

FRUGAL INNOVATION: A NEED WHICH NEED TO BE CROWD-SOURCED

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Abstract

In recent years, the focus of the governments, business and civil society around the world has been shifted from the traditional way of performing the various tasks toward more inclusive, where all the stakeholders work in collaboration. Keeping this perspective in mind, we as an author of this paper try to explore the possibilities of managing low cost innovation developed by the people who are not at the leading edge of the technologies, but who are living at the edge of poverty and its social and economic implication on the society at large. This paper with the help of a typical case study research method will try to fill the gap in the previous research in the field of frugal innovation, user innovation, crowdsourcing and BOP, which mainly focus on the frugal innovation developed by different organizations, user innovation for the upper strata of life, crowdsourcing through internet and BOP from the companies perspective. This research will highlight the low cost innovation done by people who are short of connectivity, information, education & economic resources, along with this it will try to justify the framework proposed by C.K. Prahalad for the "Bottom of the Pyramid" market and on the basis of the above findings will strongly argue in favor of crowdsourcing the process of frugal innovation.

Keywords: *User & Non-User Innovation, Frugal Innovation, Bottom of the Pyramid, Crowdsourcing*

Introduction

It is beyond doubt that the world is changing at a very fast pace and as a result there are immense challenges faced by the modern society. These challenges are not confined to few countries, few geographical areas or few societies; they are pervasive in nature and can be seen all around the world. The traditional approach of doing things, solving problems and thinking are becoming obsolete in nature and there is an urgent call from the present, that if these challenges are not met with sustainable and inclusive solutions then the future seems to be heading toward a stagnation of growth, depleted resources, increasing gap between rich and poor and the chances of friction within the society. Within the context of this changing world, innovation is one of the challenges faced by the societies & organizations to work toward the welfare of the society at large and let the benefits reach to the last person on the earth. It can be observed

that many organizations are taking the cost cutting route to stay competitive and meet the customers need for the value for money, but at the same it can be seen with naked eyes that this strategy is not sustainable for a longer period of time. As the real income of the people in developed countries is decreasing they are looking for products which can satisfy their needs within the new budget limit they have decided for their consumption. In contrast, the developing world has seen people rising out of poverty, increased level of income, wider rich and poor gap and the people whose needs are still unmet by this unprecedented growth. Big corporation are busy fighting to maintain their existing markets through cost cutting measures, increased expenditure on research & development which most often doesn't give the desired results. In this process these big organizations have ignored the vast population whose needs are still unmet and to the utter surprise

for all of us this population constitutes a large market.

There has been lot of research not only on innovation as a common phenomenon, but many other fields associated with innovation like User-Innovation, Frugal innovation, still there are many areas to be explored. Most of the research has been concentrated on user-innovation targeted at the upper strata of society and how certain companies are involving these users in the process of innovation. As far as the research on frugal innovation is concerned the focus has been on the industries which are doing frugal innovation and even if it is related with innovation by individuals, then it is focused on innovation done by the individuals with higher educational background and a wider social & financial network. Likewise research on BOP also focuses on organizations rather than people. The research on crowdsourcing as a business process has left many gap to be filled, with further research like managing people participation in an underdeveloped society in terms of connectivity, information, education and economics resources. So, within the periphery of the above background we would like to explore the possibilities and ways for different organizations & governments to manage innovation developed by marginalized people, meeting the need of the marginalized society throughout the world and provide low cost solution to the society at large.

Research Methodology

In this paper we use a case study research method. The case study we use is a typical and comprehensive which will serve the purpose of our study and it include five individual innovators case studies embedded in it. There has been a cross analysis of various websites associated with (National Innovation Foundation of India) NIF and its associated organizations. Along with the study of

this organization as a whole, we would also discuss the history of five individual innovations case studies from different categories of product so as to provide a holistic picture of the effect the low cost innovation developed by people at the grassroots level are making and to conclude that these people are not only consumers but they are also producers.

National Innovation Foundation of India This organization is our case for this study. National Innovation Foundation is an autonomous organization under the banner of Department of Science and Technology, Government of India.

This organization was established upon the philosophy of Honey Bee Network. Honey Bee is a network of individuals, innovators, farmers, scholars, academicians, policy makers, entrepreneurs and non-governmental organizations (NGOs). NIF with the support of Honey Bee Network has built a network across the whole country. Both these organizations work together along the total value chain of the grassroots innovations. The organization has developed a database of almost 200 thousand of grassroots innovations across 575 districts of the country. Honey Bee has a personal network in more than 75 countries.

The above mentioned details about NIF and Honey Bee Network can give our readers an idea that our case for this study is very comprehensive in nature and it includes every facets of our research. The scale at which these organizations are managing innovation is a perfect example of involving a large crowd to innovate and reap the inclusive benefits.

Five Individual Case Studies

As there was a vast database of innovations under NIF, for the purpose of this research it was imperative to select the cases as per the purpose of this research.

The selection of the cases was purposive in nature, considering the fact that there could be other grassroots innovation, the final selection of the cases was deemed fit to achieve the purpose of the research.

