

Under the radar

Innovation evolves in Asia

A report from The Economist Intelligence Unit



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1

Introduction: Something new under the sun

Author: *Vijay V. Vaitheeswaran, China business editor & Shanghai bureau chief, The Economist. Author of Need, Speed and Greed, How the New Rules of Innovation Can Transform Businesses, Propel Nations to Greatness, and Tame the World's Most Wicked Problems. Chairman of the Economist Innovation Summit 2014.*

There is a powerful change under way in how innovation happens. This new approach is transforming how intellectual capital connects with financial capital, knocking down ivory towers along the way. Thanks to the globalisation and Googalisation of the world economy, clever ideas from every corner of the world now have the chance to be taken seriously—even if they come from people without fancy credentials. Governments, charities and corporations alike are increasingly turning to open and networked models of innovation, such as the use of incentive prizes, to solve difficult problems.

Innovation matters, now more than ever. With manufacturing accounting for less than one-third of economic activity in many rich countries, knowledge—the currency of today's ideas economy—is now paramount. Asian economies are rapidly rising up global innovation rankings, as economies that once relied on brawn increasingly turn to brainpower. Shanghai, which is increasingly a post-industrial city, already gets 60% of its economic output from services. America and the rest of the rich world will not be able to compete with rivals offering lower-cost products and more-inventive services if they do not learn to innovate better and faster.

But if they do, there is every reason to think that the world may yet embark on a post-industrial revolution—one that will put the world economy on a much more sustainable footing for the future.

Innovation is not a zero-sum game. Because the well of human ingenuity is bottomless, innovation

strategies that tap into hitherto neglected intellectual capital and connect it better with financial capital can help both rich and poor countries prosper.

Let's be clear about what we mean by innovation. Although the word is often used to refer to new technology, many innovations have nothing to do with inventing gadgets. The over-the-counter concept behind fast food popularized by McDonald's, for instance, involved running a restaurant in a different way rather than making a technological breakthrough. So innovation is not the same thing as invention. These days much innovation happens in processes and services.

Novelty of some sort does matter, although it might involve an existing idea from another industry or country. For example, Edwin Drake was not the first man to drill for a natural resource; the Chinese used that technique for centuries to mine salt. But one inspired morning in 1859, Colonel Drake decided to try drilling (rather than digging, as was the norm back then) for oil in Titusville, Pennsylvania. He struck black gold and from his innovation the modern oil industry was born. A useful way to think about innovation is that it's fresh thinking that creates value, whether for individuals, firms or society at large.

According to popular notion, innovation is something that men wearing white coats in laboratories do. And that's the way it used to be. Companies set up vertically-integrated research and development (R&D) organisations like AT&T's Bell Labs, and governments fussed over innovation policies to help them succeed.

This approach had its successes. Consequently, many companies still spend pots of money on corporate research, and bureaucrats—particularly in Asia—still obsess over “industrial policy”. But this old-fashioned process is slow and insular, and unsuited to a world economy that moves at an ever-accelerating pace.

The good news, as the fine articles in this special innovation report explain, is that the centrally-planned approach is giving way to more democratic models of innovation:

- **Duncan Clark** argues that once one embraces the notion that innovation is about creating value and not merely coming up with cool technologies or bleeding-edge inventions, China’s wild and woolly approach to innovation is much more robust than widely thought.

- **Anand Mahindra** makes a powerful case for the revival of the incentive prize (and for more corporate involvement in general in democratising innovation), in the spirit of the British Parliament’s fabled Longitude Prize that helped speed the discovery of technology allowing mariners to determine their longitude at sea.

- **Fu Xiaolan** takes on the argument that Asia’s top-down approach to economic planning cannot possibly be capable of innovation, showing how the region’s innovation ecosystems are in fact surprisingly enthusiastic about open, collaborative innovation.

- **Gerry George** challenges the business adage that what matters gets measured. He points out that most of the ways in which innovation is measured today are flawed or inadequate, not least because existing indices fail to capture the innovation happening in Asia’s informal economy, and offers ideas on how to do better in future.

- **Navi Radjou** shows how Asia’s frugal innovators are becoming a global force by tapping into the power of networked and collaborative innovation.

As these provocative articles make clear, there is an innovation revolution under way today. Clever ideas have always been everywhere, of course, but companies and societies were often too insular to pick them up. The nascent move to an open approach to innovation is far more promising. An insight from a bright spark in a research lab in Bangalore or an avid mountain biker in Colorado now has a decent chance of being turned into a product and brought to market.

The generation and handling of ideas can make or break jobs, companies and entire national economies. Studies show that the most important driver of economic growth—and with it living standards—over recent decades is innovation. Innovative firms and countries also tend to outperform their peers. After all, mankind is not discovering new continents or encountering vast deposits of new minerals.

Most innovation over the past few decades has been caused by global economic integration and disruptive new technologies. In the coming decades, the quest for environmental sustainability and the need to meet the health demands of a fatter, sicker and older global population may prove to be the greatest engines of innovation—and, therefore, the great economic opportunities of our lifetimes.

The tools and rules of innovation are changing at an unprecedented pace today. It was once the preserve of elites, but innovation is becoming more democratic as open and networked approaches are now taking off. Countries and companies are rethinking the role of incentives, as a richer world population finds motivation in purpose and not only profit. And entrepreneurs and company bosses alike are realising the vital need to embrace risk-taking and fast failure in order to keep up with the accelerating pace of global change. There even seems to be a happy confluence of technological advances, market expansion, rising prosperity and a freer flow of ideas that promises to usher in a new golden age of innovation.

But to unleash that potential, whether as an entrepreneurial policymaker or as an aspiring employee of the month, you need to face an increasingly risky world with courage. The democratisation of innovation promises to be an extraordinarily powerful force shaping the global economy. In future, the difference between success and failure will often be determined

not by lack of access to capital, markets, talent, or other conventional obstacles. In the age of disruptive innovation, resourcefulness will matter more than resources—and success or failure will be determined inside the mind of the innovator.

Are you ready for the revolution?



2

Is Asia creating, or just copying? Does it matter?

Some thinkers on Asia's economic development contend that the region is being underestimated in terms of its innovative capacity. While sceptics point to the still ample evidence that companies in Asia, notably in China, have a tendency to mimic Western products and services in the name of innovation, others assert that China is not getting credit for a number of world-leading developments. Duncan Clark argues that rather than becoming immersed in definitions of innovation, stakeholders would be better served by seeking to understand the disruption Chinese companies will create as they enter the world stage.

Author: *Duncan Clark O.B.E., founder and chairman, BDA China*

The term innovation is often confused with one of its subsets: radical innovation, better known as invention. Most innovations are unremarkable at first sight. Like the sparks from the striking of two flints, they are ephemeral, seemingly insignificant. But if the conditions are right, if the wind is up and the tinder is dry, they may produce a flame that, as Mao Zedong said—well, we all know the cliché about the spark and a prairie fire.

Most innovations are incremental, not fundamental in nature. They are about evolution not revolution, the tweaking or combining of existing methods or processes. Innovations are often imperceptible to the public, as boring as a slightly faster warehouse routine or an enhanced algorithm for calculating an insurance premium. There is no leap from a bathtub or, in modern parlance, an “Aha!” moment. Those are the preserve of inventions, and the stuff of legends. Yet inventions are a holy grail, coveted by governments, generals, scientists and entrepreneurs (and the investors who back them). Inventions shape the course of history through their impact on civilisations and the wealth of nations. Inventions are often the product of wars or their aftermath, when everything is at stake for a country.

