition of small startups.

There is a natural synergy between large multinational corporations (MNC’s) and startups. MNC’s bring sales channels, market expertise, domain knowledge built over many years, industry connections and above all, deep intimacy with customers. Startups bring innovative ideas. This is why it is often said that every startup needs a strategic partner – a large company with extensive knowledge of, and experience in, commercial markets. A strategic partner that joins with a startup in early stages of development and innovation can bring the key insight: “if you can make X, we have customers who will buy it for certain”. This is a proven approach to demand-driven innovation.
III. Seven Principles in Search of Implementation: Case Studies

A. Bottom-up Market-Based Innovation is Superior to Top-Down

1. Case Study: A Thousand True Fans

There are two places innovators look for ideas. One is the ‘long tail’ – esoteric niche markets, on the long largely-unoccupied tail of the normal curve. The density of users and buyers here is too low to support life, generally. The second is the fat middle, where ordinary people reside. Here, competition is fierce, advantages lie with incumbents and habit dominates (ever try to get people who love vanilla ice cream to try chocolate?).

The alternative is to find 1,000 “true fans” (defined as people who will buy anything and everything you produce). Here is the calculation: If a True Fan will spend one day’s wages per year supporting what you do, that comes to: 1,000 x $100 equals $100,000. Presto – you have a business!

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2 Source: http://kk.org/thetechnium/archives/2008/03/1000_true_fans.php
If you are patient, if you add one true fan a day, it will only take you three years to build a real business. But, you have to maintain contact with your True Fans. Web 2.0 and 3.0 (the advanced versions of the World Wide Web used as the basis of new web-based products) enable that. And, the circle of True Fans is surrounded by Lesser Fans, who sometimes will buy what you sell.

You don’t need a hit to survive, according to the “1,000 True Fan” approach. There is a place in the middle, not the fat middle, and not the long tail. An ‘artist’ can aim for this spot, but only on one condition. Be sure you are passionate about the offering you are making to your true fans. If you are not, then you are doing it only for money, and that means YOU yourself are not a true fan, so you can’t expect a thousand others to be one.

**Example: “Street Performer”:** Using the logic of a street performer, the author of a book goes directly to the readers before the book is published; perhaps even before the book is written. The author bypasses the publisher and makes a public statement on the order of: “When I get $100,000 in donations, I will release the next novel in this series.” Readers can go to the author’s Web site, see how much money has already been donated, and donate money to the cause of getting his novel out. Note that the author doesn’t care who pays to get the next chapter out; nor does he care how many people read the book that didn’t pay for it. He just cares that his $100,000 pot gets filled. When it does, he publishes the next book. In this case “publish” simply means “make available,” not “bind and distribute through bookstores.” The book is made available, free of charge, to everyone: those who paid for it and those who did not. In 2004 author Lawrence Watt-Evans used this model to publish his newest novel. He asked his True Fans to collectively pay $100 per month. When he got $100 he posted the next chapter of the novel. The entire book was published online for his True Fans, and then later in paper for all his fans. He is now writing a second novel this way. He gets by on an estimated 200 True Fans because he also publishes in the traditional manner -- with advances from a publisher supported by thousands of Lesser Fans.
2. Case Study: Innovation Management at Nokia: If you don’t execute, you WILL be executed

In 2007, the second author visited Nokia headquarters on a benchmarking visit with a group of Israeli managers. We heard from top Nokia leaders, including Jorma Oliilla, and were deeply and profoundly impressed by what they told us. We were shown what appeared to be the leading-edge top system for linking massive market research with new product development.

A Nokia VP, Jonas Gøst (pronounced Guest), told us about his “four screen” analysis -- the first screen was movies (individual enjoyment); the second screen, TV (individual enjoyment), third screen computer (individual enjoyment), but the fourth screen is MMD (multi-media device), the experience is communal/networked. MMD of course is a “smart phone”. Nokia truly “got it” early. They did their homework thoroughly. They surveyed 300,000 cell phone users, understood their needs, and segmented the market into 12 segments, and designed and marked a phone specially tailored for each. (See Exhibit below).

By all odds, Nokia should today RULE the smart phone market worldwide.

The actual result: as of Q3 2010, Nokia’s global cell phone market share has fallen, in just 12 months, from 36.7 per cent down to 28.2 per cent, a huge drop of 8.5 per cent in just a year. Nokia’s mobile operating system Symbian once ruled the world, and is now plummeting, overtaken by Android. Nokia has lost the American smart phone market to Apple, and has nearly disappeared from that key market.

The mobile operating system Symbian was complex, hard to use, and failed to enlist masses of developers. Nokia’s decision to make it ‘open source’ Symbian, spun off into a non-profit foundation, was a huge error. The Nokia smartphones were well designed, well conceived – and failed to excite, they had no ‘wow’! Nokia focused on the ‘what’ of product development, not on the ‘for whom?’ (for those who love cool stuff, e.g.). Nokia dropped Symbian, in favor of Microsoft software – but perhaps too late.
An innovator can have the greatest strategic innovation plan in the world. If it is not executed flawlessly, your products will be executed – and so will you. Olli-Pekka Kallasvuu the Nokia CEO has been fired and replaced by former Microsoft executive Stephen Elop. Elop’s first decision has been to radically revamp Symbian, re-integrate it into Nokia and improve it radically. By rights, Nokia should dominate the smartphone market. Instead, it has been almost erased, by Apple, from it. And this, despite having perhaps the best market research-linked-to-R&D system in the business.

B. Open (Crowd-sourced & Lead-User) Innovation Surpasses Closed Innovation

Lead Users

Innovation, much of it, comes not from institutionalized R&D funded by companies, but rather from tinkerers and users, who have a real need and solve it inventively with their own two hands.

Eric von Hippel is an MIT scholar who pioneered research showing ‘lead users’ can be enormously valuable to companies, who want to improve their products. Now, with a British study funded by the British government, he conducted the first large-scale survey of consumer innovation ever done.³

The astonishing result: The amount of money individual consumers spent in making and improving products was more than twice the amount spent on product research and development by all British companies combined, over a three-year period. It makes sense – there are probably 20 million British consumers, and perhaps 1/100 that number of R&D engineers. Von Hippel will replicate his study in Finland and in Portugal.

Harvard Business School professor Carliss Baldwin says, “we’ve had on a set of mental blinders”, because we have missed, or underplayed, this key source of inventive progress.

“We’ve been missing the dark matter of innovation,” von Hippel said, meaning, just as dark (i.e. not visible or detectable) matter exists, because otherwise the universe would not be expanding, even though we can’t really see it, so does consumer – driven innovation exist, though we don’t really see it (until now). Von Hippel says 77 per cent of scientific instrument innovation come from users in the field. One of the implications? Change patent law, to enable people to build on others’ ideas without fear of law suits.

Does von Hippel practice what he preaches? He does indeed. His book Democratizing Innovation is available for free, by download from his personal website, even though the standard print version is published by MIT Press. I wonder how he managed to persuade MIT Press that free downloads actually boost print book sales.

This type of small-scale one-off innovation is crucial. Think of all the times you have taken a product, and in small ways changed it to improve it. Now, imagine if you had shared these ideas with the world, using Internet, the way Daniel Reetz did.

Reetz built a commercial book scanner, that normally costs $10,000, out of two old Canon A590 Powershot cameras, using parts rescued from junk piles. Total cost: $300. He can scan a 400-page book with it in 20 minutes! Reetz uploaded his do-it-yourself product to DIYbookscanner.org, 1,000 people joined his forum on that site, and 50 people actually built the scanner.

Fig. 2 below shows a regression line, with the independent variable “lead-userness” of users (the degree to which the user of the innovation was indeed definable as ‘lead’ or vitally important), and the dependent variable was the attractiveness of the innovation. The relationship is strongly positive and statistically significant. The figure is from von Hippel’s research.
The first chapter of Darwin’s On The Origin of Species (1859) sets the stage for showing how Nature ‘evolves’ its species through natural selection, by showing how human beings improve upon Nature by ‘domesticating’ species. This is done, for both plants and animals, as follows.

- Nature produces small (random) variations.
- Humans notice them and choose the ones they find useful and helpful for their own purposes.
- Humans select those variations for reproduction, (through seeds, or cuttings, or by mating animals), rejecting the rest.

