

Jugaad and innovation: Which links?

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Abstract

Purpose. The paper aims to better investigate Jugaad phenomenon to achieve a more correct definition and framing of the concept itself compared to the innovation one.

Methodology. Owing to limited availability of data related to Jugaad and, in add, the fact that it is a cultural specific phenomenon developed in certain geographic area with particular socio-cultural characteristics, it seemed to us appropriated to choose autoethnography as qualitative research methodology. We have applied text analysis as tool to study in depth the literature that encircle the concept of Jugaad, invention and innovation in various way.

Findings. The literature review has revealed poor clarity about the subject. In particular, there is a lack of a reasoned placement of Jugaad with respect to the concepts of invention and innovation. For this reason we have proposed a Jugaad positioning model with respect to invention and innovation. Moreover we have identified three different forms of Jugaad: survival Jugaad, creative Jugaad and innovative Jugaad.

Practical implications. Jugaad, in particular innovative one, has relevant implication in the entrepreneurial world because it has a great potential to reap the benefit of the talents and ideas available at grass root level and come up with breakthrough innovations.

Originality/value. The paper represent a first comprehensive study about the subject of Jugaad phenomenon. It underlines similarities and differences between Jugaad, invention and innovation and it highlights the distinct “core novelty” included in each concept.

Keywords

Jugaad; forms of innovation; invention; creativity; bottom of pyramid people; developing economies.

1. Introduction

The word Jugaad is originated from the Hindi and Punjabi languages (Radjou et al., 2012) which are spoken in the areas of India and Pakistan that used to be the same country until 1947 (their independence from British rule).

The Jugaad is a morally loaded word (Craig and Stephen, 2014) and is a unique word in practice to express various acts of creative improvisation, repairing, modifications or alteration done by the users in order to meet their needs with an aim to somehow arrive to a compromised or acceptable solution.

The term Jugaad has turned to increasingly being discussed among the academic circles (Chaturvedi, 2014). However the theme is still emerging, thus no much literature is available that establishes and classifies the topic.

The literature, in other words, shows mixed opinions and uses of the term Jugaad, often with different meanings, and this create a state of confusion around the theme.

Just to anticipate some of the points of view, someone associates this terminology to the unusual or corrective fixation of the problem in physical as well as ethical form.

Whilst, scholars as well, do argue that Jugaad has potential of breakthrough innovations (Malhotra and Seth, 2013) and Jugaad gives new way of thinking and innovating (Radjou et al., 2012).

Someone again associate it with frugal and other forms of innovation (Govindarjan, 2011).

Meanwhile, other scholars argue that Jugaad activity or Jugaad mindset leads to a wrong attitude (Birtchnell, 2011) or a subaltern social practice (Rai, 2015).

So, our initial literature review on Jugaad immediately revealed that the term needs a comprehensive study in order to get better definition and classification of Jugaad and find ways as how Jugaad can be beneficial for the scholar community.

The aim of the current study is in particular to better investigate Jugaad phenomenon in order to achieve a better understanding and framing with respect to the concept of innovation/invention, highlighting similarities and differences.

From the methodology point of view, in this paper, we have used “autoethnography” as qualitative research methodology and applied “text analysis” as tool to analyze the literature that encircles the concepts of Jugaad, invention and various forms of innovation.

We take a conceptual position in this research by suggesting that it is not valuable to generally classify or declare any awkward or user’s customized solutions to be Jugaad. Similarly, a generic association of acts of Jugaad to the frugal or any other form of innovation is also incorrect. We suggested basic conceptual difference among Jugaad, invention and innovation and proposed various forms of Jugaad that could set a foundation stone for the further research in this area.

This paper is structured as follows. The beginning summarizes the results of the literature review aimed at capturing the concept of Jugaad and its relationship with invention and innovation. Subsequently, after describing the method, the results are presented and discussed, proposing a conceptual categorization of the phenomenon. Theoretical and managerial implications, limitations and directions for future researches conclude the paper.

2. Literature Review and Analysis

2.1. Jugaad as phenomenon

The use of term Jugaad is not specific to a product or service. Sometimes, Jugaad is associated to a physical output that is available in a tangible form. This is described as *physical Jugaad* (Singh et al., 2012). The Jugaad vehicles can be rightly referred as

commonly occurring example of physical Jugaad that is mostly cited in the literature (Singh et al., 2011).

However, Jugaad is also referred to describe some social or intangible acts as is said to be a *social Jugaad* (Singh et al., 2012). This kind of Jugaad involves the exploitation of emotions/feelings/relations/contacts to get an activity done in ethical or unethical way. For example, bargaining during shopping (Jugaad is done by buyer and seller as both aiming to buy and sell the item at a favorable price), stealing electricity from the power supply or get some project allotted unethically by paying bribe (Birtchnell, 2011). Similarly, if someone misses the train or bus and needs to reach the destination, then looking for some lift is also considered as a form of social Jugaad *because it is not the standard or routine process but will provide a quick fix to satisfy an acute need*.

From this point of view, it is argued that Jugaad provides a quick (Barodawala et al., 2015) and cost-effective solution to the user so that an *acute need* is satisfied in a frugal way, although it has its drawback of not being a long-term business solution.

Jugaad is also reported as a *creative improvisational approach* that deals with cost effectiveness, creativity, utilization of only available resources and finding the way to get the workable *solution* (Brem and Wolfram, 2014). It is argued by Malhotra and Seth (2013) that Jugaad comes out of some *need*, but it works properly only if is equipped and coupled with creative thinking and thus by providing a workable *solution* only. Similarly, Rai (2015) does argue that Jugaad is a social practice that enables the human-technical mix to give yield to a material context through the utilization of various technologies.

It is further asserted that Jugaad is a *problem solving mechanism* and a “never give-up approach” to the daily challenges faced in the life (Radjou et al., 2012; Chaturvedi, 2014), a reciprocal approach or response to a problem.

Again in the context of problem solving, some Scholars as Satpathy and Patnail (2012) investigated Jugaad attitude of the managers in their jobs describing them as Jugaadee (Singh et al., 2011) or Jugaadu (one who does Jugaad). They characterized Jugaad feature of the managers who uses cost-effective ways in their daily job and problems they face and find a way out to come up with a workable solution.

In addition to problem solving, it is argued that Jugaad might also be aimed to ease one’s working and provide *better alternative way of doing* the same activity. Such as, Jugaad vehicle (motorbike spray machine in this case) has advantage to use the motorbike engine in order to yield air pressure so that to spray the pesticide (Singh et al., 2011). Thus, with relatively lesser capital cost, the farmer has better accessibility and efficiency to carry out his job. Similarly, Jugaad is argued to be an alternative arrangement to do some job or an innovative fix to some issue by some unconventional method (Barodawala et al., 2015).

Scholars also believe that Jugaad is a daily practice in economically deprived areas/population of the developing countries (for example, India and Pakistan considered in this study) and is termed as “*survival strategy*” (Singh et al., 2012). They argue that people with *scarce resources* must have to find some Jugaad or a way to meet their daily demands.


