EXPLORING INDIGENOUS INNOVATIONS:
Ascertaining the Scope for Design Interventions for their Successful Commercialization

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Synopsis

It has now been recognized that indigenous innovations are crucial for any developing nation in order to achieve cumulative growth, both economically and socially. These innovations, as they will be mostly in the form of appropriate modifications in the existing products, will require further critical interventions and hand-holding efforts for their transition into markets. Design intervention can help bring in the much needed empathetic understanding and holistic vision to connect and integrate the various efforts towards a positive outcome.

One would come across amazing indigenous innovations in India that can be developed into marketable products and thereby help in creating business success. These could provide vital directions for a country like India, to transform into an innovation-driven economy.

Innovation – A Necessity

Tom Peters reminds us in "California Management Review": *'Get Innovative or Get Dead'*. Innovation, has long been recognized, as a major driving force in economic growth and social development. According to the Growth Theory, developed by the Nobel Prize-winning economist Robert Solow, technological progress and innovation is the greatest engine of economic growth. Studies have shown that industrial policies of the world's developed nations give importance to the strategic role of innovations in generating new business ideas which will translate into greater economic growth. For any country aspiring to become a developed nation, it is imperative therefore, to transit to the innovation-driven economy (Goh 2005).

Economic condition of business organizations and the society as a whole, today depends on their capability to produce products and services that are better, cheaper and faster than their competitors. Innovation helps bring in this much needed change and improvements at all levels of business and economy. This helps improve the

economic position of all the stake holders involved. Innovation today, is essential for the long-term growth of organizations.

Innovation is also the key to success in all social developments. Creative ideas and innovations challenge existing norms and foster positive growth. They help improve the overall quality of life. Innovative ideas can cross over the hurdles of social apathy, conservative mind sets and orthodox attitudes to usher in positive changes in society. An innovation changes existing rules, norms, thinking and structures to create a novel transformation. Innovations thus, help achieve sustained change in a given environment. Innovation, has thus become the key to the sustainable development of the society.

Characteristics of Innovation

Though the importance of innovation has increased over the years, there exists a clear anxiety and major difficulty in its understanding, both in terms of its definition as well as its process. There is limited knowledge as to why, when and how innovation occurs.(Szmytkowski 2005).

According to the *Oxford Dictionary*, the word 'Innovation' first appeared around 1297. Joseph Schumpete, in his publication "The theory of Economic Development" (1911) had described the motor of the development as the innovation itself (Szmytkowski 2005). Gerard H. Gaynor, in his book *Innovation by Design*, based on the analysis of views and comments expressed by prominent researchers of innovation theories over the years, arrives at a simpler definition—

'Innovation = invention + implementation/commercialization'. While invention is described as the first occurrence of an idea for a new product or process, innovation is the first attempt to carry it out into practice. The emphasis here is on the 'newness' of the idea. Innovation creates new value rather than new knowledge. Innovation is not science or technology. It is about business. Innovations are, generally classified into three broad categories, ie.; incremental innovations, new-to-the-market/society innovations and breakthrough Innovations. Most innovations take place incrementally. Innovation can occur from the bottom-up or be sponsored from the top-down. Each approach will have its strengths and limitations (Gaynor 2000).

Innovation depends on four major elements: resources, infrastructure, culture and process. Innovation cannot take place if any of these four elements are missing. All four are equally important. Innovation encompasses three overlapping dimensions, which are –individual/ you, team/s (that also include you), and the organization/group. The individual/you will be the centre of the entire process of innovation, as only an individual will have new ideas. But taking ideas to market involves team work, for, one person cannot do it on his/her own. One needs to combine several different types of knowledge, capabilities, skills and resources to convert invention/idea into innovation. The leader of the team here, plays a key role to effectively coordinate this process to achieve the goal/tasks. The *personality* of the organization/group, known commonly as *culture*, plays a vital role in innovation. The innovation process generally falls under three major phases that are; *generating ideas, harvesting ideas* and *developing and implementing these ideas*. The common factor in these three phases is teamwork – synergy amongst the group. '*Innovation is about action, it isn't about perfection.'* believes IDEO (Gaynor 2000), (Kelley and Littman 2004), (Adair 2003).