Many such random variations, Darwin notes, are almost imperceptible. But the keen eye of the gardener or farmer or breeder spots them, and patiently strengthens and magnifies them, over the years. It is not Nature, then, that selects, but human beings, in this case. Darwin’s ‘natural selection’ suggests a demand-driven method for innovation, which does not require that the innovator himself come up with the invention.

Figure 2: User-innovators with stronger “lead user” characteristics develop innovations having higher appeal in the general marketplace.
• Observe variations in how people use products and services, often in ways the producer did not intend.

• Replicate and standardize those variations by ‘selecting’ them and adapting them. It is ‘natural selection’, only you, not Nature, are the selector.

Car companies locate design shops in California, and designers scout neighborhoods to see how individuals ‘customize’ their cars, in paint, trim and in other ways. Fashion designers watch trendy neighborhoods. Intuit (makers of Quicken accounting software) followed users home, to observe how they use their product (they discovered it was used not to balance checkbooks but to run businesses – a crucial discovery).

This is another reason for innovators to quickly get their products to market. Only when they are being used can users help you innovate, just as Darwin proposed. Watch for user-driven innovations. Adapt them. Then, observe again. You may end up with a winning product, utterly different from the one you began with. All, through ‘natural selection’.

3. Case Study: Intuit - Quicken your sales, 'follow me home'

This case study explains the three-step approach of Intuit and its founder Scott Cook, for market-driven innovation. a) Observe, b) Capture data, c) Reflect and analyze.

Observe

Intuit is the leading producer of book-keeping software. In 1984, in Palo Alto, California, near Intuit's hometown of Menlo Park, Intuit founder and president Scott Cook observes several well-dressed women, members of Palo Alto junior league, sitting at keyboards trying to use computers to write cheques. Cook watches. Empathizes. And learns.

Capture data

Intuit developed a version of empathic design known as 'Follow Me Home', in which Intuit managers closely observe customers as they buy Quicken, open the
cellophane wrap, load it on their computers and begin to use it. They never intervene, even when tempted, but observe, take notes and sometimes videotape.

**Reflect and analyze**

A year earlier, in 1983 Cook had an epiphany. Realizing that more and more consumers and small businesses were buying PCs, he saw that software that would write cheques and keep financial statements should be a hit product, because software could automate dull, humdrum book-keeping tasks. The problem was: There were already dozens of such products on the market. Cook had to find a way to compete. He asked a group of women from the Palo Alto Junior League to sit in front of computers and operate Quicken. Some had never touched a computer in their life. 'People couldn't be bothered learning a complex programme', he found. There was a big market: but the product had to be cheap, fast, hassle free, easy to use. Cook benchmarked Quicken not against other software but against the leading competitor, the pencil. The first conclusion: Quicken had to be very cheap, priced at between $20 and $50, because pencils sell for a dollar a dozen. By matching the pencil's ease-of-use (making Quick exceedingly simple to load and run), and adding other features that pencils lack (speed, accuracy), Quicken's product profile dominated that of the pencil. It lacked a large number of optional features that competing software had—but people did not find those options important. As a result of another empathetic insight, Intuit observed that buyers of Quicken were not using it to manage their cheque books—they were managing their small businesses with it! This insight was vital in Intuit's continued success. Quicken was quickly adapted to the way customers were using it. Success might not have been attained, had it not been for the Follow Me Home approach.
4. Case Study: Crowd-Sourced Businesses: Innovating HOW, Not What!

Fig. 3. Threadless T-Shirt

How do you create great innovative new products? With a dynamic (and hugely expensive and inevitably expansive) R&D department?

- Not according to made.com, an online-only furniture retailer. It has no inventory, and no warehouse. Products are crowd-sourced. Visitors to its website submit designs. The best become prototypes and are posted. Registered made.com members then vote. The most popular furniture pieces are then made in China, shipped in containers, and delivered to buyers directly from the Port.

- Threadless.com. Founders Jake Nikell and Jacob DeHart launched a “thread”, asking people to post T-shirt designs. The designer gets cash and some free T-shirts, the best of which can be made. Ten years later, threadless.com has nearly $30 m. (2009) in revenue, 1,200 designs a week are submitted, and winners get $2,000 plus $500 in vouchers. (See Fig. 3).

- Fluevog, a Canadian shoe company, launched OpenSource footwear in 2002. Customers (known as Fluevogers) upload designs. Winners have shoes named after them.

Is this cheap exploitation? Is it destroying the jobs of R&D engineers and designers? Or is it a new wave of management innovation, one that focuses on the ‘how’ things are done, rather than on the ‘what’ is done?
5. Case Study: Get On the Lady Gaga Bus – What We Can Learn from Stefani Germanotta

If you believe the phenomenon known as Lady Gaga is not serious – think again! We can all learn a great deal from her. Most albums are recorded in soundproof high-tech studios, where electronic wizardry shapes songs to perfection. This is how it is done. This is the rule. Rent time in a studio and make your album.

But not Lady Gaga. She has just released her new album, “Born This Way”. Released in February, reached No. 1. She made it while on tour, in her Studio Bus. This is an extra bus filled with equipment and comprising a recording studio on wheels. Her engineer and two producers travelled with her on tour for a whole year. “Basically, after the shows [back-breaking energy-draining two-hour shows], I would go on the Studio Bus and I would work all night. Then we would pull the buses over and I would get back on my bus and go to sleep.”

Of course all the experts argued with her. “We can’t do your vocals now!”, because of the sound of the bus and the reverberations. Said Lady Gaga: “turn on the mike and let’s do this! I get so inspired and ready to go and I’m not the kind of person that can hold in my creativity. … Because of the thrill of the show and the crowd’s energy…I get so many ideas looking out into the crowd, like: I know what you want to hear. I know what you need.”

Lady Gaga is a powerful innovator. Have you noticed that music videos are choreographed to move on the 2nd and 4th beats of 4/4 time? Like – da DAH, da DAH… Not Lady Gaga. She moves on the 1st and 3rd beats, DAH da, DAH da. Partly for that reason, radio stations refused for six months to play her first single, Just Dance. But she won.

Make no mistake. Stefani Germanotta is a 24-7 performer. She says her very life is “performance art”. But at bottom she is an innovative musician. She never lip-syncs. And she writes her songs to meet what she understands her fans want and need – and she knows what they want, because she interacts with them almost every single night.

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For innovators, a major lesson from Lady Gaga is to create the equivalent of her Studio Bus. Get your R&D people out of their sterile labs and into the real world. Get them to interact with the people who might or will use the stuff they create. Get them on the Lady Gaga bus. And, for a start, play one of her albums for your innovators. Despite what you think when you look at her fantastic costumes, beneath them there is the heart of a true passionate musician.

6. Case Study: “Connect and Develop”\(^5\)

Procter & Gamble (P&amp;G) runs one of the most productive, widely-imitated research and development operations in corporate history. But as the company grew to a $70 billion enterprise, the global innovation model it devised in the 1980s faced a major challenge. In order to grow revenues by a modest 5 per cent yearly, P&amp;G had to create yearly a new business worth $3.5 b.! Then-CEO A. G. Lafley decided to search for external sources for innovation. Why? Suppose P&amp;G has 7,000 talented R&amp;D scientists. For each of them, there are perhaps 1,000 equally-capable scientists outside P&amp;G. Why not leverage 7,000,000 brains, rather than just 7,000, asked Lafley? P&amp;G's new strategy, connect and develop, used technology and networks to seek out new ideas for future products. "Connect and develop will become the dominant innovation model in the twenty-first century," according to Larry Huston and Nabil Sakkab, both P&amp;G executives. "For most companies, the alternative invent-it-ourselves model is a sure path to diminishing returns." P&amp;G rapidly changed its innovation culture, from NIH ("Not Invented Here", rejecting any idea outside P&amp;G's own R&amp;D lab, a common syndrome in many organizations), to PFE ("Proudly Found Elsewhere", seeking ideas wherever they can be found, outside P&amp;G).

Did this new approach work? Huston and Sakkab summarize: “Today, more than 35 percent of our new products in market have elements that originated from outside P&amp;G, up from about 15 percent in 2000. And 45 percent of the initiatives in our product development portfolio have key elements that were discovered externally. Through connect and develop—along with improvements in other aspects of

innovation related to product cost, design, and marketing—our R&D productivity has increased by nearly 60 percent. Our innovation success rate has more than doubled, while the cost of innovation has fallen. R&D investment as a percentage of sales is down from 4.8 percent in 2000 to 3.4 percent today. And, in the last two years, we've launched more than 100 new products for which some aspect of execution came from outside the company. Five years after the company's stock collapse in 2000, we have doubled our share price and have a portfolio of twenty-two billion-dollar brands.”