Within companies, too, inventions can occur when their survival is on the line—in the face of stagnating growth or the rise of new players propelled by rival technologies. The trick, of course, is to be able to see this happening before it is too late. As described by Clayton Christensen of Harvard in *The Innovator's Dilemma*, companies can be lulled into a false sense of security by meeting only the current known needs of customers, not their future or unknown needs. The failure of Kodak to adapt to and embrace the rise of digital imaging dramatically illustrated how a company can be reduced from iconic status to bankruptcy within a shockingly short period.

Catch-up through imitation is not culture-specific

As the stakes are high, countries and companies sometimes yield to the temptation to steal or copy the inventions of rivals or trading partners. This is a charge often levelled at companies in Asia, and especially China. Any visit to a shopping mall in China lends credence to this criticism, from the fake Dyson vacuum on sale inside the store to the fake Hollywood DVDs on sale in a cardboard box outside.

But is this down to a lack of innovation in China, or rather does it speak to the fact that China is playing catch-up, just as numerous countries have done in the past? As China is to the US today, so was once the US to the UK. In the late eighteenth century, Samuel Slater famously memorised and exported British textile technology to America. In England he was pilloried as “Slater the Traitor”. Meanwhile, in the US he was lauded by President Andrew Jackson as the “father of the American industrial revolution”. Naturally, more advanced economies are less likely to pirate the products or methodologies of less-developed economies than the other way round. As a rising economic power seeking to close the gap with rivals and trading partners, is China really any different from other countries in this respect?

The involvement of government in large swathes of China’s economy makes its case different from the experiences of earlier rising powers such in the US and UK. Also, in recent years the much-publicised allegations of cyber-attacks on US-based multinational companies (MNCs) by Chinese state-connected actors, and most recently a slew of anti-monopoly actions by Chinese government agencies targeting MNCs, have made for an increasingly tense time in trade relations.

Government-led innovation: All in vain?

Cyber-hacking allegations aside, are government-led efforts to accelerate innovation by pouring in large amounts of capital and labour ever that successful?

Vanity projects led by governments often result in huge wastage and failure. The Anglo-French Concorde programme benefitted certain movie stars and bankers—and undoubtedly created a beautiful plane and soft-power prestige—but failed to recoup the huge costs paid by tax payers.

In China, too, state-led efforts to create “indigenous” innovation in areas such as the “TD-SCDMA” 3G cellular standard or the “WAPI” wannabe rival to WiFi have had limited commercial impact. Pursued in the name of protecting national champions, these initiatives came at a high cost, both in investment and in skewing markets—handicapping the operators who deployed them and delaying consumer adoption of new technologies.

Some government-led projects provide incentives for outright fraud. The notorious “*Hanxin*” case of 2003 was one such example, when a professor at the prestigious Jiaotong University in Shanghai—*alma mater* to then-president Jiang Zemin—claimed ownership of the first digital signal processing (DSP) microchip entirely developed in China. This was exposed three years later as a fraud, the product being merely a duplicate of a chip developed in the West, with its markings sanded off.

Of course these types of “innovation on demand”—where governments are in a hurry to trumpet success of their policies, research institutes or state-owned companies—are not confined to China or to Asia. But the reality is that China is at an earlier stage of development than the highly-industrialised Western economies, and entrepreneurs in the country are only now coming to the fore.

Opportunities lie on the fringes of the state economy

Although growth has ebbed in recent years from the previous double-digit performance that propelled China to its status as the world’s second-largest economy, continued urbanisation and the emergence of a truly massive middle class of hundreds of millions provide a vastly different opportunity from that in established economies where more radical forms of innovation are required to generate attractive returns.

This is illustrated by the emergence of vast Chinese companies, such as Tencent and Alibaba,

from seemingly unpromising origins. Tencent's rise was fuelled by its chat application QQ (formerly known as OICQ, which Israel's ICQ claims was lifted from it) and its games business, heavily influenced by Korean companies. Alibaba's rapid rise was due to its e-commerce platform Taobao and payment engine Alipay, forged in customised local mould to tackle eBay head-on in China. Both companies have filled the gaps left by the inefficiencies of state-owned enterprises. Offline forms of entertainment, such as boring and formulaic television—resulting from excessive government involvement in production and censorship—gave rise to the online and mobile gaming boom that Tencent has ably exploited. Its WeChat social communication product is, for my money, better than any equivalent in the West—a mash-up of Facebook, Whatsapp and a form of Twitter, perhaps, but appreciably better to use on a mobile device.

Shabby shops featuring over-priced goods served up by grumpy sales assistants with an onerous payment system and non-existent aftersales service presented Alibaba with an opportunity to exploit massive pent-up demand from an increasingly educated and aspirational consumer class eager to use their new-found savings to buy a wider range and higher quality of consumer goods. Alibaba is poised to expand further into the entertainment business too, and is growing rapidly in areas such as financial products and other services, competing with Tencent.

These and other “new economy” companies thrive by exploiting the deficiencies of the state-led sector. They are innovative not in a radical way, but in the new ways they combine existing methodologies, tailor-made to the specific needs of consumers in China.

Tencent has created new ways of bringing cheap-thrill games or emoticons to price-sensitive but bored young consumers. By launching a ‘freemium’ model, where gamers choose to pay to enhance their characters, Tencent and other gaming companies cracked the piracy problem

by turning the games into thriving online communities, not just an easily copied, shrink-wrapped CD-ROM. Alibaba has also created a reliable payment tool, Alipay, combined with features such as escrow to avoid fraud, and parallel-communication tools like Aliwangwang, to build relationships between consumers and suppliers. This helped it to create trust that is lacking in the offline world.

Chinese innovators benefit from trial and error on a massive scale

In effect, in China today we are seeing the consumer finally taking centre stage, and Chinese entrepreneurs have the best understanding of how to develop and tweak their products to suit their needs. Successful companies are not afraid to try and fail, and modify based on experience. The challenge of doing this long distance from Silicon Valley is one reason Chinese companies have gained the upper hand in huge swathes of the country's online economy—though this is not to minimise the fact that censorship or trade barriers have hindered outsiders in some areas, notably Internet search engines and social media, where the Chinese Communist Party will not relax its efforts at control.

But to deny the real achievements of entrepreneurs in China by looking at the market solely through the tired lenses of censorship, piracy or incumbency would be to cloud our understanding of how disruptive Chinese companies will become as they enter the world stage. Scale matters, and the ability to leverage a massive domestic market to develop new and, yes, innovative forms of serving customers abroad is something that none should ignore.

With the rise of China's economy and home-grown players appearing on the global scene we may debate whether the glass is half full or half empty, but the glass is most likely made in China—and increasingly will be designed in China too.