Changing Market Trends

It is observed that, market trends are now shifting from *'globalized'* to *'regionalized'* and further to *'localized'*. The increasing cost of energy and transportation has forced the industries to shift their focus from mass production at one location to batch production at several locations, which solves the problems of logistic support and sale of the product at different places. Scarcity of materials and the ever increasing concern for environment has further pushed industries to localize and customize their products. The fierce market competitions have further forced the industries to localize and customize their products to penetrate each and every segment of the market including the rural segment. The companies are thus forced to shift their focus from mass production to mass customization of their products. *The future therefore belongs to the products that will satisfy the physical and mental needs of the consumer, incorporate the traditional, social, cultural and ecological aspects of the region. They should be produced locally, but in terms of appearance, efficiency and performance they should be world class* (Mehta 2003). The products/solutions therefore will need to be based in the local context so as to be culturally acceptable and economically feasible. This demands local participation and utilization of indigenous knowledge. Stringent IPR norms have further pushed organizations and nations to emphasize on developing their own in-house / local solutions; namely — indigenous innovations.

Indigenous Innovations – A Way Ahead

Indigenous innovations can aid developing nations embark on a cumulative path of positive growth; thereby helping them join the ranks of the more advanced nations. Local challenges and opportunities that are as varied as the individual communities themselves, provide great opportunities to stimulate economic growth by capitalizing on the local knowledge and resources residing in the communities. '*One style of innovation that really works in a country as large and diverse as ours, is grassroots innovations: this includes inventions for a milieu that is quintessentially Indian. … they are critical to how Indian ingenuity can be directly used to transform our circumstances, in ways that elite corporate research laboratories never can'* wrote Arindam Banerji (Banerji 2004). The need to promote indigenous innovations as evolving alternatives to development has now been well recognized.

In China, the government introduced a fifteen years plan that primarily focuses on its urgent need for expanding its capacity to create "indigenous innovations". The plan, known as "National Medium and Long Term Program for Scientific and Technological Development" was introduced in the year 2006. It identifies innovation as a new national strategy for China to advance into the ranks of innovative countries by 2020. Although the industrial sector in China is burgeoning, much of this it is low value-added, labour intensive manufacturing. Majority of the industries are large multinationals owned by foreign companies, or the state-owned corporations. Realizing the urgent need to stimulate cutting-edge indigenous innovations, so as to reduce the dependence on foreign technology, the plan aims to foster smaller, entrepreneurial companies, because they are the drivers of innovation. The term 'Indigenous Innovations' is translated by them as "independent, self-reliant, and indigenous", one that combines three distinct elements: original, or genuinely new; integrated, or combining existing technologies in new ways; and assimilated, or making improvements to imported technologies (The AeA Competitiveness Series, 2007).

Significance of Indigenous Innovations

Approximately 80% of the world's population, relies on Indigenous Knowledge for either medicine or food (Nakata, 2002). The theme of utilizing indigenous knowledge to create appropriate solutions occurs repeatedly throughout developmental literature. The indigenous communities have always been innovative, but not mainly for commercial reasons (Puffer 1995). These innovations have been in the areas of farming, traditional healing, making of domestic equipments and so on, all of which were and are environmentally friendly (Sopazi and Andrew 2005). Farmers innovate due to necessity, changing conditions and curiosity, doing informal experiments on new ideas either from their own – and/or learned from other farmers, researchers, extensionists and/or other information sources like the mass media (Reij and Water-Bayer 2005). For the last 10,000 years farmers have exchanged ideas, technologies, seeds, and innovations among themselves (Rai and Shrestha 2006).

