Draft for comments only

Empathetic innovations for sustainable communities: Heuristics for extremely affordable innovations[1]

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For more than two decades, Honey Bee Network has been trying to scout, spawn and sustain grassroots green innovations and outstanding traditional knowledge. Several institutions were created to link formal and informal science, technology and policy institutions. India is the first country, which has made unleashing the potential of grassroots innovators as an essential part of the National Innovation System. Ideas, innovations and institutional initiatives for turning around economic development and fair distribution of wealth so generated will not depend upon actors in formal sector alone. Lessons from Honey Bee Network are also influencing idea or content sourcing strategies of mainstream media like Forbes and the largest Indian retail chain like Future Group.

National Innovation Foundation (NIF, www.nifindia.org 2000), Grassroots Innovation Augmentation Network (GIAN, www.gian.org 1997), Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI, www.sristi.org, 1993) and recently techpedia.in, (a portal by SRISTI pooling 104,000 engineering projects by 350k students from over 500 institutions) etc., are some of the initiatives of Honey Bee Network which are transforming inclusive innovation eco-system of India. NIF has mobilized more than 160,000 ideas, innovation, and traditional knowledge practices, of course not all unique, from over 500 districts of India. Patents have been filed for These institutions have triggered and supported a social movement with the help of volunteers in which many private sector institutions such as intellectual property protection firms, marketing companies, designer firms etc., are coming forward to join hands. Khoj Lab has been set up by Future Group (the largest owner of retail space in India) such that every idea will be labeled as India ka idea.

Several models of innovations have emerged and some have been validated such as long tail of innovation, and long nose of innovations. Empathetic innovations are triggered when an innovator internalizes the pain of others, that is third party problem as one's own. Inverted Innovations model applies when children ideate, and innovate; engineers and fabricators design and large companies commercialize these. Several

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models of such innovations are emerging in India. Deviant (New Scientist, 2007:56) researchers in formal and informal sector are joining hands to transcend new frontiers of affordability and accessibility through what Prahalad and Mashelkar (HBR 2010:2-10) call, Gandhian Engineering i.e. getting more from less for many, MLM). Grassroots innovations are unaided, developed by people having no formal training and often no experience from, or affiliation with organized sector. Given scarcity of material resources, it is inevitable that most grassroots innovations leverage local knowledge resources, which is what they may have in abundance. When household portfolios are characterized with low mean-low variance (vulnerable) or low mean (or average) income –high variance (most vulnerable) due to inherent socio-ecological characteristics (Gupta, 1981, 1989), they have to compulsively innovate because survival otherwise seems so difficult. The hope is that large and small corporations will learn new heuristics from distributed, diversified and developmental nature of such innovations at grassroots and trigger, what we call, g2G (grassroots to Global) model of reverse globalization. New pedagogies in management education have to emerge such as the courses like Shodh Yatra taught at IIMA for over a decade reinforcing learning from *within, each other, nature and common people*. A paradigmatic change is in the offing when many large corporations are recognizing that majority of the ideas for future will come from outside the organization through mass sourcing or crowd-sourcing processes. May be Forbes made it evident when it used Honey Bee Network experience to crowd-source content for its January 2011 issue and thus create a new journalistic tradition. It is for this reason that search for the so called Fortune at the Bottom of Pyramid (by selling things to poor) was a misplaced paradigm, since it did not see the Innovative potential at the Tip of the Iceberg. Unless we expand purchasing power of poor through inclusive innovation model articulated by Honey Bee Network, we may continue to sow the seeds of social instability through systematic exclusion of such creative communities from the market.

In part one, emerging models of innovations having bearing on creativity at grassroots are discussed. The trends in the in the innovation literature, particularly from the open innovation perspective are reviewed in part two followed by the summing up.

Part One: Models of innovations

Among various motivations and triggers for innovations studied by Sinha (2008)[3], one of the important drivers is empathy[4]. An innovator does not take initiative to solve a problem because he himself suffers from it. It is his internalization of the problems faced by somebody else, as his own that becomes a prime mover for taking initiative

[3] Riya Sinha, 2008, "Local creativity, institutional context and technological change: An exploration of complementarities for up-scaling". Ph.D thesis being pursued at University of Wageningen, The Netherlands.