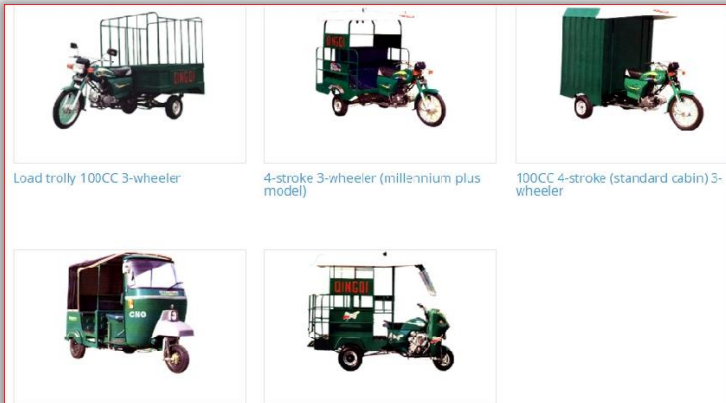


This somehow leads us to perceive that Jugaad phenomenon as a function of *acute need when the resources are limited*. The people at the bottom of the pyramid do not have sufficient infrastructures and resources to adequately meet their livelihood needs. Thus, they have no other option left but to look for Jugaad to fulfil their basic needs (Singh et al., 2012).

Apart from problem solving, achieving functional alternatives and scarce resources, another driver of Jugaad is argued to be *cost effectiveness*. Scholars (Barodawala et al., 2015) mention that Indians (as a community) have a tendency or always usually prefer and look for cheaper ways to meet their needs. They have tested the hypothesis of taking Jugaad as a business case or concept for betterment of Indian economy during the current economic-business scenario. The results have partially rejected their hypothesis of considering Jugaad as

a favorable choice in case of Indian perspective. Ultimately, they suggested an alternative hypothesis of further investigation of Jugaad phenomenon, as it might have potential appeal in the future business model.

According to the analysis so far carried out, the literature highlights different dimensions of Jugaad phenomenon. Table 1 collects them providing, when available, specific examples for each dimension.

Table 1. Different dimension of Jugaad phenomenon according to the literature analysis

Dimension	Examples	Authors
Physical	<p><i>Jugaad vehicles used in bottom of pyramid areas for transportation of goods and people</i></p>  <p><i>Jugaad vehicles (QINGQI) commercially available in Pakistan market</i></p>  <p>Source: http://punjab-pk.all.biz/sailogs-qingqi-motors-ltd-e11110#.VnmHH_nhAll</p>	Sinha, 1995 Singh et al., 2011 Singh et al., 2012
Social	<p><i>To steal electricity from the power supply</i></p>  <p><i>Bargaining between seller and buyer</i></p> 	Birtchnell, 2011 Singh et al., 2012

Dimension	Examples	Authors
Problem Solving (acute need, problem, solution)	<p><i>Jugaad practiced by worker and milk sellers that travel by train from remote villages to the cities and <u>need</u> to bring with them their bicycle.</i></p>  <p><i>Jugaad done by people that have to travel for many hours by train. They can't buy a sitting place in higher class so they solve their <u>problem</u> using a piece of cloth to tie it up on two end of train supports. Then they use it as a hammock.</i></p>  <p><i>Jugaad done as <u>solution</u> to split chilled airflow to two rooms from one source using a trouser</i></p> 	Radjou et al., 2012 Chaturvedi, 2014 Brem and Wolfram, 2014 Barodawala et al., 2015 Satpathy and Patnail, 2012 Singh et al., 2011
Better alternative way of doing something	<p><i>Jugaad vehicle pesticide spray and ploughing vehicle</i></p>  	Singh et al., 2011 Barodawala et al., 2015 Rai, 2015
Survival strategy (scarce resources)	<p><i>Jugaad done by a student to meet needs in absence of a cooking facilities (kitchen)</i></p> 	Singh et al., 2012
Cost Effectiveness		Barodawala et al., 2015
Creative Improvisation		Brem and Wolfram, 2014 Malhora and Seth, 2013

Source: our elaboration starting from data available in the sources mentioned in the respective picture.

To summarize, many Scholars describe the Jugaad phenomenon in different ways that, considered together, lead to a mind-set that is creative, driven by the existing needs of the people within limited resources to find a solution within limited period and doing it in a

simple and flexible fashion. That means, *to find a way to manage somehow a given situation within the available resources/facilities.*

2.2 Jugaad in context of invention and innovation

The theoretical contributions to the concepts of Jugaad and invention/innovation are numerically limited and often present opposite visions.

Among those who see a link, Singh et al. (2011) argue that Jugaad is linked to indigenous innovation. They further assert that innovation means the use of knowledge in order to get added benefit in the product and obtained added feature, the same way Jugaad does. Similarly, Sekhsaria (2013) advocates Jugaad as an innovation by giving various examples in its favour.

On the other hand, Prahalad and Mashelkar (2010) deny Jugaad as form of innovation due to its compromising approach in the aspect of quality of a product. A similar denial is from Birtchnell (2011) who declares Jugaad as a negative impact for the society.

To better perceive the distinction between Jugaad and innovation, it may be useful to recall few studies available in the rich innovation literature about the concept of invention/innovation and make a comparison with the results of the previous Jugaad literature analysis.

Table 2 briefly recalls definitions of various Scholars about invention and innovation.

Table 2. Difference between invention and innovation

Author(-s) of model	Innovation	Invention
Freeman, 1982	Innovation is the introduction of change via something new.	Invention is the creation of a new device or process.
Senge, 1990	'idea' becomes an innovation only when it can be replicated on a meaningful scale at practical costs	Idea has been 'invented' when it is proven to work in the laboratory.
Rouse, 1992	Innovation is the introduction of change via something new.	Invention is the creation of a new device or process.
O'Sullivan and Dooley, 2009	Innovation is more than the creation of something novel. Innovation also includes the exploitation for benefit by adding value to customers. Invention is often measured as the ability to patent an idea.	Invention need not fulfill any useful customer need and need not include the exploitation of the concept in the marketplace.

Source: Kotsemir et al., 2013, p.7

The above table helps us to identify that:

- ✓ *Invention* might be described as a device or process with a *proven novelty*, but *not aimed to be industrially produced or marketed*. In addition, it is not always aimed to satisfy any acute user-need.
- ✓ *Innovation* may introduce some *new feature* or change in the *existing product, service or lifestyle*, and/or *create new need or market*.

The Jugaad in this entire paradigm acts differently from invention and innovation and brings an innovative way of using the existing products or service to meet some existing need. Whereas invention process may or may not necessitate a need for its initiation (Arthur, 2007). Besides Jugaad does not necessarily create new need or new market, whereas innovation becomes valid once it is commercialized (Radjou et al., 2012). In other words the output of innovation is the production of some product/service/process in its diffused form in the market. This strengthens the perception to not declare Jugaad (in general) as an innovation as the diffusion of Jugaad is very nominal and limited to low income areas.

On the other hand, it is also true that innovation is defined to be a process of doing something new or modifying something existing by adding value (Guthrie and Dawe, 2004), as Jugaad does.

Other similarities can be seen with invention. According to Arthur (2007), the invention is a recursive process and it repeats itself until arrives to a physical solution or shape as the Jugaad process seems to act.

