

## **Jugaad Innovation: Case Study of the MSME Sector in India**

Professor Manisha Rajadhyaksha<sup>1</sup>, Ms. Sanjyot Andhare<sup>2</sup>

<sup>1</sup> *Department of International Business, Institute for Technology & Management, India*

<sup>2</sup> *PGDM – International Business Student, Institute for Technology & Management, Navi Mumbai, India*

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**Abstract:** The paper posits that Jugaad Innovation is the backbone of the MSME sector in India. This contrasts with the MSME sectors globally that have institutionalized innovation more effectively than the Indian sector. The Indian government is taking more pro-active efforts to encourage innovation amongst this sector. This qualitative research encapsulates the enabling factors and challenges of incorporating innovation in the Indian MSME sector. It also shows how Jugaad innovation has become popular in the entrepreneurship and management of the Indian MSME sector. The research concludes by justifying the sustainability and success of the Indian MSME sector through incorporating innovation through enabling policies, infrastructure, and systems and processes in place.

**Keywords:** enabling factors, innovation, Jugaad, MSME, process, quality

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### **1. INTRODUCTION**

The Indian MSME sector has a pivotal role in the overall growth of industrial economy. Consistently it has registered higher growth rate of 10.8% compared to the overall industrial sector, contributing nearly 45% to manufacturing, approximately 40% to the Indian export sector, and 8% to the Indian GDP [1]. The definition of MSME as per Government of India is noted in the Appendix.

Though the Indian MSME seem inconsequential in terms of investment and employment per enterprise, the following aggregate performance figures paint a different picture [2]:

- More than 100 lakh MSME units with an investment of more than Rs 1 lakh crore.
- Over 11 million MSME units that produce more than 8000 products.
- Ninety per cent of the Indian industrial units belong to the MSME sector.
- Indian MSMEs have moved up the value chain from manufacture of simple, traditional goods including leather, gems and jewellery to manufacture of sophisticated products and complicated service sector.

Despite these impressive statistics and high growth rates, Indian MSMEs have major challenges in areas of operations, technology, supply chain, competition, funding, manufacturing, and markets. Each of these challenges are inter-connected and multi-faceted.

In this globalized world, MSMEs need to be thrive and sustain in a Knowledge-based Economy, where competitive advantage is less from access to physical resources, and more from ideas that can be translated into economic and social value. Knowledge become critical to create and improve products and services, develop efficient distribution and marketing methods, and address these challenges. Dynamic and self-sustaining innovation is regarded as one of the most important factor in this Knowledge-Based Economy. Consequently, it is essential for the Indian MSME sector to foster innovation at the firm level to address these problems and challenges, and compete internationally.

The main purpose of this qualitative study is to study and position the concept of innovation in the Indian MSME sector. Hence the objectives of this research are listed as follows.

### **2. OBJECTIVES**

- Critically analyze enabling factors that inculcate innovation in Indian MSME sector.
- Highlight the challenges of incorporating innovation in the Indian MSME sector.
- Understand the Jugaad concept institutionalized in the entrepreneurship and management lexicon within the context of the MSME sector.

These objectives are important because of lack of critical analysis to the rise of Jugaad innovation. Many innovations referenced by the autonomous government body National Innovation Foundation are not commercialized. This is a cause of concern as these success stories may not highlight their core competency as innovation. Furthermore, Jugaad innovation or frugal innovation can rarely compete with top-quality or international competitors. The focus of this research is on MSME sector because of the prevalence of Jugaad or frugal innovations in MSME sector and the huge need in India for sustainable successful Jugaad innovation models.

### 3. RESEARCH METHODOLOGY

This research is a qualitative method of study, using the case study approach of analysing a sector in depth. Content analysis is used for exploring and underscoring concepts related to innovation in the Indian MSME sector. For this purpose, policy papers, reports, and articles were scrutinized in detail to highlight these innovation concepts in these available resources. Furthermore, this research presented certain innovations from different sectors that have incorporated Jugaad innovation or frugal innovation; and type (process, product, and/or business model innovation) to identify trends and correlations.

