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Creativity & Innovation

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Foreword

In an era where the ability to compete is at the heart of doing business, continuous generation and application of ideas is the lifeline of any commercial venture.

"Compete or perish" is a much used cliché in the business world. Those companies whose employees continuously generate and apply new ideas have a definite competitive edge; they are able to bring to the table: techniques, methods and approaches that help in developing new products, sales and business strategies, solutions to problems, new ways to do more with less, etc. The fact is, creativity and innovation, i.e. the processes that help to generate new ideas and apply them towards meeting the organization's objectives in a more effective way, are some of the most sought after competencies in industry today.

Some people believe that creativity is in-born and the domain of artists and inventors only. The understanding that creativity is not just a "gift" but a skill, and so a thinking process that can be learned and developed with practice, is a development of the latter half of the last century.

It is generally accepted that creative organizations with creative environments produce innovations; also, continuous innovation is vital to remain competitive. So, creativity and innovation are necessary for survival. Companies that aim to be at the cutting edge of their industry would do well to develop the competencies of creativity and innovation across their workforce.

Learning to be creative and innovative essentially is developing the habit of "thinking out of the box". This requires thinking beyond the boundaries of one's paradigms. Essentially it means: destroying habitual modes of perceiving and knowing, and learning a new way of using the mind and handling information, to arrive at a fresh synthesis. This leads to creative and innovative outcomes.

Joel Barker in his film "The Business of Paradigms" says, organizations that want to move and change to the new paradigms that are challenging them, must periodically and regularly ask themselves the question: "What today is impossible to change in our business, but if we do, would fundamentally change what we do?" This will take them to the boundaries of their paradigm, where they will encounter the new paradigm challenging them. This is necessary to be relevant and competitive today. It is only creative and innovative people and organizations who will see the new paradigm coming and generate new ideas to remain competitive, productive and successful.

The articles in the present LDA Journal of Management 2015 will enable the readers to learn from the experience of those individuals and organizations that have benefitted and remain relevant, productive and successful because they continue to be creative and innovative.

Neville Lobo
Vice President, Corporate Human Resources
Director, Leadership Development Academy

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In Conversation with M. V. Kotwal

Former Whole-time Director & President (Heavy Engineering), Larsen & Toubro

Members of the editorial team interviewed Mr. M. V. Kotwal, who has over the years displayed a penchant for being creative and innovative in the leadership & management of Heavy Engineering IC. The core success of Heavy Engineering IC is due to this consistent focus on being creative and innovative at its grass roots. This has enabled the IC to be a leader in the domestic industry and gain significant respect in the international industry. It is this passion & commitment to Creativity and Innovation, that led us to interview Mr. Kotwal. What follows is the text of this interview, conducted in his office on 13/8/2015, approximately a fortnight prior to his retirement.

How would you describe Creativity and Innovation and what is the difference? Would you share with us an example of each?

Creativity has hundreds of definitions. The way I look at it, is 'thinking without boundaries', where you look at anything, in a way without any constraints. You give yourself the freedom to think of completely new ways. Innovation is different. You are channelizing that thinking into creating something actually implementable.

Recently, I attended a seminar in St. Petersburg, where the former Prime Minister of Finland gave an interesting and simple distinction between Research & Innovation. He said Research is an attempt at converting money into Knowledge and Innovation is an attempt at converting Knowledge into Money. It is as simple as that and gives an interesting direction to thinking of Creativity which can be present in all fields. It is not limited by any constraints - whether money is available or not, or whether it is creating wealth or not. It is something which

is exhibited by different people in diverse fields. If you talk of creativity in music – the different notes of music use same fundamental notes but in totally different ways. At that time you are not thinking of whether you are creating wealth or business advantage. You could have it in paintings, or for that matter, in any sphere. Creativity is a much larger concept. Innovation is something where you use those creative ideas and build on them to create a difference, be it dealing with business, improving standard of living of people, etc.

So as per you, Creativity is more holistic and Innovation more implementable. What kind of people would you need in your organization? Creative? Innovative? Or a blend of both? What is more important for an organization, creative persons or persons who are innovative?

Obviously, for achieving innovation which is more real for business, we require people with creativity. Unless there is an opportunity and freedom for an individual to have boundary-less thinking, cutting across different strata of education, organization structures or the function which he or she is directly responsible, it will be a challenge for the organization to sustain an innovative culture. It is the ability to think differently and "out of the box" that is important. That is fundamental to really having innovation. Without creativity in Innovators, application of innovation is going to have its limitations.

Heavy Engineering, is dealing with major projects - How do you think a culture of innovation can make a difference? How do you inculcate a developmental approach?

Creativity is not limited by business or function. It is applicable across all organizations. When it comes to innovation, I feel – HE IC by the very nature of its business gives opportunities for innovation and has therefore shown perceptible results.

When we are dealing with products which are "Engineer-to-Order (ETO)" type, we do not make for stock, we do not have standard products; they are custom-made to meet the requirements of different customers. When we deal with development-oriented projects, we need to meet the functional requirements without any specific manufacturing codes and sometimes without any precedents to go by.

When we consider manufactured equipment for process plants, we have to ensure that quality & performance meets the end parameters given by the customer. As each equipment is different, we need innovation to improvise on processes to use available or in-house designed machines to improve productivity and remain ahead of competition. An example of this type was the development of a first-of-a-kind process which enables automated weld-cladding on the insides of large elbows. There are several such innovations including introduction of novel solutions for measurement & documentation, which have placed us among the top five fabrication companies globally.

Just one example in Defence was the Dhanush project. DRDO needed a system to position and fire a missile of a specified weight & size perfectly vertically from a ship which would be rolling and pitching on the high seas. There was no design code or an established concept to go by. This was a unique opportunity for innovation for a complete system in close collaboration with DRDO as well as the end users. In record time the team built a prototype, tried it out on a specially designed simulator before fielding it for sea trials.

A team of young engineers in Bengaluru has successfully indigenously developed a unique hand-held device to detect unbelievably low traces of lethal gases which if undetected, could otherwise have disastrous consequences.

Welding is an important activity in our shop production and ensuring use of correct welding electrodes is extremely important. As against the conventional manually driven process for issue & inventory control of welding consumables, we have in place a unique fully automated process with the use of Kiosks integrated with the ERP system.

Similarly in inspection: when the first submarine was manufactured, thousands of documents had to be manually produced. In the innovated process, the inspector takes a hand-held device which is wireless connected to the main system, enters actual dimensions, and that goes directly to the customer's representative for verification and digital signature.

Let us take Ship Building. What is probably not known is how we got an order against global competition for some very fast Interceptor Boats. The only reason we

could hold our own against competition, was that our team could offer a completely in-house design. This turned out to be a major advantage in getting the order and in successfully meeting the needs of the customer.

There are numerous such examples where there is a wide scope to apply creativity in all disciplines in a boundary-less and collaborative manner. Nurturing and sustaining such a culture calls for special attention and priority to be given to any new developments. Young persons have to be encouraged to try new approaches whereas the seniors need to be open to new ideas and recent developments in technology. All this is easier said than done in an environment where there is continuing pressure on delivery dates. A commonly stated hurdle is availability of sufficient funds. Whereas this is true for large developmental projects, I believe this not a real constraint for developing an innovative culture. The more important requirement is to develop an open and collaborative environment where even the junior-most person feels empowered to innovate.

What are the barriers that come into play in this?

Generally speaking, every individual has creativity built in. You do not have to teach creativity to people. It is evident even in a child who discovers new ways of doing things without the benefit of prior experience or knowledge. Humans have this inherent ability. What happens is that a lot depends on various opportunities and the environment; there are highly innovative people who live in rural backgrounds without access to proper education, but given an opportunity they show their worth. So if you look at it in a broad way, the basic raw material is there, but there are man-made constraints in one area or the other.

When we think of Innovation, we always think of products. Because we have created a mindset that innovation happens only in design houses, or by people who are wizards in technology. This approach not only gives rise to a feeling that we do not have many innovative people, but also de-motivates people in other areas who are capable of remarkable innovation. What we should be really focussing on is, if people have the essentials of being creative, what hinders them in using this potential.

There are two types of innovation – product & process innovation. Process innovation has great transformational power. Through changes in processes, we can achieve quantum improvements in productivity. In both cases you need a conducive environment. Young people are excited if you involve them without giving them too many instructions & restrictions but just give them a direction; they come out with surprising results. If you keep telling people how things have to be done it could work against innovative thinking. Very often, Customer's likely reluctance to accept change or some Code restrictions, are used as excuses to scuttle innovative thinking.

Who is generally responsible for creating or accepting such barriers? Senior management. I have always believed that responsibility to create the right environment is that of senior management. We have to create an environment that supports creativity. Many a time, seniors themselves act as barriers and sub-consciously put brakes.

What are the costs associated with Creativity and Innovation? Is it expensive?

I had asked one of our competitors about how much they invest in R&D. Of a turnover of Rs 2000 crores, they spend almost 150 crores on R&D. I was surprised. This was a lot of money considering the total turnover. But what they include in R&D are activities of every person in the design department, whether designing for regular products or in developing new products. At times, numbers and percentages can therefore be misleading. Government does offer some tax incentives for R&D. Whereas we have started using this facility in HE by segregating developmental work, we need to set aside some corpus, around 1 to 2% of turnover, that encourages futuristic development. We have already set up two groups: one for defence and aerospace, and the other for process plant & nuclear equipment, which we call the 'products and technology development' groups.

In my opinion, assessment of level of innovation in an organisation through a purely numerical process of budgeting or R&D spend is not advisable. One needs to generally evaluate the ideas that you need to pursue during the year primarily to avoid working on esoteric projects which have no application.

Do you conduct any background study with regards to the Focus Areas you want to concentrate on for Innovation?

Whether it is in production engineering or in the product technology development centres, for whatever

projects are taken up, a general discussion is held with the concerned. In fact, what we are trying to do is to involve units that are closest to the customer, like the marketing departments. They should ideally assess what the customers are likely to need, not in the immediate future but say ten years hence, and then provide these inputs to the development team concerned.

The projects undertaken are assessed in terms of possible gains to the company; now this of course could be subjective, but one can look at gains in terms of drastic reduction in cost or in strategic terms which can be somewhat intangible. So this kind of a study is done in a broad way and then the projects are selected. Now that is the stage at which a decision about allocation of funds is taken.

How do you create and nurture an environment of Creativity and Innovation, in an organization?

One model I always think of as a good benchmark, is the Israeli company ISCAR whom L&T represents for some products. I had an occasion to visit their establishment in Israel.

I was talking to their founder and he said that he would show me something different. He took me to a hill where they have created something called an 'Innovation Park'. He explained his intent – convincing the young that manufacturing can be clean and beautiful. In the park young engineers and even school students are allowed to create objects of their choice using various multi-purpose machines provided there. This park and a museum are maintained in a very beautiful environment, very peaceful and green all round. There is no saleable product produced but the young participants get an opportunity and freedom to use their imagination and creativity.

In Heavy Engineering, we have started an initiative, where young engineers come together and talk about interesting subjects not necessarily connected to their projects. We have yet to formalize this on a large scale. Another useful initiative in place which can trigger and inspire innovation, is "Guru Speak" sessions wherein eminent persons from various walks of life are invited to talk about their experiences.

All these can help in creating an environment that is supportive. But this doesn't stop there. As I said earlier, every individual has that creative spark and ability, so it is necessary to give opportunities from grass-root levels as well.

Picking up from the Japanese Kaizen system, we started some schemes many years back at Hazira which have an in-built mechanism to encourage implementation of small, "seed-level" improvements by a large number of employees in a collaborative spirit. This system is quite different from the traditional suggestion schemes which are based on monetary rewards given to individuals, worked out as percentage of savings which can potentially accrue if the suggestions are implemented mostly by others. Today a large number of workmen and staff at various units of HE participate together in "Improvement Teams" which help in resolving some chronic problems with innovative solutions.

I can give an example here about a senior staff member who was participating in the Kaizen scheme at Hazira. Due to the high water tank there, water used to gush out of taps when opened. This lead to significant wastage. The simple solution he implemented involved using the plastic washer of the tap, costing just a few paise, as an orifice which restricted the flow of water. At a negligible cost, thousands of tonnes of water wastage has been eliminated. Now if we recognise and reward only a few individuals who suggest ideas with high potential savings, then majority of people will not look at things which can be implemented straight away with minimal investment.

This is a philosophy which encourages a culture of collaborative innovation and that kind of atmosphere helps in introducing anything new. You can have a whole organization oriented towards accepting & implementing others' ideas.

What is the difference that you have seen in the approach towards Creativity and Innovation overseas, vis a vis organizations in India?

Israel has been a pioneer in their well known 'Incubation Program'. How they inculcated a spirit of innovation in their people, is worth a mention. Among the large number of Russian Jews migrating into Israel were very brilliant and highly educated people who didn't have money and were willing to do anything for a living. The Israelis thought of a very good idea. Each such chosen expert was given a small team of students to work in a relevant field of his choice. They were given all facilities to come up with highly innovative products

within a specified time frame. I have visited the Technion University where they have successfully implemented this program with remarkable results.

In USA, innovation is deep-rooted through completely different approaches – the entrepreneurial start-ups, strong industry-academia linkages, and the massive government sponsored programs through organisations like DARPA.

In Europe, I think the French have the ability to give an outlet to their free thinking and creativity. They have established their leadership position in some areas.

In UK and Germany you will find that innovation is more structured and institutionalized.

Russia and Japan, until recently tended to be very "closed" as countries, with minimal sharing of information regarding the several areas in which they have made a mark globally.

South Korea and China have been very aggressively focussed on innovation primarily through strong governmental support.

In India, unfortunately, the true potential of Innovation has yet to be realised and exploited. Although some companies and organisations have taken some steps, typically we do not exhibit the self-confidence in our own capabilities and tend to be overawed with foreign achievements. We need to drastically change this approach and come with relevant technologies and processes which suit our conditions and those of other developing countries. Much more recognition and support is needed for indigenously developed products and processes. Some organisations like ISRO for example and even the much-criticised DRDO have been responsible for some remarkable achievements in this direction.

A parting message

There is a very distinct change in direction that we need in the coming years, because sometimes success is the biggest enemy of sustainable long term improvement since it can drown the need to nurture innovation and creativity. We will be making the biggest blunder if we ignore this because, in the long term, that is our only saviour. Also the encouragement and recognition that we give to people in this respect has definitely taken a backseat. The priority given to this has to be stepped up quite a bit.

We have to be far ahead of the competition. I believe that, barring a few areas, generally we have lost out on that cutting edge, in terms of being leaders in innovative solutions and technologies whereas we have gained a lot in shareholder value.

The next 5 years should hopefully see a significant transformation, otherwise there is a lurking danger, and it applies to all fields and businesses.

The Discipline of Innovation

Peter F. Drucker

How much of innovation is inspiration, and how much is hard work? If it's mainly the former, then management's role is limited: Hire the right people, and get out of their way. If it's largely the latter, management must play a more vigorous role: Establish the right roles and processes, set clear goals and relevant measures, and review progress at every step. Peter Drucker, with the masterly subtlety that is his trademark, comes down somewhere in the middle. Yes, he writes in this article, innovation is real work, and it can and should be managed like any other corporate function. But that doesn't mean it's the same as other business activities. Indeed, innovation is the work of knowing rather than doing.

Drucker argues that most innovative business ideas come from methodically analyzing seven areas of opportunity, some of which lie within particular companies or industries and some of which lie in broader social or demographic trends. Astute managers will ensure that their organizations maintain a clear focus on all seven. But analysis will take you only so far. Once you've identified an attractive opportunity, you still need a leap of imagination to arrive at the right response – call it "functional inspiration".

Despite much discussion these days of the "entrepreneurial personality," few of the entrepreneurs with whom I have worked during the past 30 years had such personalities. But I have known many people – salespeople, surgeons, journalists, scholars, even musicians – who did have them without being the least bit entrepreneurial. What all the successful entrepreneurs I have met have in common is not a certain kind of personality but a commitment to the systematic practice of innovation.

Innovation is the specific function of entrepreneurship, whether in an existing business, a public service institution, or a new venture started by a lone individual in the family kitchen. It is the means by which the entrepreneur either creates new wealth-producing resources or endows existing resources with enhanced potential for creating wealth.

Today, much confusion exists about the proper definition of entrepreneurship. Some observers use the term to refer to all small businesses; others, to all new businesses. In practice, however, a great many well-established businesses engage in highly successful entrepreneurship. The term, then, refers not to an enterprise's size or age but to a certain kind of activity. At the heart of that activity is innovation: the effort to create purposeful, focused change in an enterprise's economic or social potential.

Sources of Innovation

There are, of course, innovations that spring from a flash of genius. Most innovations, however, especially the successful ones, result from a conscious, purposeful search for innovation opportunities, which are found only in a few situations. Four such areas of opportunity exist within a company or industry: unexpected occurrences, incongruities, process needs, and industry and market changes.

Three additional sources of opportunity exist outside a company in its social and intellectual environment: demographic changes, changes in perception, and new knowledge.

True, these sources overlap, different as they may be in the nature of their risk, difficulty, and complexity, and the potential for innovation may well lie in more than one area at a time. But together, they account for the great majority of all innovation opportunities.

1. Unexpected Occurrences

Consider, first, the easiest and simplest source of innovation opportunity: the unexpected. In the early 1930s, IBM developed the first modern accounting machine, which was designed for banks. But banks in 1933 did not buy new equipment. What saved the company – according to a story that Thomas Watson, Sr., the company's founder and long-term CEO, often told – was its exploitation of an unexpected success: The New York Public Library wanted to buy a machine. Unlike the banks, libraries in those early New Deal days had money, and Watson sold more than a hundred of his otherwise unsalable machines to libraries.

Fifteen years later, when everyone believed that computers were designed for advanced scientific work, business unexpectedly showed an interest in a machine that could do payroll. Univac, which had the most advanced machine, spurned business applications. But IBM immediately realized it faced a possible unexpected success, redesigned what was basically Univac's machine for such mundane applications as payroll, and within five years became a leader in the computer industry, a position it has maintained to this day.

The unexpected failure may be an equally important source of innovation opportunities. Everyone knows about the Ford Edsel as the biggest new-car failure in automotive history. What very few people seem to know, however, is that the Edsel's failure was the foundation for much of the company's later success. Ford planned the Edsel, the most carefully designed car to that point in American automotive history, to give the company a full product line with which to compete with General Motors. When it bombed, despite all the planning, market research, and design that had gone into it, Ford realized that something was happening in the automobile market that ran counter to the basic assumptions on which GM and everyone else had been designing and marketing cars. No longer was the market segmented primarily by income groups; the new principle of segmentation was what we now call "lifestyles." Ford's response was the Mustang, a car that gave the company a distinct personality and reestablished it as an industry leader.

Unexpected successes and failures are such productive sources of innovation opportunities because most businesses dismiss them, disregard them, and even resent

them. The German scientist who around 1905 synthesized novocaine, the first nonaddictive narcotic, had intended it to be used in major surgical procedures like amputation. Surgeons, however, preferred total anesthesia for such procedures; they still do. Instead, novocaine found a ready appeal among dentists. Its inventor spent the remaining years of his life traveling from dental school to dental school making speeches that forbade dentists from "misusing" his noble invention in applications for which he had not intended it.

This is a caricature, to be sure, but it illustrates the attitude managers often take to the unexpected: "It should not have happened." Corporate reporting systems further ingrain this reaction, for they draw attention away from unanticipated possibilities. The typical monthly or quarterly report has on its first page a list of problems – that is, the areas where results fall short of expectations. Such information is needed, of course, to help prevent deterioration of performance. But it also suppresses the recognition of new opportunities. The first acknowledgment of a possible opportunity usually applies to an area in which a company does better than budgeted. Thus genuinely entrepreneurial businesses have two "first pages" – a problem page and an opportunity page – and managers spend equal time on both.

2. Incongruities

Alcon Laboratories was one of the success stories of the 1960s because Bill Conner, the company's cofounder, exploited an incongruity in medical technology. The cataract operation is the world's third or fourth most common surgical procedure. During the past 300 years, doctors systematized it to the point that the only "old-fashioned" step left was the cutting of a ligament. Eye surgeons had learned to cut the ligament with complete success, but it was so different a procedure from the rest of the operation, and so incompatible with it, that they often dreaded it. It was incongruous.

Doctors had known for 50 years about an enzyme that could dissolve the ligament without cutting. All Conner did was to add a preservative to this enzyme that gave it a few months' shelf life. Eye surgeons immediately accepted the new compound, and Alcon found itself with a worldwide monopoly. Fifteen years later, Nestlé bought the company for a fancy price.

Such an incongruity within the logic or rhythm of a process is only one possibility out of which innovation opportunities may arise. Another source is incongruity between economic realities. For instance, whenever an industry has a steadily growing market but falling profit margins – as, say, in the steel industries of developed countries between 1950 and 1970 – an incongruity exists. The innovative response: minimills.

An incongruity between expectations and results can also open up possibilities for innovation. For 50 years after the turn of the century, shipbuilders and shipping companies worked hard both to make ships faster and to lower their fuel consumption. Even so, the more successful they were in boosting speed and trimming their fuel needs, the worse the economics of ocean freighters became. By 1950 or so, the ocean freighter was dying, if not already dead.

All that was wrong, however, was an incongruity between the industry's assumptions and its realities. The real costs did not come from doing work (that is, being at sea) but from *not* doing work (that is, sitting idle in port). Once managers understood where costs truly lay, the innovations were obvious: the roll-on and roll-off ship and the container ship. These solutions, which involved old technology, simply applied to the ocean freighter what railroads and truckers had been using for 30 years. A shift in viewpoint, not in technology, totally changed the economics of ocean shipping and turned it into one of the major growth industries of the last 20 to 30 years.

3. Process Needs

Anyone who has ever driven in Japan knows that the country has no modern highway system. Its roads still follow the paths laid down for – or by – oxcarts in the tenth century. What makes the system work for automobiles and trucks is an adaptation of the reflector used on American highways since the early 1930s. The reflector lets each car see which other cars are approaching from any one of a half-dozen directions. This minor invention, which enables traffic to move smoothly and with

Knowledge based innovations can be temperamental, capricious, and hard to direct.

a minimum of accidents, exploited a process need.

What we now call the media had its origin in two innovations developed around 1890 in response to process needs. One was Ottmar Mergenthaler's Linotype, which made it possible to produce newspapers quickly and in large volume. The other was a social innovation, modern advertising, invented by the first true newspaper publishers, Adolph Ochs of the *New York Times*, Joseph Pulitzer of the *New York World*, and William Randolph Hearst. Advertising made it possible for them to distribute news practically free of charge, with the profit coming from marketing.

4. Industry and Market Changes

Managers may believe that industry structures are ordained by the good Lord, but these structures can – and often do – change overnight. Such change creates tremendous opportunity for innovation.

One of American business's great success stories in recent decades is the brokerage firm of Donaldson, Lufkin & Jenrette, recently acquired by the Equitable Life Assurance Society. DL&J was founded in 1960 by three young men, all graduates of the Harvard Business School, who realized that the structure of the financial industry was changing as institutional investors became dominant. These young men had practically no capital and no connections. Still, within a few years, their firm had become a leader in the move to negotiated commissions and one of Wall Street's stellar performers. It was the first to be incorporated and go public.

In a similar fashion, changes in industry structure have created massive innovation opportunities for American health care providers. During the past ten or 15 years, independent surgical and psychiatric clinics, emergency centers, and HMOs have opened throughout the country. Comparable opportunities in telecommunications followed industry upheavals – in transmission (with the emergence of MCI and Sprint in long-distance service) and in equipment (with the emergence of such companies as Rolm in the manufacturing of private branch exchanges).

When an industry grows quickly – the critical figure seems to be in the neighborhood of 40% growth in ten years or less – its structure changes. Established companies, concentrating on defending what they already have, tend not to counterattack when a newcomer challenges them. Indeed, when market or industry structures change, traditional industry leaders again and again neglect the fastest growing market segments. New opportunities rarely fit the way the industry has always approached the market, defined it, or organized to serve it. Innovators therefore have a good chance of being left alone for a long time.

5. Demographic Changes

Of the outside sources of innovation opportunities, demographics are the most reliable. Demographic events have known lead times; for instance, every person who will be in the American labor force by the year 2000 has already been born. Yet because policy makers often neglect demographics, those who watch them and exploit them can reap great rewards.

The Japanese are ahead in robotics because they paid attention to demographics. Everyone in the developed countries around 1970 or so knew that there was both a baby bust and an education explosion going on; about half or more of the young people were staying in school beyond high school. Consequently, the number of people available for traditional blue-collar work in manufacturing was bound to decrease and become inadequate by 1990. Everyone knew this, but only the Japanese acted on it, and they now have a ten-year lead in robotics.

Much the same is true of Club Mediterranee's success in the travel and resort business. By 1970, thoughtful observers could have seen the emergence of large numbers of affluent and educated young adults in Europe and the United States. Not comfortable with the kind of vacations their working-class parents had enjoyed – the summer weeks at Brighton or Atlantic City – these young people were ideal customers for a new and exotic version of the "hangout" of their teen years.

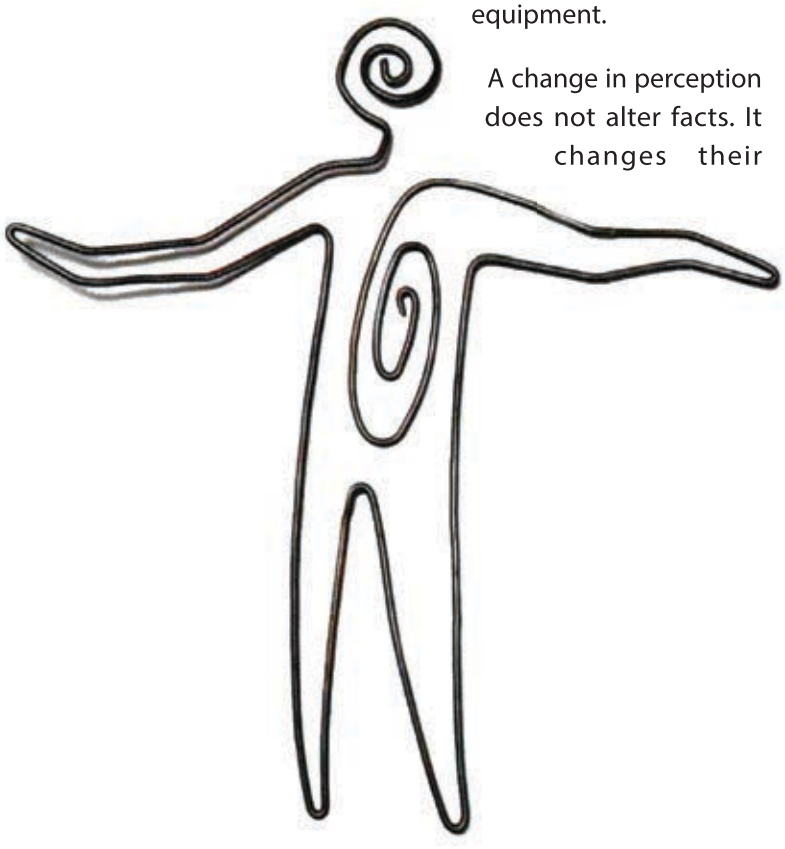
Managers have known for a long time that demographics matter, but they have always believed that population statistics change slowly. In this century, however, they don't. Indeed, the innovation opportunities made possible by changes in the numbers of people – and in their age distribution, education, occupations, and geographic location – are among the most rewarding and least risky of entrepreneurial pursuits.

6. Changes in Perception

"The glass is half full" and "The glass is half empty" are descriptions of the same phenomenon but have vastly different meanings. Changing a manager's perception of a glass from half full to half empty opens up big innovation opportunities.

All factual evidence indicates, for instance, that in the last 20 years, Americans' health has improved with unprecedented speed – whether measured by mortality rates for the newborn, survival rates for the very old, the incidence of cancers (other than lung cancer), cancer cure rates, or other factors. Even so, collective hypochondria grips the nation. Never before has there been so much concern with or fear about health. Suddenly, everything seems to cause cancer or degenerative heart disease or premature loss of memory. The glass is clearly half empty.

Rather than rejoicing in great improvements in health, Americans seem to be emphasizing how far away they still are from immortality. This view of things has created many opportunities for innovations: markets for new health care magazines, for exercise classes and jogging equipment, and for all kinds of health foods. The fastest growing new U.S. business in 1983 was a company that makes indoor exercise equipment.



A change in perception does not alter facts. It changes their meaning, though – and very quickly. It took less than two years for the computer to change from being perceived as a threat and as something only big businesses would use to something one buys for doing income tax. Economics do not necessarily dictate such a change; in fact, they may be irrelevant. What determines whether people see a glass as half full or half empty is mood rather than fact, and a change in mood often defies quantification. But it is not exotic. It is concrete. It can be defined. It can be tested. And it can be exploited for innovation opportunity.

7. New Knowledge

Among history-making innovations, those that are based on new knowledge – whether scientific, technical, or social – rank high. They are the superstars of entrepreneurship; they get the publicity and the money. They are what people usually mean when they talk of innovation, although not all innovations based on knowledge are important.

Knowledge-based innovations differ from all others in the time they take, in their casualty rates, and in their predictability, as well as in the challenges they pose to entrepreneurs. Like most superstars, they can be temperamental, capricious, and hard to direct. They have, for instance, the longest lead time of all innovations. There is a protracted span between the emergence of new knowledge and its distillation into usable technology. Then there is another long period before this new technology appears in the marketplace in products, processes, or services. Overall, the lead time involved is something like 50 years, a figure that has not shortened appreciably throughout history.

To become effective, innovation of this sort usually demands not one kind of knowledge but many. Consider one of the most potent knowledge-based innovations: modern banking. The theory of the entrepreneurial bank – that is, of the purposeful use of capital to generate economic development – was formulated by the Comte de Saint-Simon during the era of Napoleon. Despite Saint-Simon's extraordinary prominence, it was not until 30 years after his death in 1825 that two of his disciples, the brothers Jacob and Isaac Pereire, established the first entrepreneurial bank, the Credit Mobilier, and ushered in what we now call finance capitalism.

The Pereires, however, did not know modern commercial banking, which developed at about the same time across the channel in England. The Credit Mobilier failed ignominiously. A few years later, two young men – one an American, J.P. Morgan, and one a German, Georg Siemens – put together the French theory of entrepreneurial banking and the English theory of commercial banking to create the first successful modern banks: J.P. Morgan & Company in New York, and the Deutsche Bank in Berlin. Ten years later, a young Japanese, Shibusawa Eiichi, adapted Siemens's concept to his country and thereby laid the foundation of Japan's modern economy. This is how knowledge-based innovation always works.

The computer, to cite another example, required no fewer than six separate strands of knowledge:

- binary arithmetic;
- Charles Babbage's conception of a calculating machine, in the first half of the nineteenth century;
- the punch card, invented by Herman Hollerith for the U.S. census of 1890;
- the audion tube, an electronic switch invented in 1906;
- symbolic logic, which was developed between 1910 and 1913 by Bertrand Russell and Alfred North Whitehead;
- and concepts of programming and feedback that came out of abortive attempts during World War I to develop effective antiaircraft guns.

Although all the necessary knowledge was available by 1918, the first operational digital computer did not appear until 1946.

Long lead times and the need for convergence among different kinds of knowledge explain the peculiar rhythm of knowledge-based innovation, its attractions, and its dangers. During a long gestation period, there is a lot of talk and little action. Then, when all the elements suddenly converge, there is tremendous excitement and activity and an enormous amount of speculation. Between 1880 and 1890, for example, almost 1,000 electric-apparatus companies were founded in developed countries. Then, as always, there was a crash and a shake-out. By 1914, only 25 were still alive. In the early 1920s, 300 to 500 automobile companies existed in the United States; by 1960, only four of them remained.

Innovation requires knowledge, ingenuity, and, above all else, focus.

It may be difficult, but knowledge-based innovation can be managed. Success requires careful analysis of the various kinds of knowledge needed to make an innovation possible. Both J.P. Morgan and Georg Siemens did this when they established their banking ventures. The Wright brothers did this when they developed the first operational airplane.

Careful analysis of the needs – and, above all, the capabilities – of the intended user is also essential. It may seem paradoxical, but knowledge-based innovation is more market dependent than any other kind of innovation. De Havilland, a British company, designed and built the first passenger jet, but it did not analyze what the market needed and therefore did not identify two key factors. One was configuration – that is, the right size with the right payload for the routes on which a jet would give an airline the greatest advantage. The other was equally mundane: How could the airlines finance the purchase of such an expensive plane? Because de Havilland failed to do an adequate user analysis, two American companies, Boeing and Douglas, took over the commercial jet-aircraft industry.

Principles of Innovation

Purposeful, systematic innovation begins with the analysis of the sources of new opportunities. Depending on the context, sources will have different importance at different times. Demographics, for instance, may be of little concern to innovators of fundamental industrial processes like steelmaking, although the Linotype machine became successful primarily because there were not enough skilled typesetters available to satisfy a mass market. By the same token, new knowledge may be of little relevance to someone innovating a social instrument to satisfy a need that changing demographics or tax laws have created. But whatever the situation, innovators must analyze all opportunity sources.

Because innovation is both conceptual and perceptual,

would-be innovators must also go out and look, ask, and listen. Successful innovators use both the right and left sides of their brains. They work out analytically what the innovation has to be to satisfy an opportunity. Then they go out and look at potential users to study their expectations, their values, and their needs.

To be effective, an innovation has to be simple, and it has to be focused. It should do only one thing; otherwise it confuses people. Indeed, the greatest praise an innovation can receive is for people to say, "This is obvious! Why didn't I think of it? It's so simple!" Even the innovation that creates new users and new markets should be directed toward a specific, clear, and carefully designed application.

Effective innovations start small. They are not grandiose. It may be to enable a moving vehicle to draw electric power while it runs along rails, the innovation that made possible the electric streetcar. Or it may be the elementary idea of putting the same number of matches into a matchbox (it used to be 50). This simple notion made possible the automatic filling of matchboxes and gave the Swedes a world monopoly on matches for half a century. By contrast, grandiose ideas for things that will "revolutionize an industry" are unlikely to work.

In fact, no one can foretell whether a given innovation will end up a big business or a modest achievement. But even if the results are modest, the successful innovation aims from the beginning to become the standard setter, to determine the direction of a new technology or a new industry, to create the business that is – and remains – ahead of the pack. If an innovation does not aim at leadership from the beginning, it is unlikely to be innovative enough.

Above all, innovation is work rather than genius. It requires knowledge. It often requires ingenuity. And it requires focus. There are clearly people who are more talented innovators than others, but their talents lie in well-defined areas. Indeed, innovators rarely work in more than one area. For all his systematic innovative accomplishments, Thomas Edison worked only in the electrical field. An innovator in financial areas, Citibank for example, is not likely to embark on innovations in health care.

In innovation, as in any other endeavor, there is talent, there is ingenuity, and there is knowledge. But when all is said and done, what innovation requires is hard, focused, purposeful work. If diligence, persistence, and commitment are lacking, talent, ingenuity, and knowledge are of no avail.

There is, of course, far more to entrepreneurship than systematic innovation – distinct entrepreneurial strategies, for example, and the principles of entrepreneurial management, which are needed equally in the established enterprise, the public service organization, and the new venture. But the very foundation of entrepreneurship is the practice of systematic innovation.

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Innovate Your Innovation Process: Toward A Borderless Organization

Shlomo Maital

"Open innovation is expected to become the dominant innovation model of the 21st C., as changes in the external innovation environment induce firms to collaborate."

Jennifer Brant & Sebastian Lohse, 2014, p. 21

Introduction[1]

Organizations that excel at innovation do not limit themselves to new product development. They innovate in everything they do, from logistics, through supply chain management to customer service – and they even innovate the way they innovate.

This essay is about how to innovate the innovation process itself. Specifically, an old/new idea known as open innovation will be discussed, analyzed and illustrated with case studies. First, we begin with basic definitions.

Creativity is "widening the range of choice". (Ruttenberg and Maital, 2014). On hearing that America had put a man on the moon in 1969, French President Charles de Gaulle commented, rather sourly, "we may well go to the moon, but that is not very far; the greatest distance we have to travel lies within us."

De Gaulle was right. Human creativity is limited mainly by human beings themselves. We seek the familiar, the comfortable, the tried and true. And thus, we limit voluntarily our range of choice, rather than widen it. Once it is understood what creativity really is, widening our choices, the way is paved to seek new and better ways to do everything. Our journey outward, to find external sources of ideas and technology, begins with a long journey inward, into the bowels of the organization.

We define innovation as "intelligently breaking the rules, in order to create value". (See Maital & Seshadri, 2012). The operative words here are, first, "intelligently". In order to break the rules cleverly, first it is necessary to learn them. But paradoxically, if the rules of business are learned too well, they become what Warren Buffett has described as "the chains of habit" ("too light to be felt, until they become too heavy to be broken"). Millions of managers worldwide with M.B.A. degrees have learned the "right" way to manage, to raise funds, write a business plan, do marketing, manage suppliers, and hire and train human resources. If they all manage in the same manner, what strategic differentiator do they possess? What value do they truly bring to their employers?

Innovation is recognized as an increasingly important core competency of every organization, large and small. As competition grows in the global village, organizations must find new ways to differentiate themselves and their offerings from those of competitors, to create value for customers in a sustainable manner. This generally requires the resolution of another paradox – while creativity-driven innovation thrives in a free and open atmosphere, the innovation process itself requires a fairly well-organized structure, so that it can be managed and directed.

Creativity, then, is widening the range of choice, both inside the organization and beyond it, for its clients, and this is achieved by intelligently examining the 'rules', written and unwritten, and finding ways to break them, always with the goal of creating value. This principle, it is argued here, can become the foundation principle for a major change in organizational culture, arising from the new world order.

Open innovation is "the use of purposive inflows and outflows of knowledge to accelerate internal innovation and expand the markets for external use of innovation" (Chesbrough, 2005, p. 2). The underlying logic of open innovation is simple to enunciate, though difficult to implement. It is this: Globalization has made the world hyperconnected. Organizations' innovation processes must adapt and evolve to reflect this.

New World Order:

New York Times columnist Thomas Friedman recently wrote that "chaos is the new world order". (See http://www.nytimes.com/2014/07/16/opinion/thomas-friedman-israeli-palestinian-conflict-order-disorder.html?_r=0). It is hard to escape this conclusion, when one surveys the turmoil embracing the world, in the Mideast, Asia, Europe, virtually

1 I wish to acknowledge receiving many key insights from my friend and former colleague, Tali Ramon-Zilberstain, an experienced organizational consultant and educator.

everywhere. But the veteran diplomat Henry Kissinger has a different perspective. "For the first time," he observed, "we can truly speak about a world order". The reason? We now live in a hyperconnected world. Everyone is connected with everyone else, everywhere, all the time". (Source: Wall St. Journal - http://www.wsj.com/articles/henry-kissinger-on-the-assembly-of-a-new-world-order-1409328075). This is not technically true. Half the world's population still cannot connect to the Internet. But with Google investing effort and resources into finding innovative ways to bring the Internet to everyone, this may soon be resolved.

The hyperconnected world brings with it a major change in the way organizations are structured. In his book Reinventing Organizations (2014), Frederic Laloux speaks of a new paradigm: Organizations without boundaries. He observes:

"….every time humanity has shifted to a new stage of consciousness in the past, it has invented a whole new way to structure and run organizations, each time bringing extraordinary breakthroughs in collaboration. A new shift in consciousness is currently underway. Could it help us invent a radically more soulful and purposeful way to run our businesses and nonprofits, schools and hospitals?"

Laloux refers to smashing boundaries both within organizations – the 'silos' separating corporate functions, like finance and R&D – and boundaries between organizations and their suppliers, customers, and even competitors. Boundaries have fallen worldwide, ever since the fall of an obscene physical boundary: the Berlin Wall, that split East and West Germany.

Globalization can be dated from Nov. 9, 1989, and the fall of the Berlin Wall. The rapid unification of the two Germanys brought economic harmonization to Europe and soon to the world. Globalization brought great organizations, e.g. Nestle, to realize that they could manage their businesses in ways that diminished the significance of national borders. Now, organizations are innovating their internal structures, to break down internal borders, leverage synergies and replicate inside the firm what they have already done outside it. A strong example of such border-smashing is the innovative approach to innovation, known as "open innovation".

Open Innovation defined:

The term "open innovation" was coined by Henry Chesbrough in around the year 2000. (See Chesbrough, 2003). Based in California, Chesbrough exhorted American companies, accustomed since the time of Henry Ford to vertically integrate, from rubber trees through iron ore, steel, to the automobile itself, to seek expertise elsewhere.

In truth, open innovation existed well before Chesbrough gave it a name. For instance, MIT Professor Eric von Hippel showed, as early as 1976, that in the scientific instrument innovation process, lead users played a key role in providing new product ideas (von Hippel, 1976). In his 2005 book Democratizing Innovation, von Hippel expanded this concept -- and practiced what he preached, making the book freely available to all.

