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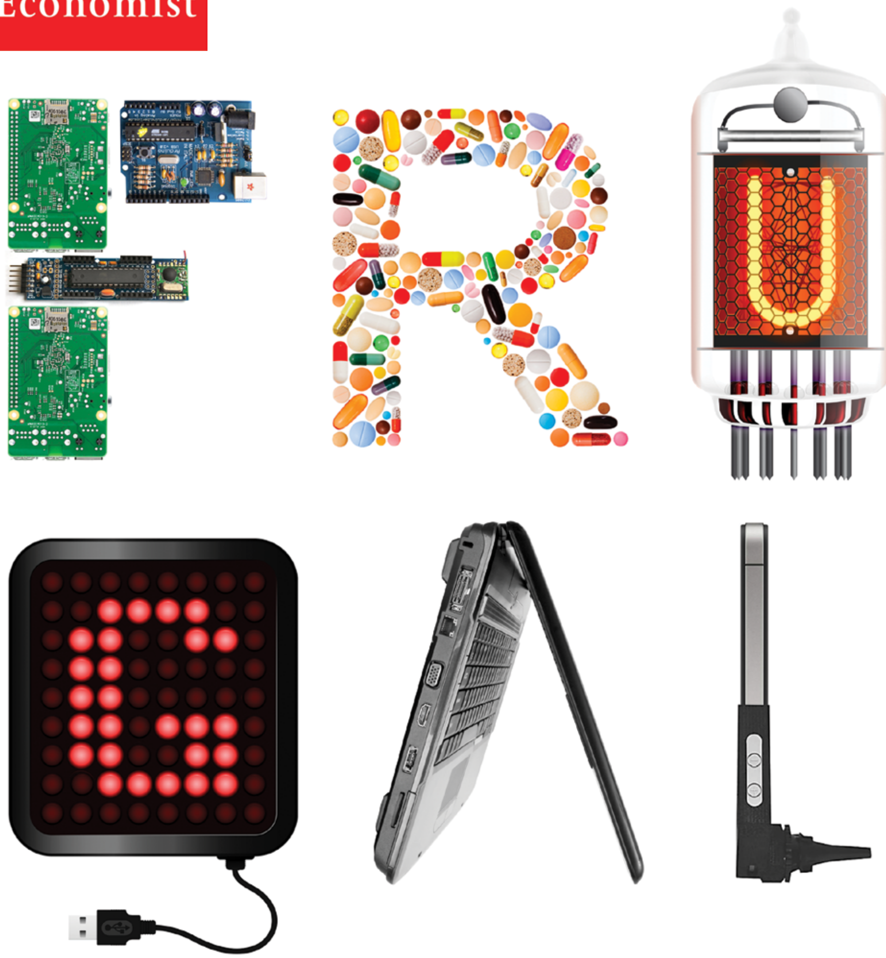

INNOVATION

HOW TO DO MORE WITH LESS

NAVI RADJOU *and* JAIDEEP PRABHU

Foreword by PAUL POLMAN, CEO, Unilever

Navi Radjou is a Silicon Valley-based innovation and leadership thinker who advises senior executives worldwide on breakthrough growth strategies. A Fellow at Cambridge Judge Business School, Navi has served on the World Economic Forum's Global Agenda Council on Design Innovation and contributes to *Harvard Business Review* online. In 2013, Navi won the prestigious Thinkers50 Innovation Award – given to a management thinker who is re-shaping the way we think about and practise innovation. He delivered a talk at TED Global 2014 on frugal innovation. Navi co-authored the international bestsellers *Jugaad Innovation: Think Frugal, Be Flexible, Generate Breakthrough Growth* and *From Smart To Wise.* He is a sought-after keynote speaker who is widely quoted in international media. An Indian-born French national, Navi lives in Palo Alto, California.

Jaideep Prabhu is Professor of Marketing and Jawaharlal Nehru Professor of Indian Business at Judge Business School, University of Cambridge. He has a BTech from IIT Delhi and a PhD from the University of Southern California. Jaideep has been published in leading international journals and his work has been profiled on BBC News24, BBC Radio 4, BBC World Service, *Bloomberg BusinessWeek*, *The Economic Times*, *The Economist*, the *Financial Times*, *Le Monde*, *MIT Sloan Management Review*, the *New York Times* and *The Times.* He has consulted for or taught executives from Bertelsmann, Barclays, BP, BT, GE, IBM, ING Bank, the NHS, Nokia, Philips, Roche, Shell, Siemens, Vodafone and Xerox, among others. He is co-author of the business bestseller *Jugaad Innovation: Think Frugal, Be Flexible, Generate Breakthrough Growth.*

Praise for *Frugal Innovation*

Long practised in developing nations out of sheer necessity, frugal innovation is now becoming a strategic business imperative in developed economies, where consumers demand affordable and sustainable products. The flow of industrial knowledge has thus become a two-way street, where the North and South, East and West learn from and exchange with each other. No business leader in the 21st century can ignore the paradigm shift fully described in this book.

Carlos Ghosn, Chairman and CEO, Renault-Nissan Alliance

Through the comprehensive set of case studies they offer in their new book, Radjou and Prabhu demonstrate that frugal innovation is one of the most critical emerging models of value creation for both businesses and the customers they serve. In a hyper-competitive, resource-constrained world, the companies that will succeed are those that can develop and market new solutions that are resource-light and cost-effective without sacrificing quality. *Frugal Innovation* provides an essential blueprint for how to approach this business imperative the right way.

Indra K. Nooyi, Chairman and CEO, PepsiCo, Inc.

Frugal Innovation distils years of thinking and experimentation into an effective and innovative how-to guide for companies large and small. It should be required reading for executives who want to get to market faster and more efficiently while delivering what customers want.

Beth Comstock, Senior Vice President, Chief Marketing Officer, GE

Frugal Innovation offers valuable insights for business leaders everywhere who are facing a familiar challenge: how to do more with less and generate sustainable value for customers, shareholders and society. To stay relevant in an increasingly digital world, organisations must embrace a frugal approach to innovation in order to increase productivity and agility, create competitive advantage and ultimately fuel growth.

Pierre Nanterme, Chairman & CEO, Accenture

Radjou and Prabhu's *Jugaad Innovation* challenged the top-down Western approach to innovation by offering an agile, bottom-up model. *Frugal Innovation* moves this further and faster forward. The practical roadmap and numerous cases in this book find the beat of the new customer-led world order – where velocity, synergy, empathy and involvement come as standard. The future will be about doing more with less, and here we see how.