Indigenous innovations can help find the best solutions for local problems. By utilizing the indigenous knowledge and existing resources available, and in turn also generating new employment opportunities, indigenous innovations help foster self-confidence and self-respect amongst the community. This eventually leads to economic growth and social change in the community. Indigenous innovations encourage local self-reliance, decentralization of decision-making and fair access to natural resources. As these solutions emerge from the local context, they will be more likely to be accepted by the community. Fostering *'innovation attitude'* amongst the community through appropriate hand holding, encouragements and promotion of indigenous innovations will create positive a attitude towards life and its challenges. This will help safeguard the community morale. This will also capacitate the innovators and the community against external threats that may be in the form of changing socio economic environment, introduction of new products and technologies, or even natural disasters (Puffer 1995), (Rai and Shrestha 2006).

Need for a Global – Local Approach

Combining indigenous knowledge with scientific knowledge can help create solutions that are culturally acceptable, economically feasible and environmentally sustainable for the society being aided (Puffer 1995). The old notion of research & development (R&D), as an isolated process carried out in a laboratory, concerned with generating new technologies and/or applications that are then transferred to the passive users, has now changed. Research and development is now widely seen as a learning process that follows inclusive, participatory, exploratory and experiential approach. Also termed as user-led approach, wherein the user becomes an integral constituent of the R&D team. It is therefore critical to create an enabling environment, for seamless fusion of indigenous and scientific knowledge by utilizing complimentary expertise and experience of people, and the one that is based on mutual respect. This will help stimulate and foster the culture of indigenous innovations in the country.

Indigenous Innovations - Meanings and Associations

It will be worthwhile at this stage to look at the terms "Indigenous", "Indigenous Knowledge", "Indigenous Innovation" and "Innovator" and their meanings and associations that are found in various literatures and research papers.

Indigenous

Originally, "indigenous" was equivalent to "local" or "folk" or, when applied to knowledge, "informal knowledge". In the 1960s to late 1970s, the word then took on a more overtly populist flavour of "grass-roots politics" and "folk culture" in the sense of "indigenous" as opposed to state or "high" culture. In view of the marginalization and destruction of the ecozones inhabited by ethnic groups, the meaning of the term "indigenous", at least as applied to knowledge, has today come to be used in a context in which "non-western" or "anti-western" knowledge, or the knowledge of minorities, as compared and contrasted with knowledge at the level of the nation state. (Antweiler 1998).

Indigenous Knowledge

*Indigenous knowledge is the knowledge that helps a society make decisions about activities, such as agriculture and education that are acceptable to their lifeways. All indigenous knowledge is by definition born out of and therefore primarily relevant to the respective locality. It is not always understood because it is an ingrained part of a culture's lifeways (*Puffer 1995), (Boven and Morohashi 2002).

Indigenous Innovations

*The term indigenous innovation has the same meaning as the following terms: traditional innovation, rural people's innovation, farmers' innovation, local innovation and community innovation, and indeed other related terms. Generally, the term innovation refers to an idea that is new or perceived to be new or altered. If this new idea or improvement of the resources is accomplished through traditional methods or knowledge systems, then it is called an indigenous innovation. It is often the case that, indigenous innovations are environmentally friendly and sustainable when compared with scientific innovations (*Sopazi and Andrew 2005).

*It has been viewed and understood that while local or indigenous technology or practice is recognized as a common practice already adapted and widely used, Innovation is considered more of something new that may have emerged from traditional practices but not necessarily the same(*Rai and Shrestha 2006).

Innovator *(…in the context of indigenous innovations)*

*Someone who develops or tries out new ideas without having been requested by outsiders to do so.' "New" is something that was started in the innovators' lifetime and not inherited from parents, like a farming techniques or a different way of organizing things (*Rai and Shrestha 2006), (Reij and Waters-Bayer 2005).

Characteristics of Indigenous Innovation

Based on the above views it is understood that the term 'indigenous' also has political connotations. Today it has come to be associated with the terms like 'rural', 'grassroots', 'anti-western' and the one based with minority. However, the dictionary meanings of the term are fairly broad based and include 'native', 'original' and 'home-grown' among others, and are lot more appropriate in the context of innovation and its implications on economic and social development.

