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FRUGAL INNOVATION – A META STUDY OF JUGAAD MINDSET IN INDIA

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ABSTRACT

Frugal innovation is the ability to generate considerably more business and social value while significantly reducing the use of scarce resources. It's about solving even transcending—the paradox of “doing more with less”. Frugal innovation is a game-changing strategy for an “Age of Austerity” in which firms are being compelled by cost-conscious and eco-aware consumers, employees, and governments to create offerings that are simultaneously affordable, sustainable, and of high quality. Even more than a strategy, frugal innovation is a whole new mindset, a flexible approach that perceives resource constraints not as a debilitating challenge but as a growth opportunity. This conceptual paper attempts to study about the frugal innovators in India, their background and achievements. Also the need and scope of Frugal Innovation is highlighted in this study.

KEYWORDS: Frugal , Jugaad, Innovation, creativity, entrepreneurs, India.

I. INTRODUCTION

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 good, such as a car or phone, in order to sell it in developing countries. Frugal innovation responds to limitations in resources, whether financial, material or institutional, and using a range of methods, turns these constraints into an advantage. The word frugal means :simple and plain and costing little, it came from a latin word frugi, it means : economical.

The frugal innovation also know as Jugaad (a word taken from Hindi which captures the meaning of finding a low-cost solution to any problem in an intelligent way) is a new way to think constructively and differently about innovation and strategy. Jugaad means thinking in a frugal way and being flexible, which, in turn, requires the innovator or entrepreneur to adapt quickly to often unforeseen situations and uncertain circumstances in an intelligent way.

Definition:

The most innovative, economical and quality method to accomplish the desired task by unusual/unimaginable means and ways.

II. LITERATURE REVIEW

What do Renault-Nissan, Siemens, and Unilever have in common? They are all pioneers of a groundbreaking business strategy called frugal innovation. Pul Polman the no-nonsense CEO of Unilever, is a corporate leader who strongly believes that resource scarcity can be a catalyst for radical innovation.He recognizes that, at our current rate of consumption, by 2030 we would need two planets to supply the resources we need and to absorb our waste. Polman wants Unilever to harness its brand reputation and scale to address this challenge. He has set a bold objective for Unilever to double its revenues by 2020 while reducing its environmental impact by 50 percent.(Polman.P ,2015)

To implement his daring “do more with less” strategy, Polman is infusing frugality into all aspects of Unilever’s business. For instance, Unilever currently obtains nearly 25 percent of its agricultural raw materials from sustainable sources and uses lower-emission trucks to distribute its products. Meanwhile, its R&D teams are reformulating all its existing products like soaps and detergents to use less water and packaging and pollute less. Unilever has already introduced many frugal products in European countries hit hard by the economic crisis. In Spain, for example, Unilever is selling its Surf detergent in smaller packs for five washes only, and in Greece it



now offers mayonnaise and mashed potatoes in smaller packages. The company has also introduced low-cost brands of tea and olive oil in European markets.

III. FRUGAL INNOVATION: THE SECRET WEAPON OF BRIC MARKETS

Unilever's frugal offerings in Europe are inspired by emerging markets such as (BRIC) Brazil, Russia, India and China countries where the company has for years distributed soaps and shampoo in individual units or small sachets to millions of cost-conscious rural consumers.

Emerging markets such as Brazil, Russia, India and China are a breeding ground for frugal innovation. In book *jugaad* innovation, researchers show how inventive entrepreneurs and firms in emerging markets are able to innovate in resource-constrained settings and create frugal solutions that deliver more value to customers at lower cost.

For instance, millions of Kenyans today rely on M-PESA, a service that enables them to save, spend, and transfer money using their cell phones without having a bank account. Likewise, SELCO provides solar energy at very low prices to over 125,000 households in remote Indian villages, debunking the myth that poor people can't afford clean technology. Or take Gustavo Grobocopatel, an Argentinian farmer who overcame scarcity of land and skilled labour by subcontracting all farming work to networks of small firms. By scaling up his "asset-light" business model, Grobocopatel has boosted his agricultural output without adding more resources.

Jugaad Innovation in India

Jugaad is a Hindi word meaning an innovative fix or an improvised solution born from ingenuity and cleverness. It is this jugaad mindset that enables these entrepreneurs to find opportunity in adversity and concoct frugal solutions using limited resources.

A "gusty" Indian Approach to innovation is being echoed worldwide by multinational companies adopting "frugal" approaches that help them to do business faster, better and cheaper.

Jugaad Innovation is one reason why India has one of the fastest growing economies of the world. Jaideep Prabhu, 2012

Indian languages have no word for innovation. But India has jugaad. It means finding practical solutions, being enterprising with resources, and learning from the principles of flexibility and frugality. Jugaad is bigger than a word. It's a mind-set.

