RESOLUTION TO RESOLVE
Sustainability Practices in Industry and Education

RESOLUTION TO RESOLVE
Sustainability Practices in Industry and Education

AUTHOR(S) ?

BLOOMSBURY
NEW DELHI • LONDON • OXFORD • NEW YORK • SYDNEY

BLOOMSBURY INDIA
Bloomsbury Publishing India Pvt. Ltd
Second Floor, LSC Building No. 4, DDA Complex, Pocket C – 6 & 7,
Vasant Kunj, New Delhi 110070

BLOOMSBURY, BLOOMSBURY INDIA and the Diana logo are
trademarks of Bloomsbury Publishing Plc

First published in 2018

ISBN: 978-93-00000-00-0

2 4 6 8 10 9 7 5 3 1

Typeset by Fortune Graphics, New Delhi
Printed and bound in India by Replika Press Pvt Ltd

To find out more about our authors and books visit www.bloomsbury.com
and sign up for our newsletters

Contents

Indovation: The Indian Way towards Frugal and Sustainable Innovation for Industry and the Economy

A. Didar Singh

INTRODUCTION

There's no alternative to sustainable development.

The world formally recognised this when the United Nations in its historic sustainable development summit in September 2015 adopted the sustainable development agenda. On 1st January of the following year these became the Sustainable Development Goals (SDGs), a collection of 17 global goals. The broad goals are interrelated though each has its own targets to achieve. The total number of targets is 169. The SDGs cover a broad range of social and economic development issues. The goals were developed to replace the Millennium Development Goals (MDGs) which ended in 2015 (most opine, being largely unmet!). Unlike the MDGs, the SDG framework does not distinguish between 'developed' and 'developing' nations. Instead, the goals apply to all countries. Together all of humanity must work to ensure a sustainable future for all.

Sustainable Development Goal 9 or SDG 9 has a very comprehensive aspiration. Possibly too ambitious but in all its aspects it is crucial for sustainable development and humanity's future. SDG 9 is a big one, literally. Big as in skyscrapers, cargo ships, and building cities.[1] Global Goal 9: Industry, Innovation, and Infrastructure is all about building the *most* sustainable future for everyone around the world. As countries build cities or develop economically, the role of Global Goal 9 is to make sure that this happens in a socially and environmentally responsible way.

SDG 9 encompasses targets to 'Build resilient *infrastructure*, promote sustainable *industrialization* and foster *innovation*'. Each of these three objectives are interlinked and dependant on each other. For '*Infrastructure*' it would mean a world with sustainable housing, where everyone has access to sustainable resilient materials to build a safe, secure home, where rural communities can access markets because roads have been built. For '*Industry*' it should mean a world where companies and countries make clean sustainable products using renewable energy and also share innovative knowledge equally with one another. And use raw materials at a sustainable pace. And for '*Innovation*' it would imply a world where countries have equal access to cutting edge technology so humans can

[10] Global Goal 9: Industry, Innovation, and Infrastructure, Meghan Werft, SEPT. 14, 2015, Global Citizen at https://www.globalcitizen.org/en/content/global-goal-9-industry-innovation-and-infrastructure/

advance and progress together. It sounds very idealistic but that is what the ideal goals should be.

As the UN sees it, the targets are:

- Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries.
- Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets.
- By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.
- Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending.
- Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities.
- Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020.

This paper will focus on 'innovation' particularly in the context of sustainable business and the Indian economy.

INDIA AND GOAL 9

As the future dawns on us employment and environmental sustainability are the two major challenges the Indian republic faces. Employment is both a demographic and political hot potato. It is beyond the remit of this paper to address its various issues except to opine that in addressing sustainable and innovative solutions for the economy, we would address this too.

There is little doubt that we have a multiple environmental crisis upon us – from the pollution in cities, to threatened forest and rivers with chemical contamination of our soils. In this bio rich land the idea of 'nature' itself is being questioned as our air, water and ecosystems have 'become self-inflicted hazards'.