Arthur again suggests that novelty or invention vary in each single case and would be difficult to generically assert that their source comes from individual efforts or from systematic and programmed tasks. So, it's difficult to sustain the existence of a programmed task as a difference between invention/innovation and Jugaad.

Jugaad is also characterized by a strong dose of creativity, as well as innovation. But if there is no innovation without creativity, there can be creativity without innovation and Jugaad might be an example. According to Krishnan (2010), the creativity is an individual phenomenon and the innovation is achieved through a social and collective process. This lead to considering Jugaad as individual action and initiative.

Ultimately, from this first step of literature analysis about the distinction between Jugaad and innovation, we realize that *Jugaad is an individual effort that does not initiate to yield a product that can be sold in the market or to create new market or new needs, rather it satisfies the existing or acute need/s in a frugal way with the help of creativity and by utilizing whatever is available in hands at that very particular moment.*

2.3 Jugaad in context of various types of innovation

In order to better understand Jugaad phenomenon we attempted to analyse it in the context of various forms of innovation.

2.3.1. Jugaad in context of radical and disruptive innovations

Sometimes Jugaad is associated to radical or disruptive innovations as described by Radjou et al. (2012) and Birtchnell (2011). Prahalad (2012) and Mashelkar (2010) also declare Jugaad as a form of radical innovation.

As known, some of the main characteristics of both these kind of innovation are: new market categories creation by discontinuous technologies (Kotsemir et al. 2013); presence of research and development activities (Coccia, 2006); disruptive change creation (Schumpeter 1934); need of normative compliance (Jon-Arild 2008); new need creation or latent needs satisfaction.

In particular, the disruptive innovation represents an innovative product or solution that serves some latent needs of the users and is being served through some other means, even though not in so effective or efficient way (Christensen, 1997). In addition, these innovations need maturity and improvements to be accepted and appreciated by the users. Whereas, the radical innovations give some breakthrough technology (Migliaccio, 2005) or material alternatives that could revolutionize the performance and the achievements of the desired results (Krishnan, 2010).

We can infer that Jugaad phenomenon differs from both types, although it seems disruptive in its appearance, yet it comes into being as a result of an acute user need. In Jugaad, the need requires to be satisfied on priority and the compliance to the norms is not considered.

2.3.2. Jugaad in context of incremental innovation

The incremental innovation is characterized by small additions/modifications and improvements in the existing product that enhances its capabilities or qualities (Herrmann 1999). Schumpeter (1934) argues that the incremental innovations continuously advance

towards the process of change. The incremental innovation in its true sense eliminates the defects and drawbacks in the already existing product or service.

We argue that the incremental innovation resembles to Jugaad in the sense that it deals with the subsequent modifications to an existing product/service or solution.

An interesting example of Jugaad similar to incremental innovation can be *Jugaad Vehicle* being used in Indian subcontinent (India, Pakistan and Bangladesh, but not limited to) for the transportation of person as a main use but also for goods (Sinha 1995). The new product comes into its being, inspired from traditional horse carts named as *Tanga* (Fig .1).

Figure 1. Classical horse driven cart (Tanga) used for the transportation of people in Indian Sub-continent



Source: mentioned in each picture

The Tanga is anciently used as a means of transport (although are still being used in rural areas). The evolution of Jugaad vehicle can be assumed as follows:

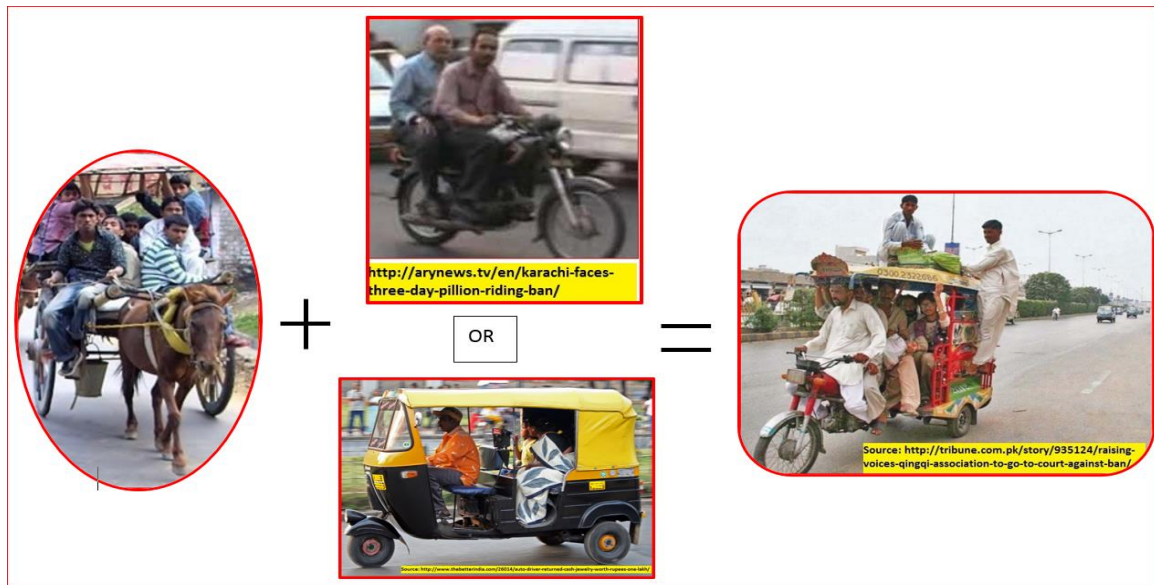
- ✓ by replacing the horse with a motorbike. A motorbike is designed to accompany the rider along with one passenger (obviously is also exaggerated as well in these countries by adding more people and kids without any protection);
- ✓ from an auto-rickshaw i.e. a three-wheeler already in the markets among the developing countries that is used for the transportation of people. These traditional auto-rickshaws have capacity of accompanying the rider along with two passengers.

The new product coming into its being becomes an auto-rickshaw headed by a motor bike and carrying a modified carriage body that can carry its rider and six passengers in normal conditions and in the conditions of needy Jugaad, it can carry two additional passengers to sit behind the rider, thus bringing up to nine in total. The final merging can be presented as in figure 2.

Although, this vehicle has restrictions in registration and recognition as traditional vehicles marketed for the transportation of people, it serves the people's needs in an excellent way by providing them immediate and low cost means of transportation both for the customer as well as for the service provider.

The difference between incremental innovation and this kind of Jugaad lies in the fact that the incremental innovation does not leave aside the basic engineering and safety aspects/calculations of the original product and applicable normative compliance. It is mainly aimed to improve the functionality of an existing product/service by providing economical and more performant features. On the other hand, Jugaad product aims to provide low cost and immediate product/service to a particular user segment and the main concern is the optimization and not the safety or compliance to the applicable norms.

Figure 2. A transition to Jugaad vehicle



Source: Our own elaboration

2.3.3. Jugaad in context of frugal innovation

Frugal innovation means to use minimum possible resources thus by producing the same desired results of the product. Some scholars argue that the traditional innovation is seeking to its destination of obsolescence and the new paradigm of innovation lies in the affordability and sustainability of products/services (Prahalad, 2012; Mashelkar, 2010).

