

Tale of Two Entrepreneurs

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Abstract: the purpose of this chapter is to highlight the innovation of two entrepreneurs. The significance of the innovation on our society regarding the health issues have been focused. Two entrepreneurs and their innovation have been studied very closely. They were interviewed as well as their websites were studied thoroughly. The result of the study shows a close bonding between innovation and creativity.

INTRODUCTION

Innovation is a continuous process associated with evolution of life. Population explosion necessitates acceleration of more and more innovations. India is a developing country. Hence, it is facing challenges in every field, from education to environment. This brings up the need of innovation ecosystem consisting of institutions, technological up gradations, and hassle free environment. Here, it should also be noticed that innovation is different from invention. (Fagerberg, 2006), “Invention is the first occurrence of an idea for a new product or process; while innovation is the first attempt to carry it out into practice.”

Entrepreneurs, on the other hand, are the risk takers. They are decision makers as well as good managers. They are capitalists and have a bend to explore the market opportunities. They have the ability to combine various products creatively.

According to R. David Lankes’ Atlas of New Librarianship, innovation is further defined by entrepreneurial activities. In the text his example centers around the capital or resources needed by an entrepreneur to successfully implement an innovative idea. Thus entrepreneurship demonstrates the innovation by putting the idea or concept into practical use with the infusion of resources, be it capital or support of institutional leadership.

In one of the research papers “Entrepreneurship and Open Innovation in an Emerging Economy” the authors stated that entrepreneurship is a creative process in which individuals engage in some form of generative and open learning. This activity permits the acquisition of new knowledge (Miller and Friesen, 1983; Popper and Lipshitz, 1998). New knowledge when linked with individual’s existing understanding and business

experience results in the generation of new ideas (Oguz, 2001). The importance of individuals and organizations being engaged in innovative learning can be enhanced through generation of new ideas.

Kirton (1976) suggested that individuals approach to solving problems is located on a continuum ranging from adaption to innovation. Western firms are giving more and more importance to creativity, innovation, and shared knowledge for individual and organizational development. Leading companies such as AT&T, American Express and United Airlines have recognized the importance of employees learning from each other and from customers to develop innovative solutions to organizational problems.

Eric von Hippel in his classic book, *Sources of Innovation*, identifies end-user innovation as the driving force for ideas and solutions that can bring a change to processes, products and services. Innovation takes different directions as it impacts products and processes. This includes changing the method that a process takes in how it is delivered to the end-user, changing what services are offered and this might include discontinuing outdated services or support. These types of innovations are observed in businesses as they change to meet customer demands, with modifications in offerings as per vendors' interest, or methods that improve the efficiency of the individuals involved (Crumpton, 2012).

Innovation is not a new phenomenon in the evolution of society, but it is a process inherent to human development. Ancient societies searched those elements that not only increase those means of subsistence obtained from natural resources, but also reduce the effort necessary to carry out their work and to facilitate the transport of individuals and products. According to Sternberg and Lubart (1999), creativity is related to entrepreneurship since they define entrepreneurship as a form of creativity that can be labeled as business or entrepreneurial creativity because often new businesses are original and useful. Studies have found that entrepreneurship and innovation are positively related to each other and interact to help an organization to flourish (Zhao, 2005; Flynn et al., 2003). More over, a significant line of research argues that cities and regions function as incubators of creativity and innovation (Lee et al., 2002, 2004; Thomson, 1965; Park et al., 1925). With the introduction of more sophisticated innovations, the benefits of these innovations were considered as well as the negative effects on society, on employment and on human behaviour (Miguel-A´ngel Galindo and Mari´a-Teresa Me´ndez-Picazo, 2013).

Over the years, many government and private agencies have started up with various innovation schemes that have encouraged the budding entrepreneurs to materialise innovations, convert ideas into sustainable products and pave the way for entrepreneurial culture in the country. It is also important to consider the entrepreneur along with the innovative technology. He is that person who was ready to take risk, and come up with better technologies for the betterment of the society. Two of such marvellous innovations and promising entrepreneurs' journey has been discussed in the chapter.