[4] Gupta, Anil K, Empathetic innovations: Connections across boundaries, in "Timeless Legend of India, Gandhi" [Ed.] Dr. R. A. Mashelkar in commemoration of 30 years of Gandhi National Memorial Society, Sakal Papers Ltd:Pune, 2010, 42-57

that eventually becomes in some cases, an innovation. Amrutbhai, an innovator who began his life as a farm labourer developed several innovations such as wheat sowing plate or box, a blade for groundnut harvesting and later a tilting bullock cart to distribute manure in the field (Honey Bee, 1992, 3 (2) 12-16). Similarly, Khimjibhai from Sabarkantha district, Gujarat was approached by women tired of carrying water on their head and thus having pain in their neck. A device to shift load on the shoulders from the head was developed as a consequence[5]. Later, he developed a device for scraping gum from thorny acacia plants which used to cause tremendous inconvenience to the women (Honey Bee: 11(1) 11, 2000). Amrutbhai had also developed a pulley which overcomes the risk of bucket falling into the well while lifting water due to loosening of grip or just fatigue. Virendra Kumar Sinha (2009) had a workshop situated opposite a primary school. The noise and the air pollution caused by 12 HP generator used in his workshop disturbed the children in the school. Neither the school could be moved away nor his workshop. He invented a pollution control device which improved the learning environment for the children and reduced the noise pollution for the neighbours as well.

Empathetic innovations can be mediated by several triggers such as articulation of the problem by the suffering people, noticing the third party oneself or feeling responsible for those who suffer. Sometimes, a teacher or other intermediary can also impress upon the innovator to recognize the need for solving problem. I had been sharing the problem of tea leaf pluckers in the tea gardens for many years. Not many got moved. Once this problem was posed to the students of CEPT University, Ahmedabad in which as a part of their course, they had to develop a solution to an unsolved local problem. Later, two groups got motivated to internalize the problem of the tea workers and developed interesting prototypes. There is a widespread realization that classical innovation system, based as it was on R&D in organized sector (Corporations or public systems) has failed to take note of lot of unsolved problems of common people. With rising aspirations and increasing media exposure, lot of local communities are becoming restive and are not willing to wait indefinitely for their problems to be solved either by local innovators or by external agency. Inclusive or harmonious innovation model requires considerable stress on empathetic innovations although several other motivators may have to be mobilized where empathy alone does not trigger action.

The *Inverted* Innovation model builds upon the imagination of children to become impatient with the myriad problems around them. They may not have the technical competence to solve the problem but they can imagine a way of solving problem. Such ideas have been mobilized by Honey Bee Network for a long time but with specific focus in the last few years under IGNITE Competition. NIF has developed a new model in which children imagine and innovate, the engineers and designers fabricate and the corporations commercialise. For a long time, the task of innovation has been far too much systematized and thus relegated to a professional and specialized group or set of individuals. The experience of triggering innovations not only in India but several other countries such as UK and Malaysia has revealed numerous examples of *Inverted* model

[5] http://www.nif.org.in/bd/node/58 description of the device developed by Khimji Bhai, at NIF website, downloaded on June 29, 2011

of innovations. Let me illustrate. Mayank Walia, a class 9 student thought of an innovation which should have occurred to the specialists in the field a long time ago. The problem was how to expand the reading potential for visually impaired people. We already have a technology of pen-based scanners, which convert printed text to digital text. We also have a technology in public domain of converting digital text into speech. Mayank thought of combining these two technologies to enable blind people to read practically any book. This sweep of imagination shows an element of empathy but also a very clever juxtaposition of available solutions. Nisha Choubey, class 8 saw lot of travelers facing a problem of not finding place to sit at bus stands, airports or railway stations because of overcrowding. People had to keep standing. She thought of an idea of having a folding seat in the stroller and thus gave rise to a multi functional stroller. A designer is improving it and a large retail network, the Future Group has decided to commercialize it. There are numerous other examples where children of class one and higher levels have imagined solutions to the problems with which, we the adults have learnt to live with. This is a trend, which portends well for the future. There can be nothing more reassuring for a society than to have children who are not willing to live with inefficiency or inadequacy any more. Much, of course, depends upon the favourable eco system to be created for nurturing such ideas. In Malaysia, a similar quest led me to visit a school along with the officials of Ministry of Science, Technology and Innovation. On the spot competitions for ideas generated numerous examples where children developed new ideas solving contemporary social and personal problems. Likewise, through a teacher who was walking with us in Shodh Yatra (learning journey), I talked to the young kids of her class who all invented one or the other queer solutions and thus surprised everybody by their creativity. While children's ideas have been scouted for long time, treating them as potential inventors and innovators for solving social problems is a recent development.