3

Democratising innovation: From *jugaad* to *jhakaas*

Author: Anand Mahindra, chairman and managing director, Mahindra Group (funding US\$1m in prize money for indigenous technologies in the areas of mobility and alternative energy)

In markets where the playing field is tilted unevenly towards established economic forces—a feature of many markets in Asia—the general population is discouraged from innovation. Countries seeking to unleash their innovative potential will need to address this issue, but market reforms can take decades. A short-cut approach is to offer incentive schemes that provide innovators with the financial means and expertise to bring their ideas to fruition. But as Anand Mahindra argues, what Asia really needs is a paradigm shift in its education systems and for corporates to create an ecosystem that supports the commercialisation of grassroots innovation.

Trying to generalise about innovation in Asia puts one in mind of the five blind men attempting to describe an elephant. The man who touched the side thought the elephant was like a wall, while the one who felt the ears insisted the elephant resembled a fan. The one who caught the tail believed the elephant was like a rope and so on. It is similarly easy to mistake the part for the whole while thinking about innovation in Asia. The impression one comes away with depends on the part you are looking at. Many Asian countries are right up there among the stars of the innovation world. Singapore, South Korea, Japan and Hong Kong all rank in the top 25 of the 2014 Global Innovation Index¹. Yet India barely squeaks into the top half of the ranking of 143 countries, and the rest of South Asia, as well as a few South-east Asian countries, fall into the lowest third. One is tempted to ask, “Will the real Asian Innovation please stand up”.

Innovation in East Asia is clearly a success story. Much of it has been led by the groups commanding the heights of the economy. In South Korea it has been the *chaebols*, in Japan the *keiretsu*, in China the state-owned enterprises, and so on. I think of that success as Asian Innovation 1.0. It has worked well so

far for the more advanced Asian economies. But for these economies to continue along their remarkable trajectory, and for other aspiring Asian countries to join the party, Asia will need to democratise innovation beyond the government and large corporations, and tap into the underutilised creative energy of the population.

The process of democratisation has been unleashed in countries like India, where lack of strong innovation infrastructure compels potential innovators to create their own playing fields. It is these countries that are largely shaping Asian Innovation 2.0.

There are three major forces of democratisation at work in India, and indeed in many Asian countries. The first of these is entrepreneurialism. Innovators like Jack Ma of Alibaba, a Chinese e-commerce giant, and the Bansals of Flipkart, an Indian leader in the same space, are among the most compelling exemplars of the Asian entrepreneurial spirit, and of how local innovation can provide novel, scalable solutions to unaddressed idiosyncrasies in the marketplace. Start-ups like these, developed in college dorms and dusty garages, have revolutionised the global economy. Happily,

¹ The Global Innovation Index is co-published by Cornell University, INSEAD and the World Intellectual Property Organization (WIPO, an agency of the United Nations).

as more and more entrepreneurs scale dizzying heights, the virus seems to be spreading. Increasing numbers of graduates from India's premier higher learning centres, the Indian Institutes of Technology and Indian Institutes of Management, are turning down mouth-watering job offers to become entrepreneurs, following their dreams in areas ranging from starting a chain of backpacker hostels to automated bike washes to new schooling models.

New funding models for new innovators

There is a growing support system for these young risk-takers. The number of Indian angel funds has more than quintupled since 2006. Venture capital investments have doubled in the last four years. The Indian government is readying a US\$1.6bn venture fund to boost the nation's micro, small and medium enterprises. Crowdfunding sites like Wishberry enable early stage entrepreneurs to crowdsource investment for initiatives ranging from mobile apps to music, comic books and even wrestling. In the digital space, NASSCOM, the Indian IT and BPO trade association, plans on mentoring 10,000 tech start-ups in the next ten years, and Google is bringing its Launchpad mentorship initiative to India.

Individual corporates are also beginning to play a role in promoting innovation. For example, inspired by XPRIZE, a US-based non-profit organisation which awards prizes for innovative solutions to specified challenges (with a view to benefitting humanity), the Mahindra Group has instituted the Rise Prize of US\$1m to be awarded to a disruptive innovator each year. This year, the competition themes are the driverless car and ultra-affordable solar roof panels. Entries are pouring in.

This is a quiet but profound transformation in the Indian and Asian context. A new generation is emerging that is slowly breaking the mental shackles of risk aversion and fear of failure. A short while ago, nobody in India would have

dreamt of allowing their daughter to marry a geek struggling in a garage. Today, the emergence of a growing number of highly visible and successful entrepreneurial role models is beginning to wear down traditional conservative attitudes. Most importantly, more young people are willing to take the plunge, regardless of societal expectations. As Abhay Pande, managing director of Sequoia Capital India, told the *Economic Times*, "It bodes very well for both the entrepreneurial ecosystem and industry in India that some of the best quality talent from the top institutes want to be entrepreneurs.... and the change is very apparent too in terms of the start-ups that approach us these days—people have better backgrounds and better experience."

Education must nurture the imagination

The emergence of this trend is good news for innovation. But Asia still needs a paradigm shift in its risk appetite—and it must begin in the classroom. Many Asian states, of which India is a prime example, produce armies of scientists and engineers, but still have education systems that fail to reward students for imagination. Sustained disruption requires an educational culture where questioning is encouraged, initial failure is embraced and initiative and ingenuity are appreciated. In Asia, culture and education often conspire to emphasise proven success over experimentation and intellectual acceptance over challenge. This carries over into a disadvantage in the global marketplace. Japanese exports of audio and visual electronic equipment have plunged 60% since the advent of the iPhone. In Taiwan, which claims a 90% market share in PCs, companies have been crippled by their inability to adapt to the global shift towards tablets and smartphones. "I don't think the Taiwanese got very good training to drive the mentality of innovation," Jonney Shih, chairman of Asustek Computer, lamented last year in a *New York Times* interview (Bradsher, 2013). These concerns are being echoed

right across Asia. As Bruno Lanvin, executive director of INSEAD, puts it, “... one mistake we make about innovation is to think that it is about brains; it is really about minds.” And the development of innovative minds starts with “whole brain” education.

While prizes will incentivise the already motivated, it is only relevant education that will ensure sustained entrepreneurial innovation. This is where both private educators and governments must step up to bat.

Corporations are incentivising open innovation

The second area in which innovation is being democratised and incentivised is within the corporate world itself. Innovation-driven companies are quick to realise that the “bluebird of innovation” may be nesting in their own backyard—and not just in their R&D departments. In many companies, hierarchical decision-making is being replaced by inclusive ideation. Corporate groups like Mahindra and Tata are trying to consciously build an internal culture of innovation, where every employee is encouraged to disrupt. We award prizes annually for three types of innovation—product, process, and business model. We also have a prize for the best failed innovation! Needless to add, it is not the R&D department that walks away with the prizes.

Many corporates are widening their innovation base by tapping into their customer’s needs and ideas. At Toyota there is an innovation philosophy called *genchi genbutsu*, studying what customers need or desire and how current offerings fall short. The development of the Prius hybrid car was enabled by this sort of irreverence towards the status quo.

Corporates can further incentivise innovation outside their own ranks by unleashing the profound entrepreneurial power of the general population. At Mahindra we have launched an online platform called Spark the Rise,

through which we are hoping to inspire and enable Indians to innovate more, disrupt more, create more, and ignore the boundaries of convention. It is an ecosystem of partners across the spectrum of innovation, connecting entrepreneurs, investors, incubators, mentors and others, around common ideas and visions. Every year, the best projects, regardless of their relevance to our own businesses, are awarded financial support.