Fig. 1 below shows the strong link, according to von Hippel, between the strength of "lead user" (i.e. users

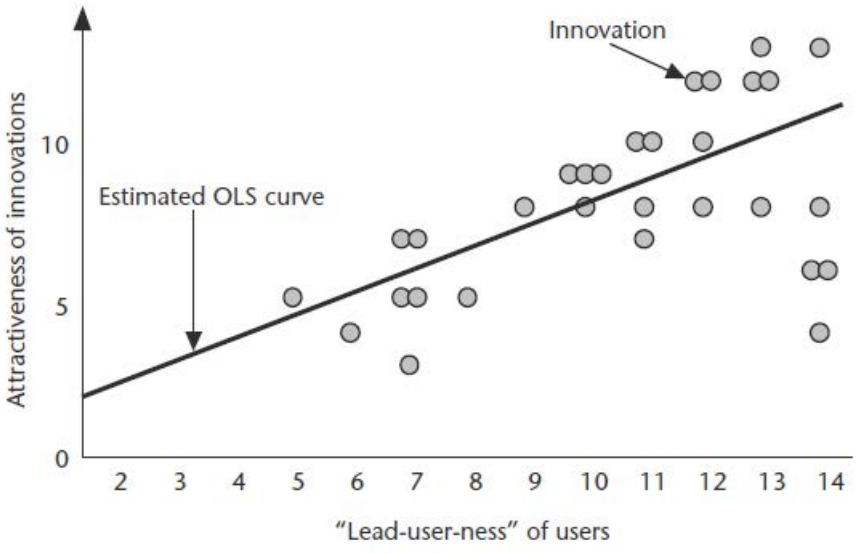

Fig. 1. User-innovation with stronger "lead user' characteristics develop innovations having higher appeal in the general marketplace. (Sample of 30 companies).

Source: von Hippel, 2005, p. 5.

of a product or service who have strong affinity for the product, for whom it creates significant value, and who as a result actively seek to participate in shaping the characteristics of the product in future versions) and the marketplace attractiveness of the resulting innovation.

Open innovation processes are integrated into architectures and systems. They inform business models of the organization, and treat R&D as an open system. Open innovation places ideas gleaned from outside the organization on the same level of importance as that of internal ideas. Finally, open innovation includes both value creation and value capture. Some believe that open innovation is indeed a new paradigm for the innovation process. Open innovation thus becomes part of Laloux's borderless organization.

Open Innovation Principles:

Happy families are all alike. Unhappy families are unhappy, each in its own way.

The memorable opening sentence of Tolstoy's great novel, Anna Karenina, can be modified as follows: Happy open innovation systems are happy, each in its own way. In other words, every organization that seeks to successfully break down borders and barriers, internally and externally, must do so in a manner that is suited to its history, personality, culture and vision. But a close review of the research and case-study literature on open innovation – a literature that is very large and growing daily – reveals that there are several key principles that appear to hold true in general. What follows is a

P&G: Proudly Found Elsewhere (Connect & Develop)

In 2000, realizing that P&G couldn't meet its growth objectives by spending more and more on R&D for less and less payoff, our newly appointed CEO, A.G. Lafley, challenged us to reinvent the company's innovation business model. It was clear to us that our invent-it-ourselves model was not capable of sustaining high levels of top-line growth. We knew that most of P&G's best innovations had come from connecting ideas across internal businesses. And after studying the performance of a small number of products we'd acquired beyond our own labs, we knew that external connections could produce highly profitable innovations, too. We needed to move the company's attitude from resistance to innovations "not invented here" to enthusiasm for those "proudly found elsewhere." And we needed to change how we defined, and perceived, our R&D organization—from 7,500 people inside to 7,500 plus 1.5 million outside, with a permeable boundary between them. Betting that these connections were the key to future growth, . Half of our new products, Lafley said, would come from our own labs, and half would come through them. It was, and still is, a radical idea. As we studied outside sources of innovation, we estimated that for every P&G researcher there were 200 scientists or engineers elsewhere in the world who were just as good—a total of perhaps 1.5 million people whose talents we could potentially use. But tapping into the creative thinking of inventors and others on the outside would require massive operational changes.

- 35 percent of our new products in market have elements that originated from outside P&G, up from about 15 percent in 2000.
- 45 percent of the initiatives in our product development portfolio have key elements that were discovered externally.
- R&D productivity has increased by nearly 60 percent.
- Our innovation success rate has more than doubled, while the cost of innovation has fallen.
- R&D investment as a percentage of sales is down from 4.8 percent in 2000 to 3.4 percent today.
- And, in the last two years, we've launched more than 100 new products for which some aspect of execution came from outside the company.
- Five years after the company's stock collapse in 2000, we have doubled our share price and have a portfolio of twenty-two billion-dollar brands.

description of those key principles, together with case studies that illustrate each.

Open innovation includes both "outward" or "outbound" processes (organizations seek strategic partners to produce, market, sell, advertise and perfect innovative products and services developed internally), and "inward" or "inbound" processes (organizations seek strategic partners who have developed, or are able to develop, solutions to specific innovation challenges").

These two processes are very different, and require different management techniques and even underlying management cultures.

Outward, or outbound, open innovation involves finding strategic partners to help produce, market, sell, advertise and distribute innovative ideas. Inward, or inbound, open innovation involves seeking strategic partners who possess vital expertise and knowledge that can be brought into the organization, and its innovations, to save time and money and perhaps explore new markets and technologies. These processes each require strong leadership, backed by experience and clear strategic goals and operational excellence.

Every open innovation process needs a dedicated manager and leader.

Companies such as Procter & Gamble, Unilever, Electrolux and Telefonica all have managers, defined as COIO's (Chief Open Innovation Officer). The need for such a position is clear. Open innovation can be a very messy, chaotic process, involving tough negotiations, internal conflicts with R&D engineers, prickly issues related to intellectual property management, and so on. Leaving this process to be run by the VP (R&D) is very much like having the cat guard the cream; VP (R&D) must prove that the large investment in his unit, at times 10 percent of revenue or more, is worthwhile, on an ROI basis; when ideas are imported externally, this can be perceived as threatening.

Open innovation was pioneered effectively at Procter & Gamble by its CEO A.G. Lafley. Its "proudly found elsewhere" campaign was a key part of a turnaround, engineered and led by Lafley. Here is the story, as told by the company itself. (See: Houston & Sakkab, 2006).

It is probably best to open the innovation process internally, by smashing internal barriers among functional areas and business units, before seeking innovation from external sources.

Sometimes, smashing internal barriers involves nothing more than the physical location of business functions, as this case study from EMC^2 shows.

Customer Service, Meet Engineering: EMC^2

The author once brought a group of senior managers to a benchmarking visit to the headquarters of EMC^2, a leading data storage hardware and software company in Hopkinton, MA., a suburb of Boston. We were shown the Engineering Dept., where R&D is done. Nestled inside the R&D engineering desks was an entire customer service unit, where experts took calls from customers, sometimes disgruntled, and dealt with service problems and complaints. The logic of this idea was simple and clear. On their breaks, customer service agents went out to the water fountain and coffee machines, where they rubbed elbows with the development engineers. There, they exchanged information about bugs, problems and customer complaints, and sometimes, on the spot, got suggested solutions from the engineers, and sometimes, spurred the engineers to redesign products to eliminate the problems.

This barrier-smashing co-location of R&D and customer service was designed to create maximum information flows between those who deal with customers daily and those who design products to create value for the same customers. And it worked.

A crucial core competency for successful open innovation is a well-structured well-resourced business intelligence system, headed by a dedicated manager.

It is no less innovative to discover ideas improvised by users to meet their needs, and scale them up, than to invent ideas. Here is an example of how the open discovery of an idea, in the Spanish Civil War, created an excellent global product whose strong brand has survived, endured and prevailed for over 70 years. All over the world, resourceful consumers use their creativity

Open Innovation (inward): The Story of M&M's

According to Chesbrough, "today, competitive advantage often comes from inbound open innovation, which is the practice of leveraging the discoveries of others: companies need not and indeed should not rely exclusively on their own R&D." (Chesbrough, 2005). An example of how acquisition of an idea found externally can create a highly successful global company, Mars, with a branded product that has endured almost without change for over 70 years, is M&M's.

While on a trip to Spain, Forrest Mars Sr. (the first "M" in M&M's) saw soldiers fighting in the Spanish Civil War (1936-39), eating pellets of chocolate covered with a hard sugary coating, which kept the chocolate from melting in the summer heat. He was inspired by the idea, and returned to his kitchen at home and invented M&M's. Realizing he lacked experience in the chocolate business, Mars recruited Bruce Murrie, son of a founder of the venerable American chocolate company Hershey. (Murrie was the second "M" in M&M's). This was another instance of inbound innovation, the acquisition of experience. Together, they licensed some British technology and made M&M's a hit with soldiers in WWII. The product has remained more or less intact since that time.

(Source: Paola Antonelli, Humble Masterpieces: Everyday Marvels of Design. ReganBooks: New York 2005).

to improvise solutions to challenges and problems. Simply by observing what they do, in an organized fashion, and processing the information, innovation efficiency and productivity can be greatly enhanced, as the story of M&M's shows.

Conducting a globally-wide search for solutions, without revealing the underlying plan for marketplace innovation, can be extremely challenging.

Figure 2 shows four different innovation strategies, depending on whether innovation is incremental or radical (step change), and whether it is open or closed.

Open innovation may be either incremental in nature, in which case the information revealed in Request for Proposal (RFP) networking may be less strategic, than the case in which innovation is radical, with organizations seeking to enter new markets, new technologies and to innovate in a step function manner.

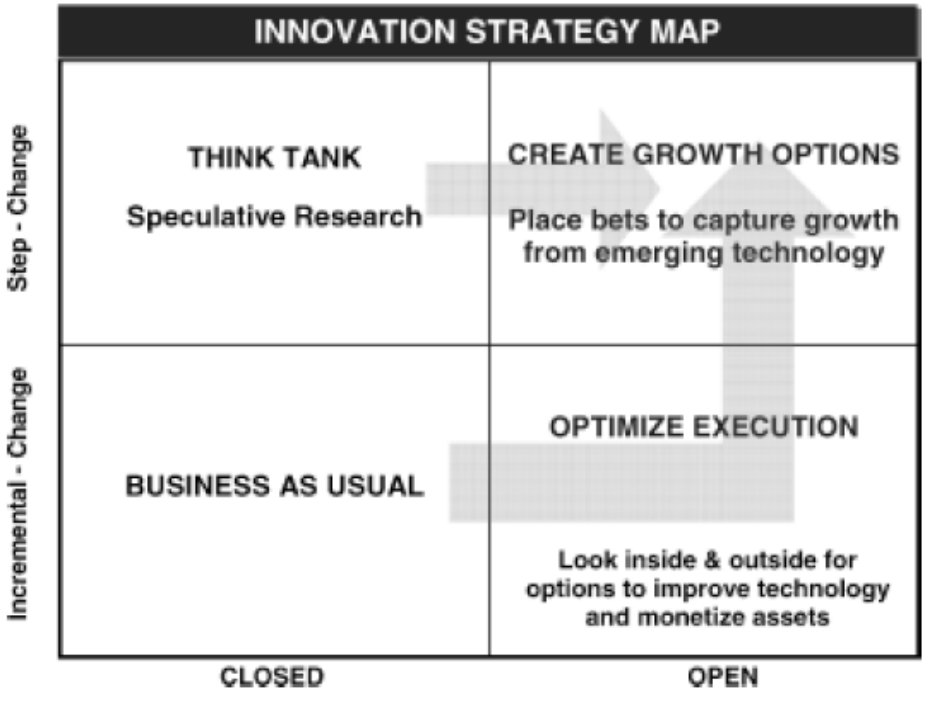

Figure 2. Innovation Strategies: Incremental vs. Step Change, Closed vs Open
Source: Chesbrough and Crowther, 2006, p.233

The case study of Pringles potato chips (Procter & Gamble) illustrates incremental innovation, acquired through open innovation.

Can you print on a potato chip?

Pringles Potato Chips

One of Procter & Gamble's strongest global brands is Pringles, a kind of potato chip, that 'nests' in a round container. (Procter & Gamble has over 20 global brands, each of which brings revenues of a billion dollars annually or more).

A P&G worker had an idea for enhancing the value of Pringles. Why not print cartoons and jokes on the potato chip? The idea was accepted for implementation. But how can this best be done? Traditionally, in closed innovation, P&G would have invested millions of dollars and perhaps a year or more, in its R&D organization, to develop effective ways for printing on delicate potato chips without breaking them.

Instead, P&G applied "Connect & Develop". An RFP was issued, seeking technology for printing on potato chips. It is admittedly true, that in doing so, P&G revealed its intentions for creating a new feature on its product. This was less strategically dangerous, partly because Pringles are securely protected by patents, and partly because the innovation itself, if executed quickly, as first-to-market, could gain marketplace advantage precisely by stimulating competitors.

A P&G employee in Italy found an Italian Ph.D., whose hobby was running a conditory. With engineering expertise, he had developed a way to print pictures on his cakes, in color. The same technology, when licensed, was used to print cartoons and jokes on Pringle potato chips. This saved P&G very large sums, in R&D budgets, but in particular, enabled this clever idea to get to market far faster, than if it had been developed in-house.

Outsourcing the external search for new product innovation may at times be optimal – including outsourcing the search process itself.

One of the basic logical drivers of open innovation is perhaps the oldest principle in Economics – division of labor, enunciated effectively in Adam Smith's The Wealth of Nations (1776). Under this principle, and using the 'pin' example, by giving each of 18 workers a single task, in preparing pins, workers become more productive, through division of labor, than if a single worker had to do all 18 operations. In open innovation, organizations practice "division of innovation labor". They do in-house, in, say the R&D center, what they are good at, what they know best, and what is efficient for them to do, and they outsource, either within the organization or outside it, what they are not competent at, and where external expertise can save a great deal of both time and money. If, for example, companies outsource food services, why can the same logic not motivate outsourcing some key technologies, that are very far from the organization's areas of interest and expertise?

It is sometimes claimed that innovation is a key competency for nearly every organization, and as such, should not be outsourced. This is true – however, aspects of innovation may optimally be outsourced, when the organization itself lacks key competencies and developing them internally would take years and millions of dollars.

The case study of Kraft/Cadbury is a good illustration of inward open innovation.

Pharmaceutical research has changed radically, from trial-and-error testing of thousands of compounds, to biotechnology that seeks specific molecules to target disease-causing molecules. Biotechnology expertise resided initially mainly in universities and in small startups. Often, these startups developed unique drugs, but lacked the capability to fund costly time-consuming clinical trials and then engage in expensive production, marketing and distribution. As a result, Big Pharma companies have acquired such "boutique" drugs and used their global scale and resources to transform them into blockbuster ethical products. This is an example of 'inward' open innovation that has proved crucial for an entire industry.

Open Innovation (inward): Kraft Foods

Kraft Foods, via its subsidiary Cadbury, sought new materials for wrapping chocolate that would be more effective in insulating against the effects of heat. Lacking advanced knowledge in materials science, and in view of technological advances in this field in recent years, they chose to employ open innovation, through hiring a consultant that specializes in open innovation processes (outbound).

NineSigma, a US consultancy, issued the design tender on Kraft's behalf, as part of its "open innovation" program. It sought "proof of concept" designs within nine months. The tender states: "Kraft Foods seeks novel materials or approaches to packaging that can protect single serve chocolate bars from medium term exposure to warm ambient conditions."

Nine Sigma said it wanted to hear from design experts that would use "novel insulating materials, phase change material and thin film approaches" that can store energy and repurpose it". Other possible approaches could include "active packaging technologies that are triggered by temperature or light" and "novel cooling or heat absorbing technologies".

An interesting innovation by Nine Sigma itself, in its innovation process, is the effort to use the models and methods of the American governmental organization DARPA Defense Advanced Research Projects Administration:

"NineSigma is an open innovation services provider that connects organizations with external innovation resources to accelerate innovation in private, public and social sectors. Dr. Mehran Mehregany, Goodrich Professor of Engineering Innovation, Case Western Reserve University, founded NineSigma in 2000 on the premise that industry needed an effective means for broadcasting corporate needs to potential solution providers to stay ahead of the technology curve, similar to the methods employed by the U.S. Government research group, DARPA".

(Source: Wikipedia).

Big Pharma firms with skill in finding and acquiring such drugs have thrived. A key competency is the ability to track "underground" research and tiny obscure startups, to acquire vital business intelligence before competitors acquire it (See Bianchi et al., 2011).

As an example, the global Israeli pharmaceutical firm Teva acquired the rights to Copaxone, a drug that effectively treats multiple sclerosis, from its academic developer, Prof. Ruth Arnon and her colleagues at the Weizman Institute, in Rehovot, Israel. Copaxone is a combination of polymers, that is exceedingly difficult to produce in a manner that produces a uniform, standard drug. Teva, with little experience at the time in developing patented drugs, acquired a blockbuster technology; while Prof. Arnon and the Weizman Institute gained significant royalties, and the satisfaction of seeing their research benefit millions of MS sufferers.

Customers spend more on R&D than businesses; be sure you have a very strong presence "at the coal face", where customer-driven ideas emerge.

One of the first large-scale surveys of consumer innovation was led by MIT Prof. Eric von Hippel. His finding was rather astonishing. It was: *"The amount of money individual consumers spent in making and improving products was more than twice the amount spent on product research and development by all British companies combined over a three-year period."*

It makes sense -- there are probably 20 million British consumers, and perhaps 1/100 that number of R&D engineers. The study was replicated in Finland and in Portugal. Harvard Business School Professor Carliss Baldwin says, "we've had on a set of mental blinders, because we have missed or underplayed this key source of inventive progress." (See Maital and Seshadri, 2012, p. 496).

In coal mines, those who truly understand the richness or poverty of the coal vein are the miners who extract it at its face. In innovation, those who truly understand the thinking and preferences of clients are those who sell to them, at the "coal face". Yet, it is generally true that sales personnel rarely frequent head office, rarely join management workshops and seminars, and in general can be regarded as a greatly underutilized resource for innovation.

Let Your Customers Design 2.0: Lego Mindstorm

Lego is a great serial innovator and by sales, is the world's fourth largest toymaker. After the initial Lego brick invention, Lego innovated Lego Technic (advanced Lego bricks), Minifigures, Lego Technic computer control (with MIT Media Lab), LEGOLand theme parks, Lego Mindstorms (the intelligent Lego brick, integrated with robot technology), Lego retail stores, Clikits (a new design for girls), and Bionicle (combines construction toys and action themes).

Despite these successful innovations, for Lego it is an uphill battle. Increasingly children prefer computer video games. Lego is squeezed at the high end of the market by these games, and by low-price Asia-made imitations at the low end. As a result, Lego lost money in three of the past five years, despite its innovations, cost-cutting and restructuring. Yet had it not been for innovations like Mindstorm, Lego would have disappeared long ago. In competitive industries like Lego's, sometimes survival is an even bigger achievement than achieving growth and profit in less competitive industries.

"In Billund, Denmark, (Lego's manufacturing center), not only is the customer right, he's also a candidate for the R&D team", notes a journalist, writing in Wired magazine. How is this done?

Lego's innovative Mindstorms product, which combines Lego bricks with programmable robots, debuted in 1998 and with no advertising, became Lego's all-time bestseller. It sold 80,000 units in its first three months, and 1 million units in all. But six years later, it needed an update. Lego lost $238 m. in fiscal 2003.

In Sept. 2004 Lego executives felt the Mindstorms innovation team needed a fresh perspective. Lego decided "to outsource its innovation to a panel of citizen developers", known as a Mindstorms User Panel (MUP). Such panels often serve as "beta" sites (testers of prototypes and working models). But Lego's MUP was different. It would actually design and invent. Four members were chosen, from a short list of 20. They received no pay, and even paid their own airfare! They met with Soren Lund, head of Mindstorms, in Washington DC, to hammer out the final details of the upgrade, known as NXT. Why are you doing this? Lund asked them. Because, they said, they felt they were playing a vital role in shaping a product they loved. According to Wired magazine, "opening the (innovation) process engenders goodwill and creates a buzz among the zealots, a critical asset for products (like Mindstorm) that rely on word-of-mouth evangelism". If NXT is a hit, the 'democratized' innovation process may be extended to the full range of Lego products.

(Source: A. Frenkel & S. Maital, forthcoming 2015).

Conclusion:

It is sometimes said that the key to innovation is this: Can you see something that others do not, that creates significant value for significant numbers of people, and implement it?

Seeing things others do not has two elements. One is the vision of the innovator himself, or herself. A second is the stimuli -- information, ideas and data that flow to the innovator and his or her vision. The flow of such information is greatly hampered by walls – walls within the organization, between business units and business functions; and walls between the organization and its customers, suppliers, and competitors. Smashing those walls can prove crucial for effective innovation.

On June 12, 1987, U.S. President Ronald Reagan made a major speech at the Berlin Wall. Four of his words echo through history: [To Mr. Gorbachev, President of the U.S.S.R.]: "Tear down this wall!". Two years later, the Wall fell.

Ronald Reagan's words could well become the mantra

of the modern organization. Tear down the walls – boundaries, and borders, that separate the organization from value-creating ideas and technologies, inside it and beyond it. Technology exists today to enable this. It requires visionary leadership to adapt organizations' culture, strategy and operations to our hyperconnected world.

The potential benefits are vast.

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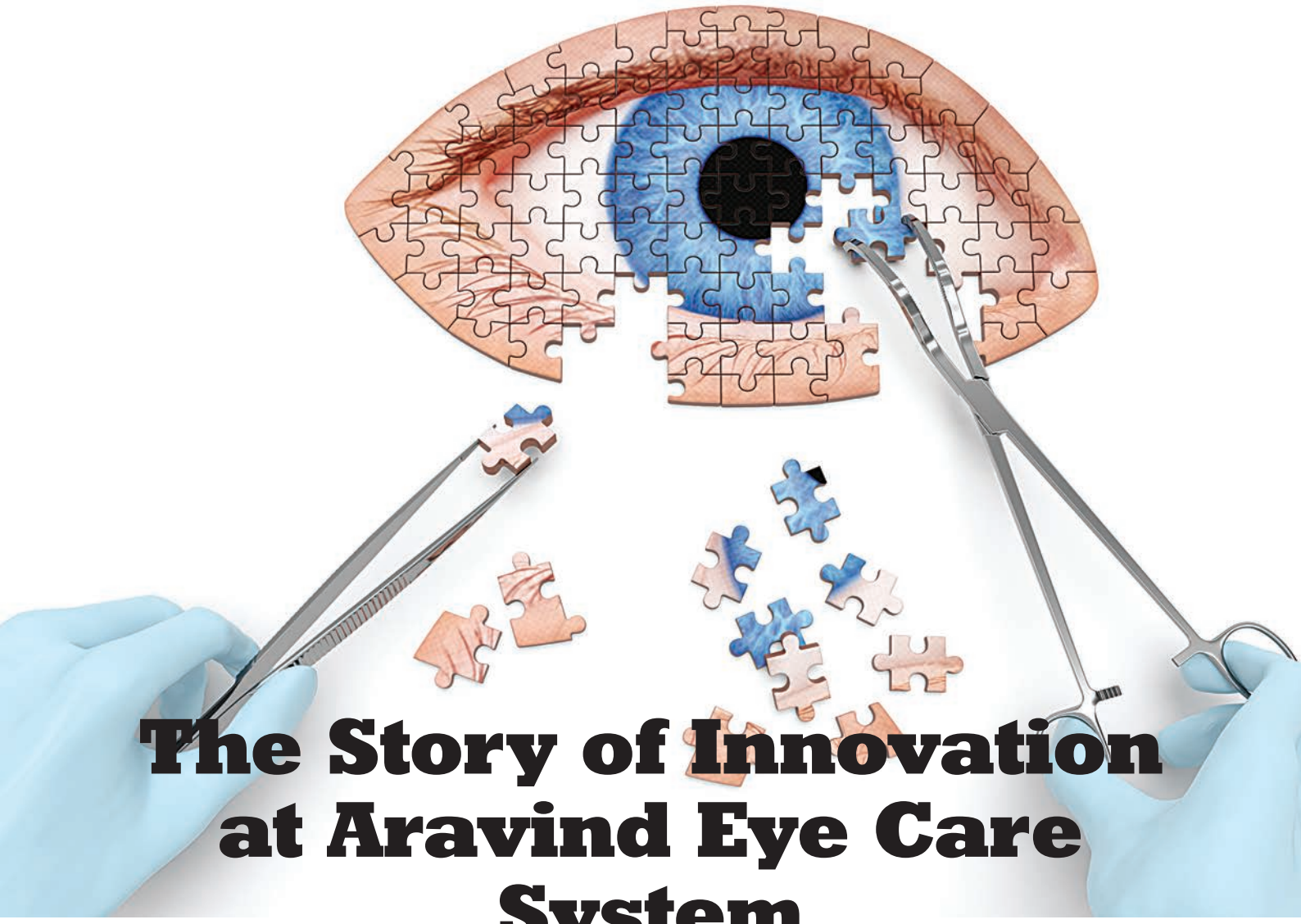

The Story of Innovation at Aravind Eye Care System

Thulasiraj Ravilla

Innovation is inevitable when there is a relentless focus on purpose and a mind-set to achieve it with what is available. It is often about harnessing existing or emerging knowledge, resources or technology to address the challenges in the journey towards achieving the purpose. The organizational values or self-imposed non-negotiables which define the means of achieving the goal, is also a driver of innovations. This also helps in developing a different and often an effective perspective to a situation, which in turn results in efficient solutions and approaches. In this paradigm of continuously experimenting with whatever is necessary to solve the social problem, innovations are often recognized in hindsight or by people from outside the organization. The Aravind case study chronicles a series of innovations which helped Aravind grow from an 11 bed hospital in 1976 to become one of the largest provider of eye care.

Context

Loss of sight is not just a physical disability; some have compared it next only to death. In India's rural communities, loss of sight not only strips a person of his means of livelihood, it also robs them of their dignity: a person suffering this condition is stripped of their position within the household and their status in society. They are essentially viewed as a burden, another mouth to be fed - a mouth not contributing in the provision of that food and, often, even tying up another able-bodied and potentially earning member of the family as a caretaker to take care of the blind person.

In 1976, when Aravind Eye Hospital came into existence, it was estimated that 1.5% of India's 637 million people

were blind. This translated to roughly 10 million blind people. In some ways, this blindness was only the tip of the visual disability iceberg. The number of people who could not see 'good enough' was a significantly larger proportion, being roughly one out of every four Indians. This would have translated to every single household having a person who was either blind, visually impaired or not having the best possible vision. For a country like India, we were talking about over 200 million individuals in need of eye care. That magnitude of need certainly looks like a daunting challenge. However, there was some very good news: Over 80% of this blindness or visual impairment was not necessary. Some of it was preventable, while the vast majority of people would be able to regain their sight with a simple cataract surgery or a pair of glasses of the right power.

So, why did this unnecessary suffering exist? There were a number of reasons. A lot of these problems occurred either amongst the poor, who didn't have adequate economic means to obtain treatment, or amongst those living in rural areas, who had access challenges…or both. Imagine living your life, with seriously impaired vision and how that would change your opportunities and interactions in the world. Now, imagine that there is a way for you to have your sight restored but you are unable to obtain that treatment. Either you are unaware that it exists or you do not have the means to access and pay for it. So you struggle on, resigned to your dismal fate. This situation existed for many people in India and Aravind's prerogative was to address it.

The management Guru, C.K. Prahalad, studied this phenomenon and came out with a game changing book in 2005. In "*The Fortune at the Bottom of the Pyramid",* he examines the phenomenon of large, underserved populations in developing countries and how a variety of innovative organisations, including Aravind, are finding unique ways to serve them. This book gives readers a good conceptual insight into why people remain blind in spite of the existence of a simple solution. He characterizes this large underserved population in the following ways:

- they are scattered,
- have poor access to logistics,
- have no economic means, and
- are uninformed about the solutions available to them.

This challenging marketplace became the first source of innovation at Aravind, with its stated purpose as "eliminating needless blindness". Medical solutions were available - we were offering them for free - but we had to find a way to reach all people with these solutions. And we found that this large, underserved population in need was ready and eager to have their sight restored or improved.

It is in this context, that Aravind came into existence. Its founder, Dr. G. Venkataswamy, known affectionately as Dr. V, retired from government service with a small pension but a large vision: *to eliminate needless blindness*. The only capital Dr. V had, which was also the most critical, was strong passion and unbending determination. He didn't come from a wealthy family and had no philanthropic backing; yet he stepped forward to make a humble beginning.

In a rented house, in the South Indian City of Madurai, Tamil Nadu, an eleven-bed hospital with its own operating theatre came to life. No one, except may be Dr. V, could have imagined the tremendous transformation this small eye hospital would undergo over the next four decades. This transformation was driven in large part by Aravind's ability to innovate. And what drives innovation? In the case of Aravind, innovation has been driven by

- a need in the society or marketplace,
- a passion and vision to meet that need,
- ability to face and overcome challenges and obstacles,
- organizational actions rooted in a patient-centric outlook,
- non-negotiable values - such as equity, compassion - which enabled us to achieve outstanding results, and
- the attitude that anything is possible when we work in a spirit of service for the uplifting humanity.

Early Days

In the early days, we did not experience a high volume of private patients. In a community that was mostly unaware of the services available to them, demand was not yet there. There were many potential patients who could benefit from cataract surgery but they did not know it was available to them. We referred to this type of potential patient as the 'non-customer.'

Innovation #1: Outreach to the non-customer

In the afternoons and on weekends the small band of Aravind doctors went out into the areas surrounding Madurai to screen patients and offer free surgery to those who needed it. It was apparent that the local community was eager to help. They would quickly spread the word and, soon after, there would appear a small assembly of patients. It was obvious that our services were much needed; the community simply had to be made aware that they were available. These forays into the community continued and increased. These frequent forays into the community to screen people and refer those needing surgery to the hospital was both practical and cost-effective when contrasted with the surgical eye camps, which was then the norm. In addition to high costs, quality was also an issue in surgical eye camps on account of having to operate and house patients in make shift facilities with inevitable compromises. Evidence was also coming on the superior outcomes of screening in the community and operating them at hospitals. This approach has now become the global standard, recommended by WHO and mandated by the Government of India.

Innovation #2: Free food and return transportation

Over time, thousands of patients had been advised to undergo cataract surgery, enabling them to again see the world around them. At that time, our small hospital did not have any sophisticated systems nor any computers. Even still, the pattern was obvious: Despite being advised to visit the hospital for free surgery, many of the patients were not coming. We didn't understand why this should be the case and, truth be told, it all felt a bit depressing. From the Aravind perspective, we were working hard, with total generosity and commitment to helping these patients. What was going on? Doubts started creeping in about community perception and trust. And then something happened - in one of the subsequent eye camps a patient named Sambavan came in for screening. He was advised to come to the hospital so that he could get a free cataract operation. At the same time, Aravind staff members asked him directly if he was actually intending to make the trip to the city. Sambavan's answer would be the indicator of a much broader issue that led to a new innovation.

Hailing from a village called Therku Theru, Sambavan managed his life by begging at the entrance to a temple. In this way, he was able to obtain just enough money to get some food each day. He said that he was certainly eager to get his eyesight back but that he would not be able to come to the hospital for the operation. We were perplexed as to why he did not immediately, and gratefully, accept the offer of free surgery. Instead, he explained that he still needed to find money for transportation to the hospital, to feed himself for the one week recovery time and then for the return trip back to his village. Unfortunately for Sambavan, with his low and unpredictable income, the cash flow required to receive this 'free' surgery did not exist. Could it be that Sambavan was not the only one experiencing this barrier to receiving treatment?

During 1979-1980, a study was conducted by Ms. Girija Brilliant and Dr. V, with the support of the American Foundation for the Blind, the Seva Foundation and the Govel Trust (that was formed by Dr. V). Its purpose was to probe the issue more deeply by following up with patients who had been advised to undergo cataract surgery. A pattern emerged and a report was published in the *Journal of Visual Impairment and Blindness*, titled, 'Social and Economic Barriers to Cataract Surgery in Rural South India: A Preliminary Report.' It was revealed that of the patients advised to have cataract surgery, only 14.6% actually had the operation while the remaining 85.4% continued to remain blind. This, despite the vast majority of patients interviewed indicating that they wanted sight and were willing to undergo the operation. Why?

This study turned out to be one of the very first articles published on barriers to cataract surgery. It led to the realisation that socioeconomic factors were a significant obstacle to accessing care. We discovered that many patients needed someone to escort them to the hospital and back. This escort - usually a family member - had to forego wages for that period of time. Also included in the economics of having the operation done was the cost of transportation, to and from the hospital, and food for the patient and escort. It all added up to a few hundred rupees which was a significant sum of money at the time. We learnt that not charging for the services and offering them free didn't translate to it being free to the patient.

In 1981, the insight given by Sambavan, and reinforced

by the above cited study lead to Aravind's first major innovation: providing free food and return transportation, in addition to the free surgery and hospitalization already being offered. With the implementation of this offering, in the very first camp, over 65% of those advised underwent a cataract operation. The local community organizations which organized the camps were willing to cover these additional costs.

Within Aravind, this process became the norm and continues today. The approach has now become one of the standard guidelines for conducting outreach programs and is now promoted, throughout India, as a preferred practice for ensuring greater compliance to surgery. As part of its national program, the Government of India provides a subsidy for cataract surgery on patients brought from outreach camps, with cost of transportation being listed as a reimbursable item.

Improving Efficiency

The community outreach process continued without any change for the next ten years. In 1990, at Aravind's annual planning meeting, a decision was made. In order to help us achieve our mission, we would increase the number of surgeries, done through outreach, by at least 30%. Based on that target, a couple of questions arose. How many more camps would need to be created? What were the associated resource implications for the increase in surgeries? During this conversation, a look at the patient acceptance rate (for cataract surgeries) showed that it was around 60%. What could be done to increase this acceptance rate? How to convince the remaining 40% from the outreach camps? These patients were not undergoing cataract surgery even though it was advised by Aravind's doctors. If we could make this work, we would meet or surpass our goal of a 30% increase in the number of cataract surgeries done through outreach without doing more camps.

Through organisational introspection, and analysis of our processes, we made a key discovery: we needed to spend more time with each patient advised to have cataract surgery. This additional time would be devoted to counselling them on the advantages of undergoing the surgery, the quality of the facilities being offered and directly addressing their concerns about undergoing the procedure. We were led to believe that this extra attention to the patients who needed surgery, given in order to empower their decision making process, could result in higher levels of acceptance.

There was, however, a barrier to making that happen. In a camp setting, when the patient volumes were very high and there was pressure to close the camp by a specific time, it just wasn't practical for the doctors or other staff to spend additional time with every patient who could benefit from cataract surgery.

Innovation #3: Patient counsellors

Continuous discussion on this challenge resulted in the idea to experiment with a brand new cadre of staff. Their sole responsibility would be to counsel patients and become patient advocates. Over the following weeks, this idea was acted upon by recruiting girls, who had just finished high school and were from the very same rural areas as the patients. For the selection process, we used our judgment to pick girls who exhibited two features:

- they should have a high level of empathy and
- they should enjoy talking.

The first batch of ten girls resulted in creation of a new cadre within Aravind's team - patient counsellors.

They were initially posted only to eye camps and all patients advised to undergo surgery were routed through the counselling station. This station was located right next to the final doctor's station so that patients easily transitioned into counselling. This input had an immediate impact, shifting the acceptance rate to over 80%. This simple innovation not only helped us meet our enhanced target but allowed us to do it in a much more efficient and patient-centric manner. Over time, the significance of empowering the patient garnered greater appreciation and the patient counsellor work was expanded to cover the free hospital and then various sections of the paying hospital. Today there are roughly 250 patient counsellors within the Aravind system and they play a critical role in ensuring patient compliance to surgery, medication and regular follow-ups.

Around the same time that we were implementing the patient counsellors, Geographic Information System (GIS) technology was becoming available - both digital maps and GIS software.

Innovation #4: Utilizing GIS technology

We immediately recognized that this could help us to visualize neglected service areas and plan for eye camps in those areas. Over the years we had realized that an eye camp, given its short duration of five to six hours, got patients feeding in from a radius of five to eight kilometres. GIS technology would help us to build on this insight through systematic identification of the villages within that radius. We could then list these villages, organized by road routes, so that the community partner could carry out the publicity efficiently. Our community partners were advised to do intense publicity in the selected villages rather than going beyond, as had been the practice earlier. Intense publicity was critical because we had learned that this would determine the success of an eye camp, as measured by the number of patients showing up.

Another successful innovation had occurred. In the year that the GIS approach was introduced across all eye camps, we saw a 30% increase in the number of patients attending and a similar number for those being operated on.

Closing the Service Loop

In all our outreach work, we were very particular to do a comprehensive eye examination and advice appropriate treatment. We also realized that such advice was merely a piece of information to the patient. However, successful treatment was dependent on one thing: the patient actually following through with all aspects of the advised treatment process.

As mentioned in the case of the surgery acceptance rate, the innovations to provide transportation and counselling had significantly increased the level of acceptance. However, we were not sure this was happening when it came to the acceptance rates for the prescription of glasses. We only had anecdotal feedback that may be around 10% of those prescribed glasses were actually buying and using them. This bothered us for a long time and we were not clear on how to address the situation. The ideal solution would have been to make the prescribed glasses available right at the camp site but that seemed impossible at the time. Since an individual's refractive error (which determines the prescription) could not be predicted ahead of time, it posed a challenge: what lenses should be taken to the camp? Also, patients tended to prefer specific frames which suited their own sense of style. Even a monk takes time, browsing and trying out 10 pairs of frames to find the right style!

The first attempt we made was to take a selection of frames to the camp site and take orders from those who were willing to purchase them. We would then come back to the same site, on a pre-appointed day, to deliver the completed prescription lenses fitted to the selected frames. This worked to some extent but not many people placed orders because it meant making another time-

consuming and expensive trip to the camp site in order to collect the glasses.

The second attempt involved taking a selection of readymade glasses, pre-fitted with various powered lenses, so that we could give the glasses out on the spot. This, again, didn't make much of a difference since each patient had a specific preference for suitable frames. This preference, all too frequently, differed from the available readymade glasses. We had to look more deeply at the situation.

Innovation # 5: Prescribing and fitting glasses on site

In the next attempt we studied, in detail, the distribution of refractive errors across all patients. We then used some statistical methods and our judgment to create an inventory of lenses of various powers, along with a wide selection of frames. We also brought along a simple machine that allowed us to cut the lenses, polish the edges and fit them into the frame of choice. This intervention of making prescription glasses, fitted to the desired style of frame, available immediately at the camp site, removed a lot of barriers and the prescription to order conversion rate immediately rose to over 80%.

That experience gave us tremendous insight into the real cost for a person to get appropriate glasses, as per the prescription. The key realisation being that he or she would have to make two or three trips to the nearest town to visit an optical shop. Each of those trips cost money, not only for the transportation but for the wages forgone by the patient missing work, as well as any other incidental expenses. This was adding up to a significant amount - often more than the glasses themselves. We realized that this innovation was about seeing cost from the customer perspective and completely eliminating the 'non-value added' costs.

This understanding of viewing cost from the customer perspective became, over time, central to the Aravind's DNA. It has often come into play for a number of other innovations and patient-centred service designs.

Equity at All Costs: The Aurolab Story

At Aravind, equity means: *the desire to provide the same level of quality to all patients*. This is one of the unstated but non-negotiable values on which the organisation was built. We translated this by ensuring that the core service - diagnosis, treatment, surgery and the outcome should be the same for everyone regardless of how much they pay or even pay nothing. This value was never challenged until the mid-1980s when a new technology was emerging in the treatment of cataract. Since its origin was in the western world, the technology was only available at a cost much too high to be accessible to the average patient in India.

At that time, when a person developed cataract and lost his/her sight, the treatment was to surgically remove the cataractous human lens, which had turned opaque and was obstructing light from entering. Once the human lens was removed, a pair of eyeglasses with high powered lenses - 11 dioptre - was provided so that the person could focus on objects. The high power made them very heavy. Without these glasses, the cataract patient would literally be blind. These cumbersome spectacles were commonly referred to as 'coke bottle glasses,' much to the dismay of the patient having to wear them. In addition to being heavy, these 'coke bottle glasses' also had some inherent limitations and created disruptions affecting functionality for some individuals. Enter the new technology.

The intraocular lens (IOL) was developed using an inert biocompatible material which could be implanted in the eye at the exact same location as the natural lens. It was available in a range of powers. This medical breakthrough completely revolutionized cataract surgery, allowing patients to regain normal vision, often without the need for any glasses. But there was one setback: the IOL came with a high price point, at around $200 per lens. As this technology trickled into India, it was only accessible to those people who could afford the high cost. At Aravind, it was only the paying clientele who could afford such a luxury. The numbers of such patients was a trickle, if at all. We simply didn't have the financial strength to provide

these lenses for the free patients, who then accounted for two thirds of our volume.

Addressing this inequity in care became a challenge and almost an obsession towards the end of the 1980s. Eventually, negotiations with suppliers to get IOLs for Aravind, at a cost of $10-$15, led to failure and frustration, and a decision was made. It was decided that Aravind Eye Care would take on the manufacturing of the intraocular lens in-house and make them affordable.

Innovation #6: Aurolab

By studying the manufacturing process, we recognized that a small piece of plastic, though very precisely shaped, did not need to cost in the realm of hundreds of dollars. This gave us a boost in confidence - however unfounded it may have been - and we gave ourselves the green light to set up our own facility for manufacturing IOLs. It was named *Aurolab*.

We purchased the technology from a small group in the US and set up a unit to produce the intraocular lenses. Initially, we had to be prepared for the worst case scenario. This was because we were early adopters in the use of this implant technology and not many people in India used IOLs, or even believed in the merit of using them. Just in case not a single lens could be sold, we wanted to be sure that whatever was produced would get used. We were then doing 50,000 cataract surgeries and the investment made was to set up a production facility of this annual capacity to 'de-risk' the investment. This unit was also set up as not-for-profit. This allowed Aurolab freedom from the pressures of making the bottom line, which could potentially move us away from our goal of providing affordable technology.

As affordable IOLs became available it was recognized that there was a shortage of eye surgeons trained in the new lens implantation technique. It was vastly different from the older technology and required the use of a surgical microscope, learning to make very precise incisions and then implanting the lens. There were also additional technologies which enabled the right powered lens to be inserted into a patient's eye.

Innovation #7: IOL Microsurgery Training Course

The recognition, that for use of the IOL to become more widespread, more surgeons would need to become competent in the necessary procedure, gave birth to Aravind's *IOL Microsurgery Training Course*. We designed an eight week program for the ophthalmologist to learn the new skillset. We truly had no idea if there would be any demand at all.