### 4. FINDINGS AND DISCUSSIONS

#### 4.1. India's Role in Global Innovation

Global Innovation Index (GII) is an integrated metric of selected weighted variables like education, R&D, patent filings, knowledge and technology inputs, and institutions that highlights the following innovation facets and helps countries benchmark their innovation policies:

- It shows the importance of innovation and its policies to policy makers;
- It creates an environment where factors related to innovation are reevaluated; and
- It becomes a tool to refine national innovation policies.

#### 4.2. India's ranking in GII: [3]

- Global rank – 62<sup>nd</sup>; Regional rank – 1<sup>st</sup>, and Income group rank (after China, Moldova, Jordan, Thailand, Viet Nam, Ukraine, and Guyana) – 8<sup>th</sup>
- Ranked 11<sup>th</sup> in GDP, with US\$1,310 billion.
- Ranked within the top 40—on R&D (35th); general infrastructure (11th)

Global studies of innovation patterns of MSMEs in different countries shows a positive relationship between innovation and the growth of MSMEs. Examples include England MSMEs pursued radical innovation as a strategy of firm growth, Estonia MSMEs used innovation to improve their market share performance and diversified range of goods and services [2]. Other empirical studies (Engel et al, Coad and Rao in [2]) have found a positive impact of innovation output on the sales turnover change in the craft-dominated German industries and American high-tech industries. As these findings are related to industrialised countries, their relevance to developing country like India can be slightly discounted [2].

India has very few what are considered as innovating firms. This is evident from TABLES 1 & 2 that have collated comparative information of India Innovation Survey, Thailand R&D/Innovation Survey 2001, and South Korea Innovation Survey 2002 in MSME Annual Report 2016. These Tables shows successes and differences in innovative capabilities of these countries [4].

TABLE 1: CROSS – COUNTRY ANALYSIS OF INNOVATING COMPANIES (IN TERMS OF %):

	India	Thailand	S. Korea
Innovating companies	19	6.4	42.8
Product and process innovation	2.3	2.9	21
Only product innovation	9	4.1	17
Only process innovation	3.8	4.3	4

Ref: MSME Annual Report 2016

TABLE 1 shows Indian companies lagging behind South Korean companies in terms of innovation and R&D activities. Relatively higher percent of Indian companies carry out sole product innovations as compared to Thailand companies. This could be probably because Indian companies prefer to use their resources to improve their products than the production processes. Comparatively, South Korean companies combine both process and product innovation reflecting a more mature innovation behaviour that improves innovation in a systemic manner.

TABLE 2: INNOVATING COMPANIES AND FIRM SIZE (IN TERMS OF %)

	India	Thailand	Korea
SME	2.6	7.3	41
Large company	13.9	14.4	78

Ref: MSME Annual Report 2016

TABLE 2 shows the predominance of innovation irrespective of firm size for South Korea, while Indian and Thai large companies rather than SMEs have successfully adopted innovation. Invariably this is a given fact that large Indian companies have adopted product and process innovation. The caveat for this inference is that the SME definition varies for each of the countries. Definition of SME is based on number of employees for South Korea (300 employees) and Thailand (200 employees); while Indian SME definition is based not on number of employees but investment in plant and machinery.

More recent statistics are highlighting the increasing importance of innovation and its scale and scope among the firms. A recent National Knowledge Commission of India study showed that 42% of large firms and 17% of MSMEs introduced 'new to the world' innovations in their business, with 17% of the large companies ranking innovation as their top strategic priority and 75% ranking it among their top three priorities. MSMEs, with the use of technological innovations, intend to achieve cost-effective, improved versions of existing products to maintain technological momentum.