7. Case Study: Lego Mindstorm - When users innovate

Lego is a great serial innovator and by sales, is the world’s fourth largest toymaker. After the initial Lego brick invention, Lego innovated Lego Technic (advanced Lego bricks), Minifigures, Lego Technic computer control (with MIT Media Lab), LEGOLand theme parks, Lego Mindstorms (the intelligent Lego brick, integrated with robot technology), Lego retail stores, Clikits (a new design for girls), and Bionicle (combines construction toys and action themes).

Despite these successful innovations, for Lego it is an uphill battle. Increasingly children prefer computer video games. Lego is squeezed at the high end of the market by these games, and by low-price Asia-made imitations at the low end. As a result, Lego lost money in three of the past five years, despite its innovations, cost-cutting and restructuring. Yet had it not been for innovations like Mindstorm, Lego would have disappeared long ago. In competitive industries like Lego’s, sometimes survival is an even bigger achievement than achieving growth and profit in less competitive industries.

“In Billund, Denmark, (Lego’s manufacturing center), not only is the customer right, he’s also a candidate for the R&D team”, notes a journalist, writing in Wired magazine. How is this done?

Lego’s innovative Mindstorms product, which combines Lego bricks with programmable robots, debuted in 1998 and with no advertising, became Lego’s all-
time bestseller. It sold 80,000 units in its first three months, and 1 million units in all. But six years later, it needed an update. Lego lost $238 m. in fiscal 2003.

In Sept. 2004 Lego executives felt the Mindstorms innovation team needed a fresh perspective. Lego decided “to outsource its innovation to a panel of citizen developers”, known as a Mindstorms User Panel (MUP). Such panels often serve as “beta” sites (testers of prototypes and working models). But Lego’s MUP was different. It would actually design and invent. Four members were chosen, from a short list of 20. They received no pay, and even paid their own airfare! They met with Soren Lund, head of Mindstorms, in Washington DC, to hammer out the final details of the upgrade, known as NXT. Why are you doing this? Lund asked them. Because, they said, they were playing a vital role in shaping a product they loved. According to Wired magazine, “opening the (innovation) process engenders goodwill and creates a buzz among the zealots, a critical asset for products (like Mindstorm) that rely on word-of-mouth evangelism”. If NXT is a hit, the ‘democratized’ innovation process may be extended to the full range of Lego products.

C. Even Supremely Demand-Driven Innovation May Require Market Education

8. Case Study: SodaStream’s Bubbly Business: Making Money from Air

Daniel Birnbaum had a great job, heading Nike Israel, from 2003-2006. In early 2007 he was offered the job of CEO of a failing Israeli company, Soda Club, selling an old fashioned product (devices to carbonate water using CO2 cartridges). He took the job – and the rest is history. Today SodaStream, the reincarnation of Soda Club, is a $300 m. annual business, with $35 m. net income, operating in some 50 countries, selling cool colorful carbonating devices with a powerful ‘razorblade’ model (most revenues come from selling the flavors, so the one-time sale of the machine is no longer a key part of the money model). One family in every five in Sweden has a SodaStream device.

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6 Based on a case study by Yaara Ben-Nahum, Knowledge & Innovation Center, Technion; and on S. Maital, “Marketplace”, Jerusalem Report, May 2012.
How did he do it? A key innovation was not in the product, but in how it is advertised. Birnbaum does not hire expensive ad agencies, who spend millions on ads, half of which are worthless (but, the old cliché goes, ‘you never know which half’). Instead, SodaStream uses Public Relations firms, whose job is not to buy media time but to get SodaStream into the public consciousness and create ‘buzz’. In the photo, for instance, Daniel Birnbaum is shown with Susan Sarandon, Hollywood movie star and environmental crusader. They are shown at a Chicago housewares exhibition. The ‘cage’ contains 10,657 empty bottles and cans, collected by high school kids from a Malvern, Pa. school. Birnbaum holds one SodaStream bottle – sufficient to replace all those cans and bottles. If a picture was ever worth a thousand words, this is it. Sarandon was quoted as saying, : “The recycling rate in America is less than 35 percent. Troubling news to say the least, particularly considering that this means that 141 billion beverage cans and bottles go to landfill each year.” PR firms cost money, true – but far far less than ad agencies, and perhaps far more effective.

![Daniel Birnbaum & Susan Sarandon](image)

**Fig. 4. Daniel Birnbaum & Susan Sarandon**

The latest SodaStream product, launched April 17, is the bright red AquaBar, an on-demand tabletop device that provides hot, cold, ambient and carbonated water, designed by a leading Italian designer. The launch was at a design show.
SodaStream did an IPO on NASDAQ in August 2010, reached a market value of $1.5 billion a year later, and is still worth nearly $700 million.

D. Individual Entrepreneurs Themselves Are Often the Most Powerful Market-Demand Research

9. Case Study: Sarah Blakely Hated How Her Butt Looks – and Made a Billion!

Fig. 6. Sarah Blakely, Spanx

On Feb. 21, Sarah Blakely celebrated her 41st birthday. Who is Sarah Blakely? She is the youngest woman (an American) to reach Forbes’ “billionaire” list, self-made, on her own, without husband or family wealth. She is 416th on the Forbes billionaire list.

How did she do it? Sarah proves this. Here is her story.

She was working as a sales trainer by day, and stand-up comedian by night. She knew zero about pantyhose (except, she hated them), and had never taken a business class. “I had only one source to operate from…my gut”, she says.

She hated the way her fanny looked, wearing regular panties. She decided to do something about it, because she was sure many other women felt the same way. She developed a fanny-scrunching panty using Spandex, wrote the patent herself and it was approved. Then she trademarked the name SPANX. For months she
drove around North Carolina begging mill owners to manufacture her product. Finally, after many rejections, she found a mill owner who agreed. Why? He said, he had two daughters. It took a year to perfect the prototype, because Sarah was obsessed that her Spanx should be comfortable. (After all – she would wear them herself). She chose the Spanx name carefully, and it proved to be a winner. (“It’s edgy, fun, catchy, and makes your mind wander,” she says, “and it’s all about making women’s butts better, so why not?”

She took a bold new approach to packaging – if your product is innovative, its package has to look it – and chose a bold red package with three women on the front. She called the buyer at Neiman Marcus, a top-of-the-line department store chain. She agreed to give Sarah 10 minutes. Together, they went to the ladies’ room, and Sarah showed the buyer her butt, in her cream pants, before Spanx..and after! Three weeks later Spanx was on the shelves of Neiman Marcus. She did the same with Saks, Nordstrom, Bloomingdales and others. She asked her friends to go to the stores and make a huge fuss over her product.

She had no money to advertise, so she hit the road. She did in-store rallies about Spanx with the sales associates, then stayed all day introducing customers to Spanx. And she got help from media women; her product was on the Oprah Winfrey show, for instance, and on Tyra Banks’ Show. To get free publicity for Spanx, she even joined Richard Branson’s reality show The Rebel Billionaire, leaving her business for three months to do daring tasks all over the world.

Sarah has now launched a foundation, to empower women all over the world. She summarizes: “My energy and inspiration comes from inventing and enhancing products that promote comfort and confidence for women. Customer feedback is one of the key drivers of our business.”

How many millions of women looked in the mirror, turned around, and did not like what they saw below the waist? One bold woman did something about it. And she’s a billionaire. Annual revenues are $250 m. and her net margin is estimated at 20 per cent. And she started with the huge sum of $5,000 in personal savings.

A Planet Money blog discusses the key difference between those who complain bitterly and those who take action. Adam Humphreys, who lives in NYC, wanted to travel to China. He filled out a long form, downloaded from a website, and showed up at the Chinese Consulate only to learn he had filled out the wrong form. At the nearby Internet café, where he went to get the right form, he found many others in the same predicament.


Not this time. Adam called his friend Steven Nelson. They rented a large Penske cargo van. They parked it in front of the Chinese consulate and they mounted a sign: Lucky Dragon Mobile Visa Consultants. Inside the fan: Two Mac laptops and a printer, an old couch, “cozy as a dorm room”. Confused visa applicants line up outside. Adam and Steve first charged $10. They were over-run. They then charged $40. Too high. So they settled on $20, with a $5 discount for Buddhist monks. Sweet spot! Just right. Just like Goldilocks and the Three Bears’ porridge.