TALE OF BRAINCHILD INNOVATION: MOZZIQUIT

Background

Sitting back at his office, and looking outside the window, Ignatius Orwin Noronha remembers the days when his product “MozziQuit” (MQ) Mosquito Trap” was just in the ideation phase. He had exchanged several mails with government officials and Angel Investors to conceptualize his product and set up his own company and was anxiously waiting for their response. 52 years old, Ignatius Orwin is the sole inventor of MQ and the Managing Director of Leowin Solutions Pvt. Ltd., registered under Companies Act on 18th June, 2008 to innovate, manufacture and market eco-friendly products. He is a self-trained innovator with thorough knowledge of product innovation lifecycle. He has worked in the Middle East for ten years. Back in India, he manufactured waterproofing chemicals and executed works in and around Mangalore city. Thereon, he also started manufacturing products of polymer in 2001-02 to repair deteriorated structures of containers found above the sea at Jawaharlal Nehru Port Trust, Mumbai.

Mr. Noronha has another feather of innovation in his cap. He proposed 2” thick modified concrete-mix design to Indian Oil Corporation Limited (IOCL) in December 1999 instead of conventional 12” thick concrete mix. It would be used for roads and driveways with specific claim on allowing the concreted roads for movement of vehicles after 24 hours of concreting without waiting for 28 days of stated period, saving time and costs. IOCL tested the sample on 6th December, 1999 after 24 hours of concreting, and awarded the first project of Concreting Driveway at Goregaon Petrol Pump in 2000. This technology is testimonial even after 10 years of its use because of its performance and quality. It would save five times of concrete cost and time, as India has got huge requirement of road infrastructure.

Concrete mixture releases greenhouse gases like carbon dioxide and other by-products like fly ash and sulphur, which when in contact would lead to problems like skin burns, rashes, irritation in the eyes, nose, and throat, and other respiratory diseases like asthma. So MQ is not only reducing the usage of concrete, but also benefitting the environment indirectly.

Mosquito Apparatus: “MozziQuit”

Mr. Orwin, the brain child behind the innovation of the famous mosquito trap “MozziQuit” has carried out R&D on the product since 2001. His Eureka! Moment was after observing an American Product Mosquito Magnet at Shri Shakthi Gas & Energy the exclusive distributor of American Bio-Physics Inc. at Hyderabad, priced at 1.1 million per unit with operating cost of five thousand per month for three LPG cylinders and for a hazardous chemical called Octenol. Octenol is used along with carbon dioxide in mosquito repellants and traps to attract mosquitoes and other biting insects. However, it mimics human breath, leading to problems like asthma, skin rashes, irritation in the eyes, and ingestion.

Raw materials combined, this electronic device works on the unique heat and light generating technology within the device to attract mosquitoes. Mosquitoes are attracted by unique vacuum system integrated within the device, and are killed instantly. Dead mosquitoes can then be disposed of through the removable collection container in the device (exhibit 8). The apparatus uses less than three Watts of power consumption which is only five paise per day. Even if the electricity cost is increased, it would not cross three digits for five years (exhibit 6). The product so designed works without the use of any chemicals and combat mosquito menace.

Available in two sizes “MQ Max[®]” (exhibit 1) and “MQ Mini[®]” (exhibit 2), the device involves a one-time investment of Rs. Two Thousand Nine Hundred and Ninety and Rs. One Thousand Five Hundred respectively. It does not involve any hidden charges and daily consumables as in the case of other mosquito repellents available in the market, making it as the lowest acquisition cost of killing mosquitoes in India. It provides efficacy to the system, i.e. the waste can be checked personally from catch net container. The product is effective up to ten thousand square feet area without barriers. It even sucks invisible and minute dust particles, as tested by Raman Research Institute Bangalore and certified by National Institute of Malaria Research, India.

