

# Jugaad Innovation by a Rural Protagonist : A Case on Rustic Potential

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**Abstract:** Rural India, is replete with people who are transforming lives with their own innovative ideas. These innovative ideas are termed as “Jugaad”. The purpose of this study is to examine jugaad as a product and to examine how a rural person as a protagonist generates an innovative idea. In this paper “a pedal operated power generator” as a jugaad product has been studied. To examine such an innovative idea generated by a rural person, personal interview with the protagonist has been conducted. Case Study method has been used as a research method and Grounded Theory has been used for data analysis. It was found that the innovative idea resulted from a lack of power generation capacity, long power cuts, and no affordable mode of electrification. The present study suggests that India should capitalise on the power of the rural person as a protagonist of innovation.

**Keywords:** Jugaad, pedal operated power generator, Protagonist

## Introduction

The Indian term “jugaad” describes a style of innovation that is based on making do with what's available, by improvising and thinking out of the box. The Jugaad attitude is created out of a context of limited resources. It is related to the western idea of “hacking” – an informal and unconventional approach that gets the job done, often in surprising and elegant ways. Some of these inventions have the potential to scale to mass industrial production. Among the successful Indian jugaad-style products are:

- Maruti 800 engine on 2 Wheeler (Converted Motorcycle)
- Use of Cycle bell on Motorcycle
- Portable Scooter engine of tricycle
- Use of Water Extraction motor Pump for Sugarcane Juice
- Chotu Cool: A Mobile Refrigerator

Jugaad is the result of innovative ideas established by creative individuals to make their work environment more captivating (Cohen and Ambrose, 1999). Jugaad happens for a short term. It is short term because it involves quick fixes to problems. However, unlike a structured approach, whenever one has short-term solutions, or a

band-aid solution; jugaad leads to the next big thing, and that is because of quality of results. “Jugaad” symbolizes an innovative concept of need fulfillment in a dynamic environment characterized by provisions and constraints in the form of goods or services which are ingeniously indigenous.

Jugaad is not the perfect solution or product but it fills the gap between need/problem and solution to that problem by applying creativity. So it can be said that jugaad is a medium level of creativity which can fix the problem (Cropley, 1999). Jugaad illustrates grassroot innovation to overcome any impediment (Aiyar, 2010). Earlier jugaad was considered as a term to describe vehicles designed indigenously in rural areas (Mitra, 1995).

Jugaad is a prefigured characteristic of Indians that is they can find the middle ground solutions which work as effectively as its perfect solution (Desai, 2010). The term jugaad is considered as an activity which involves low level skills in an informal economy (Thomas, 2011). Jugaad can be described as a work which reflects flexibility and creativity (Talukdar, 2004).

In this section jugaad as a product is discussed. Jugaad as a product involves the approach that the *jugaadoo* (the person who has designed the jugaad) uses to solve the problem. The quick fix or the short cut or the approach that he has applied to come out of the problem gives the jugaad product.

### Objectives of study

- The objective is to study the factors that induce the protagonist for jugaad.
- To study the extent to which the features and benefits of jugaad as a product fulfils the need of the protagonist.
- To suggest the areas where jugaad as a product needs further improvement to make it scalable.

### Research Methodology

Grounded theory is a method that involves systematic collection of data and its analysis to discover a theory (Glaser and Strauss, 1967). It is a research technique where the researcher gathers data with no hypothesis or preconceived notion (Glaser, 1978). To gather data for the study, in-depth interview and observation method is used. It begins with open ended questions and then in-depth interview with the protagonist is conducted. To analyse the data, coding is done. Memo writing is continued throughout data collection. For sorting, similar categories are grouped and then data is re-examined to find all available insights and finally a theory emerges from those collected insights.

### Introduction to Case

Working with the electrical machinery and related business, Abid Hussain realised the power of the moving pedal, and that gave him an idea that pedal power can be utilised to generate electricity. He started working on this idea and came out with a sample model and called it a 'Pedal operated generator'. The most critical issue associated with the device is about its commercialisation. There are some issues related to the device's design which makes its commercialisation difficult.

### Background

Abid Hussain, the protagonist of a jugaad is from Delhi. He is a second standard dropout. He has experience in electrical

machinery and related businesses. He is not earning, and the monthly income of his family is around ₹6,000. He supports his innovations from the savings he has by selling his innovations. He comes from a poor financial background, and cannot afford to pay large electricity bills.

He realised that there are problems related to short supply of electricity and he himself faced the problem of long power cuts in his village. He found that over 1.2 billion people (20% of the world population) are still without access to electricity worldwide, almost all of whom live in developing countries. 400 million of those without electricity are in India alone. Abid realised that something should be developed which can meet electricity requirements even during power cuts, and that too at the lowest possible cost. He analysed that this problem can be solved by utilising pedal power. His objective was to develop an effective and cost efficient mechanism for decentralised power generation especially in distant areas and villages, which are not serviced by power grid. So, he developed the Pedal operated power generator.