Kevin Roberts, CEO Worldwide, Saatchi & Saatchi

Radjou and Prabhu show the benefits of viewing resource limitations as an opportunity. In our increasingly resource-constrained world, consumers are demanding affordable, high-quality products that are environmentally friendly and socially inclusive – and numerous innovators are already obliging them. *Frugal Innovation* insightfully articulates how Western companies can evolve to capture opportunities presented by the burgeoning "do more with less" economy.

Dominic Barton, Global Managing Director, McKinsey & Company

In a world of budget cuts where we all strive to do "more for less", Radjou and Prabhu provide real practical examples of how we can all learn the lessons of frugal innovation. They successfully draw out the wider social and environmental benefits of frugal innovation and the concept of "prosumers" in a way that is both engaging and practical. A great read.

Iain Gray, Chief Executive, Innovate UK

An excellent and bang up-to-date primer on how to do innovation cheaply, quickly, flexibly and with close attention to users and customers – approaches which are, perhaps surprisingly, diametrically opposite to the ways in which so much innovation is organised today.

Geoff Mulgan, CEO, NESTA

Frugal innovation is an idea whose time has come. Downward pressures on cost and the need to use resources sustainably demand this new approach to innovation. In this seminal book, Radjou and Prabhu explain clearly how frugal innovation works and illustrate their case with a host of practical examples from companies around the world. They have captured the wave of the future.

Sir Michael Barber, Chief Education Advisor, Pearson

Frugal Innovation offers a compelling path forward for small and large companies striving to cost-effectively develop products and services of high quality that deliver real value to customers.

Jennifer Tescher, President and CEO,
Center for Financial Services Innovation

Frugal innovation is a critical business strategy for companies to prosper in a world where customers are both value-conscious and values-oriented. It challenges Western companies to create high-quality products that are affordable and sustainable as well as desirable and meaningful for end-users.

Carol L. Cone, Global Chair, Edelman Business + Social Purpose

Radjou and Prabhu offer a clarion call for leaders in mature organisations to rethink and reinvent their fundamental approach to innovation by drawing upon the smarts of their people rather than the riches of their organisations. *Frugal Innovation* shows how established companies can stay relevant by learning to think and act like challengers again.

Liz Wiseman, Thinkers50: Top 10 leadership thinker and author of Wall Street Journal *bestsellers* Multipliers *and* Rookie Smarts

The certainties of rising consumption in the 20th century are gone. Austerity, aspiration, personalisation and planetary limits all demand that we take a new approach to business. But what should it be? Radjou and Prabhu paint a vivid picture of how business can blend values and quality to deliver the personal and social balance that 21st-century consumers want.

Mike Barry, Director of Sustainable Business (Plan A) at Marks and Spencer

With the cost of R&D increasing year on year, it is important for pharmaceutical companies to keep a focus on ensuring positive returns from investment in R&D and innovation. To be successful requires R&D to be organised differently, in ways that simultaneously improve both effectiveness and efficiency – an approach we at GSK are taking. *Frugal Innovation* is a timely book that provides insightful and practical guidance to firms trying to do more with less.

Stephen Mayhew, Head, R&D Strategy Development, GSK

At Thinkers50 we have been following the development of the ideas of Radjou and Prabhu for some time. They are exciting because they challenge many fundamental assumptions about how and why companies innovate; and they are important because frugal innovation is an idea of and for our times. This book will accelerate the re-invention of how we understand and practise innovation.

Stuart Crainer and Des Dearlove, founders, Thinkers50

Health care may be the global sector most urgently in need of Radjou and Prabhu's insights in *Frugal Innovation*. Aging populations and surging demand for affordable services confront health-care leaders everywhere with a stark reality: innovation must be harnessed to create massive, sustainable improvements in health delivery systems without crippling economic growth. *Frugal Innovation* sets forth a compelling roadmap for delivering better care at lower cost for more people.

Molly Coye, MD, Chief Innovation Officer, UCLA Health

Frugal Innovation is a tour d'horizon of a changing economy. The authors make a compelling case for a feedback-rich economy that is restorative and regenerative rather than extractive, heading for the "upcycle". There is real economic and business advantage to be had through a system change approach, and the authors are to be congratulated for their stimulating guide to the future.

The Ellen MacArthur Foundation

Frugal Innovation is a must-read for corporate leaders around the world facing pressure to create high-quality products using limited resources. Radjou and Prabhu convincingly show that it is possible for companies to "do better with less".

Tango Matsumoto, Corporate Executive Officer, EVP,
Head of Global Marketing, Fujitsu Limited

Businesses have to innovate in an increasingly resource-constrained environment. Addressing clients' pain points and dreams in a frugal way requires a focus on simplicity and agility. This book gives many suggestions on how to do this well.

Sophie Vandebroek, chief technology officer, Xerox
and president of Xerox Innovation Group

Frugal Innovation holds important insights for companies across sectors wishing to do more with less. The book is of great relevance to the financial services industry and banks like Barclays that are working with new technologies and start-ups to help customers manage their finances better.

Elisabetta Osta, Managing Director, Design Office Information,
Insight & Innovation Team, Barclays Bank

In *Frugal Innovation*, Radjou and Prabhu show how the lessons from developing countries are starting to make a real impact on the innovation processes of established companies in the West. This book nicely describes these transformations and some of the difficulties encountered, and lists practical solutions for companies who want to do more innovation with less, no matter where you are in the world.

Henry Chesbrough, Faculty Director, Garwood Center for
Corporate Innovation at UC Berkeley's Haas School of Business,
and author, Open Innovation

Frugal Innovation proposes a breakthrough approach to solving some of the most complex issues of our global economy as it empowers human beings to use their creativity to generate economic and social value while preserving the environment. A must-read for thought leaders and practitioners worldwide.

Bruno Roche, Special Adviser to the G20 French Presidency Mission on Social Justice
& Globalisation; and Chief Economist, Mars Incorporated

The Economist

FRUGAL INNOVATION

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Navi Radjou and Jaideep Prabhu

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To all the frugal innovators out there who are every day making the world a better place for everyone.

Foreword

by Paul Polman, CEO, Unilever

IN A WORLD INCREASINGLY CHARACTERISED AS VUCA – volatile, uncertain, complex and ambiguous – few things are assured. There is one thing however of which we can be relatively certain: that the insatiable demand for ever higher quality products will continue to rise while at the same time the availability of the resources needed to satisfy that demand will remain constrained.

Reconciling this apparent conflict is rapidly emerging as one of the biggest business challenges of our age. Doing more with less can no longer be a short-term response to difficult economic conditions. It has to become an essential long-term business strategy. Businesses that recognise this new reality stand to prosper. Those that continue to live in denial will surely perish.