Assessment of “MozziQuit”

Existing mosquito repellent mats, coils, and traps do not kill mosquitoes. In fact these machines keep them away from a designated area by releasing harmful radiations and chemicals which not only have side-effects on skin, and also leads to continuous headaches in some people but also leads to mosquito multiplication (exhibit 9). Regular maintenance is also required to purchase and refill the repellents leading to high costs.

MQ, on the other hand, attracts and kills mosquitoes, stops multiplication, and prevents diseases. It is easy to use and is environmental friendly viz, it neither uses any chemical nor release any kind of harmful fumes having side-effects on human bodies. The performance can be checked at regular intervals. It is value for money as it involves one time acquisition cost with zero maintenance. It saves up to 37% of cost and energy in two years, 74% in five years, and 86% in ten years. It is sustainable in long run and can be used anywhere from big houses to flats, schools to colleges, hospitals to big corporations. It is highly effective within half hour of its operation and hence is required to be switched only for one to two hours during the evening.

“MozziQuit” was displayed on the vision summit of ISA Technovation 2010, organized by the Indian Semiconductor Association and was recognized as ISA’s Best Electronics Product of the Year – 2010 in Healthcare sector (exhibit 10). For this master invention, Mr. Noronha was awarded gold medal from Mr. Rakesh Singh, Additional Secretary of Information and Technology at the Taj West End, Bangalore (exhibit 3). National Institute of Malaria Research has certified the product, *as reported by daijiworld.com/news, 2010.*

Further, Mr. Noronha has already been granted patent for MQ and received some ten design registration certificates (exhibit 15) from Indian Patent and Designs Office.

Quality Assurance and Industrial Tie-Ups

MQ has been acknowledged by various institutes and government agencies. The sample has been tried, tested and approved for use by National Institute of Malaria Research, Bangalore and Indian Council of Medical Research, Bangalore (exhibit 14). Mr. Noronha has also been also offered Research and Development facilities by Delhi branch of these institutes on contract basis. Further, IC² Institute, University of Texas at Austin, USA has recommended commercialization of MQ in India (exhibit 11) as well as globally during the Analysis Report presentation at DST-Lockheed Martin India Innovation Programme in 2010 (exhibit 7).

Defense Research & Development Establishment (DRDE) of Defense Research & Development Organization (DRDO), Ministry of Defense, has signed Engagement Agreement with Orwin on 6th September, 2010 after assuring the quality of the product. Last but not the least, Raman Research Institute Bangalore has also tested the product and named it as the only product with Zero emission of UV radiation.

Environment-Socio-Economic Impact

The objective of this master innovation was to create mosquito free environment, and reduce the number of people being affected by mosquito borne diseases. Emergence and resurgence of mosquito-borne diseases, namely malaria, dengue, filarial, typhoid, jaundice, encephalitis, and chikungunya are well known in tropical and subtropical regions. Such diseases impose socio-economic burden on humanity, some of which, still do not have any cure.

According to World Health Organization (WHO) fact sheet 2011-2012, India has the highest malaria burden with an estimated figure of 24 million registered cases per year. During 2010-2011, 219 million patients were registered being affected by malaria, out of which 1.1 million deaths were averted globally. Other diseases are also painful and are increasing in prevalence. It is said that these diseases have killed people more than those killed so far in all the wars combined. More than \$5 billion are spent on patients infected with malaria alone. But, in spite of so much spending, the diseases continue to explode from time to time because the mosquitoes develop resistance towards medicines and chemicals.

Climatic changes have taken place to a great extent in developing countries like India, Africa, and China. There is storm surges, coastal flooding, sea-level rise, weather changes, erratic electricity and water supply, reduced agricultural productivity, and droughts in some areas which leads to ill-health and disrupted livelihoods in both rural and urban populations. These changes in bio-

diversity have further lead to multiplication of mosquito and mosquito-borne diseases resulting in risk of mortality rate.

These diseases are also one of the causes of poverty and a major hindrance to economic development. Poverty increases the risk of mosquito-borne diseases as people below poverty line do not have the financial capacities to prevent or treat the disease.