The selection of the cases was based on the: Innovator Background (particularly education and financial, all of them had no preliminary technical training, they belonged to poorer section of the society), User & Non-User Innovations (the innovations were done for both individual uses and societal uses) and finally, Entrepreneurship (all the innovations were commercialized to a certain extent).

Literature Review

Innovation

There have been many definitions of Innovation but in context of our study we find the following very relevant:

“Innovation is something fresh (new, original, or improved) that creates value”. The explanation behind this definition is that something new is not enough for the definition of innovation.

There are plenty cases where something new have no new value (a new color of a product or a new chemical produced that does nothing). Sometimes, the value creation results because the item is simply useful to us. We can create a lot of fresh or new things that are of no use and no value. It must create value to be innovation. Also note that the “something” could be a process, product, or service.

“Innovation is the creation of something that improves the way we live our lives”(Obama, 2007)

User-Innovation

“An innovation developed by an innovator who, at the time the innovation was developed benefited only from using it is classified as a user innovation”. (Shah, 2000)

Non User-Innovation

From the above definition we can conclude that “An Innovation developed by an innovator who, at the time the innovation was developed must have tried to commercialize it and started getting benefit out of selling it to users rather than using it”.

There is a vast research database for the user innovation and it all suggest that many innovative products and process have been developed by user- individual as well as user firms. Adam Smith (1776) recognized this phenomenon very early and specified the importance of “ the invention of a great number of machines which facilitate and abridge labor, and enable one man to do the work of many.” Furthermore he went to write that “ a great part of the machines made use of in those manufacturer in which labor is most subdivided, were originally the invention of common workmen, who, being each of them employed in some very simple operation, naturally turned their thoughts towards finding out easier and readier methods of performing it.” Eric Von Hippel is the prominent writer on user innovation and he is the one who came out with the term “Lead Users” (Von Hippel, Lead Users: A Source of Novel Product Concepts, 1986). Most of the useful innovation in the oil refinery industry were made by the firms itself (Enos, 1962). The same phenomenon was reported in chemical industry (Freeman, 1968). It was found that many innovations by British firms were made for their own use (Pavitt, 1984). Von Hippel himself found that major innovation in semiconductor processing and scientific instruments were made by user firms (Von Hippel, 1988). Even in the consumer products category like sports equipment, it was found that some of the products which went on to become commercially successful were developed by individual users; in fact they were the one who created the opportunity for the existed manufacturers (Shah, 2000). Some other

research have also shown that 19% to 36% user firms in five industrial products category developed or modified the products for their own use (Urban & Von Hippel, 1988); (Herstatt & Von Hippel, 1992); (Morrison, Roberts, & Von Hippel, 2000); (Franke & Von Hippel, 2003); (Lüthje, Customers as Co-Inventors: An Empirical Analysis of the Antecedents of Customer-Driven Innovations in the Field of Medical Equipment., 2003). On the other hand three different studies of user innovation in consumer products category, it was found that 10% to 38% of users developed or modified the products for their own use (Lüthje, 2004); (Franke & Shah, 2003); (Lüthje, Herstatt, & Von Hippel, 2005). In their paper Vinita Yadav and Preeti Goyal finds out how user innovation in the rural areas have been instrumental in social & economic growth (Yadav & Goyal, 2015). On the basis of one of the meta-analysis of market segmentation, in which it was found that the user need for products is highly heterogeneous across various fields (Franke & Reisinger, 2003), it can be said that user innovate themselves as these varied needs are not met by the incumbent industries. It has been found that as the user innovators gain experience with the products or service they have developed, they tend to figure out the commercial potential for them (Haefliger et al. 2010).

Frugal Innovation

“Frugal Innovation” arose from one English translation for the Hindi term Jugaad, which means an improvised arrangement or work-around obliged by a lack of resources. In India, Jugaad is also the name for a kind of cobbled-together rural vehicle made from a wagon and a repurposed diesel irrigation pump. Crude, but effective”. In context of our study “Frugal innovation” can be defined as a process of utilizing fewer resources, or deploying them in creative ways,

which helps to create affordable products and services that deliver value to low-income consumers (Bound & Thornton, 2012). The Boston Evening Post of 1767 illustrated the practice of using resources in an economical fashion by stating “Save Your Money and You Will Save Your Country!” (Morgan, 1967). Though, this frugality doesn’t signifies any sort of deprivation for the concerned people but rather as “sacrificing a series of whims for the sake of obtaining a more worthy goal” (Lastovicka et al, 1999: 1987).

As far as the literature on Frugal Innovation is concerned it revolves around the work of C.K. Prahalad. He strongly argues in favor of the market at the Bottom of Pyramid in all his work. Navi Rajdou, Jaideep Prabhu, Simone Ahuja in their book “Jugaad Innovation. Think-Frugal, Be Flexible, Generate Breakthrough Growth” discuss why world needs frugal innovation. They have recommended organizations to “seek opportunity in adversity, do more with less, think and act flexibly, keep it simple, include the margin and follow your heart” (Rajdou, Prabhu, & Ahuja, 2012). A research report by Kirsten Bound and Ian Thornton for Nesta states that frugal innovation is the need of the hour for not only developing countries but as well as the developed countries (Bound & Thornton, 2012). In another report for Serco Institute Shalabh Kumar Singh, Ashish Gambhir, Alexis Sotiropoulos and Stephen Duckworth studies many successful frugal innovations in public service and recommend an active role for the government (Singh, Gambhir, Sotiropoulos, & Duckworth, 2012). In his paper Anil K. Gupta states that the “sink” has to become the “source” and poor the providers, so it’s the time to challenge the status quo and connect with the people who are creative but short of economic resources (Gupta, 2006).