As things unfolded, we were pleasantly surprised; both the IOLs and the training program were in high demand. In fact, the demand for the training program was so great that we had a three year waiting list. This, despite the fact that we were taking six candidates a month. In parallel, the sale of the lenses was contrary to our fears. The market welcomed a high quality lens at a lower price and within the first year we had to triple our manufacturing capacity to 150,000 lenses a year. A further surprise occurred when the lenses were independently, and somewhat unknown to us, evaluated by the United States Food & Drug Administration (FDA) labs. Their results were very encouraging and indicated that the lenses produced in Aurolab were comparable to or better than commercially made lenses in the US.

Taking another step in the progression of the IOL, adoption still had not become universal and governments along with the World Health Organisation were very reluctant to embrace the technology. They continued to believe that it was too expensive. Around that time we engaged a large field survey. Its purpose was to establish the prevalence of blindness and its causes. As part of the study, information was also collected on those operated for cataract and the visual outcome in the operated eyes. What the studies showed, in addition to estimating the prevalence of blindness, was a vast difference in post-operative vision between those who got the intraocular lens and those who had the conventional surgery without it. Because many in the group receiving the conventional surgery did not have the corrective glasses, their rate of blindness was at about 40% compared to 5% in those who had the IOL.

The study data was presented to the Indian government that eventually lead to a major policy being implemented, which aggressively promoted the use of the intraocular lens. This was also made possible by funding that had just been awarded to the government by the World Bank. A major shift took place in how eye care in India was delivered as well as the number of people who received the modern surgery - largely free of cost through government subsidy. This particular innovation reshaped how cataract surgery was done, not only in India but in many developing countries. Today Aurolab holds a

global market share of between 8-10%, by volume, for the intraocular lens. Our training program continues even today and has spread to many other institutions through a trainers' training programme and by the establishment of IOL training centres. This is a very good example of how non-negotiable values - in this case, equity - can drive a phenomenally powerful innovation.

Harnessing Technology

Proven means of treating patients, who were visually impaired or blind, exist and we were willing to provide the service at low or no cost. However, the major challenge continued to be reaching out to those who would benefit from such interventions. Most developing countries such as India, are characterized by populations that are scattered and facing logistical challenges. As mentioned previously, these populations are largely underserved for multiple reasons, including economic and access issues.

Up until the late 1980s and mid 1990s India had an extremely low telephone density - something like two or three percent of the population had access to telephone - and the reasons were around viability of connectivity of rural areas. It wasn't financially viable for telephone companies to lay a telephone line to a remote village for just one connection, which often was the case then. But technology was evolving rapidly in the field of communication and lot of experimentation was going on.

One group, out of the Indian Institute of Technology, Madras (Chennai), had developed a Wireless Local Loop (WLL) technology which allowed for coverage of about 20-30 kilometres around a transmitting tower. This was designed for the purpose of providing telecommunication as well as data communication. This technology was being rolled out in a few locations and Dr. V stumbled upon it when he was visiting some of the field activities of the renowned *M.S. Swaminathan Foundation*. In a coastal village, he found a centre able to utilize the Internet to get weather information and current market prices for the fishermen's daily catch. As there was no provision of physical landlines, their connectivity was established through this WLL technology. Immediately, a thought process was opened up around how we could harmonize wireless technology for the provision of eye care.

We connected with the fact that a company called *n-logue* that had set up a number of Internet kiosks in villages around Madurai. As part of our experimentation, in collaboration with them, we trained the Internet kiosk operators to provide eye care service. For a small fee of five rupees, they would elicit the complaint of a patient and record it as a voice file. This voice file was then emailed to the Aravind Hospital as an attachment. As the emails came in, there was someone in the hospital who would listen to the complaint. They would then send back a voice reply. Back at the rural Internet kiosk, the operator would then send for the patient, who lived in the village, and let him or her listen to the reply. In order to make this efficient, the kiosk operators underwent one day's training at Aravind where they were also given a standard template to elicit the complaints; details such as age, occupation and the complaint - what caused it and how long it had been occurring.

This was very cumbersome but the very limited bandwidth of 40-60 KBPS allowed just such email messaging. It was too slow for any other means of real-time collaboration. This was far from satisfactory, yet it did establish a very rudimentary proof of concept for providing telemedicine.

As we struggled with inadequate technology, a group of students from the University of California, Berkeley were in contact with us. Their work was in developing a technology which would allow a much higher bandwidth for data and Internet communication. They were experimenting in making regular Wi-Fi to go long distances - as much as 40-50 kilometres. This did, however, require a line of sight between locations for it to work. So we went about setting up tall towers, with antennas, that could literally 'see' each other.

Innovation #8: Vision Centres

In collaboration with the UC Berkeley group, we did a proof of concept at one of the locations, about 12 kilometres away from our base hospital at Theni. We were pleasantly surprised at the bandwidth, in-terms of connectivity, which allowed for smooth video transmission. We could talk in real time between both ends! This was extremely exciting for us. Once the proof of concept was established, we decided to provide eye care service in remote locations by using this low cost telemedicine. We built an electronic medical record in the cloud and, in 2004, established the first of, what we now call, real time tele-medicine enabled *Vision Centres**.

These centres had basic diagnostic equipment staffed by

well-trained ophthalmic technicians. Each centre had two computers - one for patient registration and administrative functions like the sale of medicines and glasses, and the other to provide a telemedicine linkage as well as facilities for uploading all the clinical information. The centres had sophisticated IT technology at the backend while remaining simple and easy to the users – Vision Technicians and rural patients. The Vision Centre was completely paperless, which made many real time interventions possible.

Currently we have 51 Vision Centres, covering a population of about 3.5 million and handling about 1,000-1,500 consultations each day. This makes it one of the largest telemedicine applications in the world. For the first time in Aravind's history, and possibly even in the broader healthcare scenario, we are confident in saying that we are providing eye care to everyone who needs it in the community. In this particular case, it is important to recognize that the innovation was possible because of the strong commitment to a purpose: making sure that everyone who is in need of eye care gets it.

The Story of Financing Innovation

In 1976, Aravind started out with almost no capital. We believed that certain industrialists may be interested in participating to meet the cost requirements of restoring sight to people so desperately in need. So Dr. V went on a fund raising tour to the nearby city of Coimbatore, known for its textile industries. Many of the business owners were known to Dr. V and some of them were his patients. Aravind's founder set out, confident he would be able to raise all the money required to build the hospital and provide free care. He spent over a week trying to raise funds for this - as he thought - noble cause. Apparently others did not see things the same way. He raised a meagre 5,000 rupees, often given out of sympathy rather than a belief in the cause.

Innovation #9: Self-sustaining service model

This reality check for Dr. V quickly led to the realisation that the fundraising or donor approach was not tenable. There was a basic recognition that if he had stayed back in Madurai for that one week, treating the paying patients, he would have earned a lot more money. He discovered that treating the patients who could afford eye care services would be a much more cost effective method of fundraising. And so it became an unwritten condition that we had to make it all work through earned income from services provided to patients who could afford to pay. This was the beginning of the much celebrated Aravind model which allows us to provide a significant amount of free care without needing to depend on outside donor funding.

Based on this condition, it was clear that we had to live within the means of the revenues earned at that point of time. This meant very low salaries and living very frugally. The model continued to evolve organically under this self-imposed constraint and this triggered a couple of related innovations.

Innovation #10: Distinct facilities & Innovation #11: Differential pricing

Things naturally unfolded so that the paying patients were given accommodations in one of the four bedrooms of the rented house. They were given a reasonable level of comfort and luxury, reflecting the standard of living at that time. In contrast, the free patients, who came from rural areas and had a poor economic background, were housed in a different building where the accommodations were similar to what they were used to at home. For them, this meant sleeping on a clean floor on a mat. They were quite happy to get the free surgery and then spend the required week (which was the necessary length of stay at the time) in order to get their eye sight back. The same surgeons performed the surgery for both types of patients, using the same techniques and the same instruments. The only differentiation came in the accommodations, the ambience and the frills like air-conditioning. This was the best that we could possibly provide given our circumstances.

And then, another insight emerged. To the patients, there was no separation between the medical component and the hotel component. This realization came from looking at our services from the patient's perspective. Going forward, this got systematized and scaled into separate facilities - one distinct facility for the paying patients and one for the free patients. Several of the common services, like the operating room, were the same while the living quarters

* Note: While we were the first to introduce low-cost telemedicine enabled Vision Centres, while primary eye care in various forms were avaialble for a while.

and the examination areas were separate. This allowed the patients to self-select from which facility they wanted to receive care, based on whether or not they had the money to pay. In hindsight, we have seen that this self-determination also preserved the dignity of the patient. A poor patient did not have to plead that they were poor. They could just choose to go and receive the free services.

Distinct facilities and differential pricing had an enormous impact on multiple fronts. Patient volumes increased because people from all economic strata felt comfortable coming to the hospital. The community developed an enormous trust in Aravind Eye Hospital, both in terms of the care being given and the fee being charged. They fully trusted that tests, medications or surgery prescribed were all essential to their care. This trust has had a significant impact on patient volumes, which steadily increased and this has been fundamental to Aravind's growth and development. Care provision became very simple and transparent with zero as a legitimate price point. Being able to create the product differentiation on the frills and not in the core service ensured that equity and ethics were not violated.

Innovation #12: Single visit cycle of care

The perspective of viewing costs from the patients' perspective and trying to keep it to the minimum resulted in a number of process innovations. We tweaked our systems in order to provide the complete cycle of care on a single visit - from patient registration, to consultation, to investigations, to surgery. All of this was possible in the same visit, as long as the patient was willing to undergo surgery and had the time to do it. Any scheduling was done at the patient's request since the hospital did not have any appointment system. By working on appropriate prediction models, micro-level planning and workflow tweaking, we were able to achieve this.

The outcome was a significant reduction in the cost of overall care, both to the institution and to the patient. As an example, the cost of providing care at Aravind is currently about one percent or one hundredth the cost in the UK. This model of high efficiency leading to low cost, allowed us to more than break even, even though only 40% of the patients pay market rates while the rest paid nothing or a steeply reduced price.

In the initial stages of Aravind's development, capital came through borrowing from the bank. But for the subsequent expansion and building of new hospitals, all of the funds came from accrued savings. Today Aravind's financial model generates over 30% plus operating surplus. As a non-profit, that entire surplus stays within the organisation for its development and growth. This innovation was born through a value framework and self-imposed restrictions as to how we would operate, along with viewing cost from the patient's perspective, which in turn led to a greater impact in reducing our own cost.

It Is Not Only About Innovation

A lot of what has been described, on the surface would seem like a series of innovations that worked well. However, the details of what happened are incomplete without understanding what drives such changes in the first place. This reflection about innovations at Aravind led to a number of realisations in hindsight.

The most important one seems to be the strong and continued focus on purpose. This in Aravind's case was to "eliminate needless blindness." This meant that we had to reach everyone in the areas that we served, and beyond. This is not an externally imposed mandate. We have had to hold ourselves accountable for this purpose. This fundamental focus on purpose, which became non-negotiable, brought forth a lot of these innovations, including:

- the initial outreach for accessing the non-customer (*Innovation #1: Outreach to the non-customer*),
- the provision of transportation because without follow-through the vision would not get restored (*Innovation #2: Free food and return transportation*), and
- much later, setting up Vision Centres when survey evidence showed the eye camps were only reaching a very small fraction of the those in need (I*nnovation #8: Vision Centres*).

Similarly, another driver of innovation has been how one goes about achieving the purpose. Clearly it was not about achieving the purpose through any means. Instead, we went about achieving our purpose by specific means governed by a value framework or self-imposed set of non-negotiables. For instance, one of the non-negotiables was that Aravind's services had to be provided without dependence on external funding

(*Innovation #9: Self-sustaining service model*). If service to our population was driven by external donors, it would mean that the provision of eye care was at the mercy of external conditions. Our self-imposed constraint continues to be that we must find the means by which to guarantee continued and sustainable service. This is what led to the inclusive pricing model (*Innovation #11: Differential pricing)*, which gave Aravind financial self-reliance.

Another self-imposed, non-negotiable value was equity. At Aravind, equity means that everyone must get similar quality of care and that we must preserve the dignity of each patient, regardless of whether they are paying for the services or getting them for free. Without this self-imposed constraint Aurolab would never have been created (*Innovation #6: Aurolab*). It also brought us the delivery model wherein any patient can self-select their facility and price - either for free or paying rates, with absolutely no mechanism to test the economic means of the patients (*Innovations #10 & 11: Distinct facilities & Differential pricing*).

There are many ways that innovation can come about on a problem solving platform. But a lot more gets driven when there is a very strong and undiluted focus on purpose as well as a non-negotiable, exalted value framework within which it must be addressed. Having said this, it is equally important for organisations to continually check whether they are on track, both in terms of the direction of the organisation as well as the non-negotiables within which they must operate. These factors have been the foundation in Aravind's on-going story of innovation.

Takeaways…

While this is all about Aravind, a lot of what has spurred and enabled innovation at Aravind is very relevant to other eye hospitals, healthcare providers and other organizations. Aravind, through its replication arm LAICO (Lions Aravind Institute of Community Ophthalmology), has raised resources to mentor over 300 eye hospitals from across the world, in more effective ways of eye care delivery. This has resulted in doubling theses hospitals' output with enhanced quality within two years. A steady stream of senior government bureaucrats now come in batches to spend several days at Aravind to study generic processes such as customer (patient) centric approach, to help transform their own services to the country. Several corporate organizations such as SAP, Mindtree and GE send their senior leadership teams and this has helped mutual learning and development. Innovations seem to stem out of seemingly **contradictory goals** – must serve (all) the poor and yet must be financially self-reliant; there must be equity in care and yet there must patient perceivable differences to encourage some of them to pay for the services; can't charge more than market rates nor depend on donations and yet be able to provide free or subsidized care to all those who seek it. Where does the organization draw the boundaries is also an influencer of innovations – if a patient doesn't comply with seemingly clear instructions, who is responsible? if people continue to remain blind in the community in spite of offer of free care, who is responsible? **Extending the boundaries** to take on more responsibilities tends spur more innovations and the pay back is a much larger and a growing market. Such more generic abstraction of what drove innovation at Aravind would help understand the relevance to other sectors.

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Thulasiraj has been part of the senior leadership team of Aravind Eye Care System since 1981 and was instrumental in establishing Aravind's administrative systems and processes. Now he headsLions Aravind Institute of Community Ophthalmology. In line with organization's mission to eliminate needless blindness, along with his team, LAICO has mentored over 320 eye hospitals across the globe, often resulting in doubling of their output following the engagement.

He has been an Advisor to India's National Programme for the Control of Blindness and WHO; served as the Southeast Asia Chair of International Agency for the Prevention of Blindness and was the founder President of Vision 2020 India.

Thulasiraj was named as a Social Entrepreneur in 2005 by the Schwab Foundation; adjudged the "Hospital Administrator of the Year in 2008" in India by Modern Medicare and GE Health; speaker at the TEDConference, India in 2009; listed among the 30 Most Influential People in Public Healthglobally by a portal on Masters in Public Health Management; in2014, honoured as the "Most inspiring Healthcare Leader of the year" by Times of India.

Tough-Minded Ways to Get Innovative

Andrall E. Pearson

Like John Seely Brown, Andrall Pearson takes a broad view of innovation. And like Peter Drucker, he believes that productive innovation – the kind that actually makes a company more competitive – arises from discipline more than imagination. Pearson, an experienced corporate executive, sees innovation from the trenches, not from the clouds.

In his article "Tough-Minded Ways to Get Innovative" Pearson downplays the need for great product or technological breakthroughs, instead encouraging executives to seek steady, small enhancements in all business functions. Achieving that goal requires management that is simultaneously hardheaded and open-minded. You have to be ruthless in ferreting out information about your business's existing innovation investments and in cutting off those that don't have a clear strategic purpose. But you must also have the guts to encourage your people to constantly question their assumptions and to think freely about the future. And when they do come up with a strategically sound idea, you need to give them the resources they need to bring it to fruition. When it comes to innovation, half measures just don't cut it.

Most chief executives fervently want their companies to be more competitive, not just on one or two dimensions but across the board. Yet outstanding competitive performance remains an elusive goal. A few companies achieve it. Most do not.

What distinguishes the outstanding competitors from the rest? Two basic principles. First, they understand that consistent innovation is the key to a company's survival. Being innovative some of the time, in one or two areas, just won't work. Second, they know that the most powerful changes they can make are those that create value for their customers and potential customers. The result? Competitive companies constantly look for ways to change every aspect of their businesses. Then, when they've found them, they make sure that they translate those changes into advantages customers will appreciate and act on.

Lincoln Electric has understood and applied these principles for years. That's why it has been able to offer its customers better products at lower cost year after year. Yet many people see only Lincoln's success in cutting costs. They miss the fact that it is a great innovator because they think about innovation too narrowly – in terms of home runs only and not all the hits players make, inning after inning, game after game.

Lincoln Electric and other outstanding performers look at innovation systematically. They know that their competitive successes are built on a steady stream of improvements in production, finance, distribution, and every other function, not just a big hit in sales or marketing or R&D. So they make sure they've got players who can deliver consistently. And they create organizations that give those players all the backup they need. That means

- creating and sustaining a corporate environment that values better performance above everything else,
- structuring the organization to permit innovative ideas to rise above the demands of running the business,
- clearly defining a strategic focus that lets the company channel its innovative efforts realistically – in ways that will pay off in the market,
- knowing where to look for good ideas and how to leverage them once they're found,
- going after good ideas at full speed, with all the company's resources brought to bear.

To beat the competition, go for singles, not for home runs.

Individually, none of these activities may be very complicated or hard to do. But keeping a company focused on all five, all the time, takes tremendous discipline and persistence. That systematic effort to institutionalize innovation is what gives market leaders their edge. And it's what other companies can learn from them.

Begin with the Right Mind-Set

To convert a solid performer into an aggressive competitor, you have to create an organization that not only values better performance but also sustains the commitment year after year. That means a major shift in values, not a slight step-up in the number of new ideas for next year.

Even a brief exposure to companies that are consistently successful innovators shows their constant dedication to changing things for the better. Everyone in the business thinks and acts that way, not just a few people at the top. Just picture what it was like to work at Apple Computer or Cray Research or Nike in their early years. Or consider the way things are today at innovative leaders like Wal-Mart Stores or Toys "R" Us or Progressive Mutual Insurance. Or ask anyone at Heinz about the pressure on innovation since Tony O'Reilly introduced risk taking into that once sleepy outfit. Change is a way of life in companies like these.

To sharpen an organization's receptivity to change, several ingredients are essential. First and foremost, top management must be deeply and personally involved in the process.

Innovative companies are led by innovative leaders. It's that simple. Leaders who set demanding goals for themselves and for others, the kinds of goals that force organizations to innovate to meet them. Specific, measurable goals that constitute outstanding relative performance – like becoming number one in a particular market. Not vague, easily reached objectives.

Innovative leaders aren't necessarily creative, idea-driven people (though obviously many are). But they welcome change because they're convinced that their competitive survival depends on innovation. That's a mind-set most executives can develop – if their conviction is based on a specific understanding of a particular competitive environment, not just a bromidic generality.

Look at what Cummins Engine has done to stay alive and gain market share in a truck engine market that's dramatically off. As any key Cummins executive will tell you, the company cut its costs and prices per engine by close to 40% and materially improved its products for one simple reason: to prevent the Japanese from repeating their auto triumph in the truck engine business. To accomplish all this, Cummins had to overhaul nearly everything that, historically, had made it the industry leader: products, processes, prices, distribution methods – the works.

People throughout Cummins found the grit to make these changes by looking at their business through the eyes of a Japanese competitor. Other innovative companies do the same thing. They get their people to focus on beating a particular competitor, not just on doing better. One-on-one competition pushes the entire organization to be bolder, to take more risks, and to change more quickly than companies that have no particular target for their innovative efforts. It also makes a company a tighter, more effective competitor because its innovative efforts are designed to cut away at a particular opponent's current competitive advantages.

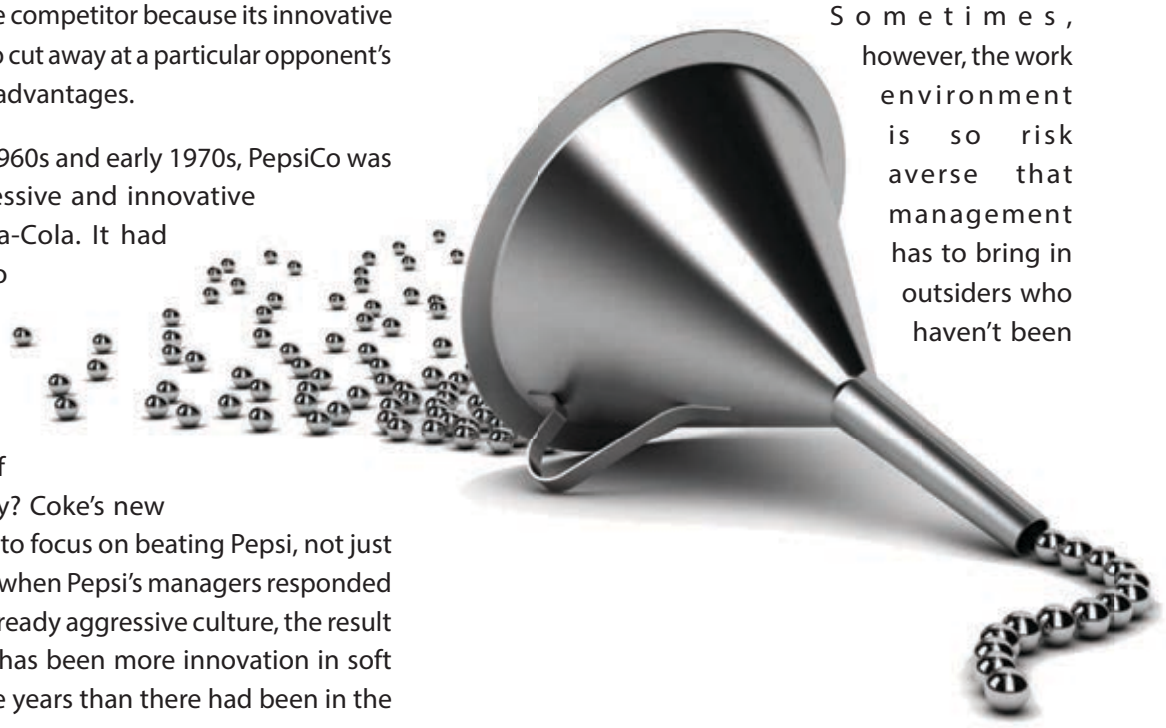
For instance, in the 1960s and early 1970s, PepsiCo was a much more aggressive and innovative company than Coca-Cola. It had to outflank Coke to survive. When Coke finally woke up – after losing its market leadership – it did a terrific job of innovating, too. Why? Coke's new management began to focus on beating Pepsi, not just on doing better. And when Pepsi's managers responded by revving up their already aggressive culture, the result made history. There has been more innovation in soft drinks in the past five years than there had been in the previous 20. Industry growth has doubled, and both companies' market shares are the highest ever.

The same thing happened in the beer business when Miller began to take market share from Anheuser-Busch. Suddenly Busch became a much more aggressive, innovative competitor because it was focused on Miller. In contrast, I believe IBM paid a huge price in the 1970s and early 1980s because the company wasn't focused on a number of specialized competitors that were eroding its leadership, segment by segment.

If you don't have any major competitors, you can't focus on them, of course. But targeting smaller local competitors is just as effective and invigorating. It's also a good way to ward off the complacency that undoes a lot of winners. At one time, for example, Frito-Lay thought that it didn't have to pay attention to its regional competitors since its market share was more than 50%. Then, collectively, the little guys cut the company's growth rate in half. Frito became very focused very fast.

Finally, innovative companies have lots of experiments going on all the time. This encourages more risk taking since people don't expect every experiment to succeed. It contains costs since tests and trials don't get expanded until they show real promise. And it improves the odds of success because you're betting on a portfolio, not on one or two big, long-odds projects.

Sometimes, however, the work environment is so risk averse that management has to bring in outsiders who haven't been



intimidated by the sins of the past. That was what happened when PepsiCo acquired Taco Bell, which had been run by an ultraconservative management team that regarded all new ideas with suspicion. It took an infusion of three or four outsiders to create a critical mass and get the company moving again.

Unfortunately, it's very easy for managers to convey the wrong messages about risk taking. Appearing to be short-term oriented, giving the impression that only winners get promoted, searching for people to blame, second-guessing managers who take risks (often before they even have time to work out the bugs) – actions like these send a much clearer signal than all the speeches about innovation a chief executive may make. We learned that at PepsiCo when we surveyed our middle managers and found out that many of them thought we were saying one thing and doing another. We had to correct signals and practices like these before the managers would credit what we said.

All three of these ingredients – commitment, a specific villain, and risk taking – are soft requirements. Not tangible things like structure and process. But just because they're soft doesn't mean they're unimportant. In fact, unless all three are in place, I question whether you'll ever emerge as a leader.

Unsettle the Organization

Most big organizations are designed mainly to operate the business: to get the work done, control performance, spot problems, and bring in this year's results. And for the most part, that's as it should be.

But the structures, processes, and people that keep things ticking smoothly can also cut off the generation of good ideas and can block their movement through the business system. Excessive layering, for example, kills ideas before senior managers ever consider them. Barriers fencing off R&D, marketing, production, and finance block up functional problems until it's too late for effective solutions. Elaborate approval systems grind promising innovations to a halt. Staffers nitpick ideas or put financial yardsticks on them long before they are mature enough to stand rigorous scrutiny.

To get around organizational roadblocks like these you have to differentiate between what's needed to run the business and what's needed to foster creative activity. Most successful innovations require four key inputs:

- a champion who believes that the new idea is really critical and who will keep pushing ahead, no matter what the roadblocks;
- a sponsor who is high up enough in the organization to marshal its resources – people, money, and time;
- a mix of bright, creative minds (to get ideas) and experienced operators (to keep things practical);
- a process that moves ideas through the system quickly so that they get top-level assessment, endorsement, and resources early in the game – not at the bottom of the ninth inning.

There are, of course, lots of ways to organize your company to bring these four elements together. One is to use task forces on either a full- or part-time basis. Even Procter & Gamble (the ultimate product-manager company) has begun to superimpose multifunctional project teams, often headed by senior managers, onto its old structure. Other companies use full-time task forces to achieve similar goals. They've found their old structures didn't allow enough cross-functional interaction early on. Or enough top-level involvement and support.

Still other companies, like Hasbro, rely on frequent, consistent, and freewheeling meetings with top management to achieve their integration goals. They work within the existing structure but install a process to prevent rigidity and delay. Johnson & Johnson, on the other hand, has thrived largely by spinning off operations into small divisions to encourage its general managers to act more like freestanding entrepreneurs. In all these cases, the companies are striving to create the freedom needed to cross lines, get a variety of inputs, and take risks. They've tried to organize the creative parts of the company differently from the operational ones.

These efforts aren't cost free, of course. When you're trying to change and run the business at the same time, there's bound to be some competition and conflict. But bright people can live with that, and sooner or later the bumps get smoothed out. The risk I'd worry about is leaving one of the critical bases uncovered – by trying to make a champion out of someone who isn't committed to a project, say, or neglecting to temper your whiz kids

with some seasoned people who'll be able to tell them whether the product they envision can actually be made. Because if you announce you're going to innovate more aggressively, yet you consistently come up short, people will get discouraged and turn off.

Be Hardheaded About Your Strategy

Once the entire organization is committed to stepping up the pace of innovation, you have to decide where to direct your efforts. One way, of course, is to put smart and talented people to work and pray that they'll come up with something great. But more often than not, an unfocused approach like that produces lots of small ideas that don't lead anywhere, big costs and embarrassing write-offs, and a great deal of frustration and stop-and-go activity.

In contrast, successful innovators usually have a pretty clear idea of the kind of competitive edge they're seeking. They've thought long and hard about what's practical in their particular business. And just as hard about what's not.

Frequently, you'll hear CEOs say that their company is committed to becoming the low-cost producer, or the industry leader in new products and production processes, or the best service provider. All are worthy visions or concepts – provided they apply to that particular business and company. But in many cases, the vision and the reality don't match up.

For much of smokestack America, for example, the concept of becoming the low-cost producer is simply a cruel fantasy. The Japanese already occupy that position, in many cases permanently. So the best that U.S. manufacturers can possibly hope for is to close the gap, which isn't likely to bring them back to being number one.

Likewise, leading the way in new products has turned out to be a fool's mission for most companies in mature industries like packaged goods. The reason? Fewer than ten new products a year are successful, despite expenditures of literally tens of millions of dollars by the major companies.

Finally, superior service can be an illusory and impractical goal for many large retailers. It simply takes more management and discipline than they can muster to bring so many outlets up to a higher-than-average level of service and keep them there.

The moral here is that your strategic vision has to be grounded in a deep understanding of the competitive dynamics of your business. You have to know the industry and your competitors cold. You have to know how you stack up on every performance dimension (the way Ford did before it was able to close the gap on some 300 product features on which it lagged behind Japanese competitors). And you have to be hardheaded about using this knowledge to position your company to gain a competitive edge. Are you big enough? Technically strong enough? Good enough at marketing? In short, you must be practical – not go after a pie in the sky.

Hasbro, a $1.5 billion (and growing) toy company, has a strategic vision that works. Unlike most of its competitors, Hasbro doesn't focus on inventing new blockbuster toys. Its management will take blockbusters if they come along, of course. But the company doesn't spend the bulk of its product development dollars on such long-odds bets. Instead, it centers its efforts on staples – toy lines like G.I. Joe, Transformers, games, and preschool basics that can be extended and renewed each year.

Another fine example is Crown Cork & Seal, one of America's best-performing companies for more than 30 years despite its five-star terrible business – tin cans. How did Crown do it, especially when it was number four, dominated by two giants (American Can and Continental Can) that were in a mature business where size and scale appear to be essential? Simple. Crown focused its efforts on growth segments (beverages), on being the lowest-cost producer in each local area (instead of nationally), on growing in less-developed countries (too small for the biggies to worry about), and on taking over the profitable, residual business left open as Continental and American diversified out of cans.

Both Hasbro and Crown Cork & Seal are tightly focused; they don't try to be all things to all customers. And because their directions are so clearly set, their creative people can channel their efforts toward things that will work against competitors in their particular businesses. Strategic focus works – in real life, not just in articles about strategy.

Look Hard at What's Already Going On

How do you find good, concrete ideas? Brainstorming is one approach, but I've never found that very helpful, except when nobody in the group knows much and nobody cares whether the output is realistic. No, I firmly believe the best backdrop for spurring innovation is knowledge – knowing your business cold. Good ideas most often flow from the process of taking a hard look at your customers, your competitors, and your business all at once. So in looking for ways to innovate, I'd concentrate on

- what's already working in the marketplace that you can improve on as well as expand,
- how you can segment your markets differently and gain a competitive advantage in the process,
- how your business system compares with your competitors'.

Looking hard at what's already working in the marketplace is the tactic likely to produce the quickest results. I call this robbing a few gas stations so that you don't starve to death while you're planning the perfect crime.

Lots of companies think that the only good innovations are the ones they develop themselves, not the ideas they get from smaller competitors – the familiar not-invented-here syndrome. In my experience, the opposite is usually true. Normally, outside ideas are useful simply because your competitors are already doing your market research for you. They're proving what customers want in the marketplace, where it counts.

I've found that good ideas come from all over – conventional competitors, regionals, small companies, even international competitors in Europe and Japan. So it may not surprise you to learn that most of PepsiCo's major strategic successes are ideas we borrowed from the marketplace – often from small regional or local competitors.

For example, Doritos, Tostitos, and Sabritos (whose combined sales total roughly $1 billion) were products developed by three small chippers on the West Coast. The idea for pan pizza (a $500 million business for Kansas-based Pizza Hut) originated with several local pizzerias in Chicago. And the pattern for Wilson 1200 golf clubs (the most successful new club line ever) came from a small golf clubber in Arizona.

In each case, PepsiCo spotted a promising new idea, improved on it, and then outexecuted the competition. To some people this sounds like copycatting. To me it amounts to finding out what's working with consumers, improving on the concept, then getting more out of it. You can decide how much this idea appeals to you. But at PepsiCo it led to $2 billion to $3 billion worth of successful innovations. And without those innovations, the company's growth would have been a lot less dynamic.

Next, I'd look at how to create segments or markets for your products. It sounds simple, but, believe me, it takes a lot of creativity and skill to segment a market beyond simple demographics (which rarely ever produce meaningful segment edges or boundaries), ferret out what individual groups of consumers really want (as opposed to what they say they want), and actually create distinctive product performance features (despite the technological and operational problems you usually encounter).

Several examples illustrate what I have in mind. At Taco Bell, the biggest Mexican fast-food chain in the United States, top management found that working women were avoiding its outlets like the plague. Women felt Taco Bell's food was "too heavy," "too spicy." So the company developed a taco salad served in a light flour tortilla and seasoned very mildly. The addition of that salad increased per-store sales more than 20%, with 70% of the sales coming from women – mostly new customers. It also added about $100 million to Taco Bell's sales in its first full year.

It sounds simple, I'm sure: Pick out a big segment you're not reaching, find out what consumers don't like about existing products, and develop a product to serve them

Good ideas most often flow from the process of taking a hard look at your customers,your competitors,and your business all at once.

better. But it took Taco Bell nearly two years to get the idea, develop it in R&D, test-market several versions of the salad, and finally launch the winner nationally.

Another, much more familiar, example is what the Japanese have done in the camera business. They decided that a segment of camera users couldn't afford German top-of-the-line models but wanted vastly better pictures than they could take with their Kodaks or Polaroids. Camera technology has been around for a long time, and the Japanese just hammered away at improving it until they succeeded in making superior 35mm cameras at a price people could afford. In the process, they created and now dominate a huge segment that no one else had seen.

Finally, there's Budget Gourmet, a four-year-old company you may never have heard of. Its management developed a profitable $300 million business from scratch in a field – frozen foods – characterized by enormous price pressures, undistinguished products, little innovation, as well as low returns. The founder's strategic vision was to offer working families high-quality products intended for microwave ovens and aimed at the low end of the market.

So the company started out by developing a process to make and sell a line of entrées for $1.69 each, which gave it a good price advantage. But unlike other low-priced lines, Budget Gourmet's products were comparable to the over-$2 competition. And it backed up the product with first-class packaging, promotion, and advertising (the kind its low-end competitors didn't think of investing in).

The result – a remarkable success in an extremely competitive field previously dominated by three of America's largest, most successful food companies. It's a terrific example of how segmentation and strategic focus interact. And, like most good ideas, it looks obvious – once you see how it works.

As these examples show, successful segmenters are very clear about what they're trying to do: offer their customers better value than their competitors do. This usually takes one of three forms: lower prices, better-performing products, or better features for certain uses (a niche). Unless you can beat your competitors on one of these three dimensions, your innovation probably won't be a big success. The key idea, of course, is that you're trying to outperform the competition on a specific performance dimension and scale, not with vague platitudes. And successful innovators don't give up until customers reassure them that they've done just that.

The third place to look for good innovative ideas is in your business system. Beyond its products, every company has a business system by which it goes to market. That system is the whole flow of activities, starting with product design and working its way through purchasing, production, MIS, distribution, customer sales, and product service. It will come as no surprise that these systems differ from one competitor to another, even in the same industry. And in almost every case, each competitor's system has particular strengths and vulnerabilities that can provide a fruitful focus for your innovative energies.

The underlying concept here is that a distinctive system can give you a big competitive edge for all your products because it will help you leverage their inherent consumer appeal in ways your competitors find hard to match. And once you understand how your business's system works at each step – both in terms of the marketplace and comparative system costs – it's surprising how often you'll uncover weak spots in a competitor's system or potential strengths in your own.

The number of Pizza Hut outlets (4,500), for example, dwarfs that of its nearest competitor (about 500). Scale like that is no guarantee of success. But it means that only the Pizza Hut system can market pizza products on a national basis virtually overnight – and thereby preempt local competition.

At one time, the biggest marketing problem Pizza Hut faced was lunch. Compared with McDonald's, its restaurants had virtually no lunchtime sales, and neither did any of its pizza competitors. The reason, of course, is that it takes 20 minutes to cook a pizza from scratch in a traditional pizza oven, and most people won't spend that long at lunchtime waiting to be served. By using a new, continuous-broiling technology adapted from the burger business, Pizza Hut developed a personal pan pizza that could be served in less than five minutes. It was quick, tasty, and moderately priced. And Pizza Hut rolled it out to all 4,500 stores and locked up the pizza-lunch business almost everywhere, almost overnight.

Another good example of using a business system to maintain a competitive edge comes from the cookie

Even the best concepts or strategies tend to develop incrementally. They rarely ever work the first time out or unfold just as they were planned.

business. P&G decided it could produce better cookies than Nabisco, the current leader, could. So the company came out with a great cookie that tasted and looked better than Nabisco's Chips Ahoy!, the market leader. Duncan Hines cookies were the kind of superior product P&G has used to become the market leader time and time again.

But its managers didn't count on the retaliatory strength of Nabisco's direct store-to-door distribution system and its intense desire to protect that big, profitable base system.

Nabisco quickly matched P&G's cookie, in addition to expanding and improving its entire cookie line. Nabisco also used the leverage of its bigger system to get trade support and consumer impact. Despite the inherent superiority of P&G's single-product entry, it stood no chance against Nabisco's system strengths.

Virtually any part of your business system can be the basis for building a competitive edge. Product technology has been a fruitful source of systemic advantage for Cray Research. Lincoln Electric's decades-long leadership is based largely on a systemic edge in production. Truly superior marketing and service have made Fidelity Investments' Fidelity Funds the dominant player in a business where it was once an also-ran.

Naturally, in analyzing your business system and your competitors', you have to look at them dynamically since structural changes are usually at work altering what's required for success. When Philip Morris bought 7-Up, for example, its management knew the company was entering an industry that historically had allowed smaller brands to prosper nicely. In fact, many Coke and Pepsi bottlers also handled 7-Up. But the battle between Coke and Pepsi was heating up, and as it intensified, those cola competitors put tremendous pressure on their bottlers to launch new products, promote more often, and scramble for supermarket space. Both 7-Up and its new cola brand were left out in the cold. A once forgiving industry had become downright hostile.

Go for Broke

Even the best concepts or strategies tend to develop incrementally. They rarely ever work the first time out or unfold just as they were planned. In fact, the original concept or its execution usually gets changed considerably before it's ready to be implemented broadly. Pizza Hut's pan pizza, for instance, went through four or five iterations. So even after you spot a promising segment and develop a product to serve it, you've usually still got at least one major hurdle to jump before you can capitalize on your new idea.

Tab initially flopped as a diet cola because consumers couldn't tell the difference between Tab with one calorie and Diet Pepsi, which then had 100. Then Coke figured out that it could dramatize the difference by surrounding a bathing beauty with 100 empty Tab bottles. Armed with that insight, Coke flooded the TV screen with ads and backed them up in stores with displays, signs, and samples. It was frightening to see how quickly that one idea, which sounds pretty small, changed the competitive dynamics.

To take another example, the Wilson Sting graphite tennis racket was developed to sell for half the price of the Prince graphite racket. But very few high-end consumers believed they could get the same quality racket for $125 as Prince provided for $250, even though the less expensive racket was indeed as good a product as the more costly one. Fortunately, an alert marketing person at Wilson then uncovered a new segment for the Sting – people who were buying metal rackets because they couldn't afford graphite. Sting's pitch became "a graphite racket for the same price as steel," and that positioning made it a major success.

Once an idea or a concept is properly developed, it seems logical to assume that any sensible company would throw the book at it to make it a success. Yet I've found that reality is often quite different. As I look back, most of the new-product mistakes I've seen grew from a company's failure to back up the innovation with enough resources – not from overspending.

Several factors explain this phenomenon. First and most important, many people fail to recognize that their competitors will retaliate – especially if their innovation takes customers away. People get so captivated by their own product that they plan launches implicitly assuming there will be no significant competitive response. Almost inevitably, that turns out to be a poor assumption.

Second, people try to stretch their resources to finance too many projects at once because the prospect of four or five successes instead of one or two is so attractive. But new products generally involve considerable front-end investment and lots of management attention. So in a world where money, people, and programs are necessarily limited, this usually means that none of the projects get enough sustained support and effort to be guaranteed success. The only way around it is to be disciplined enough to say "next year" to most of the good ideas available.

Finally, people are often in such a hurry to get a new product to market that they neglect to think through all the things needed to launch it properly. These include programs to get adequate retailer support, advertising to generate high customer awareness, and above all, trial-inducing devices to entice consumers to pick the new product instead of the one they're already using. One or more of these essentials often go by the boards.

In contrast, the big winners make careful plans to throw everything needed at new products to ensure their success – money, people, programs in every functional area. They don't just allocate resources; they marshal them, and then they execute them like the Russian hockey team or the Boston Celtics. The successful companies have learned that doing it right the first time is lots more effective (and usually far less costly) than doing the job on a shoestring and then scrambling to fix things when what happens doesn't meet expectations. They also know they're never going to have the first-blood advantage again, and that the best way to preempt or block out competition is to do it right the first time.

I'm a firm believer in developing innovations as fast as you can do each one properly, which includes stopping to be sure you've got everything needed to generate a big success and then going to war to make the idea a winner. It sounds so obvious, you wonder why so many companies fail to execute either of these pieces properly.

To sum up quickly, I believe there are five steps you can take to make your company more dynamic and innovative: Create a corporate environment that puts constant pressure on everyone to beat your specific competitors at innovation. Structure your organization so that you promote innovation instead of thwarting it. Develop a realistic strategic focus to channel your innovative efforts. Know where to look for good ideas and how to use your business system to leverage them once they're found. Throw the book at good ideas once you've developed them fully.