The economic impact of mosquito borne diseases is worse. From loss of money involved in healthcare to time in terms of number of working days. It might also lead to brain damage from cerebral malaria and decreased productivity. This would further be liable for some 40% hospital admissions, 50% outpatient visits. Overall resulting in 40% loss of public health spending, investments, and tourism *as per malariaconsortium.org*.

Way Ahead

In the Fifth Assessment Report released by Intergovernmental Panel on Climate Change (IPCC) has stressed upon the impact of emission of greenhouse gases, and climatic changes, causing skin diseases, and respiratory problems. Further, multiplication of mosquitoes result in mosquito-borne diseases like malaria, typhoid, chikungunya, etc.

The targets and objectives of the government will be attained only when progress is made towards a healthy and disease free society. There is a strong need for the government and the innovators to work in tandem, as a team, and innovate in the field of healthcare, in terms of anti-disease drugs, medicines, creams, ointments, healthcare schemes and programs, mosquito repellants, that mark the history of inventions. Innovative products like “MozziQuit” should be strongly supported, promoted, and funded by various government agencies in order to improve upon the society and bring it at par with international standards.

The sudden telephone ring brings Mr. Noronha out of his reverie. It was his secretary with the reminder for his meeting with government officials in fifteen minutes. He thanks her and gathers all his thoughts for the meeting regarding his invention’s funding.

GROWING GREEN IS THE NEW COOL: SNOWBREEZE

Background

Experts have cited age as one of the factors affecting creativity. Creative output relates to how an individual questions the status quo. According to Bob Kelleher, from 99EmployeeEngagement.com, creative thinking will be the way we define leadership in the future

as questioning the status quo of existing services and ideas. However, one of our creative designers and innovator, Shri M B Lal, has questioned this with his mind boggling innovation.

Retired Bureau Chief and Assistant Editor of The Statesman and 85 years old innovator got the idea of innovation during a hot afternoon in the summer of 2007. There was a power cut for seven hours and to curb the heat his wife placed a large tub full of ice under the fan, which gave the family some respite and an idea to build an innovative air conditioner. One of the economic and environmental friendly innovations works on the basic principle of ice energy. The product was created for the elderly and sick people facing difficulties due to extreme weather conditions and power cuts. Different models are available in the market depending on the usage, suffering in similar circumstances. The same are available in the market and online at greenairconditioner.org and indiamart.com.

Power shortages everywhere is hampering the economy, specially industrialization and electrification of rural areas where networks of poles and wires stand without power. Since most of the high demand for power during summer is caused by air conditioning on a massive scale, the power shortage witnessed can be substantially reduced if conventional air conditioning systems are replaced with ice-based air conditioning systems, which are already in vogue in parts of Europe and America, as reported by the author in Outlook Magazine, 29 August, 2010.

The retired journalist invested some 1.5 Lakhs on testing the product and building eight trial models. He promoted his special device through newspapers, books, magazines, and website snowbreeze.org and has applied for patent too. The walking stick does not deter him to stand and walk. He himself uses iPad much faster than a 12 year old kid. Chinese electronics company, Zhejiang More, is already manufacturing and selling the equipment in China.

Snowbreeze: World's most economic Air Conditioner

Snowbreeze, world's most economic AC works on the basic principle of ice energy. It is 100% green. The 12 inch electronic device uses ice, water, electric pump, and as much electricity as a cooler. It has many added advantages. It brings comfort to millions of people from heat at a low cost; serves as a life-saver for the sick and elderly of all classes during power breakdowns; requires less energy as compared to other ACs; reduces pollution; and the most important saves electric power for the country, besides rendering numerous other minor benefits. Further, it runs easily on power backup and the cooling effect does not make the room humid. The Snowbreeze project has established beyond a shadow of doubt that it is possible and easy to air-condition rooms, offices and halls of all types with ice and chilled water.

The Green Gandhian AC is a cooler with a drawer at the bottom. There is a metal drum inside it consisting of handful of coils and mesh of PVC pipes, along with two pumps fitted at the bottom of. Half the drum has to be filled with water. Blocks of ice are loaded on top of the mesh of pipes, resting on the water. It functions on the simple process of evaporation and condensation found in

the Himalayas. River and seawater evaporate and rise up to form clouds. When clouds hit mountains, water turns into snow and flows back down into the rivers. The fan then gives a cooling effect. Complete working of the model can be seen on the website.