Deviant research (1998, 2007) has been argued as a process of breaking out of the boundaries of conventional research paradigms both in terms of methodology as well as purpose. Innovations emerging from deviant research follow unconventional methods and approaches. What has now become popular as crowd sourcing, mass sourcing or user driven innovations was conceptualized initially as a deviant research by practitioners who realized the limits of available methods of discovering new ideas then. Honey Bee Network itself began as a deviant research more than two decades ago. The importance of deviant research as a precursor of innovations lies in recognizing the limits of disciplinary and sectoral boundaries of innovation organisations. Many large corporations today are acknowledging that majority of the new leads for innovative products and services are likely to emerge from people outside the organisations. These may be users, non-users, just observers, supply chain members or even those who are excluded from the use. The concern for frugal, flexible and friendly innovations which are extremely affordable arises on account of majority of the poor people having remained excluded from the purview of various commercial and developmental policies, programmes, products and processes. The concepts of *reverse globalization* (or g2G, Grassroots to Global) and *innovation insurgent* are the offshoots of the concern for the excluded.

The much abused term of the profit at the bottom of the pyramid (BOP) triggered a cast of mind in which the little savings and purchasing powers available with the economically poor people had to be tapped by the large corporations by selling things to them as Prahalad famously said, even if it meant a one rupee ice cream. Whether the children born in the poor families needed milk to meet their nutritional gaps or eat ice cream became a moot point. It is not surprising that a mind set of this kind has led to a situation where almost 50 per cent children in one of the fastest growing states of India, i.e., Gujarat are found to be malnourished as per the official surveys. There was no concern in this approach of looking at those pyramids in which the economically poor people could be at the top such as ethical, knowledge, institutional or innovation pyramids. As we well know, the language shapes the habit of thought. Once we use the BOP framework, we will inevitably find only the inadequacies of the economically poor people. We will never try to discover their strength. The Honey Bee Network was a departure in this context. It focused on the ideas, institutions, initiatives and innovations in which economically poor people were rich. That is how a huge database of innovations and traditional knowledge emerged in the last two decades.

The *reverse globalization* or g2G implies creating global markets for grassroots products. The fair trade organizations and companies like Body Shop did try to pursue such a path with various limitations and potential. In most cases, the poor were provider of raw materials and seldom of knowledge and ideas. Instead of treating poor as receivers of aid, assistance and help, thinking of them as provider of new ideas, traditional knowledge and creative institutions can change what I have called as from Sink to Source (Gupta, 2006). NIF has facilitated commercialization of several grassroots innovative products around the world. SRISTI has filed patents for such innovators in US with the *pro bono* help of patent firms. If a proof was needed, it has been provided in abundance about the potential of *reverse globalization.* However, the performance of this potential remains to be fully tapped. The model of reverse innovation (Govindarajan, 2009; Trimble, 2009; Immelt, 2009; Prahalad, 2009) suggests that innovations developed in resource starved conditions in developing countries may find applications and market in developed countries as well. The reverse globalization implies that the innovations developed in the informal sector in developing countries find global markets not just in western countries but also other developing countries. Within developed countries, there is a scope of grassroots innovations by common people outside of formal sector and this is one potential, which has not been tapped in most developed countries. There are examples where attempt was made to learn from the margins within developed countries. Hiscox and Connor (1939) wrote a book, “Fortunes in Formulas for Home, Farm & Workshop” illustrating numerous examples of local knowledge in grassroots innovations made by farmers, fishermen and women, artisans, etc., for solving local problems. Unfortunately, this tradition did not continue in most of the developed countries.

The concept of innovation insurgent (Gupta, 2007) implies harnessing the qualities of an insurgent for a positive transformative end. The insurgents are irreverential, don’t

respect the order or establishment or a dominant paradigm, risk takers, courageous, and don't often care for social approval (though peer approval is still relevant even for them) before embarking upon a new mission. In most developing countries, where development process is not inclusive enough, youth in several marginalized communities gets influenced by the extremists, violence prone leftists ideologies. Their choice of means is wrong but their ends, i.e., desire for fair and just social order cannot be questioned. It is in such a context, that an eco system for supporting social and economic entrepreneurship based on local creativity and innovation can hopefully translate the concept of innovation insurgents.