Pedal power refers to transmission of energy from a manual human source via pedalling of foot pedal. This pedal power is used for means of transport and to drive bicycles. Pedal power is also used for agricultural purposes and can even be used to produce electricity. Abid Hussain came up with the idea to produce electricity through pedal power.

### About the Product

He developed an interface for utilising the pedal power of a conventional cycle to drive the generator. It is a device that has a cycle frame with sitting arrangement and pedal fitted and connected with the converter. It translates mechanical energy into electrical energy and this gets stockpiled in a battery provided with the arrangement. He has optimised the entire arrangement and the device can run four tube lights (20 watts each), one table fan (60 watt) and one Television (40 watt) for 3-4 hours with half an hour of pedalling of bicycle. Apart from very good application for rural electrification and remote local

electrification, it has potential in cities as it will provide an exercising option to people and at the same time provide electrical power during power cuts.

Components of the device are generator, battery, tube sets and DC fans. Beauty of the system is the matching of each component; each functioning at optimum efficiency and also the combined efficiency is optimum. The combination of generator and battery is so exclusive that quick charging is possible.

The Department of Science and Technology, Government of India, set up the National Innovation Foundation (NIF) at Ahmedabad in March, 2000 for recognising and rewarding innovations. National Innovation Foundation has recognised this innovation and is now trying to commercialize the device, while also evaluating its diffusion potential. The purpose is to undertake product development based on the specific requirements of the customers, using this jugaad as the platform technology. NIF undertook development of a pedal operated power generator along with the Institute of Engineers, Hyderabad.

### **Features of the product**

The product can be commercialised as it has the following specifications:

- Charges 120 W Battery in about 30 Minutes.
- Charging time: 30 minutes.
- Discharge: 3 - 4 hours.
  - Load: 4 tube lights - 20 Watt each
  - 1 DC Fan - 60 Watt
  - 1 TV - 40 Watt
- It costs ₹12,500 per set including excise duty, sales tax.

### **Benefits of Innovated product**

When this product is compared with other modes of electrification, it has benefits, like being noise free compared to other sources or equipment and being pollution free. It creates an incentive for people to save money on their household bills, and a way of healthy living, staying fit and lowering medical costs, while also helping combat obesity. It could be something the government or local councils set up. In

remote locations where even the power grid is not available, this could be a viable option to generate electricity. Pedal power generator stand can be used by children or by adults. People can pedal while watching television and thereby can store power in the battery which can be utilised at the time of power cuts in urban areas.

Although initially targeted at rural areas, the product has sales potential in both rural and urban areas. Three units of the product have already been supplied to GIAN (Grassroots Innovation Augmentation Network). But the specific area of concern is marketing of the product. To commercialise the device, the National Innovation Foundation (NIF) has to work on its marketing as it is difficult to attract and convince potential buyers because of some limitations of the device.

### **Limitations of the product**

- It takes more time for charging higher capacity battery, and not always within the physical capacity of one person.
- There are areas related to its design that need further work such as
  - Drawing size of the wheel has to be increased to 19-20 inches.
  - Welded parts should be neat and clean.
  - Frames for keeping battery should be provided.
  - Handle grip should be soft as in exercising cycle.
  - Seat should be soft and with a small backrest.
- Apart from the above issues the cost of the device is also a barrier for its marketing as it costs ₹12,500.

### **Suggestions**

The problem related to charging time can be solved by adding a solar panel option as it will increase the energy available. The solar panel option will allow capturing the sun's energy to store additional electricity in the battery, but the cost aspect should also be considered. One problem with the solar panel option is that solar power (especially during monsoon season) proves unreliable as compared to pedal power.

The government can set up power generation centres in rural and remote location areas where even the power grids are not available to generate electricity. The Centre can employ some people who can pedal to generate electricity and thereby government can serve two purposes - power supply, and employment generation. Rural people can earn some income out of it and they can have access to electricity at low cost.

For problems related to designing the device, the following considerations should be taken into account:

- The device should be suitable for local manufacturing capabilities.
- The attachment should utilise materials and manufacturing methods which are low-cost.
- It should be accessible and affordable to low-income groups, and should fulfil their basic need for mechanical power.
- It should be simple to manufacture, operate, maintain and repair.
- It should be multi-purpose such that it can provide power many agricultural tools and for small machines used in rural industry.
- It should exploit locally available materials and skills. Standard steel pieces such as steel plates, iron rods, angle iron, and flat stock that are locally available should be used.
- It should make use of ordinary bicycle parts wherever possible.
- The device should adjust easily to as many different bicycles as possible. Permanent structural modification should not be made to the bicycle.
- The broad stand attached with the device should be such that it can be flipped upwards during the transport mode. This stand which provides stability during power production phase would be an everlasting fitting of the device.
- Excessive weight should be circumvented, as durability is a prime consideration.