Yet recognising the new reality and preparing effectively for it are two very different things, which is where this excellent book comes in; Radjou and Prabhu demonstrate how – and why – the concept of frugal innovation has moved seamlessly from management school slogan to boardroom priority. Through a series of case studies they provide unequivocal evidence of why the "age of austerity" can become the "age of opportunity" for those willing to approach innovation in a very different way.

They start with an innate understanding of what people want. First, quality. People are not willing to compromise on the taste or the performance of the products they buy – and increasingly they cannot afford to; having to buy an alternative or replacement product is an expensive mistake they will not make twice.

Second, value. The demand for value is greater than ever, but this need not mean low cost, as the authors show. People are willing to pay for innovations that add value rather than just giving value. Launching an innovative premium jelly bouillon into a highly competitive market at the height of austerity, for example, might not have been thought the wisest move. Yet with people eating out less, the demand for high-quality convenience products that enable people to cook at home has grown. As a result, Knorr Stock Pots are now in 36 markets and have grown at five times the rate of the overall bouillon market.

Third, purpose. Increasingly people expect companies to use their ability to innovate in a way that addresses the biggest challenges we face around social inclusion and the sustainability of our planet. Business can no longer remain on the sidelines. It has an obligation and – as Radjou and Prabhu demonstrate – a clear opportunity to use its innovative capacity to develop solutions. This is the thinking at the heart of the Unilever Sustainable Living Plan and our business agenda at Unilever. It is a total value chain approach, as highlighted in the Unilever case study (see pages 94–7), but one that finds its greatest resonance at the level of our brands, such as Dove, Lifebuoy, Domestos, Knorr, Signal and the many others infused with a strong social mission and deep sense of purpose. To address people's growing demand for quality, value and purpose, it's not enough for companies to just do more with less; they must learn to do *better* with less.

Perhaps the greatest insight from this book is the extent to which we are not just living in a VUCA world, but in a world increasingly turned on its head. Traditional business models in the West need to be revisited. Poverty is prevalent today in many parts of Europe. That's why we need to apply to European markets the principles of frugal innovation that were used to develop more affordable products at key price points for emerging and aspiring markets. In Spain, for example, our Surf detergent brand sells in packages with as few as five washes; and in Greece, our mayonnaise is available in small packets as well as large jars. Ultimately, as the authors highlight, by combining the frugal ingenuity of developing nations with the advanced R&D capabilities of advanced economies, companies can create high-quality products and services that are affordable, sustainable, and benefit humanity as a whole. This work provides the essential roadmap for those wishing to navigate this new world.

Frugal innovation is an idea – and a book – whose time has come.

Preface

FRUGAL INNOVATION is the ability to "do more with less" – that is, to create significantly more business and social value while minimising the use of diminishing resources such as energy, capital and time. In this "age of scarcity", Western companies are facing growing pressure from cost-conscious and eco-aware customers, employees and governments, who are demanding affordable, sustainable and high-quality products. Frugal innovation is therefore a game-changing business strategy. But it is more than a strategy: it denotes a new frame of mind, one that sees resource constraints as an opportunity, not a liability.

In April 2012, after four years of research, our book *Jugaad Innovation* was published. It led readers into backroom innovation labs in developing countries such as India, China, Brazil and Kenya to examine the roots of this frugal mindset. (*Jugaad* is a Hindi word meaning an innovative fix or an improvised solution born from ingenuity and cleverness.) It showed how inventive entrepreneurs and firms in resource-constrained emerging markets concoct frugal solutions such as a fridge that consumes no electricity, a bicycle that converts road bumps into acceleration energy to run faster, or a mobile-based service that allows users to send and receive money without having a bank account.

Since the publication of *Jugaad Innovation*, there has been an explosion of interest in frugal innovation for *developed* economies. Corporate leaders and policymakers in the US, Europe and Japan are eager to understand how to do more with less. This has led them to fundamentally rethink how they operate, build and deliver products and services, interact with customers and citizens, and create greater value for themselves and society while preserving the environment.

This book identifies the best practices drawn from our studies of frugal pioneers in the US, Europe and Japan across sectors including manufacturing, retail, financial services, health care and education. It takes readers deep inside developed-world businesses and industries that are already reaping the benefits of frugal innovation. Pioneering companies such as Aetna, Fujitsu, General Electric (GE), GlaxoSmithKline (GSK), Pearson, PepsiCo, Renault-Nissan, Siemens and Unilever are striving to embed frugal processes and, most importantly, a frugal mindset in their organisations.

To achieve dramatic gains in cost efficiency, speed and agility, companies need to rebuild their innovation engines. This will present different challenges for different industries and functions, but six general principles are relevant to all industries and companies. Chapter 1 provides an overview of the socio-economic factors in developed nations that have given rise to frugal innovation, and how and why Western consumers have embraced frugal thinking. Chapters 2–7 look at the six frugal principles, and how companies have adopted and profited from them:

- **Engage and iterate.** Chapter 2 lays out the first principle of frugal innovation: engage and iterate (E&I). Rather than using insular research and development (R&D) departments that rely on educated guesses about customer needs, E&I starts with customers, observing their behaviour in their natural environment, and then considers how products can be made as relevant as possible, going back and forth between the customer and the lab to refine designs. Using case studies of frugal pioneers such as Arla Foods, Fujitsu, GE, GSK, Intuit and SNCF, it shows how R&D managers and marketing executives can embed this customer-centric principle within their organisations.
- **Flex your assets.** Chapter 3 explains how customers are becoming ever more demanding. They increasingly want tailored products and services where and when they desire. It describes the trend towards mass customisation, and how new tools (such as robotics and 3D printers) and new approaches (such as social manufacturing and continuous production) can help operations and supply chain managers “flex” their production, logistics and

service assets to satisfy demanding customers better and more cheaply. It draws on examples from cars (BMW and Volkswagen), pharmaceuticals (GSK and Novartis), cement (Cemex), soft drinks (Coca-Cola) and energy (GDF-Suez and GE). The goal of flexing assets is not only about saving resources, such as carrying less inventory, but also about saving time – a business's most valuable resource. Studies of Saatchi & Saatchi + Duke and W.L. Gore reveal how managers can draw out the most from their staff by creating a simpler and more agile organisation.