Moreover, from the economic point of view, Adam Smith (1904; II.3.19) recognize that capital

Can be generated by the savings from frugal: "By what a frugal man annually saves, he not only affords maintenance to an additional number of productive hands, for that or the ensuing year, but, like the founder of a public workhouse, he establishes as it were a perpetual fund for the maintenance of an equal number in all times to come." Thus the savings from being frugal can not only generate capital or disposable incomes for individuals but also as a result can lead to national wealth. Furthermore, from the customer perspective the frugal innovation not only signifies lower cost but also functioning of it with scarce resources and infrastructure and from the firms perspective frugal innovation means coming up with a product for the underserved consumers in constrained environment (Bhatti, 2012).

Bottom of the Pyramid

Since C.K. Prahalad and his colleagues introduced the concept of BOP, there has been a lot of research related to this concept (Prahalad & Hart, *Strategies for the Bottom of the Pyramid: Creating sustainable development.*, 1999). In his work he defined the BOP market as the population of 4 billion people living on less than \$1500 a year and he discusses extensively about the BOP in his book and argues in favor of developing business around this market (Prahalad, 2005). On the other hand one of the writers Aneel Karnani criticizes the concept of BOP as introduced by C.K. Prahalad. He argues that the profits are only modest in comparison to what Prahalad had suggested, and to reap the real benefits the organizations should not treat people at BOP level as just consumers but also as producers (Karnani, 2007).

Prahalad reply to this criticism by stating that he also recommends that the people at BOP should also be considered as producers and he cites many examples in his letter to Aneel where companies are involving the users as producers (Prahalad, 2007). SRISTI also criticize Prahalad in its GRIID report stating that his concept treat poor as sink or consumers rather than source or producers.

The BOP framework signifies the creation of value through mutual collaboration among various stakeholders, the ability of the enterprises to meet the needs of the poor is directly proportional to return generated (Antúnez-de-Mayolo, 2012). BOP as a concept can be seen from two perspective: one from BOP as consumer which generate revenue and other from BOP as Producers which help to enhance the standard of living of the poor (Prahalad & Hart, 2002, Prahalad & Hammond, 2002). The firms can work from both the perspective (Anupindi & Sivakumar, 2007). There are some research which suggest that there is profitability at BOP as Hart find that Solar Electric Light in Bangalore, India is profitable (Hart S. L., 2005), likewise Lakshman finds that ITC got 30% increase in its market capitalization since it started targeting BOP market (Lakshman, 2009).

Crowdsourcing

The term 'crowdsourcing' was first introduced by Howe as "the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call. This can take the form of peer-production (when the job is performed collaboratively), but is also often undertaken by sole individuals. The crucial prerequisite is the use of the open call format and the large network of potential laborers" (Howe, *The rise of crowdsourcing.*, 2006). Later internet or online

was also added in the many other definitions given by other writers. The first writer to write a research article on crowdsourcing was Brabham who mentioned the importance of “wisdom of crowd” and the development of web technology (Brabham, 2008). Howe in his book “Crowdsourcing. How the power of crowd is driving the future of business” discusses how different categories of business are using the crowdsourcing for their business process particularly for production. His case studies include wide range of industries like Wikipedia sourcing information, Linux sourcing software codes, Threadless a T-shirt manufacturing company sourcing its design, iStockphoto a web company sourcing photographs, Procter & Gamble sourcing ideas from the crowd (Howe, 2008). Don Tapscott and Anthony D. Williams in their book “Wikinomics..How Mass Collaboration Changes Everything” talks about Ideagoras like InnoCentive which helps companies find solution for their unsolved R&D problems, he further states that companies need to look beyond their own individual R&D departments and start treating the world as the source of solutions to their problems (Tapscott & Williams, 2006).

As crowdsourcing signifies the external source, the importance of external source for innovation was recognized back in 1980s (von Hippel, 1988) and gained even more traction since 2003, as Chesbrough came up with the term ‘open innovation’ (Chesbrough, 2003). Since then the consumers are no longer simply considered to be only external sources of ideas (outside-in) (Berthon et al., 2007; Bogers et al., 2010; Poetz and Schreier, 2012), but also an external pathway to the market (inside-out) (Baldwin and von Hippel, 2006; Shah and Tripsas, 2007). In their article Larry Huston and Nabil Sakkab reported that P&G R&D productivity has increased by 60%, the innova-

tion rate has more than doubled and cost of innovation has fallen since it started sourcing solutions from the crowd (Huston & Sakkab, 2006).