Indigenous knowledge is ingrained into the culture and exists largely in tacit form. Unlike the western knowledge system (scientific knowledge system) that is easier to communicate and articulate through formal language including grammatical statements, mathematical expressions and specifications, indigenous knowledge is difficult to explain through formal language. Though it is probably the oldest system of knowledge and has evolved with the evolution of mankind, it is not properly documented. It has therefore generally remained constrained within the community/region. By the very nature of its evolution, indigenous knowledge will be different at different locations and with different people (Nakata, 2002).

Indigenous innovations are primarily based on their evolution as well as their applications – in the local context. These solutions/innovations are developed mostly through informal, unorganized and experimental basis, by individuals, group of interested/ affected people from the same community. As the solutions would evolve largely for necessity – to solve the problems at hand, and not for any business purpose, they will have inherent weaknesses, in terms of their replication, production and/or commercialization. They will also have limitations in terms of their migration from one culture or tradition to new environments. Within the specific context/boundary, these solutions will be most effective, both in terms of their suitability as well as sustainability. For a diverse and densely populated country like India, that is also large in size, indigenous innovations, if encouraged and hand-held properly; offers tremendous business opportunities. For the contemporary Asian economies, the definition of indigenous innovations— “Independent, self-reliant and indigenous”; will be more inclusive and appropriate.

The innovator/s is generally part of the same community facing the problem/ necessity for new solutions. The solution/innovation will largely be the result of personal/interested group initiatives and commitments, in terms of time, resources including finance, and also the risks involved. The solutions will therefore be dependent on the experience, expertise, exposure and enthusiasm of the innovator/s. As both the innovations and the innovators are very much part of the normal life of the community, it becomes difficult to identify/segregate them for their documentation, analysis, planning for further action, or their promotion.

Interventions for Indigenous Innovations - Documentation

Identification, and detailed documentation of these indigenous innovations will be the starting point for any intervention, which may be required/planned. Identification of these innovations demands extensive field survey and investigation. Advertisements through local audio, video and/or newspaper channels, organizing specific competitions, seminars, fairs for local innovators and scouting trips/visits to local areas/villages are some of the methods used to locate these innovations and their innovators. Government and non-government extension/field workers, researchers, students, local functionaries, etc. need to be roped in to scout these ideas.

At the global level, there has been a growing interest in documenting and describing indigenous innovations/indigenous knowledge. According to documentations at the United Nations Development Programme indigenous knowledge fuels multi-billion dollar genetics supply industries (Nakata,2002). Efforts are directed to record and validate this knowledge for its inclusion into scientific knowledge which can then be tried and used for varied applications and contexts. However, safeguards against exploitation and/or

extinction, politics between beneficiaries are some of the contentious issues that need to be addressed and resolved. Today, indigenous knowledge is being seen as a commodity, something of value that can be extracted and exchanged, refined, value-added and/or applied to new situations (Nakata, 2002).

Holistic understanding, sensitivity to environment and empathy to local community, while documenting indigenous innovations/knowledge will therefore help protect and augment community interests.

Many national and international organizations and resource centres, actively supported by various global agencies such as World Bank, UNIDO, UNESCO, USAID and many others are now working towards the collection, dissemination, development and extension of indigenous knowledge and innovations. These organizations and resource centres provide a platform for sharing and exchanging knowledge, information and idea/innovation, peer-to-peer learning, and for much needed collaborations and networking with various experts and supporters. They also help raise awareness amongst the community, the role of indigenous knowledge and innovations for the development and growth of local economy. These organizations, while promoting this knowledge about innovations at various levels, help safeguard the interests of the innovators and the community. Besides these, the organizations also provide the much needed incubation and hand holding support to bring these innovations and knowledge into the mainstream.