- **Create sustainable solutions.** Chapter 4 demonstrates how companies can implement sustainable practices such as "cradle-to-cradle" (where components and materials are repeatedly recycled) in the design and manufacture of waste-free products. Based on case studies of Kingfisher, Levi Strauss, method, Tarkett and Unilever, the chapter provides insights into how R&D and manufacturing managers can develop self-sustaining solutions that help both businesses and the environment.
- **Shape customer behaviour.** Drawing on research in psychology and behavioural economics, as well as on the pioneering work of organisations such as Barclays, IKEA, Khan Academy, Nest and Progressive, Chapter 5 shows how companies can influence consumers into behaving differently (for example, driving less or more safely) and feeling richer while consuming less. It also shows how marketing managers can improve brand loyalty and market share by tailoring frugal products and services more closely to the way customers actually think, feel and behave – and by properly positioning and communicating the aspirational value of these frugal solutions.
- **Co-create value with prosumers.** Chapter 6 looks at ways consumers – especially the tech-savvy millennial generation (those born between 1982 and 2004) – are evolving from passive individual users into communities of empowered "prosumers", who collectively design, create and share the products and services they want. As a result, R&D and marketing leaders at firms like Auchan are working with do-it-yourself (DIY) and crowdsourcing pioneers, such as TechShop and Quirky, to bolster

and harness the collective ingenuity and skills of consumer communities. Additionally, big brands such as IKEA are linking up with start-ups such as Airbnb to develop a "sharing economy" in which consumers share goods and services. The chapter also outlines how sales and marketing managers can build greater brand affinity and deepen their engagement with customers by co-creating greater value for all.

- **Make innovative friends.** Firms such as GE and Ford are ensuring that the R&D function is lean, flexible and highly networked. Chapter 7 shows how R&D and operations managers can develop frugal products, services and business models more efficiently by collaborating with diverse external partners (such as suppliers, universities, venture capitalists and start-ups) than by working alone.

Chapter 8 discusses how firms can foster a frugal innovation culture. It shows how leaders of companies such as Aetna, Danone, IBM, Kingfisher, Marks & Spencer, PepsiCo, Renault-Nissan, Siemens and Unilever are radically changing the culture of their organisations – and altering employees' thinking too – as they strive to implement the six principles of frugal innovation. In doing so, these pioneering companies are rewriting the rules of the game – and even changing the game entirely – in their respective industries.

The chapter contains guidelines to help senior managers identify and prioritise the principles they can implement to achieve better results faster. It provides this guidance from within a change management framework that outlines the what, how, and why of adopting a frugal innovation culture within a company. Lastly, the chapter addresses how functional leaders in charge of R&D, strategy, manufacturing, finance, operations, marketing and sales can individually and collectively foster a frugal innovation culture within their firms.

But first, let us begin by looking at the disruptive nature of a frugal strategy when implemented in a traditional multinational company used to operating in Western markets; and see why so many more established companies feel compelled to follow the same path.

Navi Radjou and Jaideep Prabhu
October 2014

1 Frugal innovation: a disruptive growth strategy

IN 1999, JEAN-MARIE HURTIGER, a senior manager at Renault, a French carmaker, was given what seemed like an almost impossible task. His boss, Louis Schweitzer, then Renault's CEO, wanted him to create a modern, reliable and comfortable car that would retail at $6,000.

Two years earlier, Schweitzer had visited Russia where, to his dismay, he had discovered that the Lada – a locally made car priced at $6,000 – was selling fast, while Renault's fancier cars – twice as expensive as the Lada – had few buyers. As Schweitzer recalls:

> *Seeing those antiquated cars, I found it unacceptable that technical progress should stop you from making a good car for $6,000. I drew up a list of specifications in three words – modern, reliable and affordable – and added that everything else was negotiable.*

Schweitzer instructed Hurtiger, an engineer by training with international management experience, to build a $6,000 car that matched these specifications.

Technically, Hurtiger could engineer a stripped-down version of a car for that price. But, like the Lada, this car would be clunky and uncomfortable, and customers would question its safety. Renault had a reputation for elegance and quality to protect; launching a shoddy product would be a form of brand suicide. Hurtiger therefore realised that what his boss was asking him to do was not just create a cheaper car, but one that married high quality and affordability.

This "more for less" proposition was at odds with Hurtiger's long experience. R&D engineers in the West are taught to push the frontiers of auto technology by adding features to existing products. Indeed, Western car companies invest billions in R&D to create ever more sophisticated products, in order to differentiate their brands from competitors' and charge customers more for the privilege. Schweitzer's "more for less" proposition seemed to flout the conventional "more for more" business model that had proven so lucrative in consumption-driven Western economies over the previous five decades.

Both Hurtiger and Schweitzer recognised that they would first have to change the way Renault employees think. Creating a $6,000 car required not just a new business model, but a new mental model. This would amount to an immense cultural shift in a company that was over 100 years old and for decades had designed high-quality cars – some for the premium market – primarily for Western middle-class consumers. All Renault's French engineers had grown up in a resource-rich and relatively stable economy with a "bigger is better" R&D philosophy. Schweitzer and Hurtiger needed a new breed of engineers with a different outlook who could innovate under severe constraints and turn adversity into opportunity.

They made a bold decision. Rather than build the car in France, they would do so in an emerging market, where workers were familiar with a world of limited resources. The obvious place was Romania, where in 1999 Renault had acquired a local car company called Dacia. Hurtiger assembled a cross-cultural team made up of French designers and Romanian manufacturing engineers. The French brought their high-end design sensibility to the project and the Romanians brought their cost sensitivity. Renault's Romanian engineers had grown up in a harsh communist environment. Doing more with less was second nature, and they had both the motivation and the ingenuity to succeed.

And succeed they did. They created a car that used 50% fewer parts than a typical Renault vehicle and boasted a simpler architecture. Yet the car was also spacious. To accommodate the needs of rural Romanians, the original design brief had called for a vehicle that could carry "four adults, a pig, a sink, and 100 kilos of potatoes". To achieve more with less, the engineers designed symmetrical rear-view mirrors (so they could be used on either side of the car), a flatter-than-usual windscreen (curved windscreens create more defects and cost more) and a dashboard made from a single injection-moulded piece. All this reduced the use of raw materials and avoided costly tooling on the shop floor. The engineers also limited the number of pricey electronic components, making the car easier and cheaper to produce and repair. The result was a robust saloon car with a minimalist, modern design that met stringent quality and safety standards. In 2004, Schweitzer proudly unveiled the Logan, a no-frills car priced at €5,000 ($6,000).

For Renault, the Logan was not only a technical success; it soon became a huge business success too. The carmaker initially planned to sell the no-frills saloon car to value-conscious consumers in emerging economies in eastern Europe and the Middle East. To Renault's surprise, the Logan also found a market in affluent western Europe. Especially after the recession of 2008, budget-conscious consumers in the West began clamouring for affordable products like the Logan that delivered better value for money. In 2010, a report by L'Observatoire Cetelem, which studies European consumer behaviour trends, revealed that on average 29% of Europeans (and 39% in the UK) were willing to buy a low-cost car. Suddenly, Renault could no longer keep up with demand.