The above listed suggestions will help in overcoming the difficulties related to marketing of the product.

### Other Application Areas of the Product

There are various application areas of pedal power, such as to charge cell phones, pedal powered grinders, pedal powered rice threshing, pedal powered winnowing, and pedal powered water propelling from a shallow well. Apart from these applications the device is a good option for agricultural purposes, especially when it is time to harvest the crop and the farmer is facing power cut problems. At that time, with some peddling effort, the farmer can avoid damage to his crop/save his crop from damage.

### Conclusion

To conclude, the pedal operated power generator has diffusion potential. Initially targeted at rural areas by the protagonist, it can now be targeted in cities also where people are very conscious about their body fitness. It keeps health conscious users fit while producing power that may be used to power lights and/or other small appliances. So, it serves a dual purpose. But, National Innovation Foundation (NIF) has to work on the cost of the device to make it more affordable for the rural people and on the device design in the near future. Once these limitations are worked out, the device has good diffusion potential in rural and urban areas.

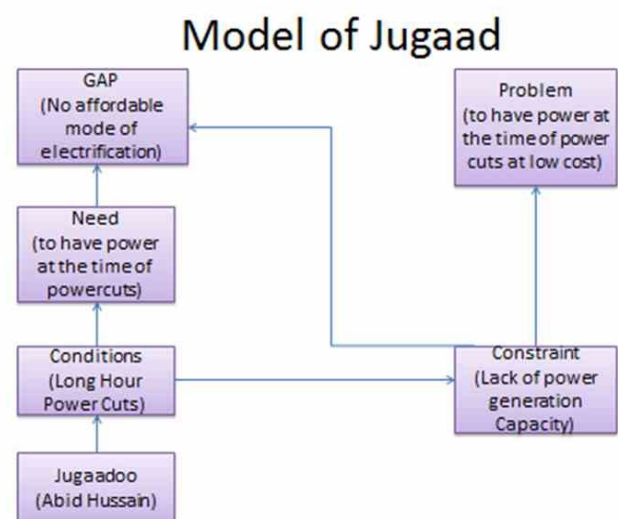


Figure 1: Model of Jugaad as a product (Pedal operated power Generator)



**Figure 2: How “Pedal operated power Generator” works**



**Figure 3: Pedal operated power Generator**

### Acknowledgement

The author wishes to express her sincere gratitude to those individuals who have supported her throughout the writing of this research paper. First, her deep appreciation goes to her adviser, Prof. Mukesh Chaturvedi, whose help and advice throughout the writing of this research paper have been invaluable.

Very special thanks to her parents, Surinder Singh and Balvinder Kaur for never losing faith in her while consistently providing support in spirit.

### References

- Aiyar, S. (2010). Jugaad is Our Most Precious Resource. *The Economics Times*. Retrieved from <http://www.articles.economictimes.indiatimes.com/>
- Birtchnell, T. (2011). Jugaad as Systemic Risk and Disruptive Innovation in India. *Contemporary South Asia*, 19(4), 357-372.
- Cohen, L. M. & Ambrose, D. A. (1999). Adaptation and Creativity. *Encyclopedia of*

*creativity*, Vol. 1, 9-22. San Diego, CA: Academic Press.

- Cropley, A. J. (1999). Creativity and Cognition: Producing Effective Novelty. *Roeper Review*, (21), 253-261.
- Desai, S. (2010). 'Jugaad', Our Idea of Unique Possibilities. *The Times of India*. Retrieved from <http://www.timesofindia.indiatimes.com/>
- Glaser, B. G. & Strauss, A. L. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Chicago: Aldine.
- Glaser, B. G. (1978). *Theoretical Sensitivity: Advances in the Methodology of Grounded Theory*. Mill Valley, CA: Sociology Press.
- International Energy Agency. (2010). *Energy Poverty - How to Make Modern Energy Access Universal?* Retrieved from [http://www.se4all.org/wpcontent/uploads/2013/09/Special\\_Excerpt\\_of\\_WEO\\_2010.pdf](http://www.se4all.org/wpcontent/uploads/2013/09/Special_Excerpt_of_WEO_2010.pdf)
- Mitra, B.S. (1995). India's Informal Car. *Wall Street Journal*. Retrieved from <https://www.wsj.com/>
- National Innovation Foundation(2006). *Annual Report*. Retrieved from [http://nif.org.in/dwn\\_files/AR%202005-06.pdf](http://nif.org.in/dwn_files/AR%202005-06.pdf)
- Radjou N., Prabhu J. & Ahuja S. (2012). *Jugaad Innovation: Think Frugal, Be Flexible, Generate Breakthrough Growth*. India, John Wiley and Sons.
- Talukdar, S. (2004). Makeshift Miracles: The Indian Genius for Jugaad. *The Times of India*. Retrieved from <http://timesofindia.indiatimes.com/articleshow/398740.cms>