Frugal innovation means cheap, reliable, easy to use and developed with the least possible raw materials and resources (Wooldridge, 2010). Frugal means to get a functional and workable product/solution at an affordable price that is appreciably lower than the one already existing in the market. Frugal engineering or innovation does not mean to cut the costs and give the minimum features of the product from a developed country (Balatchandirane, 2010). Frugal engineering is supposed to be the modification and remaking of an existing product, in a way to get the cost reduced and be able to provide an affordable version with reduction of some of the excessive features (Pitterle, 2014).

The challenges for the companies/entrepreneurs and innovators is to deliver low cost and affordable products to the low income class/targeted consumers and thus by doing so to overcome the barriers of resources, costs and policies (Bhatti, 2012).

Some of the examples of frugal innovation or frugal engineering are the Renault's frugal engineering approach (Rao, 2013) for a targeted budgeted car (being one of the pioneer in the world in giving concept of frugal engineering) followed by many including TATA's Nano.

Govindarjan (2011) gave an example of constraint based innovation, by referring to the customer needs study done by Indian company Godrej and Boyce to look for a low cost refrigerator. Godrej and Boyce has determined the customer needs of rural people in India who were in a need of a refrigerator that could keep conserved their meal and other consumable food items for shorter periods in a cool condition, without working up to very low temperatures as even they did not need ice (whereas originally the refrigerator along with a freezer is invented and produced as per need of users who desire ice for their drinks and who use frozen food). The poor village people needed cold water and preserved food for several hours. Therefore, the manufacturers were able to develop a low cost freezer (Chotukool®, fig. 3) that is customized for that very particular market and was working on

the principle of cooling by some low cost chip and not by compressor (as was the case of conventional refrigerator combined with freezer). This saved the cost of manufacturing for the producer and enabled them to provide a low cost refrigerator to a low-income class customer with limited needs.

Figure 3. Example of low cost refrigerator



Source: WIPO Magazine, 2013

It remains debatable in any case if it is a Jugaad as claimed by Govindarjan (2011) or a form of frugal innovation that provided a targeted product with aim to reach low budget class customer.

Gupta (unpublished article) argues that it is not right to associate frugal innovation to Jugaad. We argue that the difference between Jugaad and the frugal innovation lies in the fact that the frugal innovation process is started with a target customer, price and budget in hands and the company re-engineers the design. The manufacturing phases are designed to meet the alternative and low cost materials thus by providing a certain level of product or service to the customer within their budget and affordability.

2.3.4. Jugaad in context of grass root & inclusive innovation

The sustainable innovation needs the coordinated efforts of the people involved in the process (Bartel and Garud, 2009).

According to Baskaran et al. (2012), people in the developing communities use their indigenous knowledge to meet their needs and to develop new ways to do the things. The Authors further argue that people do inherit the knowledge of doing things in a way from generations and then they develop economical and functional products. They also add that the grass root innovations are of significant importance and is now taking fame in the form of frugal innovation and Jugaad.

A wining example of grass root innovation in India includes Honeybee, GIAN and NIF, which are managed by government, University and the local NGO's to promote local knowledgeable people and local knowledge (Kumar et al., 2013).

Moreover, Mantri and Ahuja (2015), by referring to the statistics given in NISTADS (Gupta, 2008) which unveils an important aspect of the innovation and intellectual property (IP onwards) trends in India, report that, from a period of 1997 to 2007, the total number of patents produced in India was 26,250 and the following was the composition: industry 57%, university 5%, government 21%, individuals inventors 17%.

This enhances the grass root and individual level potential of the people in India, which is significant part of the total intellectual property produced.

Singh et al. (2011) argue that grass root innovations are form of Jugaad, whereas Gupta (unpublished article) argues that the association of Jugaad to grass root innovations is a mistake.

3. Methodology

Owing to limited availability of data related to Jugaad and to the fact that they contain various subjective attributes, we have selected a qualitative research methodology. And since our research deals with a cultural-specific phenomenon and a terminology used in a certain geographic area with particular socio-cultural characteristics, it seemed to us appropriate to choose an ethnographic study to better understand this phenomenon.

More in detail, to understand in depth the Jugaad reality it was necessary to match knowledges emerging from literature review and the experience about Jugaad and innovation environments of one of the Authors of this paper. He was born in a lower middle class family in Pakistan where he has lived until 2006 and where he has directly experimented the Jugaad situation.

This circumstances motivated us to choose *autoethnography* as research methodology. It supported us in analysing the outcomes of the reviewed literature combining the innovation expertise of the overall research team with the practical and lived experience in the Jugaad cultures of one of the Authors.

The use of autoethnography is well noted in the literature in exploring in depth and understanding complex and various individual and social phenomena (Drechsler Sharp et al., 2012; Anderson, 2006).

Along with cultural understanding and perception, the socialization is another aspect where auto-ethnography helps to draw conclusions. In other words, this method is a reflection of one's very experience and point of view that also has its value and significance and it can be utilized to draw some conclusions about certain cultural phenomenon where not everyone had a chance to socialize and learn and hence reflect (Wall 2008).

However, auto-ethnography is a challenging and difficult method of qualitative research owing to methodological critics it faces and demand for objectivity rather than subjectivity along with ethical aspects, quality and legitimacy of the data collected (Wall, 2008).

We argue that the transition from the subjectivity to objectivity may be achieved by proposing conceptual models, theoretical foundation and hypothesis and then by adopting the best tool to verify them.

About the literature review, we have collected data through different tools and softwares such as *Docear*, *Zotero*, *Business Source Premier*, *Scopus*, *Web of Science*, *Researchgate* and *Google Scholar*. Our main focus was the literature related to Jugaad and innovation and related themes. The details about the topic of the literature consulted in the research on which the paper is based are given in table 2.

Table 2. The topics of the literature consulted

Topic	Nr.
Innovation	30
Jugaad	40
Frugal innovation	15
Knowledge management	20
Tacit knowledge	15
Bottom of pyramid	10
Qualitative research methods	10
Grass root innovation	10
Socio-cultural dimensions	10

Topic	Nr.
Reverse innovation	10
Autoethnography	10
Entrepreneurship	09
New product development	09
Disruptive & radical innovation	05
Trends in economies	05
Incremental innovation	04
Total	212

Source: our own elaboration

The number of sources mentioned above does not include books, web sources and unpublished articles that amount in total to 53 units.

The data obtained through literature review and autoethnographic exercise was analyzed with help of *NVivo 11 PRO* © software and thematic coding analysis was done in the form of conceptual study.

4. Results and discussion

4.1. Positioning of Jugaad with respect to invention and innovation

Apparently Jugaad could seem to be a phenomenon similar to innovation or invention as all these have some novelty in common. But our reasoned literature review supported by the auto-ethnography method revealed that, in its true sense, Jugaad differs from invention and innovation.

Invention means the introduction of some novel thing that was not known at that time. The novelty in the invention is something contained within that very particular device, method or service. On the other hand, innovation gives a novel product or service to market and it needs diffusion or commercialization. The novelty in innovation deals with a functional outcome in the form of some new product or service.