#### 4.3. Jugaad Innovation

The term Jugaad Innovation was popularized by Radjou *et al* through their book. They have listed 6 principles of Jugaad Innovation: seek opportunity in adversity, do more with less, think and act flexibly, keep it simple, include the margin, and follow your heart [5]. Even Western or US large corporations have adopted Jugaad innovation strategies not by increasing their R & D budget, rather shifting from a structured, top-down approach to innovation to an open, adaptable culture that leverages stakeholder and employee creativity [6].

These Jugaad Innovation principles are similar to the 10 core competencies of Frugal Innovation developed by the Frugal Innovation Lab at Santa Clara University: ruggedization, lightweight, mobile enabled solution, human centered design, simple in features and functional requirements, new distribution models through non-conventional channels, adaptation to local conditions and constraints, high use of local resources, ecologically friendly, and affordability [7].

Radjou, Prabhu, and Ahuja believe that the structured approach to innovation favoured by mature large companies cannot deliver agility and differentiation needed in this globalised world. Their research point to the fact that top-down R&D systems are unable to open up and integrate bottom-up input from employees and customers. However, in this globalized world, integrating knowledge from across spectrum is essential; and a new approach to innovation – like frugal, flexible, and participative Jugaad – is needed [8].

Birtchnell equates Jugaad as a practice accompanied by indigence and corruption in traditional interpretations, but avers that the notion of Jugaad had brought India's emergence into the global economy. He thinks that this term has seen unprecedented popularity and is now proffered as a development tool and a robust solution to global recession. Jugaad is part of method for working within resource constraints as 'Indovation'. He has suggested that far from being 'disruptive innovation', Jugaad in practice is part of India's systemic risk [9].

Greenhalgh surveyed economic studies to understand relationships between IPR, innovation and diffusion in India. Through this survey, he suggested that innovation should be employed to meet the demands of large number of unskilled workers. He laid more emphasis on inclusive innovation as suggested by the World Bank through its recommendations of speeding innovation and technology diffusion in India [10]. Innovation under local conditions is crucial for the Indian MSMEs. Innovation should consider concept of scale in the Indian context, customer size, reach, price points, and leveraging local resources through cultural and regional insensitivities. This will be possible through indigenous pervasive models, rather than emulating established global models. Indian MSMEs should re-assess applicability of these models within the Indian context.

India has always plenty localised creativity, or Jugaad – literally meaning working around lack of resources by making best use of available resources and coming up with quick-fix solution [11]. The challenge for the Indian MSMEs is the institutionalisation of this Jugaad innovation. Indian MSMEs innovate and offer new products that address local problems, though this innovation does not sustain [12]. There are few Indian MSMEs that offer more than one innovative product or service. Hence, they should adopt incremental innovation to ensure competitiveness.

Indian MSMEs have distinct challenges – stiff competition from bigger and established players in the market and imports. This necessitates that MSMEs innovate a product to fill the void created by bigger players (product innovation), or streamline processes to enable more level playing field against bigger players (process innovation). Moreover, MSMEs' ability to innovate is restricted by two challenges – strategic and operational. Hence the need for creating an enabling environment for the promotion of innovation in India, particularly for the MSME sector.

#### **4.4. Enabling Factors for Promotion of Innovation in India**

Public and private sectors, individually and through PPPs, promote innovation through several initiatives right from ideation, promoting grassroots, university and industrial innovation, through later stages of innovation process.

India's National Innovation Council (NInC) focuses on innovation in every sphere of economic activity. NInC with members from the academia, research organizations, and industry taps grassroots/ industrial/ educational/societal innovations and then assists in commercialization and scaling-up stages.

Cluster Innovation Centres (CICs) connect stakeholders and innovators in symbiotic relationships based on cooperation and collaboration with universities, industry, institutions, and government to share and develop ideas, create IPRs, develop new business models, create new markets, and encourage R&D activities and create an overall ecosystem for innovation.

The Innovation Fund set up by NInC proposes buy-in from the government and private stakeholders such as key social venture capital funds, mentoring networks, and entrepreneurship groups. Expanding this innovation infrastructure would reach innovative products and services, and facilitate and collaborate among clusters.