Some three years ago, FICCI, the apex and largest business chamber of India had at its annual sustainability conference published a report entitled 'Corporate sustainability: Drivers and enablers, India Sustainability Conclave 2014'. As the then Secretary General of FICCI, I had in the foreword, opined that: 'The sustainability dialogue has in the last three years taken a new turn because of various regulatory requirements such as Business Responsibility Reporting (BRR) arising out of the National Voluntary Guidelines for Social and Environmental Responsibility (NVGs) and the Corporate Social Responsibility (CSR) provisions under the Companies Bill. This has started a new conversation within the corporate sector on the appropriate paradigm for sustainability. At the same time, it has resulted in a confusing debate, on the one hand, on the relationship between CSR and sustainability and, on the other hand, about the overlaps in terms of reporting requirements. We are at a juncture where this debate must clear the air and provide companies the contours for internalising social and environmental concerns. Ultimately a business is sustainable if it has factored in social concerns.'

Sustainability cannot be thrust down corporate gullets through reporting regulations. It cannot also be just a CSR response. It's much much more than that and corporate are beginning to understand that.

Corporate sustainability in India is currently a multi-level learning process, where regulators, companies and other stakeholders are experimenting with innovative approaches to establish sustainability benchmarks. These attempts are dominated by the trends in adoption of sustainable development policies by world economies and developments in industry sector circles.

In fact, when we say 'Indian corporate sector' it is something very cosmopolitan. The entities range from subsidiaries and branches of international companies, Indian conglomerates, State owned agencies, Small and medium scale companies to Entrepreneurial ventures. Traditionally, the impact of global mega-forces is recognised by the large companies first, who often set benchmarks for other companies to follow. Further, sustainability drivers in the global scenario cascade to companies operating in India, albeit with reduced impact.

Key issues diverge from companies' carbon or energy centric operations. Not only direct operations, but indirect operations in the form of responsible supply chain management are expanding the scope of sustainability. Either through regulatory pressure or voluntary initiatives, sustainable development is coming into its own as a driving force for competitiveness and innovation. Industry associations and trade bodies also are initiating measures to support organizations in rising to this requirement of linking core business agendas with sustainability.

According to the FICCI-KPMG report, 'sustainability' is a long-term goal and an evolving agenda. There is no 'one-size fits-all' approach to sustainability, and translating it into action means defining it in the company's context. Further, such actions and operational implementation cannot be separated from

public perception. Capitalising on sustainability involves behavioural changes and developing a new corporate culture. Every business unit and function of a company will be touched by sustainability. Adopting sustainability as the way of doing business may bring in path-breaking business models or approaches. Market dynamics, coupled with increased economic uncertainty increase the need for corporate entities to better understand the risks associated with their sustainability programs. Every company has its own reason for investing in sustainability. Broadly, the drivers can be categorised as:

- Regulations
- Access to capital
- Expanded consumer base
- Social license to operate
- Innovation
- Brand and Reputation
- Operational Efficiency.

Here we shall not discuss the imperatives behind each of these except to say that together with 'innovation' they play a crucial role for the future sustainability of business.

INNOVATION

A vast majority of the corporate surveyed by KPMG cited that innovation of new products and services is a key opportunity arising out of company's efforts to bring in social and environmental change. Many companies discovered innovative solutions to other aspects, like diversification of energy procurement portfolio, introduction of effective monitoring procedures and improvement of operational efficiency. In many such ways, companies can redefine their organic growth plans by designing more effective, efficient, sustainable products, or operations that cater to changing social and economic challenges of a region. Solutions where the value generated accrues to society primarily, rather than meeting individual needs might attract government support as well. Innovation could be bidirectional, both in operations and product design. For example, the environmental concerns of a country could inspire companies to launch eco-friendly products or buying methods. Similarly, solutions to the neighbourhood's social problems could resolve an organisation's pertinent human resource issues. And finally, innovation is about business models itself. It is this that we will talk some more about.