It all sounds simple because, of course, it is. Simple but not easy, since each innovation is a constant challenge from beginning to end. Yet innovation is a challenge you have to meet because that's what builds market leadership and competitive momentum. That's the bottom line. And that's why it's worth the extra effort to become an innovative company.

Andrall E. Pearson *was a professor of business administration at Harvard Business School in Boston when he wrote this article, and before that he was the president of PepsiCo for 15 years. After becoming professor emeritus, he served as the chairman and CEO of Tricon Global Restaurants, the world's largest restaurant chain.*

Creating Excellence – Hype-or-Reality

D. P. Sinha

Today's wider world offers plenty of choices for products and services. Yet most products and services and even people offer more of the same. MBA programs across globe, for example, churn out young leaders with essentially the similar analytic and conceptual toolkit. Why is it so difficult to not just think but actually be different? There are many dimensions to the issue. A common reason is that people and organizations hate making mistakes. Being different is putting ourselves out of established norms and structure and experiment with new ideas, new elements – unfamiliar, unimagined and un-experienced earlier – with high probability of errors. But if people demand for value that is distinctive and sustainable in some new way, sustained differentiation is the answer. However, creating differentiation and sustaining it (a key to creating excellence) is a multifaceted challenging management feat. The writer thoughtfully analyses the challenge and identifies the core issues. His focus is more on the spirit - the core of the excellence. The core creates right organizational and business context and provides a unique meaning to the excellence concept (relevant to the context) and a distinctive way to make it happen. The paper argues adopting an organic approach (one that is inspired by the 'Aspiration', 'Passion' and 'Imagination') over instrumental approach (led by mechanistic paradigm, models, structures, frameworks and templates based). While Instrumental approach characterizes efficiency of processes, organic approach characterizes unique synthesis of aspiration and imagination with structure, systems and technology. In order to achieve effective and sustained differentiation in turbulent times, the business world is moving more towards organic management paradigm. The writer shares carefully selected analogies, stories, cases and real life experiences from the world's leading organizations, leaders and entrepreneurs to illustrate the idea in an interesting way.

Every occasion when I deal with the theme of creating excellence, I am reminded of the story of **Phidias** the **greatest sculptor** of ancient Greece. The story aptly presents the crucial elements behind the excellence creation.

Around 440 BC Phidias was commissioned by the city of Athens to construct a set of statues to ring the top of a building Parthenon in Athens. The Sculptor toiled for months longer than expected. When Phidias submitted his bill, the city accountant of Athens refused to pay. The statues stand on the roof of the temple and on the highest hill in Athens. Nobody can see anything but their fronts. Yet, you have charged us for toiling for months longer than expected in sculpting the back of the statues as beautiful as fronts which nobody can see. The city Commissioner angered by his extra work asked "why did you make the backs of the statues as beautiful as front. No one will ever see the backs". "Ah, but Gods can see them", replied the sculptor. More so the work you and I can never see, but without which the work would **lack integrity and excellence**.

The Greek Sculptor's **passion** for excellence in whatever he does is rooted deeply into his attitude and intent that permeate an insight to envision the **'ultimate whole'** and **comprehend** the uniqueness of its features. Comprehension provides a framework to contemplate the **contextual consistency**, **congruity** and **coherence** in assembling and blending the various elements.

This article expands on the fundamental idea and thinking behind the Greek Sculptor's analogy and its relevance to the philosophy of excellence in any system of performance be it architecting exquisite design or in sports or in the world of business.

Since publication of Mckinsey's Tom Peters and Robert Waterman's **'In Search of Excellence'** about three decades ago, a number of organizations provide accounts of their way of adapting excellence concept to the business. They designed models, structures, frameworks and processes. But no recipes seem to guarantee success in retaining excellence for long having achieved it once. Scott Keller and Collin Price, in their recent publication, **'Beyond Performance',** find that 'only a third of organizations that achieve excellence are able to retain it'. The experience provides two practical lessons to the managers. One, there are no models or patterns or frameworks universally applicable for making and sustaining excellence. The organizations need to design solutions unique to their approach and situation. The second lesson is that frameworks, models and structures constitute the hard aspect of the system. They alone are not sufficient for the success. The key to success lies in combining the hard elements with a number of unique soft components such as the leadership, attitude, intent, aspirations, innovation, creativity and culture in the organization. They constitute the core or the **spirit o**f the excellence management system.

Adapting Excellence to Business

Initially the idea of **adapting** the concept of excellence to the **business** and commercial activities appeared **inappropriate**. Its **potential** to generate tangible **value** to the business was not clear. But as the businesses started getting **saturated** with more and more products having **similar** features, there was a realization that if what they offer is not significantly **different** having **unique value** which others cannot offer, their chances of success are small. This assumed even greater **relevance** in the fast **changing global economics**, rapidly advancing technology and new social and geopolitical order giving rise to a variety of **new variables** each **contributing** its own **uniqueness** and challenge to the world of business and its management. It was realized that success **no more** remains **a number game**, managing denominator –vs- numerator and achieving more technical efficiency. It has instead, turned more into the art of **assembling and integrating** a variety of new **elements un-familiar, un-imagined and un-experienced** earlier and re-tooling the existing ones.

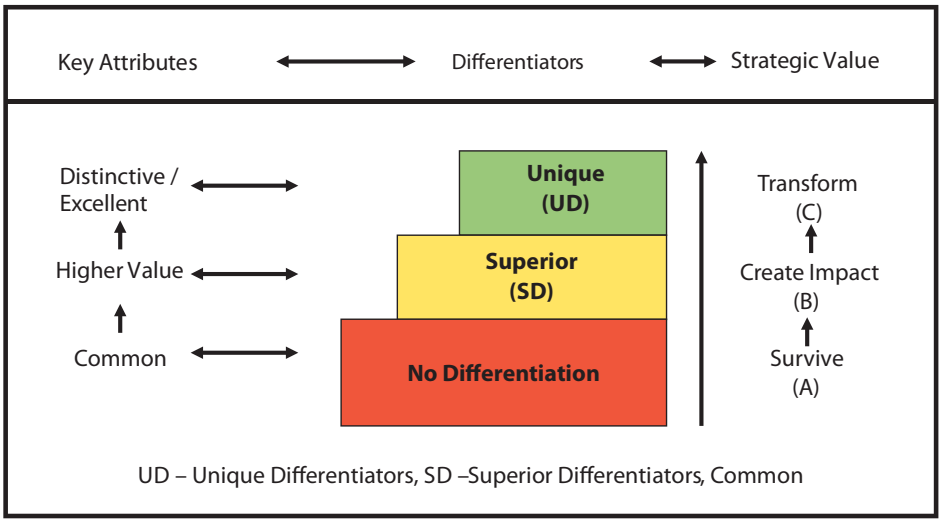
This led **excellence and innovation management** to be reckoned as an important strategic activity to be managed like any other corporate business function (The **Discipline of Innovation** – Peter Drucker, HBR August 2002) but not with same approach and same way as other activities. **Managing to build innovative capabilities** that others do not have and **transforming** the organization into a **distinctive and excellent** company, is different from **managing output- input equation and profitability**. It involves re-defining the **strategic value** which others cannot even contemplate and for which customers will be willing to pay. The task requires **comprehending** new variables and **unique differentiators** and strategic **evaluation** of their **potential** to create that value and **differentiation**. There may be a number of differentiators but it is only a **vital few** that have **power** to **transform** organization from **common** to **superior** and to **a distinctive** company.

The figure below illustrates the **correlation** between **choice** of differentiators, their key **attributes** and **strategic value**.

Differentiators, Their Corresponding Key Attributes and Strategic value

Excellence creating companies **balance** their **strategies**, **adjust priorities** and **choice** of **differentiators** (unique, superior and common) between A, B, and C simultaneously depending on the business environment and the organizational circumstances . Also refer figure above.

Making And Sustaining Excellence



The **experience** of companies **in translating** the innovative **ideas** into hands on **practicality** and creating unique value to the business **varies** from organization to organization. Most of them find difficulty in differentiating clearly between the **functionalities** of **innovation** and excellence and their real value to the business outcome. The two point to two different dimensions of excellence creation. While **innovation** relates to **'Creation of Knowledge'** excellence to its **'execution'**. One is **knowing** other is '**doing** – two important dimensions of '**making**' and **'sustaining'** excellence. **'Knowledge'** though is tap root for **'innovation'** but excellence creation depends on its execution. It is the way of **'execution'** that makes the real **'differentiation'**.

'Innovation' is a **'set of tools'** at best **'capabilities'** that facilitate, creating excellence. Using knowledge is **'doing',** a conscious response to the innovative **idea** to operationalize it as a unique strategic **differentiator** (UD) to generate a strategically differentiated value. Until both the '**knowing' and 'doing' are aligned**, it is difficult to make and sustain excellence.

Innovation And Hard Management Work

Peter Drucker in his article on **'Discipline of Innovation'** examines how much innovation is inspiration and how much is hard **management work**. Innovation does not act on its own. Its **outcome** is **tied** to the intense **action** by the management covering a variety of **strategic task** such as identifying conditions necessary to create differentiation, search for unique opportunities to innovate, identify and classify features that contribute uniquely to excellence, embed right culture, choose right management tools and technique and most importantly **build** high but realistic **'aspiration'**. Innovation can add to learning but **its value outcome** is tied to **the hard management work** and right role by the managers.

Make Innovation a Management Expectation

The most important thing about creating excellence is to make **innovation and creative behavior** an **'expectation'**. A question commonly raised is 'how do we make something like creativity and innovation an expectation? **Dr. Edward de Bono** in one of his creativity program, which I attended, suggested one way and that is to put people in a situation where this type of behavior is needed and has to be used for right fulfillment of the task. Different company device different kinds of programs. Dr. de Bono identifies four **strategic management tasks** for success.

- Create right conditions for the organization to set **'High Aspiration'**
- Inspire people to accomplish **'Aspirational Objectives'** (**Unusual, Unique and Exciting**)
- Create right **knowledge** and **capabilities** (**Innovate**)
- Translate knowledge into '**Distinctive** outcome' (**Excellence**)

Structures, Designs And Innovation

Characteristically **innovation and creative** thinking is a **free flowing process** - free from constraints and system **limitations**. There is, therefore, a general notion that the use of structure and framework with deliberate design interrupts and cuts the creativity and excellence creation process off. Innovative entrepreneurs and business managers do not wholly contribute to this view. They regard **innovation** as a unique, unusual and exciting **business excellence pursuit** that demands special skill and technique like gathering, analyzing and inter-relating ideas. The structures and designs do act as effective enablers in achieving the excellence mission provided they are free from obstacles. Dr. Edward de Bono identifies them as **'liberating structures'**. As against 'liberating structure' he identifies others that limit the freedom by creating **structural inertia**. He calls them **'restricting structure'**. Structure and design has a lot to do with the success of the innovation programs provided the choice is right.

Excellence – A Personal Philosophy

There is no one size – fit all management approach to make and sustain excellence. The concept is **subjective**, its dimensions conceived out of once own mind, all based on individual tastes, prejudices, perspective, belief and ambitions. Attitude and approach to excellence depend on the way in which we conceptualize it. It is all about ourselves, our thinking, our choice, our aspiration, no blaming externals – other people, systems or circumstances. A personal philosophy - philosophy of demanding excellence from ourselves and accepting nothing less. **No acknowledged tool** that can be applied universally to identify the uniqueness of the components, their characteristics and potential to contribute to excellence creation. No mechanism to carve out excellence.

Experiential Learning

Practical Lessons from Action Focused Initiatives

Since excellence is a matter more of personal **doctrine and passion**, its dimensions conceived in once own

mind, the success stories, analogies and illustrations of leaders and entrepreneurs, the way they try out new ideas and innovate to be distinctive and unique, provide **practical lessons** and **effective experiential learnings** about how successful leaders re-tool their organizations and make it **compatibl**e with their **aspirational goals**. The examples of **Yuanquing Yang** CEO of **Lenovo** and **Markzuckerberg** of **Facebook** provide wonderful illustration for learning and inspiration.

Lenovo

Let us take the example of **Yuanquing Yang,** CEO of Lenovo, a Beijing based company producing innovative tech products. **Yang's aspiration** was to become planets No. 1 PC seller. He is trying to build a **global brand** and **outmaneuver** companies like **Apple and Samsung**. Lenovo was formed out of 2005 acquisition of IBM's money losing business. Forty years after HP got its start in Palo Alto garage, Lenovo was born inside an equally humble structure, a guard sack at Chinese academy of science.

Lenovo has already edged out HP to become world's No. 1 PC maker. Yang has built Lenovo unlike any other in China. It has dual headquarter in Beijing and North Carolina where IBM business was based. Much of the credit goes to decision made by Yang to take a back seat initially leaving US based executives to run the company while he took chairman's post after a rocky start that was made more difficult by cultural differences and financial crisis, the Lenovo – IBM for $1.75 billion, turned into a smashing success. it's all happening when PC business is not the juggernaut it used to be when industry experienced a 14% drop in sales, its largest decline ever, Lenovo's business grew 13% in US, the largest PC market while analyst see industry destined to shrink further, Yang thinks very differently. He says "PC definitely will not die". He says **"what will die are some of his rivals only few can survive"**. For years Lenovo pursued what it calls **'protect and attack'** strategy by selling low-priced computers to masses to protect mass market of PC business **sacrificing margins**. Executives are expected to deliver profitability only after market share gets double – a risky approach but has largely paid off.

Lenovo's competitive advantage lies in its **unique corporate culture** which is built around three distinct components: **effective strategy**, **persistent innovation** and **ownership culture**.

Facebook

Another example is **Mark Zucuerberg** who created **Facebook**, a **social network** of size **no one else has built**. He built Facebook to accomplish a **social mission** – a mission to give people the **power to connect** and **share**. It is based on the **belief** that more **open world** will encourage businesses to **engage** with their **customer directly and authentically** which in turn will help **transform** the way of core institutions and industries. It has evolved a **'developer platform'** which has already enabled hundreds of thousands of businesses to build higher quality and more social products. **Zuckerberg's concept of excellence** is to **bring something in being which has not been there and ascribe value to it**. More than 4 million businesses have home pages on Facebook that they use to have dialogue with their customers.

Facebook's **mission** sounds **big** but it starts **small** with the **relationship between two people**. The **fundamental belief** on which Facebook's business is built is that 'more and more people want to use services from companies that believe in something **beyond simply maximizing profits**'. By **focusing** on its **mission** and building great services, Facebook believes, it will create most value for its shareholders and partners. It has carefully **articulated** following **six fundamental principles** around which the organization **excellence mission** has been designed and activities structured:

The Hacker way

Making Facebook the best place for **great people** to have **big impact** on the world and **learn** from other great people. It has cultivated a **unique culture** and management approach that Facebook calls **the 'Hacker way'**. The word hacker has an unfairly negative connotation from being portrayed in media as people who break into computers. In reality hacking just means **building** something **quickly** or **testing the boundaries** what can be done. Hacker believe that **something can always be better**, and that **nothing is ever complete** – **a real recipe for creating and sustaining excellence**.

Focus on Impact

If you want to have the **biggest impact**, the best way to

do this is to make sure we always focus on solving the **most important problems**. '**Find the biggest problem** to work on'.

Move Fast

Moving fast enables to **build** more things and **learn faster**.

Be Bold

Building great things means **taking risks**. This can be scary and prevents most companies from doing the bold things they should. Zuckerberg says **'riskiest thing is to take no risk'**.

Be Open

More **open world** is a **better world** because people with more information can take better **decisions** and have a **greater impact**.

Build Social Value

Focus on how to build real value for the world in everything they do.

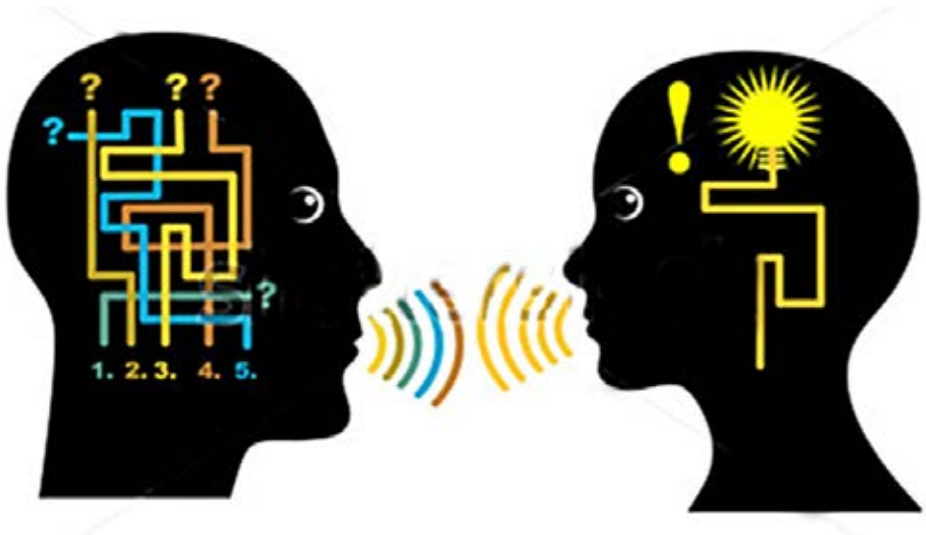
These **six principles define** the organization of **Facebook** and give a **soul** to it.

Create differentiation

'Make differentiation to make a difference' is a proven management mantra. Differentiation **transforms** companies from **mediocre** to **outstanding**, generates **fresh perspective**, new **ideas** and **unlocks potential** to change **radically** from **being one of many to be one in many**. While there could be a number of **sources** and **features** that **make differentiation** in some or the other way, it is only a **few that sparkle** and create **uniqueness**. Determining that source accurately out of a large choice is a **challenging** management task. The **experience** of companies searching differentiators with unique features is very different.

Take the example of **Apple** TV's remote control. It is a thin piece of metal with just **three buttons** as compared to **78 buttons** of **Google TV**. How did Apple's designers decide to make this differentiation? Apple just **needed** to make the **best product** that **changes the people's life**. They debated until they had just what was needed - a button to **play** and **pause** a video, a button to **select** something to watch and another to go to the **main menu**. The Google TV remote's features are in accordance with how their engineers and designers determined what they needed. The **secret** lies in the belief that two companies follow in **creating** their **culture**. **Apple** has built a **unique culture** to ingrain the belief that they make the **best product** that **change people's life** – a **key to create uniqueness**.

Uniqueness is **sinequanon** of excellence. Creating excellence, however, is not like domino effect – one event setting off train of similar events. It is rather **culmination** of a number of different factors coming together in right **alignment** to create a **unique outcome**. It is a **strategic process** designed mainly around **three strategic components:** right **differentiators**, right **strategy** and right **management tools** and **techniques**. All three interrelated and mutually reinforcing. Examples of Proctor & Gamble (P&G) and Apple differentiation strategies are worth noting in this regard.



Procter & Gamble (P&G)

Procter & Gamble has undertaken well-defined **differentiation strategies** to compete its rivals. Briefly the **key features** of differentiation strategies are:

- Create **new categories** of product rather than just **mere products.**
- Focus on **innovation** and set up large number of **innovation centers** around the world.
- Products to **match** high as well as low **income** consumers.
- Huge **attention to R & D**
- **Differentiation** in **health** and hygiene products to **beat Johnson & Johnson**

Apple

Apple **believes** in differentiating business for **finding unique value** for which **customers will pay**. Once that is determined, **execution** requires **aligning** organization to **deliver** that value. If the organization is not aligned, **old habits** will quickly **mute attempts** to create new value.

How Apple does it?

1. Apple **focuses** its **resources** on a **few highly differentiated innovations** that are really exciting to the customers enabling company to **heighten the unique innovation** contribution while **controlling cost** and **maintaining stability**.
2. Apple **limits** the **innovations** in each **new** product generation. They focus on a **few that are vital** while **re-using** much of the **original** product **design**.
3. The **processes** and **pacing** are **pegged** to a relentless **pursuit of "insanely great products".**
4. Apple is **clear** about who they serve. More importantly they are willing to **say no** to those they do not.
5. Its business practices are **aligned** to their **customer**; **not Wall Street** or other stake holders. They believe meeting Wall Street's expectations can drive executives to take **actions** that are **counterproductive** over the long term.

Five key takeaways from the Apples way of **creating differentiation**:

1. Create **uniqueness** that is **readily visible** to customers and others.
2. Look for **differentiated value** that **uniqueness** offer for which customers will pay.
3. **Show case** that value so that it is **easily seen**.
4. **Look** for areas to **apply** or extend that value.
5. **Align** work and time with **delivering** that **value**.

Walter Isaacson in his book on **Steeve Jobs** has observed that **'he built a company where leaps of imagination were combined with remarkable feats of engineering'**. It is amazing to imagine **interconnecting diverse** features like tablet, computing music, and digital publishing all in one, **revolutionalising** industry and creating altogether a **new race**.

Samsung

Another latest example is **that of Samsung**. About two decades ago few people would have predicted that Samsung would **transform** itself from a few a **low-cost OEM** (Original Equipment Manufacturer) to a **world leader** in R&D and design. Normally companies that are set to achieve **continuous achievement (incremental)** adopt business **practices** that will look **incompatible** if aim is to **create and sustain excellence** (radical change). But Samsung, though an organization focused on **continuous improvement**, introduced focus on **innovation** too and **integrated** two **apparently opposite** to business ideologies **uniquely** to take the company to a position where it stands today.

Take - Away Value

The **key points** that I attempted to make in the article and their **key take away value** for the readers can be summarized in the following way:

Create Idea Even Small but Perfectly Formed

The **approach** of the business managers in most organizations has been to **keep things going** and fix the problems as they arise. They are happy with the way of doing things so long as it is **meeting** the **requirements** defined **within the standard task boundary**. They are under no pressure to change. In highly competitive business world the **'fix-it' way** of managing is no longer adequate. As the complexities of the business unfold and organizations reach the **plateau of their competence**, the managers find themselves continuously under pressure to **move out** of their **familiar comfort zone**.

They feel the need to acquire **new knowledge**, **sharpen** their **sense** of comparative advantage and think of **creating new ideas**, **no matter how small.**

Following examples will illustrate the concept:

- One supermarket in US invented an innovative **'misting machine'** that can keep vegetables from drying up horribly . They call it **'plug and spray '**(an incremental change).

- A company with various products in food sector with **low market share** in the **breakfast cereal** category was looking for ways to gain market share in cereal **market**. Breakfast cereal category was highly **fragmented** and **saturated** with varieties. The company was trying for **ideas** that can work but they discovered there were **too many variables**. The company acquired all possible knowledge and studied factors like geography where to introduce the product, pricing, product ingredients and quality. The question was how to find **where to focus** to create new idea? Ultimately they found that the solution could be in **shifting** the **focus** from **'product'** to its **'utility'**. They re-defined the usually **known utility** of cereal as **breakfast complement**. The new idea was to use cereal **'as any time healthy snacks'**. It was a **simple idea** of **combining** cereal and chocolate bar and developing a **new category called 'Cereal Bar'**– a **break through idea**, may look small.

- The knowledge and familiar business **environment** enjoyed so far is in at a **point of dissolution**. The success in future will depend on creating a **new insight**, **un-experienced** and **unthought-of**, instead of choosing one from the existing ones. A good example is the **Japan's consumer electronics** companies. In **1982** 'The Economist' published a briefing on how 'the **giants** of Japanese electronics' were set to **keep conquering** the world with **exciting new gadgets**: video cameras, Fax machines, CD Players. They conquered for a while. But **now** they **struggle** to compete with rivals such as **Samsung** of South Korea and **Apple**. Apart from other problems in Japanese electronics industry, a **common problem** was that **too many firms all making similar products** and all trying to remain in their familiar zone. They were **failing to spot changing consumer taste**. Now under new market environment they are all under **pressure to re-invent** the business and search for **new areas** of **value creation** and make certain hard decisions about which product to give up and which new one to pursue, be it Sony, Toshiba, Hitachi or Panasonic. Some electronics firms are moving into **surprising new area** of high – tech farming. Companies like Hitachi, Panasonic and Sharp are converting unused factory space and opening **high–tech green houses** to grow vegetables, an expensive item in Japan. (The Economist – July 12 – 2014).

A Subjective Concept

Excellence has a **high subjectivity** element rooted deeply into the **singularity** of individual's **personal, aspirational and behavioral** characteristics as in case of Phidias the great Greek Sculptor. It is borne out of **personal philosophy and passion.** The **secret of success** lies in **personal doctrine** of **self organizing internal discipline** than the **paradigm of organizing external system, structure and design**. Many believe that though the logic of excellence is good but not much any one can do about it deliberately. It is for this reason that excellence creation is **mistakenly construed** as an act of **Semi–mystical talent** some may have it some may not. The fact, however, is that **excellence creation is an art** which can be learnt and practiced and not a mystical talent. The examples of Yang Yuanquing of Lenovo and often quoted Steeve Job's unique personal attributes about how they created new options are worth referring to.

Ten years ago **Lenovo** sold only **one product** PCs in only **one country** China. **Now** it sells PCs, phones, tablets and servers in **over 160 countries**. It is more to do with the **Yang's personal aspirations** and his unique unglamorous approach to empire building unlike Apple, Samsung, HP and many other manufacturers. When analyst thought PC industry is on decline, Yang thought very differently. He said "PC industry will not die".

The other most striking example is that of Steeve Jobs. Instead of choosing the **familiar option** of looking at the **usage of the mobile phone as a single purpose devise** and **joining the same race with other competitors**, he **contemplated** the usage very **differently**. He **created** something **rare** with **unique combinations**, computing, phoning and music - **all in one device** designed for **multipurpose usage**. He created a **new race** with **new value monopolies**, a totally new option un-thought, unimagined earlier.

Excellence driven companies **ask questions** such as **'what and how to do things to distinguish themselves from others**? How to **sustain** un-comparable, **distinctive position** once achieved? **Albert Einstein** described **doing** something **over and over again** and expecting a **different result** as **insanity**'.

Business managers generally use the term excellence more in a **tactical way** to give an impression that they are doing **something un-common** while they continue to do the **same thing the same way**. The organizations aspiring to **distinguish** themselves from others in a **unique way** understand the relevance of **wisdom** in Einstein's quote. They understand that being distinctive involves multilevel aspirations. It begins initially with the **intention** to **protect the profitability** to **survive**, **moving up** the graph to go beyond and **accomplish something** and **make an impact on the industry.** Moving **finally** to be **un-comparable** and **unique**– a **distinctive and excellent** organization. They are aware that as the **level of 'aspiration'** rises the **horizon changes** and so the **perspective**, the **sphere** of purview, **complexities** and the **strategies**. They understand that higher **'aspiration' aligned** to right management **action** is the key to **making excellence**.

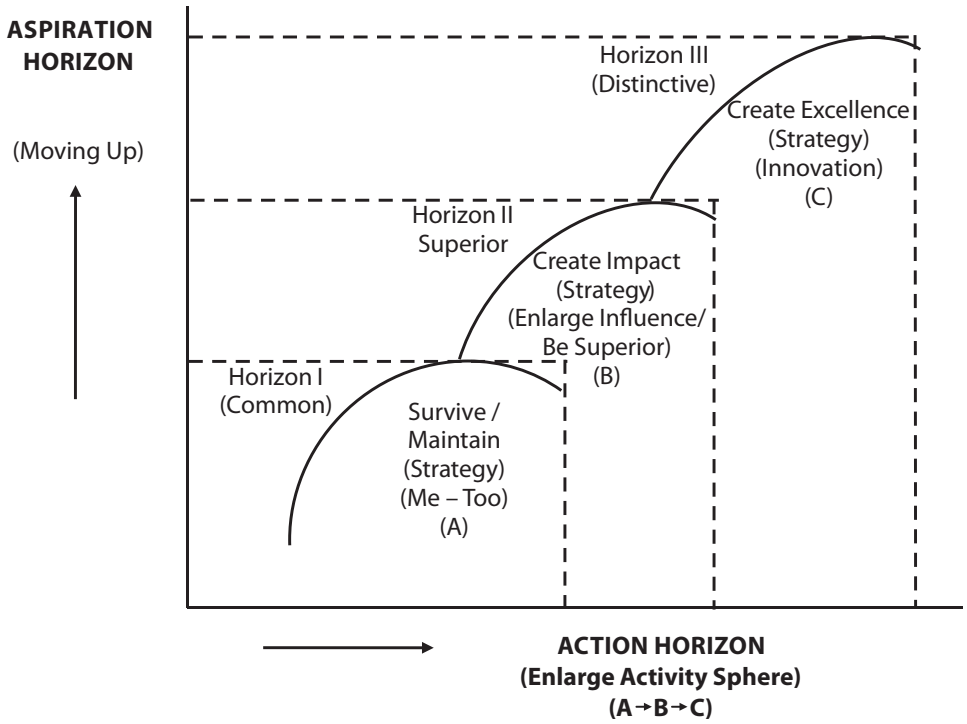
For example, if the company's activities are centered around **protecting** the **bottom line** and profitability for today and survive the result will be different from that of a company that **aspires** to **accomplish** something and create an **impact** on the industry. Their **endeavor** is to find **avenues** to create **new revenue sources and value** to the customers. Think of yet a third set of organization that looks much beyond. Their **level of aspiration** is at the **highest horizon** they aspire to **invent innovative** but **viable** options that will **underpin tomorrow's Tomorrow**. They are **unconventional** in their thinking. Their way of anticipating the future opportunities and business environment is very different. They give due **recognition** to **ideas and thinking** differently. They understand the **intricacies** of **combining the art of aspiring high and the science of making it actionable and happen**. They know the fact that the **secret of excellence lies in synthesizing the two uniquely**. See the figure below.

Excellence creating companies raise the aspiration horizon and broaden the strategic sphere viz A, B, and C as shown in the figure simultaneously. Also see figure above.

Today's environment demands more **sophisticated approach** in **aligning aspirations** at **multiple levels and corrosponding management action**. Excellence creating companies are generally good at **balancing all three levels simultaneously** viz profitability for today, making a superior 'impact on the industry and achieving a distinctive position with unique characteristics.

Conclusion

The **'excellence myth'** which was born and widely believed at the beginning of the 1980's **faded** away **gradually** and died before the end of the decade. **The great excitement about excellence now is that we can create it and shape it**. All that we need is the **deep desire**



(**aspiration**). When **Jeff Bezos** left his job in finance and moved to Seattle 20 years ago to start a new firm, he rented a house with a garage, as that was where the likes of **Apple and HP** had been born. Although he started selling books, he called the firm **Amazon** because a giant river reflected the scale of his **ambition**.

The article has been structured around this **premise**. Its focus is on following core aspects of making and sustaining excellence:

The **nature and logic** of excellence, the **myths and realities** and the fact that we can create it.

Significance of **desire, aspiration, attitude and intention** as **spirit** of the excellence management system.

Relevance of **organic approach** (spirit and intent based) over **instrumental approach** (structure, process and frame work based) in making and sustaining excellence.

To what extent the intended purpose is achieved is another matter. It will, however, be wrong to conclude that what the companies or the leaders referred to in the article do, will work for you, your business or your job as well. The purpose of the article and the point made out will be missed if readers get that understanding. The case situations, information and concepts need to be taken as a guide to help you think differently. One question that you always need to ask **'where and how can I and my organization create a differentiated and unique value for which customers will be willing to pay? How can I be different?** It is worth remembering that life responds to our intentions. When we **desire** to do something **unique and distinctive life tends** to move in that direction.

The* Upanishads *declare:

"We are what our deepest DESIRE (Aspiration) is. As is our Desire so is our Intention (strategic design) as is our intention so is our deed (Action). As is our Deed (Action) so is our Destiny (result)". Upanishad

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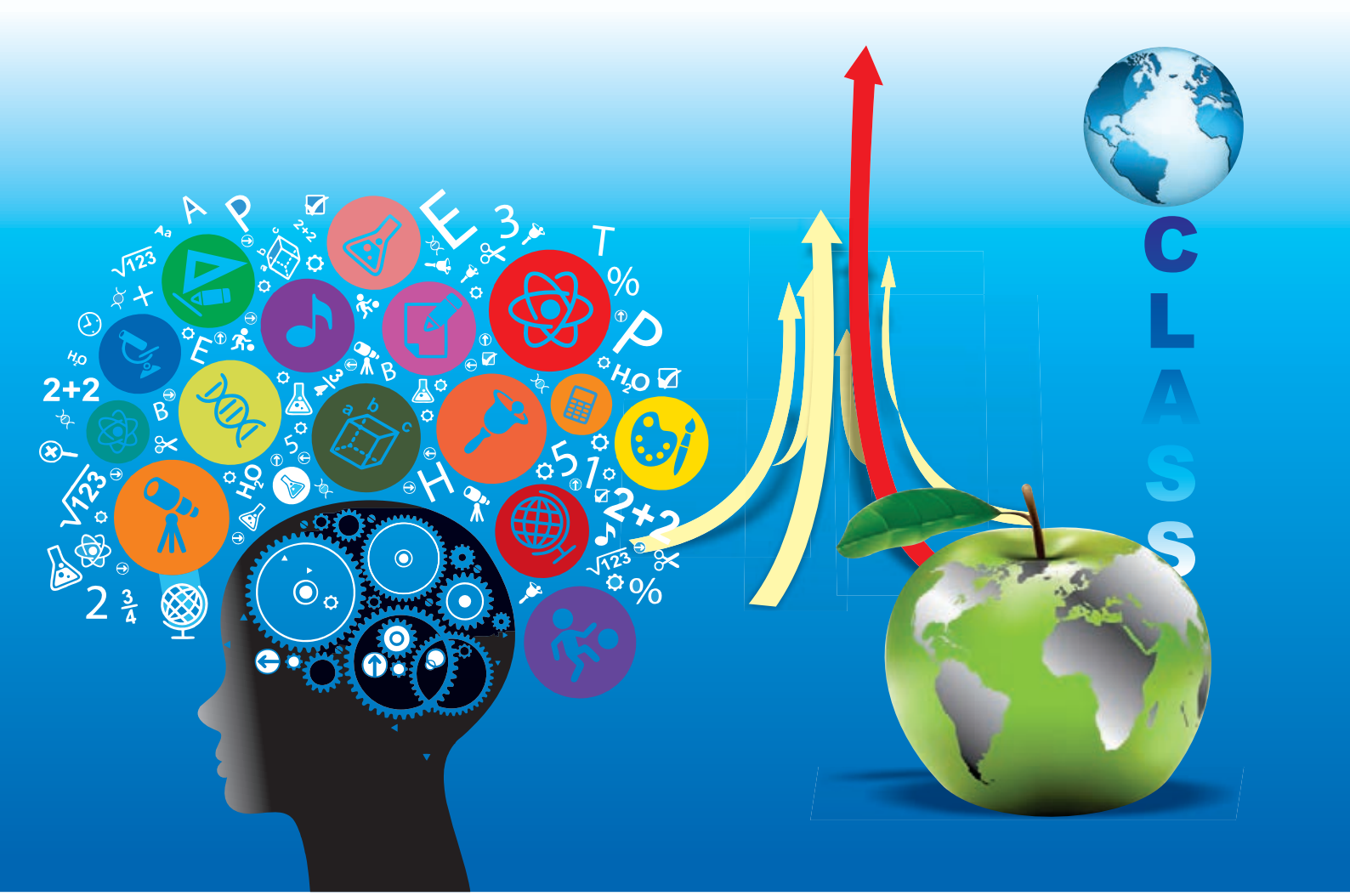

Creativity & Innovation Make A World-class Organisation

Ajit Ekbote

The article takes a historical account of the creativity by primitive man in the ancient times and the origin of the word "Creativity". It brings forth the factors impacting creativity. The subtle difference between invention and innovation as a result of creativity is explained. The article defines two new terms viz. Invention Spread & Invention Novelty and establishes the relationship between them. The intellectual property landscape is prepared by many organisations to pinpoint the opportunity of blocking & protecting the inventions in order to enhance business. It helps the organisations in optimizing the returns on invention. A systematic way of invention is ensured by the application of the Theory of Inventive Problem Solving (TRIZ). It lays down certain inventing principles as well as resolution in case of contradicting requirements. The article elaborates four different types of innovations – Product Innovation, Process Innovation, Service Innovation and Organisational Innovation. A right combination of various parameters makes an organisation world-class. However, creativity and innovation are the accelerators to become world-class. A supportive legal system by the country's governing body acts as a catalyst.

History:

Evolution, as per Darwinism, made the first homo-sapiens appear on this earth. The earliest indication of human existence is estimated to be about 0.2 million years ago. Early man gradually learnt to create fire and used it for cooking. Gradually he learnt the art of agriculture to obtain constant supply of grains. As a further step, he made circular blocks to transport load. All these could be categorised into inventions then.

From the art-forms in the caves by cavemen to those in the medieval and renaissance periods and in modern times, man's creativity has peaked from time to time. Thus, the human brain's evolution and artistic revolution happened almost in tandem. A similar inference could be drawn in almost every known field of arts, commerce and science.

For a long time, the term "creative" was used in conjunction with arts. Its association with science and technology was perhaps relatively recent, as creative minds led to scientific discoveries and technological inventions. Man's creativity, since old times, has resulted in convenient methods of mechanisation and automation for comfort, ease of use and mistake-proofing. This necessity has been the mother of invention.

Creativity:

The genesis of the word "creativity" is in Biblical roots which propose God as the creator of the universe from the state of nothingness. From thence, other cognitive words were derived such as creation, creature and creativity. The earliest use of the word "creativity" dates back to 1875 AD [1].

Creativity is the process of cerebration, imagination, ideation, experimentation, exploration and coming up with something new that is not obvious to other similarly skilled colleagues / co-workers. "Novelty" is an inalienable element of creativity. The earliest model of creativity was proposed by Graham Wallas, the co-founder of London School of Economics, in 1926 AD. As per Mr. Wallas, there are four stages involved in creativity, viz. preparation, incubation, illumination and verification. However, there are various models of creativity, each one in its own right explaining the process [2]. As creativity is related to sub-conscious thought process, it cannot be instructed, taught or compelled. Hence, no time-limit can be imposed for creativity to manifest.

The three components that influence creativity are – Expertise, Thinking skill and Motivation [3]. Motivation again can be divided into two components – intrinsic motivation and extrinsic motivation. Intrinsic motivation makes the person self-propelled to be creative due to curiosity, profound interest and the joy it gives. On the other hand, extrinsic motivation stems from reward, recognition, timeline, goal, earning livelihood, etc. This is depicted in Figure 1.

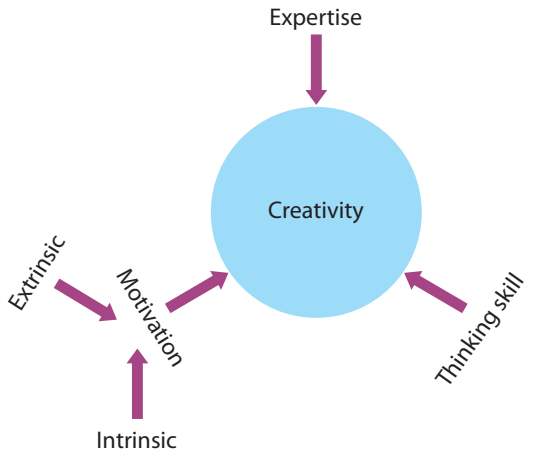

Figure 1: Components of Creativity

Creativity can happen in any field – science, literature, painting, music, sports and so on. The following examples in Table 1 are those of creativity in different fields:–

Area	Creator	Example
Music	Miān Tānsen	Rāga Darbāri
	Mozart	40th Symphony in G minor
	Mozart	Turkish March
	Beethoven	Für Elise
	Johann Strauss II	By The Beautiful Blue Danube Waltz
Paintings & Sculpture	Unknown artists	Murals in Ajanta Caves
	Unknown artists	Sculptures in Ellorā Caves
	Leonardo Da Vinci	Mona Lisa -- Painting
	Michelangelo	Madonna & Child -- Sculpture
	Rājā Ravi Varmā	Saraswati -- Painting
Literature	Vyāsa	Mahā Bhārat
	Kālidās	Megh-Dūta
	Homer	Iliad & Odyssey
	Shakespeare	Merchant of Venice
	Alfred Lord Tennyson	Charge of the Light Brigade
Science	Āryabhat	Astronomy
	Newton	Mechanics
	Einstein	Theory of Relativity
	Planck	Quantum Mechanics
	Darwin	Theory of Evolution

Table 1: A few examples of creativity in different fields

Creativity, Invention & Innovation:

Creativity requires lateral thinking instead of vertical thinking. The term "lateral thinking" was coined by Dr. Edward de Bono [4]. Stereotype thinking does not give rise to creativity, for it limits the choice of a thinker due to bias towards known information. On the other hand, an adaptive thinker possesses mental and psychological neutrality towards anything and everything. Not knowing how something ought to be done, one tends to explore and develop new and unique ways. In some cases, one knows the existing ways, fathoms their limitations and hence opts to do away with them, seeking a fresher approach. Thus, creativity of innocence and creativity of escape result in expanding the frontiers of known information.

Curiosity propels the adaptive thinker to perform out of box thinking. A classic example of lateral thinking is, proving or disproving Fermat's Last Theorem proposed in 1637 AD. The efforts spanned many generations of mathematicians for various special cases, but the generalized proof eluded them for over 350 years. Each generation realised that the existing methods or tools were inadequate and that necessitated new ideas and new tools to be developed. Ultimately, the last piece of gap was bridged by Andrew Wiles in 1994 AD [5]. He received the famous Wolfskehl Prize for the same.

With reference to industries, creativity is used in the connotation of something that can impart either tangible or non-tangible benefit to the organisation. In that context, creativity can result in invention or innovation. Some inventions can lead to innovations, but invention is not the pre-requisite for innovation [6].

Figure 2 below illustrates the two different paths. There is a subtle difference between invention and innovation. The difference will be explained in this article in due course.