Wow! Taking Asian frugal innovation to the world

The third force of democratisation is the increasing relevance of frugal innovation. This is the area with the highest potential and is, currently, the most underserved. At one end of the frugal innovation scale is *jugaad*—often considered to be India’s great contribution to global innovation. *Jugaad* refers to quick-fix solutions, usually developed by individuals to address the practical problems of daily life within severe resource constraints. At the other end is what I call *jhakaas* (Hindi slang for “wow!”): sophisticated but frugal thinking that could well trigger new technological trajectories that could disrupt even Western markets. A prime example is GE’s portable ECG machine developed for rural India. When redesigned in India, the cost shrank from \$10,000 to \$1,000. Chinese designers truncated the cost of GE’s ultrasound device from \$30,000 to \$10,000. The Tata Nano, a small car initially selling for around US\$2,000, was another brave attempt at *jhakaas* innovation. The Mahindra Scorpio SUV was developed from the ground up in India at one-fifth of what it would have cost to develop in Detroit.

This journey from *jugaad* to *jhakaas* is the one with the greatest potential for both impact and democratisation of innovation. Countries in Asia, Latin America and Africa that struggle with resource constraints every day can move up the value chain from ingenious but localised solutions to constraint-driven innovation that

meets larger needs. This would engage the creative energies of large numbers of people across the economic and educational spectrum; it would capture and commercialise small but important ideas that would otherwise get lost, and it would ensure the widest possible reach for the products emerging out of these ideas.

The best incentive for this type of democratisation is the creation of economic value for its promoters. That is where I believe companies could provide the catalyst to create a collaborative network of individual players, communities, innovation network organisations, universities, financial institutions and governments. Such a virtuous network has the ability to transform individual ingenuity into replicable, revolutionary products and service offerings. Ever-accelerating mobile penetration—430m Indian and Chinese consumers will purchase their first smartphone in 2014—will enable unprecedented knowledge-sharing and scalability. This is the essence of Innovation 2.0—using established and expanding infrastructure to unlock growth within untapped sources.

Betting on Asia's grassroots innovators

Experimental business models are already evolving on a limited scale. Khoj Lab is a joint initiative of India's Future Group and the National Innovation Foundation (NIF), where the Future Group applies its business capabilities to the ideas of innovators identified by NIF, to market elegant but affordable products like the Mitti Cool refrigerator, which is made of clay and requires no electricity. The innovators retain intellectual property and get a royalty on sales.

I believe this is the time for corporates to think big and see this as the growth opportunity of the decade. It calls for a paradigm shift in the way companies look at diffused innovation. It calls for the vision to see *Jhakaas* innovation as an unprecedented business opportunity. It calls for alignment between business philosophy, strategic goals and operational business models. Above all, it requires the same stepping out of the comfort zone and the same fearlessness and eschewal of risk aversion that business leaders ask of young entrepreneurs. If the developing countries of Asia and the world are to play the catch-up game, the rewards will be worth the risk.



4

What potential does open innovation hold for Asia?

Author: *Dr Xiaolan Fu (傅晓岚), founding director of the Technology and Management Centre for Development (TMCD), Professor of Technology and International Development and Fellow of Green Templeton College, Oxford University.*

Innovation in the West tends to be market-driven and bottom-up. In recent years more firms have adopted a strategy known as “open innovation” (OI) to collaborate over the generation of new ideas or the combination of existing ones. In contrast, across much of Asia, discussions of innovation policies and strategies have tended to focus on top-down approaches. Governments focus on hard building blocks such as infrastructure, and plan for innovation in pre-selected strategic growth sectors. Xiaolan Fu argues that the innovation ecosystem in Asia, where the state has played a prominent role, is not necessarily detrimental to the diffusion and adoption of open innovation. Indeed, it is being widely adopted.

More and more firms are abandoning the traditional closed model of innovation, by which investment was poured into R&D departments to produce new technologies or ideas—to be tightly guarded as organisational secrets. Instead, open and collaborative innovation networks are now becoming the norm in a growing number of places.

The term open innovation—or OI, as it has become known—was coined by Henry Chesbrough, a scholar at the University of California, Berkeley, in 2003 in his seminal book entitled *Open Innovation: The New Imperative for Creating and Profiting from Technology*. OI is a distributed innovation process that involves managing knowledge flows across the organisational boundary (Chesbrough et al, 2014). It is used by firms to accelerate internal innovation and to expand markets for external use of innovation, using one of several modes: outside-in (harnessing ideas and technologies from outside the organisation), inside-out (releasing under-utilised innovations from within the firm, to feed into other organisations’ innovative processes), or ‘coupled’ (where companies use both modes).

Over the past ten years, OI has become a new imperative in innovation practice and research. Its power spreads not only to technological innovation, but also to services and open business model innovations. It is being explored in multinational corporations (MNCs) and also in small and medium enterprises (SMEs). Various forms of OI such as crowdsourcing, innovation networks and product “platforming” are widely used, with high-profile examples including the iPod/iTunes store, IBM/Linux system, and P&G’s Connect + Develop platform.

The adoption of open innovation in Asia

Despite the significant variations in innovation systems across Asian countries, OI is increasingly being adopted in Asia. A study by Frost & Sullivan (2012), a consultancy, showed that while companies around the world are embracing OI, some are more willing than others to actively commit resources to it. Asia-Pacific companies lead the pack in this respect: 72% of the companies surveyed in the region had a dedicated OI team. Leading innovative Asian companies, such as Samsung and Huawei,

have set up R&D labs in the US and Europe, and collaborate widely with customers, suppliers and universities. India has also opened up its innovation system, notably in the realm of social innovation. This can be seen, for instance, in efforts to democratise education and training and to involve the grassroots of society in innovative systems.

China is no stranger to OI, with policies in the reform era actively seeking to encourage acquisition of external knowledge and development of university-industry linkages. Firms use OI systems in order to address a shortage of resources, technology and skills, as well as the rising costs of internal R&D.

Outside-in is the most popular type of OI among Chinese firms, and was already widely used in a basic form in the 1990s. Chinese firms imported foreign technology, while foreign direct investment (FDI) was permitted for technological upgrading. These transferred technologies were then assimilated and adapted for local conditions, which led to incremental diffusionary innovation in China. From the late 1990s, Chinese firms started to transition from a technology-transfer development strategy to an indigenous innovation-oriented growth strategy. The years since China's entry into the WTO in 2001 have witnessed the introduction of more sophisticated and varied OI systems, along with the rapid internationalisation of innovation activities by both foreign and indigenous firms in China. Besides continued acquisition of foreign technology, outside-in innovation takes the form of joint R&D labs and collaboration with users, suppliers, competitors and public or private research institutions.

The proportion of firms in China reporting to have collaborated with external organisations was nearly 50% in the late 2000s (Fu and Xiong, 2011), comparable to that of UK firms, according to a 2008 national innovation survey. Universities, customers and suppliers were the most popular collaborators for these Chinese

firms. Interestingly, the proportion of Chinese firms reporting to have engaged in university-industry collaboration was above the European average (Fu, 2014). This type of outside-in OI is widely used not only in high-technology sectors but also in medium-technology sectors in China. Firms such as BOE, which produces semiconductor displays, Haier, a leading consumer electronics and home appliances producers, and Little Swan Corporation, a washing machine manufacturer, have built up extensive external collaborative networks to support their innovative capabilities and competitiveness. In recent years, some Chinese firms have also set up local and overseas R&D centres, and have acquired foreign technology-intensive firms through M&A (Bai, 2009; Fu, 2014). High-technology firms Huawei, ZTE, Lenovo and Haier are pioneers in this respect.