Snowbreeze can bring down the temperature by seven degrees centigrade in an hour in a closed room. It is energy efficient, i.e. compared to an average 1.5 ton AC guzzling 2,000 watts it draws only 100 watts. There are different models of the contraption made out of plastic drums, metal boxes and desert coolers, designed differently for different purposes. The desert cooler is the most effective, costing about Rs 15,000. The plastic drum model costs about Rs 5,500. The box type would cost anywhere between Rs 5,000 and Rs 6,000 depending on the amount of copper used. The latest model "makes its own ice".

Snowbreeze comes in variety of designs and models to comply with the need of different users. While it can fit the needs of every section, those requirements have to be classified in groups and standard designs have to be developed for each group. Thus an enlarged redesigned European concept would be ideally suited for air conditioning large rooms, offices and halls. The Bucket or Desk-top model would be the best choice for a small room. At the same time for automated cooling the Water Cooler model may be considered. The same are enlisted below.

Snowbreeze 1: Match for wall AC

Designed in several shapes and sizes Snowbreeze 1 runs on a stream of compressed air for 100 to 150 feet through aluminium grooves fitted in a separate casing around an aluminium drum packed with ice. This energy saving air conditioner is that innovation in the field of air conditioner which protects us from heat and cold at the least cost. It is cheap, 90% energy saving, and 100% 'green' gadget that a carpenter can fabricate in three to four days. This unique cooling device has never been invented before.

This AC is converted into room heater also by removing the lid of the ice-drum. Suspend a 300 to 500 watt halogen bulb from a bar resting on its rim, with its frame tilted inward, in the upper half of the drum, filling the lower 40% of it with water and leaving a gap of half to one inch between the water and the bulb-frame. Then switch on the system. Warm air will start blowing into the room within 10 minutes. The warming up period could be reduced to five minutes or less if, to start with, you put pre-heated water in the drum. It keeps the room cooled and dehumidified for about 8 hours when it has to be refilled with ice after draining out condensed water. (exhibit 17)

Snowbreeze 2: Unique Self Cooling AC

Snowbreeze 2 is a unique cooling device which harnesses the self-cooling energy of water in conjunction with ice. It is based on the centuries old self-cooling 'matka' (pitcher) principle, which sets in motion an automatic convection current in a water body. (exhibit 18)

Automated Snowbreeze: Multipurpose AC

The latest 90% energy saving, 100% green, fully automated model of Snowbreeze is designed to match a wall air conditioner. Their chief advantage is that it costs practically nothing and keeps the room cool and comfortable during the summer and monsoon seasons. (exhibit 19)

Mini Snowbreeze: Boon for old and sick

Mini Snowbreeze is a boon for elderly people with limited means. It helps the sick to cope up with the weather and power breakdowns. Mini-Snowbreeze is a cheap but effective air conditioner which can run on an inverter and keep a small room cool and dehumidified for eight hours with “free” ice from the family fridge (Cost Rs.2,500-\$50). (exhibit 20).

Snowbreeze Room Heater

Converting Snowbreeze 1 into a power saving room heater is a simple process. Remove the lid of the ice drum. Suspend a 300 to 500 watt halogen bulb from a bar resting on its rim, with its frame tilted inward, in the upper half of the drum, filling the lower 40% of it with water and leaving a gap of half to one inch between the water and the bulb-frame. Then switch on the system. Warm air will start blowing into the room within 10 minutes. The warming up period could be reduced to five minutes or less if pre-heated water is poured in the drum. (exhibit 21)

Battery Powered Rural Unit

It is a special model suited for rural areas where power is available for just a few hours a day or not at all. It can run for eight hours at a time on a specially designed power unit equipped with an automatically recharging 15-ampere dry battery and a 6” DC fan. (exhibit 22)

Worldwide News

Ice-powered air-conditioning is catching up worldwide and products like Snowbreeze are popular in parts of the world. They have been deeply acknowledged by economists all over the world.