To capitalise on this growing demand, Renault developed an entirely new entry-level product line under the Dacia brand. As well as the Logan saloon car, the Dacia brand now includes the Logan van, the Logan pickup, the Sandero hatchback, Duster SUV (sports utility vehicle) and the Lodgy minivan. Dacia is now the fastest-growing car brand in western Europe (including in the demanding German market). Renault's entry-level products, mostly sold under the Dacia brand, have become the carmaker's cash cow, accounting for over 40% of the company's global sales in 2013, compared with 20% in 2008.[1] These products also generate greater than average margins for Renault due to a strict no-discounts retail policy. To top it off, Dacia products are eco-friendly: 95% of the parts in every Dacia are recyclable. With its successful launch of Logan – and subsequently other Dacia-branded vehicles – Renault created a new segment of "low-cost vehicles" in the automotive industry that combine quality and affordability. In doing so, it established itself as a pioneer of frugal innovation.

Renault, however, could not afford to rest on its laurels, as it faced two major challenges. First, the huge commercial success of Renault's entry-level vehicles had whetted the appetite of Western rivals, such as Volkswagen and Opel (part of GM), which were looking to launch their own low-cost brands. Second, Renault would need to expand its entry-level segment with even more affordable vehicles than its Dacia line to meet the needs of hundreds of millions of first-time car buyers in large emerging markets like India, China and Brazil.

Carlos Ghosn, who succeeded Schweitzer in 2005, was not intimidated by these challenges. Unlike most Western CEOs, he had a truly multicultural background and a track record of tackling the intractable. A Brazilian-born French national of Lebanese descent, Ghosn had made his mark in the early 2000s by successfully turning around Nissan, a nearly bankrupt Japanese carmaker, before becoming CEO of both Renault and Nissan in 2005.

Ghosn believed that the only way Renault could compete in the entry-level vehicle segment in both developed and emerging markets was by continually out-innovating rivals. In particular, he wanted Renault to learn new, cost-effective innovation techniques from emerging markets that could serve the company well in its home market too. After several visits to India (where Renault and Nissan had joint ventures with local partners), Ghosn became intrigued by the Indian ability to innovate faster, better and cheaper. Impressed, he coined the term "frugal engineering" to describe the ability to innovate quickly and at low cost under severe resource constraints, a resourceful skill that was common in several emerging markets.

Ghosn realised that, even after the Logan's success, his Western engineers needed to master the art of frugal engineering completely if they were to continue to produce ever more affordable cars that delivered greater value at lower cost. He also realised that this was not going to be possible with an outlook shaped by resource-rich, stable Western markets. And so in 2012 Ghosn sent Gérard Detourbet, who was head of Renault's entry-level segment, to Chennai in southern India to write the second chapter in the company's frugal innovation journey. In Chennai, Detourbet leads an R&D team that is building an entirely new car platform called CMF-A, which will be shared by Renault and Nissan to develop a wide range of ultra-low-cost, high-performance vehicles aimed at India and other emerging markets.

Ghosn's ultimate aim is to bring the principles of frugal thinking, acquired and honed in resource-constrained India, to Renault's Paris headquarters and use them to develop a new generation of affordable, high-quality vehicles for Western consumers. In doing so, Ghosn is leading a frugal revolution in the West that other CEOs in other firms and sectors are also signing up to.

Before looking at the "how" of frugal innovation – that is, the tools and techniques for implementing a frugal strategy discussed in subsequent chapters – let us first consider the "what" and "why". Specifically, what are frugal innovation's unique characteristics? And why has it become today's most pressing management issue?

The rise of the frugal economy

Several profound economic changes account for the rise of frugal innovation in the developed world. First, the advanced economies have entered an age of austerity in which the notion of frugal living and consuming is becoming mainstream. Over the past decade, the middle classes in the US, Canada, Europe, Japan, Australia and elsewhere have seen their incomes stagnate and their purchasing power shrink. Adjusted for inflation, the real median household income in the US increased by merely 19% between 1967 and 2013. According to a 2014 Pew Research survey, only 44% of Americans define themselves as middle class, a nine percentage point drop since 2008. Over the same period, the number of Americans who believe that they have fallen into a lower income class has shot up from 25% to 40%. Moreover, since 2009, 95% of all income gains in the US have gone to the top 1% of earners. The richest 20% of Americans now account for over 60% of the country's consumer spending.

In parts of Europe where recession persists, deepening poverty is eroding middle-income purchasing power. Spain and Greece have been most affected, but wealthier states such as France and Germany have not been spared. For instance, only 58% of Germans now identify themselves as middle class compared with 65% in 1997. In

France, between 2008 and 2012, average salaries fell by 24%, while the cost of living rose by 30%.

As a result of these economic pressures, North American and European consumers are becoming increasingly concerned about getting value for money, and are opting for cheaper products. For example, nearly one-third of European consumers, especially young people who have only known recession in their adult lives, are now more interested in buying a low-cost rather than a premium car. Car purchases by Americans aged 18–34 fell 30% between 2007 and 2012. In Japan, where the poverty rate shot up to a record 16% in 2012, consumers are shifting from premium brands to inexpensive private-label products in retail stores. Rather than eating out, more Japanese workers now pack their own lunch, earning themselves the nickname *bento-danshi* or "box-lunch man".

These changes are here to stay. Thomas Piketty, a French economist, predicts that income inequality in developed economies will widen in the coming decades, as long-term annual growth rates remain stuck below 2%.[2] With inflation outpacing their incomes since 2007, 76% of US adults now believe their children will be financially worse off than them in the future. And well over half of consumers, surveyed by Booz & Company (now Strategy&), a global management consultancy, in late 2012, reported that they would not revert to their previous spendthrift behaviour when times improve. Booz calls these frugal buyers "permanently value-sensitive consumers".

It is not only consumers who have become more cost-conscious. Governments throughout the developed world are also watching the pennies. Ageing populations, spiralling health-care costs, the pensions burden, huge debts and deficits since 2008 have conspired to introduce a new spirit of austerity in the US, Europe and Japan.