The database of Indigenous Knowledge and Innovations is available on the World Bank website - www4.worldbank.org/afri./ikdb and a publication titled 'Best Practices using Indigenous Knowledge', jointly developed by Nuffic - the Netherlands based NGO, and UNESCO's Management of Social Transformations Programme (MOST) are some of the excellent examples of the efforts being currently made at the international level, for documentation and dissemination of Indigenous Knowledge and Indigenous Innovations information (Boven and Morohashi 2002). At the national level, the National Innovation Foundation (NIF), established by Government of India in the year 2000, has documented over 50,000 innovations and traditional knowledge practices from over 400 districts of the country (IEC: IUCN Commission on Education and Communication). This information is shared with the local communities and individuals through the 'Honey Bee Newsletter' that is published in eight different languages and distributed in over 75 countries. The knowledge and information thus transmitted in vernacular languages will help ensure people-to-people communication*. 'A honey bee does two things that we intellectuals often fail to do i) it collects pollen from the flowers, which do not complain, and ii) it connects flower to flower for pollination. In the Honey Bee network, it is a matter of principle that we always credit the knowledge we collect from people and we share any benefit arising from this knowledge with them fairly'* , explains Anil Gupta, executive vice-chairman NIF(Gupta 2000). The NIF also announces innovation awards and competitions at the national level to recognize and reward these innovators.

Interventions for Indigenous Innovations - Hand-holding

While the organizations mentioned above are focusing their efforts towards documentation, dissemination, promotion and protection of indigenous knowledge and indigenous innovations, various other organizations are working in the field to provide hand-holding and incubation support to convert these local innovations into commercially viable solutions/enterprises. One such international organization, PROLINNOVA (Promoting Local Innovation), set up by ETC – Eco-culture, a Netherlands based NGO,

is today actively involved in various African, Latin American and Asian countries. Through their unique Participatory Innovation Development (PID) programmes, PROLINNOVA creates institutionalized partnerships of local innovators and scientists/researchers/academia to jointly experiment on innovations (Rai and Shrestha 2006). This helps to bring the local innovator at the centre stage as a leader/coordinator and equal partner of the entire development process. Similarly, the PFI (Promoting Farmer Innovation) project, the ISWC (Indigenous Soil and Water Conservation) project and many such projects implemented in Tanzania, Ethiopia and other African nations, arrange village workshops that facilitate farmer-innovators to organize themselves into cluster, to then carry out joint experiments/refinements/improvements on their innovations/ideas (Reij and Waters-Bayer 2005). This, while reducing isolation of these innovators, stimulate community-led social development processes. The village workshops, while together improving the identified indigenous innovations, will also discuss and identify problems/issues bothering the community that can then be solved jointly. Rural Innovation Network, RIN, Kerala; Rural Incubator, Hyderabad; Grassroots Innovation Augmentation Network, GIAN, Ahmedabad; etc., are few of the Indian organizations, today engaged in similar pursuits of development and hand-holding for indigenous innovations. These organizations help the innovator carry out market research, product refinements, sourcing of resources including capital, and its protection through IPR applications etc. They provide a platform for collaborations, partnerships for further development, and also if required, the identification of a possible entrepreneur/company to finally pass on the innovation for a royalty.

Interventions for Indigenous Innovations – Case Studies

GIAN, Ahmedabad, successfully supported Amritbhai Agrawat, an artisan-innovator from a small village in Gujarat, to further develop his innovation of a four-wheeled bullock-cart integrated with tilting mechanism. This new innovative cart eliminates the drudgery for the farmers/labourers involved in manually carrying and spreading the farm manure in the field. The tilting cart can be used single-handedly by the farmer to distribute manure over the entire field. GIAN arranged the innovator to refine and improve this new innovation, get the necessary micro-finance etc. and also helped Amritbhai file patent for his innovation, which is now licensed to three entrepreneurs on district basis for its production (Gupta 2000, 20-21). Another success story is that of the ‘rain gun’, innovated by Anna Saheb, a local innovator in Kerala. Anna Saheb was successfully supported by Rural Innovation Network, RIN, which helped to understand its market potential, its further improvements and finally its technology transfer to another company. (Banerji 2004) Both these case studies are the examples of successful interventions for implementation/commercialization of indigenous innovations so as to benefit both, the innovator - in terms of satisfaction and financial gain - and also to their many users, for getting products/solutions suitable to their needs and contexts.