Research Gap

Most of the present research literature on user innovations focuses on user firms innovating industrial products or users innovating consumer products like sports equipment's. There are very few exemplary research papers on innovation by the people who belong to lower strata of life, so this area is wide open for the further research. Likewise the research in frugal innovation is concentrated on the organizations which are doing frugal innovation rather than the user driven low cost innovations. The same is the case with Bottom of the Pyramid concept, most of the research focuses on how big organizations can make low cost products and create a market for themselves at the bottom of the pyramid. There are researchers who criticize this concept and argue in favor of including poor as producers to create a sustainable consumer market, on the other hand the proponent of the concept say that his findings not only suggest that there is huge consumer market at the bottom but also talks about the inclusive and sustainable growth. Most of the research in crowdsourcing revolves around how companies are using the crowd through various internet platforms to solve the problems at their end, so there is a gap in research as far as managing the crowdsourcing is concerned in a population which is not connected through internet and how common people with no professional training and scarcity of resources can be part of crowdsourcing process. So this study will not only try to fill the gap in the fields of user innovation, bottom of the pyramid concept and crowdsourcing, but also try to project a unified picture of these three different concepts.

Findings

Management of Innovations at the grass-root level

As mentioned above we are trying to find out how innovation at the grass root level

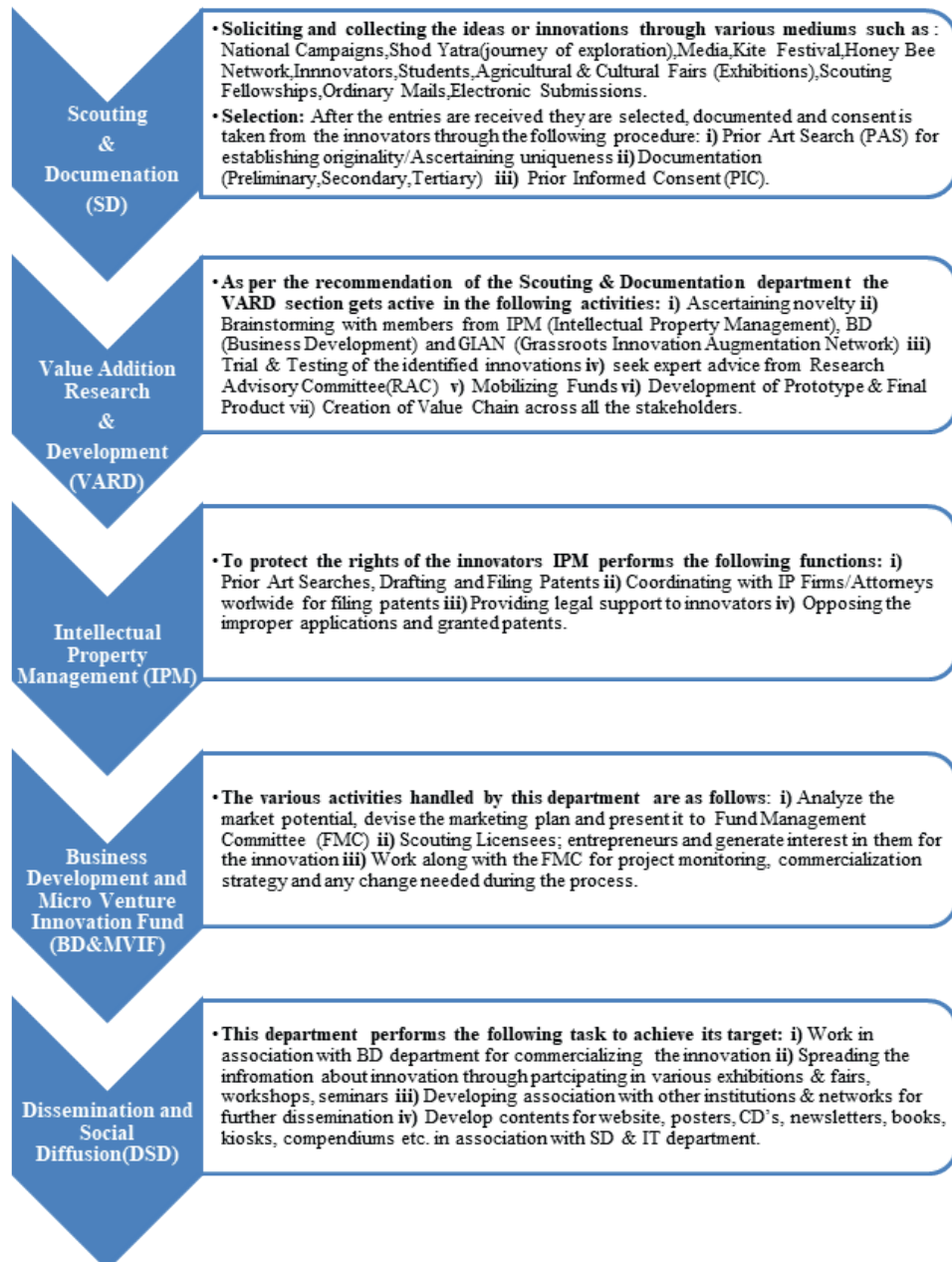


Fig 1: Details of Departments compiled by the author

Innovators, Innovations & Social & Economic Implication of Grassroots Innovations