To explain, Professor Jaideep Prabhu, co-author of *Frugal Innovation: How to do Better with Less* published in 2015, points to a small clay box in the corner of his office. "It's an ingenious invention! It consumes no electricity, is 100% biodegradable and produces zero waste."

Frugal Innovators of India

1. Mansukhbhai Prajapati

The MittiCool fridge is the brainchild of Mansukh Prajapati, a potter by trade. Water in an upper chamber of the clay box seeps through the walls of a lower chamber, cooling it through evaporation. In a country where 500 million people live without reliable electricity, Prajapati realised that his clay fridge could provide huge health benefits by keeping food cool without the need for electricity and at an affordable price; he trained a local workforce and started mass production. Forbes magazine has since named him among the most influential rural Indian entrepreneurs.



Mansukhbhai's wife once asked him to bring a non-stick tava from the market. At that time, in 2003, he found out that a non-stick tava costed Rs. 200. Mansukh bhai did some more market research and found out that apart from being costly, Teflon coated non-stick tavas do not retain the natural taste of food. Also, the coating tends to wear off quite soon.

So, he reached Mumbai to learn the process of non-stick coating on pans and to find an appropriate coating material for his earthen tavas. After about a year of research and making one lakh trial tavas, he finally succeeded in developing the non-stick coating for earthen pans using Azo Noble.

Mansukh bhai's non-stick earthen tava uses less oil than a normal pan and preserves the natural flavor of food. It is much cheaper than non-stick tavas and consumes less LPG as well. As the coating gets absorbed by the pores of the earthen material, it does not wear off that easily.

The non-stick coating has been tested at the Institute of Chemical Technology, University of Mumbai. For this product, Mansukhbhai was also supported under the Micro Venture Innovation Fund (MVIF) of NIF-India.

GIAN also helped him to set up a company, Clay Creations, in 2008 and assisted him in developing the online retail portal (www.mitticool.in). He got awarded by Dr.A.P.J Abdul Kalam and by President of India Pratibha Ben Patel in 2009.

All these creative entrepreneurs in emerging markets share a unique mindset- we call *jugaad*. "Emerging markets like India, Brazil, Russia, India, China and Kenya are a breeding ground for ideas like the MitiCool that transform scarcity into opportunity and do more with less," explains **Prabhu, the Jawaharlal Nehru Professor of Indian Business at Cambridge Judge Business School(2012)**

"*Jugaad* innovation is one reason why, despite a scarcity of food, water and energy, and limited healthcare and education, India has one of the fastest growing economies in the world."

And now, in a world that is increasingly described as 'VUCA' – volatile, uncertain, complex and ambiguous – the 'winds of frugal innovation are blowing west', as some of the world's top companies are embracing business models that look for simple solutions and then deliver them quickly and at less cost.

Prabhu explains that it is a need-based, bottom-up approach to innovation that has largely not been seen in Western economies since the early days of the Industrial Revolution. "The more usual pathway today is to channel innovation through large-scale R&D efforts, often with crippling levels of costs, control and time. Take the pharma industry for example: R&D spending rose from \$15 billion in 1995 to \$45 billion in 2009, yet the number of new drugs launched annually dropped 44%."

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He adds: “*Jugaad* is gutsy and different. It’s rather like comparing the freedom and improvisation of a jazz band with the set of rules and structures followed in a classical piece of music.”

To research the principles of *jugaad*, Prabhu and co-authors Navi Radjou and Simone Ahuja spent four years talking to rural entrepreneurs and leading Indian and Western companies. The result was their 2012 book *Jugaad Innovation* – the first ‘recipe’ for how *jugaad* works and why businesses are adopting its principles in their own innovation programmes.

2. GE Healthcare

Realising that access to expensive medical devices like electrocardiography (ECG) machines was a problem for many thousands of people in rural areas, they developed a low-cost machine that could be carried by doctors from the city to the countryside. “The innovation,” explains Prabhu, “was in asking what was the ideal product needed for the purpose, and then reusing off-the-shelf components developed for other applications, in this case bus ticket printers and telephone keypads.

GE’s Vscan is a pocket-sized ultrasound device being utilized in both developing and developed regions of the world. Launched in 2010, the hand-held tool costs just \$7,900 (compared to traditional ultrasound consoles which can cost as much as \$150,000) and has improved access to advanced prenatal care in areas of rural China, India and Africa.



Kaushik Mukerjee-2012 in his research study highlights that the R&D costs of GE’s MAC ECG device development were much lower, since the engineers were based in India. Further, by using the commercially available chips instead of customized processing chips, GE was able to reduce costs immensely. To ensure that the device would function smoothly in India, the team ensured that the dust from rural roads would not cause the device to jam. The battery was also redesigned to withstand the local conditions. All these innovations ensured that the product was accepted.