The socio ecological model of transforming organizations through innovative self-design also needs to be taken forward. The ecological conditions define the range of enterprises whereas the access to factor and product markets, kinship and other non-monetary exchange relationships determine the scale and scope of economic activities. The risk inherent in various enterprises generates the portfolio of choices having high risk - high return, high risk – low return, low risk – high return and low risk – low return (Gupta, 1981, 1984, 1989, 1992, 1995). The implications of household choices for the design of resource delivery system are obvious. Stationary organizations will not be able to serve the mobile communities such as pastoralists, fish workers, forest workers, etc. Similarly, organizations designed for high population density regions will inevitably fail to serve the communities in low population density regions. Such fundamental disjunctions in the theory of organizational design and creative aspirations of local communities have escaped the core of the international scholarship. It is time to ask questions about the innovations in the research on innovations. Anderson, Dreu and Nijstad (2004), in fact after reviewing research during 1997 – 2002, suggested study of innovations, "Study innovation as an independent variable, across cultures, within a multi-level framework, and use meta-analysis and triangulation." Most of the studies are focused on innovations in organizations at different levels and due to varying motivations. The triggers could be stressed, conflicts or hope of other positive outcomes. The authors are focused on distress related triggers, which motivate individuals to innovate so as to alleviate the distress in the organizations.
In the next section, a review of recent studies on various models of innovations is presented to highlight the general neglect of innovations in the informal sector and their linkages with the formal sector.

Part two: innovations trends

The review of research by Anderson, De dreu and Nijstad (2004) also revealed that more than 80 per cent studies dealt with replication of extension of existing lines of research and only about 13 per cent could be said to be theory driven. Majority of these studies were field based and not lab based and relied on questionnaires survey. The authors did not find any intervention study during 1997-2002.

Incentives for innovations: The role of prize as a motivator for innovation has received renewed interest in the recent past. Lohr (2011)[6] reviews the experience of X Prize Foundation famous for announcing prize for low cost private space flight and Qualcomm for announcing a 10 million dollar competition for smart phone that could diagnose human health problem as accurately as medical doctors do. The Federal government in USA passed the America Competes Act in December 2010 authorising government agencies to sponsor prize competitions upto 15 million dollar. The US government had listed various challenges at www.challenge.gov with and without prizes to tap the innovative ideas from common people. This is a natural extension of the concept of crowd sourcing and open source softwares within the broad domain of open innovation model. Lohr recalls a prize offered by Britain of pounds 20000 (4.5 million dollar today) in 1714 to anyone who could develop a device to accurately determine the longitude of a ship. That is how the marine chronometer emerged as an invaluable tool for sea navigation. Mahatma Gandhi had announced a competition in 1929 with a prize of 7700 pounds to improve the design of spinning wheel. He had given six criteria of efficiency and cost. The winner was supposed to assign the intellectual property rights of the improved design to the organizers. It is a different matter that such prizes have not been offered for solving social problems subsequently. There is very little research on the way different incentives work to promote innovation by common people.

Terwiesch and Xu, 2008[7] suggest that the potential of an open innovation system generating appropriate solutions through a promise of reward is linked to the type of innovations to be generated. When potential solvers are many, there could be some under investment of effort but with appropriate incentives and multi level or multi round screening system, effort can be maximized. Mahatma Gandhi had set a bar far too high by offering one of the best prizes at that time to intuitively eliminate the chances of under investment of effort. He had also specified the output parameters to prevent frivolous entries. Even without a multi round screening effort, one can offer a substantially large award and get challenging problems solved. In the recent past, a private space flight came about through such an award system. The irony is that such awards are seldom offered for persistently unsolved socio-technical problems.

Open innovation model: In a recent review of users as innovators, Bogers, Afuah and Bastian (2010) build upon the work of von Hippel (1988) about the role of users as innovators. They referred to the earlier example of this kind given by Adam Smith (1776/1999: 114-115) illustrating how a boy employed to run a fire engine tied a string from the handle of the ball to automate the system and thus get time to play around. In 60s, Enos (1962) cited to illustrate user driven innovation in oil sector and by Freeman (1968) in chemical industry. Shah and Tripsas (2007) illustrate the potential of user innovators becoming user entrepreneurs. There are various reasons why users innovate. However, none of the paper indicates the producers sharing the benefits derived from the deployment of user driven innovations with the users. The role of