With a large database of 200 thousands of ideas/innovations/traditional knowledge with NIF, there are many success stories of these innovations. We will highlight some of them so as to support the purpose of our research. The five case studies which the authors felt to be appropriate for the present study are as follows:

<p>Case 1 Innovation Laxmi Asu Machine Innovator Chintakindi Mallesham</p>	<ul style="list-style-type: none"> • Innovator Background: 20 years of age with middle school education & no technical know-how, from a poor handloom silk weaver's family. • Innovation Details: Laxmi Asu Machine is a Saree(a traditional Indian women wear) weaving machine, innovated seeing his mother's hardships as a weaver. • Social & Economic Implications: Relieved women of their physical pain, helped in work-life balance, girls are free to go to school, good designs, quality, quantity & increased returns for the weavers, the innovators sold hundreds of machines .
<p>Case 2 Innovation Groundnut Digger cum Separator Innovator Yusuf Khan</p>	<ul style="list-style-type: none"> • Innovator Background: Born in village, studied till primary school, after working for a while in Kuwait as building contractor established his workshop to repair & manufacture agricultural equipments. • Innovation Details: Groundnut Digger cum Separator is an agricultural equipment to harvest groundnuts, innovated noticing the problems of groundnut farmers. • Social & Economic Implications: Relieved the farmers from manual extraction of the pods which were left in the ground by the previous harvesters machine ,as a result decreased their financial burden, increase the harvest, helped to manage the scarcity of labor, the innovator sold 35 machines & was the finalist in the Asian Innovation Award in 2005, The technology of groundnut digger has been transferred to ARDEE Group of Companies, Visakhapatnam, India to be used in Sea Beach Cleaner.
<p>Case 3 Innovation Mini Sanitary Napkin making machine Innovator A. Muruganatham</p>	<ul style="list-style-type: none"> • Innovator Background: Lost his father at early age, dropped out of school, tried his hands on various jobs from farm labor to yarn selling agent. • Innovation Details: Sanitary Napkin manufacturing machine, innovated noticing his wife using cloth instead of sanitary pads. • Social & Economic Implications: Affordable sanitary napkins for girls and women and saving them from embarrassment of using cloth, many self -help groups of women are using these machines, the innovators owns a firm by the name of " Jayshree Industries" .
<p>Case 4 Innovation Multi Tree Climber Innovator D. Renganathan alias D.N. Venkat</p>	<ul style="list-style-type: none"> • Innovator Background: After working as a daily wage earner, selling spare parts and as a mechanic, chose agriculture as his work area, as he belonged to coconut plantation area. • Innovation Details: Noticing the difficulty in climbing coconut trees innovated the low cost Multi Tree Climber. • Social & Economic Implications: Reduce the risk and hard work for coconut tree climbers, increased the opportunity to earn more in the wake of scarcity of labor, the innovator sold hundreds of machines and exported to some countries also.
<p>Case 5 Innovation Solar Mosquito Destroyer Innovator Mathews K Mathew</p>	<ul style="list-style-type: none"> • Innovator Background: Born in a farmer family Mathews was a keen lover of the nature and always busy and interested in developing different devices. • Innovation Details: Noticing the menace of mosquitoes in rural areas with electricity problem innovated the Mosquito Destroyer. • Social & Economic Implications: Help in fighting the menace of mosquitoes and in turn fighting diseases, innovator supplied his product under the name "Hawker" to various individuals, institutions, hospitals, government schools etc.

Fig 2: Innovation List compiled by the author

Are being managed and disseminated in a society, where there is lack of connectivity, information, education & economic resources. In this section we are trying to explore the various activities performed by the NIF and the associated organizations regarding managing these innovations. After navigating through the entire website related to NIF we come across the following procedures and departments performing various functions:

In line with the model of Grassroots to Global (G2G) proposed by NIF, these innovation has generated lot of publicity worldwide and as a result there have been many enquiries regarding different products from countries across the globe. Many of the innovative products like coconut trees climber and milk machine have been exported to countries like Hawaii (USA), Ethiopia, Philippines, Maldives and Uganda. Moreover, many established companies, firms and even some development organizations of government has come forward in marketing the grassroots innovations. Some of the prominent ones are; Future Group which is having retail stores across India , Dham-pur Sugar Mills a leading integrated sugarcane processing company, Tata Group of Industries, one of the biggest business conglomerate , MATSYAFED – The Kerala State Co-operative Federation for Fisheries Development has tied up with NIF, Altair Management Consultants a company of Dubai was given the non-exclusive international rights of Mitticool products. The literature available on the website of NIF suggest that many national & international development agencies like IRDC India, CSIR India, ICMR India, DST India, ICAR India, ISIS Innovation Ltd. (A Oxford University Company) etc. which are engaged in research and development are working in association with NIF to support the cause of grassroots innovation.