Different ministries have set up their R&D institutions to facilitate the technological and training requirements of SMEs – examples include Ministries of Textiles, Commerce, Agriculture and Rural Industries (ARI) and Chemicals and Petrochemicals. This has recognised the importance of generating and commercialising R&D.

Private players namely trusts and societies are also activating innovative culture and climate particularly in the MSME sector.

#### **4.5. Enabling factors for Innovation in MSME sector**

The Ministry of Micro, Small, and Medium Enterprises (M/o MSME) designs policies and facilitates programmes, projects and schemes to assist MSMEs to scale up. The State Governments primarily promotes and develops MSMEs with complementary efforts of Government of India through various initiatives. The M/o MSME assist the States to encourage entrepreneurship, employment and livelihood opportunities and enhance competitiveness of MSMEs in the globalized world. The programmes undertaken by the M/o MSME facilitates:

- i) adequate flow of credit from financial institutions/banks;
- ii) support for technology upgradation and modernization;
- iii) integrated infrastructural facilities;
- iv) modern testing facilities and quality certification;
- v) access to modern management practices;
- vi) entrepreneurship development and skill upgradation through appropriate training facilities;
- vii) support for product development, design intervention and packaging;
- viii) welfare of artisans and workers;
- ix) assistance for better access to domestic and export markets;
- x) cluster-wise measures to promote capacity-building and empowerment of the units and their collectives.

The following caselets or examples of product and process innovation in Indian MSME are evident of the success strategies employed by these examples.

#### **4.6. Process Innovation**

Embrace Global: Keeping Newborns Warm

15 million premature babies are born each year, with three million dying within the first month of their lives because of infection, low birth rate, asphyxia, and birth trauma. Many people put premature infants near light bulbs, coals or hot water bottles, but these “solutions” are ineffective and often hazardous to the babies' health. As per WHO, two thirds of newborn deaths are preventable and that half of babies in developing countries do not receive skilled care at the time of birth. India has a high mortality rate for newborns following hospital

discharge. Embrace is a social enterprise specializing in infant healthcare, founded by Jane Chen, Linus Liang, Rahul Panicker, and Naganand Murty. Embrace is a thermal cocoon-like wrapper for the new borns.

#### Aravind Eyecare: The Gift of Sight

39 million people worldwide and 12 million in India suffer from blindness, a condition that restricts their autonomy and ability to work. 80% of blindness is treatable. According to Aravind, “a 10-minute cataract surgery will restore sight to 7.5 million and a pair of spectacles will help another 2.4 million see.” Unfortunately, less than 10% of this population has been healed. As per 1993 HBR case study, United States had twice India’s number of ophthalmologists (16,000) for a quarter of India’s population size. India’s infrastructure was disproportionately skewed to urban areas containing less than 1/3<sup>rd</sup> of country’s population. Aravind Eyecare was founded in 1976 by Dr. Govindappa Venkataswamy to eradicate needless blindness first in his home state Tamil Nadu and then in the rest of India

#### Narayana Health: Fixing Broken Hearts

Globally, only 8% of the population has access to affordable heart surgery. There is a need to perform two million heart operations in India and all the heart hospitals put together perform less than 120,000. Tertiary care only reaches 10-15% of the population. According to Dr. Devi Shetty, founder of Narayana Health, India needs two million hospital beds, one million doctors, and at least two million nurses to meet demand. Building the required 500 medical schools is expensive at a cost of \$40 million per building, and the government is unable to make significant capital investments. The vision of this organization is to provide “high quality healthcare, with care and compassion, at an affordable cost, on a large scale,” Narayana Health is a hospital chain in India with 7500 beds spread across 29 hospitals in 17 cities that focuses on affordable quality tertiary care, including cardiac care, neurosciences, oncology/cancer care, and organ transplant. There was no intention of frugal innovation – with lack of money, the emphasis was on breakthrough innovations as there was no model in tertiary healthcare to follow.