[6] Steve Lohr, Change the Word and Win Fabulous Prizes, New York Times, May 21, 2011

[7] Christian Terwiesch, "innovation Contests, Open innovation and multiagent problem solving," Management Science, Vol.54, No.9, Sep 2008, pp. 1529-1543

acknowledgement, reciprocity and respect has remained grossly under studied. The issue of intellectual property right of the users has also been ignored. The authors feel that theoretical underpinning of why users innovate have not been articulated systematically. The role of tacit knowledge triggering user based innovations is also not adequately discussed. The incentives through enhanced performance are suggested as one of the major drivers of user driven innovations (Riggs and von Hippel, 1994: 459 – 460 in Bogers, Afuah and Bastian, 2010).

There are several questions that this literature review leaves unanswered; why has the role of non-users but passive observers in generating innovations not been studied, will the role of user who continues with the usage vis-à-vis the one who discontinues the use of original device or practice be similar or different in triggering derivative innovations; why should benefit sharing with the users not be pursued on ethical as well as efficiency ground. The process of seeking innovations from common people who may not be users of the manufactured goods or services but identify the need gap among available technologies and thus develop innovative solutions has been ignored almost completely. The Honey Bee Network triggered this process in late 80s and has spawned a whole new framework of seeking innovations from untrained, often unschooled minds in rural and urban areas whose motivations vary a great deal.

Crowd sourcing: The concepts of crowd sourcing, mass sourcing were part of outsourcing in open innovation models emerging in the west (Howe, 2006, Chesbrough, 2003, Piller and Ihl, 2009, Hippel and Jong, 2010). The literature, however, remained focused on the need of a corporation or an organization to seek ideas for improving existing products and services. Piller and Ihl (2009) gave example of Danish government using user centered innovation as a national policy (2005). Indian government had announced the establishment of NIF (National Innovation Foundation) in the budget speech of the Finance Minister in the parliament in 1999. The Foundation was actually established in 2000. In 2010, it became an integral part of Department of Science and Technology, Government of India as an autonomous institution. India is perhaps the only country where the grassroots innovations and outstanding traditional knowledge practices are part of National Innovation System since then. Honey Bee Network with the help of volunteers and institutions like SEVA, SRISTI, Hitalgida, etc., had mobilized about 10000 innovations and ideas by 2000. In next decade, NIF had mobilsed with the help of the Network volunteers a database of 150000 ideas, innovations and TK practices. Not all of these are unique but a large number of them are very distinctive and extremely affordable. The Memorandum of Understanding NIF has with Indian Council of Medical Research and Council of Scientific and Industrial Research facilitates blending of formal science with the informal technologies developed by common people. A recent MOU with Future Group, the largest private sector owner of retail space in the country has led to establishment of Khoj Lab to incubate and commercialise the grassroots innovations and technologies. Every product coming out of this collaborative lab will be labeled as, “India ka idea”.

Gemunden, Salomo and Holzle (2007) extend the work of Schon (1963) and Howell and Higgins (1990) to stress on the role of innovation champions in projects or programmes having different degree of innovativeness. They conclude that more than the champions, the open innovators willing to learn from outside the organization, take risks and identify valuable options play an important role in promoting innovations. However, the focus in these cases is on organized sector.

Wiggins (2010) narrates an interesting model of research collaboration of what he calls as citizens' science in which people are involved in scientific research to deal with real world problems. Millions of volunteer participants from around the world can be motivated for distributed knowledge production, as witnessed in open source software. Schenk and Guittard (2009) continue the discussion on crowdsourcing from organizational perspective using web2.0 and other social network platforms. As a matter of fact, Eli Lilly had used the concept of crowdsourcing at InnoCentive in 1998 drawing upon the knowledge of crowd for offering solutions to the corporate problems.

During the period of economic downturn, Minin, Frattini and Piccaluga (2010)[8] described the process of open innovation helping a firm during and after the downturn. Laursen and Salter (2005)[9] linked the degree of openness of a firm to its absorptive capacity. By implication, there could be occasions when people's knowledge does not get recognized by public and private organizations because of their lack of absorptive capacity and perhaps ability to share benefits and win trust of the knowledge providers.