NIF has filed 725 patents so far including eight filed in USA, out of which 37 have granted in India and five in USA. Many innovations which don't have the potential of commercialization at a larger scale but can be immensely useful for the society are disseminated as open source technologies which can be used by anyone freely. NIF has also established Grass-

roots Technological Innovations Acquisition Fund (GTIAF) to acquire the rights of grassroots innovation through an upfront fee and disseminate at a low cost or no cost to other innovators, fabricators, farmers or entrepreneurs across the country for societal good.

Discussion

In this study we have explored and find out how grassroots innovation developed by the people, who are living at the edge of poverty and are short of connectivity, information, professional education and economic resources are being managed at a mass scale and how the collaboration among different entities is leading to social & economic transformation of the society at large. In this section we will use our findings related to these research questions and try to justify the framework proposed by C.K. Prahalad for the BOP market and support our objective which is to recommend that people at the grassroots level can be part of the crowdsourcing process and they can be the solution providers of the problems at this level of society.

The Bottom of the Pyramid Framework by C.K. Prahalad

As mentioned in the literature C.K. Prahalad along with his colleagues, is the one who came up with the Bottom of the Pyramid concept and suggested that there is a big consumer market for the companies to explore at the BOP. Along with many proponents of his concept there were many people who criticized his concept, the most prominent one was Aneel Karnani who criticized Prahalad concept by saying that the market at BOP is not as profitable as suggested by Prahalad and the consumer centric approach toward this market will not succeed. He further added that the people in this market should be treated as producers

rather than only consumers. Prahalad in his answer to the criticism of Aneel, says that he also focusses on consumption as well as production at the BOP level. He stated that the initial process should be started by treating the people at BOP as consumers and then the evolution of the process can follow with the passage of time. He tries to justify his point by citing some examples of companies which are not only treating the population at the BOP as consumers but as well as producers and he also mention that consumption of innovative products/services can increase the disposable income at the hand of people which in turn creates a consumer market for other products. Prahalad has proposed that the solution for economic development and social transformation at the Bottom of the Pyramid is Co-Creation between the consumer at this level and the organization involved in this process. In extension of his idea of BOP, Prahalad proposed a framework where various entities from different spheres of society can be a part of the social & economic development at the BOP.

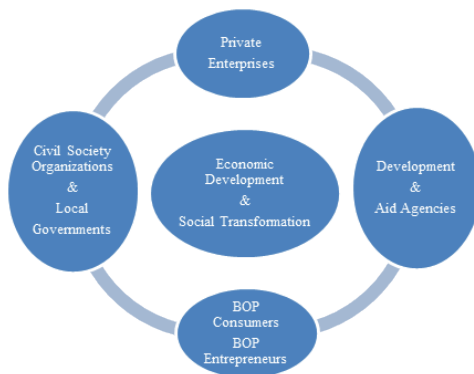


Fig 3: Source (Prahalad, 2005). The Fortune at the Bottom of the Pyramid: Eradicating Poverty through Profits. New Delhi: Pearson Education.

During our case study we found out that at various stages of activities performed

by the NIF, the entities which have been talked about in the above framework has been playing a major role in managing the complete value chain of the frugal innovation development and dissemination among the marginalized society and improving the economic and social conditions of the society.

Crowdsourcing the Frugal Innovation

Through, literature review we found that crowdsourcing is gaining currency and many organizations are using this process to perform various business & social tasks. Crowdsourcing as a phenomenon has become more important since the internet got pervasive all around the world but as a process it has been there before the arrival of the internet. The definition mentioned above states that crowdsourcing is a process of soliciting a solution from the crowd instead of regular employees or any designated agency and the platform most often used to solicit the solutions is internet. But as we know at the first stage the world is divided between developed, developing countries and underdeveloped countries then at the second stage the population in these countries particularly in the developing and underdeveloped countries is divided by connectivity not only by internet or other means of communication but also in terms of basic transport facilities. So in this divided population it becomes a huge challenge to seek out solution and provide solution for the problem of this population. The case study we have followed for this research provides solution to this challenge.

During our study of various cases of innovation we found that every innovation has its genesis in the problems faced by the innovator himself or his immediate neighborhood and his/her concern and earnest desire to solve that problem. It

was found that once the innovator came up with the solution, there was a natural process of dissemination of the innovation through word of mouth and many people showed interest in the technology and bought it for their use and were content with the change the product brought to their life. It shows that the need for the product existed but there were no established solution providers who can give solutions to their problem, so the solution came from within the society and it was consumed within the same society. As different organizations, whether they are government, non-government or private, exist as a part of society and their every effort is directed toward society, it seems quite natural for them to be interconnected with each other and work for inclusive growth. But most often it is found that some part of the society is neglected, especially by the private organizations, because they don't find any lucrative market in that part of the society. Sometimes it is also observed that organizations are not able to judge the exact need of this society. As rightly pointed out by Stuart Hart in his interview, citing the example of Godrej "Chotukool Refrigerator" that initially Godrej, relying on traditional marketing research, launched the refrigerator, thinking they had created the right product with a right price for the BOP market, but the product failed. After learning from their failure, they thought of co-creating the product with their targeted consumers and asked its team to spend time with the consumers and try to know what exactly they want. Now they were with the consumers, treating them as potential partners rather than just consumers, and as a result, they came up with a successful product called "Chotukool" which means little cool in Hindi language (Hart S., 2013). The case study in this research addresses this gap between the efforts of the various organiza-

tions and the need of the marginalized society.