INNOVATION AND SUSTAINABILITY

In reality, many companies fear that the more environment-friendly they become, the more the effort will erode their competitiveness. They believe it will add to costs and will not deliver immediate financial benefits. Most corporate in the United

States or Europe, opine that making their operations sustainable and developing 'green' products places them at a disadvantage vis-à-vis rivals in developing countries that don't face the same pressures. That's why most executives treat the need to become sustainable as a corporate social responsibility, divorced from business objectives.

According to many experts it would appear that corporate seem to think that they have to choose between the largely social benefits of developing sustainable products or processes and the financial costs of doing so. But that's simply not true. Research[2] shows that sustainability is a mother lode of organizational and technological innovations that yield both bottom-line and top-line returns. Becoming environment-friendly lowers costs because companies end up reducing the inputs they use. In addition, the process generates additional revenues from better products or enables companies to create new businesses. In fact, because those are the goals of corporate innovation smart companies now treat sustainability as innovation's new frontier.

It is the quest for sustainability that has transformed the competitive landscape, and has forced companies to change the way they think about products, technologies, processes, and business models.

FRUGAL INNOVATION

Frugal innovation or **frugal engineering** is the process of reducing the complexity and cost of a good and its production. Usually this refers to removing nonessential features from a durable goods, such as a car or phone, in order to sell it in developing countries. Designing products for such countries may also call for an increase in durability and, when selling the products, reliance on unconventional distribution channels. When trying to sell to so-called 'overlooked consumers', firms hope volume will offset razor-thin profit margins. Globalization and rising incomes in developing countries may also drive frugal innovation. Such services and products need not be of inferior quality but must be provided cheaply.[3]

Frugal innovation is distinctive in its means and its ends. Frugal innovation responds to limitations in resources, whether its financial, material or institutional, and using a range of methods, turns these constraints into an advantage. Through minimising the use of resources in development, production and delivery, or by leveraging them in new ways, frugal innovation results in dramatically lower–cost products and services. Successful frugal innovations are not only low cost, but outperform the alternative, and can be made available at large scale. Often, but not always, frugal innovations have an explicitly social mission.

[2] Ram Nidumolu, C.K. Prahalad, and M.R. Rangaswami, Why Sustainability is now the key driver of innovation, Harvard Business Review, September 2009

[3] Wikipedia at https://en.wikipedia.org/wiki/Frugal_innovation

Examples of frugal innovation are found throughout the Indian system: from Dr Devi Shetty's path– breaking model of delivering affordable heart surgery, to efforts to crowdsource drug discovery driven by government labs, to Bharti Airtel's approach to cutting the cost of mobile phone calls, to the Keralan approach to palliative care which is providing access to support at the end of life for thousands in a void of formal healthcare.

INNOVATIVE BUSINESS MODELS

The Narayana Hrudayalaya story is a striking example of frugal innovation, an approach to innovation that has emerged as a distinctive strength of the Indian innovation system, and one that is increasingly relevant to policymakers and businesses around the world.

Founded in 2001 by Dr Devi Shetty, the Narayana Hrudayalaya Group provides world class cardiac care at radical low cost by applying the philosophies of mass production and lean manufacturing. Heart surgery costs between $2000 and $5000, compared with $20,000 to $100,000 in the US. Despite providing around 60 free operations a week to poor patients, the group makes a higher profit margin than the average American hospital. Shetty has plans for 25,000 new beds across India in the next five years. It's a striking reminder of the scale of the market for innovation in India. At the same time, Shetty's success is about more than volume: it has also involved a wholesale remodelling of the hospital care system. The Group run their own training (surgeons operate on a thousand pigs' hearts before touching a human heart), a State–wide health insurance scheme, and are moving to designing their own consumables. Specialist surgeons' time is spent only on the most complex tasks, with others doing all their preparation and paperwork. Monitoring and continuous improvement draw inspiration from Toyota's lean manufacturing methodologies. This is innovation in business based on a sustainable model!