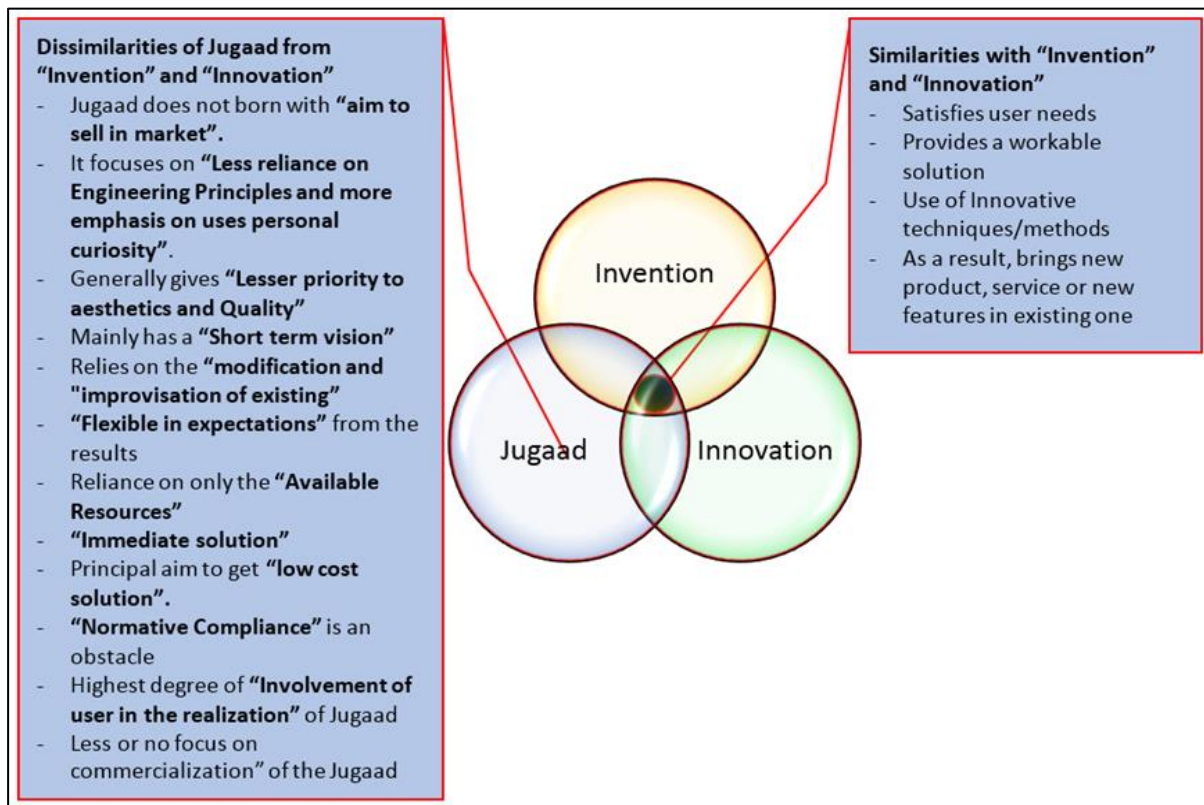
However, Jugaad deals with the novel use of a product or service already existing without seeking any mass production or commercialization.

The *novelty* in Jugaad is different from invention and innovation due to the fact that in Jugaad it lies in the *novel* use or modifications of existing products in a way that these were not designed to do. We have proposed a more precise collection of similarities and dissimilarities between *Jugaad* and *invention/innovation* in figure 4, where we have kept invention and innovation together one side with a motive to conceptually isolate them from Jugaad and compare.

We comprehend from the literature that the occurrence of Jugaad is a function of scarce resources and acute need that require immediate actions to handle the situation in the existing scenario. Moreover, in the literature, we could not find examples about the proactive use of Jugaad approach as a tool in the highly sophisticated areas like space technology, medicine or pharmaceutical industry.

For example, the use of hack during the Apollo 13 mission done to save the lives of three astronauts can be seen as form of Jugaad. This Jugaad was not a built-in feature of their travel planning and risk management toolkit. The astronauts were forced to find a solution *by using the only available resources/material that they had on board*. The actions taken during this very particular situation clearly indicate that it was a *survival strategy* and none of the design engineers had foreseen such a dramatic situation and anticipated workable solution. However, such incident did not change the strategy of space missions to leave the sophisticated design and engineering and opt for Jugaad configurations.

Figure 4: Positioning of Jugaad with respect to invention and innovation



Source: Our own elaboration upon literature review

4.2. Proposed classification of Jugaad

In the literature and in practice, we have seen a diversity among the nature of Jugaads resulted in various situations. These include mending of a cooking pan to a Jugaad vehicle and even more. This indicates us to look into certain defining parameters, which may help us to segregate the types of Jugaad. We argue that these parameters can be:

- ✓ Output of the Jugaad
- ✓ Level of ingenuity and its benefit to the person or community
- ✓ Significance of scientific know-how
- ✓ Identification of spontaneous response or systematic conceptualization within Jugaad

From this point of view, we suggest the following forms of Jugaad:

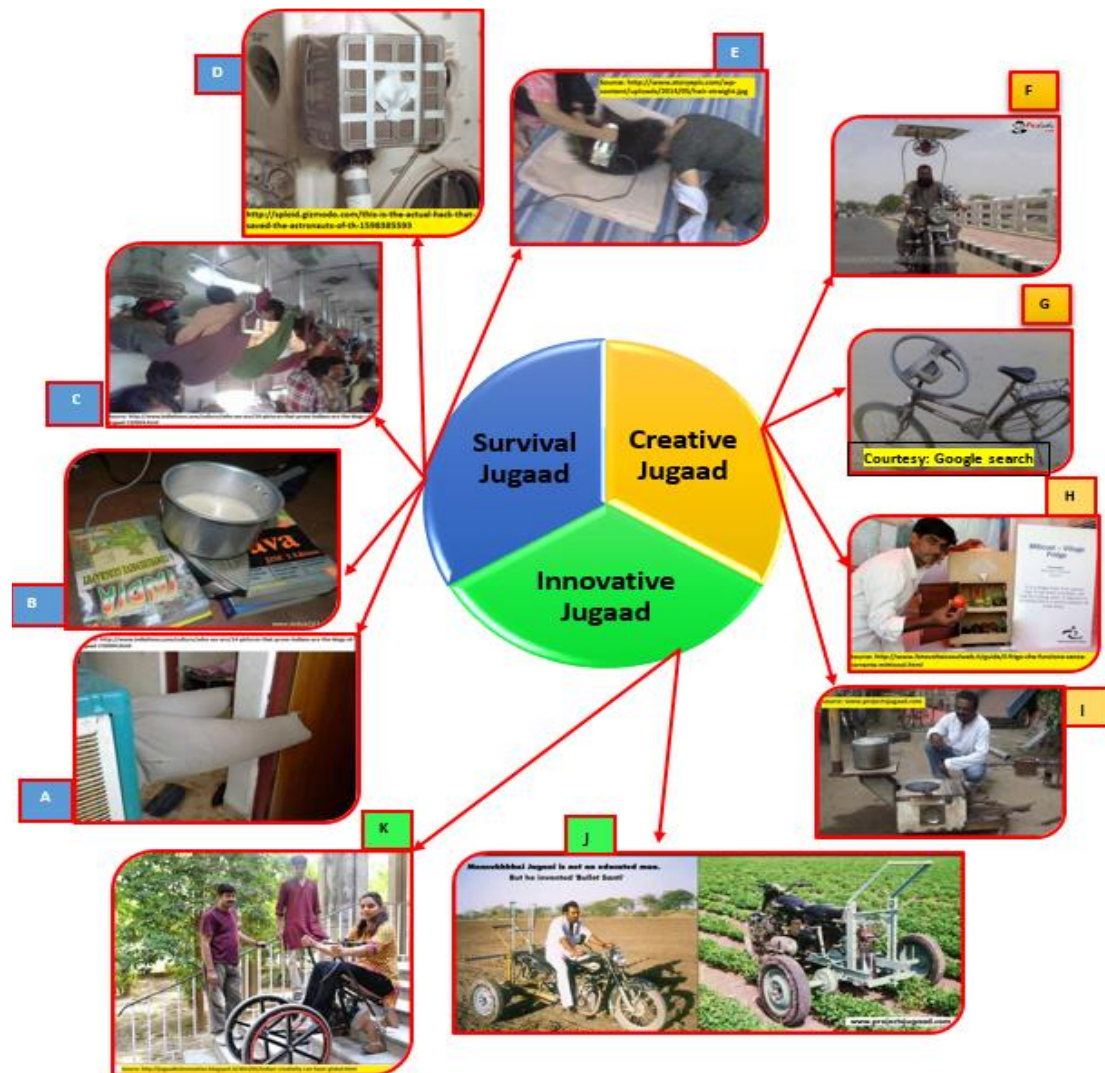
- ✓ Survival Jugaad (to cope with day to day needs of common livelihood)
- ✓ Creative Jugaad (to satisfy and quench creative thirst).
- ✓ Innovative Jugaad (act innovatively to a common problem of an individual or a group in order to come up with a workable solution by using available resources).