Adam says he can make $500 a day, but, he’s cagey about disclosing real numbers. After all, someone else can park a van next to theirs. It’s called capitalism.

How many times have we complained about bureaucracy, red tape, delays, incompetency, rudeness… and stopped there, rather than finding an initiative, taking action and offering a solution or work-around?

That, clearly, is the difference between an innovator and a complainer. Not IQ, brains, creativity, or anything else. Simply – willingness to act, to do something. Recall that da Vinci, that great creative brain, never actually built most of his amazing inventions, but simply drew them. Five centuries later, we venerate him, and recently a daring Swiss engineer built the parachute da Vinci sketched and leaped out of a helicopter with it -- but most of us would like to change the world a little faster.

11. Case Study: How Strong Minds Raced So Weak Legs Could Walk

Fig. 7. ReWalk Exoskeleton, with the second author

A U.S. National Football League charity campaign once used the slogan, “strong legs run so weak ones can walk”. The second author recalled this during a visit to an Israeli startup named Argo, launched by Dr. Amit Goffer. Argo’s product is called ReWalk, and it is an exo-skeleton (outside-the-body skeleton) which, with electronics, enables those who cannot walk to stand on their own two feet and walk at 2 km. per hour, a good clip. ReWalk can also enable people to climb stairs. You might call it, “strong minds race so that weak legs may walk”.

Dr. Goffer told us that following a terrible accident, which left him paralyzed and confined to a wheel chair, he asked an audacious question: How can I create a device that enables people who cannot walk, to walk by themselves? Dr. Goffer has three degrees in electrical engineering, and worked for years at Odin Medical Technologies, which he started (real-time MRI images for brain surgery) and at Elscint (medical imaging). In 1998/9 he conceived of ReWalk and built a prototype himself. He described his approach to entrepreneurship: “not succeeding is not in my vocabulary. You create a corridor…you see a light at the end of it, and there are no exits, once you start you have to go all the way to the end, until you succeed.”

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Goffer estimates there are 2 million persons in the U.S. alone who are in wheelchairs, and of them, some 500,000 could use ReWalk. He is marketing the device to U.S. Rehabilitation Hospitals, including the Veterans’ Administration. There are two models: one for institutions, like hospitals, and the other, for purchase by individuals. Argo has venture funding and employs 15 people in Israel, one in Europe and four in the U.S. It has several patents. The essence of Goffer’s innovation is his deep insight, stemming from his own disability, that paraplegics would greatly value the ability to stand upright, and look others in the eye, rather than perpetually face upward and look at people a meter taller than their eye level.

We saw a demonstration of ReWalk. Attached to a disabled person’s legs, it uses an electronic sensor device on the person’s wrist to move each leg forward, when the person (on crutches) leans forward. The battery power is carried in a small backpack. The device makes a whirring noise, that is not unpleasant or loud. The price is currently $90,000 per device, in the U.S., and 90,000 euros in Europe. This price will decline as large-scale manufacturing occurs. It finds use both as a ‘walker’ and as a rehabilitation device to help those who have been injured. By putting those confined to wheelchairs on their feet, erect, it essentially moves them from ‘disabled’ to ‘enabled’. Goffer himself cannot use his device, as he is quadriplegic. But he nonetheless wants to get his device to market quickly. I told him I thought a great many people are waiting for it. “I know,” he said. This is why he and his team are working very hard. Production currently takes place at the company’s offices in Yokneam, a northern suburb of Haifa.

12. Case Study: How eBooks were Invented, and How Michael Hart Changed the World

Fig. 8 Michael Hart
The person who invented e-Books died recently at the age of 64. His name is Michael Hart, and his little-known story shows how one person with one idea can truly change the world.\(^9\) Hart was a student at Univ. of Illinois. (Recall that this university was a major pioneer in computer science, thanks to Marc Andreessen, who thought up Mosaic while at U of Illinois; Mosaic later became Netscape, the Internet browser). He was given a user’s account on a Xerox Sigma V mainframe computer in the school’s Materials Research lab in 1971, an account worth, according to him, $100 m. at the time. He tried to think up a project that would justify the cost, even though it was free for him. On July 4, 1971, he attended an Independence Day fireworks celebration and later stopped at a grocery store. With his purchases, he received a copy of the Declaration of Independence. Hart typed the document and intended to send it as an email to all the users of ARPANET (the precursor of the World Wide Web). But a colleague said this would crash the system! (The whole Declaration is only 1,357 words!). So instead, he posted a notice saying the text could be downloaded. Hart said he wanted to “encourage the creation and distribution of e-books” in order “to help break down the bars of ignorance and illiteracy.”

Hart’s initiative and modest idea gave birth to Project Gutenberg, which today lists more than 30,000 downloadable e-Books in 60 languages. The Project got off to a slow start. Hart created only 313 e-books by 1997. But by 2021, Project Gutenberg’s 50th anniversary, it is predicted there will be a billion e-Books available – and, said Hart in an email, “you will be able to carry them all in one hand!”.

Hart once told a magazine called Searcher: “I was just waiting for the world to realize I’d knocked it over. You’ve heard of cow-tipping? The cow had been tipped over, but it took 17 years for it to take up and say, ‘Moo’. “


13. Case Study: Find Yourself a “Squeeze Box” – And Think In It; Spend Less – and Innovate Better!

Thinking “outside the box” is vastly over-rated. The best creative thinking is done INSIDE the box – but the right box. By ‘box’, we mean the things about reality you CANNOT ignore because they just won’t go away. Like time, money, and feasibility.

A new book by author Vijay Govindarajan’s “Reverse Innovation: Create Far From Home, Win Everywhere” (HBS) makes this point. Despite the MBA/Harvard type title, Govindarajan is right.

“Innovation in the rich world is based on the approach “Spend money and innovate.” In the U.S., you can see this clearly in health care. We push the frontiers of medical science and technology with very little attention paid to cost. Our health-care system is prohibitively expensive, yet does not guarantee the highest quality; nor does it provide universal coverage. There is an alternative model of innovation: “Spend less and innovate.” This is the only feasible model in poor countries that are resource-constrained. As some companies have discovered, constraints can be liberating. This notion is at the heart of reverse innovation. General Electric (GE) was able to come up with an ultralow-cost electrocardiogram (ECG) only when it bumped up against many constraints in rural India.”

Remember former Curitiba (Brazil) Mayor Jaime Lerner’s dictum? If you want to truly innovate, slash two zero’s off your budget!

So, think different about thinking differently. In wealthy countries, VC’s and MBA professors caution, “you always need more money than you ask for – ask for more, and then raise money when you can, not when you need it”. Problem is, as all of us know, when you have money in the bank, you tend to spend it; you tend not to respect it. And then high burn rates kill the innovative companies. They run out of money because having money means you have time (to doodle) – but you don’t! Because time to market is crucial and urgent, and having money kills it.

So, find a ‘squeeze box’. Find a tight constraint, a challenging one. Make sure it is credible. Use it to create urgency, the first step in transformative change. And then
work hard inside that box. When John F. Kennedy made his famous “we will go to the moon by the end of the decade” speech before a joint session of Congress, on May 25, 1961, he did precisely that. And just eight years later, in 1969, American put a man on the moon. The ‘squeeze box’ definitely helped. If he had said, well, we’ll go to the moon, sometime before the year 2050, would it have happened?

*Here’s how GE innovated the electro-cardiogram device affordably for rural India.*GE’s premium ECG machines were nonstarters in rural India, because patients didn’t have the money to pay for the test and small clinics and physicians couldn’t afford the machine or the support costs. These constraints defined the sandbox for GE Healthcare to develop an $800 ECG machine for rural India that is portable, battery-operated, easy-to-use, and easy-to-repair. GE found many ways to cut costs. The high-end machine was custom-designed, so GE built a machine using commodity components, realizing huge cost advantages. For a cost-effective printer, GE used the kind of ticket printer found on public buses and in movie theaters. Since these printers are produced in the millions, GE could enjoy significantly lower costs due to economies of scale. The small printer reduced the weight of the machine—less than a can of Coke—and helped make it portable. By eliminating the monitor, GE reduced the need for huge power consumption. This, in turn, contributed to longer life for the rechargeable battery.