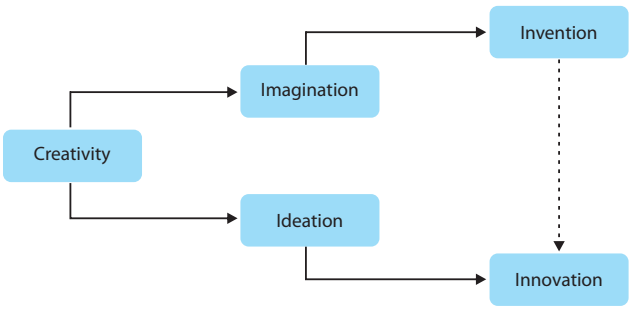

Figure 2: Creativity, Invention & Innovation

Invention, Innovation & Diffusion:

The linear model of innovation has three phases, viz. Invention, Innovation and Diffusion [7]. A typical transformation begins with "invention", a totally new concept; and may end with "diffusion", useful application of the invention in society. In general, invention may be known to less number of persons, may be of the order of tens to a few hundreds. Innovation is known to larger number of persons, say of the order of thousands to a few tens of thousands. After diffusion, it is well-known within society – may be millions to billions of persons.

The three phases are elaborated in the subsequent sections.

Invention:

Invention is a novel contrivance or method or composition, which may result in some benefit to an organisation and / or to society in general.

Invention may be kept as a trade secret to derive maximum benefit by monopolising the idea / product, or may be patented to obtain legal protection of the intellectual property. Figure 3 shows Edison, the founder of General Electric and a prolific inventor in a class by himself, who had 1093 patents in his name in his lifetime.

Figure 3: Edison with Phonograph

Innovation:

Innovation is the effective application of tacit knowledge or experience or known invention to bring forth a different product or solution that attracts attention in the market or society.

For example, the wheel is an invention. Use of the wheel for carts being pulled by horses or bullocks was an innovation in ancient times.

Diffusion:

Once the innovation is adopted by manufacturers and/ or by various sections of society, it becomes an implied need. This is the diffusion of the original invention.

For example, bicycles, scooters, autorickshaws and automobiles in general are always equipped with wheels. Thus, wheels have become commonplace. So is the case with mobile phones.

Invention Spread & Invention Novelty:

This article defines two new terms – Invention Spread (or Invention Usefulness) and Invention Novelty.

$$\text{Invention Spread} = \frac{\text{Number of persons using the invention}}{\text{Total population}}$$

Symbolically, the above relation can be written as follows:–

$$\varsigma = \frac{N_U}{N_T} ----(I)$$

$$\%\ \text{Invention Spread} = \frac{\text{Number of persons using the invention}}{\text{Total population}} \times 100\%$$

Symbolically, the above relation can be written as follows:–

$$\varsigma_P = \frac{N_U}{N_T} \times 100\% ----(I-A)$$

$$\text{Invention Novelty} = 1 - \text{Invention Spread}$$

Symbolically, the above relation can be written as follows:–

$$\nu = 1 - \varsigma ----(II)$$

$$\%\ \text{Invention Novelty} = (1 - \text{Invention Spread}) \times 100\%$$

Symbolically, the above relation can be written as follows:–

$$\nu_P = (1-\varsigma) \times 100\% ----(II-A)$$

It may be noted that

$$0 \le \varsigma \le 1 ----(III)$$
$$0 \le \nu \le 1 ----(IV)$$
$$\varsigma + \nu = 1 ----(V)$$

Initially, the Invention Spread is negligible, and may be even restricted to the inventor only. It is a highly novel concept during the invention stage. During the innovation stage, a few colleagues / persons in the same area might use it. Invention Novelty will reduce as the diffusion of creation progresses, and the invention will ultimately cease to be new. The stages of creativity and their relationship with awareness of creation in the society as well as the degree of novelty are graphically illustrated in Figure 4 below.

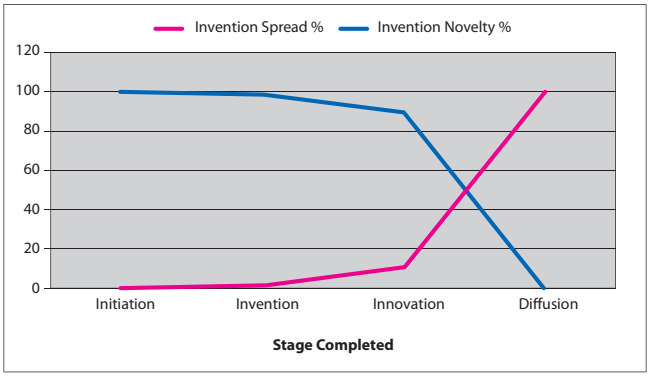

Figure 4: Invention, Innovation & Diffusion scissors

This is a typical and qualitative graph. In reality, some inventions may end up remaining on paper only. Also, if the same graph is plotted with time as the x-axis, then some inventions may take excessive time to become innovation due to various reasons such as manufacturing technology is not matured, economically not viable at present, etc. Such inventions may be still patented, but would await favourable conditions in order to convert them into innovations.

The Intellectual Property Landscape:

Patents protect Intellectual Property (IP) legally. However, if there is any infringement of IP, it may result in law-suits and legal battles. Many organisations study existing patents in their relevant business areas and prepare the IP landscape. This gives a pictorial view of the entire IP arena and reveals which landscape is unoccupied. The

organisation then endeavours to make patents related to the vacant area and blocks it. The IP landscape not only helps in identifying vacant areas, but also cautions and pre-empts against encroaching occupied areas. This consequently avoids losses due to litigation that can arise in the case of IP infringement.

There are various softwares available in the market e.g. Landscape Viewer, IPVision, Aureka. They use the technique of data-mining for structured information such as patents, publications, etc. and also text-mining for the unstructured data e.g. title, abstract, etc. [8]. These softwares facilitate drawing the IP landscape. For a typical IP landscape, refer Figure 5 below. The more the patents by an organisation, the stronger will be its IP.

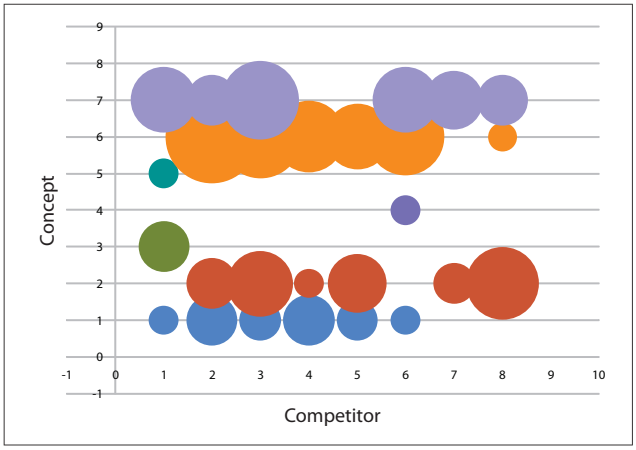

Figure 5: IP Landscape

ROI – Return on Invention:

There are various ways inventions and the resulting patents help grow business.

By blocking the IP landscape, an easily operable machine with better features and functionalities or an efficient method becomes the specialty of the inventing organisation. This helps increasing the market share vis-à-vis competitors and consequently the top-line and bottom-line growth. At times, an organisation or individual can sell or license the patent to an interested party and make money out of it. The interested party, in turn, would use the patent, innovate and make profit out of it. If an organisation finds its IP being infringed and wins the law-suit, it may gain compensation which is also a return on invention.

After a certain number of years, the term of the patent is over. In India and U.S.A., the term of patent is 20 years. After the patent duration is over, it does not remain the intellectual property of the individual or the organisation filing it. But, by then, the organisation would have received the return out of it through profit. If the invention is kept as a trade secret, it results in monopolising the business. For example, the exact formula of Coca-Cola is known only to very few top executives in that organisation [9]. Such products will make profit forever.

With fast technology upgrades, some of the inventions either do not see the light of the day, or end up as ephemeral innovations. For example, the innovations of pagers and mp3 players were short-lived, for they were overshadowed by similar functionalities in the cell-phones. Such inventions give comparatively less returns. But, it is also relatively hard to judge which invention will last how long. Perhaps, over the passage of many decades, such obsolete products may be sold at very high prices due to antique value – for instance, phonograms or vintage cars.

Theory of Inventive Problem Solving:

TRIZ, a Russian acronym, when translated into English, is Theory of Inventive Problem Solving or TIPS. Genrich Altshuller, a Russian inventor, and his colleagues studied 40000 patents and recognized certain pattern.

Based on this study,

a) Altshuller categorised them in five levels and realised that only 0.06% of them are pioneering work. The rest of the inventions are either small changes or small improvements or notable improvements or based on new principles of performing primary function.

b) Altshuller came up with 40 principles of invention especially when there are contradictions to deal within 39 different parameters, wherein improvement in one parameter leads to adverse effect on another. As an example, if mass is required to be less, but strength needs to be high, it is a contradiction. A set of principles will help to resolve such requirements. The TRIZ principles can be applied to circumvent such contradictions and offer creative solutions.

Industries use TRIZ principles and bring new products / solutions into the market. The step-by-step methodology from identifying a problem to arriving at the solution is known as ARIZ (Russian acronym for Algorithm of Inventive Problem Solving) [10]. There are various TRIZ software tools that are available on internet – some online and some downloadable.

Innovation without Invention:

There can be a possibility of innovation without making things fundamentally different, but something different from the existing. This may lead to simplification of the operation in industry to make it easy, efficient and less time-consuming with overall benefits. Such innovations get local recognition in that industry. On the other hand, if the innovation is leading to the improved performance of a product / service sold in the market, then product differentiation may result into increased market-share. Some innovations, e.g. sustainability solutions, benefit entire society.

CFL (Compact Fluorescent Lamp) is the derivative of already existing ideas, viz. light bulb and tube light. Hence, this is innovation without invention. Similarly, two-in-one (Radio & tape recorder) was the innovation of yester years. Force-fitting of two or more known ideas / concepts may lead to innovation. This is also a type of creativity, resulting in speedy acceptance. Hence it is innovation.

Types of Innovation:

There are various ways innovation can be categorised. However, broadly there are four types viz. Product Innovation, Process Innovation, Service / Marketing Innovation and Organisational Innovation [11], [12].

Product Innovation creates product differentiation with reference to the competitors' products. This product becomes customers' preferred choice in the market. Consider for instance the innovation of the digital clock / wrist-watch which greatly revolutionalised the clock manufacturing industry. Similarly, the innovation of digital cameras revolutionalised photography, eliminating the need for Silver Bromide. In fact, it made the conventional analog watches and conventional film cameras obsolete.

Process Innovation simplifies the process for uniform application and standardisation. For example, taking a cue from Deming cycle (Plan – Do – Check – Act), Motorola came up with the innovation of DMAIC methodology as Six Sigma process. This is, in general, applicable to the manufacturing set-up with the intention of improvement in the products / processes. GE came up with the innovation of DFSS (DMADV) process [13] for the R&D set-up, aimed at creating new products / processes. Many organisations are adopting or adapting the six-sigma methodology to reduce the defects in the product and / or to make the existing process simple and more efficient.

Service Innovation offers ease of service and is aimed at better customer satisfaction. Credit cards were the innovation of yesteryears for cashless transactions and offered ease of payment, in addition to avoiding the menace of cash being stolen. Some of the early service innovations by some of the airlines were online booking, seat reservation and e-Boarding-pass. This increased the customer-convenience and hence customer-satisfaction. This innovation was later adapted by other airlines and railways.

There is no unique definition of Organisational Innovation [14]. Hence, this article defines Organisational Innovation as an idea or a set of ideas that aims at bringing new strategy to deal with a new market situation, and in some cases may result in the metamorphosis of the organisation. A typical response to bad market scenario is to cut down unnecessary cost, especially in R&D. On the contrary, an organisation may decide to focus on R&D during a lull period instead of pruning it. This strategy would help the organisation to be better prepared ahead of its competitors when the boom period returns. This is certainly an innovative strategy, which was successfully applied by Ms. Mallika Srinivasan, Chairman, TAFE (Tractor and Farm Equipment). She was awarded the "Woman Leader of the Year" in 2012 [15].

What makes world-class organisations?

A confluence of several great parameters makes world-class organisations. A few of these parameters includes – Quality of products / services, Image in the world, Employee-friendliness, Shareholders' confidence, Creativity and Innovation.

Quality of products and services and other parameters

help in sustaining the business and growth to a limited extent. The real boost on the path of becoming a world-class organisation is offered through research & technology [16]. This, in turn, stems from creativity, invention and innovation. But mere inventions, without making business out of them, can steer the organisation away from its motive.

However, the top management of the innovative organisation needs to have business acumen to judge, recognise and imagine how important that particular invention can be for spiraling growth upwards. Else, such an invention does not become innovation and lands up in the state of oblivion.

Sometimes, one organisation's invention may become other organisation's growth engine. For example, Graphical User Interface and mouse as a pointing device were invented by Palo Alto Research Centre of Xerox Corporation. However, not being able to guess the business potential of the inventions, the board of directors frowned upon them; and instructed the researchers to share them with Apple. Steve Jobs, the then CEO of Apple Corporation, realised their importance. Based on these, Apple introduced Macintosh, the first Personal Computer with GUI & Mouse, in the market. This product innovation became a huge success [17].

In terms of transactional analysis, every person possesses three ego-states viz. Parent Ego, Adult Ego and Child Ego. Creativity is at its peak when the Child ego-state is dominant over the others. Children are bubbling with enthusiasm and are very creative. Some of the attributes of the Child-ego state are – Curious, Inventive, Innovative and Spontaneous [18]. If a proper work environment is maintained to encourage the so-called "Child Ego state", there is more probability of the employees being creative.

Mere lip-service and meagre funding for research projects are show-stoppers when it comes to creative thinking. Such organisations are less likely to produce inventions and eventually may lose key talent. On the other hand, world class organisations not only allocate handsome funding for research, but also reward the deserving individual researchers. Such organisations generally have a hall of fame for persons with say 500 patents, 100 patents etc.

Various remarks by seniors and colleagues such as "This is too far-fetched", "It defies logic", "This won't work" and "This is against our policy" are the strong deterrents to creativity. In the industrial context, a good working environment acts as the catalyst for adaptive thinkers. Many organisations emphasise on a professional approach, ensuring free and fluent idea generation, fair and impartial evaluation, ensuring no politics; the working environment is conducive to creativity & innovation and the emphasis is laid on constructive criticism rather than discouraging remarks. These organisations have a well-defined process of invention and innovation management. A typical process of Invention – Innovation – Diffusion is captured in Figure 6 below.

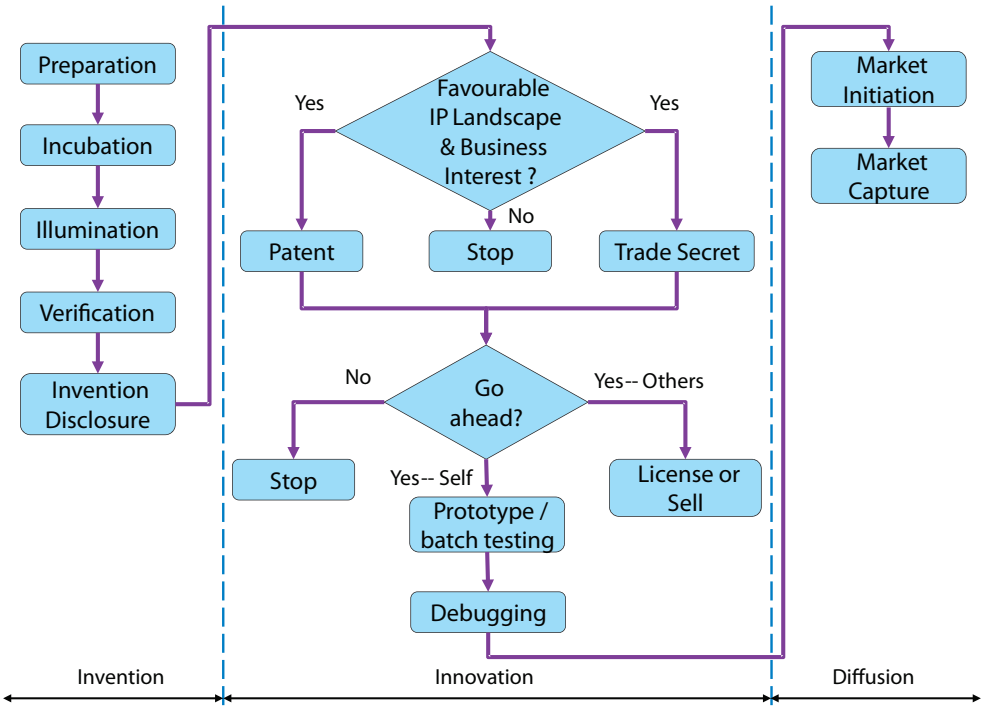

Figure 6: Invention, Innovation & Diffusion – A typical process

What makes Innovative Countries?

The educational system in a country has a great influence on moulding inventive & innovative minds. Many-a-times, the conventional pedagogy has more probability of developing a regimented thought-process. On the contrary, non-conforming minds are more likely to be more creative. Encouraging and motivating such minds right from childhood and chanelising their talent in the right direction results in inventions and innovations in future. A thought-provoking educational system with emphasis on practical experience and experimentation would cultivate the habit of idea generation.

The right proportion of investment in research is a differentiator that keeps certain countries in a different league. Some typical examples are South Korea, Israel, Finland, Germany, USA etc, who allocate about 2 to 4.5 % of their GDP to funding for Research [19], [20]. The more the long-term research, the more is the probability of invention of break-through technology and innovation.

A strategy to safeguard the country's IP through a proper legal framework including protecting the secrecy of some key technology is an important aspect that innovative countries focus on in the interest of the nation. For instance, cryogenic engine technology, nuclear power plants and hot-gas path in gas turbines are technologies for which sanctions are imposed by some countries.

Conclusion:

Invention – Innovation – Diffusion and Innovation – Diffusion are two different ways creativity can manifest into. If an organisation encourages new ideas and innovation, then the likelihood of some of the ideas culminating into a new line of business is more. "Right innovators for the right domain" is the right way for organisations. A frugal and spendthrift approach towards long-term research & development can mar the creativity of the researchers. In the long run, it may jeopardise the very existence of an organisation for the lack of a suite of competitive products / services.

Innovation through tacit knowledge / experience is generally useful to solve practical problems and is aimed at increasing revenue or reducing loss. An encouraging environment and a well-defined process of evaluation are some of the attributes of a world-class organisation. Innovative organisations are able to sustain in various market scenarios – from highly competitive to monopolistic markets, from sellers' market to buyers' market, from a lull period to an excessive boom period. Inventions and innovations can lead to the specialised products / services which a country can boast of as its monopoly. Proper legislation by a country helps an organisation in protecting its intellectual property; and enables in enhancing its business and market share on a global level. Thus, innovative organisations become world-class and, in turn, contribute to the noble cause of nation-building.

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Note:

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Democratise Innovation – For Sustained Innovation Culture

Lalgudi Ramanathan Natarajan

The power of innovation in Titan, perhaps can be compared to the power of a punch delivered with a clenched fist, as opposed to the power, the punch can generate with an individual finger. We believe in involving every employee on our innovation journey and focusing on the processes created around innovation, rather than results (results of course, follow). The innovation journey , which started in a small way in 2003 has graduated over years, to most of the teams (departments) and employees having to do two jobs simultaneously a) How do I do my job better b) How do I find new ways to do my job .

We have reached certain stage on our journey in democratising the innovation process, and this exciting and purposeful journey, which does not have a final destination, is continuing.

CONTEXT

Titan Industries Limited, a joint venture between TATA group and Tamil Nadu Government (TIDCO), was formed in 1985, to design, manufacture, brand and retail watches. As per the understanding reached between the partners, the Managing Director of Titan will be a nominee from TATA group and the Chairman will be nominated by Tamil Nadu Government. Today, Titan is the dominant watch retailer in India, with sales of 15 million watches per annum, and with market share of 55%. 15% of our total sale comes from exports; we also have an international presence in Middle East, Singapore, Malaysia, Vietnam, Bangladesh and many other countries.

Titan diversified into precious jewellery manufacturing and retailing in the year 1995. Precious jewellery is a big market in India with 40 billion USD market today (8 billion USD in 1995). The retailing of precious jewellery in India is dominated by family jewellers. Jewellery retail is also highly fragmented, with over 300000 individual retailers. We were the first corporate to enter in Jewellery retail, and the task was to understand jewellery manufacturing, precious metal buying, and the biggest task was to compete with family jewellers, who have been in business for decades with a loyal customer base. The family jewellers source their jewellery from goldsmiths (through middle men) who work from their house (cottage industry) with nil or minimum overheads.

We had started with a manufacturing plant with all modern refining, alloying, waxing and casting facilities, imported from Sweden, Japan and Germany, with an investment of 15 million USD. We evolved to selling jewellery under two brands, brand Tanishq, for the evolving, modern design and fashion conscious Indian women, and brand GOLDPLUS for traditional, investment conscious Indian women. We have, as of date, 152 retail stores under these two brands across the geographies of India.

The annual revenue from jewellery business had crossed 1.5 billion USD in last financial year.

As of today, we are the largest jewellery and watch retailer in India. Also, we have recently expanded our retail foot print in selling optical eye wear (started in 2006), and have achieved market leadership in this category also with over 250 retail stores.

In Titan (being a part of TATA group), we are guided by the TATA group philosophy on ethics, values, and governance, and also, processes for business excellence (called TBEM), HR processes, Sustainability, safety, and Innovation Processes (guidelines by TGIF). There are appropriate forums, and structured yearly audits by assessors certified by TATA group, to understand where Titan is good at and the areas of improvement, in our journey of excellence.

TRIGGERS

The family jewellers were getting their margin (huge) by giving under karatage jewellery to customers. Also the family jewellers had not invested in right manufacturing set up, in getting the purity of their jewellery products, built in to the process. It is to be noted that, the regulatory measures from the Government is in its nascent stage and it is impossible for the customers to know the purity of product they are buying, since even a jewellery made with under karatage will shine.

Under this backdrop, our jewellery products with right karatage were perceived as expensive by the customers, and, Titan Jewellery division, with huge manufacturing investment, initially, could not penetrate market dominated by family jewellers and was making losses year on year from 1995 to 2003. Introduction of karat meter (a device to check the karatage of jewellery in a non destructive way) in 2002 in all our retail show room, and creation of awareness amongst customers, started bringing foot falls to our stores. **But the challenge was to make our business model profitable.**

It is said that necessity is the mother of invention, and this in our context can be re-phrased as necessity is the mother of innovation. In the year 2002, an international consultant, engaged by our company (in an attempt to revisit our strategy) had recommended closure of our jewellery manufacturing plant . What was required for manufacturing to survive (considering its huge investment, as opposed to minimal investment by the market), was not incremental improvement in productivity, but quantum leap in output. With a leap of faith in innovation, and a leap of faith in people, we started our innovation journey in 2003. Very encouraging initial results, created a genuine love for innovation amongst key participants, and then we began to think systematically in designing processes for innovation, creating structure around innovation, themes around innovation, educating people on innovation, involving every employee in innovation, backed with rewards and recognition. Our company created value for Innovation, reads as below:

Figure I

Systematic progress (processes) in Democratising Innovation

Transparent culture leads to trustworthiness, which is a pre-requisite for Innovation culture. Having won the trust of employees and partners (as explained in various parts of this story to follow), we started with theme based innovation, branding the same widely, within the company, and inviting ideas and having a structure to scrutinize ideas till implementation. People sensitization and motivation to understand and participate in innovation, is important.

Every year, a theme of innovation was adopted, branded to give visibility, and efforts were channelized in getting ideas and acting on it.

Year	Innovation Theme	No. of innovative ideas Experimented (successful ones implemented)
2004	What is new?	163
2005	Leap for Lasting Leadership	9
2006	HOD Funds	13
2007	Ideas Unlimited	26
2008	Simplify and Automate	10
2009	Innovation School of Management	28
2010	TATA innoverse	48
2011	Year of Innovation	14

Figure II

Some landmark milestones achieved in the process of democratizing innovation are highlighted below:

A) In 2004, we started **WHAT IS NEW?** Each department is given a white board, where they should capture three new things that they are pursuing, every month. Competitive spirit was brought in by attaching rewards to departments systematically following this initiative. 14 departments and 3 ideas per month, and 12 months, gave us amazing results.

Process followed to engage and evangelize employees :

It is said that "**People do not care who you are and what you say, until they know, you care for them**". The important foundation in any change management initiative, is to win the trust of employees (and all stake holders). As is there is no instantaneous magic switch

to build trust, with the everyday acts and deeds that the senior leadership does, over a period of time, the employees observe and judge whether we are trust worthy. Genuine care for people and placing people interest ahead of the business interest has always been in Titan's DNA. The great platform of trust, therefore, was already prevalent in our company and the task was to build on this for this new initiative. Series of engagement with people, as detailed below, followed:

a) Discussion with all departmental heads, leading them to think that only through innovation, can we obtain break through results. Getting their consensus before launching the program.

b) Engaging with union office bearers and opinion makers in formal discussions in the factory and informal discussions outside the factory premises, in creating awareness on the current situation, and the expected outcomes in terms of productivity for us to break even (200% improvement in productivity). Sharing with them the turn-around stories of many corporate with employee involvement. Sensitising them to the urgency and leading them with conversation to think that, we need to innovate, and they can innovate.

c) After taking the department heads, office bearers of the union and opinion makers into confidence, conducting many open houses, to genuinely communicate with employees on the need for break through improvements, and sharing many inspiring innovation stories.

d) After all these were done (took us about 6 months), launch of what is new, with a big fun fare.

e) Designing a suitable reward mechanism, and announcing the same to create competitive spirit amongst people.

f) Daily rounds in shop floor, most of my time will be spent on few departments who had initially filled in the board.

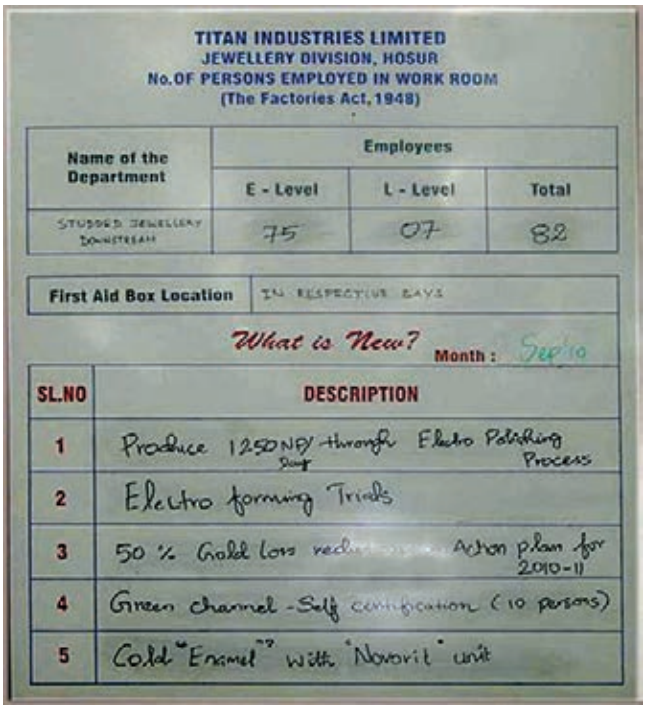
g) Peer pressure slowly started setting in and over a period of three months all departments (14 in all) had their boards filled in.

h) Daily reviews in the shop floor, weekly reviews with Managers, assisting them with timely resources in experimenting their ideas and applauding people in the shop floor, started yielding results.

i) Monthly production review starts, with reviewing the progress on what is new, ahead of the production numbers.

j) Introducing each team to MD whenever he visits the plant and, making the employee to present to MD about their new idea, opened up the flood gate for newness every month .

k) The winners every quarter as assessed by external jury, were rewarded.



TITAN INDUSTRIES LIMITED
JEWELLERY DIVISION, HOSUR
No. OF PERSONS EMPLOYED IN WORK ROOM
(The Factories Act, 1948)

Name of the Department	Employees		
	E - Level	L - Level	Total
STUDDED JEWELLERY DOMESTIC	75	07	82

First Aid Box Location: IN RESPECTIVE BAYS

What is New? Month : Sept 10

SL.NO	DESCRIPTION
1	Produce 1250 NOS Rings through Electro Polishing Process
2	Electro forming Trials
3	50 % Gold loss red... Action plan for 2010-11
4	Green channel - Self certification (10 persons)
5	Cold "Enamel" with "Novarit" unit

Figure III **The WHAT IS NEW? Board launched in 2004.**

LEAP FOR LASTING LEADERSHIP: The jewellery business had two major product portfolios, diamond jewellery and plain gold jewellery. Our manufacturing plant was equipped to manufacture all cast diamond jewellery, and also, we had great facilities to alloy and refine gold. The plain gold jewellery manufacturing is outsourced, (70 % of our revenue comes from plain gold jewellery), and as explained in the beginning, they work like a typical cottage industry, with age old equipment, processes and mind set. The inefficiency of goldsmith community was borne by customers paying for underkaratage. The task ahead of us was to improve substantially the efficiency

at the vendor premises, and deliver the right karatage jewellery, at a price, which is comparable to what family jewellers are offering.

In 2005, we involved the vendor fraternity, with the innovation initiative called **"Leap for lasting leadership",** (Bob Beamon's long jump record, remained a record for over two decades, and inspiring our vendor fraternity to find the equivalent for Titan) challenging them to reduce the manufacturing lead time for plain gold jewellery from 30 days to 3 days, studded jewellery (handmade) from 58 days to 9 days, and kundan jewellery from 60 days to 3 days. Continuous engagement with Karigar (goldsmith) fraternity, in motivating and training them was done.

Figure IV **Traditional Karigar Workplace**

Figure V **Karigar Work Environment at Titan**

The steps and the philosophy we followed in enrolling vendor fraternity and goldsmith, in Innovation Culture

A) Backdrop: **It is important to mention here that, we looked at the goldsmiths as people, first, and then as goldsmiths.** The one million goldsmith fraternity in India, being a highly unorganised industry, are a neglected lot, and do not get any help either from the retailers or from the government, in improving their life standards. The middle men who connect the retailers and goldsmiths were benefitting the most. Involvement of child labor and an unhygienic work environment (where most work, eat and sleep) are traditionally accepted norms in this industry. Also since the work environment is not well engineered, our research revealed that they retire at the age of 35 to 40 with health problems like back pain, poor eye sight, lung disease, etc.

B) Our Innovation challenge was four fold

1) Create a work environment, in which they can work up to 60 years of age.

2) Upgrade their equipment in getting consistency in purity of products.

3) Radical improvement in processes to crash the lead time of manufacturing, and substantial reduction in inventory holding days.

4) With process improvement, improve their productivity, enabling them to earn much more.

To achieve the above, we went with a six prong approach **Engage, Implement 1, Include, Inspire, Educate and Implement 2**

With the above backdrop, we started **engaging** ourselves in series of group discussion (2500 people covered in 8 months time) and listening session with vendor along with their goldsmith. We understood that like every human being is entitled to have his own hopes and aspirations, the goldsmith fraternity had their own legitimate hopes and aspirations and they could never get a platform for someone to listen to them in the past. Before embarking on our innovation initiative,

based on our earlier discussions with them, we had quickly prepared an action plan and started to implement (**Implement 1**) some of the welfare measures. To mention a few —

- Organised yearly eye camps for goldsmiths. People needing spectacles or cataract surgery, were identified and our company had borne the expenses of all corrective measures.
- All goldsmiths (around 2500 who worked for us) were covered under hospitalisation insurance and the yearly premium borne by the company.
- Assisting them in procuring the right equipment, to achieve consistent purity, depending on the merit of the vendor, either we had financed or arranged for them to get loan from banks.
- Made our judicious judgment, with all the interactions we have had with them, and rationalised the vendor base from 64 to 21.
- After having done this, we believed that we should create an environment to appreciate them before inspiring and educating them. Our efforts to **INCLUDE** them involved.
- Coming out with a magazine for goldsmith fraternity, christened "BANDHAN", covering the success stories in goldsmiths' personal life and professional life (a quarterly magazine) distributed to all karigars (goldsmith).
- Giving them platform to come out with their ideas for efficiency improvement (Brahmaputra was the name of this idea collection scheme).
- Recognising the goldsmith with best alignment, best design, and best suggestion and rewarding them in the presence of their family members.
- Each vendor's place had a corner displaying the photograph of achievers (goldsmith).
- Bringing goldsmiths in batches to our factory, allowing them to see how we are doing things and making them to think.
- Celebrating goldsmith day once a year, with cultural and sports program.
- After having set the right platform, we had series of meetings to **INSPIRE & EDUCATE** them.
- With the grand plans that we have to make their work place a world class one (an initiative called Mr. PERFECT, right infrastructure, right equipment, right layout, right safety, right process, etc.).
- Inspire them with stories of people who have created history (the challenge was doing it in their local language Bengali), and seeding in them the thought that impossible things are possible.
- Sharing the challenges with them (30 days to 3 days manufacturing) and asking for volunteers, (from vendors, who wants to be with us in experimenting this journey). Two vendor partners had volunteered and we had started working with them.

Having won the trust and confidence of the partners, the environment was receptive to changes and new way of doing things. Implementing (**Implement 2**), after thorough investigation on what needs to be improved, was an year long journey. Some of the major initiatives which led us closer to achieving desired results (30 days to 3 days) being;

- creating bill of material for the individual variants with the help of goldsmiths. (Otherwise the practice was to give them a 2D drawing of the jewellery and the individual elements, that goes in to making the jewellery, are decided by goldsmiths, with their experience, and we had no data on this).
- Consolidating the bill of material of all the variants in our system and mapping it with past sale data to understand the consumption pattern of various common elements used across categories of jewellery (864 elements we understood are being used by them with which any jewellery can be made).
- Based on the consumption pattern, arriving at kanban stock to be available at the vendors place. A two bin system was introduced to delink the parts manufacturing and jewellery manufacturing.

The orders were released with BOM, and the newly created parts department picked the parts required for a given variant, and gave it to the goldsmith whose job

was now, only to solder and polish the jewellery . The parts removed for manufacturing was indented and replaced to replenish the bin

Along with this, the operations in soldering involving maximum time were identified and alternate innovative method defined and implemented. (RTV mould to help them reduce manufacturing time in a process **from 6 hours to 6 minutes**, and curing of POP which was taking **60 minutes, reduced to 3 minutes**).

Horizontal deployment at other vendor premises

We had organized an event for these success stories to be shared by the goldsmiths whom we had initially involved to other goldsmiths. Over a period of time (4 to 5 years) the goldsmiths' earning has tripled and our inventory is now one sixth of what we were otherwise holding. Encouraged by the above results our management is investing 5 million USD in four manufacturing buildings, engineered to take the life style of goldsmith many notches up.

C) SIMPLIFY & AUTOMATE:

Encouraged by good results from 'what is new' and 'leap for lasting leadership', in an effort to get more from the already motivated Managers and employees, we had come out with an Innovation Theme, called SIMPLIFY & AUTOMATE. Our belief was that, whenever a collection launch of product in the market place happens there is a huge buzz associated with the newness and it increases the excitement and energy levels in the market place and amongst our employees. In similar lines, if we are able to place a theme around our innovation and brand it internally, it generates excitement and new found energy surfaces. Accordingly, in 2008, the theme for our innovation was **"SIMPLIFY AND AUTOMATE".**

Why & what of simplify & automate: In 2008, we had achieved a sales revenue of Rs. 1000 crore and the company was all poised for a 5 fold increase in revenue in 5 years' time. The challenging question posed to the managers was, how are we going to get five fold increase in output in 5 years' time. In an exclusive off site meet, people were made to think on the fact that;

1. We can get 5 fold increase by increasing our capacity five fold by adding machines and equipment, and plan for increase in manpower to reach Rs. 5000 Crore revenue.
2. They were made to think that this approach is ok, if we all agree that we have already the best equipment and best of processes, and there is no room for any improvement. Also they were enlightened in this work shop on the uncertainties of market place, and the risk associated with adding facilities and increasing the manpower, and made them to seriously think on what processes can be simplified and what can be automated, in a systematic way.
3. They were asked this challenging question, "why not we create history in jewellery manufacturing, by innovating newer and better ways of doing things"?
4. Different groups were formed to address capital intensive processes and manpower intensive processes and we decided to meet after three months, at the same venue

Results- Ten path breaking thoughts /projects evolved. The presentation made by a manager (at the end of 3 months) explained, how in an area involving 456 manpower (as is for 5000 crore), this team had come out with new ideas and their recommendation was that, the same job (to manage activities), for Rs. 5000 crore turn over can be done, only with a total of 47 people.

Figure VI of Annexure - **Manual Diamond Bagging**

Figure VII of Annexure - **Diamond Bagging Automation Implemented in 2009**

D) INNOVATION SCHOOL OF MANAGEMENT:

Having tasted the hidden strengths of employees and partners, since only 20% of the employees were actively participating in innovation, in 2009, we came out with an initiative called **INNOVATION SCHOOL OF MANAGEMENT**, with the view to make all stake holders innovators by 2015.

A six month program on innovation, co-created by EREHWON, an innovation consulting company, that has pioneered the Orbit Shifting Innovation Methodology, to build and multiply the number of innovation champions, with the capacity to conceive and execute innovation projects, at Titan, was designed with 3 days of class room session, on what, why and how of innovation, followed by 4 hours / week free time to work on identified innovation projects, 2 hours of mentoring in a week,

Figure VIII of Annexure – Innovation School building

Monthly review with SMT, ultimately leading to a diploma in innovation to the employee. So far 50% of our employees have been converted as trained innovators, and manufacturing innovations contribute to around 20% of our profits.

Figure IX of Annexure - **First Batch of "Innovators" From ISCM**

E) TATA INNOVERSE:

As explained in the CONTEXT initially, we are a part of TATA group and have access to their best practices. From 2010 we have tasted the power of open innovation through **TATA INNOVERSE**, an open innovation web 2 platform promoted by TGIF (Tata Group Innovation Forum) bringing all Tata employees together**. Five unresolved challenges from our past were posted by our managers, on Tata Innoverse and for three problems; the team could get solution from this new platform, within four months.** The initial success story, had created a deep belief in collaborative innovation, and this platform is being used by many of our managers regularly.

Figure X

Figure XI **Award Ceremony for Tata Innoverse**

F) In 2011, we created two huge events called **INNOVATION BAZAAR (IDEA MARKET PLACE)**, a two day event to show case employee ideas, and **INTERWEAVE**, a one day event, to bring all brand executives under one platform.

Innovation Bazaar: The idea of innovation bazaar was conceived after going through the HBR article in 2007, on "A buyers guide to Innovation Bazaar" written by Mr. Mohanbir Sawhney and Mr. Satish Nambisan. Innovation bazaar was decided to be done within Titan with three objectives.

1. To encourage employees to show case their implemented innovation and give them the pride of sharing their innovation with their other colleagues.
2. Create a cross pollination opportunity platform within Titan, for people to get inspired by ideas they see, and possible implementation in their area of work.
3. To demonstrate management's commitment to the subject Innovation, by conducting this large two day event.

Eight eminent jury panel evaluated the ideas, and decided on the best innovation. The innovations spanned across brands, businesses and functions, covering process, product, retail, customer service, and support functions. From 340 entries received, through proper filters, 120 ideas were shortlisted to be on display.

A nearby 3 star hotel with all their facilities were completely booked for our event for three days. Innovative products from six other leading companies were on display, along with the respective company's executives. Our employees could get new insights through this. We had converted the hotel's squash court in to a theatre and inspiring films on innovation were played. This event was attended by over 3500 people, and this was done to cross pollinate ideas within different businesses of TITAN.

Figure XII **Titan Innovation Bazaar**

Figure XIII - **A Stall in Action**

INTER WEAVE:

This was a one day event conducted in an off-site resort. The purpose of Inter weave event was, in an effort to bring the SIX different brands of our company (Titan, Tanishq, Goldplus, Sonatta, Fast Track, Eye +) and retail executives who work for Titan, to share their innovations with one best example in each of the four subjects given to them, with the larger audience . The four subjects were

1. Innovative customer acquisition
2. Innovative customer retention
3. Innovative advertisement
4. Innovative retail process improvement.

With 6*4= 24 presentations, this event was attended by over 350 executives. There was a jury panel to evaluate and zero down on the best. This was perhaps the first platform created since inception of our company (23 years back) in bringing all brands together and sharing their innovations. The idea was to create a platform to cross pollinate the ideas and reward the best.

Figure XIV

Figure XV **Interweave Rewards Ceremony**

G) INNOVATION CENTRE:

Inspired by Mr. Steven Jhonson's TED talk and his book on WHERE GOOD IDEAS COME FROM, we have created this unusual building with the hope of bettering the quality of ideas from our employees. This temple for innovation (an innovative building) called **INNOVATION CENTRE**, is aimed at engaging & inspiring people to come out with best of ideas for the challenge that they are working on. Unusual ambience coupled with bringing diverse set of people to come together, in this building, is expected to lead to unusual and impactful ideas. In Innovation Centre, we are giving the right ambience for employees to come, see the challenges, think and submit their ideas. It is a two hall construction with the first hall designed to be used as hall of creativity and the second hall designed to be used as hall of tranquility. A small proto-centre, library, discussion rooms are part of Innovation Centre.

Figure XVI **Titan Innovation Centre**

Also this year we have taken space in IIT M Research park, (result of an effort between a premier engineering institute IIT in India and industry for collaborative work between industry and academia) and having a strategic tie up with them to have IIT brains and their facilities to work on resolving our challenges. This is called Titan Innovation Hub.

CHALLENGES & SOLUTIONS

Challenges:

1) Enrolling employees to innovation initiative was a problem faced. This was done by identifying the opinion makers and giving them a serious listening on their grievances. On solvable issues, giving them a commitment and honouring the commitment and, therefore, winning their trust post which they were made the light house for the next innovation initiative, supporting them and facilitating them to succeed and recognizing them.