“With the *jugaad* approach, instead of doing everything yourself, you look around you and see what’s available and you combine them – you join the dots.” To date, more than 10,000 of these low-cost ECG units have been sold. Being able to act flexibly is key, Prabhu explains.

“Ratan Tata, Chairman of Tata Group, conceived of the Nano car as an affordable, safe alternative to the perilous two wheelers that often carry whole families in India. When sales flagged, they had to re-think their marketing and customer financing, and even the formality of their rural showrooms.”

3. Mehtar Hussain and Mushtaq Ahmed

Another Example is “Bamboo-Wind Mill Mehtar Hussain and Mushtaq Ahmed from Assam built a bamboo windmill for around \$100 to pump water from a small paddy field. The invention has now been adopted by Gujarati salt workers, who are some of the poorest people in the state, to pump brine water. Petrol-powered

pumps consume huge amounts of fuel, at a cost of around \$1,000 each year. The wind-powered pump runs at a fraction of the cost.

It's a well-known fact that India is the third largest salt producing country in the world with an average annual production of about 157 lakh tonnes. The Little Rann of Kutch (LRK), Gujrat supplies 21% of the total salt production of India.

Salt workers, known as *Agarias*, are some of the poorest people in the state. *Agarias* mostly used counterpoise, a method that requires two people, one for lowering the counterpoise and other for straining the water. Some of them started using diesel pumps, but the exorbitant machine and fuel costs made a huge dent in their already diminishing returns from salt farming.

With the mission to improve lives of salt farmers, Gujarat Grassroots Innovation Augmentation Network – West (*GIAN W*) along with National Innovation Foundation (*NIF-India*) took the lead in diffusing the innovation in salt farming areas.

Based on the feedback received from salt farmers, *GIAN W* improved the design and developed a multi-dimensional model which was installed at LRK in 2008.

As of 2012, 25 of these windmills have been installed in Kathivadar and Kadiali villages in Amreli district. Thanks to the windmill pump, now salt farmers don't have to slog for hours with the water pump. The windmill pump saves about Rs.50,000 worth of diesel in six months. It has decreased salt farmers' reliance on manual labour resulting in savings of about Rs. 28,000 per season per person. Farmers can now easily recover their investments within the harvesting season.

The innovation would also result in the reduction of five tonnes of carbon emissions for every 100 tonnes of salt produced. As per NIF, on an average, every windmill-powered hand pump should generate five Carbon Emission Reductions (CERs) certificates worth Rs.3750.

Every rupee saved and milligram of carbon emission reduced is a glaring testimony of how rural innovations impact the community, society and the world at large.

4. Bamboo splint-making machine

Paresh Panchal's bamboo splint-making machine makes it possible for people in isolated villages to make incense sticks at low cost. Bamboo splint-making has been done manually for years using knives, which can be tedious, time-consuming and risky. The machine was awarded at the 7th annual presidential grassroots innovation awards in March, 2013. Bamboo sticks are used in the Agarbatti (incense stick) industry. For processing of bamboo, electricity operated high capacity machines are suitable for industries but not for smaller rural communities who use knife to make strips and sticks. The machine is a set of two devices, one for making bamboo strip and another for incense stick.

The first machine is used to slice the bamboo pieces of definite size, thickness and length. The slices cut are then fed into the strip making machine to produce the sticks.

Salient features of Bamboo-Splint making machine

Easy to use & maintain, most suitable for the rural/tribal people who can use this machine comfortably. Manually operated, reduced drudgery and risk of injuries to the rural people. Easily accommodate at house as it very compact and do not occupy much space. n an average one

5. Biomass Gasifier: by Raj Dahiya

Innovators are scientists looking for the best possible solutions. And innovators usually don't need laboratories – they are risk takers who experiment with whatever resources they have in their immediate environment.

One such innovator is Raj Singh Dahiya who has developed an efficient biomass gasifier that ensures smooth operation of any engine at a low operational cost. Biomass gasifiers basically convert woody biomass, agricultural wastes like rice-husk, coconut waste etc. into a combustible gas which can be burnt like conventional gaseous fuel for thermal applications, or fed into diesel and gasoline engines.

6. Pedal operated washing machine.

Remya Jose a 14 year old girl from India invented this pedal operated washing machine. It requires no electricity and using it also gives you exercise. She won a national award for this.



7. Mechanical tree Climber

Renganathan developed a mechanical tree climber which can be used for scaling palm and coconut trees. Climbing trees for harvest is difficult and dangerous work -- the tree climber designed by Renganathan uses a 'four-lock pin' system to prevent falls. The device now sells across south Asia.