A key insight of frugal innovation techniques is that higher performance doesn't always mean higher specs. It can also mean more suitable and more efficient. One of the best known examples of frugal innovation is the 'Jaipur foot'. The original Jaipur foot was developed in the 1960s by a temple sculptor frustrated with the lack of an affordable supply of prosthetic limbs. Costing up to $12,000, existing models were completely unobtainable for the majority of the Indian population. Using rubber, wood and tyre cord, he designed and manufactured a prosthetic foot for under $45 that had far greater functionality, it enabled squatting, sitting cross–legged, walking on uneven terrain and even withstood being immersed in water for long periods while its owner tended to his rice paddies. Today over 20,000 individuals each year receive a free Jaipur foot and there are mobile clinics in 26 countries around the world. The design turned out to be revolutionary, and has influenced the market for prosthetics around the world.

Bharti Airtel: Instead of focusing on average revenue per user, Bharti Airtel realised that signing up millions of Indians each generating a tiny revenue would still generate large overall revenues, and if costs could be lowered enough, large profits. To achieve this they took collaboration to extremes. They outsourced all functions except for six. Clever contractual arrangements allowed the company to incentivise quality whilst still profiting from predicted growth. For example, they outsourced IT services to IBM, promising to pay a minimum monthly payment. Bharti tied IBM's revenue into its own growth, thus incentivising performance. Beyond a certain growth threshold however, IBM's percentage revenue declined, allowing Bharti to gain from economies of scale.

Cooperation with competitors on sharing costs for passive infrastructure, like towers, air conditioners and generators enabled massive expansion into rural India. Now though, the low–cost telecoms boom might have reached its limits and Bharti may now need to think of a whole new operating system for the company.

Another unique area is frugal innovation in the services sector. Often frugal innovations in services respond not only to a lack of skilled human capital, but an institutional void. Take the example of the Kerala-based Neighbourhood Network in Palliative Care. In contrast to an inadequate doctor–led hierarchical model of care, volunteers from the local community are trained to identify problems of the chronically ill in their area and to intervene effectively. While at a national level only 1 per cent of the population have access to palliative care, in Kerala the figure is 70 per cent. The network consists of more than 4,000 volunteers, with 36 doctors and 60 nurses providing expert support and advice to enable care for 5,000 patients at any one time. All the doctors and nurses in the network are employed by the community initiatives. More than 90 per cent of the resources for the projects are raised from local community donations of less than 15 cents. This Network in Palliative Care involved an entire rethink of the delivery system for social care. Often, the radicalism of frugal innovation comes not from the products and services themselves but from the root and branch methods by which innovators enable access to them at large scale.

INDOVATION OR JUGAAD 2.0

'Jugaad' is a Hindi word that roughly translates as 'overcoming harsh constraints by improvising an effective solution using limited resources.' From connecting a diesel engine onto a cart to create a truck, to irrigation systems powered by motorbike, there are widespread examples of this kind of creative improvisation over India. The Honey Bee Network and SRISTI, the Society for Research and Initiatives for Sustainable Technologies and Institutions, have documented over 10,000 grassroots innovations of this kind, with a view to patenting them

as validation of their intellectual and commercial merit. The authors of 'Jugaad Innovation: Think Frugal, Be Fexible, Generate Breakthrough Growth', show how this mindset and adaptability are important not only to local innovations, but to multinationals whose innovation processes have become 'too rigid, insular and bloated to remain effective.' They suggest three reasons why.

- 'First, it is frugal: it enables innovators to get more with less.
- Second, it is flexible: it enables innovators to keep experimenting and rapidly change course when needed.
- Third, it is democratic: it can therefore tap into the wisdom of otherwise marginalized customers and employees.'

For some Indians, the association of frugal innovation with a jugaad mindset is limiting. It has connotations of 'making do' and of 'getting by' which overlook the increasing flow of resources into the innovation system. Yet the principles of seeking opportunity in adversity and methods of doing more with less apply even to advanced technologies.[4]

Anand Mahindra, CEO of Mahindra & Mahindra, a company that is one of the largest R&D spenders urged: 'We have to move beyond jugaad, frugal engineering and frugal innovation is fine, but not jugaad. The age of jugaad is over, we have to do more for less and that is what Mahindra Research Valley will embody.