In his excellent YouTube talk, Prof. Govindarajan amplifies on his ‘reverse innovation’ idea:

“What is reverse innovation? Why is it so important? What is it that multinationals must do to master reverse innovation? Think about the innovation paradigms inside GE, P&G, Pepsi, IBM, Cisco, Nestle and others. Historically, MNC’s design products in rich countries, and sell them in poor ones. Reverse innovation involves the opposite, innovating in poor countries and bringing the products to rich ones. Clearly poor people want what rich people have. But why would a rich man want a poor man’s product? That is the essence of reverse innovation.

* Nestle: is remaking itself as a health and wellness company. The place they are looking to innovate is emerging markets, because of the size of the consumer base. They innovated under the brand name Maggy (noodles), in India, low fat healthy noodles. It created a huge market in India, but is now sold successfully in rich countries.

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10 [http://www.businessweek.com/printer/articles/20236-the-case-for-frugal-thinking](http://www.businessweek.com/printer/articles/20236-the-case-for-frugal-thinking)
* Tata Nano: $2000 car. The cost of a DVD player in a BMW is much more! They target the two-wheeler population in India. Two-wheelers cost $1500. A $2000 car will win the two-wheeler population. You are converting non-consumers into consumers. This is fundamental innovation. Tata Motors plans to bring the Nano into Europe and the U.S.

* GE. Five years ago GE pioneered an ultra low cost portable ultrasound machine in China. It costs $15,000. Contrast that with the premium ultrasound machines, sold for $350,000. Why do you need a portable machine in China? 90% of China is rural. You have no hospitals. The hospital has to come to the patient. So the machine must be portable. The low cost portable machine, innovated for China, is now creating markets for GE all over the world, including the US. It is a $300 m. global business for GE.

  In the US, you can put the portable ultrasound machine in an ambulance, when there is an accident.

How come reverse innovation has become so important? It is because of the 2008-9 Great Recession. It has fundamentally reset the world. Growth has shifted from developed to developing countries, from rich to poor. 15 years ago, GE used to prepare its global strategy, so there was a strategy for the US, Europe, Japan and the rest of the world. Today GE has a BRIC strategy, for the Mid-East, and – the rest of the world. This is a fundamental change. MNE’s have taken the 7 b. people on earth and divided them into 2 b. rich people, and 5 b. poor. The latter were left to government and charity. This is outmoded. We need to bring the 5 b. poor into the consumer base. They cannot consume the same products consumed by the 2 b. rich base. There is no product created for middle America ($50k pcap.) that can be adapted to capture middle India ($800 pcap.).

What should the MNE’s do to master reverse innovation? 1. Have a big dream for emerging markets. Unless you think big, you won’t become big. 2. Make ‘amplifying weak signals’ a core competence. The future is unknowable. There are many ‘weak signals’ in emerging markets, MNE’s are unused to hearing them. They must become expert at it. You cannot wait for the weak signal to become clear before you act. By the time the signal is clear, the game is over. The golden rule is, spend a little, learn a lot. Keep the cost of failure cheap. Then you can fail more often. Failure is converting assumptions into knowledge. Fail early, fail fast, fail cheap. 3. Fundamentally change the center of gravity of your organization. You have to
massively redeploy resources from rich lands to poor ones. Delegate power. Localize power and resources in emerging markets. This is hard for MNE’s."

Rethinking Innovation: Start at the Bottom, Not the Top!

The Global New York Times’ “Dawn of the New Decade” ad insert seeking investment in Asia (as if Asia needs money and investment, rather than the overspending America) has an interesting interview with Anil Gupta, INSEAD Professor and expert on globalization.11

Here is Gupta’s ‘take’ on the changing world of innovation:

“Enterprises that hope to emerge as the global leaders in 2020 will also need to think differently about innovation. Traditionally, innovation has originated in the developed countries….within industries, at the top of a product range, for example, a Lexus, and then worked its way down to, say, a Toyota Corolla. ..In order to capture the very large market opportunities in the low-to-middle segments [in emerging markets], the leading global enterprise of 2020 will need to be good at not just top-down innovation but also at frugal innovation, whose roots would lie in the low- and middle-income markets of emerging economies.”

Prof. Gupta cites as an example Tata Group’s Nano car, the world’s cheapest, and its strategic plan to bring out an electric Nana in the EU and US, matching the performance of domestic equivalents at 1/3 less cost. “We’ll see this phenomenon in many industries, from tractors to banking,” he notes.

Innovator must ask: Can I shift my focus from premium-priced ‘toys’ bought by those with scads of money, to low-priced products that even low-income groups in low-income countries can buy? The late C.K. Prahalad identified “fortunes at the bottom of the pyramid”… but apparently, according to Gupta, there are also superior innovation opportunities down there.

14. Case Study: Quingjie Shui - Tishlovet Water

(Note: “Qjingjie Shui”, or ‘clean water’ in Chinese, is a pseudonym for a large global Chinese consumer electronics company. “Tishlovet”, or conglomerate in Hebrew, is a pseudonym for a large global Israeli company. Neither company has yet formally approved the release of this case study to the general public, although senior executives have read and commented on it.)

水能载舟，亦能覆舟 “Not only can water float a boat, it can sink it also”.
-- Chinese proverb

Quingjie Shui Tishlovet Water device: retail price, 4,490 yuan ($692)

Background:

Tishlovet Group is an Israel-based global food company focused on dairy, coffee and chocolate. Tishlovet Water is a kind of start-up operating within H2Q Water Industries, owned 87% by Tishlovet Group for making and selling water devices worldwide. Quingjie Shui Group is a large Chinese global consumer electronics and home appliances company, headquartered in Quingdao, China; the Quingjie Shui brand led the world market share in ‘white goods’ (kitchen appliances) with 6.1 per cent. Its annual revenue is an estimated 33 b. RMB (about $4.6 b.).
In Oct. 2009 Tishlovet acquired Tana Industries, purchased by Tishlovet subsidiary H2Q for NIS 291 m. Tana Industries was owned by Kibbutz HaLamed Hai and made the Tami4 water purifying device.

On May 18, 2011, Tishlovet Water and Quingjie Shui Group launched their joint venture in Shanghai, to produce the home water filtration device shown above, with a $4 million marketing campaign featuring the mantra “Smart Water – Safe Home”. The device is based on ten pending patents. The heart of the device is a high-tech filter known as MAZE, developed by Israeli entrepreneurs and produced in Israel. The high-tech purifier not only filters water but also heats it to exactly the right temperature for making tea. Tishlovet and Quingjie Shui each invested $20 m. in the joint venture. The device will be sold initially in Beijing, Shanghai and Quingdao (headquarters of Quingjie Shui), and later, in Shenzhen and Guangzhou.

Israeli entrepreneur Haim Wilder invented MAZE, together with Hebrew Univ. Prof. Avi Domb. MAZE is a unique water purification technology and filter that works with zero water pressure and its technology is the core of the Quingjie Shui Tishlovet device. A key point is this: The Tami 4 appliance itself will be made in China. But the crucial high-tech MAZE filter is produced in Israel, at Kibbutz Netiv Halamed Hey, thus keeping both high-value-added jobs and sensitive technology at home.

On July 12, 2009, the Tishlovet Group Chair outlined Tishlovet’ strategy for its water ventures: "Several years ago the Tishlovet Group identified water as a strategic category presenting significant business opportunity, in line with the Group’s long term business strategy and vision. We view the development of a technology that enables high quality drinking water for both home and offices as a means to improve the quality of life of millions of people worldwide. About three years ago we teamed up with a group of Israeli entrepreneurs and scientists, and invested in the H2Q venture which develops a water purifier using a breakthrough technology. Tishlovet’ water activities, which highlight both its social responsibility and commitment to the environment, meet a genuine need of people around the world today."
Interview with R.R., CEO Tishlovet Water:

R.R. has a strong background in high-tech industry. He has a B.Sc. degree in Electrical Engineering and an MBA degree. He is 48 years old and is married, with three children. R. joined Tishlovet Group to head Tishlovet Water as CEO, about two and one half years before the Quingjie Shui Tishlovet Joint Venture. Though he had no experience with the food or water industries, with all of his managerial experience focused on high-tech, he was fiercely recruited by Tishlovet Group Chair Ofra Tishlovet and other Board members. They spotted in him qualities they felt would enable him to build a new venture within Tishlovet. Tishlovet’s vision is to bring ‘magic’ to basic products, and few things are more basic than water. In R.R.’s own words:

“Tishlovet Water is a company launched within Tishlovet Group. I became CEO of Tishlovet Water in January 2007. The Quingjie Shui Tishlovet joint venture was the result of an orderly disciplined process. We chose Quingjie Shui as our Chinese partner after a careful selection process. We engaged in a dialog with Chinese consumers, and focused on a compelling reason to buy our joint-venture product, built on effective communication with consumers.