At the same time, some Chinese firms, including Lenovo and high-tech ceramics business Tsinghua Ziguang, have also started to adopt inside-out OI, such as licensing, intellectual property (IP) sales, spin-offs and corporate ventures, in order to commercialise their innovations. Top Chinese innovators such as Huawei, Lenovo, ZTE and Feiyue Sewing Machine have now embraced a coupled mode of OI. They acquire foreign technology through licensing, international collaboration and setting up overseas R&D labs, while at the same time selling their own IP and spinning off internal know-how through joint ventures with MNCs and other companies.

China's innovation leaders have a notable international orientation in their OI models. In addition to in-house R&D and collaborating with domestic universities, Huawei, a telecoms equipment maker, has a rich network of international collaborators ranging from universities such as Yale (US), Imperial College London (UK), the University of Surrey (UK), Inatel (Brazil) and Sharif University of Technology (Iran), to customers such as BT in the UK, and Spain's Telefonica.

Open innovation is also taking place in basic and applied scientific research in Asia. Evidence for this is provided in a number of joint publications by authors from Japan, Korea and China (Li et al, 2012). The authors note a rapid increase in regional scientific collaboration between these three countries on the one hand, and Association of South-East Asian Nations (ASEAN) countries on the other.

What could OI contribute to innovation in Asia?

OI offers a wide range of benefits for both large and small firms. It allows firms to tap into the best talent in order to stay ahead of the innovation game (Chesbrough, 2003) and to overcome various impediments that a firm faces (Keupp and Gassmann, 2009).

OI may be a result of “pull” factors external to firms, such as environmental change; availability of skilled workers, knowledge or venture capital; more intense competition from rivals or suppliers; technological change; knowledge transfer and leveraging of spillovers or partner advantages, all of which drive R&D activities beyond the boundary of the firm. At the same time, internal constraints may also “push” firms to open up the innovation process.

Firms in emerging economies face substantial institutional, resource and capability impediments to innovation. Fu et al (2014) found that for firms in China, institutional, financial and knowledge/skills-related risks and constraints are the main drivers determining the degree of OI adoption. Responses, however, vary across firms of different ownership types. Foreign-invested firms appear to be most responsive, taking action by widening and deepening their openness in innovation, while state-owned firms appear to be the least responsive in the use of OI.

The spread of OI will no doubt change the significance of some of the innovation sources

that are important in the closed innovation model. For example, in the closed system, a key driver is incentivising the efforts of managers, R&D personnel and other relevant staff. When firms open up their innovation chains and start to tap into external talent and resources, the relative importance of incentives falls (Fu, 2012).

Such changes have important implications for business. As the overall innovation model that individuals operate within changes, key internal R&D personnel may no longer feel they are as important as they were in the closed model. If individuals believe they have little influence on overall performance, the incentive effect disappears (Prendergast, 1999), or at least is weakened. Managers will need to redesign incentive structures in light of the resources they have, the scarcity of internal and external expertise, the complementarity and substitutability of these knowledge resources and companies’ dependence on these resources.

The wide diffusion and adoption of OI also reduces firms’ reliance on government funding. Firms can overcome resource constraints by collaborating with venture capitalists, industry peers, suppliers, customers and universities. This new paradigm of innovation empowers the SME and non-state sectors, which often face discrimination in transition economies. Given the creativity at the grassroots and among SMEs, the significance of OI should not be underestimated. This is particularly the case for Asia, where most countries are still in the process of industrialisation, transition and catch-up.

The role of the state in an open innovation era

The state and industrial policy have played a significant role in Asia’s economic development, including in Japan, South Korea, Taiwan and Singapore, which are now classified as developed economies. The region also hosts the world’s second-largest economy, China, where the

visible hand of the state has played a significant role in economic growth, inspiring talk of the so-called China Model and Beijing Consensus (albeit with some exaggeration). Based on these successes, it is not surprising that across much of Asia, discussions of innovation policies and strategies focus on top-down approaches. Despite the recent changes in Chinese government policy emphasising the role of the market in incentivising innovation and allocating resources, governments are still focusing on hard building blocks such as infrastructure, and speak of long-term planning for innovation in pre-selected strategic growth sectors. What potential does OI hold for Asia under these circumstances?

First, we have to consider the conditions for successful OI. Although OI holds much promise, firms need technological and managerial capabilities to manage the innovation process and the necessary absorptive capacity to benefit from OI. Although OI enables firms to overcome some internal constraints and share risks in innovation, only firms that already have some infrastructure, such as an Internet connection, proximity to knowledge sources through being in a cluster or a science park, or through being a virtual member of an innovation platform/network, will be able to engage in and benefit effectively from OI.

What is, then, the relationship between government support and OI? Does state intervention hinder or enable firms to adopt and benefit from OI?

The state's role lies in addressing market failures, and these are especially prevalent in developing Asia. For instance, information asymmetries suggest a role for the state in facilitating innovation through knowledge provision. Also, owing to the nature of knowledge as a public good, and the prevalence of knowledge spillovers that may benefit external users, government intervention is needed to protect R&D investors and encourage

innovation. Besides, innovation is risky and costly, which justifies a need for government financial support, especially for basic research, where uncertainty and the cost of failure are both high.

State policies do not necessarily hold back the adoption of OI, and instead may help Asian firms, especially SMEs and those firms that lack the absorptive and management capacity to embrace OI alone. In the case of China, a series of policies has been introduced by government departments since 1985 regarding technology acquisition and exploitation, as well as university-industry collaboration. There has been a wealth of policies aimed at facilitating inbound OI by encouraging import, licensing and inward foreign direct investment. Since 2000, the government has been encouraging Chinese firms to "go global" and actively seek out and acquire relevant foreign technology.

All these policies encouraged the adoption of inbound OI. Since the mid-1990s, there have also been changes to laws on the intellectual property rights of scientists, to encourage the commercialisation of innovations in universities and research institutions, and to facilitate the spin-out of new companies from these public institutes. Finally, over the last decade, government-sponsored R&D programmes for university-industry collaboration and innovation platforms have been introduced. Such interventions have encouraged the diffusion and adoption of OI networks (Fu and Xiong, 2012; Fu, 2014).

However, we must also be aware of the risks of the top-down approach.

Governments face information and incentive problems no less than the private sector does. First, we need to recognise both the strengths and the limits of markets, as well as the strengths and limits of government interventions aimed at correcting market failures (Stiglitz, 1989). Second, in developing countries

where institutions and legal systems are not well developed, government intervention, especially with industrial policies aimed at “picking winners” and subsidising innovation, creates opportunities for corruption and rent seeking. This is a problem increasingly being recognised by heavy R&D-spending countries such as China. Finally, allocating innovation resources through a government instead of a market mechanism also gives rise to the problem of low efficiency in innovation. This is another problem that Asian countries, China included, need to tackle with urgency.