China

China is already manufacturing and exporting electronic devices on the same concept, ice energy. Chinese electronics company, Zhejiang More, has started the process of manufacturing and selling the equipment in China. Details can be viewed at zjmore.manufacturer.com.

Europe

The energy crunch and climate change have forced intelligent leadership in Europe to invest resources and scientific talent in alternative ways of air-conditioning which is one of the biggest power guzzlers. In this race for options ice has clearly emerged the front runner, source greenairconditioner.org.

USA

America woke in September 2010 when consortium of municipal utilities in California began retrofitting government offices and commercial properties with systems that use ice made at night to replace air-conditioning during the day. It is part of a pilot program for the devices, which are built by Windsor, CO-based Ice Energy. If widely deployed, they could reduce fuel consumption by utilities by up to 30% and put off the need for new power plants.

Over the next two years, these eleven participating utilities will install 6,000 devices at 1,500 locations, providing 53 megawatts of energy storage to relieve strain on the region's electrical grid. The project is the first large-scale implementation of Ice Energy's technology. Brian Parsonnet, Ice Energy's chief technology officer, says the technology can cut a building's power consumption by 95 percent during peak hours on the hottest days. Cutting demand for electricity during peak hours reduces the need to build new power plants, as reported by ice-energy.com on 19 May, 2010.

London

According to Economist Magazine, London, 17 July, 2010, five percent of all offices in southern Europe have switched over to ice as the cooling agent for air-conditioning their premises should serve as a shot in the arm to the enthusiasts of green cooling as a means to combat climate change. This means that millions of square meters of office space in Mediterranean Europe (which includes Portugal, Spain, southern France, Italy and the nine Balkan countries) are being cooled with ice.

This shows that the launch of the European concept model and the Water Cooler model, the three-year old Snowbreeze project has arrived at a definitive stage. Further, use of ice for cooling rooms as an alternative to conventional air conditioning is fairly wide spread in southern Europe. "In countries where electricity is cheaper at night some air-conditioning machines now take a different approach. As the evening beckons, they start making ice. During the day fans blow air over the ice. In southern Europe roughly one in 20 air-conditioned offices is now cooled with ice, cutting electricity bills by about 10%."

Snowbreeze has proved that the saving in electricity bills would be much higher if the European offices made their ice in ordinary ice plants and were not obliged to use their power guzzling air conditioning systems to make ice. Air conditioning is one of the highest power consumers in the world. IBM reckons that in some centres about half of all the electricity consumed is spent cooling equipment.

Other Countries

Canada, Brazil, and other parts of the world are also manufacturing ice-based air-conditioning systems. Ice run cooling is also becoming popular on ships worldwide, as reported by news.cnet.com.

Also, western technology has paid more attention to heating buildings than to cooling them. Huge effort has gone into warming up buildings as efficiently as possible; less into cooling them down. New developments would make cooling systems greener still because they would use less power. Hence, there is need of electronic devices like Snowbreeze.

In Western countries, ice energy could be used to rationalize the power load distribution between day and night; take advantage of the low night temperatures when water can be frozen with 20% less power; and derive the benefit of differential day and night power rates; with a total power saving ranging between 10% to 30%.

In poor countries like India, ice-run air conditioning, when practiced on a large scale, would cut power consumption by 50 to 70%. This is so because it offers the scope for regulating the quantity of ice used, according to the intensity of heat which varies vastly with location, season and hour of the day. Thus ice could be produced more cheaply and with less power with ordinary ice plants than with air-conditioning units. Developing nations should also import western techniques of designing ice-run units and channeling the air flow.

Inventor's take on the Impact of Innovation

“The capital city roughly consumes about one thousand Megawatt additional electric power for heating and cooling during peak summer and winter months. This extra burden on the power starved metropolis could be reduced by more than 50% by overhauling and simplifying the cooling and heating systems. The whole world is searching frantically for cleaner, cheaper, alternative sources of power”, says Shri M.B.Lal. “Generating more power beyond certain limits is not only prohibitively expensive, but also brings in more pollution, global warming, disease and deprivation”, he adds.