1. The starting point is this: Chinese consumers do not drink tap water. It is Chinese custom and culture that water is boiled. This is why the Chinese drink tea and serve tea to guests. Plain boiled water is not tasty. And in China it is considered impolite to offer cold water to guests.

2. There is high awareness in China of all the contaminants that enter into tap water. Moreover, water that ‘stands’ for one night is thrown out. This is a very clear code in Chinese culture. For this reason, bottled water is widely sold and there is strong penetration of bottled water, in terms of per capita consumption.

At the same time, there are already a variety of home water devices, many of the local varieties are very cheap, some of the importer ones are quite expensive.

We felt that the size of the potential market for a home water device was very large and attractive. But it was necessary to build a strong compelling value proposition.
I was hired by the Chair of Tishlovet Group and grand-daughter of the original founders of Tishlovet, to build Tishlovet Water. Tishlovet Water is a world leader in water purification and filtration technology. And the Chinese market is very attractive. We treated the issue of how to do business in China, and how to penetrate the Chinese market, as an issue in business development. We first decided to map the market and the players in the market in great detail. We entered into the joint venture with Quingjie Shui only after we achieved a very deep understanding of the market.

There are two key points vital for doing business in China:

1. We understood that business in China is driven by interests. It is sometimes claimed that the Chinese do not keep agreements, even signed legal ones. This is, in my view, not the case. The Chinese do keep agreements, provided it is in their strong interest to do so. And the agreement has to be win-win. In the West, a deal is a deal. In China this is not the case, when the deal turns against China’s interest.

2. In China, the process of building a deal and reaching agreement is crucial. It is very important that in this process, Chinese leaders maintain ‘face’ and honor. We have learned this from experience. To head our China operations with Quingjie Shui, we opened an office in Shanghai and hired a very sophisticated CEO, local Chinese. This is very important.

3. Mutual trust is very important. We were very patient, to get to know our Chinese partners and to let them get to know us, to build the trust needed as the foundation of our joint venture. Our joint venture is built as much on trust and mutual respect as it is on capital or on technology.

4. To make a joint venture with Quingjie Shui, we engaged in a very long screening process, beginning with a long list that was sorted down to a short list. We chose Quingjie Shui as the best of two candidates. In this process, we used a local consultant. The key role played by this local person was crucial. It is also very important to establish trust with key local officials. Local government
officials in China have strong powers in regulating business in their area. Their approval and goodwill are crucial.  

5. There is a widespread view, especially among Israelis, that proprietary technology should not be brought to China, even as part of a joint venture, because the Chinese will quickly copy and appropriate it. At Tishlovet Water, we disagree. The only real protection for unique technology is to continue to develop it, one step ahead of competition. If you cannot do this, you will lose out, no matter how heavily you patent. The Chinese bring their own unique ‘technology’ – the ability to ‘design for manufacturability’, to take complex technologies and make them suitable for efficient production. This is as important as the patented core technology.

There were three separate signing ceremonies, over a two year period. The Board Chair and CEO of Tishlovet Group took part in one of them. In the second signing ceremony, it was held in Israel. The Chairman of the Board of Quingjie Shui himself came to Israel, along with Quingjie Shui’s CEO, and stood behind the CEO during the signing ceremony. However, the Chair did not sign. I asked him, why? “It is sufficient that I am standing here,” he said. The fact that the Chair of Quingjie Shui literally stood behind this agreement, and made this known to all his managers, was vital. Without this, deals are not stable.

The third signing ceremony involved the full detailed agreement, including ‘route to market’. Quingjie Shui has 7,000 retail outlets all over China. We (Tishlovet Water) are responsible for the product itself; we are in full control of making the product.

China has a detailed Five Year Plan. It includes supplying improved infrastructure throughout China, including high-quality water. The plan also includes raising the value-added of goods made in China. We studied China’s government’s interest and goals, and also Quingjie Shui’s key interests, related to its Quingdao region and city. Quingjie Shui itself insisted that we had to have an engineering setup in China.

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12 An extreme example is the Souzhou Science Park, about 30 minutes outside Shanghai. The Singapore government invested an enormous sum to build it – but few companies signed up to occupy the space. The logjam was broken only when a major portion of the equity in the Park was transferred to the Souzhou City administration.
For China, simply making a product in China is not sufficient. There has to be a component which involves some element of learning for China, in terms of technology.

*Israeli engineers are very good at innovating new products. However, they are not good at ‘engineering to cost’ and ‘designing to cost’, or ‘designing for manufacturability’. A Chinese engineer will take a product, and reduce the number of parts in it from 100 to, say, 30, to make it faster cheaper and easier to make. But Israeli engineers do not have this mindset. However, Israeli engineers are very good at creativity, and inventing new things. Israeli engineers will make things work. Chinese engineers will make them commercially viable. This is a strong and positive collaboration.*

The MAZE high-tech filter that is at the heart of our devices is currently produced in Israel, on Kibbutz HaLamed Hai. Eventually, it may be produced elsewhere, perhaps in China. However, Israeli engineers will continue to develop advanced versions of the filter. As the filter becomes more and more commoditized, more sophisticated versions will be developed, and we will work on this process continually.

*Quingjie Shui has set up an organization as part of our joint venture. The CEO used to run the small appliances branch of Quingjie Shui. We have in our China operation an Israeli marketing manager, and an Israeli finance manager. It is our intention to be in China over the long term. Our Tishlovet Water CEO in China is Joanna Chao Gu.*

*Our pricing plan will unfold over time. At the launch, our device is high-priced, $692. Next year, we will introduce a medium-priced device. Over time, we will also introduce affordable devices. This is the opposite of the market penetration plan used by Japanese car and motorcycle firms in America, which began at the low end, to attract young customers, and moved up to the very high end (Lexus, for instance). In future, we plan to introduce this device in other countries, perhaps the UK.*
We considered other large Asian nations, such as India. We chose not to go to India; there are water purifying devices there, they are very inexpensive and only involve purification. The Indian market is complex.

What should Israeli companies know, in order to go to do business in China?

First, you must structure the joint venture so that it is relevant over time, so that the Israeli partner brings significant value added to the agreement, in the eyes of the Chinese partner. When you become irrelevant to the deal, which often happens, you will likely be sidelined. Second, you must structure sustainable win-win benefits for both Israeli partner and Chinese partner. This is crucial. The win-win must be sustainable over time.

When you consider engaging in a joint venture in another country, you must decide not only in which country to operate, you should decide carefully, in which countries NOT to operate. And above all, analyze very carefully, what are the interests of the other side to the agreement? “

At the heart of Tishlovet Group’s strategy is the view that the most basic of human needs, food and water are growth industries.

The Green Revolution pioneered by American agronomist Norman Borlaug caused grain prices to fall by 75 per cent between 1950 and 1990. Then, the price of rice, corn, soybeans and wheat effectively doubled, since 2007, causing the number of hungry people in the world to rise to 1 billion, or one person in every seven. Grain prices are poised to rise again, because of climate change, drought, rising population, local wars and biofuels. A joint report by the UN Food and Agriculture Organization and the Organization for Economic Cooperation and Development warns that wheat and grain prices will be 15-40 per cent higher over the coming 10 years. That means even more hungry people and major social unrest.

The problem is not lack of land. There is enough land in the world, over six acres per person. But there is not enough good, fertile land – only one arable acre per person. So the world needs to find ways to grow more food on poor land. And it
needs to find ways to deliver pure drinking water, as increased use of fertilizers degrades ground water and endangers the health of millions of people. Food and water are about to reclaim their place as a central concern of policy and business.