Government intervention can be positive, but carries risks

OI is widely embraced by Asian firms, as much as those in the West, not only in the industrial sector but also for social innovation. It enables Asian innovation leaders to remain globally competitive, and also helps followers and SMEs to address the constraints and risks of innovation. The innovation ecosystem in Asia, where the state has played a prominent role, is not necessarily detrimental to the diffusion and adoption of OI. The key is to build the state’s capacity so that the government knows where, when and how to intervene in an appropriate way, and to develop necessary complementary institutions and markets to curb corruption and incentivise innovation organically, not politically.

5

Can we really measure innovation?

Numerous attempts have been made to measure the innovativeness of countries. Efforts, typically in the form of country-ranking indices, tend to focus on innovation inputs and outputs, using metrics like R&D spending, number of engineering graduates, citations of scientific papers, and patents filed. Professor Gerry George argues that such measures of innovation are just retelling the known story. What isn't measured is just as compelling.

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Measuring the tip of the iceberg

Innovation measures what can be seen—unfortunately, what is not seen is more interesting. Current measures of innovation focus on formal systems: indices that target innovation ecosystems in countries tend to focus on investments (graduates, R&D), intermediate outcomes (patents, trademarks, copyrights), and to some extent new products as outputs (loosely defined). There are key elements here that these measures miss.

First, countries with services as a bulk of the economy are always understated, because services are more difficult to identify and capture with longitudinal data—though this is improving. Second, Asian economies have a strong informal component which is equally innovative in creating new products and services. By some estimates, about one-third of economic activity is understated. It is not just the economic value of such work which is missed, but also its potential for social transformation, because informal innovation is typically practised by those in lower income categories—the economically disenfranchised.

Third, our econometric measurement fails us when new business models and entrepreneurial

activity are considered, as traditional innovation models are now being disrupted by the open business models discussed in the preceding essays, multi-channel/multi-modal transactions, and global flows of service production and consumption. Closed systems—within organisations, value chains or nations—are becoming rare.

Consequently, in focusing on measurement we miss some big-ticket issues that could be the source of Asia's strength.

Measurement strengthens our economic foundation

We should recognise though that our current measurements, mostly global indices, do us a great service—they do the best with what they can capture. Let's look at factors that current innovation indices do well. They capture formal systems, investments and flows. Knowing the annual rate of change in investment in R&D allows us to see if we are slipping or growing in creating new products. Tracking formal systems also projects a clearer picture of sectoral flow, for instance whether our research productivity in stem cells is outpacing semiconductor hardware. Further, it allows us to segment investment in the industrial value chain of producers, for example, in delivering the iPhone 6 or a Samsung Note.

These macro investments, sectoral flows, and cross-industry ecosystem dependence can now be plotted in great detail, which underpins our understanding of the broader economy and capital markets. Tracking intermediate outcomes of innovation, such as patents or publications in academic journals, allows us to understand technical progress through open science and cumulative knowledge (Alnuaimi et al., 2012a, b). These intermediate measures acknowledge the building blocks of knowledge, later embedded within products and services. Patents and publications also allow us to track flows of ideas through knowledge networks, co-authorships, and coordinated teams working within and across companies and geographies delivering complex innovations.

The problems with measuring innovation

Despite these advantages, three problems remain with innovation measures. The first challenge is *identification*: if you can't track informal activity, then you are ignoring areas that fall outside the realm of quantification. If you only interpret what gets measured, then precision of analysis comes at the cost of the full picture. For example, we miss several elements of inclusive innovation, those low-cost technologies that tend to serve the underserved. We also miss out on bootstrapped or improvised technologies.

The second issue is *aggregation*: in creating data-sets, some non-innovative activities inevitably get scooped up in the same net as innovation, and value capture is conflated with value creation potential. The challenge with aggregation is that granularity is lost. If we measure innovation by the economic value captured, then we miss the much wider and longer-term value creation potential.

The problem of orphan drugs (used to prevent, diagnose or treat very rare medical conditions) is a case in point. These may require several billion dollars' worth of investment in the research

phase, only to fall by the wayside because few are willing to develop their route to market, owing to limited market scalability. Here, our measures can become distorted as the value creation potential is much higher than the actual value captured. We need different business models to take these drugs to market to capture economic value.

The third problem is *evolution*: the principle behind innovation itself is to find new ways of doing things. Technologies change, their platforms get disrupted and new processes replace them—that's the nature of all innovation. Recent changes that have captured our imagination are based on digital platforms such as digital money or big data analytics. These new technologies also have new business models which defy indices that look for stability over time. By definition, new ideas, technologies and new business models can only be loosely identified and aggregated; thus our measurements miss the velocity of underlying technological and social change.

Fixing the plane while flying it

Any measure of innovation needs to adapt, but measurement derives its benefit only if we can track it over a reasonable period of time. Below, some ideas are put forward but, in the spirit of open innovation, these are offered as a conversation starter rather than a definitive answer. These should be considerations when improving indices, or might require new indices altogether.

- **Measuring value-added.** How does innovation map to value-added? This is a tricky issue: do we measure innovation inputs and connect them to outputs? Productivity growth is the key economic indicator of innovation—but what kind of growth? To see this we must ask how one gets growth without innovation. The answer is replication: we can simply have more of the same, more machines and people making the same thing. So what about growth with innovation? That comes from doing something

different: applying new ideas and new technologies. So it is the part of productivity growth over and above that from just replication. An Imperial College team led by Jonathan Haskell has been measuring this for the UK government, via the innovation charity Nesta, as the official innovation index in the UK for the past four years (Goodridge et al, 2014). They focus on measuring growth due to new ideas and in particular spending on intangible assets, such as software, R&D, market research and new business processes.

● **Integrating spillovers into discussions of innovation.** How does innovation in one sector affect others? As we improve our knowledge graphs—that is, how a semantic concept could be related to and affect different ideas that would not normally be considered together—we can also improve our connections between ideas. Innovations that have distant commercial applications are quite common; they are the ones where the project at hand reveals a potential solution for a problem that was not part of the original remit. Companies now realise that they cannot control technology trajectories and they selectively reveal their technologies to foster greater cooperation across industries or to signal their technology trajectory within their industry. My work with Oliver Alexy and Ammon Salter begins a discussion of how revealing knowledge and working within innovation ecosystems can have a transformative effect (Alexy et al, 2013). Related to this point, new technologies provide us with new platforms for services, and updating these in our measurement is essential. The cases of digital money, mobile payment platforms, near-field technologies and business models for the rural poor all draw on fundamentally different ideas and innovations but have significant innovative spillovers in society (Dodgson et al, 2013). Establishing these spillovers and interconnectivity can only be done semantically, which requires us to shift from economic measurement to conceptual overlapping innovative spaces as we do in knowledge graphs or natural language

processing in big data analytics.

● **Capturing informal sector practices.** Asia is a hub of economic activity driven by innovation. Improvised technologies, makeshift innovations and low-cost innovations are exemplars in this category. It does merit pondering whether we can come up with systematic ways of thinking about and measuring these types of informal sector innovation. It is clear that informal economies drive a significant part of socioeconomic activity in Asia. Measuring informal activity itself will take innovation—our challenge here is that we don't get to see or hear technical improvements, whether it is rip-off software or near-perfect imitations with refinements, these are incremental innovations that create a product market that is often untracked but has significant economic value. What are needed are discussions on how informal practices can be built into holistic representations of economic and innovative activity.