2) Enrolling the vendor fraternity was even a bigger problem (the how part was explained earlier).

3) Even when a bright idea was arrived at, resistance from the others in implementing was the other challenge.

Actions to surmount the challenges: It has not been one quick fix idea, but has been a series of genuine efforts which has helped us to overcome most of the challenges.

1) The culture should be employee friendly. If employees are not participating in innovation, we believe that, it is not their fault, and look at what we should do and what we are not doing.

2) Engaging with opinion makers and giving them a serious listening, and fulfilling some of their grievances and making them a light house for innovation

3) Creating a structure to focus on innovation - **INNOVATION COUNCIL** & **FUTURE GROUP** (future group has 15 executives working full time on innovation, in Jewellery division). Innovation Council (16 member senior group, covering all business verticals and functions in Titan), was formed by our MD in the year 2010. This was done after the success stories on Innovation from Jewellery manufacturing and after we underwent the innometer study as a company (and for jewellery division).

The task given to **INNOVATION COUNCIL**, was three fold:

- How do we create a frame work to improve continuously on innovation?
- How can we increase participation level on innovation from employees?
- How do we integrate innovation into our Strategy process?

Innovation Council thus formed, analyzed the Innometer scores on different aspects of innovation (meets once a month for two hours) and had come out with a 5 pronged agenda.

- Innovation enablers (organising many innovation activities) (Innovation Bazaar for Titanians, Innovation Bazaar for Vendors, Interweave, Inter weave in regions, Innovation Newsletter, daily mail on Innovation, etc. are done).
- Providing platform for idea generation (Seed, Idea +, What is new, Launching Innoverse in Titan, Innovation Hub In IIT Chennai, Innovation Centre).
- Educating people to innovate (Innovation school, Innovation Challenge Program at IIMB, a two week program for managers, lectures by eminent people on innovation, sponsoring employees to many innovation conferences).
- R& R programs (Dream team, Outstanding Titanian, Innovation Bazaar winners, Interweave winners, Hall of fame, Moment of fame) : Involving the finalist family members, cash rewards, publishing these events in our Newsletter, rich momento and certificates, grand award ceremony in a five star hotel with entertainment from eminent artists, inviting eminent speakers.
- Measurement on innovation (to know where we are doing well and where we should improve. Innometer study by TGIF adopted)

FUTURE GROUP

Future group was formed in jewellery manufacturing in 2008, to enable the organization to cope up with the ideas pouring from employees. A two member team was formed initially, with a view to filter the ideas (earlier done by CFT, part time), and to work along with the ideators in experimenting . What started in a small way, has now developed into a 15 member team headed by a Divisional Manager, three Managers and the rest Executives. They are perhaps the busiest people in jewellery manufacturing.

Our learning is that A) Believe in people B) Take responsibility (do not blame it on people) C) Keep definite time to review innovation D) Keep challenging questing floating always E) Grand R&R F) Measure / bench mark where we are on innovation & improve

BENEFITS & METRICS

To mention a few stunning outcomes from our Innovation culture

The biggest benefit from our effort to democratise innovation is that, we have created a bunch of agile employees, who are ready to adopt and take head on the rapid and disproportionate changes happening in the market place, and lead the changes with their innovative ideas.

a) Production quantity per shift per person in stone setting improved from 100 to 1800 per person per shift. An international bench mark (patent pending for mould setting innovation).

b) Wax setting production improved from 350 to 2100 per person per shift. Again an international bench mark. (Patent pending).

c) Manufacturing lead time on plain jewellery reduced from 30 days to 6 days.

d) Studded jewellery (handmade) manufacturing lead time reduced from 56 days to 9 days.

e) Robotic bagging automation introduced (Otherwise we would have engaged 150 people for this job) (patent pending innovation). We are the World's first in introducing this process.

f) Colour & lustre matching automation.

g) Kundan jewellery - manufacturing lead time from 60 days to 3 days.

h) Virtual stone setting 100 proto per month from a group of 20 employees to 1000 proto from the same group (Patented).

i) 700 gms per month production of karigar to 4000 gms per month per karigar.

j) Gold loss in manufacturing, through series of innovation today stands at 0.11%, down from 5% in 2003 (An industry bench mark).

k) First TATA INNOVISTA in 2006, First prize won by our employees (otherwise called workers in other companies).

Figure XVII - **Titan Awarded for Mould Setting Innovation in Tata Innovista**

Figure XVIII - **Titan Awarded in Tata Innovista For Diamond Bagging Automation in 2006**

The Tanishq story was recognized as an example of innovation in the form of a case study called "The Voyager" in the TATA innovista.

l) Working on 41 path breaking projects, prioritised based on an innovation portfolio created..

m) Substantial Improvement in Innometer Study (a study for benchmarking the innovation ecosystem available in the company using a tool developed by Prof. Julian Birkinshaw). In 2009/10, the innometer study results revealed that, our scores on innovation from Inside, Cross Pollination, and Innovation from outside (please see chart below) were not in the top 25 percentile in global benchmarking. We started concentrating on these fronts by adding more pertinent initiatives to improve our current practices and thereby improving our scores.

Innovation Inside: We came out with a new initiative called SEED +, encouraging individual employees to come out with ideas, on a constraint (once a month) defined by the management. Cash awards of up to Rs. 30,000 was announced. In Innovation school, we recruited 87 students.

Innovation from Outside: We started engaging ourselves with outside entities with different talents, in finding solution to our problems. Vision camera manufacturing firm in Bangalore, an independent R&D firm specialised in powder metallurgy based out of Hyderabad, strategic tie up with a small R&D firm, Serenity Inc., based in California, specializing in Nano technology, tie up with Goldratt Consultancy based out of Israel, etc. to learn from their experience.

Cross Pollination a) Exposure to Innovation students on other (un) related industry, when they generating ideas to solve their challenge. Interesting example can be sending a team of our employees, who were working on obtaining 100% acceptance in our alloying process, to get uniform homogeneity, to a pharmaceutical company, alloy steel makers, to a sweet manufacturing company.

b) Innovation bazaar & interweave were done to get more cross pollination ideas.

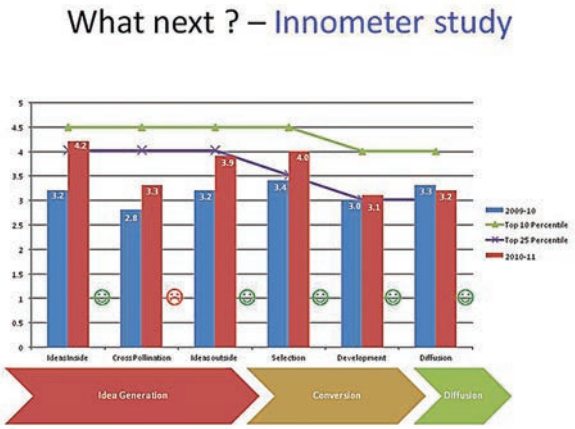


Figure XIX - **Titan Innometer Study**

c) International recognition for the processes of innovation adopted in Titan by the European Business School, in one of their competition on "Developing leaders in Supply chain . . . A publisher covering the event, had our story as a case study in their book –"Develop Leaders in Supply Chain Management".

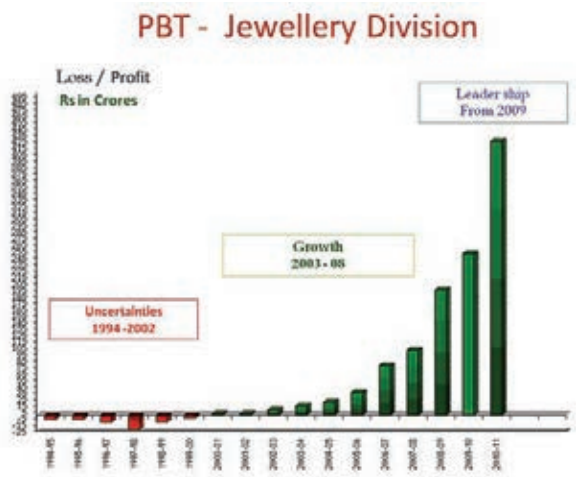


Figure XX - **Completer Turnaround in the PBT of the Jewelery Division as a result of various innovartion measures.**

LESSONS

1) Every employee can innovate (given the right culture and opportunity).

2) Never blame people for not innovating. Always ask yourself what is that you could have done better.

3) Keep sensitising people to innovation (this should be an ongoing effort).

4) Create specific structure for scrutinising ideas (otherwise people will lose interest).

5) Take idea to next step immediately. (even if you fail, you will learn fast).

6) Educate people on tools and techniques to come out with ideas.

7) Always publish challenging questions to make people to think beyond their routine.

8) Liberal rewards and recognition programs.

9) Always (once a year) measure the status of INNOVATION ECO SYSTEM in your company, to improve.

10) Innovativeness is sustained, when the employee realises that, innovation can go beyond the economic benefits to the company, in helping him to reinvent his professional and personal life.

11) Always focus on processes for innovation and not for results (results are bound to follow).

12) Keep generating ideas, more the ideas, more are the chances that we will get a break through idea.

13) Learn the art of managing the present without losing focus on future (TOP MANAGEMENT).

14) Last, but an important lesson learnt being, you cannot push employees to be creative, and the top needs to create the required pull by constantly and relentlessly, engaging, inspiring, with courageous patience.

L. R. Natarajan is a multi-faceted executive, with a total of over 35 years of experience, who has worked in a number of industries, spanning from Agricultural, Engineering, Automotive, Consulting, Manufacturing, Retailing of Consumer Goods and Services. Originally trained as a graduate automobile engineer from the Madras Institute of Technology, he expanded his professional profile into many business and process management areas including (but not limited to) lean flow manufacturing, TOC (Theory of Constraint), leadership development, organizational innovation development, business turn-around and disruptive innovation.

He has around 25 years of experience in various capacities within the automobile and agricultural manufacturing industries. During his tenure in the automotive sector, he has provided leadership in the implementation of three green field projects, namely: Single Cylinder Diesel Engine, Multi-Cylinder Diesel Engine and Tractor Project.

During the last ten years with the TITAN COMPANY, he has led the Jewellery Division's integrated supply chain management for both, the Tanishq and the Goldplus brands. He was also primarily responsible for conceiving and conceptualizing and launching the brand "GOLD PLUS". His last assignment in Titan , at the capacity of CEO for the new business division.

Moreover, he was heading the Innovation Council of TITAN COMPANY.

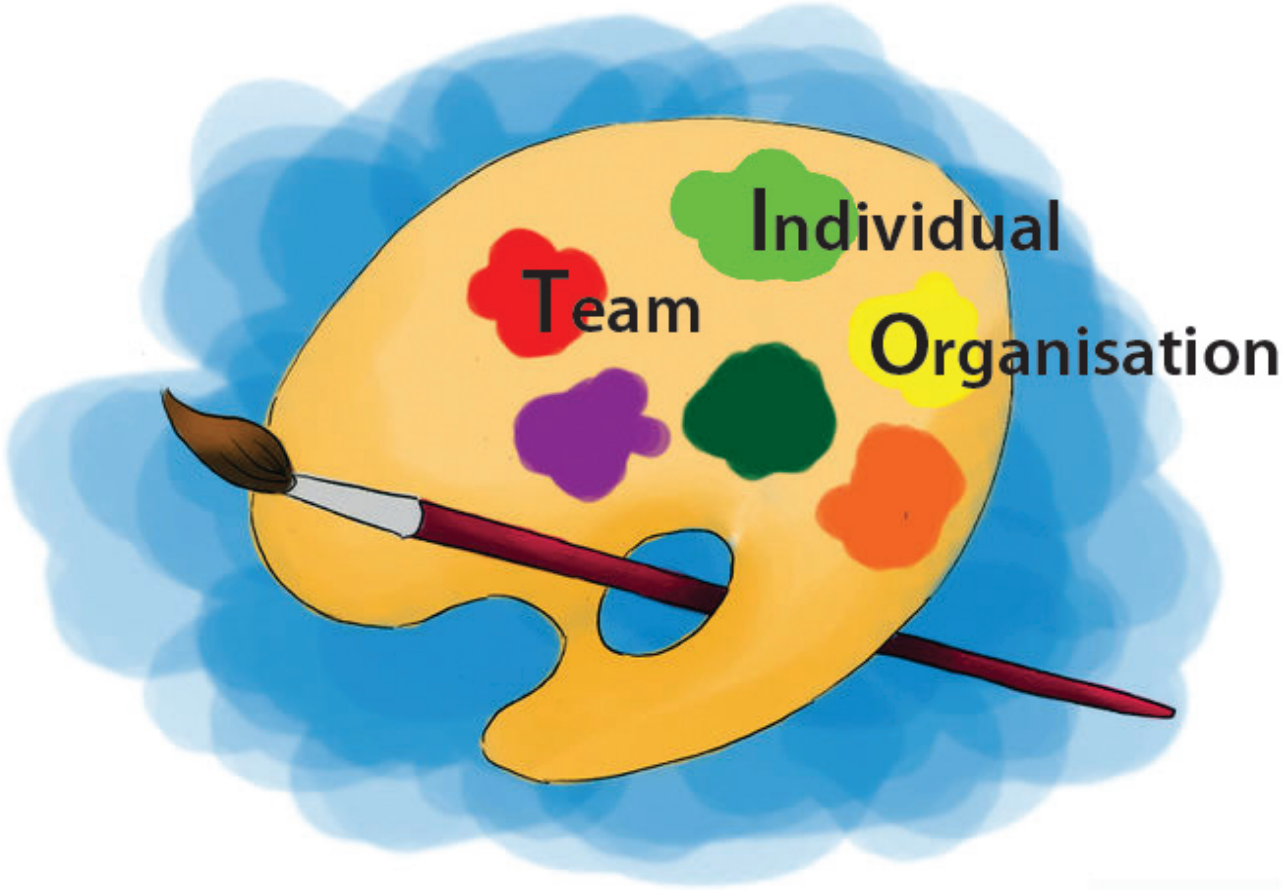
He was a member of the Tata Group Innovation Forum (TGIF), as well as a board member of Tata Ceramics Limited. He was also the Chairman of the Hosur Chapter of the Madras Management Association.

His leadership to innovation had facilitated, Titan Company in receiving many national and international accolades, awards and coveted prizes. One of the most recent recognitions has been the selection of Titan as amongst the winners in two international competitions, organized by MIX Prize in association with Harvard & McKinsey on the subjects of " Innovating Innovation" and "Leaders Everywhere ".

"Getting disturbed, when things are going fine" and "institutionalizing the culture of innovation in the team" are some of his work habits.

His non-professional interests include following national and international cricket as well as reading management books and mentoring.

He is currently teaching in IIM's and also does consulting to businesses.



Creativity is Everybody's Business

Taresh Varshney

There is systems view to creativity which suggests that creative outcomes are produced in a creative environment, where creativity as a culture is encouraged and rewarded. Unless all the systems in an organisation are well aligned; creativity cannot foster. A fragmented approach is analogous to juggling one ball at a time. All the pieces must be moving at once for anything noteworthy to occur. The question we ask is who will be involved in the process of creativity? The answer is 'everybody' right from senior management to the junior most employee in an organisation. It requires the personal, constant and consistent involvement of everybody. In fact, the word commitment may be too weak, passion may be more accurate. In this article, I have discussed the need for innovation in current business environment and then sources of creativity at individual, team and organisation level. Swami Vivekananda has said, "Let us perfect the means; the end will take care of itself". Thus by focusing the efforts in fostering creativity at individual, team and organisational level; sucessful innovations are bound to happen!

In today's business environment which is referred to as VUCA (Volatile, Uncertain, Complex & Ambiguous); success of any business hinges on speed of innovation. New technologies, new products, new services, whole new industries have emerged. The call for innovation in business has never been more intense. Current business environment is characterized by following parameters:

- Stiff competition
- Unknown business challenges
- New disruptive technologies coming into existence
- Diverse workforce with changing values & expectations
- World is changing from industrial based to knowledge and information based
- Stakeholders are making greater demands from organisations

Being innovative is now a matter of survival for all the organizations irrespective of the industry or sector. Whether you are a manufacturing company, construction company or a company providing services, innovation has no boundaries. This encourages creativity in all fields such as new product development (NPD), diversification, business modelling, HR practices of employee retention, etc.

According to IBM 2010 Global CEO study, creativity was selected as most crucial factor for future success. As per this survey, more than 1,500 Chief Executive Officers from 60 countries and 33 industries worldwide, believe that more than rigor, management discipline, integrity or even vision; successfully navigating an increasing complex world will require creativity. More than 60% of CEOs believe industry transformation is the top factor contributing to uncertainty, and the finding indicates a need to discover innovative ways of managing an organization's structure, finances, people and strategy.

However, the challenge that organisations are facing is that they are so busy solving current problems such as managing customer complaints, managing reworks not only within the factories but also at site and handling material shortages, etc., that they do not find time to do future thinking. We need to understand that if the rate of change outside the organization is more than the rate of change inside the organization, then it is an alarming signal for the organization to wake up and do something about it before it is forced to perish. Just as we do innovation in our products whenever they reach the maturity phase of life cycle, businesses also need to do creative thinking and bring about innovation in their business models before they reach maturity.

Edward de Bono is widely regarded as one of the foremost experts in the fields of creativity and lateral thinking. He was the first person to propose that the human brain is a self-organizing pattern making system.

It was from this understanding that he had, for the underlying principles that he developed his thinking tools and creativity methods that have helped people and organizations revolutionize their thinking by bypassing the normal thought-blocks that impede their everyday thinking.

He says with the changing definitions of doing business, for manufacturing organizations, there is a definite shift in focus from manufacturing to 'Valufacturing'. If manufacturing is producing products and services according to customers' requirements and expectations, 'Valufacturing' is about formation and creation of value for customers.

For 'Valufacturing', we have to think of 'Surpetition', which basically means creating value monopolies when everyone else is merely competing. Competition should be understood as performing better than competitors in cost, quality, delivery etc., whereas 'Surpetition' is finding out innovative direction, features and educating customer with new innovation and moving much ahead of time than competitors.

For example, if competitors A, B, C are competing with same variables of quality, cost and delivery, then there is less chance for player A to win, but if A takes the route of 'Surpetition' with some new values useful to the customer then even A can be a leader in future. (Fig.1).

The literature suggests multiple strategic and tactical techniques that both management and innovative staff can employ to guide the creative process. Perhaps the most interesting and revealing of these is Kim and

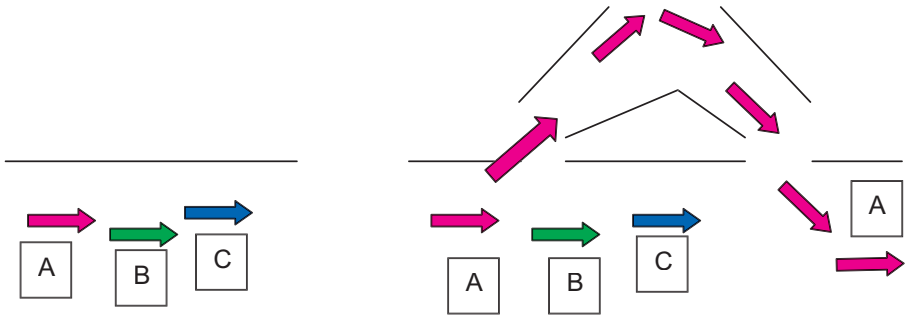


Figure 1: Competition Vs. Surpetition

Mauborgne's concept of 'Value Innovation'. Studying 30 companies over a period of five years, these researchers attempted to understand what differentiates high-growth companies from their less successful competitors. They observed a wide range of variables and found the only one of significance was management's approach to strategy.

Average or unsuccessful competitors followed the conventional strategic logic of attempting to beat the competition while high growth companies rendered their competition irrelevant by breaking established industry boundaries to create new sources of value for customers while often lowering costs at the same time. They re-shape the industry game. They focus on what the mass of customers have in common rather than the differences between customer segments. This value innovation approach represents a clear, simple and appealing model for companies to consider. The strategic logic of value innovators differs from conventional logic along five dimensions, as outlined in the Table-1.

Also all the operational excellence techniques promote creative thinking and continuous improvement. Value Engineering job plan has a creative phase, Six Sigma DMAIC methodology has Improve phase, Gemba Kaizen focuses on continuous improvement and innovation, Total Quality Management (TQM) philosophy emphasizes on never ending improvement, 14 principles of Toyota Production System (TPS) accentuate to become a learning organization through relentless reflection and continuous improvement. In all the above improvement initiatives, it is the creative thinking which works as a means of overcoming problems that confront us today or may

Five dimensions of strategy	Conventional Logic	Value Innovation Logic
Industry Assumptions	An industry's conditions are given.	An industry's conditions can be shaped.
Strategic Focus	A company should build competitive advantages.	Competition is not the benchmark. A company should pursue a quantum leap in value to dominate the market.
Customers	A company should retain and expand its customer base through segmentation and customization, focusing on the differences in what customers value.	A value innovator targets the mass of buyers and willingly lets some existing customers go. It focuses on the key commonalities in what customer's value.
Assets and Capabilities	A company should leverage its existing assets and capabilities.	A company must not be constrained by what it already has. It must ask, what could we do if we were starting new?
Product & Service Offerings	An industry's traditional boundaries determine the product and services a company offers. The goal is to maximize the value of those offerings.	A value innovator thinks in terms of the total solution customers seek, even if that takes the company beyond its industry's traditional offerings.

Table 1: Conventional Logic Vs. Value Innovation Logic

confront us in future. Organizations may have many new products, technologies, services and processes but these will not be effective in today's highly competitive environment if it does not encash the creative potential of their employees. Focus on employees, therefore, is of prime importance.

Creativity is one of the primary characteristics which employers look for while hiring or promoting employees. There have been several misconceptions about creativity such as 'You have to be an artist to be creative, creativity can't be learnt, It takes high IQ to be creative, creativity is related to some types of eccentricity. All of these are wrong. Creativty can be learnt. We, as employees, need to understand this. Increasing my creativity at work can:

- help me make the best use of my talents, abilities
- enhance the enjoyment of my job
- cause me to have more self-confidence
- cause me to be a more valuable employee
- enhance my and others' opinion of myself as a proficient problem solver
- cause me to become more self-motivated
- help me to feel more innovative and 'intrapreneurial'
- give me a greater sense of control and mastery over my job

What are the sources of Creativity in individuals?

Teresa Amabile, PhD in Psychology and Head of the Entrepreneurial Management Unit at the Harvard Business School, has provided the field with one of the most simple and yet comprehensive frameworks for the topic. As depicted in the diagram below, creativity arises through the confluence of the following three components:

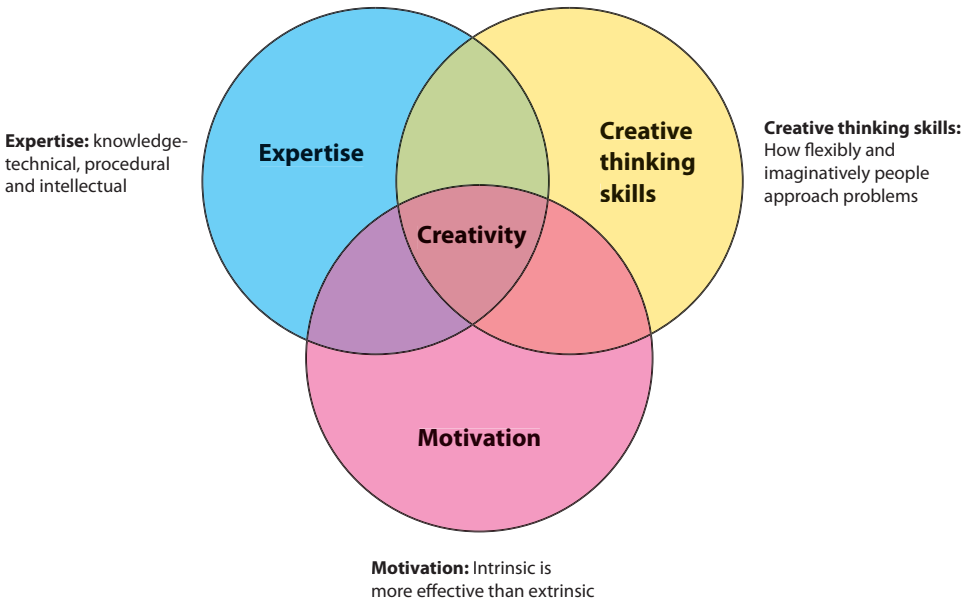
Knowledge: All the relevant understanding an individual brings to bear on a creative effort.

Creative Thinking: Relates to how people approach problems and depends on personality and thinking/ working style.

Motivation: Motivation is generally accepted as key to creative production, and the most important motivators are intrinsic passion and interest in the work itself.

Knowledge: Amabile describes knowledge as all the information that individual brings to bear on a problem. On one hand in-depth experience and long term focus in one specific area allows people to build the technical expertise that serves as a foundation for creativity within a domain and on the other hand creativity rests on the ability to combine previously disparate elements in new ways, which implies a need for a broader focus and varied

Three Components of Creativity



interests. This is also referred as widening the span of relevance. Thus an individual must have breadth of understanding across various disciplines and depth of understanding and expertise in one or two areas.

Creative Thinking: While both Amabile and Gardner assert that thinking is a key aspect of the creative process, they address this topic at a higher level. Amabile suggests that key aspects of creative thinking are:

- comfort in disagreeing with others and trying solutions that depart from the status quo.
- combining knowledge from previously disparate fields.
- ability to persevere through difficult problems and dry spells.
- ability to step away from an effort and return later with a fresh perspective (incubation).

Edward deBono says Creative thinking is not a talent, it is a skill which can be learnt. As in case of acquiring any other skill, you need to practice hard before becoming truly skillful. Most people believe their thinking is pretty good or some may believe that nothing can be done about their thinking, or some may believe that trying to improve thinking would be complicated and a boring process. Thinking is an ultimate human resource which distinguishes us from animals. The quality of our past, present and future depends on the quality of our thinking. Thus, individuals must be able to break the associative barriers that exist between disciplines and areas of knowledge.

Motivation: Indeed many theorists see motivation as the most important component of creativity. Amabile says that people will be most creative when they feel motivated primarily by the interest, satisfaction, and challenge of the work itself—and not by external pressures. The intrinsically motivated person will explore various pathways and alternatives, taking his/her time and enjoying the process along the way. This exploration will lead to novel, alternative solutions, some of which will turn out to be more appropriate and successful than the original obvious path.

In sum, within the three main components of the sources of creativity in individuals, it appears that the following are key to individual creativity:

Knowledge: the balance between breadth and depth of knowledge.

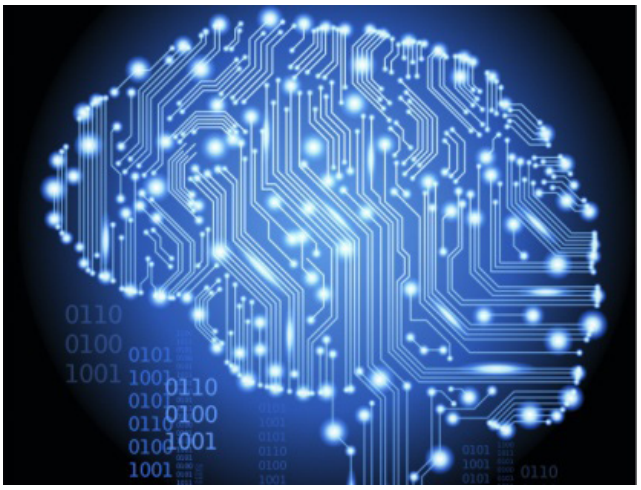
Creative Thinking: a strong ability to generate novel ideas by combining previously disparate elements. This 'synergistic' thinking must be combined with analytical and practical thinking.

Personal motivation: the appropriate levels of intrinsic motivation and passion for one's work combined with appropriate synergistic motivators and self-confidence.

Environment: a non-threatening, non-controlling climate conducive to idea combination and recombination, such as the 'intersection'.

An explicit decision to be creative along with a meta-cognitive awareness of the creative process can go a long way in enhancing long-term creative results.

What are the sources of Creativity in teams?



The natural and inescapable behaviour of our brain is that it is a self-organising pattern making system. Rain falls on a virgin landscape. Eventually the interaction of the rain and the landscape forms streams and rivers. The newly arriving rain now follows these patterns. That is a natural behaviour of the system. Thus this marvelous functionality of the brain to make patterns allows us to make sense of the world and respond to the situations in a much faster manner. However, this marvelous functionality of the brain also makes it miserably uncreative. And that is the reason why the teams get stuck with a particular idea or alternative. It is extremely difficult to restructure these patterns.

Pattern is the arrangement of information on the memory surface that is mind. A pattern is a repeatable sequence of neural activity. In practice, a pattern is any repeatable concept, idea, thought or image. A pattern may also refer to a repeatable sequence in time of such concepts or ideas. A pattern may also refer to an arrangement of other patterns which together make up an approach to a problem, a point of view, a way of looking at things. There is no limit to the size of a pattern. The only requirements are that, a pattern should be repeatable, recognizable and usable.

In order to generate different ideas and not get stuck with an idea, the team has to use a new stimulus to seek another path, i.e. try to restructure the pattern by putting things together in a different way. Thus, the team has to deliberately generate ideas using various creativity divergent thinking techniques. Dr. Edward deBono in his various books, has discussed such techniques in detail. Some of them are lateral thinking, alternatives, challenge, concept extraction, random stimulation, reversal technique, etc.

Let's discuss a technique called 'Random Stimulation' to elaborate restructuring of patterns deliberately. This methodology suggests we should choose a random input. It involves introduction of something that is completely 'outside' the prevailing situation. One of the simplest random inputs is a random word (a dictionary word or any word that comes to your mind can be used). Then we should list all attributes or associations of that random word on one side and try to establish connectivity from those attributes to generate ideas.

Random Stimulation only works because the mind functions as a self-maximizing memory system. In such a system, there is a limited and coherent attention span. This means that any two inputs cannot remain separate no matter how unconnected they are. Normally, if there were two unconnected inputs, one of them would be ignored and the other one would be attended to. But if both are deliberately held in attention (by deliberately arranging the setting) then a connection will eventually form between the two.

For example, if the focus (topic where new ideas are needed) was mobile phone and the random word was 'flower'. The possible associations could be colour, shape, petals, frangrance, garland, funeral, etc. Now, the team could come up with the ideas like fragrance emitting mobile phones using fragrance attribute or it could be batteryless mobile phones (phone that will never die) using the funeral association. These ideas would not have come through conventional brainstorming technique. Imagine the idea of fragrance emitting mobile phone wherein you could also set fragrances as you currently set caller tunes; how disruptive this innovation can be for deodorant and perfume market. This technique is a very powerful pattern breaker. It is easy to use and very effective at breaking people out of thinking patterns. It can produce ideas that are exciting and provocative. This technique is effective when:

- you have a brand new situation and you need a starting point
- the same ideas keep coming up over and over
- ideas are needed fast (new products, services, etc.)

Another technique is 'Reverse Brainstorming'. Reverse brainstorming helps you solve problems by combining brainstorming and reversal techniques.

Reverse brainstorming is a good technique to try when it is difficult to identify solutions to the problem directly. Reverse the problem to: How to cause it? Change the wording of the problem on which you are working from how to solve it to how to cause it.

The basic rules are:

- Clearly identify the problem or challenge, and write it down.
- Reverse the problem or challenge by asking, "How could I possibly cause the problem?" or "How could I possibly achieve the opposite effect?"

- Brainstorm the reverse problem to generate reverse solution ideas. Allow the brainstorm ideas to flow freely. Do not reject anything at this stage.
- Once you have brainstormed all the ideas to solve the reverse problem, now reverse these into solution ideas for the original problem or challenge.
- Evaluate these solution ideas. Can you see a potential solution? Can you see attributes of a potential solution?

For example, if we wanted to generate ideas to enhance the satisfaction of a restaurant customer, the team should generate ideas to dissatisfy the restaurant customer. Invariably you will notice that the number of ideas generated in reverse direction is much more than that those generated when you think in normal direction. In this example, the reverse ideas could be: serve cold food, ask the customer to wait, switch off the lights while he is dining, charge him extra, etc. Once you get this big list, you should reverse these into possible solutions to enhance customer satisfaction: serve hot food, avoid waiting, offer pre-booking facility, ensure no power failure, provide back-up supply, appropriate ambience, avoid billing errors, offer discounts, etc.

There are several such other powerful divergent techniques that can be sources of team creativity to generate new ideas deliberately and purposefully.

What are the sources of Creativity in an organization?

Even if you have put a great team of creative people, that team will produce disappointing results if it operates within an organisation that is unfriendly to new ideas. Beyond welcoming new ideas, the organisation should view innovation as a normal part of business and not as a special activity practiced by a handful of employees. By serving up it as something exotic, you isolate it from what's normal.

Goran Ekvall, professor emeritus of organisational psychology at the University of Lund, Sweden spent many years looking at the organisational climatic dimensions which affect organisational creativity. Ekval took a representative sample of 27 different organisations and divided them into Innovative (8), Stagnated (4) and Average (15) industries. Innovative refers to the ability to develop new products and services quickly, get to market more efficiently and have products with high commercial success, stagnated refers to an inability to effectively handle newness and have products which were not as successful.

Each organisation was independently scored for organisational climate using a 50 item questionnaire named the Creative Climate Questionnaire (CCQ) which looked at the ten dimensions listed below:

Challenge: How challenged, emotionally involved, and committed are employees to the work?

Freedom: How free is the staff to decide how to do their job? It shows the level of autonomy, discretion and initiative in behaviour exerted by individuals to acquire information, make decisions, etc?

Idea time: Do employees have time to think things through before having to act?

Dynamism: the eventfulness of life in the organisation.

Idea support: Are there resources to give new ideas a try?

Trust and openness: Do people feel safe speaking their minds and offering different points of view?

Playfulness and humour: How relaxed is the workplace- is it okay to have fun? Spontaneity, ease, good natured joking and laughter is displayed by the people.

Conflicts: To what degree do people engage in interpersonal conflict or warfare?

Debates: To what degree do people engage in lively debates about the issues? The expressing and considering of many different view-points, ideas and experiences.

Risk-taking: Is it okay to fail? It shows the tolerance of ambiguity and uncertainty.

All of these dimensions are positively associated with creativity, innovation and change except one- conflict. Working environments that have high levels of conflicts are less likely to sustain creativity, innovation and commercial success that can come with it. If an organisation has to really become an organisation fostering creativity, it must focus on these dimensions. Initially may be a survey can be done to understand

the current level of creativity climate and then based on the goal, appropriate measures can be taken to plan improvements addressing specific dimension.

The term creativity and innovation are often used interchangeably; however, there is a clear distinction between creativity and innovation, the former being the generation of ideas and the latter its implementation. Thus, innovation is the commercialisation of creativity. Creativity is the cause and innovation is the effect. As stated in the beginning of this article, in current business environment, being innovative is a key factor for survival, success and excellence of organizations. In this article, I have mainly focused on three levels of creativity viz. individual creativity, group/team creativity and organizational creativity; trying to describe the sources for each level. Thus, if the organisation works upon these three levels of creativity then innovations are bound to happen.

There is a systems view to creativity which suggests that creative outcomes are produced in a creative environment, where creativity as a culture is encouraged and rewarded. In this context, creativity is not confined to a few individuals, but all employees are encouraged to be creative for the benefit of the whole. And hence I say, **"Creativity is Everybody's Business!"**

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He is a Six Sigma Green Belt certified by the Indian Statistical Institute. He is also a life member of the Indian Value Engineering Society (INVEST) & SAVE International, USA. He is the treasurer of INVEST, Western Zonal Council.

Innovation: The Classic Traps

Rosabeth Moss Kanter

Every few years, innovation resurfaces as a prime focus of growth strategies. And when it does, companies repeat the mistakes they made the last time. Here's how to avoid those errors.

Innovation is back at the top of the corporate agenda. Never a fad, but always in or out of fashion, innovation gets rediscovered as a growth enabler every half-dozen years (about the length of a managerial generation). Too often, however, grand declarations about innovation are followed by mediocre execution that produces anemic results, and innovation groups are quietly disbanded in cost-cutting drives. Each generation embarks on the same enthusiastic quest for the next new thing and faces the same challenge of overcoming innovation stiflers.

Over the past 25 years, I have conducted research and advised companies during at least four major waves of competitive challenges that led to widespread enthusiasm for innovation.

The first was the dawn of the global information age in the late 1970s and early 1980s, an era that introduced new industries and threatened to topple old ones. Entrepreneurs and foreign competitors imperiled established companies on their own turf. Information

technology was beginning to evolve from the clunky mainframe to a consumer and desktop product, and companies such as Apple Computer made Silicon Valley garages the new base for product innovation in the United States. IBM emulated Apple's model by developing its PC in dingy surroundings in Boca Raton, Florida, freed from many corporate constraints. High-quality Japanese products, such as the Sony Walkman and Toyota cars, reflected not just good product design but also innovations in manufacturing processes that forced American giants to create their own programs to generate new ideas faster. "Total quality management" became a passion.

The second wave was the pressure to restructure during the takeover scare of the late 1980s. Buyout groups were attacking traditional companies, seeking to unlock the value of underutilized assets; "shareholder value" became a rallying cry. In Europe, restructuring was associated with the privatization of state-owned enterprises now exposed to the pressures of capital markets. Software was emerging as a major force behind innovation, and the strategic value of IT was touted, with American Airlines' Sabre reservations system widely cited as an example of a process innovation that succeeded as a separate business. Companies created new-venture departments to make sure they captured the value of their own ideas and inventions, rather than allowing a behemoth like Microsoft to arise outside the firm. Financial innovations were the rage: leveraged and management buyouts, derivatives and other forms of financial engineering, or financial supermarkets combining banks and nearly everything else. The restructuring era also favored products that could be instantly global: After defeating a hostile takeover bid in the late 1980s, Gillette boldly and successfully launched Sensor Excel shaving systems in the early 1990s, in identical form worldwide, with a single advertising message.

Third was the digital mania of the 1990s. The promise (and threat) of the World Wide Web drove many established companies to seek radical new business models. Brick-and-mortar companies were at risk for extinction; many rushed to create stand-alone Web ventures, often unconnected to the core business and sometimes in conflict with it. Eyes were on the capital markets rather than on customers, and companies got rich without profits or revenues. AOL bought Time Warner, put its name first, and proceeded to destroy value rather than create innovation.

The current wave of innovation began in a more sober mood, following the dot-com crash and belt-tightening of the global recession. Having recognized the limits of acquisitions and become skeptical about technology hype, companies refocused on organic growth. Surviving giants such as General Electric and IBM have adopted innovation as a corporate theme. GE, for instance, is committed to double-digit growth from within. For its part, IBM is seeking innovation by tackling difficult social problems that require—and showcase—its technology solutions. A good example is World Community Grid, a nonprofit IBM created that aggregates unused computer power from numerous partners to give AIDS researchers and other scientists the ability to work with unusually large data sets. This wave's central focus is on new products designed to offer users new features and functionality to meet emerging needs. Customers and consumer markets have returned to center stage, after having been temporarily crowded out by other obsessions. Companies are seeking new categories to enrich their existing businesses rather than grand new ventures that will take them into totally different realms. Signature innovations in this era include Apple's iPod and Procter & Gamble's Swiffer.

Each wave brought new concepts. For example, the rise of biotechnology, characterized by complicated licensing arrangements, helped legitimize the idea that established firms could outsource R&D and learn from entrepreneurial partners or that consumer products companies could turn to external idea shops, as well as their own labs, to invent new products. Approaches to innovation also reflected changing economic conditions and geopolitical events. And, of course, innovation has covered a wide spectrum, including technologies, products, processes, and complete business ventures, each with its own requirements.

Still, despite changes to the environment and differences among types of innovation, each wave of enthusiasm has encountered similar dilemmas. Most of these stem from the tensions between protecting revenue streams from existing businesses critical to current success and supporting new concepts that may be crucial to future success. These tensions are exacerbated by the

long-known phenomenon that important innovations often arise from outside an industry and beyond the established players, creating extra pressure for companies to find the next big concept quickly. Consequently, a large body of knowledge about innovation dilemmas has arisen.

Books such as Tom Peters and Bob Waterman's In Search of Excellence, my own The Change Masters, and Gifford Pinchot's Intrapreneuring supported the 1980s innovation wave by pointing to the importance of relieving potential innovators of bureaucratic constraints so they could run with their ideas. This was followed by a body of work documenting the difficulty of exploring the new while exploiting the old, reflected in Michael Tushman and Charles O'Reilly's call for more ambidextrous organizations in Winning Through Innovation; my work on managing the tensions between the powerful organizational mainstream and fragile new streams produced by innovation groups in When Giants Learn to Dance; and Clayton Christensen's more recent finding, in The Innovator's Dilemma, that listening to current customers can inhibit breakthrough innovation.

Yet despite all the research and literature, I still observe executives exhibiting the same lack of courage or knowledge that undercut previous waves of innovation. They declare that they want more innovation but then ask, "Who else is doing it?" They claim to seek new ideas but shoot down every one brought to them. And, repeatedly, companies make the same mistakes as their predecessors. For example, a 1983 HBR article by Harvard Business School professor Malcolm Salter, et al., "When Corporate Venture Capital Doesn't Work," provided warnings that companies failed to heed about exactly the same dilemmas they face today: With a few notable exceptions, such as Intel and Reuters, companies' venture-capital departments rarely create significant value for the core business.

The Lessons of Innovation

Innovation goes in or out of fashion as a strategic driver of corporate growth, but with every wave of enthusiasm, executives make the same mistakes. Most of the time, they stumble in their R&D efforts because they are engaged in a difficult balancing act: They need to protect existing revenue streams while coaxing along new ones. But "corporate entrepreneurship" doesn't have to be an oxymoron. Innovation can flourish if executives heed business lessons from the past.

Executives declare they want more innovation but then ask, "Who else is doing it?"