### **4.7. Product Innovation**

#### Jaipur Foot: Making People Walk

In the early 1970s, Professor P.K. Sethi, an orthopedics professor in Jaipur, India, realized that the prevalent prosthesis design for lower-limb amputees was poorly suited to India’s sitting culture. He developed a waterproof, lightweight rubber-based prosthetic leg for less than 1% of the manufacturing cost in the US. The nonprofit Bhagwan Mahaveer Viklang Sahayata Samiti (BMVSS) began distributing the Jaipur Foot internationally, selling not only to amputees, but also fitting war victims and polio patients. To date, the Jaipur Foot has reached over 1.3 million people and BMVSS has held artificial limb fitment camps in 26 countries across Africa, Latin America, and Asia.

#### Mitticool: Earthen Refrigerator

In 1988, Mansukhbhai Prajapati, a rural innovator from Rajkot, Gujarat who failed his Class X exam, quit his job at Jagdamba Potteries. He borrowed Rs 30,000, began producing earthen pans with a modified hand press, and soon started his own earthen plate manufacturing factory. After an earthquake in 2001, Prajapati was inspired to create Mitticool, a Rs 2500-3000 clay-based fridge run without electricity that can keep fruit and vegetables cool for up to five days. Customers and home appliance companies from over 40 countries have ordered from Prajapati’s product catalogue, which has expanded to include a clay tawa and low-cost water filter.

#### Vortex: Banking Services for All

In 2001, Vortex Engineering, a Chennai-based startup, sought to make banking services accessible in remote and rural locations across India by designing affordable ATMs powered by solar energy. These ATMs are over 50% cheaper than traditional ATMs, consume 95% less electricity, and offer a fingerprint scanning system for illiterate users. Vortex has influenced competitors, forcing market leader NCR to launch a solar-powered ATM model, and forged export partnerships in Africa, neighboring Asian countries, and the Middle East.

#### GE Healthcare: Reimagining and Redesigning for India

GE Healthcare is an \$18 billion unit of the multinational General Electric Company. In 2009, GE Healthcare launched “Healthyimagination,” a \$6 billion dollar effort to provide high-quality affordable healthcare products in developing countries. GE is investing in India to increase the accessibility of consumer healthcare, with the anticipation that Indian revenues will reach \$1 billion by 2016-17. GE Healthcare currently has 25 products, developed out of the GE John F. Welch Technology Centre in Bangalore.

#### **4.8. Product / Process Innovation**

National Innovation Foundation (NIF): From Field to Market

NIF is part of GoI's Department of Science and Technology. The NIF has helped file over 650 patents, catalyze grassroots technological innovations across all sectors, and preserve traditional cultural knowledge. In collaboration with the Honeybee Network, a knowledge-sharing network, the NIF has compiled a catalogue of 200,000 innovations from 555 districts in India. The NIF consists of six divisions: Scouting and Documentation; Value Addition and Research & Development; Business Development and Micro Venture Innovation Fund; Intellectual Property Management; Dissemination & Social Diffusion; and Information Technology. In the scouting phase, the NIF undertakes two exploratory journeys to find creative talent and participates in agricultural fairs and exhibitions. The NIF also hosts a biennial competition and involves business and engineering students in processes such as collecting market inputs, conducting background research, and creating a business plan for grassroots innovators. The Micro Ventures Innovation Fund, supported by SIDBI, has sourced initial capital for nearly 200 small-scale projects and helped commercialize select projects internationally, charging lower interest (12.5%) than local banks and collecting no collateral. The commercialization process happens by both licensing innovative technologies to entrepreneurs and helping the innovators become entrepreneurs (NIF website).

### **5. CONCLUSION**

The emerging concept of Jugaad Innovation has important implications both for Innovation in general and Indian MSME sector. The Indian MSMEs, through their agile and dynamic nature, have shown innovativeness and adaptability to survive economic downturns. Moreover, to compete with large and global enterprises, Indian MSMEs adopted innovative approaches on multiple parameters like business processes, product/ service development, technology, and competing globally.