The UK's Conservative-led government is committed to dramatic budget cuts of £81 billion ($128 billion) over four years (4.5% of 2014–15 GDP). This includes an 8% reduction in the defence budget by 2015, a 30% reduction in local government spending and a 16% decrease in the police force. In the US, Barack Obama has proposed a three-year freeze on discretionary spending, and the Pentagon is considering cutting the US army to its smallest size since the second world war. Spain, Italy and Greece are doing the same. And if the Scandinavian and Benelux countries and Germany seem relatively restrained about austerity, this is only because they underwent structural adjustments before the 2008 crisis.

However, the frugal innovation revolution is about more than austerity. Consumers in the developed world are becoming not only more value conscious but also more *values* conscious. They increasingly care about social harmony, worry about ecological degradation and the depletion of natural resources, and want businesses to play their part in making the world better. According to the 2014 Edelman Trust Barometer, an annual global study of consumer attitudes, 84% of respondents believe that business can pursue its self-interest while doing good work for society. As Carol Cone, who heads Edelman's social business practice, argues:[3]

> *To increase trust levels among consumers – and earn the "licence to lead" – businesses must learn to simultaneously create more operational and societal value while also impacting less the environment. "Citizen consumers" will vote with their wallets for brands that are socially inclusive and environmentally active.*

Indeed, 71% of US consumers now consider the environment when they shop, compared with 66% in 2008. Over 80% of Europeans believe that a product's environmental impact is a critical element in their purchasing decisions. More worryingly for businesses, 90% of millennials (the 70 million or so Americans in their 20s and early 30s), who spend $180 billion annually, are willing to switch to more socially and environmentally responsible brands. Despite their tight budgets, millennial consumers also expect products to be high quality and sustainable. To win the trust of these values-conscious consumers, Cone believes that companies must "move beyond transactional thinking towards a better understanding of tangible actions needed to solve critical societal issues necessary to mutual benefit". As best practices, Cone cites CVS Health's action to stop selling tobacco products from 2014; Gap raising its employees' minimum wage; and Starbucks offering employees who work at least 20 hours a week tuition reimbursement.

Governments across the developed world are also playing a role in this process. New regulations require businesses to be resource efficient. A new US law championed by President Obama requires US carmakers to improve fuel efficiency from the current average of 27.5 miles per gallon to 54.5 miles per gallon by 2025. Similarly, in 2012, the European Parliament passed a stricter recycling law that requires electronic and electrical goods suppliers and retailers to collect, and potentially recycle, 85% of electric and electronic scrap they generate by 2020. And in early 2014, the Parliament voted in favour of requiring member states to meet stricter binding national targets for 2030 to deal with climate change, including a 40% reduction in greenhouse gases (compared with 1990 levels) and at least 30% of energy to come from renewable sources. The European commissioner for the environment, Janez Potočnik, notes:[4]

> *In these times of economic turmoil and rising prices for raw materials, resource efficiency is where environmental benefits and innovative growth opportunities come together.*

More crucially, consumers' values are shifting, with more emphasis on quality rather than quantity. Studies show that between 15% and 28% of Americans have willingly reduced their material possessions in favour of greater self-sufficiency, with the aim of leading a simpler and more meaningful life. In Japan, a country known for long working hours, half of all consumers across generations now spend more time at home, a trend referred to as *sugomori* or "chicks in the nest". Across the developed world – from New York to Paris to Tokyo – consumers now view frugality as a means to increase not decrease their quality of life. As Simon Mainwaring, author of *We First*, points out:[5] "Consumers want a better world, not just widgets."

The silver lining in the post-crisis gloom is that citizens' search for a more balanced lifestyle is helping to create a new economic system – a frugal economy. It represents an amelioration of the more excessive aspects of 20th-century overconsumption and waste. And the "bigger is better" consumption model may slowly be sharing space with a "small is beautiful" system of consumer values.

So what are the defining features of this new frugal economy?

Recycling along the value chain

New methods of design, production and distribution allow for the continual reuse of parts and components, reducing waste and creating a so-called circular economy. In contrast to the traditional linear economy, in which products are designed, built, sold and consumed, and end up in landfills, the circular economy reuses materials, even waste. The World Economic Forum believes that the circular economy could save $1 trillion a year in major economies by 2025 by using resources better.

Mass customisation

The 20th century gave birth to three major organisational innovations: the corporate R&D lab (pioneered by Thomas Edison, who founded GE); mass production (perfected by Henry Ford); and "big-box" retail and mass distribution (developed by Sam Walton, the founder of Walmart). All three sought to centralise corporate functions – from R&D and purchasing to manufacturing, sales and marketing – with the aim of generating economies of scale. Although this centralised approach helps mass production, thus reducing unit costs, it also consumes a lot of energy and has become expensive to maintain. Worse, it reduces consumers to passive users of products and services, excluding them from a production process that typically occurs far from where they live. However, developed-world consumers are rapidly and dramatically evolving into creative producers of personalised products and services. Much of this is thanks to 3D printing and do-it-yourself (DIY) platforms such as TechShop and FabLab, which cut production costs. A new era of distributed manufacturing will be less resource intensive and will yield higher-quality, mass-customised products and services that are also affordable and sustainable.[6]

Sharing, not buying

In his book *The Age of Access*, Jeremy Rifkin, an economic thinker, sees new technologies like the internet gradually eliminating the concepts of property and ownership. The ownership of physical objects, he predicts, will be seen as an albatross around consumers' necks, as people come to prefer access and experience to ownership.[7] The sharing economy that Rifkin predicted is now upon us. An example is Zipcar (and its equivalents from around the world), a cheap pay-as-you-go car-sharing service popular among urban Americans. The service is easy to use, convenient and better for the local community and the environment. Why own a car, say its customers, when you can get wheels when you need them? Today, nearly 10 million people are less than 10 minutes' walk from a Zipcar. Similarly, why pay $400 for a night in a New York hotel when Airbnb will find you a couch to crash on in Manhattan (or 8,000 other cities the site covers) for $40?

This grassroots shift from an ownership-based consumer economy to a sharing society is propelling the growth of a peer-to-peer economic model based on frugality that involves sharing, bartering, swapping, renting or trading. Collaborative consumers do not covet the latest and fanciest products; they prefer good-enough solutions that meet basic needs. Collaborative consumption, a concept popularised by Rachel Botsman in her book *What's Mine Is Yours*, threatens to disrupt many industries. In 2013, more people used BlaBlaCar, a leading European car-sharing service, than travelled by the high-speed Eurostar train between London and Paris.[8] Airbnb now rents more room nights annually than Hilton's entire hotel chain does globally. And the peer-to-peer lending market, which bypasses banks and their hefty hidden fees, passed the $1 billion mark in early 2012. In August 2014, Zopa, a leading UK peer-to-peer lending firm, announced that its platform alone had loaned over $1 billion since its launch in 2005, with a default rate of less than 1%.