For a better understanding of the correlation among these forms of Jugaad, we have theoretically correlated them to the bottom of the pyramid division.

The occurrence of Jugaad, in fact, predominantly relates to the environments lacking the resources and available options to meet a certain need of a situation. We assume that the Jugaad phenomenon is a function of low income and low resource situations that are particularly part of the bottom of the pyramid cultures. People do Jugaad at various levels as depends upon the situation they are facing.

We propose following the three forms of Jugaad with respect to their occurrence and significance to the technological environment, providing some examples for each of them (fig. 5).

Figure 5: Forms of Jugaad with examples



Courtesy: Google search with keyword "Jugaad"

Source: Our own elaboration upon literature review and auto-ethnographic exercise

Survival Jugaad

The survival Jugaad is a kind of first level Jugaad that happens more frequently on daily basis in the pyramid population. The main aim of survival Jugaad (as evident from the name) is to cope with needs as a survival strategy.

Examples included in it are:

- ✓ Bargaining during the buy/sell process or shopping
- ✓ Fixing/repair activities despite buying new one and replacing
- ✓ Chilled air splitting with trouser to bring cold air to both the rooms, even though not so efficient (fig. 5, example A)
- ✓ Cooking under restricted conditions (fig. 5, example B)
- ✓ The space and convenience optimization in train journey (fig. 5, example C)
- ✓ The device prepared during the catastrophic condition in Apollo 13 mission (fig. 5, example D)

- ✓ The determination of the lady to straighten her hair in any case, shows the severity of the need and the tool used by the lady to meet her need (*fig. 5; example E*)

Characteristics:

- ✓ Individual skills are already developed and sufficient to accomplish the Jugaad.
- ✓ The solution is temporary.
- ✓ The aesthetic aspects are secondary.
- ✓ No engineering calculation or safety studies are done.
- ✓ It is mostly a hit and trial method that ends up upon achievement of desired either goal or giving it up.

Concluding, this kind of Jugaad usually looks ugly, appear situation-specific and has less applicability to other cases.

Creative Jugaad

This kind of Jugaad although is found at the bottom of the pyramid culture or at grass root level, is not limited to them. Through this kind of Jugaad, people satisfy their basic and creative needs/desires in a frugal way and come up with a Jugaad output called as creative improvisations. In some cases, the creative Jugaad might not be indispensable but the creator, owing to his or her thirst for creativity, goes for it.

Examples:

- ✓ Motorbike with roof and sealing fan (*fig. 5, example F*).
- ✓ Bicycle with car steering handle (*fig. 5, example G*).
- ✓ Clay refrigerator widely used in villages to prepare cooking pots/utensils in a creative way (*fig. 19, example H*).
- ✓ The multi-level cooking device, a creative design of a local fabricator to recover the heat energy (*fig. 5, example I*)

Characteristics:

- ✓ In general, not all the individuals have needed skills to go for creative Jugaad.
- ✓ Such kind of Jugaad also sometimes adds some additional features to an already existing product.
- ✓ Such Jugaad could be similar to incremental innovation or grassroots innovation.
- ✓ The focus in such Jugaad is to realize a thought, a modification, or an idea by using the available resources thus sacrificing on sophistication of the aesthetics.
- ✓ Such Jugaad is a result of high level of ingenuity with specific benefit to the person.

Innovative Jugaad

It deals with the application and contributions of *user's know-how* to find a solution to an existing problem or issue or in some cases provide a frugal alternative to already existing practices. Such Jugaads are not limited to personal use but may also give benefits to the community as well. Innovative Jugaad is a need-cum-opportunity based phenomenon that in comparison to the other forms of Jugaad has entrepreneurship as a part. This is the most important and potential form of Jugaad that appears worthy to be explored in details. To bring this Jugaad to mass production, anyway, specific measures and tools are necessary and this represents the biggest critical and challenging issue for innovative Jugaad.

Examples included in it are:

- ✓ The motorbike driven pesticide spray/ploughing vehicles, that provides *fast, easy to use and efficient way of spraying and ploughing services in cost-effective way*. This is a good example of customization that has *potentiality to be used by multiple users and in diverse agricultural applications* (*fig. 5, example J*).
- ✓ The *stair climbing wheel chair for disables* is another *innovative use of existing items to satisfy needs of a segment of the population* with mobility issue. Such innovative Jugaad

needs support from engineering and entrepreneur fields to manufacture and sell in the market (*fig. 5, example K*).

Characteristics:

- ✓ The occurrence of such Jugaad is very limited as compared to survival or creative Jugaad.
- ✓ It generally requires scientific knowledge or higher level of skills in that particular sector.
- ✓ For such Jugaad, however, a high level of education might not be necessary.
- ✓ The know-how in typical sector is the key factor of success in such Jugaad.
- ✓ In general, such solutions do have potentiality of mass production.
- ✓ In general, such solutions do have potentiality of knowledge creation.

By summarizing, we can say that the mentioned three forms of Jugaad can be imagined as three different layers. The first and bottom layer is the survival Jugaad, followed by the creative Jugaad and final layer is that of innovative Jugaad.