Bughin, Chui and Johnson (2008) noticed the tension in open innovation model and asked a question as to who owns the intellectual property in the co-created products and services. The McKinsey research suggests that a variety of incentives would be needed for co-creation with customers. The trust in the company is a vital factor. They recognized that the limits of individual voluntarism may be reached sooner than later. A whole variety of licensing models emerge. The earlier work by Honey Bee Network (Gupta, 1997, 2000) had advocated a portfolio to incentives combining material or non-material benefits targeted at individuals and communities which may fructify in short term or long term, upfront after the commercial realization.

Terez-Luno, Medina, Lavado and Rodriguez (2011) analysed the effect of social capital and the tacitness of the knowledge on the emergence of medical innovations. By itself, social capital does not guarantee higher radical innovations indicating an important role for trust apart from reciprocity.

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[8] Di Minin, A., Frattini, F., & Piccaluga, A. 2010. Fiat: Open Innovation in a Downturn (1993-2003). California Management Review, 52(3): 132-159.

[9] All-Academy Symposium "Open Innovation: Empirical Research on Locating and Incorporating External Innovations", August 9, 2005, at the Academy of Management Conference 2005, August 5-10, Honolulu, Hawaii, US

Dahlander and Gann (2010) look at openness of the open innovation model. They traced much of the literature beginning with von Hippel's book of 1988 and notice far more citations for Chesbrough's (2003) publication. They recommend that the cost of openness needs to be figured out more thoroughly. The incorporation of external actors for generating innovations within the firm needs to be studied in terms of various processes used to cope with openness as well as competitive environments. They also suggest that management of relationship with variety of sources from which ideas are taken needs to be factored while conceptualizing the open innovation model. A variety of combination of openness, offers seal will need to be evaluated for their respective effectiveness. Gupta (2010) discussed this issue from slightly different perspective of accessibility of knowledge and opportunity to common people who may only communicate in local language and sometimes only through oral means. In such cases, their participation in the innovation chain will be contingent on the availability of multimedia and multi language tools as articulated by the Honey Bee Network at the first Global Knowledge Conference, Tornoto in 1997.

Schaffers, et al.,[10] (2007) and Marita Holst, Anna Ståhlbröst and Birgitta Bergvall-Kåreborn (2010) Openness in Living Labs–Facilitating Innovation deals with the concept of the users, researchers, companies and other stakeholders getting into voluntary agreements for solving problems. This is an early stage collaboration for generating systemic innovations involving people in rural areas in a specific domain. It is still an engineered process highly purposive in nature and this purpose is not always autonomously decided but could be steered by specific stakeholders.

Dean [2011] traces the sources of technological innovations in China[11] and highlights the role of mass innovations in the early years of industrialization, particularly in the agriculture and decentralized industries. The role of workers for suggesting improvements was clearly identified. The innovations by workers were focused as a legitimate mode of improvement in productivity. The role of design in improving processes and product features began to be stressed in the late 60's. Currently, innovations by workers are again being stressed and the design is no more focused to adaptation but also local generation of solutions suitable for Chinese conditions. It is useful to mention that China Innovation Network [CHIN] modeled on the basis of Honey Bee Network based at Tianjin University of Finance and Economics [TUFE] has succeeded in identifying more than 5000 grassroots innovations in the last five to six years, several of which have been published in Honey Bee newsletter. There is a renewed emphasis in China on harmonious development, which in India is called as inclusive development. The exact degree of inclusion or harmony may remain a matter of interpretation but there is a conscious attempt.

[10] Schaffers, H., van Bemmeln, J., Horak, P., and Merz, C. 2007. Creating and Managing Synergies in a Network of Rural Living Labs. eChallenges 2007. Hauge, Netherlands.

[11] Dean, Genevieve, 1972, "A note on the sources of technological innovation in the people's republic of China", Journal of Development Studies, 9:1, 187-199.