The new frugal economy is growing by leaps and bounds in the developed world not only because it meets the needs of cost-conscious consumers, but also because it responds to their aspirations to give back to society and be environmentally responsible. Companies will be able to surf this wave only by reinventing how they operate, build and deliver products, interact with customers, and create value for themselves and society.

Faster, better and cheaper

To produce affordable and sustainable products, firms must develop a faster, better and cheaper system of innovation. The frugal approach is disruptive; its intensity can be measured in terms of the following simple formula:

$$\frac{\text{Greater value (for customers, shareholders and society)}}{\text{Fewer resources (natural resources, capital, time)}}$$

This requires companies simultaneously to maximise value for all stakeholders while minimising the use of resources.

As Paul Polman, CEO of Unilever, an Anglo–Dutch multinational consumer-goods company, notes:

> *Business cannot survive in a society that fails, so it is stupid to think that a business can just be standing on the sidelines of a system that gives it life in the first place.*

Polman believes that Unilever's frugal innovation initiatives, many of which are described in this book, are not altruistic but simply common sense.

Meanwhile, frugal innovation seeks to reduce not just the financial cost of doing business but also its environmental cost. Frugal innovation also seeks to minimise time, especially important in such situations as bringing a promising new drug to market.

Frugal innovation is not a management technique like Six Sigma and total quality management (TQM), which aim to reduce cost and waste. Rather, cost efficiency is a means to achieve the larger goal of greater customer value, as is manifest in $30 computers, $40 tablets, $800 electrocardiogram (ECG) machines and $6,000 cars.

It is also possible for firms to be frugal in how they develop and market new products and services, while exercising discretion over whether or not they pass these savings on to consumers. And so frugal innovation practices can coexist with, and even enhance, high-end brands. For instance, Fujitsu, a Japanese technology company, has applied frugal innovation in its manufacturing processes to build one of the world's most advanced supercomputers. This also differentiates frugal innovation from low-cost innovation – an approach that enables a company to develop and market products and services of average quality at low prices. Frugal innovation yields products that are not necessarily cheap or of the highest quality. Rather, they are well-designed, good-quality products that are developed cost-effectively and sold at affordable prices to deliver best customer value.

What does customer value mean? Frugal innovators strive to create products and services that score high on three, seemingly contradictory, attributes that are increasingly valued by Western customers: affordability, quality and sustainability. A high-quality product (say, an over-engineered, beautifully designed, gas-guzzling car) is generally expensive and not always sustainable. Rather than seeking a trade-off or dealing with each of the three attributes independently, frugal innovation seeks to integrate them. For example, over 70% of a product's life-cycle costs and environmental footprint is determined during its design phase. Hence, rather than tackling quality and sustainability later in the manufacturing or distribution process, when doing so becomes more costly, frugal innovation factors in these aspects earlier in the R&D phase. When Renault developed its $6,000 Logan car, its R&D team incorporated elegant design, reliability, safety, comfort and fuel efficiency early on in the development phase. The result was a best-selling, attractive, dependable, energy-efficient and affordable vehicle. This was not easy to achieve: one engineer described it as like trying to change the car tyres while driving at full speed on a road that is still being built.

Doing better with less

Frugal innovation is not just about "doing more with less" but about "doing better with less", and finding ways to reduce complexity in all aspects of the business. But when done right, companies will find that they are better placed to do the following.

Capture underserved markets at the bottom of the pyramid

In his book, *The Fortune at the Bottom of the Pyramid*, C.K. Prahalad, a management guru, argued that low-income people in developing economies such as India, Africa and Brazil collectively represent a huge, untapped market. But a bottom of the pyramid exists in *developed* economies too, and is not negligible. According to Accenture, a multinational management consulting and services company, low-income Europeans represent a €220 billion ($280 billion) untapped market. Western companies have traditionally ignored them, focusing instead on high-income earners or middle-class consumers. For instance, according to the Federal Deposit Insurance Corporation (FDIC), over 68 million Americans – nearly one-quarter of the US population – have little, if any, access to financial services. Traditional financial institutions are not adequately meeting their unique needs. Yet, according to the Center for Financial Services Innovation (CFSI), underbanked Americans collectively earn around $1 trillion in annual income and represent an untapped market worth nearly $90 billion. With frugal products, they could be reached. As Vianney Mulliez, CEO of Auchan, a French international retail group, puts it:[9] "There are many 'emerging markets' within Western economies that we are eager to serve."

Comply with new regulations, aimed at promoting inclusive growth

Governments in North America and Europe are pushing new measures and regulations that aim to reduce social inequality and promote inclusive growth. In the US, where 50 million citizens lack health insurance, President Obama championed the Affordable Healthcare Act in an effort to rein in health-care costs that are expected to rocket to $4.6 trillion in 2020. By adopting frugal business models, makers of drugs and medical devices and health maintenance organisations (HMOs) could make their products and services more affordable and accessible to more Americans while maintaining the same levels of quality.

Cope with an ageing workforce

According to a 2013 Stanford University study, by 2020 workers aged 55 and older will account for 25% of the US labour force, compared with just 13% in 2000. Meanwhile, more than one-quarter of German and Japanese manufacturing workers will retire by 2020. Large industrial countries will soon have to adopt frugal processes to deal with having a smaller workforce to draw upon.

Attract and retain younger staff

Most young people in the developed world prefer to work in socially and environmentally responsible companies. Frugal innovation can boost staff engagement and productivity. This change is sorely needed. According to Gallup, a US research company, in its 2013 *State of the Global Workplace Report*, only 13% of employees worldwide feel actively engaged at work, implying that at the global level, work is more often a source of frustration than one of fulfilment. In the US, among the 100 million people who have full-time jobs, 50 million people are not engaged and another 20 million are totally disengaged, costing the economy up to $550 billion annually in lost labour and output. This dissatisfaction can, however, be turned around by involving staff in projects that make full use of their talents, skills and ingenuity. According to a 2012 study funded by the John and Catherine T. MacArthur Foundation, workers who are able to make a social or environmental impact on the job are twice as satisfied and motivated as those who are not. This is particularly true of millennials, who are more sceptical of big business and less loyal to their employers compared with earlier generations. Over half of the millennials surveyed by Deloitte, one of the big four professional services firms, believe that innovation and social development, rather than maximising profit and shareholder value, should be the primary purpose of business. Yet the majority also believe that business is collectively most able to solve pressing social problems. Large, frugal companies now have a means to attract this values-conscious generation.