Tishlovet Water is not confining its strategic expansion plans to China alone. It was announced on Nov. 20 that Tishlovet has teamed with another innovative company, Virgin, (specifically with Virgin Green Fund, a private equity fund affiliated with Virgin and focusing on green technologies), to form a new joint venture. The JV will bring Tishlovet Water purification products and services to Britain and to Ireland, later expanding to France, Australia and South Africa. Under a 30-year agreement, Virgin Tishlovet Water will use the Virgin brand to market Tishlovet Water products.

In a press release, Tishlovet Water CEO R.R. said:

"I am proud of the fact that Virgin Group chose to establish a partnership with us in view of our expertise and excellent ability to provide consumers with pure, tasty water at point of use – highest quality, affordable and easy to use hot and cold water. Tishlovet Water is currently operating a successful partnership with Quingjie Shui Group in China to market its products there, and I am confident that our expertise and technology, combined with Virgin’s leadership in understanding and meeting consumers’ needs, will result in the creation of a company that specializes in the supply of pure, safe and tasty drinking water to consumers in countries around the world."

The joint venture described here is a strong example of reverse innovation – initially designing and launching products in emerging markets, then migrating them to developed countries. It is likely we will see a great many more examples of this process; emerging markets offer growth and a growing middle class, as well as production expertise. Demand-driven innovation will increasingly seek to satisfy needs and wants in emerging markets, first and foremost.
F. Demand-Driven Process Innovation Often Surpasses Product Innovation

15. Innovation Where It Counts: Save Lives, Don’t Invent Gadgets

A simple idea in economics is this: Put your money where it brings the highest marginal return. In medical care, America is disastrously failing to do this. The result costs thousands of lives! According to a study by AARP (American Association of Retired Persons), published in their March 2012 Bulletin, “hospital errors cause 100,000 deaths yearly” in the U.S.”. These are all preventable deaths, notes the author Katharine Greider! These deaths are equivalent to a hurricane that would wipe out the entire population of South Bend, Indiana!

A study of Medicare found that 1 in 7 patients died or were harmed by their hospital care! How about those odds: 14.2 % you’ll be harmed or die. “The number of patients who die each year from hospital errors is equal to four jumbo jets crashing each week,” notes the author. U.S. surgeons operate on the WRONG BODY PART as often as 40 times a week!

A small investment in operations innovation could remedy this, and substantially cut the death toll. For example: Supply each nurse and doctor with an MDA (medical digital assistant) that provides instant comprehensive information on each patient and connects to a central databank. Some 1,500 lives were saved in 18 months in Michigan intensive care units, when a checklist was introduced for handling catheters! Just a checklist!
Yet America continues to spend $8,000 a year on medical care, double that of France or Canada, investing in very very very expensive procedures instead of investing in innovations that improve operations, prevent errors and save lives. For example: open heart surgery costs $324,000 (!), a heart transplant, $287,000, a liver transplant, $235,000; and a heart valve procedure, $133,000. These operations are done all the time.

It is true in general that there is massive underinvestment in strategic operations innovation, in companies. But in hospitals, this costly mistake kills huge numbers of people – and it is simply ignored. Process innovation is desperately needed – and could be hugely profitable.

16. IKEA: Can You Feel Small When You’re Really Big? Anders Dahlvig Thinks You Can’t!

Consider IKEA. This Swedish company, founded by Ingvar Kamprad at his uncle Ernst’s table in 1943, has revolutionized the global furniture business. It is the world’s largest furniture retailer, and its innovation is its business model, not its products. We now have a new book, The IKEA Edge, by Anders Dahlvig, who rose from store manager to become Kamprad’s right-hand man. Here is what Fortune magazine said about this book:

Dahlvig does give a brief history of IKEA's evolution into the privately held retail giant that generated $31 billion in 2009, with 125,000 employees (ran 300 stores, operated in 38 countries and was the 3rd largest buyer of wood in the world). But more often than not, the book is about management -- motivating and inspiring employees, keeping an entrepreneurial streak as a company grows, creating loyalty and diversity, the role of a CEO. The book is rich in
ideas about how to take a brand that has a strong regional culture and make it global. While some of these lessons are helpful and refreshing (Dahlvig suggests having numerous people report to you so you don't have time to micromanage or hover), I wanted more of a personal story about his time at the company. Instead the book is written in the style of Ikea itself: practical and no-frills.

What is IKEA's secret of success? Fierce supply-chain management, bulk buying and the creation of a unique customer experience. Consider IKEA’s restaurants. Their real purpose?

“Take, for example, the fact that its restaurants generate $1.5 billion in sales. But the main reason behind those 15 Swedish meatballs for $3.99 is not to make a profit -- it's to highlight the store's low prices and get the customer to shop longer.”

Dahlvig knows clearly why IKEA and any company exists: "A company's reason for existence should be to contribute to a better society."

It's hard to imagine these words coming out of the mouths of most U.S. CEOs, says FORTUNE. But it might serve them well if they at least read the book.

IKEA’s founder is now 85, and about to retire. Dahlvig is worried. He recently told BBC’s Business Daily: “What will happen when the founder of IKEA is not around? What will happen to IKEA? The founder is 85, this transition is about to happen. He is less visible in the business. Transition is on the way. My biggest worry for the company is, the loss of the values, he is the guardian of that. This is the soul of the company. The consequence of losing the values is, the loyalty of employees declines, and we become like every other company. This is our first generational change. That's a worry. The fact that IKEA is becoming bigger, a bureaucracy, the small company feel is declining, maybe inevitable, but, I'm worried about that, and worried about the loss of the culture and the values. And I don’t have a solution, how you can act like a small company when you are the size of IKEA.”
Milkshake Marketing: How a ‘jobs-to-be-done’ perspective spurs innovation

In Innovation Management, D.V.R. Seshadri and Shlomo Maital suggest that innovators should listen to four ‘voices’ – those of the product, the organization, the customer/client and your internal intuitive voice. All these voices ‘speak’ – except the product. How can products make their voice heard?

Now comes Harvard Business School Professor Clay Christensen’s “milkshake marketing” perspective to reinforce this point. Readers will know Christensen from his famous ‘disruptive technology’ work. Here is our ‘take’ on Christensen’s approach, which says products are simply things that do a job. Find what that job is, and you can innovate successfully. He suggests writing as if we were a milkshake.

Hi! I’m a milkshake. My mom is a fast-food chain. She wants to sell more of me. So she did everything the MBA marketing texts say to do. And nothing worked. Then, she did the obvious – she asked me, the milkshake itself. So I asked my buyers. Turns out I’m bought mainly in the morning by commuters, who want something they can hold in one hand and relieve the boredom of the long commute to work. So we made the ‘morning milkshake’ thicker, so it lasts the whole trip, and more interesting, with chunks of fruit. Also kids like milkshakes. But it takes them forever to finish them, because they are so thick, so parents balk. So I told mom to make thinner milkshakes for kids. It worked! Sales doubled!”

Christensen says, “Looking at the market from the function of a product really originates from your competitors or your own employees deciding what you need, whereas the jobs-to-be-done point of view causes you to CRAWL INTO THE SKIN OF YOUR CUSTOMER and go with her as she goes about her day, always asking the question as she does something, ‘why did she do it that way?’ “.

17. Case Study: Mellanox -- Warp Speed for Networks

On July 19 2012 shares of an Israeli semiconductor company, Mellanox, rose by almost 50 per cent in a single day on both the Tel Aviv stock exchange and on NASDAQ. Lucky shareholders have seen their stocks double in value in one year.

The market value of Mellanox shares is now $3.7 b. and exceeds that of Bank Leumi, Israel’s second largest bank.

Despite the global recession, Mellanox shares have risen from NIS 27 ($7.70) in 2008 to NIS 380.7 ($94.50) today. The reason is Mellanox’s phenomenal profitability (71% gross margin) and revenue growth (from $48.5 m. in 2007 to a possible $600 m. in 2012). Investors love rapid growth. And what has driven Mellanox’s speedy growth is speed, loads of it.

In the TV series Star Trek, “warp speed” was a faster-than-light propulsion system. The secret of Mellanox’s success is ‘warp speed’ technology connecting companies and their clients with enterprise data processors – but it is not science fiction. Mellanox hardware can transfer 100 gigabits per second, or a hundred 2,600-page Encyclopedia Britannicas every second. Mellanox’s remarkable attainment of market-leading “warp speed” for networks is the result of a decade-long quest, led by a talented entrepreneur and engineer, who identified a burgeoning embryonic market need well before other competing companies did. The need is, simply, to move data, in networks, faster.