Further, the inventor reported, “According to the BSES chart of power consumption in electrical appliance issued with every bill, a refrigerator consumes about 100 watts of power in one hour while a 1.5-ton room air conditioner consumes 2 kilowatts of power in one hour, which is sufficient to produce 30 kilograms of ice in an ice factory or 20 kg in a refrigerator. With that much ice, Snowbreeze can keep a room almost equally cool and dehumidified for eight hours. One might say there are distribution losses in ice deliveries. But, under Indian conditions electricity transmission losses are no less, for which there are a variety of reasons including technical deficiencies and massive “thefts”, committed in the open, and the biggest problem in India, mainly by the richer power guzzling sections of society such as big factories and large bungalows and flats.

Add to that the colossal investments in the shape of electrical energy and finance to create the giant-sized infrastructure of power houses and transmission lines for every additional megawatt of power. If you take all this into account you will arrive at the sobering conclusion that a gadget which consumes one unit of energy per hour is in fact using two, the other half being invisible.”

According to the 85 year old inventor, “Example of over a dozen European countries is a visible demonstration of my belief that ice provides the only practical “green” option to the present power

intensive and highly polluting mode of air-conditioning. There are several alternative for sources of energy such as solar power, thermal heating systems and evaporative techniques as possible options, but ice-cooling is the most widely used among them all. These examples induce more confidence in ice-based air-conditioning in the minds of Indian scientists and technologists holding high positions who can carry this movement forward. It will also help to convince the media while publicizing the idea.”

“What The Economist leaves unsaid is equally important. While it reports on big offices resorting to ice for cooling rooms it is silent on the involvement of private house-holds in this new movement. Presumably their number would not be so large. After dabbling in this field for four summers I too have arrived at the conclusion that recourse to ice for cooling space will be most economic and efficient in bulk-using applications and not immediately as practical in piecemeal usage in the hands of individuals, unless they use a made-to-order water cooler model unit.

To reach out to individual homes we need standardized ready-made models of Snowbreeze and an automated supply chain of ice from ice-factories to the home in replaceable containers available at wholesale rates to each user. Taking a cue from the success of the European experience builders and designers of big buildings and towers should include ice-plants in their designs in place of elaborate conventional air-conditioning systems”, he added.

The fantastic innovator also says that making of Snowbreeze is very easy. Until standardized small units enter the market, enterprising individuals can make their own model with the help of a mechanic, after studying the material on the website, greenairconditioner.org.

Fan Following

Undoubtedly Shri Lal has a huge fan following. He has received more than 500 mails and thousands of hits on his website, greenairconditioner.org. There has been mention in various newspapers, TV reports and Google displays on over a 20,000 websites (exhibit 24). All this suggests that consumers are waiting for a standard model to come in the market which can be bought off the shelf. This is not the case only in India, but worldwide (exhibit 25).

Way Forward

Snowbreeze, undoubtedly, is the need of hour. The energy consumed by Snowbreeze, including energy used in making ice, is only 10% to 20% of the wall AC’s consumption of power. However, the handling costs of market ice on a small scale, plus the manual labour involved in operating in individual homes are yet to be addressed.

The Water Cooler model offers a viable solution to many such problems and situations. But it has to be operated at a high intensity, of say chilling 15 to 20 litres of water per hour per 100 sq ft. if, besides cooling the room, it has to control humidity as well.

While making a comparative analysis of conventional and ice-based cooling, energy and resources spent (per unit) on creating the huge power infrastructure at public cost should also be considered. When we use one unit of power, we are in fact consuming two. The other invisible unit being the power we use to create and operate the infra-structure of power houses, transmission lines and coal mines.