Jugaad is something that produces an idea that is novel and achieves the desired result quickly and at low cost. If so, is the result on account of an impulse or an intuition rather than a well thought out process where the "Design of Experiment" is spelt out in advance? By definition, owing to time and fund crunch, the solution is thought on the spur of the moment, so Design of Experiment or "DoE" is ruled out. Jugaad is mainly practiced by individuals or mom & pop shops wanting a quick fix to the problems at hand, hence the creativity is more intuitive in nature. It is this that is changing. It is no more about bridging the gap, it is a new paradigm, which is Indian.' Therefore 'Jugaad 2.0' is this next step. This 'new paradigm' is increasingly relevant to cash–strapped economies in Europe, Asia and in fact globally.

DISRUPTIVE INNOVATION

Disruptive innovation creates a new market and value network and eventually disrupts an existing market and value network, displacing established market leaders and alliances. The term was defined and phenomenon analysed by Clayton M. Christensen beginning in 1995. More recent sources also include 'significant societal impact' as an aspect of disruptive innovation. Not all innovations are disruptive, even if they are revolutionary. For example, the automobile was

[4] 'Our Frugal Future: Lessons From India's Innovation System' by Kirsten Bound and Ian Thornton, July 2012, Nesta (UK Innovation Foundation)

not a disruptive innovation, because early automobiles were expensive luxury items that did not disrupt the market for horse-drawn vehicles. The market for transportation essentially remained intact until the debut of the lower-priced Ford Model T in 1908. The mass-produced automobile was a disruptive innovation, because it changed the transportation market, whereas the first thirty years of automobiles did not.

A disruptive process can take longer to develop than by the conventional approach and the risk associated to it is higher than the other more incremental or evolutionary forms of innovations, but once it is deployed in the market, it achieves a much faster penetration and higher degree of impact on the established markets.

Some Examples

Innovation	*Disripted Market*
Automobiles	Rail Roads
CDs, DVDs	Tapes
Downloadable Digital Media	CDs, DVDs
Digital Photography	Film Photography
Mini Computers	Mainframe Computers
Personal Computers	Mini Computers
Flat Panel TVs	CRT TVs
Robotic Factories	Assembly Line Factories
Jet Planes	Propeller Planes

Examples from FICCI Millennium Alliance Project

Innovation is meaningless without adaptation. That involves convergence at all levels of the economy as also a social platform that encourages that. To encourage and ensure this FICCI as an industry platform, has been working for several years on the commercialization of technology.

As is a well-known and oft repeated thought, the very concept of business is changing and morphing. Today the world's largest hospitality company, AirBnb.com doesn't own a single hotel room; the world's biggest transport company, Uber doesn't have a single vehicle of its own and the world's largest content provider- Google, doesn't produce any content of its own! So, are these companies' manufacturers or service providers or what? That is the new convergence happening because of innovation.

FICCI through a programme called Millennium Alliance with the support of Department of Science and Technology; USAID; DFID; World Bank and some others, has for the past five years run an innovation platform. Some recent examples are:

FIA Technology Services Private Limited

FIA aims to create a distribution network for access to Financial Products, Livelihood Programs, Clean Water and Green energy in the financially excluded and underdeveloped districts. This is done by empowering rural entrepreneurs, spreading awareness & financial literacy, and leveraging technology in a Partnership Network of Nationalized Banks, NBFC and Local Community/Organizations for elevation of poverty and empowerment of Youth across Asia, senior citizens and women.

FIA currently serves more than 11 million customers. The organisation also provides employment to thousands of entrepreneurs by appointing them in FIA inclusion centres located in resource poor settings.