As we can see in the figure below, NIF has created a wide physical network, in contrast to the online crowdsourcing, where an internet network connects the organization and the crowd of contributors. The NIF network lets all the people involved in the process of soliciting & disseminating the frugal innovation physically through the various networks depicted below. This is the best example of crowdsourcing through offline means, which can be used in digitally divided countries like India.

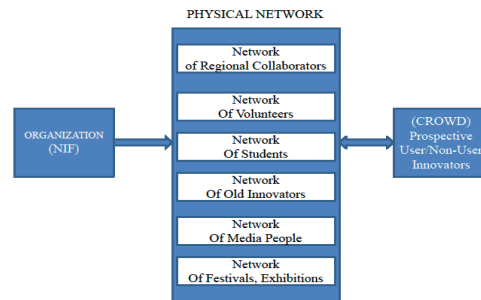


Fig 4: Offline Crowdsourcing for Frugal Innovation in India

Conclusion & Recommendations

As the study suggests that there have been many positive economic and social changes due to the innovation developed at the grassroots level, the results of the study are highly significant for the managers and organizations. As the study proves that the consumption of innovative products increases the disposable income of the people at the BOP level, it is highly recommended to the marketing managers or the organization as a whole to include the support for frugal or user & non-user innovation as a part of their CSR strategy (as TATA group is doing), as it will not only enhance their corporate image, but will also result in a potential consumer

base for them in the long run.

From the academic perspective our findings and the above discussion suggest that the interconnected network of different entities mentioned in the BOP framework helps in the economic development and social transformation of the society at the grassroots level. So we can say that our case study support the framework proposed by C.K. Prahalad. Crowdsourcing as a process suggest that it solicit solutions from the crowd to the problem at the end of the various organizations. As organization exist to serve the people, so there is an opportunity for crowdsourcing at the end of organizations. We know that there is a problem not only at the end of the government and non-government organizations that how they can improve the social and economic condition of its people they are serving, but the private enterprises are also always in search out for profitable and social solutions to meet the need of the consumers. Our case study clearly shows that people at the BOP level can be the solution providers for their own problem; all they need is just a support and motivation. The governments, civil society organizations, private enterprises and development & aid agencies proved to be this support and motivation. As we found that the innovations were done by the people living in all sort of scarcity, it has been a huge challenge to manage these innovations and disseminate them not only across India but also beyond the borders of India. NIF and its associated organization are using the vast physical network of people along with the latest information technology to scout and disseminate the innovations. It shows the way how crowdsourcing can be managed in a society devoid of and divided by many resources. So, with our findings and discussion we can conclude that the problem of economic & social development of the

marginalized society and the availability of low cost innovation exist in the world and the solutions can be solicited from the same society. Finally we can say that the need for the frugal innovation can be crowdsourced to the society to get the inclusive solution for the inclusive growth. As far as the scope for further research is concerned a cross-country research, more quantitative and qualitative research based on primary & secondary data can be done to measure the effect of the grassroots innovation. Furthermore, on the basis of our finding we propose two suppositions for further research:

H1: The organizational support for the frugal innovation positively affects the corporate image.

H2: The frugal innovation increases the savings and consumer expenditure.

References:

- Ant-nez-de-Mayolo, C. (2102). The Role of Innovation at the Bottom of The Pyramid in Latin America: Eight Case Studies, *Procedia - Social and Behavioral Sciences* 40 (2012) 134 – 140
- Anupindi, R., and S. Sivakumar (2007). ITC's e-Choupal: A platform strategy for rural transformation. In V.K. Rangan, J.A. Quelch, G. Herrero, and B. Barton (Eds.), *Business Solutions for the Global Poor: Creating Social and Economic value: 173-182* (San Francisco: Josey-Bass).
- Baldwin, C.C.H., von Hippel, E., (2006). How user innovations become commercial products: a theoretical investigation and case study? *Res. Policy* 35 (9), 1291–1313.
- Berthon, P.R., Pitt, L.F., McCarthy, I., Kates, S.M., (2007). When customers get clever: managerial approaches to dealing with creative consumers? *Bus. Horiz.* 50

(1), 39–47.

Bhatti, Y. A. (2010). What is Frugal, What is Innovation? Towards a Theory of Frugal Innovation Available at SSRN: <https://ssrn.com/abstract=2005910> or <http://dx.doi.org/10.2139/ssrn.2005910>

Bogers, M., Afuah, A., Bastian, B., (2010). Users as innovators: a review, critique, and future research directions. *J. Manage.* 36 (4), 857–875.

Bound, K., & Thornton, I. (2012). Our Frugal Future: Lessons From India's Innovation System. www.nesta.org.uk.

Brabham, D. C. (2008). Crowdsourcing as a Model for Problem Solving: An Introduction and Cases. *Convergence: The International Journal of Research into New Media Technologies*, 14(1), 75-90. doi:10.1177/1354856507084420

Enos, J. L. (1962). *Petroleum Progress and Profits: A History of Process Innovation*. MIT Press, Cambridge MA.