CONCLUSION

The innovators face many challenges during the process of innovation. Bureaucratic system, financial crunch, administration hassles, too much of paper work, designing B-plans, prototyping, R&D, market research, surveys, commercialization, and many more. But inspite of so many challenges, India has grown rapidly with the help of its people, who are inherently innovative and entrepreneurial. It ranks 66 in the Global Innovation Index, 2013. Like India, many developing and developed nations have much to offer to the world in terms of their innovation models of growth. Collective efforts of all would turn the world into one dynamic and sustainable nation.

Innovative spirit is required to carry out the changes and build a sustainable future for the generations to come. And those who are able to demonstrate those innovations with tangible products and services that impact and change the existing processes, become the future entrepreneurs of. Innovation takes leaders who are willing to invest in an open and creative culture that will foster new ideas and break standard or conventional thinking in carrying out professional responsibilities. These leaders need to incorporate innovation strategies into the strategic planning process in order to make innovation real and sustainable (Michael A. Crumpton, Innovation and Entrepreneurship, 5 July, 2012)

Apart from the above mentioned challenges, some factors should also be considered in building the culture of innovation in the economy. One of them is public and private institutions. These institutions play a very important role in lifting up the entrepreneurs, facilitating them in obtaining the resources needed to develop their creative product or service. Another important factor to be stressed upon is social climate. Relieving the entrepreneurs from stress of financial crunch, administration hassles would only stimulate them to carry out their activities.

As we have seen, there are numerous examples in every field of how innovative and creative ideas have impacted the end-user. Creativity and entrepreneurship is encouraging for a new vision of future. Last but not the least, according to Schumpeterian approach innovation plays a central role in the economic growth process and the entrepreneur is the vehicle to introduce the new technologies to improve the firms' activity and to obtain higher profits.

EXHIBIT

Exhibit 1: Sample MQ Max

<insert exhibit 1 about here>

Exhibit 2: Sample MQ Mini

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Exhibit 3: Mr. Noronha receiving award by Rakesh Singh, additional secretary at the vision summit of ISA Technovation 2010

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Exhibit 4: MQ Packaging

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Exhibit 5: MQ Online Order Form

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Exhibit 6: Cost comparison between MQ and other Repellents

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Exhibit 7: Receiving Gold Medal from Shri Prithvi Raj Chavan, Minister for Commerce and Industry in DST-Lockheed Martin India Innovation Programme on 20th May, 2010, Delhi

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Exhibit 8: Collection of Mosquitoes in Bottle in 30 Days

<insert exhibit 8 about here>

Exhibit 9: Multiplication Rate of Mosquitoes

<insert exhibit 9 about here>

Exhibit 10: ISA Best Electronic Product of the Year 2010

<insert exhibit 10 about here>

Exhibit 11: Recommendation from IC² Institute, USA, 2010

<insert exhibit 11 about here>

Exhibit 12: Articles published in various newspapers, 2002

<insert exhibit 12 about here>

Exhibit 13: Recognition from Economic Times in The Power of Ideas

<insert exhibit 13 about here>

Exhibit 14: Approval from NIMR/ICMR

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Exhibit 15: Patent and Design Registration Certificates

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Exhibit 16: Shri M B Lal

<insert exhibit 16 about here>

Exhibit 17: Snowbreeze 1: Match for wall AC

<insert exhibit 17 about here>

Exhibit 18: Snowbreeze 2 (Unique Self Cooling AC)

<insert exhibit 18 about here>

Exhibit 19: Automated Snowbreeze: Multipurpose AC

<insert exhibit 19 about here>

Exhibit 20: Mini Snowbreeze: Boon for old and sick

<insert exhibit 20 about here>

Exhibit 21: Snowbreeze Room Heater

<insert exhibit 21 about here>

Exhibit 22: Battery Powered Rural Unit

<insert exhibit 22 about here>

Exhibit 23: Appliance usage guide issued by BSES

<insert exhibit 23 about here>

Exhibit 24: Number of Hits on the Website (Intra Country Comparison)

<insert exhibit 24 about here>

Exhibit 25: Number of Hits on the Website (Inter Country Comparison)

<insert exhibit 25 about here>

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