Criteria for Selection of Indigenous Innovations

Indigenous innovations, as they are not clearly defined, thereby make it difficult for the field/extension workers to differentiate them from the traditional practice or technological advances. These indigenous innovations/solutions could either be in the form of innovative modification/value-addition of the existing/traditional product/ process/ application or entirely new innovation that may have emerged locally or transferred from outside. PROLINNOVA’s Nepal unit, based on their experience over the years, has developed criteria that could be used as guidelines for the field workers while selecting

these innovations (Rai and Shrestha 2006). The important criteria for these guidelines include its technical feasibility, economic viability, environment friendliness and its social acceptability. The innovation should be locally evolved/developed using local knowledge and skills, by addressing the person's/community's immediate or long term needs. The solution should also be widely replicable while getting the innovator's consent and his/her level of interest are one of the important criteria of selection, suggested in the guidelines, its adaptability (how easily can it be used/ modified), use of easily available/accessible local resources, its affordability and cost effectiveness in terms of time and resources are few of the desirable criteria suggested in the guidelines. These criteria for selection of indigenous innovations help prioritize these innovations as per the context, understand the level of innovation and also the need and type of further interventions required.

Design – a Key Constituent of Interventions

The interventions/supports offered by these organizations would largely be in the domain of marketing – to carry out initial market research to understand market and business potential, and/or for marketing of the new products; planning and management of resources, finance; technology – product refinements, modifications, product testing and production/replication; capacity building through training and exposure, etc. Besides these, the organizations also support the innovators for documentation and protection of innovations, promotion and dissemination of innovation and knowledge to larger audience, interface with government, academia, industry, etc., and the much needed co-ordination, networking and hand-holding. The hand-holding supports, including documentation, are generally carried out from anthropological perspectives. By the very nature of these interventions, they focus largely on market and business potentials, that is, commercialization of these innovations.

There are however little interventions visible in terms of idea/content refinements/ improvements. Design interventions, here can bring in the much needed user perspective, and help the solution sharply target its primary objective as indigenous innovation, to satisfy the need, the skills and resources available, and the local context. Product refinements, from its functional, production/fabrication, packaging and transportation, maintenance and service and also aesthetics aspects, will help convert these preliminary ideas into marketable and sustainable products. Designer's ability to view the problems from various different perspectives, empathetic understanding and unique focus on quality will help bring in holistic understanding of the problem at hand. Besides this, his/her ability to create and evaluate multiple alternatives, while helping to communicate with varied stake holders - each with different backgrounds and expertise - will help reduce numbers of iterations and thereby precious time and resources. The Grassroots Innovation Design Studio, GRIDS, set up at the National Institute of Design, NID, in collaboration with GIAN, Ahmedabad, helps provide this crucial design intervention support to the local innovators and organizations.

Characteristics of Successful Indigenous Innovations

Successful indigenous innovations, according to Paula Puffer, quickly become permanent local knowledge of the community (Puffer 1995). Paula Puffer, from her study of several such innovations, has derived some of the features that she found were common in these innovations. These features include its affordability, easy availability and reduced risks. According to her, a successful innovation generates income and at

the same time saves labour. It should be easy to understand and should easily fit into current practices. These innovations produce readily visible results within a reasonable amount of time. They meet multiple needs of the user/community and are attested by evidence from several sources, including those most trusted in the community. These innovations take into consideration things such as taste preferences, nutritional beliefs, etc.. The innovators, designers and organizations therefore can try to incorporate as many of these features as possible, to improve/refine their indigenous innovations to increase the potential of their acceptability and thereby their success.

The best/successful solutions, according to the UNESCO/MOST publication titled 'Best Practices using Indigenous Knowledge', demonstrate positive and tangible impact on the living conditions, quality of life or environment of the individuals, groups or communities concerned. They are innovative, and offer creative solutions to common local problems. These solutions create sustainable effects, in terms of eradication of poverty, social exclusion, etc., and especially through participatory involvements. They also act as source of inspirations to others and also as a model for generating policy initiatives (Boven and Morohashi 2002).