The research on knowledge and innovative potential of workers in and out of organizations has remained grossly understudied though various authors have drawn attention to this lacuna from time to time. Yanow (2004) articulated this very sharply, “In principle, these workers develop knowledge in interaction with clients and customers that could be valuable to the organization, were it but to learn from them. Instead, the ‘local knowledge’ they learn in acting across these peripheries *is discounted, if not disparaged (emphasis mine)*, by more centrally-located managers and executives. The article theorizes about the nature of translating local knowledge concerning organizational practices and about the structural character of local versus ‘expert’ knowledge”. She sums up the tension as,” The problem appears to be old, recurrent, and structurally entrenched. Given the extent to which the language of ‘organizational learning’ has caught on in recent years, it is possible that describing the problem of the disparagement or disregard of local knowledge in these terms may work to change the nature of management practices in this regard. If the problem is located in the societal value attached to expertise, changing the situation will require a change in the working definition of ‘expert’ and expertise and a re-privileging of local knowledge. Such an approach would engage questions of power and the hierarchical structuring of work and the workplace, a source of potential resistance. If the problem is located in the societal value attached to ‘Science’ and technical rationality made through rhetorical argumentation, then change may require a counter-rhetoric of value. Here, perhaps, is where there might still be a role for ‘culture’ in talking about organizational learning, in that it enables an argument for the values of experience and local knowledge as sources of expertise”.

Earlier, Nilsson [1995] highlights the process through which the scattered knowledge accumulated by workers in the process of solving local problems, often by learning-doing was organizationally neglected but informally networked by the workers themselves. It was so vital for their continued efficiency. It is argued that in several specific circumstances, “skill innovations by workers can be an important source of technical advance.”

It is apparent from the review that there are several factors which have led corporations to look outward for seeking solutions to their problems. The fact that most of them did not explicitly involve workers inside and outside in seeking solutions implies continued neglect of the potential the workers have for developing, ‘expert knowledge’. Many times, this expertise evolves through innovations. Stuart McDonald [1983][12] had shown through a study of sales notices of slaves during 19th century England that some owners of slaves highlighted their highly skilled status and innovative potential while putting them for sale. Isn’t it ironical that when workers were treated as commodity, their creativity found value but after their incorporation as colleagues of sorts, the explicit notice towards their creative potential went down. Open innovation models have improved the ability of corporations and public systems to seek ideas and innovations far more easily and in diverse manner than before. But the limitations of such models

[12] Stuart MacDonald, “Agricultural Improvement and the Neglected Laborer,” Agricultural History Review 31, part 2 (April 1983): 81-90

are: [a] attribution, reciprocity and benefit sharing with the idea providers remain a contentious issue; [b] while looking outward, the degree of openness has been subject to the access to tools, techniques, platforms and other kinds of domain of knowledge. The asymmetry in access invariably makes the so-called open systems less open; [c] the methods of incentivising the common people and experts to share their solutions have yet to be empirically tested so as to produce a body of knowledge that can link formal and informal systems of knowledge productions, exchange and augmentation; and [d] the focus is far too much on seeking solutions to the predefined problems instead of treating open source or proprietary solutions developed at grassroots as indicator of problems being faced by the society [and thus worthy of solution].

Summing up:

Grassroots innovations have triggered several fundamental changes in the way national systems of innovations are viewed, articulated and conceptualized. It is no more possible to characterize national systems of innovations as dealing with formal sector R&D. The open innovation models influenced by early models of user driven or user centric innovations have still retained the focus on problems defined by the organisations and that too at managerial level. The involvement of workers as problem solvers or as mobilisers of social insights might have brought about greater connect between the organizational strategies and the ideas of unorganized workers. This has not happened as yet. Several models of innovations have emerged which warrant further work to test their empirical validity in different cultural and institutional contexts. The available evidence from the Honey Bee Network's activities in China and other countries and cultures indicates some potential for these ideas and philosophical foundation to work cross culturally. The inverted model of innovations, particularly empathetic innovations generates a new idea of involving young children as a source of ideas about the world they want to live in. Sustainability is likely to be higher in models that take into account the aspirations of future leaders of our society. The empathetic innovations emerge in socio-ecological contexts. A model of inclusive or harmonious development in which focus is far too much on one's own problem as a valid trigger for innovations needs to be tempered by a *samvedansheel* dimension so that innovations are triggered by internalizing others' problems as one's own. The slowdown in economic growth in the recent past has further underlined the need for rethinking developmental approaches. The conventional models of corporate social responsibility or philanthropic approach to address problems of social iniquity, continued drudgery by women and other workers and lack of fair opportunities for developing one's talent will not work any more. It is borne out by the fact that there is almost total disconnect between the largest database of green grassroots innovations and such pursuits of larger organisations. Absence of certain linkages speaks volumes about the chasm between philosophies of dominant foundations and their accountability and assimilation of the perspectives from the grassroots. I have argued that linkage between formal and informal science and organisations of knowledge, innovation and practices can spawn a huge new ground of creativity, compassion, and collaboration.

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