D. Renganathan alias D.N. Venkat (49), an agriculturist from Coimbatore, Tamil Nadu has developed a coconut tree climber with a sitting arrangement, locking system and a safety belt @7,700/- won a 6th National Grassroots Innovation Awards in 2012.

He noticed the problems in climbing coconut/palm trees. Taking it as a challenge for income he planned to address all the issues and design a simple low cost tree climber. Working hard over a period of a year and making about three progressively improved prototypes; finally in 2008 he was able to fabricate a model to his satisfaction. The tree climber has a seating provision and has two frames. The upper frame is operated by hand while the lower one is operated by leg. The user sits comfortably on the seat and by the up and down movement of upper and lower frame, can climb the tree. A locking system has been provided, which enables the climber to work without fear at any height. To avoid the possibility of a fall, a four lock pin can be fixed at any height. One can climb up **to 40 ft in 5 minutes** (this includes time needed in fixing, climbing up- down and removal of device from tree). One of the major advantages of this machine is that it is useful for trees with different girth. University of Agricultural Sciences, GVK, Bangalore has tested the device as part of an all India coordinated research project on Post Harvest Technology and found it useful for climbing coconut palms. The team also gave a special mention of its in-built safety feature.

8. Motor-cycle based Tractor

Tractors are too expensive for small-holder farmers in India and draft animals are becoming increasingly difficult to feed in drought-prone areas. A farmer in the Indian state of Gujarat has come up with an innovative solution. Taking his inspiration from auto-rickshaws made from converted motorcycles, Mansukhbhai Jagani

modified an Einfield Bullet motorcycle into a multi-purpose cultivator that can perform all of the functions of an ox—without the daily requirement of fodder!

The rear wheel of the motorcycle is removed and replaced with two smaller wheels and various implements. The motorcycle pulls a retro-fitted chassis which can be adapted to perform shallow plowing, weeding, sowing and spraying. It can be easily converted back into a motorcycle for transportation.



The Bullet Santi, as it is called, has several advantages over other types of cultivators. First, though price estimates vary, it is more affordable than larger tractors. Second, because of its smaller size and lighter weight, the Bullet Santi causes less soil compaction than larger models. Third, the Bullet Santi is fuel efficient—it can plow two acres on just one liter of diesel.

At just 6.5 HP, the Bullet Santi is not as powerful as a larger tractor, but more powerful than a draft animal. Most farmers in Jagani's region of Gujarat already own a motorcycle, so adoption of the new technology was rapid. Now hundreds of farmers use the converted motorcycles. For nearly twenty years Mr. Jagani has been running a workshop in his village which converts and repairs the cultivators. Similar workshops have cropped up in other areas of the state.

The invention has the potential for global application among small farmers all over the developing world. The Bullet Santi has been displayed at innovation expos in other parts of India as well as in South Africa.

The inventor won a National Award from India's National Innovation Foundation's Competition for Grassroots Innovation and Traditional Knowledge. Patents have been granted for the product in India and the United States. With little in the way of formal education but with a resourceful approach to solving problems, Mr. Jagani is typical of India's inventors. India is famous for frugal, or *jugaad*, innovation which applies simple fixes to complex problems. In fact, Mr. Jagani didn't stop with the Bullet Santi.

His other inventions include a bicycle-operated agricultural sprayer that can spray four acres in three hours, and a seed and fertilizer dibbler designed to reduce fertilizer waste.

IV. CONCLUSION

C gainful/ supplementary employment to rural and tribal areas. But it's still early days in the revolution. Prabhu and Radjou, co-authors of *Frugal Innovation*, estimate that around 5% of companies in developed economies are advanced in their frugal innovation journey, 15% have adopted some aspects and 80% have yet to formulate a strategy: "Implementing a frugal innovation strategy in any organisation can be daunting. There is no magic formula." Radjou and Prabhu are not suggesting that traditional innovation pathways involving structured and rigorous R&D should be abandoned. They see each approach as complementary and part of an 'innovation toolkit' to be used by businesses in developed and emerging markets alike.

"The developed world needs the liveliness and the growth of the emerging markets," says Prabhu. On the other hand, says Tata, "Indian business needs to integrate the structured Western R&D model of innovation with their free-flowing *jugaad* model to create a dynamic balance between both approaches in their organisations."



In the word's of Prabhu we can conclude that : "It's symbiotic – one feeds from the other. *Jugaad* teaches the West to innovate in ways that are different. But equally, emerging markets must learn about what makes the West the West – the technology, the processes."

"Ultimately, frugal innovation is about people," says Prabhu. "It is human ingenuity that drives innovation – just like Mansukh Prajapati and his clay fridge – seeking opportunity in adversity, doing more with less, being flexible and simple, and following your heart."

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