Mellanox was founded in 1999. Its founder Eyal Waldman is a serial entrepreneur and, many believe, a genius, though in a recent interview with him he denied both labels. After graduating from Technion-Israel Institute of Technology, he worked for Intel from 1989-93 as part of a highly successful team that developed the Pentium microprocessor, led by Dadi Perlmutter, now a senior Intel VP. Waldman left in 1993 along with several others in his Intel team to co-found Galileo with Avigdor Vilentz. When Galileo, which made high-speed communications hardware, was acquired by an American firm, Marvell, in 1999, Waldman left to found Mellanox. It is based in Yokneam, a Haifa suburb, and in Sunnyvale, CA.

Waldman had a key insight earlier than most other entrepreneurs. He saw that computing would shift to the “cloud”, a system where businesses keep their data and software at distant sites and access them through a network, named for the cloud-like shape of the diagram that describes the system. This will mean that the bottleneck in computing, Waldman reasoned, will not be computing power,
memory or data storage, but speed – how fast you can transfer data over the network. Mellanox hardware delivers speed, more of it than its competitors, including giant Intel. Calling Mellanox a semiconductor company is like calling Ferrari a car firm. As a small “David”, Mellanox has slain much bigger Goliath competitors.

In a recent speech at a Technion conference, Waldman explained one unusual reason why data transfer speed is so important – electricity. Facebook, he notes, spends a third of its operating budget on electricity, because its thousands of servers burn huge amounts of kilowatts. “Warp speed” data transfer simply means using fewer watts of power.

“At Mellanox, we have almost daily challenges,” Waldman said, when I interviewed him recently. “We have many obstacles. We did a round of capital-raising in the third quarter of 2001, just around the time of 9/11! The conditions were nearly impossible. We had only $4 m. in the bank at the time. This was enough to survive for only 3 more months. We once did a life-saving project for the company in only three months! This was impossible, unheard of. The team did and saved the company. I don’t know of another team that would even have attempted it.”

Why has Mellanox not been acquired, like most other startups, swallowed by a giant U.S. firm? For one, Waldman truly wants to build a global giant, not do an ‘exit’ and bank a huge check, and he seems capable of doing it. For another, thank Oracle founder Larry Ellison. Oracle sells database software, about $11 b. worth every quarter. Oracle sells speed in accessing and using huge databases (“10x more speed!”) and Mellanox helps provide it. Ellison bought 10 per cent of Mellanox stock. This investment acts as both a Good Housekeeping seal of approval for Mellanox and a kind of ‘poison pill’, deterring other companies, who know Oracle wouldn’t agree to sell its shares.

Mellanox is one of a handful of Israeli high-tech firms that have outsourced some of its engineering to the West Bank. It has hired Palestinian engineers from Ramallah through a Palestinian outsourcing firm. Waldman believes business partnerships
between Israelis and Palestinians can contribute to peace in the region and I strongly agree.

G. Startups Require a Strategic Partner With a Strong Market Presence

18. Case Study: From Eggheads, Golden Eggs

“Egghead” is an epithet describing intellectuals (such as professors) out of touch with reality, lacking common sense. Senior high-tech executive and entrepreneur Dan Vilenski believes he knows how to help eggheads lay “golden eggs” (startups that generate wealth, jobs, and exports). It’s not just a theory. Vilenski has “proof of concept”, with successful startups emerging from the highly productive lab of Technion optical physics Professor Steve Lipson. Lipson and Vilenski, in interviews, explained the winning formula for transferring technology from university labs to the marketplace.

Vilenski brought three major American high-tech companies to Israel – Kulicke & Soffa, KLA and Applied Materials. As head of BIRD-F (the U.S.-Israel Binational Industrial R&D Foundation) he found many strategic U.S. partners for struggling Israeli startups. Lipson served as his scientific mentor for over 20 years.

The term “technology transfer” doesn’t begin to convey how hard it is to convert basic research into market success. Many experts prefer the term “Valley of Death” – the huge gap between the lab and the market, where startups trying to turn science into products lack funds, management skill, expertise and sales channels, and often stumble and die as a result.

A student project in Lipson’s lab led to an idea – use a known technology (known as surface plasmon resonance) in a new way, to identify proteins on a “biological chip”, or microprocessor, able to classify 36 different proteins at one time. With Lipson’s knowhow, a startup, ProteOptics, was launched in 2000, with Lipson’s student, Ariel Notcovich, as CEO. Lipson says most of his graduate students work in industry, rather than in academe.
Vilenski brokered a ‘marriage’. He found a U.S. company called Bio-Rad that for over fifty years produced and sold innovative lab equipment. Bio-Rad is led by its founder, Norman Schwartz and his son David. Lipson, too, is part of an extended father-son team. His textbook Optical Physics is authored by his late father Henry, Stephen, and son Ariel.

Bio-Rad invested in ProteOptics, starting in 2001 and eventually acquired the firm outright in 2006. Bio-Rad thought Lipson’s technology could generate a new device for analyzing proteins, just what scientists needed at a time when genomics (study of genes) was evolving into “proteomics” (study of proteins triggered by genes). Bio-Rad was an ideal strategic investor. It brought intimate knowledge of the marketplace (in this case, scientific laboratories doing research on proteins), along with brand-name credibility that helped sell innovative products to cautious customers.

“A strategic partner understands the market, can finance the development, has a business approach and has a world sales and service infrastructure,” Vilenski argues. “In my opinion all these elements are served better by a proper strategic partner than a financial partner.”

“A Bio-Rad director asked us, at an early stage, will this work?” Lipson said. “We did some lab experiments, reflected, and changed direction from ‘interferometry’ to ‘absorption’. This switch was crucial. Bio-Rad was patient and supportive all along.”

Today ProteOptics is Bio-Rad Haifa, sited on the Technion campus. Its technology is the heart of a $250,000 machine with a consumable bio chip widely used by pharmaceutical firms and other scientists and sold globally by Bio-Rad.

Lipson’s ideas have created at least two other successful startups, both located in a development town, Migdal HaEmek – CI Systems, which also makes test equipment for labs, and Applied Spectral Imaging (ASI), whose spectral technology colors images with multiple colors, beyond the basic red, green and blue previously offered by digital cameras.
Lipson himself is firmly and irrevocably a bench scientist. But he has a rare knack of seeing how his discoveries can potentially become commercial products. He patents them before publishing. And his students love to do the implementation, aided by strategic partners.

“For instance is not a proof,” goes a Yiddish saying. Scientists like Steve Lipson and dynamic matchmakers like Dan Vilenski are quite rare. As a result, golden eggs from eggheads remain an exception, rather than a rule.

IV. Conclusion

Readers may justifiably feel rather baffled after reading our narratives on demand-driven innovation. These are often (though not always) stories of rather eccentric individuals, who often have weird ideas, and take personal risks to implement them. The core of demand-driven innovation is always an idea born in a single brain, to an individual who has intuitive and/or evidence-based understanding of needs and wants that are currently unmet.

There is a fundamental paradox, and often, a major misunderstanding, related to market-based demand-driven innovation. Market research, based on marketing ‘science’, is often not the friend of innovation, but rather the sworn enemy of innovation. The reason, as John Kearon notes in his challenging article “The death of innovation” [Market Leader, Quarter 4, 2010, pp. 20-24], is that marketing science is based on what exists, not on what does not yet exist. Kearon claims:

“When originating a new category, everything has to be invented, everything is new and by definition contrary to the way things are. Trying to research new category ideas is pretty near impossible since people are notoriously bad at predicting whether they will adopt new behaviors in the future and generally reject such changes as alien and odd. Examples of hugely successful brands that originated their category but which failed disastrously in market research include Sony Walkman, Bailey’s Irish Cream, Post-Its, Perrier (in the UK), Red Bull and Cashpoint machines. “

Market research often reveals what consumers are buying now, rather than what they might wish to buy in future. This may be helpful for incremental innovation, but
not for radical innovation, of the ‘blue oceans’ variety that can create market leadership. Market-based demand-driven innovation is not necessarily innovation driven by massive conventional market research (as our Nokia narrative above suggests). Most breakthrough innovations appear to occur because individual entrepreneurs achieve deep insights into market needs that others seem to lack. Innovation systems that give such individuals both the freedom to innovate, and the infrastructure and resources to do so, will ultimately triumph.