Indigenous Innovations and India

India, with its rich tradition of over 5000 year old civilization, posseses infinite treasure of indigenous knowledge and practised wisdom that are being constantly used and practised in the daily life. *Creativity, in each of the culturally cohesive Indian societies, was recognized as a quality as essential and ordinary as the act of breathing...,* observed Dr. Kapila Vatsayan, a noted historian, during her convocation address at NID in 1989. Over seventy percent of India's population today, lives in more than 5, 50, 000 villages spread across thirty-five states of the country. Agriculture and crafts being their main sources of income, use of indigenous knowledge and indigenous innovations is here a necessity and therefore a common practice. As for Indian industries, majority of them comprise of Small and Medium scale Enterprises (SMEs). Fierce competition amongst these more than 3.57 million SMEs and auxiliary units drive constant innovations – indigenous innovations - for refinements and up-gradations of their products and processes. Also, a vast majority of the country's population comprises of people from rural and middle-income group segment. Indigenous innovations here are a necessity for them, in their struggle of daily life. *Indians by nature are highly enterprising and they find ingenious and amazing ways to make the most of whatever resources and skills at their disposal to earn their daily living. ....Design is the way of life in India* (Mehta 2003). There is therefore, a rich resource of indigenous innovations available in India that could be meaningfully exploited to stimulate social and economic developments at all levels of the Indian society.

Conclusions

This is the era of innovation-driven economy. Today's fiercely competitive and increasingly saturated global markets, rapid technological breakthroughs, Information Technology (IT) integration, have all left the old weapons of achieving any differentiation/edge, inadequate. Innovation is today the key to any business success. Coupled with this, the increasing awareness of ecological and sustainability issues, scarcity of materials, stringent IPR norms, mass customization, have all resulted in the demand for the solution – innovations, that have emerged/evolved based on local needs and the ones that focus on the '*quality of life',* of all of its stake holders. Tomorrow's

business will compete on originality, and only the local user and the local context can provide this much needed edge, and thereby the unique strength. Indigenous innovations, it has now been recognized, is crucial for any developing nations to achieve cumulative growth of economic and social developments.

The very nature of the composition of Indian society – primarily an agrarian and service economy, large middle income and rural segment, crafts and SMEs as the main industry sectors, they all encourage development of indigenous and ingenious ways to earn their livings. Its rich resource of indigenous knowledge evolved over the years, is been constantly used and practised in the efforts of their survival, and also their progress. One would therefore, come across amazing innovations – solutions that may have been developed/innovated to meet and solve the specific needs and requirements of the person or region. By their very nature of development, these ideas/innovations will have inbuilt considerations of many of the ecological and sustainability aspects. There is, therefore, a great scope of developing these ideas and also the traditional knowledge into contemporary applications for local solutions. This would benefit the large number of people living in the region and would also generate employment opportunities. These indigenous innovations/ideas/knowledge could thus form a significant resource that can be developed into marketable products and thereby help creating business successes, and in turn providing a vital direction for the country like India, to transit into an innovation-driven economy. *Indigenous design and development capabilities are the keys to gaining a competitive edge.…One of the very important ingredients for success of the vision of transforming India into a developed nation by 2020 is the evolution of creative leaders,* said His Excellency, the President of India, Dr. A. P. J. Abdul Kalam, during his 25th Convocation address at NID on 5th January 2005.