The clustering and networking approach of Government of India and State Governments has helped the MSME sector to boost their competitiveness. Indian MSMEs are adopting and implementing innovative information and communication technologies on a large scale like Software as a Service (SaaS) and Infrastructure as a Service (IaaS). The government has created a favourable environment for this sector through infrastructure development, skill set development, entrepreneurship development, and technology upgradation. Jugaad innovation or frugal innovation is a present and future opportunity for the Indian MSME sector because of the tremendous demand and increasing growth rate of the country. However, the Indian MSME sector should note that globally scalable innovations are from environments with high intellectual or financial capital, and not grassroots innovations with traditional definitions of Jugaad and frugality.

For these Jugaad innovations to transfer to other environments (like Embrace or GE) needs local partners to enter foreign markets where new products can be introduced with adaptable design as per their culture. Providing open source innovation will improve efficiency only when leaders in other ecosystems or cultures share social vision of founding organization.

Though India will take its place in world order as an economic superpower, this will not displace its Jugaad innovation or frugal innovation. Rather this will bring in new business models in disruptive technologies and social entrepreneurship. Jugaad can provide economies of scope to tailor to the needs of multiple customer segments in heterogenous markets. Soft capital is created through innovative processes and practices of employees and business partners; and customers. Jugaad solutions enhance flexibility to manage unexpected challenges and constraints of limited resources.

Limitations of the study include the few examples explored in detail, metrics chosen for evaluation, inaccessibility of statistics and hard core data, and lesser-known and competitively protected innovations.

On a concluding note, the future of Jugaad Innovation appears promising for all the stakeholders of the Indian MSME sector. There is substantial scope for further research in this innovation arena. As there is no conceptual clarity and statistical data of innovation in MSME sector, there is a need to bridge the gap between policy making and MSME entrepreneurship. Further research to highlight and justify the role of Jugaad innovation in supporting the MSME sector, and to some extent even influencing the innovation policies is needed. Studies that observe the overall impact of Jugaad rather than individual anecdotal experiences would be particularly helpful in this respect.

### **6. APPENDIX**

#### **1. MSME: [4]**

The Micro, Small and Medium Enterprises Development (MSMED) Act, 2006 terms the definition of MSMEs as:

- **Enterprises engaged in the manufacture or production, processing or preservation of goods as specified below:**

1. A **micro enterprise** is an enterprise where investment in plant and machinery **does not exceed Rs. 25 lakh**;
2. A **small enterprise** is an enterprise where the investment in plant and machinery is **more than Rs. 25 lakh but does not exceed Rs. 5 crore**; and
3. A **medium enterprise** is an enterprise where the investment in plant and machinery is **more than Rs.5 crore but does not exceed Rs.10 crore**.

Investment in plant and machinery is the original cost excluding land and building and items specified by the Ministry of Small Scale Industries vide its notification No.S.O.1722(E) dated October 5, 2006

- **Enterprises engaged in providing or rendering of services** and whose investment in equipment (original cost excluding land and building and furniture, fittings and other items not directly related to the service rendered or as may be notified under the MSMED Act, 2006 are specified below.

1. A **micro enterprise** is an enterprise where the investment in equipment **does not exceed Rs. 10 lakh**;
2. A **small enterprise** is an enterprise where the investment in equipment is **more than Rs.10 lakh but does not exceed Rs. 2 crore**; and
3. A **medium enterprise** is an enterprise where the investment in equipment is **more than Rs. 2 crore but does not exceed Rs. 5 crore**.

## 2. INNOVATION: [13]

Innovation refers to any new policy that an entrepreneur undertakes to reduce the overall cost of production or increase the demand for his products. Innovation is classified into 2 categories:

**Product innovation:** all activities that increase the demand for a product – such as introduction of new commodity or quality goods, emergence or opening of new market, new sources of raw material, new variety or design of the product.

**Process innovation:** all activities that reduce overall cost of production such as introduction of new production technique, machinery, innovative methods of organizing industry.

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