FIA runs a project 'Sanchay' funded by the Millennium Alliance which has been implemented in 19 states across 450 districts providing financial literacy in 32000 villages, access to financial products and services to 6 million customers and has created 8000 rural entrepreneurs. FIA does an average transaction of INR 12 crore/day (equivalent to US$ 1.8 Million/Day). FIA is currently operational in 27 states/3 out of 7 union territories and 590 districts. Their network expands to over 6000 Financial Inclusion Centers working as Customer Service Points for over 17 banks in the country.

Science for Society

Science for Society (also known as S4S) started in 2008 and has since aims to focus on innovations in science and technology that can improve the quality of life of under-served communities in rural (and urban) areas. Therefore, in order improve food security and local industrialization, Science for society aimed at tackling the problem of post-harvest losses by introducing the innovative solar conduction dryer technology. Solar Conduction Dryer (SCD) is an electricity free solar powered food dehydrator that reduces moisture content in agro-produce so that farmers and rural women can preserve their produce up to 1 year without using any chemicals and earn additional income through the sale of dehydrated products. SCD converts agro-produce into value added dehydrated products which can be sold at high value or used by farmer families throughout the year.

Following the installation of dryers in and around the target areas, about 500 farmers and representatives of farmers co-operatives were sensitized and trained in its use.

Government of Nepal has tested and certified S4S's patented SCD technology and founded to be extremely useful in Nepalese context. Nepal Government has lived of 25% tax and also subsidies product by 50% (Rs. 50,000 of product is now available at Rs. 20,000).

After being supported by MA and having our presence beyond India, now S4S has tied up with Bayer (Covestro, Germany) as consortium partner for International Food Security issues.

S4S is now present in more than 10 countries and 22 states of India. Their initiatives have shown impact on increasing farmer income by over 50%, nutrition uptake level by 37% and considerable post harvest reduction.

S4S has started actively buying back from farmers and support them for market linkage. Various products made by our farmers are now available in Nature's Basket, Hypercity, Big basket and many other outlets.

MIRA Channel

MIRA Channel operates as a mobile-based app for MCH using interactive graphics and voiceovers adapted to both feature phones and smartphones. Content is delivered across five sub-channels: prenatal care, neonatal care, child immunization, adolescent health (for girls) and family planning. MIRA Channel uses icons with audio support, making the service an interactive 'talking toolkit' designed for women and young people with low literacy skills. MIRA Channel also provides digital content by way of stories and mobile games to adolescent girls on issues related to water, sanitation and hygiene (WASH), menstrual hygiene, and dowries and early child marriage.

MIRA Channel has a current reach of over 850,000 women, children and adolescent girls, including a roll-out with the Partnership with Haryana Livelihood Mission involving 511,000 women.

In the MIRA Channel intervention area in the Mewat district, the impact has been:

- 55% increase in ANC consultations
- 49 % increase in institutional deliveries
- Child immunization rates have increased by 41%

The MIRA Channel PHC-Connect model is being scaled to 180 government-sponsored CHWs and 25 ANMs reaching 69,000 women.

Scalability - Positive outcomes from India have led to an adaptation of the MIRA Channel for implementation in Uganda and Afghanistan, where 66,000 and 43,000 women, children and girls are using the solution.

ZMQ's MIRA Channel has become a part of UNESCO-Pearson Initiative for Literacy 2017.

Each of these are examples of social innovation – sustainable yet profitable.

WHY INDIA FOR SUSTAINABLE BUSINESS INNOVATION?