None of this suggests that the transformation will be easy. As they attempt to adopt frugal innovation, Western corporations especially are likely to encounter deeply entrenched thinking and processes. Some of the worst of these include the following.

The pursuit of technology for its own sake

R&D engineers like to push technological boundaries for no particular commercial reason. Many think about innovation in terms of "bigger is better" – more features and newer technology – rather than the purpose their products are meant to serve. Traditionally, large Western firms spend vast sums to achieve this objective. For instance, the world's

1,000 largest corporate R&D spenders (most of which are Western) invested a record $647 billion in R&D in 2014. It is hardly surprising that R&D teams in these companies view complexity as progress, and doing more with less as a step back. Moreover, because of the way budgets are allotted, there is little incentive to think otherwise.

Branding worries

Marketers are concerned that consumers will equate frugal solutions with poor quality. For them, quality must always command a market premium. A product's quality is typically rated according to the number of features, so low-cost products, with fewer features, suggest poor quality. Managers fear that frugal products will damage the corporate brand, and so think in terms of money for value rather than value for money.

The cannibalisation conundrum

Business strategists and sales executives fear that frugal products will eat into their more expensive goods, and even destroy their more profitable product lines. Sales teams typically are urged and incentivised to sell the firm's big-ticket items. Why would, say, medical-device company sales staff, on 5% sales commission, pitch portable, low-cost ECG devices priced at $5,000 to hospitals, when they could sell high-end ECG machines for $100,000?

Market pressures

Board members are concerned that shareholders and analysts will hammer their stock price if they start producing more frugal products and services. Even if senior managers are amenable to a strategic shift, they may be unable to get it past the board. Board members will typically oppose lower-margin products even if sales volumes and profits rise.

Distorted views of sustainability

Western companies rarely take a balanced view of sustainability: it is either something that is "nice to do" or a compliance cost. Frugal innovation marries these two outlooks. It is a source of competitive advantage, but also provides a firm with a licence to operate that is essential for market success. However, changing existing mindsets about sustainability can be a major undertaking.

Unusual frugal competitors

Despite these obstacles, companies do not have the luxury of waiting and watching. Frugal competitors are already in the market.

Rivals from emerging markets

Emerging-market companies are already having an impact on Western markets. Haier, a Chinese home appliance manufacturer, is now a leading supplier to the US of wine coolers, once a premium product for the affluent. Likewise, India's Tata Motors plans to sell its $2,500 Nano car in Europe and the US within a couple of years. Although it will be priced somewhat higher, it will still be the cheapest vehicle in its different markets, and will especially appeal to young adults who cannot afford Western cars, and whose share of the new-car market in the US has already dropped from nearly 38% in 1985 to around 27% today. Moreover, Western versions of Tata cars might also be the most environmentally friendly: Tata Motors has licensed from MDI – a French company that makes eco-friendly, affordable vehicles and power generators – compressed-air engine technology that it plans to integrate into its compact cars.

Digital disrupters

The iPhone 4 contains more technology than the Apollo spacecraft of the 1970s. Facebook has over 1.3 billion monthly active users. This massive computing and communication power literally at everyone's fingertips is spawning a virtual R&D platform that is permanently switched on. Aspiring entrepreneurs, whom Forrester Research refers to as digital disrupters, are now using this nearly free, online R&D platform to innovate faster, better and cheaper, and create affordable products and services that leverage social-media and mobile technologies.[10] In doing so, these start-ups are disrupting the lucrative business models of well-established bricks-and-mortar companies.

For instance, the Khan Academy, founded by Sal Khan, offers free maths and science courseware as bite-sized videos via YouTube, creating panic among academic publishers who charge a fortune for textbooks. Or take Plastyc, a start-up that claims to put the "power of a bank in your cell phone" by providing affordable 24-hour access to FDIC-insured virtual bank accounts that can be accessed from any internet-enabled computer or mobile device. These accounts are tied to prepaid Visa cards; consumers cannot go overdrawn and they incur no late fees. Plastyc's low-fee, no-frills, online banking services are appealing to the nearly 70 million underbanked, or unbanked, Americans who cannot afford to pay large bank fees. And in the sharing economy, firms such as Airbnb (sharing homes), RelayRides (sharing cars) and ParkatmyHouse (sharing parking spaces) are taking advantage of the internet and social media to enable ordinary people to monetise their idle household assets. Many of these disruptive digital ventures are being launched by millennials (popularly known as generation recession), who can raise capital on crowdfunding sites such as Kickstarter, KissKissBankBank and MedStartr.

Digital disrupters are not all young bootstrap entrepreneurs. Technology heavyweights including Apple, Google, Cisco and IBM are investing heavily in driverless cars, smart grids, connected homes and consumer medical devices. A massive shakeout in the automotive, construction, energy, health-care and other mature industries seems imminent. When asked who her company's main competitor would be in five years' time, a senior executive at a large US industrial firm answered: "Google."

Ingenious "prosumers"

Deterred by high prices for commercial products and services, and empowered by new tools, many Western consumers are becoming "prosumers"; that is, producing the goods and services they need themselves, thereby unleashing a DIY revolution. In *Jugaad Innovation* several ingenious emerging-market "MacGyvers" (named after a US TV character known for his improvisational skills) were profiled. These are small entrepreneurs who find frugal solutions to meet local community needs. This bottom-up innovation phenomenon is now taking root in the US and Europe.

When his daughter Lily was born, Rupert Plumridge was reluctant to invest in a $300 branded video baby monitor. So he built his own, using Google Android devices, a night-vision webcam and open-source platforms. His DIY invention cost $80. Thousands of Europeans and Americans are also rolling up their sleeves and building products in their kitchens. In his book *Makers*, Chris Anderson, a former editor of *Wired*, chronicles this MacGyverisation of the US economy, which is taking root thanks to the proliferation of such inventions as 3D printers and events such as the Maker Faire which celebrate the DIY ingenuity of ordinary people. Michael Bloomberg, a former New York mayor, has designated the last week in September as the city's "Maker Week".

Big-box retailers

Walmart, a US multinational retail corporation, is rapidly becoming a leading provider of affordable financial services. It has opened hundreds of Walmart Money Centers across the US to serve the basic financial needs of low-income consumers. Similarly, Costco, a US membership-only warehouse club, is now selling private-label medical devices at a fraction of the cost of branded products. Costco's hearing aid is priced at $500, one-quarter of the cost of the branded competitor, and is an especially attractive option for retiring baby-boomers who lost out in the financial crisis.

Conclusion

Having addressed the "what" and "why" of frugal innovation, let us now turn to the "how" and begin with the first of our six principles: engage and iterate.