Taking measurement forward

Measuring innovation provides us with significant benefits. Current measures do a good job, but they fall short by giving us greater precision on what we already know reasonably well. Yet what we do not measure is just as socially compelling as what we do measure. Asian innovation practice highlights why we might not be capturing the full potential of underlying product and service innovation. Capturing the bigger picture—seeing the whole iceberg—might require us to shift from surveys and economic indices to other new tools of the recent decade: mobile usage patterns, digital and social media, semantic mapping and data analytics. To improve our current measures, we would need to consider differences between social value creation through product use and value capture by paying for it. What is missing in measurement is the dynamism and excitement “under the hood” of changes in the digital economy, informal economy and global cross-sectoral flows of ideas and services. ■

6

Marrying Asian frugal ingenuity and Western R&D

Author: Navi Radjou, co-author of *Jugaad Innovation and Frugal Innovation*.

Navi Radjou argues that as the global economy becomes increasingly interconnected, nimble innovators in emerging markets will combine their resourcefulness with the advanced R&D capabilities of developed economies to co-create ground-breaking frugal solutions, meeting demand from cost-conscious and eco-aware customers worldwide.

Doing more with less

Frugal innovation is a revolutionary new paradigm that encourages companies to “do more with less”—to develop affordable, simple and sustainable solutions that generate greater economic and social value while minimising cost and use of scarce resources. Frugal innovation is utterly opposed to the “more for more” R&D-driven innovation model long practiced in the West, which consumes ever more resources to produce ever more complex, expensive and eco-unfriendly products.

In India and China, scores of ingenious entrepreneurs and companies are using frugal innovation to satisfy the needs and aspirations of not just the rapidly growing middle class but also millions of citizens at the bottom of the economic pyramid. In India, for instance, Embrace, a start-up, offers a \$200 portable infant warmer that saves the lives of thousands of premature babies in remote Indian villages (incubators sold in the West cost \$20,000). In China, Haier and Galanz sell affordable and energy-efficient washing machines and microwave ovens for the mass market, and Neusoft, China’s largest IT service provider, has developed a cost effective telemedicine solution that enables doctors in cities to remotely treat elderly and poor patients in Chinese villages.

The secret formula of frugal innovators in Asia

Frugal entrepreneurs and companies in India and China are able to innovate faster, better and cheaper than their counterparts in advanced economies because they possess a unique mindset and leverage an effective set of operating principles. First, frugal innovators possess a resilient and ingenious mindset. In India it is called *jugaad*—a Hindi word that translates as “innovative fix, an improvised solution born from ingenuity and cleverness.” The Chinese call this *jiejian chuangxin* (resource-saving ingenuity). Both concepts denote the ability to spot opportunities in adverse circumstances and resourcefully improvise clever solutions. For instance, He Liangcai, a farmer from China’s Hunan province, converted a suitcase into a battery-powered scooter that can carry two people for 37 miles on a single charge. Armed with the ingenious *jugaad* and *jiejian chuangxin* mindset, frugal innovators in India and China—from rural entrepreneurs to large firms—innovate more effectively using a set of unique principles that can be summed up as follows:

Reuse and recombine. Rather than reinventing the wheel and building everything from scratch—as is often done in Western R&D labs—

innovators in India and China find clever ways to reuse existing technologies and resources and recombine them into novel solutions. For example, Zhongxing Medical, a Chinese medical device maker, borrowed the high-end Digital Direct X-Ray (DDX) technology from its parent company Beijing Aerospace, and adapted it for broader applications like chest X-rays. As a result, Zhongxing is able to produce X-ray devices costing only \$20,000, seven times cheaper than Western rivals' products, and now dominates the Chinese X-ray machine market. Similarly, YES Bank, a leading Indian private bank, has adapted high-end financial instruments—traditionally reserved for big businesses—to meet the financial needs of small and medium enterprises.

Keep it simple. Frugal innovators in India and China do not try to impress customers with complex solutions featuring cutting-edge technologies and sophisticated functionality. Instead, they offer “good enough” solutions with minimal features that address customers' basic needs—not desires—and are simple to use and maintain. Neusoft simplified the design of its portable Xikang All-in-One Healthcare Terminals so that even technicians and nurses in tiny village clinics across China can use them to conduct physical examinations and offer better health services to millions of low-income rural patients. Similarly, the Indian government-backed Aakash, a \$35 tablet computer, may not match the technological sophistication—or the \$400 price point—of Apple's iPad. But Aakash is easy to use, offers basic capabilities like web browsing and educational software, and most importantly is affordable and accessible to students in 25,000 colleges and 400 universities across India.

Iterate and adapt. Indian and Chinese innovators are frugal with *time*. They don't waste time trying to create the perfect solution. Instead, they rapidly develop and launch basic solutions with a view to iteratively improving products based on market feedback. For

instance, Chinese mobile handset makers like SIM Technology Group and Xiaomi first launch initial versions of products with basic features and then use suggestions from millions of customers to add new and better functions to their products, which they bring to market within weeks. Moreover, frugal innovators constantly improvise and adapt their business models and plans in the face of adversity. In 2008, when Tata Motors faced political resistance in the Indian state of West Bengal where it had originally planned to manufacture its Nano car (the lowest-priced car in the world), it swiftly shifted its production to the investor-friendly state of Gujarat and ramped up manufacturing within months.

Collaborate extensively. Innovators in India and China save energy and hone their focus by partnering extensively to carry out every activity in their value chain—rather than doing everything themselves. As a result, they can achieve impressive economies of scale (breadth) and scope (depth) in their operations. For instance, after earning his PhD in the US, Harish Hande returned to India to launch SELCO, which today provides affordable solar energy to over 125,000 rural households. SELCO offers high-touch service at low cost by tapping a widespread network of grassroots micro-entrepreneurs, who distribute and maintain solar panels in their local communities.

Be sustainable by default. For Indian and Chinese innovators, environmental sustainability is neither a luxury nor an afterthought. They design solutions that minimise the use of scarce natural resources, rely heavily on renewable energy and do not have a negative impact on the environment. For example, KPIT Cummins, an Indian engineering and IT services provider, developed Revolo, a low-cost plug-in device that can convert any car than runs on gas into a hybrid vehicle. Revolo technology costs 80% less than other hybrid car options and yet it can boost fuel efficiency by over 35% and reduce greenhouse gas emissions by at least 30%.

Western firms learn frugal innovation in Asia

The subsidiaries of Western multinationals (MNCs) in India and China have traditionally imported Western products and “de-featured” them to make them more affordable to local customers. These reengineered solutions, however, still remain too complex and expensive for mainstream customers in these markets. And they are often ill-suited to the local context. For instance, Siemens was shocked to discover that its technically-advanced power converters broke down frequently in China. It found out that micro-particles from heavy dust pollution penetrated the electronic circuits of its sophisticated device and caused a malfunction (later, in this text, we describe how Siemens responded to this).

Humbled, a growing number of MNCs are unlearning their “bigger is better” R&D techniques and adopting frugal innovation principles to develop entirely new products and services that match the needs of cost-conscious Indian and Chinese customers. In the process, MNCs that long associated quality with technological sophistication are re-conceptualising quality in terms of *value* as perceived by customers in the local context. Let us use the examples of Renault-Nissan and Siemens to illustrate how MNCs can leverage India and China to learn how to deliver greater value to customers at lower cost.