It's inevitable that historical memory will fade—but not inevitable that we lose the lessons. Here's a chance to collect some of what is known about innovation traps and how to avoid them.

Strategy Mistakes: Hurdles Too High, Scope Too Narrow

The potential for premium prices and high margins lures executives to seek blockbuster innovations—the next iPod, Viagra, or Toyota Production System. Along the way, they expend enormous resources, though big hits are rare and unpredictable. Meanwhile, in seeking the killer app, managers may reject opportunities that at first glance appear too small, and people who aren't involved in the big projects may feel marginalized.

For years, large consumer products companies typically screened out ideas that couldn't result in revenues of several hundred million dollars within two years. This screen discouraged investments in ideas that couldn't be tested and measured using conventional market research, or that weren't grounded in experience, in favor of ideas that were close to current practice and hardly innovative. In the 1980s and 1990s, Pillsbury, Quaker Oats, and even Procter & Gamble (an innovation powerhouse today) were vulnerable to smaller companies that could quickly roll out new products, thus eroding the giants' market share. P&G, for example, lamented not having introduced a new toilet bowl cleaner before a competitor did, despite P&G labs' having developed similar technology. The rival, of course, gained dominant market share by being a first mover. Likewise, Pillsbury and Quaker lagged the competition in bringing new concepts to market and, as underperformers, were eventually acquired.

Time Incorporated, the magazine wing of Time Warner, for a long time was slow to develop new publications because managers wanted any start-up to have the potential to grow into another People or Sports Illustrated, two of the company's legendary successes. During the period before Don Logan took the helm in 1992, almost no new magazines were launched. After Logan brought a different innovation strategy to the magazine group, Time developed (or bought) about 100 magazines, which dramatically increased the company's revenues, cash flow, and profits. Not every offering was a blockbuster, but Time had learned what successful innovators know: To get more successes, you have to be willing to risk more failures.

A related mistake is to act as if only products count, even though transformative new ideas can come from a range of functions, such as production and marketing. For instance, a fabric company that made complicated woven materials had a long-standing problem: yarn breakage during production, which was reflected in the cost of the company's products and represented a competitive disadvantage. But the top team at the fabric maker continued to talk about the company's search for really big product innovations, such as totally new materials. A new executive, who believed in opening the search for innovation to all employees, joined the company. After a meeting discussing the need for change, a veteran factory worker, who had joined as a young immigrant and still spoke with a heavy accent, tentatively approached the new executive with an idea for ending the breakage. The company tried it, and it worked. When asked how long he had had that idea, the worker replied, "Thirty-two years."

Similarly, because managers at Quaker Oats in the 1990s were too busy tweaking product formulas in minor ways, the company missed numerous opportunities in other arenas, such as distribution—for instance, taking advantage of the smaller, health-oriented outlets used by its Snapple beverage acquisition. And in a packaging coup, Ocean Spray, the cranberry juice company, stole a march on America's largest juice purveyors (then including P&G and Coca-Cola) by getting an 18-month exclusive license for the introduction of Tetra Pak's paper bottles to the U.S. market. Ocean Spray boasted a more eclectic innovation strategy than that of its rivals, including idea forums to explore innovations in any domain and open to any employee. Paper bottles were an instant hit with children (and parents packing their lunches), and Ocean Spray's market share shot way up.

Early in its history, the U.S. auto industry gained a breakthrough innovation from its financial function: Consumer financing opened mass markets for products that previously only the affluent could afford. One Intel breakthrough was in marketing: It treated computer chips like potato chips. As a technology company, Intel could have left innovation to its R&D folks. But by marketing a component directly to consumers, Intel gained enormous power with computer manufacturers, which had little choice but to put an Intel Inside label on every machine.

Similarly, Cemex, the global cement company based in Mexico, has used widespread brainstorming to generate innovations that create other sources of value for a product that could easily become a commodity. Those innovations include branded, bagged cement and technology-enabled delivery methods to get cement to customers as fast as if it were a pizza. And while P&G is getting attention for its product innovations, such as the Swiffer and Crest Whitestrips, its innovations in new media, such as interactive Web sites for the soap operas it sponsors, may prove even more valuable for the company's future.

When a company is both too product centric and too revenue impatient, an additional problem can arise. The organization's innovation energy can dissipate across a raft of tiny me-too projects chasing immediate revenue. Perversely, such projects may raise costs in the long run. While a failure to encourage small wins can mean missed opportunities, too many trivial projects are like seeds sown on stony ground—they might sprout, but they do not take root and grow into anything useful. If new ideas take the form not of distinctive innovations but of modest product variations, the resulting proliferation can dilute the brand, confuse customers, and increase internal complexity—such as offering a dozen sizes and flavors of crackers rather than a new and different snack food, a problem Kraft currently faces.

Process Mistakes: Controls Too Tight

A second set of classic mistakes lies in process; specifically, the impulse to strangle innovation with tight controls—the same planning, budgeting, and reviews applied to

existing businesses. The inherent uncertainty of the innovation process makes sidetracks or unexpected turns inevitable. The reason upstart Ocean Spray could grab the paper-bottle opportunity from large U.S. juice makers is that the big companies' funds had already been allocated for the year, and they wanted committees to study the packaging option before making commitments that would deviate from their plans.

AlliedSignal (now Honeywell) in 2000 sought new Internet-based products and services using established strategic-planning and budgeting processes through existing business units. The CEO asked the divisions to bring their best ideas for Internet-related innovations to the quarterly budget reviews. Although designated as a priority, these innovation projects were subjected to the same financial metrics the established businesses were. Budgets contained no additional funds for investment; managers working on innovations had to find their own sources of funding through savings or internal transfers. What emerged were often retrofitted versions of ideas that had been in the pipeline anyway.

Performance reviews, and their associated metrics, are another danger zone for innovations. Established companies don't just want plans; they want managers to stick to those plans. They often reward people for doing what they committed to do and discourage them from making changes as circumstances warrant. At a large defense contractor, for instance, people got low marks for not delivering exactly what they had promised, even if they delivered something better—which led people to underpromise, eventually reducing employees' aspirations and driving out innovation.

In the early 1990s, Bank of Boston (now part of Bank of America) set up an innovative unit called First Community Bank (FCB), the first comprehensive banking initiative to focus on inner-city markets. FCB struggled to convince mainstream managers in Bank of Boston's retail-banking group that the usual performance metrics, such as transaction time and profitability per customer, were not appropriate for this market—which required customer education, among other things—or for a new venture that still needed investment. Mainstream managers argued that "underperforming" branches should be closed. In order to save the innovation, FCB leaders had to invent their own metrics, based on customer satisfaction and loyalty, and find creative ways to show results by clusters of branches. The venture later proved both profitable and important to the parent bank as it embarked on a series of acquisitions.

Structure Mistakes: Connections Too Loose, Separations Too Sharp

While holding fledgling enterprises to the same processes as established businesses is dangerous, companies must be careful how they structure the two entities, to avoid a clash of cultures or conflicting agendas.

The more dramatic approach is to create a unit apart from the mainstream business, which must still serve its embedded base. This was the logic behind the launch of Saturn as an autonomous subsidiary of General Motors. GM's rules were suspended, and the Saturn team was encouraged to innovate in every aspect of vehicle design, production, marketing, sales, and customer service. The hope was that the best ideas would be incorporated back at the parent company, but instead, after a successful launch, Saturn was reintegrated into GM, and many of its innovations disappeared.

In the time it took for Saturn to hit its stride, Toyota—which favored continuous improvement over blockbusters or greenfield initiatives like Saturn—was still ahead of GM in quality, customer satisfaction, and market share growth. Similarly, U.S. charter schools were freed from the rules of public school systems so they could innovate and thus serve as models for improved education. They've employed many innovative practices, including longer school days and focused curricula, but there is little evidence that charter schools have influenced changes in the rest of their school districts.

The problem in both cases can be attributed to poor connections between the greenfield and the mainstream. Indeed, when people operate in silos, companies may miss innovation opportunities altogether. Game-changing innovations often cut across established channels or combine elements of existing capacity in new ways. CBS was once the world's largest broadcaster and owned the world's largest record company, yet it failed to invent music video, losing this opportunity to MTV. In the late 1990s, Gillette had a toothbrush unit (Oral B), an appliance unit (Braun), and a battery unit (Duracell), but lagged in introducing a battery-powered toothbrush.

The likelihood that companies will miss or stifle innovations increases when the potential innovations involve expertise from different industries or knowledge of different technologies. Managers at established organizations may both fail to understand the nature of a new idea and feel threatened by it.

AT&T Worldnet, the Internet access venture of the venerable long-distance telephone company, faced this lethal mix in the mid-1990s. Managers in the traditional consumer services and business services units participated in a series of debates over whether to manage Worldnet as a distinct business unit, with its own P&L, or to include it in the existing business units focused primarily on the consumer sector. While consumer services managers were reluctant to let go of anything, they eventually agreed to a carve-out intended to protect the embryonic venture from being crushed by the bureaucracy and to keep it from being measured against more-mature businesses that were generating significant cash flow rather than requiring investment. They weren't all that concerned, because they believed an Internet service provider would never generate significant revenue and profitability.

But as Worldnet gained momentum, it attracted more attention. The people in consumer services began to view the innovation's possible expansion to provide voice over Internet protocol (VoIP) services as a threat that could cannibalize existing business. Consumer services managers grabbed control of Worldnet and proceeded to starve it. They used it as a platform to sell core land-based long-distance services and started applying the same metrics to the Internet business that were used for consumer long-distance. Pricing was an immediate problem. Worldnet's services had been priced low to fuel growth, to get the scale and network effects of a large group of subscribers, but the mainstream unit did not want to incur losses on any line of business. So it raised prices, and Worldnet's growth stalled. Consumer services managers could then treat Worldnet as a trivial, slow-growing business, not worthy of large investment. They did not allocate sufficient resources to develop Internet access and VoIP technology, restraining important telecom innovations in which AT&T could have been the pioneer.

Cultural clashes exacerbated tensions at AT&T. Mainstream managers had long tenures in the Bell system. The Internet group, however, hired external tech professionals who spoke the language of computers, not telephony.

Even when a new venture is launched within an existing business, culture clashes become class warfare if there are two classes of corporate citizens—those who have all the fun and those who make all the money. The designated innovators, whether an R&D group or a new-venture unit, are identified as creators of the future. They are free of rules or revenue demands and are allowed to play with ideas that don't yet work. Their colleagues are expected to follow rules, meet demands, and make money while feeling like grinds and sometimes being told they are dinosaurs whose business models will soon be obsolete.

Beware of creating two classes of corporate citizens—those who have all the fun and those who make all the money.

In the early 2000s, Arrow Electronics' attempt at an Internet venture, Arrow.com, was given space in the same facility as the traditional sales force. The similarities stopped there. The Internet group was composed of new hires, often young, from a different background, who dressed in a completely different style. It spent money on cushy furniture, including a big expenditure on a new kitchen—justified, it was said, because the Arrow.com team worked 24/7. The traditional sales force, already anxious about the threat Internet-enabled sales posed to its commissions and now aware of its dingier offices, became overtly angry. Relations between the groups grew so acrimonious that a brick wall was erected to separate the two sides of the building. Both teams wasted time battling, endangering customer relationships when the two groups fought over the same customers—after all, Arrow.com was just another distribution channel. The CEO had to intervene and find structures to connect them.

Skills Mistakes: Leadership Too Weak, Communication Too Poor

Undervaluing and underinvesting in the human side of innovation is another common mistake. Top managers frequently put the best technical people in charge, not the best leaders. These technically oriented managers,

in turn, mistakenly assume that ideas will speak for themselves if they are any good, so they neglect external communication. Or they emphasize tasks over relationships, missing opportunities to enhance the team chemistry necessary to turn undeveloped concepts into useful innovations.

Groups that are convened without attention to interpersonal skills find it difficult to embrace collective goals, take advantage of the different strengths various members bring, or communicate well enough to share the tacit knowledge that is still unformed and hard to document while an innovation is under development. It takes time to build the trust and interplay among team members that will spark great ideas. MIT researchers have found that for R&D team members to be truly productive, they have to have been on board for at least two years. At one point, Pillsbury realized that the average length of time the company took to go from new product idea to successful commercialization was 24 to 26 months, but the average length of time people spent on product teams was 18 months. No wonder the company was falling behind in innovation.

Changes in team composition that result from companies' preferences for the frequency with which individuals make career moves can make it hard for new ventures to deal with difficult challenges, prompting them to settle for quick, easy, conventional solutions. At Honeywell in the 1980s, leaders of new-venture teams were often promoted out of them before the work had been completed. Because promotions were take-it-or-leave-it offers and pay was tied to size of assets controlled (small by definition in new ventures) rather than difficulty of task, even dedicated innovators saw the virtues of leaving their projects midstream. Honeywell was undermining its own innovation efforts. An executive review of why new ventures failed uncovered this problem, but a technology bias made it hard for old-school managers of that era to increase their appreciation for the value of team bonding and continuity.

Innovation efforts also bog down when communication and relationship building outside the team are neglected. When Gap Incorporated was struggling in the late 1990s, the company mounted several cross-unit projects to find innovations in products, retail concepts, and operations. Some of the project teams quickly became closed environments, and members cut themselves off from their former peers. By failing to tap others' ideas, they produced lackluster recommendations; and by failing to keep peers informed, they missed getting buy-in for even their weak proposals.

Innovators cannot work in isolation if they want their concepts to catch on. They must build coalitions of supporters who will provide air cover for the project, speak up for them in meetings they don't attend, or sponsor the embryonic innovation as it moves into the next stages of diffusion and use. To establish the foundation for successful reception of an innovation, groups must be able to present the radical so it can be understood in familiar terms and to cushion disruptive innovations with assurances that the disruption will be manageable. When technical experts mystify their audiences rather than enlighten them, they lose support—and "no" is always an easier answer than "yes." Groups that work in secret and then present their ideas full-blown at the end face unexpected objections that sometimes kill the project.

Such inattention to relationships and communication with mainstream business managers doomed the launch of Timberland's promising TravelGear line. Developed by an R&D group called the Invention Factory, which was independent of the company's mainstream businesses, TravelGear allowed a user to travel with a single pair of shoes, adding or subtracting components suitable for a range of outdoor activities. The concept won a design award from BusinessWeek in 2005. But some existing business teams had not been included in the Invention Factory's developments, and the traditional sales force refused to sell TravelGear products.

By contrast, Dr. Craig Feied's success in developing a state-of-the-art digital network for Washington Hospital Center and its parent, MedStar Health, was a testimony to investment in the human dimension. A small group of programmers designed a user-friendly information system in the emergency department, not the IT department, so they were already close to users. Dr. Feied and his partner, Dr. Mark Smith, made a point of sitting on numerous hospital committees so they would have a wide base of relationships. Their investment in people and their contributions toward shared hospital goals had a positive effect: Feied and Smith's actions helped create good word of mouth and support among other departments for their information system (now called Azyxxi), which resulted in saved time and lives.

The climate for relationships within an innovation group is shaped by the climate outside it. Having a negative instead of a positive culture can cost a company real money. During Seagate Technology's troubled period in the mid-to-late 1990s, the company, a large manufacturer of disk drives for personal computers, had seven different design centers working on innovation, yet it had the lowest R&D productivity in the industry because the centers competed rather than cooperated. Attempts to bring them together merely led people to advocate for their own groups rather than find common ground. Not only did Seagate's engineers and managers lack positive norms for group interaction, but they had the opposite in place: People who yelled in executive meetings received "Dog's Head" awards for the worst conduct. Lack of product and process innovation was reflected in loss of market share, disgruntled customers, and declining sales. Seagate, with its dwindling PC sales and fading customer base, was threatening to become a commodity producer in a changing technology environment.

Under a new CEO and COO, Steve Luczo and Bill Watkins, who operated as partners, Seagate developed new norms for how people should treat one another, starting with the executive group. Their raised consciousness led to a systemic process for forming and running "core teams" (cross-functional innovation groups), and Seagate employees were trained in common methodologies for team building, both in conventional training programs and through participation in difficult outdoor activities in New Zealand and other remote locations. To lead core teams, Seagate promoted people who were known for strong relationship skills above others with greater technical skills. Unlike the antagonistic committees convened during the years of decline, the core teams created dramatic process and product innovations that brought the company back to market leadership. The new Seagate was able to create innovations embedded in a wide range of new electronic devices, such as iPods and cell phones.

Innovation Remedies

The quest for breakthrough ideas, products, and services can get derailed in any or all of the ways described earlier. Fortunately, however, history also shows how innovation succeeds. "Corporate entrepreneurship" need not be an oxymoron. Here are four ways to win.

Strategy remedy: Widen the search, broaden the scope.

Companies can develop an innovation strategy that works at the three levels of what I call the "innovation pyramid": a few big bets at the top that represent clear directions for the future and receive the lion's share of investment; a portfolio of promising midrange ideas

pursued by designated teams that develop and test them; and a broad base of early stage ideas or incremental innovations permitting continuous improvement. Influence flows down the pyramid, as the big bets encourage small wins heading in the same direction, but it also can flow up, because big innovations sometimes begin life as small bits of tinkering—as in the famously accidental development of 3M's Post-it Notes.

Thinking of innovation in terms of this pyramid gives senior managers a tool for assessing current efforts, making adjustments as ideas prove their value and require further support, and ensuring that there is activity at all levels. A culture of innovation grows because everyone can play. While dedicated groups pursue the big projects and temporary teams develop midrange ideas, everyone else in the company can be invited to contribute ideas. Every employee can be a potential idea scout and project initiator, as IBM is demonstrating. This past July, the company held a three-day InnovationJam on the Web, during which about 140,000 employees and clients—representing 104 countries—contributed about 37,000 ideas and ranked them, giving the company an enormous pool of raw ideas, some of them big, most of them small. Indeed, an organization is more likely to get bigger ideas if it has a wide funnel into which numerous small ideas can be poured. One of the secrets of success for companies that demonstrate high rates of innovation is that they simply try more things.

Gillette adopted the pyramid model as part of its push to accelerate innovation in 2003 and 2004. The result was a stream of innovations in every function and business unit that raised revenues and profits. They included new products such as a battery-powered toothbrush; new concepts in the R&D pipeline, such as the 2006 five-blade, battery-powered Fusion shaving system; innovative marketing campaigns that neutralized the competition, such as the campaign for the Mach3Turbo, which outshone Schick's introduction of its Quattro razor; and new technology in HR. At the first Gillette innovation fair in March 2004, every unit showcased its best ideas of the year in a creative way. The legal department promoted its novel online ethics course with a joke: distributing "get out of jail free" cards like those in Monopoly. Having the legal department embrace innovation was a plus for a company in which innovators needed speedy service to file patent applications or help to clear regulatory hurdles.

An innovation strategy that includes incremental innovations and continuous improvement can help to liberate minds throughout the company, making people more receptive to change when big breakthroughs occur.

Process remedy: Add flexibility to planning and control systems.

One way to encourage innovation to flourish outside the normal planning cycles is to reserve pools of special funds for unexpected opportunities. That way, promising ideas do not have to wait for the next budget cycle, and innovators do not have to beg for funds from mainstream managers who are measured on current revenues and profits. In the mid-to-late 1990s, autocratic management and rigid controls caused the BBC to slip in program innovation and, consequently, audience share. Budgets were tight, and, once they were set, expenditures were confined to predetermined categories. In 2000, a new CEO and his CFO relaxed the rules and began setting aside funds in a corporate account to support proposals for innovation, making it clear that bureaucratic rules should not stand in the way of creative ideas. The BBC's biggest hit comedy in decades, The Office, was an accident, made possible when a new recruit took the initiative to use money originally allocated for a BBC training film to make the pilot.

IBM is building such flexibility directly into its infrastructure. The company established a $100 million innovation fund to support the best ideas arising from its InnovationJam, independent of the normal planning and budgeting processes, to allow bottom-up ideas to flourish. "No one has ever before brought together such a global and diverse set of business thought leaders on this scale to discuss the most pressing issues and opportunities of our age," says Nick Donofrio, IBM's executive vice president of innovation and technology. "We have companies literally knocking at the door and saying, 'Give us your best and brightest ideas, and let's work together to make them a reality.' It's a golden opportunity to create entirely new markets and partnerships."

Besides needing different funding models and development partnerships, the innovation process requires exemption from some corporate requirements;

after all, there are numerous differences between established businesses and new ventures. For example, the knowledge that innovations could move forward through rapid prototyping—learning from a series of fast trials—might mean that certain milestones triggering review and additional funding would occur faster than they would for established businesses, following the rhythm of the project rather than a fixed quarterly or annual calendar. For other kinds of projects, greater patience might be required—for instance, when an innovation group encounters unexpected obstacles and needs to rethink its model. The key is flexible, customized treatment.

Structure remedy: Facilitate close connections between innovators and mainstream businesses.

While loosening the formal controls that would otherwise stifle innovations, companies should tighten the human connections between those pursuing innovation efforts and others throughout the rest of the business. Productive conversations should take place regularly between innovators and mainstream business managers. Innovation teams should be charged with external communication as part of their responsibility, but senior leaders should also convene discussions to encourage mutual respect rather than tensions and antagonism. Such conversations should be aimed at mutual learning, to minimize cannibalization and to maximize effective reintegration of innovations that become new businesses. In addition to formal meetings, companies can facilitate informal conversations—as Steelcase did by building a design center that would force people to bump into one another—or identify the people who lead informal cross-unit networks and encourage their efforts at making connections.

Innovation groups can be told at the outset that they have a responsibility to serve the mainstream while also seeking bigger innovations to start new businesses. This can be built into their charters and reinforced by overlapping relationships—whether it involves representatives from mainstream businesses rotating through innovation groups or advisory boards overseeing innovation efforts. After its first great idea flopped, Timberland's Invention Factory learned to work closely with mainstream teams to meet their needs for immediate innovations, such as recreational shoes lined with SmartWool, and to seek game-changing breakthroughs. Turner Broadcasting's new-products group mixes project types: stand-alone developments, enhancements for current channels, external partnerships, and venture capital investments. PNC Financial Services Group recently established a new-products group to oversee mainstream developments, such as pricing and product enhancements, as well as growth engines in new capabilities, such as technology-enabled services and back-office services for investment funds. The company's sales of emerging products were up 21% in 2005, accounting for 46% of all sales.

Flexible organizational structures, in which teams across functions or disciplines organize around solutions, can facilitate good connections. Media conglomerate Publicis has "holistic communication" teams, which combine people across its ad agencies (Saatchi & Saatchi, Leo Burnett, Publicis Worldwide, and so on) and technology groups to focus on customers and brands. Novartis has organized around diseases, with R&D more closely connected to markets and customers; this has helped the company introduce pathbreaking innovations faster, such as its cancer drug Gleevec. The success of Seagate's companywide Factory of the Future team at introducing seemingly miraculous process innovations led to widespread use of its core-teams model.

Would-be innovators at AlliedSignal discovered that tackling promising opportunities required outreach across silos. For example, the aerospace division was organized into groups that were dedicated to large commercial airlines, small commercial airlines, and general aviation (private and charter planes), but the best new idea involved differentiating customers by whether they performed their own maintenance or contracted it to others. The division needed to create new connections across previously divided territories in order to begin the innovation process.

The success of Williams-Sonoma as a multichannel retailer innovating in e-commerce can be attributed to the ways its Web pioneers connected their developments to the rest of the company. From the very beginning, CEO Howard Lester refused to consider Internet ventures that were independent of other company operations. The first main Web development was a bridal registry to create new functionality for the mainstream business. When this

pilot project proved its value, an e-commerce department was launched and housed in its own building. But rather than standing apart and pursuing its own direction, that department sought to enhance existing channels, not compete with them. It measured its success not only according to e-commerce sales but also according to incremental sales through other channels that the Web had facilitated. To further its close connections with the mainstream business, the department offered free training to the rest of the company.

Skills remedy: Select for leadership and interpersonal skills, and surround innovators with a supportive culture of collaboration.

Companies that cultivate leadership skills are more likely to net successful innovations. One reason Williams-Sonoma could succeed in e-commerce quickly and profitably was its careful attention to the human dimension. Shelley Nandkeolyar, the first manager of Williams-Sonoma's e-commerce group, was not the most knowledgeable about the technology, but he was a leader who could assemble the right team. He valued relationships, so he chose a mixture of current employees from other units, who could be ambassadors to their former groups, and new hires that brought new skills. He added cross-company teams to advise and link to the e-commerce team. He invented an integrator role to better connect operations groups and chose Patricia Skerritt, known for being relationship oriented, to fill it.

Similarly, Gail Snowden was able to steer Bank of Boston's First Community Bank through the minefields of middle-manager antagonism toward a successful innovation that produced other innovations (new products and services) because of her leadership skills, not her banking skills. She built a close-knit team of talented people who bonded with one another and felt passion for the mission. Soon her group became one of the parent bank's most desirable places to work. She developed strong relationships with senior executives who helped her deal with tensions in the middle, and she communicated well and often about why her unit needed to be different. Her creativity, vision, teamwork, and persistence helped this group succeed and become a national role model, while other banks' efforts faltered.

IBM's big innovations, such as demonstrating grid computing through World Community Grid, are possible only because the company's culture encourages people to collaborate. CEO Sam Palmisano has engaged hundreds of thousands of IBMers in a Web-based discussion of company values, and Nick Donofrio, IBM's executive vice president for innovation and technology, works to make 90,000 technical people around the world feel part of one innovation-seeking community. The corporate champion of World Community Grid, IBM vice president Stanley Litow, sought out partners in its business units and geographies to move the innovation forward.

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Established companies can avoid falling into the classic traps that stifle innovation by widening the search for new ideas, loosening overly tight controls and rigid structures, forging better connections between innovators and mainstream operations, and cultivating communication and collaboration skills.

Innovation involves ideas that create the future. But the quest for innovation is doomed unless the managers who seek it take time to learn from the past. Getting the balance right between exploiting (getting the highest returns from current activities) and exploring (seeking the new) requires organizational flexibility and a great deal of attention to relationships. It always has, and it always will.

Rosabeth Moss Kanter's latest book is *MOVE: Putting America's Infrastructure Back in the Lead.* She is a professor at Harvard Business School and chair and director of the Harvard Advanced Leadership Initiative. Follow her on Facebook and Twitter @RosabethKanter.

Development of Cored Brick Type Regenerative Heater for Hypersonic Wind Tunnel Application

Suyog Shinde, Randal Nunes,
Shibnath Banerjee, Vinay Neve

Space Mission with application of Reusable Launch Vehicle is an important development in emerging space technology. Such space missions with re-entry of space vehicles to the earth take place with major part of the flight in hypersonic flow regimes (High Mach number) , where many critical aero-thermal events take place. Characterization of the aero-thermal properties for such conditions by using Hypersonic Wind Tunnel System is essential to carry out safe design of space vehicles considering the severe re-entry conditions.

L&T has set up a Hypersonic Wind Tunnel System (HWTS) for Vikram Sarabhai Space Centre, Trivandrum to carry out aerodynamic testing at higher Mach number flow conditions. This Mach number is achieved by using air velocity in hypersonic range. An important requirement in this is to heat up the air to specific high temperature in a very short duration before increasing its velocity to desired Mach condition. Cored Brick type Regenerative Heater has been developed for such air heating and is one of the critical subsystems of HWTS.

This development includes design of various critical elements such as refractory brick bed (used as a heat storage media), bed heating system, bed support arrangement and refractory linings inside Heater vessel. Thermal design methodology has been evolved and a computer program has been developed for sizing of Cored Brick Heater and to simulate its performance over a range of operating conditions. This methodology is based on energy balance principle applied for the Heater systems. The unique design of high temperature bed support arrangement ensures its safe functioning under variable temperature conditions. The design of refractory linings is optimized to limit the Heater skin temperature within 100^{o}C for operational safety.

The developed Heater is performing successfully at VSSC with completion of more than 600 aerodynamic tests. This innovation makes L&T the third organization in the world to have such type of technology.

Background

With advancement in space technology, application of Reusable Launch Vehicle is becoming an important aspect. Such space missions with re-entry of space vehicles to the earth takes place with major part of the flight in hypersonic flow regimes, where many critical aero-thermal events take place. Characterization of the aero-thermal properties for such conditions by using Hypersonic Wind Tunnel System is essential to carry out safe design of space vehicles considering the severe re-entry conditions.

L&T had received an order from VSSC to establish a complete Hypersonic Wind Tunnel Facility on turnkey basis. The system works on flow of air at very high velocity (in Hypersonic range) and includes various sub-systems such as Air Compression Section, Air Heater system, Nozzle, Test Section, etc. The air is to be heated to very high temperature in short duration of testing time before increasing its velocity. This is essential to achieve the desired air conditions during testing. This heating is carried out by using cored brick type Regenerative Heater. Cored brick type Heater is a special type of Regenerative Heater and is preferred over conventional technology. Only two companies in the world had design and manufacturing capabilities for this type of Heaters. Due to the export embargo and denial of technology sharing for setting up Hypersonic Wind Tunnel facility by US government, this technology was not available to VSSC. L&T took up the challenge along with VSSC to carryout in-house development of this technology.

Concept and Operating Principle

The design of the Heater is developed on the principle of regenerative heat transfer. The Heater stores a large amount of heat in a heat storage media and transfers it to large mass of air in a short time during testing. The major components in this innovation are refractory brick bed used as heat storage media, brick bed heating system, brick bed support arrangement, refractory linings and Heater vessel. The heat is stored in specially developed cored bricks during the heating phase by passing hot flue gases generated by combusting fuel in a burner which is located within the Heater vessel. A perforated

distributor system having a unique design has been developed to support the cored brick bed as well as to provide passage for air flow through the refractory bed.

The Heater operates to deliver air at very high temperature and pressure corresponding to Mach-6 condition for four tests (blow-downs) during the day. Typical operation of the Heater in each cycle involves flow of hot flue gases at normal pressure condition till the heating of storage media is completed. This is followed by flow of cold air (which is to be heated) during the test period at very high pressure and high mass flow rate resulting in highly fluctuating temperature and pressure conditions during each test. Apart from these, the whole system with very large accumulated heat remains idle during night. This equipment has been developed to operate with these operating cycles considering the following design aspects.

Critical Design Requirements

Blow-down air temperature: The air coming out of the Heater is required to be heated to a specific temperature called blow-down air temperature. Heater had to be designed to achieve this specific air temperature throughout the blow-down duration of few seconds, with maximum permissible variation of + 50 K.

Heat Storage Bed profile: The refractory bed configuration had to be designed to generate a suitable temperature profile along the bed height during heating cycle.

Heat Storage Bed bottom temperature: Cored brick bed is supported by a support system, which is subjected to bed load at elevated and fluctuating temperature conditions. Bed bottom temperature increases gradually during continuous operation of the Heater over a period of time due to conduction in the bed. Hence maximum expected bed bottom temperature is an important parameter for selection of the material of construction of the bed support structure.

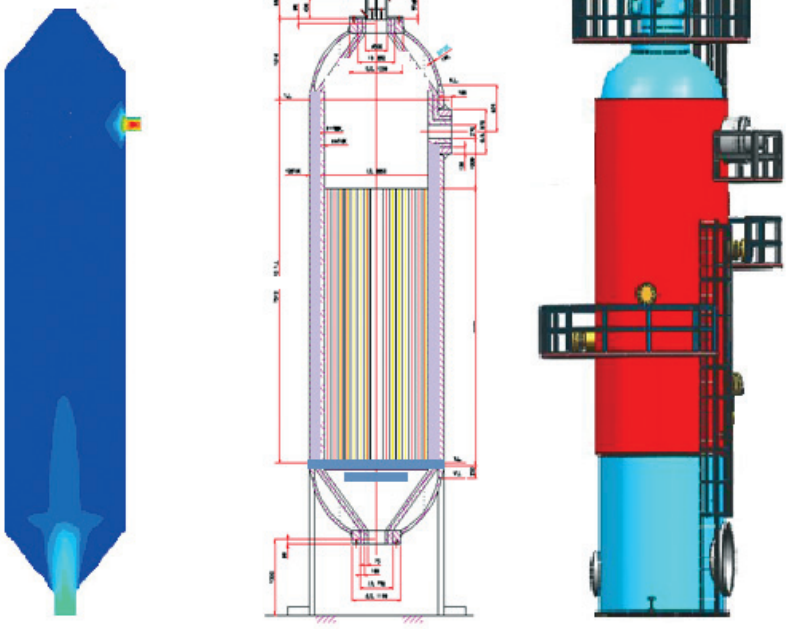
Heater shell/Skin temperature: This skin temperature of the Heater vessel should be limited to 100^0C considering personnel protection requirement.

Heat Loss: Heat losses by convection and radiation had to be kept to a minimum, in order to improve efficiency.

Development

The critical operations of HWTS demand specific requirements such as wide range of operating pressure, blow-down temperature and blow-down air mass flow rates. This makes it different than conventional regenerative Heater. Commercially available thermal design and simulation tools were not found suitable for design of this Heater considering above specific design requirements. Hence, a thermal design methodology derived from fundamental principles has been developed in-house.

The thermal design methodology is based on division of complete Heater domain in to sub-domains and development of a mathematical model of the systems based on Principle of energy balance. This model is solved by using Finite Difference Method to determine various Heater parameters. The solution includes blow down air temperature, temperature profile of refractory bed and



Heater from Concept to Realisation

air along the refractory bed height including temperature profiles at other critical locations of Heater. A thermal design program is developed by using visual basic to carryout simulations of Heater operations based on the developed methodology. The methodology and program are used for sizing of the Heater in an optimum way.

The Heat Storage bed made up of special refractory material has been developed considering cyclically varying elevated temperature and severe thermal shocks. The layout of the bed has been designed in the form of refractory bricks stacked together. These refractory bricks are provided with large number of small diameter holes for the passage of hot flue gas and cold air during Heater operations. The perfect alignment of large number of holes between bricks along the bed height has been ensured for continuous flow passage. The manufacturing of these bricks with holes along with good surface finish to achieve dust free operation has successfully converted the intense efforts put by L&T, VSSC and Saint Gobain team into realization of this new product. Cored brick bed heating system with greater efficiency and uniform bed heating is designed in collaboration with LPG Burner System OEMs. Optimization of the refractory lining design inside Heater vessel is carried out to maintain Heater skin temperature below specified 100 ^{0}C to ensure operational safety, and energy efficient operation.

The Refractory Bed Support arrangement (distributor system) have been developed to provide support for the heavy refractory bed at high temperature under severe thermal shocks and repeated heating and cooling cycles. The support arrangement is provided with equal number of aligning holes with holes in refractory bed for the passage of flue gas and air during Heater operations. It was a challenging task to design this component with thermal stresses within specific limit due to its uneven heating pattern. Numbers of conceptual designs have been analyzed to achieve an optimum design of this system. The fabrication of support distributor with large number of holes was carried out with implementation of advanced manufacturing techniques. The support system has been connected to main Heater vessel with specialized welding technique.

The in-house developed design of Cored Brick Type Regenerative Heater is superior and preferred over conventional regenerative Heater technology due to lower pressure drop across Heater bed, longer life of heat storage matrix, better thermal shock capability and lower maintenance cost of Heater and downstream equipment. It also eliminates the bed fluidization and dusting problems in conventional technology.

Technology Applications

This product is mainly used in aerospace industry worldwide as a critical subsystem in Hypersonic Wind Tunnel applications. It is one of the sustainable air heating technology due to its advantages over conventional solutions for such applications.

Apart from hypersonic wind tunnel system, application of Regenerative Heater technology can be extended to various other industry sectors such as Heat storage in Solar Energy, acetylene/ethylene production processes, high temperature gas reactors, various metallurgical processes and improvements to existing technology such as blast furnace stoves and glass tank regenerators.

Benefits derived from the Innovation

The indigenous design development has resulted into reduction in the overall product cost, delivery time and dependency on foreign sources along with savings in FOREX required for import of Hypersonic Wind Tunnel Systems.

By this development, L&T becomes the first in India and third company in the world to develop capability for designing and manufacturing of Cored Brick Type Regenerative Heaters.

Hypersonic wind tunnel at Vikram Sarabhai Space Center, Trivandrum is a program of national importance. This development was a part of L&T's technological contribution to this prestigious project.

Based on the development and expertise obtained from execution of the VSSC HWT project, L&T has won another order for Hypersonic Wind Tunnel System for DRDL, Hyderabad which was based on global bidding process. Many foreign bidders were willing to work with L&T as prime contractor since we had developed this capability.

With Solar Thermal Power Plants gaining prominence, this technology is being explored as a viable option for storage of heat energy during period of availability of solar radiation to ensure uninterrupted power generation during the night.

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Innovation in Education – The journey of SSISM in changing mindsets, transforming lives and uplifting society

Debolina Dutta and Pranjal Dubey

Rural India suffers from a perpetuating environment of low literacy levels, absence of enabling systems to promote education, deep-rooted societal belief systems inhibiting growth and social upliftment. In such a scenario, SSISM has emerged as an institution which has promoted higher education among rural youth in Madhya Pradesh, adopting innovative approaches to deal with the multifarious complex issues surrounding it. Using a multi-pronged approach, the founder and management team of SSISM have increased women's literacy rates, enhanced employability options and changed mindsets towards the utility of and a belief in education. This article, while highlighting the daily challenges of social entrepreneurship, demonstrates how transformation of the social system is possible through innovative approaches to deal with complex problems.

Rural Higher Education Scenario

The education system in rural India suffers both on poor infrastructure as well as an abysmal quality of primary education provided to young pliable minds. With a majority of the schools using local vernacular as the language for imparting primary education, accessibility to higher education automatically gets restricted. With most graduate and post graduate courses offered in English medium, the paradigm shift in learning is overwhelming for most students, who opt out for fear, lack of confidence, lack of awareness of appropriate options through career counseling or just plain inability to cope with the rigors of the language.

The environment is even more adverse for the poor and socially repressed girl students. Social stigma, a preponderance towards early marriage, lack of sufficient role models, concerns for security and an overwhelming social order that abjures female emancipation all together, collectively have a snowballing effect in reducing the aspiration for higher education among female students.

Education of a few stragglers who muster the initiative and courage to get into higher education does not serve to demonstrate the value of education. Most of these students complete the mandatory course work for the degree, but face a classic catch-22 situation, as they lack the social skills necessary to complement the degree and win a decent job. The disillusioned unemployed youth then return back to their village, too educated to want to make a livelihood through farming but not educated enough to be employed in the cities.

The entire ecosystem supports short-term aspirations of gaining admittance to a desired education course, but not in building strong foundations of learning. A plethora of mediocre coaching institutes have mushroomed in the hinterlands, promising the utopian job, entrance to desired engineering or medical colleges or similar quick fix options.

This scenario has made education just a degree-vending machine which definitely does not provide education and need not necessarily produce employment. To compound the issue, the teachers at the rural schools (and in the colleges in the hinterland) are generally those who have failed to seek gainful employment elsewhere and opt for the teaching vocation as a measure of last resort, so that they can at least be close to their 'homes' in the hinterland. Most of these uninspired and de-energized lot fail to nurture or harness potential of students.

There is a great preference for government jobs, assured through reserved quota schemes. This aspiration is not grounded in a more noble desire to do well or serve the community but rather grounded in deep rooted awareness that these jobs provide significant opportunities for under-the-table income. A stable income from corruption and assured job security in the face of absolute incompetence sustain the desire for these government jobs among both the students and their families.

All of these factors converge to catalyze the creation of a society of unemployed and misdirected youth. Recent statistics indicate that the percentage of educated but unemployed youth has been steadily increasing, which makes the quality of education suspect. In 2011-12, nearly 30% or 4.5 million of the 15 million "completely unemployed" youth were graduates, a significant increase from 21% as seen nearly a decade earlier in 2004-05[1]. The 2014 India Labour and Employment Report[2] paints a grim picture: 92% of those employed have only informal employment; less than 30% of workforce have completed secondary education; there is declining participation of women due to lack of employment opportunities; significant skill mismatch with employability needs; and poor quality of technical education that is being provided in the country.

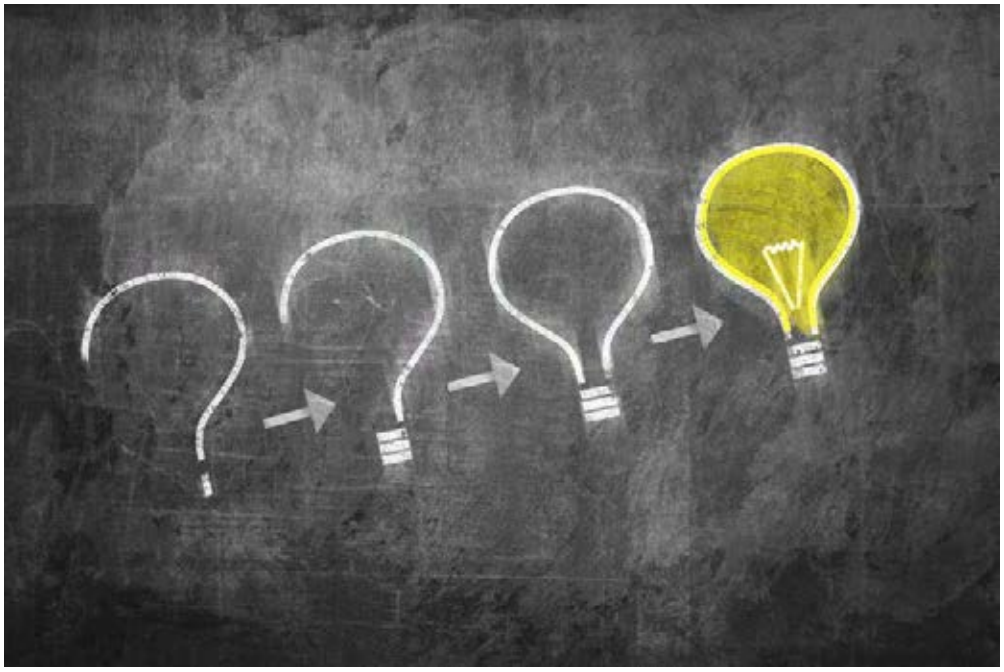
The resultant of all these factors is that the system generates a large population of unemployed and misdirected youth in rural India. The absence of quality education, lack of good mentors and role models, lacuna of success stories that reinforce the value of education and a medieval social order together coalesce to create a society with poor value systems and a corrupt socio-economic system.