So what makes India a special place in this context? Several reasons are there. We list a few:

1. Jugaad 2.0. We have explained what this entails but essentially its an old tradition that has a new modern context. This is leading to a dramatic rise in start-ups and innovative business practices.
2. We are an emerging economy so new players that have to find their place. The economy is under a churn and fast growth path. There is opportunity and there is the market.
3. Frugal innovation keeps prices optimised. Price plays a very important role in India. It's the difference between success and failure. Companies are therefore under great pressure to optimise their production – this leads to frugal innovation.
4. India has the volumes to justify this – bottom of pyramid aspect. Many innovative products and services are very good but very expensive in the West. This is because their markets are small. India offers volumes, especially large volumes at the bottom of the pyramid – in rural and semi-urban areas. These volumes justify optimized pricing.
5. Demographic dividend which actually means more pressure on jobs. Yes, India is a young nation with the largest population of youth and workers. Such surpluses have traditionally led to massive manufacturing growth globally. India has to find its own solution to both manufacturing and services especially in the context of technological change. Of course, this puts severe pressure on jobs, but is also a great opportunity.
6. And finally there is the great Indian Diaspora. They have special skills, expertise and experience. They can and are bringing back technology and business to India. This needs to be encouraged.

DIASPORA AND INNOVATION

India has long realised the value of its diaspora in research and innovation, and is encouraging expatriate Indians to return home. The 22 million–strong Indian diaspora worldwide has come to be recognised as a powerful asset for research, entrepreneurship and innovation. In Europe and North America, the Indian diaspora tend to be among the best educated and wealthiest immigrants. The contribution of Indians to technology and innovation outside India, particularly in the US, has been well documented by academics such as Anna Lee Saxenian and Vivek Wadwha. From 2000 to 2007, Indians founded more engineering and technology companies in the US than immigrants from the UK, China, Taiwan and Japan combined. Many retain close links with friends or former colleagues who are still in India. In a survey of Silicon Valley, Saxenian found that more than half of Indian scientists and engineers regularly shared tips about technology and business opportunities with people at home. Many of these individuals first join the Indian Diaspora as students. Today there are over 200,000 Indians studying abroad, representing a four-fold growth since 2000. While in the past this would

have been lamented as brain drain, it has increasingly come to be seen as 'brain circulation'. Although precise data is hard to come by, anecdotal evidence points to an increasing flow of skilled scientists, engineers and entrepreneurs returning to India over the past decade. According to research by IT and Engineering recruitment specialist, Kelly Services India, 'As many as 300,000 Indian professionals are expected to return to their homeland in the next four years.' In a recent interview for The Economist, the CEO of IT giant Tata Consulting Services was asked how many of his top employees had worked abroad. 'All of them', he replied. Indian government policies have set out to support these flows with a number of initiatives in place to attract returnee talent.

INDIAN ECONOMY AND SUSTAINABLE BUSINESS: INNOVATION AS THE KEY

According to a recent report by PWC[5], India could boost its current GDP of 1.9 trillion to 10.4 trillion USD by 2034 (and elevate per capita GDP from 1,490 to 6,800 USD) by achieving a GDP CAGR of 9% over the next two decades. Reaching this level of growth will require transformation—a difficult task, given that India has battled structural deficiencies such as underinvestment in infrastructure, an unproductive business environment, poor education and low-quality health outcomes over the past few decades. However, research indicates that such a transformation is possible and will be steered by innovation.

According to the NASSCOM Startup Ecosystem Report 2015, India serves as the fastest growing startup-base worldwide and stands third in technology driven product startups just after US and UK respectively. The report opines that the boom in the Indian startup ecosystem has made a conspicuous impact on certain critical areas such as education, healthcare, employment, agriculture etc. On the macroscopic level, the ecosystem has contributed majorly to the Indian economy by enhancing citizen's life, building innovative solutions and generating scope for opportunities for stakeholders. The digital revolution coupled with startup evolution has been instrumental in transforming India's image as the repository of the next big idea. Gone are the days when Silicon Valley was considered, 'the space' for startups to be in. Today, India stands as one of the major technology hotbeds offering fascinating opportunities for emerging companies to thrive and establish themselves in the world with their innovative ideas and disruptive approaches.