Indigenous innovation, by its very definition, is the one that is evolved locally, utilizing local knowledge and locally available materials, skills and resources, to solve typical local problem/s. It has to be culturally and economically acceptable to the community. Ideally, the indigenous innovation, if it is exported or transported out side its locality/region, should render itself ineffective, inappropriate or it may cease to exist completely. The boundary of the locality/ region will be flexible and may include region, states or countries, depending upon the type of solution/s and its applications. These solution/s could be in the form of non-conventional use of a given product, local improvisation/modification with scope of replication, new application of the product/materials, combination of traditional skills and the contemporary needs and markets, a foreign technology/ solution modified/value added to suit the local context, or it may be in the form of a completely new innovation. It is generally carried out to add value, to increase the life-cycle or usage of the available resources and/or products, to reuse or recycle the available products/materials, to create new opportunities and above all to improve the quality of life of the people involved. By their very nature of development, these solutions/ideas would have inbuilt considerations of many of its usability, practicality (in terms of its production/fabrication), ecological, cultural, and sustainability aspects of design.

Majority of these solutions/ideas, as they are developed to solve specific needs of the person or a group/s and not for any commercial purpose, would therefore be found scattered in the community. These solutions, as they will be mostly in the form of appropriate modifications/refinements or improvements in the existing products, will fall under the category of incremental and ‘bottom-up’ type of innovations. Due to the very nature of these innovations, they all will require further, critical interventions and hand-

holding efforts for their protection (in terms of IPR, etc.), promotion and developments. Connecting this informal and indigenous knowledge of the innovator to the formal knowledge of the researchers/academics/industry needs delicate and empathetic hand-holding. Replication and/or commercialization of the solutions demand different expertise and mindset, than the ones generally associated with the innovators.

Any innovation involves risks, and demands patience and perseverance. The government and the NGOs involved in these tasks therefore, need to be willing to share these risks and be prepared for their long term involvements. Also, innovation is primarily a team work that thrives in creative environments and a culture that encourages experimentations and positive critique. Team synergy based on complementary expertise and strength of each of the members, and innovator as its central member, will greatly increase the chances of its success. A cluster based participatory approach that brings together the grass root innovators from the region/locality and the scientists/researchers will therefore be more suitable here.

While, interventions and supports in terms of marketing, management, engineering and finance are visible, the design interventions, that are so crucial today to develop these innovative ideas into marketable solutions are found missing, or are at best inadequate. With global outlook, sensitivity to local needs and aspirations, and capability to hand-hold the innovator/industry, designer can help convert these innovative ideas into market success. Design, it is now recognized, is the core of innovation, and thus the key to any business success. By the very nature of its profession, design helps bring in the much needed empathetic understanding and holistic vision to connect and integrate all the various efforts towards a positive outcome. Designer would, while utilizing the unique strength of the innovation/idea, help connect these indigenous innovations to the users' aspirations, and in the process help overcome those typical constraints of resources, skills etc. He/She would thus act here as a catalyst to bring in the much needed new changes and new vision.

Indian economy demands different solutions, the solutions that are 'people centric' - people not as consumers but as human beings – a solution that generates new employment opportunities utilizing the existing skills of the people, improves the standard of living while preserving the values of traditional society (Mehta 2003). These necessitate developing a product design methodology that addresses this unique need to en-cash the abundant ingenious and indigenous resources available in the country, encourages sustainability in all its forms, and the one that is focused primarily on improving the quality of life of people involved.

Over 50,000 indigenous innovations and indigenous knowledge practices, documented by NIF, over the last seven years, could form an excellent base to build further interventions efforts. These ideas/innovations could be categorized to understand their levels of innovations, type of further interventions required, their practicality and replicable aspects, their market and business potentials, etc. While providing necessary support for their protection/IPR, developing an idea-bank/ website of these innovations with necessary technical details and market and business potentials of each of these ideas will help connect these innovators/ innovations to the interested investors/entrepreneurs. Systematic, networked and institutionalized interventions involving design, technology, marketing, management and finance specialists, along with the innovator and local participation will help increase the rate of successful transition of these innovations into markets. Incubators that can provide these much needed hand-

holding supports to the so far isolated individual/innovator to quickly get varied expert inputs, information and resources are thus the need of the hour. Increased rate of conversion of these indigenous innovations into market success will thus, help foster innovative attitude in the community, leading to economic and social developments at all levels of the society.

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