5. Conclusions: theoretical and practical implications, limits and future research directions

We have often heard an idiom as “where there is a will, there is a way”. In the same way, we can also say, “where there is a problem, there is a Jugaad”.

People in India and Pakistan often encourage other fellows in the moment of acute need or trouble by saying, don’t worry, we will find some Jugaad. In the practical terms, Jugaad is a way to solve an acute problem or satisfy an acute need.

In the literature, we found that the Jugaad on one side is used as a generalized term to describe some awkward fixes and makeshift arrangements done in order to come up with a temporary solution, while on the other hand, is used to describe innovative and frugal solutions.

This conceptual study has highlighted various comparative aspects of Jugaad and innovation, offering a theoretical contribution in terms of:

- a) distinction between *invention*, *innovation* and *Jugaad*;
 - b) proposition of a *classification model* with various *forms of Jugaad* to avoid generalized use of the term and propose some context-specific forms of Jugaad;
- and thus filling a gap in the specific literature that appears poor of contributions able to put order into the variety of point of views.

a) Apparently, Jugaad resembles the invention and innovation phenomena and the study unveils that Jugaad has certain similarities with invention and innovation in terms of finding innovative solution to some need, but there are also certain dissimilarities among these phenomena. The invention has more similarities with Jugaad in comparison to innovation, but it differs from Jugaad in the aspect that a Jugaad occurs only after it becomes functional and put into operation. However, invention may stay in the files and laboratory for longer period without even its implementation. Nonetheless there is a form of Jugaad that has the potentiality of innovation and it is presented in the classification model b).

b) The outcomes of the research helped us to propose three different forms of Jugaad as survival Jugaad, creative Jugaad and innovative Jugaad, each of them shows specific practical implications.

The *survival Jugaad* is function of people with scarce resources and low income with respect to their needs and thus they are forced to follow cheap ways of living hood or find a

solution with whatever is available in their hands at that time. This includes finding low cost materials for the food and living, adopting indigenous methods to meet daily necessities and relying as much as they can on the naturally occurring sources. The condition of survival Jugaad is also applied where the person is entrapped in a situation where s/he must have to rely on the option only available there at that very particular situation. This results in getting some other use of a product or component for which it is not even designed or intended to be used. We argue that a survival Jugaad is not a roadmap for innovation as it lacks sustainability and diffusion. It is a basic product of need-based reaction or response of people. However, it may lead to adopt analytical behaviour and an approach to seek multiple uses out of a product or component in order to discover some interesting uses and this may lead to optimization.

The *creative Jugaad* is a product of indigenous creativity in the individuals that grows by facing some situation of an acute need or desire to satisfy their sense of creativity and thus gives yield to a product that addresses the needs of that segment. This kind of Jugaad has a great potential to reap the benefits of the talent and ideas available at the grass root level and come up with breakthrough innovations. The role of university and government involvement may facilitate development of grass root talent. A remarkable exemplary work is ongoing in India under supervision and vision of Anil K. Gupta (Indian institute of management, Ahmedabad) and a number of organizations including Honeybee, National Innovation Foundation (NIF) and Grassroots Innovations Augmentation Network (GIAN). Their objective and vision is to promote grass root talent and empower local innovators. This movement has generated remarkable good quality innovations and useful knowledge.

The third proposed form is *innovative Jugaad* that includes innovative and incremental modification/ideas that satisfy needs of the large market segment. It has potentiality of diffusion if coupled with good entrepreneurship and marketing qualities. The universities and the government support can play an important role in promoting and developing innovative ideas and this potentially can result in sustainable innovations. These acts may lead innovative Jugaad to frugal innovation. These kind of Jugaads are not necessarily the results of efforts of individuals but also often include teamwork activities and contain multiple skills. This kind of Jugaad happens because of user's in depth awareness about the local needs. These innovations are sparked due to technical know-how of the people who develop these Jugaads. The great challenge for the success of such Jugaad is linked to the good entrepreneurial skills and support of venture capitalists to give financial and infrastructural base for the mass production and marketing up to the consumers. If properly groomed, this kind of Jugaad can give good quality solution at affordable prices.

We have thus proposed not to use a generic terminology as Jugaad to describe a mix of makeshifts, repairs and innovative ideas. We have proposed that survival Jugaad is only the makeshift arrangements that occur as result of struggle to continue living and using the available resources as much as possible. The other forms of Jugaad mentioned as creative Jugaad and innovative Jugaad are roadmaps for the sustainable product and process development. In this sense, the model we propose could have important practical implications in terms of his ability to help better distinguishing among the big Jugaad phenomenon those forms which could represent a road map for innovation and new business models.

So considering also our future direction for the research, we suggest to conduct single and dedicated studies on each of the above-mentioned forms of Jugaad by adding value to the entrepreneurial aspects of Jugaad.

Anyway, this paper is of course not without limitations. First of all it's important to underline that it represents only the first step of a more comprehensive research aimed to understand the phenomenon not only in the innovation perspective but also in the cultural one. In particular, the starting point of the overall research has been the doctoral thesis of one

of the Authors conducted during the period 2014-2016. So it's lacking of the literature analysis referred to the 2017 year. From the methodology point of view the qualitative method chosen has been justified by the particular cultural-geographical context considered in the research. Anyway the research could achieve more value if data setting was extended to other cultural context and analyzed in a quantitative form as well.

From this last point of view, the models given in the study need to be implemented in the grass root level in the low-income cultures as well as in the developed cultures. So, as a future research dimension, we suggest also to use similar study in a country other than India or Pakistan and without focusing on term Jugaad but focusing on creative improvisation or makeshift arrangement done by the people with limited resources and try to find out conceptual relationships to the results discussed here.

Closely related concepts to investigate could also be grass root innovation, frugal innovation and incremental innovation. Moreover, new product development and grass root entrepreneurship are also significantly linked topics that are aligned with the strategic scope and potential use of Jugaad.

Truly speaking, we have explored various themes linked to invention and innovation in comparison to Jugaad. The availability of large amount of literature on these topics makes it difficult to include all related concepts in a single study.

Thus, we suggest comparing Jugaad with these innovation typologies and other related concepts in each single and structured study so that maximum possible number of data can be analysed and good quality and rigor can be ensured on each topic in comparison with Jugaad.

Finally, as a common thing among the various forms Jugaads is the direct transformation of the tacit knowledge and user perceptions into a product providing perfect outcome in the form a new solution. So, the direct interaction and involvement of the user as an innovator could represent another interesting research area to explore.