One initiative with vast potential to create a platform for future frugal innovation is not framed around innovation at all, but rather around social protection. The Unique Identity Scheme, headed up by the former CEO of Information Technology giant Infosys, is already the world's largest biometric database collecting the retinal scans and fingerprints of all 1.2 billion Indians. The Government is well aware of the potential of 'Aadhar' – the Hindi name

[5] Innovation-Driven Growth in India Report by PWC, 2015.

for the scheme translates as 'foundation' or 'platform – to support innovation. Combined with mobile phone technology, this scheme could and will herald the transformation of everything from banking to the welfare state.

India now talks of the JAM trinity – **JAM (short for Jan Dhan-Aadhaar-Mobile) trinity** refers to the Government of India initiative to link Jan Dhanaccounts, Mobile numbers and Aadhar cards of Indians to plug the leakages of government subsidies. (Pradhan Mantri Jan-Dhan Yojana is India's National Mission for Financial Inclusion to ensure access to financial services, namely Banking Savings & Deposit Accounts, Remittance, Credit, Insurance, Pension in an affordable manner. This financial inclusion campaign was launched by Prime Minister Narendra Modi on 28 August 2014.)

In fact, all the government's flagship interventions like Make in India, Skill India and Start Up India are all fuelling innovation and sustainable industrial and economic development.

For a large country like India with its massive population, the task however will not be easy. Especially financially. Research estimates show a financial gap of over INR 100 lakh crores or USD 1500 billion![6] Estimates may vary but the bottom-line is that the gap for a developing country like India will always be huge.

INDIA AND THE GLOBAL ECONOMY OUTLOOK

Economists differ on what the economic future holds. In a recent article in Economic Times just the other day, noted economist Surjit Bhalla penned an articleon 'World Economy Looking Up'. According to him 'the world economy had a very successful year in 2017. Just how successful can be gleaned from the fact that GDP growth (IMF data) registered close to 3.7 per cent in 2017. Unemployment rates in the advanced economies (AE) are at multi-year, if not historical, lows.' Obviously, prospects for India will be good. However, Ruchir Sharma, the Chief Global Strategist and head of the Emerging Markets Equity team at Morgan Stanley Investment Management seems to differ. According to him, 'In short, with economic growth and employment peaking across the globe, growth is likely to slow in 2018 while rising wage pressure finally pushes up inflation…. If the rest of the world starts to lose speed as a result of these tighter policies, it is less likely India's growth rate will accelerate much beyond its current pace.'

CONCLUSION

Designing and ensuring success for the innovation ecosystem in India would require participation of three key stakeholders: the corporate sector, the entrepreneurial sector and the government. Each of these will need to play critical roles in developing and deploying innovation-driven solutions in India in the

[6] Report by Development Alternatives in 2015: Financial Assessment of Goal 9.

coming years. That this is in fact happening is reflected in the 7% plus GDP growth that the country has seen and expects for the future. As a successful model, this will serve as a beacon to many developing countries.

It is recommended India should market its distinctive strengths in frugal innovation to the world. In the last 50 years, a select cadre of countries have had a visible influence on international innovation policy through the study, imitation or adaptation of their national models of innovation. This includes the Silicon Valley cluster model from the US, Japanese lean manufacturing, or the 'Finnish model' of technology investment. India could be poised to join them if it succeeds in building an 'inclusive' model of innovation that draws on strengths in frugal innovation and connects efforts across business, academia and civil society.

India should become an even more vocal advocate and ambassador for the methods and outcomes of frugal innovation. With Europe, the US and other developed economies facing the twin pressures of financial austerity and environmental constraints, frugal innovation can only become more important over the next decade and beyond. India can be highly influential by promoting frugal innovation around the world, and reaping the many benefits (in terms of economic growth, trade, cultural capital, and networks) that will flow from it.

It's a global goal that we have talked about. An Indian imperative but to be seen in the global context. Sustainability is no more just a goal. It's all about survival. It is about the future of the human race. It's about inclusive development and carrying everybody along to a sustainable future. This paper has argued that innovation is the solution – especially '*indovation*' or frugal innovation, the Indian way. Not only can we strive for this but consider it a moral responsibility.

Ultimately, we have to aim at a higher realism, about 'nature' and development, about society and self….