In 2004, the French carmaker Renault launched Logan, a \$6,000 sedan. Manufactured in Romania, Logan became an instant hit in Western Europe. Logan’s big success encouraged Renault to gradually develop a new entry-level product line under the Dacia brand. Today Dacia is the fastest-growing brand in Western Europe (even in Germany, known for its premium cars) and contributes to over 40% of Renault’s global sales.

Renault’s visionary CEO Carlos Ghosn wants his company to push the boundaries of what he calls “frugal engineering” by developing even more affordable cars to serve the needs of value-conscious customers in emerging markets like India and China. In an R&D centre in Chennai, Renault and its partner Nissan are currently developing an entirely new car platform named CMF-A, that will be used by both carmakers to build a whole range of ultra-low-cost and high quality vehicles to be marketed in India and other emerging markets, which together will represent 60% of the global car market in 2015.

Siemens, the German industrial giant, is also leveraging its R&D centres in India and China to develop frugal solutions that deliver higher value to customers at lower cost. Its Chinese engineers, for instance, developed an affordable 16-slice computer tomography (CT) device that is easy to operate and generates valuable clinical data at lower cost. This inexpensive and easy-to-use device is part of a whole new mid-range product line that Siemens is developing under the moniker SMART—short for Simple, Maintenance-Friendly, Affordable, Reliable, and Timely-to-Market. SMART products cost up to 50% less than high-end products. They consume less energy and are faster to set up and easier to operate and service. Over 15,000 Siemens engineers—mostly in India and China—are actively involved in developing hundreds of SMART products for use in emerging markets—which already account for over 30% of Siemens’ global sales—and even in advanced economies.

Siemens and Renault-Nissan are not the only Western MNCs cutting their teeth on frugal innovation in India and China. With two-thirds of the global customer base expected to live in Asia-Pacific in 2030, a growing number of multinationals across industries such as Essilor, GE, IBM, Pearson, PepsiCo, Unilever and Xerox are also leveraging India and China as their new base to develop frugal products and services for local as well as global markets.

Co-creating frugal solutions for global markets

As the economic crisis lingers on in the West, cost-conscious Western customers—whose purchasing power is shrinking alarmingly—are clamouring for products and services that deliver greater value for their limited money. As a result, Western MNCs are embracing “reverse innovation”—that is, they take the frugal solutions initially developed in India and China and market them in recession-hit Western economies. For example, Siemens is selling its 16-slice CT scanner (developed in China) in the US, which is the biggest global market for this device. Similarly, GE now markets in the US its Mac 800, an ultra-portable, affordable, and battery-operated ECG machine that GE originally designed, produced, and sold in India under the Mac 400 brand.

In the coming decade, as the global economy becomes increasingly interconnected, nimble innovators in emerging markets will be able to combine their resourcefulness and agile thinking with advanced R&D capabilities available in developed economies to co-create groundbreaking frugal solutions that no single region could exclusively develop on its own. I designate

this synergistic win-win form of cross-regional collaboration as *globally networked innovation*.

Forward-thinking Western MNCs are already constructing these global innovation networks by integrating R&D expertise, ideas, and capital from multiple regions to develop affordable and high-quality solutions for customers worldwide. For instance, in 2010, Xerox inaugurated Xerox Research Center India (XRCI), its first research lab in an emerging market. Today, engineers and scientists at XRCI co-create cutting-edge technology and business solutions with their colleagues at Xerox’s other R&D centres in the US, Canada and France. Similarly, under CEO Ghosn’s impetus, the Renault-Nissan alliance is building a global innovation network that integrates its Indian engineers’ frugal ingenuity with its French teams’ project management skills and its Japanese R&D groups’ deep technical expertise, to co-create next-generation cars for global markets.




Multinationals from emerging markets are also setting up global innovation networks by integrating their low-cost ingenuity with cutting-edge Western technologies. For example, India’s Tata Motors is using its top-notch R&D centre in the UK as a global base to create frugal and eco-friendly car technologies.

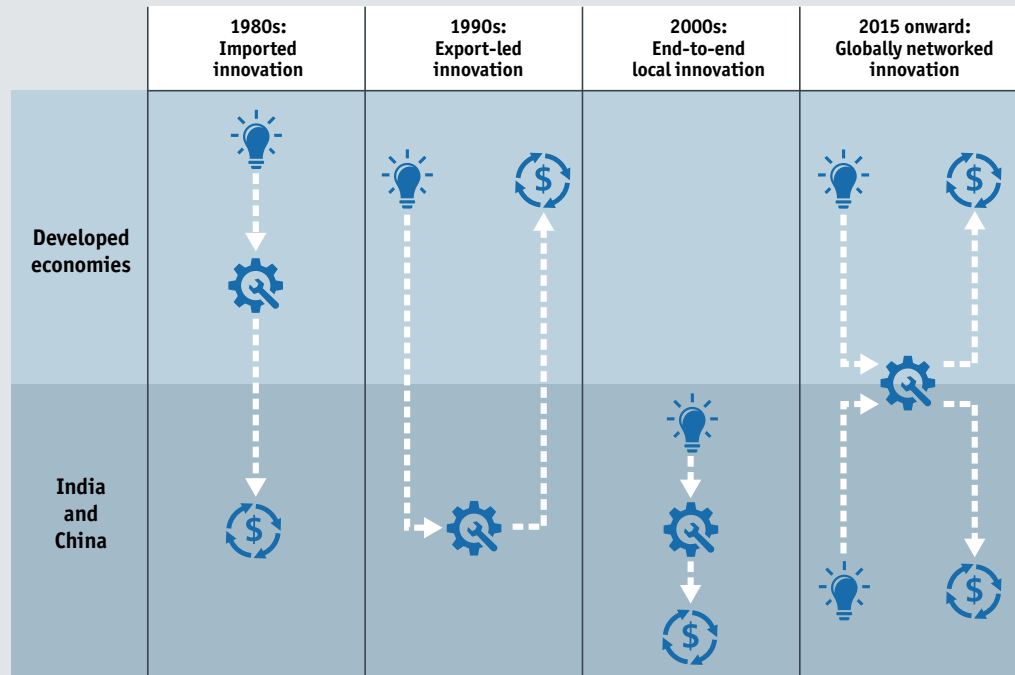


New trajectories of global innovation

The figure below depicts the evolution of frugal innovation in a global, historical context and from the perspective of India and China. In the 1980s, little R&D was done in India and China, which had to import expensive products originally designed for affluent customers in advanced economies. The 1990s gave birth to outsourcing and offshoring, with Western MNCs leveraging low-cost Indian software talent and Chinese tech hardware expertise to develop innovative solutions but mainly for use in developed markets. In the 2000s, as Asia-

Pacific emerged as the global economic engine, Western MNCs began expanding their R&D presence in India and China where, inspired by local low-cost rivals, they started to develop frugal solutions to serve the unique needs of the 2.5bn Indian and Chinese consumers. The next phase of global innovation, which Western as well as Indian and Chinese multinationals are just embarking upon, will consist of networking ideas, know-how and talent across regions to co-create frugal solutions for cost-conscious customers worldwide.

 Inspired by  Developed in  Commercialised in



Source: Radjou, N. (2014), Frugal innovation: A pioneering strategy from the South.



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