Franke, N., & Shah, S. K. (2003). How Communities Support Innovative Activities: An Exploration of Assistance and Sharing Among End-Users. *Research Policy*, 32(1), 157-178.

Franke, N., & Von Hippel, E. (2003). Satisfying Heterogeneous User Needs via Innovation Toolkits: The Case of Apache Security Software. *Research Policy*, 32(7), 1199-1215.

Freeman, C. (1968). Chemical Process Plant: Innovation and the World Market. *National Institute Economic Review*, 45, 29-57.

Gupta, A. K. (2006). From sink to source: the Honey Bee Network documents indige-

nous knowledge and innovations in India. *Innovations: Technology, Governance, Globalization*, 1(3), 49–66.

Hart, S. (2013). *The Thinker*. Retrieved from <http://knowledge.ckgbsb.edu.cn/2013/06/06/finance-and-investment/bottom-of-thepyramid-stuart-hart/>

Hart, S. L. (2005). Innovation, creative destruction and sustainability. *Research Technology Management*, 48(5), 21-27.

Herstatt, C., & Von Hippel, E. (1992). From Experience: Developing New Product Concepts Via the Lead User Method: A Case Study in a Low Tech Field. *Journal of Product Innovation Management*, 9(3), 213-222.

Howe, J. (2006). The rise of crowdsourcing. *Wired Magazine*, 14, pp. 1-4.

Howe, J. (2008). *Crowdsourcing: How the Power of the Crowd is Driving the Future of Business*. New York: The Crown Publishing Group.

Huston, L., & Sakkab, N. (2006). Connect and Develop: Inside Procter & Gamble's New Model for Innovation. *Harvard Business Review*, 84(3).

Karnani, A. (2007). The Mirage of Marketing to the Bottom of the Pyramid: How the private sector can help alleviate poverty. *California Management Review*, 49(4).

Lakshman, C. (2009). Corporate social responsibility through knowledge leadership in India: ITC Ltd and Y.C. Deveshwar. *Asian Business & Management*, 8(2), 185-203.

Lüthje, C. (2003). Customers as Co-Inventors: An Empirical Analysis of the Antecedents of Customer- Driven Innovations in

- the Field of Medical Equipment. 32th EMAC Conference. Glasgow.
- Lüthje, C. (2004). Characteristics of Innovating Users in a Consumer Goods Field: An Empirical Study of Sport-Related Product Consumers. *Technovation*.
- Lüthje, C., Herstatt, C., & Von Hippel, E. (2005). User-innovators and "local" information: The case of mountain biking. *Research Policy*, 34(6), 951-965.
- Morrison, P. D., Roberts, J. H., & Von Hippel, E. (2000). Determinants of User Innovation and Innovation Sharing in a Local Market. *Management Science*, 46(12), 1513-1527.
- Obama, B. (2007). 6. (B. Week, Interviewer)
- Pavitt, K. (1984). Sectoral Patterns of Technical Change: Towards a Taxonomy and a Theory. *Research Policy*, 13(6), 343-373.
- Pralhad, C. K. (2005). *The Fortune at the Bottom of the Pyramid: Eradicating Poverty through Profits*. New Delhi: Pearson Education.
- Pralhad, C. K. (2007). Bottom of the Pyramid (BOP) Debate. *NextBillion.net*. Retrieved from <http://www.nextbillion.net>
- Pralhad, C. K., & Hart, S. (1999). Strategies for the Bottom of the Pyramid: Creating sustainable development. Retrieved from <http://www.bus.tu.ac.th/usr/wai/xm622/conclude%620monsanto/strategies.pdf>
- Rajdou, N., Prabhu, J., & Ahuja, S. (2012). *Jugaad Innovation: Think Frugal, Be Flexible, Generate Breakthrough Growth*. San Francisco, CA.: Wiley.
- Shah, S. K. (2000). Sources and Patterns of Innovation in a Consumer Products Field: Innovations in Sporting Equipment. MIT Sloan School of Management Working Paper # 4105, Cambridge, MA.
- Singh, S. K., Gambhir, A., Sotiropoulos, A., & Duckworth, S. (2012). Frugal Innovation: Learning from Social Entrepreneurs in India. The Serco Institute.
- Tapscott, D., & Williams, A. D. (2006). *Wikinomics..How Mass Collobaration Changes Everything*. USA: Penguin Group.
- Urban, G. L., & Von Hippel, E. (1988). Lead User Analyses for the Development of New Industrial Products. *Management Science*, 34(5), 569-582.
- Von Hippel, E. (1986). Lead Users: A Source of Novel Product Concepts. *Management Science*, 32(7), 791-806. doi:10.1287/mnsc.32.7.791
- Von Hippel, E. (1988). *The Sources of Innovation*. Oxford University Press.
- Yadav, V., & Goyal, P. (2015). User innovation and entrepreneurship: case studies from rural India. *Journal of Innovation and Entrepreneurship*. doi:10.1186/s13731-015-0018-4

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