References

- Anderson L. (2006). "Analytic autoethnography" *Journal of contemporary ethnography*, 35(4): 373-395.
- Arthur W.B. (2007). "The structure of invention", *Research policy*, 36(2): 274-287.
- Balatchandirane G. (2010). "Strategic implications of human capital TODAY", *IDSA International Workshop on National Security Strategy*.
- Barodawala B., Banerjee R., Roy S., Kapur V. (2015), "'Jugaad'- The Perennial Short-term Solution", *World Journal of Social Sciences*, 5(2): 163-176.
- Bartel C.A., Garud R. (2009). "The role of narratives in sustaining organizational innovation", *Organization science*, 20(1): 107-117.
- Baskaran S., Malekar G., Mehta K., (2012) "The Global Jugaad Commons: Cross-pollinating Concepts across Cultures", *Proceedings of National Collegiate Inventors and Innovators Annual Meeting*, San Francisco, March.
- Bhatti Y.A. (2012). "What is frugal, what is innovation? Towards a theory of frugal innovation", *Working Paper, Oxford Centre for Entrepreneurship and Innovation*. Retrieved from <http://ssrn.com/abstract=2005910>.
- Birchnell T. (2011). "Jugaad as systemic risk and disruptive innovation in India" *Contemporary South Asia*, 19(4): 357-372.
- Brem A., Wolfram P. (2014). "Research and development from the bottom up-introduction of terminologies for new product development in emerging markets", *Journal of innovation and entrepreneurship*, 3(1): 1-22.

- Chaturvedi A. (2014). "Jugaad", *International journal of multimedia information retrieval*, 3(2): 4-8.
- Christensen C.M., (1997). *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*, Boston, MA: Harvard Business School Press.
- Coccia M. (2006). "Classifications of innovations: Survey and future directions", *Working Paper Ceris-Cnr*, 8(2): 3-19.
- Craig J., Young S. (2014). "Jugād: Youth and Enterprise in India", *Annals of the Association of American Geographers*, 104(1): 182-195.
- Drechsler Sharp M., Riera J.L., Jones S.R. (2012). "Telling our stories: Using autoethnography to construct identities at the intersections", *Journal of Student Affairs Research and Practice*, 49(3): 315-332.
- Freeman C. (1982). *The Economics of Industrial Innovation*, 2nd edn, London: Pinter.
- Govindarjan V. (2011). "Jugaad - A Model for Innovation", *Forbes India Magazine*, June 1, Retrieved from <http://forbesindia.com/printcontent/25512>.
- Gupta A.K. "This is not Jugaad: a misnomer for majority of the grassroots innovations". Unpublished article.
- Gupta V.K. (2008). "Indian patent output 1990-2007", *India, Science and Technology*, National Institute of Science, Technology And Development Studies (NISTADS), CSIR: India. Retrieved from <http://www.nistads.res.in/indiasnt2008/t5output/t5out9.htm>.
- Guthrie H., Dawe S. (2004). "Overview: What is Innovation". *Vocational education and training and innovation: Research readings*. Adelaide, Australia: National Centre for Vocational Education Research Ltd.
- Herrmann, D.K. (1999), "Tracking systems as a catalyst for incremental innovation", *Management Decision*, 37(10): 786-791.
- Hoffmann, V. (2011). "Knowledge and Innovation Management", *Module Reader*. Hohenheim University.
- Jon-Arild J. (2008). "Organisational innovation as part of knowledge management", *International Journal of Information Management*, 28(5): 403-412.
- Kotsemir M.N., Abroskin A., Meissner D., (2013) "Innovation Concepts and Typology – An Evolutionary Discussion", *Higher School of Economics Research Paper*, WP BRP 05/STI/2013. Retrieved from <https://ssrn.com/abstract=2221299>.
- Krishnan R.T. (2010). *From jugaad to systematic innovation: The challenge for India*, Bangalore, India: Utpreraka Foundation.
- Kumar V., Chand V.S., Zhang L., Hoppers C.A.O., Zhang W., Esders M., Gupta A.K., (2013). "Colloquium Grassroots Innovations for Inclusive Development: Need for a Paradigmatic Shift", *VIKALPA*, 38(3): 103-122.
- Malhotra D., Seth S. (2013). "Jugaad as a Strategy: An Indian Perspective", *International journal of Innovative research & studies*, 2(12): 289-300.
- Mantri A., Ahuja S. (2015). "Innovation Management process in young academic institutes", *Journal of Engineering Education Transformations*, Special Issue, January: 252-256.
- Migliaccio M. (2005), "Innovazione architetturale ed innovazione radicale: effetti sulle competenze organizzative delle imprese", *Sinergie Italian Journal of Management*, n. 67, p. 259-264.
- O'Sullivan, D., Dooley L. (2009). *Applying Innovation*, Thousand Oaks, California: Sage Publications, Inc.
- Pitterle S. (2014). "STEPHEN'S E-PORTFOLIO", April 29th. Retrieved from <http://sites.psu.edu/stephen/blog/>.
- Prahalad C. K. (2012). "Bottom of the Pyramid as a Source of Breakthrough Innovations", *Journal of Product Innovation Management*, 29(1): 6-12.

- Prahalad, C. K., & Mashelkar, R. A. (2010). "Innovation's Holy Grail", *Harvard Business Review*, (July-August): 10.
- Radjou N., Prabhu J., Ahuja S. (2012). *Jugaad innovation: Think frugal, be flexible, generate breakthrough growth*. San Francisco: John Wiley & Sons.
- Rai, A.S. (2015). "The affect of Jugaad: Frugal innovation and postcolonial practice in India's mobile phone ecology" *Environment and Planning D: Society and Space*, 33(6): 985-1002.
- Rao B.C. (2013). "How disruptive is frugal?", *Technology in Society*, 35(1): 65-73.
- Rouse, W.B. (1992). *Strategies for Innovation: Creating Successful Products, Systems, and Organizations*, New York: John Wiley and Sons, Inc.
- Satpathy I., Patnail B.C.M. (2012). "JUGAADU - The Smart and Cost effective Innovative Managers", *Journal of Business Management & Social Sciences Research*, 1(1): 19-23.
- Schumpeter J.A. (1934). *Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle*. Cambridge: Harvard University Press.
- Sekhsaria P., (2013). "The making of an indigenous STM: Technological Jugaad as a culture of innovation in India", (pp. 137–152). In Konrad K., Coenen C., Dijkstra A., Milburn C., van Lente H., (Eds.), *Shaping Emerging Technologies: Governance, Innovation, Discourse*. Amsterdam: IOS Press and AKA.
- Senge P. (1990). *The Fifth Discipline: The Art and Practice of the Learning Organization*, New York: Doubleday Currency.
- Singh R., Gupta K.V., Mondal A. (2012). "Jugaad - From 'Making Do' and 'Quick Fix' to an innovative, sustainable and low-cost survival strategy at the bottom of the pyramid", *International Journal of Rural Management*, 8(1-2): 87-105.
- Singh S., Sharma G., Mahendru M. (2011). "The Jugaad Technology (Indigenous Innovations), A Case Study of Indian Origin", *Asia Pacific Journal of Research in Business Management*, 2(4): 157-168.
- Sinha, J.B.P. (1995). "Factors facilitating and impeding growth of psychology in South Asia with special reference to India", *International journal of Psychology*, 30(6): 741-753.
- Wall S., (2008) "Easier said than done: Writing an autoethnography", *International Journal of Qualitative Methods*, 7(1): 38-53.
- WIPO MAGAZINE, (2013) "Chotukool: Keeping things cool with frugal innovation", 6: 6-8. Retrieved from http://www.wipo.int/wipo_magazine/en/2013/06/article_0003.html.
- Wooldridge A. (2010). "First break all the rules: The charms of frugal innovation", *The Economist, Special Report: Innovation in Emerging Markets*, April 15th.

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