The Vision Of Change

Pranjal Dubey, until very recently, had epitomized the 'upwardly mobile, educated, middle class' dream. Till 2008, he had worked as a Program Manager in

1 Alakh D. Sharma , Director, Institute for Human Development and Editor, Indian Journal of Labour Economics.

2 http://www.ihdindia.org/ILERpdf/Highlights%20of%20the%20Report.pdf last viewed on 30th May 2015



SAP Labs Bangalore for about 13 years. Having an ancestral home at Sandalpur, he visited annually to conduct the ritualistic religious ceremonies that were the responsibility of the "Mahant" or the village priest, a hereditary post handed down over the generations. Each of these visits served as a stark reminder to Pranjal of the huge disparity between his achievements and of those of his village, but these pangs of conscience were silenced once he re-joined work and got engrossed in the regular hustle-bustle of metropolitan and corporate life. It was during one such annual visit to Sandalpur in 2006, after conducting the mandatory rituals as the Mahant, that Pranjal was approached by one of the village elders, with his son in tow, to provide employment to the youngster:

Please Mahantji, you have to help my son find a job. You are in such a good post. I heard the company you work for is very big. Can you please get him a small job there? Anything will do.

After realizing that the boy in question had only completed his basic schooling, Pranjal advised him to 'get a degree', without which it would be difficult to get a job, and then forgot all about this casually dispensed advice.

During his next visit to Sandalpur, two years later, he was confronted by both father and son. Pleaded the old man:

Mahantji, we have got him a degree. We sold our land and bought this degree for Rs. 400,000. Now you will get him a job, won't you?

The enormity of the consequences of his casually dispensed advice hit Pranjal like a bullet. The 'degree' the boy and his father had bought was not worth the paper it was printed on. However, the only source of livelihood that the family subsisted on was now dependent on this worthless paper. This single event became the genesis of transformation, both for Pranjal, whose avatar changed from an urban affluent IT professional to a social entrepreneur, as well as for Sandalpur, which saw a ray of hope through the initiatives of Pranjal and his team of educationists. Thus was conceived the Sant Singaji Institute of Science and Management (SSISM).

With the decision taken to make a difference through high quality education at the degree (graduate) level, SSISM conducted an independent study of the number of potential students in Dewas district with their base as Sandalpur, their needs in terms of preferred curriculum and potential hindrances to their getting higher education. It was found that there were approximately 9000 students in the radius of 50 kms of Sandalpur. Out of these, 15-20% of the students went for graduate level studies to metro cities and nearly 40% of the students dropped out after high school, owing to lack to interest and the long distance from colleges to their homes, with girl students getting effected the most. With approximately 50 schools visited in and around Sandalpur, SSISM determined that a core 3-year curriculum would be most effective in terms of enhancing employment potential. It was strongly felt that short-term courses of 10-15 weeks may not be effective in increasing employment opportunities. The 3-year curriculum also needed to include soft skills and behavioral training on goal-setting, communication, spoken English, confidence building, etc.

Education As Driver Of Change

Sant Singaji Institute of Science and Management came into being in July 2010 with Sant Singaji Education Society (SSES) registered under the Government of Madhya Pradesh Society Registration Act of 1973. The name was inspired by the teachings of Sant Singaji, a saint and guru, in whose memory a very famous temple was built in Sandalpur 88 km from Bhopal, the capital of Madhya Pradesh. Pranjal had been the Mahant of the very same temple for several years and had now decided to do something substantial to economically and socially uplift the surrounding areas, by providing good quality college education at the degree level. SSISM was incorporated to facilitate the starting of the educational institution.

The vision of SSISM has been to 'provide practical education to rural students so that they develop into good and confident citizens, to help them achieve their dreams and also contribute to the socio-economic environment.' The objective was the overall development of rural students. The guiding framework is shown in Exhibit-1. The founders of SSISM hoped that multiple initiatives such as industry exposure through training and internships leading to job opportunities, career counseling , entrepreneurial assistance and guidance, providing financial assistance and scholarships to students from lower economic strata and a special focus on girl education through parent counseling, would help in the overall socio-economic development of the region.

With this focus, SSISM offered degree (B.Sc.) and undergraduate degree-level courses in Computer Science, Microbiology, Business Administration, Commerce (B.Com.), and Arts (B.A.). Each of these courses sought to include high levels of industry connect to build industry-relevant skills into the course curriculum, so as to address the needs of the industry. SSISM sought affiliation to Vikram University, Madhya Pradesh. After due process, it received the accreditation to offer its proposed curriculum. An enlarged bouquet of courses also enabled SSISM to generate more income through additional fees from the various streams of offering, thus enhancing the viability of the college. This naturally meant bringing in diverse qualified staff and faculty to teach these courses. Considering the location of the college and the financial constraints it operated within, this automatically limited the salary offerings, thereby adding to the challenges in managing SSISM.

Building A Sustainable Business Model

Having identified education as the medium for facilitating change, SSISM chose to define the domain of graduate education as the boundary of "where to play"[3]. However, the "how to win" required a multi-pronged approach of having clarity on managing competitors and skeptical societal stakeholders, defining and crafting internal capabilities that had to be built and maintained, and robust management systems to build the institution. All of these required significant innovation at every step, which is the primary focus of this article.

Innovation In Financial Viability

Ensuring a viable operating income and generating steady cash flows to meet on-going expenses required a multi-pronged approach. Initial capital was provided by the founders of SSISM, who mortgaged and eventually sold ancestral property to raise Rs. 30 million. The possibility of raising capital from venture capitalists and banks to support the construction of buildings required for the institution was limited, since these sources of funding did not consider SSISM as a potentially profitable venture.

From 2010 to 2013, approximately Rs. 89.9 million was spent on the buildings, equipment, supporting infrastructure, and land development (see **Exhibit 2** for SSISM's statement of liabilities in 2014). Construction work on 75,000 sq. ft. had been completed, but much work related to infrastructure creation and construction remained. Since its inception until 2013, SSISM earned approximately Rs. 33 million as revenue. Of this, in the past, accruals from fees constituted 40%, scholarships (from the government for the economically weaker students) constituted 50% and balance 10% was contributed by donations from corporates and individuals. SSISM had borrowed Rs. 25 million from a nationalized bank at a steep 14.5% interest rate to develop the various facilities, but the high quarterly EMI outflows strained SSISM's finances.

Until 2012, information on the financial ability of each student's family to pay the tuition fees (sourced through local sources) was used to determine the

3 A.G. Lafleyand Roger L. Martin (2013) *Playing to Win : How Strategy Really Works*. Harvard Business School Press

fees that each student would be willing to pay. Implementing this variable fee structure posed its own set of challenges. SSISM discovered that the local grapevine worked overtime in broadcasting any "discounted fees" to others. Additionally, the willingness to pay educational fees was low in the pecking order of the family's priorities, even if they had the wherewithal to do so. A staff member recounted a recent painful experience where an affluent student refused to pay the full fees for the year. The student's father went to the extent of lodging a police compliant citing extortion, but was happy to sponsor a more expensive disco celebration night after the class had achieved 100% results.

Pranjal reflected, '*Nobody values education here and unless the payoff is visibly demonstrated, we will continue to see this reluctance of pay the fees.*'

After this experience, the SSISM Trust decided to reduce the annual fees from Rs. 30,000 (with discount option for economically poorer students) to a flat rate of Rs. 15,000 per annum for all students. The discount option was withdrawn. Economically backward students were supported through private sponsorships whenever available and given the flexibility to pay the fees in installments throughout the academic session. About 15% of the student population belonged to this category.

The funding received from industry CSR initiatives remained sporadic and required huge amount of lobbying effort and follow-up, the bandwidth for which the small team of SSISM did not have, as they were preoccupied with fire-fighting on multiple fronts to keep the college going. As a consequence, SSISM struggled to meet its monthly cash flow obligations such as paying salaries, paying for its fleet of vehicles, loan repayments, etc. SSISM created a video and uploaded the same on social media[4]. This video showcased the efforts and achievements of SSISM and sought help in any form. In 2015, a tie-up with an NGO, LetzChange[5] helped raise nearly Rs. 2 million through crowd funding.

SSISM also looked to leverage NSDC and NCVT[6] schemes of the government to supplement SSISM's revenues. NSDC and NCVT funds and government provided scholarships accounted for nearly 55% of the revenue requirements of SSISM.

The first year of SSISM inducted 185 students, out of which 50% were girls. 40% percentage of this enrolment were non-paying students, but SSISM team felt it was more critical for the local villagers and students to first experience the value of education first hand. They were convinced that the payment would naturally follow later.

Developing Professionalism

In order to develop a professional educational setup, a team of professional educators and support staff is a must. SSISM is located in hardcore rural area and traits like timely execution, good communication skills, drive for excellence is a rarity. SSISM also deals with this issue on a day to day basis in all the departments. Continuous motivation and never say die attitude is required to deal with the problems of the rural youth. Founders work with the team of SSISM on a regular basis and lead from front in this regard. SSISM drives the need of professionalism and positive attitude in the team by calling many management experts for guest lectures and also talking to the team on a regular basis and developing a bond with the team.

Innovation In Building And Developing IT Infrastructure

Given the founders' educational background and work experience in IT, a computer center was established early on at SSISM. SSISM team realized quite early that an IT education could also help in generating employment opportunities for the students. The IT Lab at SSISM aimed at benefitting multiple stakeholders in the region, apart

4 https://www.youtube.com/watch?v=MPLKcNJXUuI last viewed on 30th May 2015

5 https://letzchange.org/projects/donate-to-empower-rural-youth-in-madhya-pradesh/ last viewed on 30th May 2015

6 NSDC: National Skill Development Corporation, is a first-of-its-kind public private partnership (PPP) in India set up to facilitate the development and upgrading of the skills of the growing Indian workforce through skill training programs. NSDC is a not-for-profit company set up by the Ministry of Finance and seeks to fill the gap between the growing demand for, and the scarce supply of, skilled personnel across sectors, by funding skill training programs.

NCVT: National Council for Vocational Training, set up by the Ministry of Labour, Government of India, aims to provide vocational training to school leavers, existing workers, ITI graduates, etc. to improve their employability by optimally utilizing the infrastructure available in government, private institutions, and the industry. NCVT paid Rs. 15/hour of training provided to each student.

from the students. Leveraging his contacts at SAP Labs, Pranjal arranged for several obsolete computers of the company to be shipped to SSISM. Although the Computer Science lab at SSISM was utilized by the students of computer science streams of BCA and B.Sc. (Computer Science) predominantly, the center was also open to the general public after college hours. It provided ICT connectivity, awareness, and education to the rural populace. This initiative was aimed at benefitting farmers, traders, and individuals who were engaged in various other professions.

The training revolved around basic computer education for IT-oriented courses; use of IT tools such as MS-Office, email, Social Networking, etc.; and software development for ERP Technologies. For students specializing in agriculture, familiarity with Agri-Software (farm management) and trading portals was encouraged. For commerce students, use of software such as Tally-Online as well as software for banking and trading was promoted, which oriented the students toward practical application of IT and enhanced their employability. Students of microbiology and biotechnology used the computer lab for modeling, animation, etc. In addition to this, educational content delivery in classrooms through computers made it easier to visualize and retain the lessons being taught. Students graduating in Arts worked on graphics, animation, and copy-writing in regional and multi-lingual content.

Innovation In Getting The Girl Students To College

Attracting students to the college proved to be an uphill task. During the initial years, this required SSISM team to go door-to-door in the various targeted villages, accompanied by Diwanji (local retired Administrator), selling the dream and his vision. SSISM team increasingly found that in most of the houses, girls were discouraged to go for higher education, even if they were academically proficient and inclined toward higher studies. A major effort was required to convince the parents to enroll these girls at SSISM. To appease the concerns of the parents on the safety of these girls, SSISM had to organize safe transportation of the girl students from their residences to the college and back.

By 2015 SSISM has total 1100 students from over 150 villages, out of which 50% are girls. The following table shows the build-up of student strength year on year, from the initial modest numbers. It also shows the proportionate growth in the number of girl students.

Session	Registered # of students	# of girl students
2011	228	100
2012	349	160
2013	445	220
2014	475	250

Many girls are not allowed to venture outside the village after completing their education. To address this issue, an IT company has been established in the college itself, in order to give jobs to the youth from college. The company currently has 10 people working and executing projects for clients based out of Bangalore and Germany.

Innovation In Addressing Student Drop Out And Increasing Retention

A local politician approached SSISM to see if he could do something to help bring his wayward son back on track. The boy, Aditya Kundal, was not interested in pursuing graduation and wanted to take up a career in sports. In absence of family support and encouragement, he had taken to multiple vices. Aditya was enrolled into SSISM as a reluctant student. SSISM team discovered that Aditya's passions were cricket and volleyball. SSISM team challenged Aditya to build a college team in these two games, and even allowed him to miss classes to practice, if they won competitions. When the SSISM team captained by Aditya won the state volleyball championship, SSISM put up a large hoarding at the Sandalpur bus stand, the hub for the grapevine and local gossip, celebrating the achievement.

Focused clubs and extra-curricular activities are now being run by faculty and students are encouraged to learn skills in their areas of interest. This served as the 'honey to attract the bees', with many students voluntarily staying back after regular college hours to spend time in these clubs. These clubs and activities not only helped in broadening the exposure of the students and providing a more holistic education; it also addressed a key social ill

of preventing students from falling prey to bad company and habits.

This also helped in reducing college dropout rate from 26% in 2010-11 to 7% in 2013-14.

INNOVATION IN 0 To break the fascination for government jobs (and the assumed accompanying income through bribes from corrupt practices), exposure to possibilities of alternate careers that were aspirational in nature had to be provided to the students. To dream beyond their known boundaries, students in their first year are taken on a trip to Bangalore and other metro cities to give them exposure to possibilities in fields such as IT, Biotechnology, Management, etc. During these visits, the students would meet lots of successful professionals who were immensely successful in their respective fields. This helped plant in the minds of the students, the seeds of dreaming big to achieve similar level of success in their own lives. With these visits, jobs in the IT, manufacturing and other such industries gradually began to become appealing among the students.

Innovation In Celebrating Success Stories

To reinforce incremental gains, successes and achievements, it required the SSISM management to disseminate each success and achievement to a wider audience, so as to change societal mindset. The team took every opportunity to herald these success stories in a novel manner. Realizing that the print media had a limited reach, minimum recall and costs a lot of money, they adopted a low cost but highly effective approach of celebrating these achievements, by leveraging the power of local grapevine. The local bus depot and its surrounding areas such as the marketplace were the best places for the local population to get up to speed on all local developments. Hence, each episode of success of the students and the institute was conspicuously celebrated at this venue. The modus operandi involved taking out a cacophonic procession in the local marketplace, accompanied by noisy beating of drums and accompanying commentary of the success story using microphones. Two-wheelers and autos were also deployed to make these announcements. Through these means, the names of the students and their parents as well as the achievements being celebrated were broadcast to the whole village. Buntings and banners with the photographs of the proud achievers were displayed at places where these could be seen by all. Processions were organized with the garlanded proud students and parents making their way through the streets of Sandalpur.

Job placement of many students of SSISM with some of the top corporates was celebrated with festive fervor for many weeks. Along with the students, parents were also felicitated at the local village assembly. The sweet taste of success was savored by the students for many weeks thereafter.

Innovation In Building Team Spirit

To incentivize students to study, SSISM instituted the "*Mission 100%*" theme. Aimed at reaching a 100% pass rate in the university examinations, the students were promised the carrot of an all-expense paid trip to locations such as Bangalore and Kullu Manali. Applying the team building concepts practiced at MNCs, the activity resulted in great results. What this fostered was sharing of notes and coaching by the brighter students to those who were lagging behind. The students even requested for delaying the return bus transportation timing, to facilitate group studies. This enthusiasm saw 95% results for SSISM as a whole, with many classes getting a 100% pass rate. It also resulted in 13 university toppers over the period of 2 years.

To build a strong emotional bond between the teachers and their students, SSISM encouraged the guardian tutor scheme through a campaign termed 'Know *Your Students*'. This initiative was new in many ways to the faculty members of SSISM. Each one of the faculty member was encouraged to visit the students' homes and understand the social surroundings and the learning environment. Building this connect at a personal level was a challenge for many of the faculty members, who had to travel to remote dispersed locations in the interiors. However, building a personal rapport with the parents and family members encouraged sharing of problems and in many cases helped in finding mutually beneficial solutions. This initiative went a long way in changing mindsets within the local community and garnering support for more such initiatives, especially for the female students.

Innovation In Faculty And Staff Retention

Teachers form an integral part of the whole initiative and were core pillars to impart the strength to the whole initiative. In the rural hinterland there was an acute paucity of motivated and talent academics. The existing infrastructure, career opportunities and compensation were not compatible to those available in urban areas. In order to acquire and retain their small band of teachers, SSISM team took inspiration from corporate practices of team outing and bonding which increases the sense of belonging and team work. Special emphasis was provided in helping the staff both emotionally and financially, specifically in case of any crisis which helped to develop a bond between the management and staff. An open and transparent culture has been developed where the top management people are approachable to each and every member of staff.

Issues, task allocation and mutual support systems through open discussions and collaboration helped built a tightly knit committee. Continuous flow of information and transparency in financial management of the institute built confidence and a sense of belongingness. Training investments through free workshops provided by the faculty of IIM- Bangalore exposed the staff to new and innovative methods of adult teaching.

Democratic way of decision making helped the team to feel part of the process and encouraged them to stand against odds. Building a positive thinking and mindset was done through regular visits from professors and dignitaries, who demonstrated their admiration and support for the faculty and staff. In these sessions, the staff members were also encouraged to discuss theirs problems and challenges openly and try to find out the solutions together. All these initiatives help reduce the attrition rate to minimal.

Innovation In Making Farming Fashionable & Sustaining Local Entrepreneurship

In spite of all the efforts of staff and faculty of SSISM, it was not possible to guarantee full employment to the graduating students. To provide an impetus to organic farming among the community, SSISM initiated an add-on training program for the students of seed technology, biotechnology and microbiology, in addition to the university curriculum. They engaged Dr. Deepak Sachde, a scientist who had been carrying out research in organic and natural farming for 20 years, who conducted a one-month full-time residential program for these SSISM students at his farm house at Bajwada on the banks of river Narmada. This program was implemented during the semester break vacation, based on voluntary participation of the students. As a result of this exposure, many students were enthused to think of entrepreneurial ventures in this field, and the resulting organic produce from these efforts were sold by the students in the nearby local towns, which was quite a success.

Additionally, small farm plots at the college campus were utilized for harvesting vegetables which were exotic but popular in the cities. Experiments in growing vegetables such as sun-dried tomatoes and bell peppers in small plots of land and selling them in nearby markets suddenly brought the realization to the students that farming could be extremely lucrative, if done smartly.

Innovation In Enhancing Employment Opportunities

A large measure of success for SSISM will be in achieving increasing numbers of student job placements. A focused

drive on industrial training and internships, coaching on preparing for assessment tests and interview processes was undertaken. Over the last 3 years, SSISM established a creditable reputation in the number of students placed, including in large multinational organizations like SAP, HSBC, Cognizant, as well as large Indian IT and Retail firms. SSISM students also found many takers among start-up companies in Bangalore, Pune and Indore. When these students employed at large organizations return to their village, their transformation into corporate professionals, as well as their increased self-assuredness and confidence help in creating a snowballing effect among the existing students of SSISM. The increased affluence of the families from the remittances of these children also helps in significantly changing the mindset of the local population. The role models in the proximate areas in and around Sandalpur are no longer the local mafia or the influential power brokers. Instead, the new role models are these students, who have demonstrated what is possible for youngsters from these villages, through their sheer hard work and immense determination.

SSISM is planning to collaborate with Unnati, a Bangalore-based vocational training center having a 100% placement record, to set-up one of their units at SSISM. Since SSISM already had a NCVT (National Council of Vocational Training) center in its premise to deliver training programs on ICT, Retail, and KPO/ BPO to many students, it was expected that the collaboration with Unnati would bring in proven processes and methodology to deliver practical vocational training in order to increase employment opportunities.

With the efforts of team SSISM, an increasing number of students have now started opting for higher education, a phenomenon unheard of in the past. A few students were also selected for the prestigious post graduate teacher training programs conducted by the Azim Premji Foundation.

An indirect measure of success of SSISM is reflected in the increasing number of student enrolments, who prefer to join SSISM to well-entrenched local engineering colleges. As a student said:

"If *a SSISM graduate can get be interviewed with SAP, I would rather be a BSc with a job than a B.Tech without one.*"

Success And The Long Road Ahead

From the start, the founders and members of SSISM knew that the journey of social change would be a long and arduous one. Within a short span of 5 years, SSISM has started seeing a change in the way education is being perceived and valued within the community. Female student enrolment has hugely increased. In 2010, the number of girl students in SSISM was 65. By 2014, this number had reached to 630. A lot of their success was regularly documented in the press[7] and a business case study on social entrepreneurship was published by Harvard Business Publishing[8]

SSISM management and staff estimate that it would likely take more than a decade to transform the quality of education and improve the situation at the grassroots level. While they struggle with the daily challenges of keeping the vision alive, they have now started dreaming of a more audacious goal of replicating this change across larger sections of rural India and truly transform the social and economic fabric of rural India. They intend to do this increase in geographic spread through collaborations and transferring their learnings to other like-minded teams of educators who are focused on improving the quality of life in rural and semi-urban India through education.

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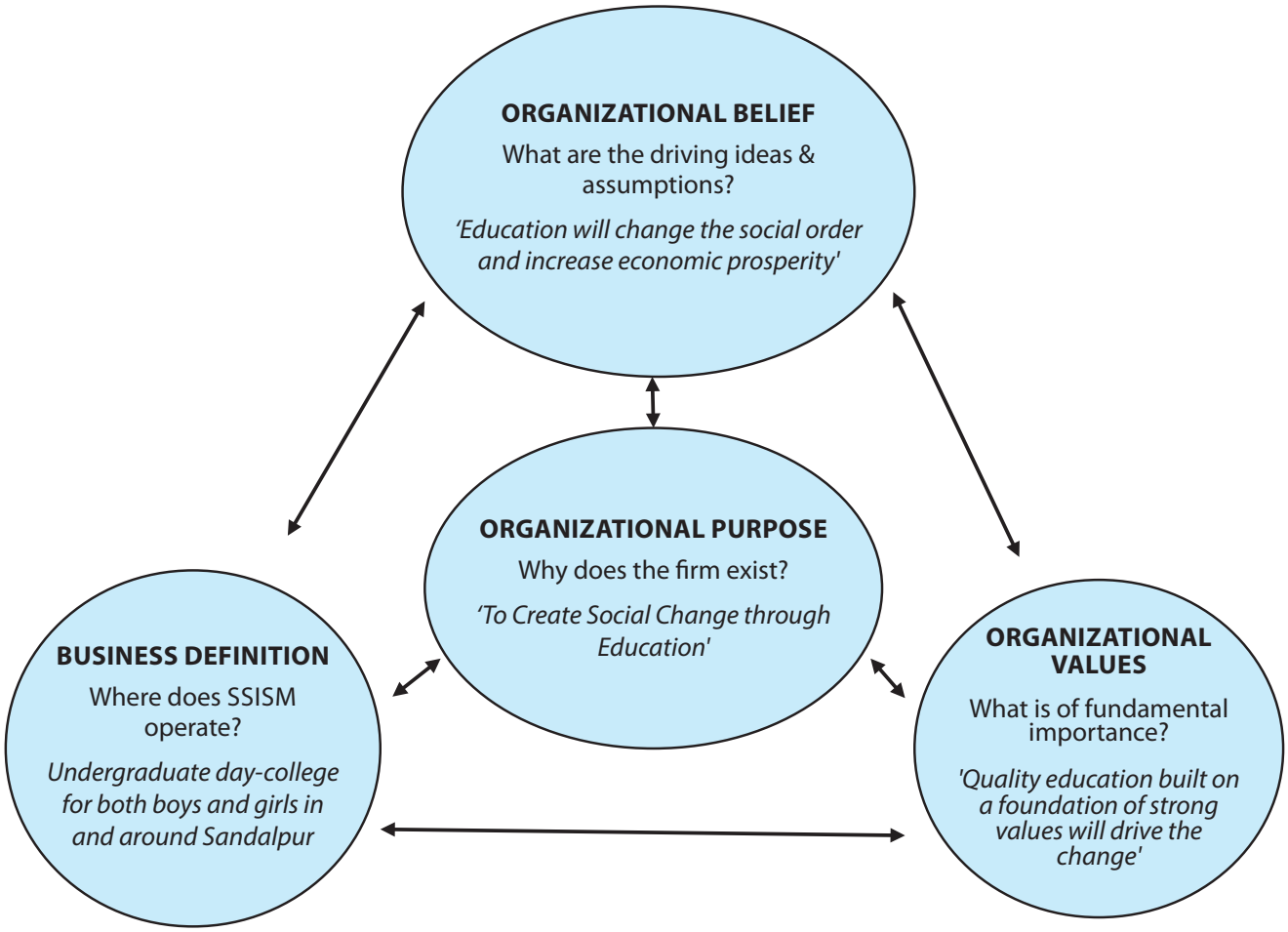
7 http://www.thebetterindia.com/16347/man-sold-house-start-college-rural-youth/ ; last viewed on 30th May 2015

8 https://cb.hbsp.harvard.edu/cbmp/product/IMB479-PDF-ENG last viewed on 30th May 2015

Exhibit 1: Elements Of SSISM's Corporate Mission



Source: Adapted from De Wit B. and Meyer R., Elements of a corporate mission, *.Strategy - Process, content, context -An international perspective,* 4th Edition. Andover, Hampshire, UK: Cenage Learning EMEA, Fig.11.2, p. 598, 2010.

Exhibit 2: SSISM Liabilities

BALANCE SHEET AS AT MARCH 31, 2014				
LIABILITIES		**AMOUNT**	**ASSETS**	**AMOUNT**
CAPITAL ACCOUNT			**FIXED ASSETS**	
			As per details in schedule (Not	
Corpus Fund		21764259.00	included in this writeup)	66385209.00
SURPLUS IN INCOME & EXPENDITURE ACCOUNT			**CURRENT ASSETS, LOANS & ADVANCES**	
Opening Balance	342128.95			
Add : Surplus during the year	950248.61	1292378.00	**Current Assets :-**	
			Tuition Fees Receivable	10008356.00
SECURED LOANS			Bus fees Receivable	4225210.00
			Sundry Debtors	90000.00
Term Loan from Bank of Baroda		22328255.00	Cash in hand	237832.00
(Against Hypo. Of Land & Building)			Cash at Bank	1323792.00
Kotak Mahindra Bank (Bus Loan)		23362.00	(As per schedule "C")	
UNSECURED LOANS			**Loans & Advances :-**	
(As per schedule "A")		17754732.00	Advance to Employees	69500.00
			Advance against Expense	2789000.00
CURRENT LIABILITIES & PROVISIONS			Deposit Related to NCVT	641968.00
Expenses Payable		19702867.00		
Provision for Audit Fees		35000.00		
Sundry Creditors		2870013.00		
		85770866.00		85770867.00

Dr. Debolina Dutta has 23 years of work experience in HR & Sales domain. She had a degree in Electrical Engineering from College of Engineering, Pune, a Post Graduate Degree in management from IIM, Bangalore and completed her FPM-Industry program from IIM Indore.

She is working as Director-Head of HR, VF Brands (I). With significant experience in HR , her multiple responsibilities have included stints as Business HR Head for over 1000+ employees, head of Talent Acquisition functions, responsible for OD & HR Strategic initiatives in employee Life Cycle Processes, Leadership Development, Talent Acquisition and Campus Recruitment, Engagement & Retention and Business Partnership. She is a certified practitioner of SHL (OPQ) assessments, Thomas PPA, PAPI psychometric solutions as well as a DDI certified facilitator for DDI training curriculum with substantial experience in dealing with large international stakeholders in organization growth initiatives, M&A and multiple overseas client interfacing responsibilities.

Debolina has also contributed to academic research with some of her contributions being published by Harvard Business Publishing and Ivey Publications, apart from other prestigious research journals.

Pranjal Dubey has 13 years of IT experience. Pranjal has completed his M.C.A. from Devi Ahilya University Indore and P.G.D.B.A. Finance from Symbiosis. Pranjal is now Chairman of Sant Singaji Educational Society in Sandalpur Village District Dewas Madhya Pradesh. From 2001-2011 he was part of SAP Labs India Bangalore as a Development Manager. He was leading Mobile Business Solutions technology team. After completing M.C.A. he also had started his own software development company. Later he joined Tata InfoTech Ltd. in Bangalore 1999. He also is head priest of a temple in his village. He manages annual fair and many other social activities as head of the temple trust.

Innovations in Social Sector

A Case of DHAN Foundation

M.P. Vasimalai and P. Krishnamurthi

DHAN Foundation is a pan-India not-for-profit development organisation based at Madurai, Tamil Nadu. DHAN follows a unique process of identifying and promoting a new theme that can address the issues of poverty and make it a scalable programme. The innovation pathways in DHAN in the fields of microfinance, water resources conservation and development, and building human capital for the social sector have resulted in hundreds of sustainable and self-governed institutions of the poor, mutually beneficial partnerships with public and private institutions, tens of thousands of grassroots leaders, a larger pool of highly motivated and committed professionals for social sector. The success lies in its unique way of attracting and engaging high quality human resources at the grassroots, nurturing young professionals to transform them into highly competent development professionals through a distinct process of socialisation, mentoring and graduation. The experiences of DHAN offer a number of lessons for the corporates.

Innovation at DHAN Foundation: An Overview

DHAN (an acronym for '**D**evelopment of **H**umane **A**ctio**N**') Foundation (DHAN for short) is a pan-India not-for-profit development organisation, based at Madurai, Tamil Nadu. DHAN is working towards creating a more equitable society. It seeks to provide opportunities for sustainable livelihood for the poorest of poor sections of the country.

DHAN's innovative approach to the development of the poor

Its unique model of innovation in the development sector, which has since been widely emulated, is rather than roll out development programs across the country solely by itself (which would pose enormous organisational, managerial, logistical and scale-up challenges), it instead seeks to be an organisation that mothers development innovations. Since its founding, it has always been on the look-out for identifying new opportunities for the betterment of the poor sections of the society. Thereafter, it designs a theme around the identified issue and launches a series of experiments (called pilots) for a few years to test the suitability of the innovation to different contexts (such as urban, rural, tribal and coastal contexts, each of which is significantly different from the others). The innovation is then refined and perfected. Next, it is evolved into a scalable and adaptable community organisation model that is fine-tuned to suit different contexts. The experience is then consolidated to launch it as a nation-wide program for scaling up so as to have large-scale impact. The whole process could take anywhere up to a decade from idea conception to nation-wide rollout! The primary criteria for evolving a new program are its potential to impact large numbers of poor people for their betterment and its scalability in different contexts.

Process of identifying and promoting new developmental themes

Promotion of a new developmental theme in DHAN follows a very unique process. Initially, a think–tank is formed, comprising of DHAN senior staff, to generate various new ideas, which are then sieved to zero in on a promising and critical new theme. To explore this theme further and to give it a more concrete shape, a core committee would be formed comprising of senior DHAN staff. The core committee would take up a detailed study of the theme, thus considerably it fleshing out. This would entail several field visits as well as consultations with experts in the relevant field. Subsequently an advisory committee would be formed with experts and practitioners, drawn both from within and outside DHAN, for giving technical advice and suggestions to the core committee for initiating the program in a few locations initially. It is at this stage that a specific Programme Team would be constituted to drive the theme forward through the various ensuing stages.

The Programme Team would pilot the program intensively in a few locations that are representative of different contexts (such as rural, urban, tribal and coastal contexts) for 5-6 years. Towards the end of the piloting phase, the program design including various components of the program would be evolved and standardized according to the context. The Peoples' Organisation model and Development Intervention Components would be discussed in detail in the in-house Consultative Forum of DHAN, which includes senior professionals and program leaders of the various programs. Based on the inputs from the Consultative Forum and consolidation of experiences by the Programme Team, the program would be ready for scaling up, once again after extensive preparatory work.

DHAN promotes separate thematic institutions for scaling up such mature themes. Through such an elaborate process, Water Conservation and Development as well as Community Banking have emerged as largest themes. DHAN has promoted exclusive foundations for taking up expansion of these themes. Several other themes are currently in different stages of scaling up.

A snapshot of DHAN's two decades of innovation

Kalanjiam Community Banking Program and Vayalagam Tank-fed Agriculture Development Program were the pioneering programs initiated by PRADAN (Professional Assistance for Development Action) in the early 1990s to address the issues of poverty. PRADAN was one of the early innovators in the development space in India. Founded in 1983 and head-quartered in New Delhi, it had several co-founders including Mr. Vijay Mahajan and Mr. M.P. Vasimalai, both alumni of IIM Ahmedabad. In 1997, pursuant to a Board resolution, PRADAN spun off its

Madurai-centered programs, under the auspices of the DHAN Foundation, a new NGO established specifically to continue mothering new innovations and build exclusive thematic institutions to scale up its innovations.

- **Kalanjiam Community Banking Program** (Kalanjiam in Tamil stands for granary but in the context of the program connotes prosperity) was initiated in 1990, focuses on poor women and promotes SHGs (Self Help Groups) and their networks. By promoting enabling model of microfinance, it serves the savings, credit and insurance (including pension) needs of poor households. Also, they address other social and development needs of the members such as drinking water, health, education, sanitation, and access to basic infrastructure and gender issues.
- **Vayalagam Tank-fed Agriculture Development Program** (Vayalagam in Tamil stands for farm and home. In the context of the program, it connotes farm-based activities) was initiated in 1992. It organises small and marginal farmers who are dependent on small irrigation tanks for bringing back the traditional practice of local management through the Tank-level Farmers Associations and their networks.

At the dawn of the new millennium (year 2000), DHAN initiated four more themes - Development Management Education, Rain-fed Agriculture Development, Information and Communication Technology for Poverty Reduction, Democratising Local Governance, as well as Coastal Conservation and Livelihoods. These are now briefly described.

- **Development Management Education theme,** through the Tata-Dhan Academy, an institution for Development Management Education, is the result of a partnership between the DHAN and Sir Ratan Tata Trust, Mumbai. The Academy works to induct and groom fresh graduates as Development Professionals through specially designed program, as well as to build the capacity of development practitioners.
- **Rain-fed Agriculture Development theme** works to make rain-fed farming viable by improving farm productivity through location-specific interventions. It organises the farmers involved in rain-fed farming into groups and federating them at the block level, in order to learn from and build on the local best practices in rain-fed farming.
- **Information and Communication Technology for Poverty Reduction theme** develops and implements socially relevant ICT programs through the People's Organisations promoted by the other themes of DHAN.
- **Democratising Local Governance theme** seeks to promote and strengthen village-level institutions as functional groups in the Panchayat to ensure people's participation, access to resources and reduce its dependence on the State.
- **Coastal Conservation and Livelihoods theme** started in response to the Tsunami in 2004 that ravaged large parts of coastal India. It works with communities that are vulnerable to disasters in the coastal areas by organising them to enhance their livelihoods and prepare them to face future disasters.

In the beginning of the next decade (2010), DHAN launched three new development themes, viz. those focused on migration, youth and climate change adaptation.

As can be seen from the above, each new decade ushers in several new themes that are then taken up and launched into major programs through the decade, so as to ensure the sustainability of the programs long into the future, well beyond the respective decade.

Innovation in Attracting, Developing, Motivating and Retaining Human Resource

One of DHAN's core purposes is Human Resource Development. It works to bring more motivated young professionals into the development sector and provide them an opportunity to practice and develop practical knowledge about the development sector. The focus of the HR processes for these young professionals is to build required skills and competence to undertake development work for the long term. Due to induction of such a dynamic and highly motivated set of young professionals, who are groomed at every stage to take up larger responsibilities, DHAN has been able to launch several high impact programs. This has resulted in tremendous growth of DHAN in terms of its outreach, impact on the community, as well as its influence on mainstream institutions. Emanating from its core purpose

and overarching organisational philosophy, it has defined its core values to include: Grassroots Action, Enabling, Collaboration, Innovation, Excellence and Self-regulation.

Nurturing young professionals to transform them into highly competent Development Professionals

The core element of DHAN's organisational design and in the strategies it follows reflects its unique philosophy, viz., the primacy of the individual in organisation building. Hence it deliberately builds the organisational unit around significant individuals. Given that it has rigorous induction and acculturalisation processes for its people, long-term retention of its members is reasonably assured. Professionals in DHAN are groomed in such a way that they will occupy leadership positions in people's institutions. Alternately, they could lead a functional area or become a theme / program leader. The organisational growth and ability of the organisation to take up bigger and bigger challenges are built around these individuals, who additionally provide guidance and support to their younger colleagues, thus creating a fantastic ecosystem for a learning organisation.

Creating space and growth path in the development sector for professionals

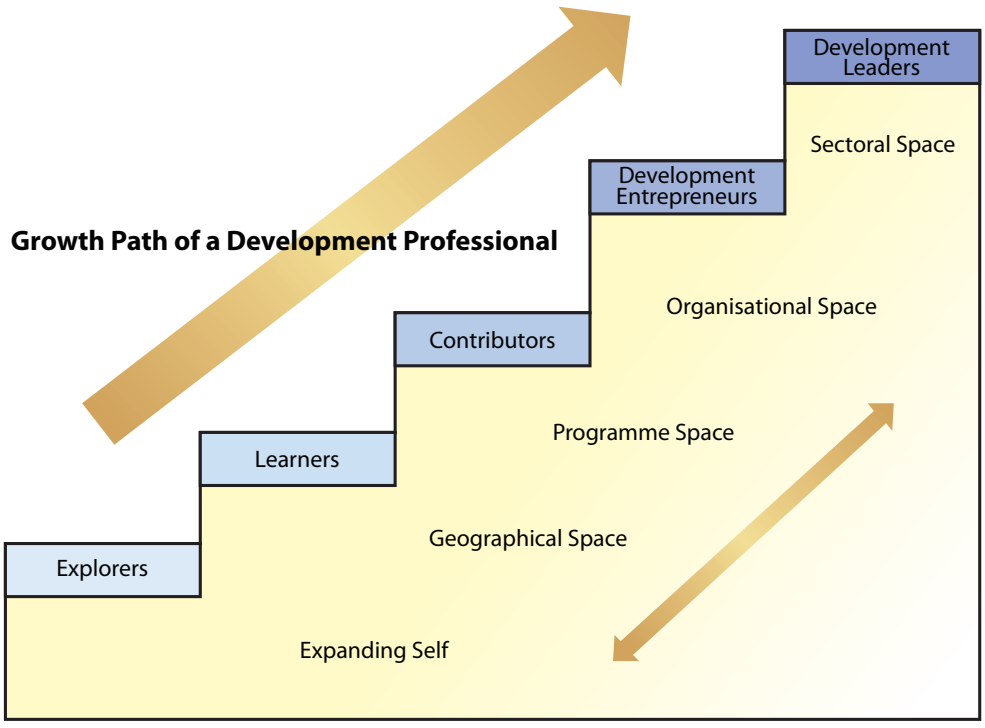
DHAN has created an innovative alternative paradigm in the realm of social entrepreneurship, by which the professionals can discover themselves and their strengths in order to grow. Young professionals who join DHAN go through the graduation process of moving from one level to the next level. Individuals at each level occupy four kinds of spaces in the development sector namely geographical, program, organisational and sectoral.

Explorers (Development Associates)

As someone seriously considering a career in grassroots development action, Associateship provides the young entrant an opportunity to assess the opportunities and ground realities of a life that entails grassroots work. It also helps them do a reality check about what an alternative career is all about, the constraints, responsibilities and rewards that go with it, judge their ability to meet the expectations of family and friends, get used to the conditions of living and working with economically poor communities, as well as comprehend the broad content and pace of work in villages.

Learners (Development Apprentices)

This phase is aimed at providing aspiring development professionals opportunities for exploring themselves, resulting in clarity of their life mission, concretising values and consciously striving to bring changes in their life pursuits. They acquire requisite skills through guided practice in the field, and continual reflection on one's experience. This calls for the ability to swim against the social current, and to bear the resulting hardships willingly and by choice. This stint will give them an opportunity to explore the unexplored areas of the program, resulting in value addition to the theme. Finally, this phase provides an environment to practice DHAN's unique values and become a permanent member of the DHAN family.



Contributors (Project Executives)

This phase is a crucial phase in the growth of the development professional. Project Executives are expected to respond to the demands of the people, program, organisation and the outside institutions with whom they relate. It calls for developing different competencies in order to plan, implement and monitor the impact of the program and successfully promote and build the people's organisation at various levels to ensure self-management as well as its sustainability. They build linkages with the local mainstream agencies like the government and banks, to ensure that entitlements meant for the poor reach the intended recipients. They stay with the communities for at least 5-6 years until they make meaningful contributions.

Development Entrepreneurs (Team Leaders)

At the level of a team leader, ownership of the role and the associated stakes grow significantly. Through experience and practice, they get an opportunity to build the vision of the organisation and play a significant role in shaping the organisation and its future. Over a period of time, these professionals will also play a strategic role in policy advocacy and networking in the development sector. They transform into development entrepreneurs and start working on larger issues with the many years of experience gained from the grassroots level.

Development Leaders (Programme Leaders)

The programme leaders, with solid experience in leading a theme or institution in DHAN collective, provide collective leadership to DHAN by taking leadership roles at various levels, and as members in working groups and committees to build collective wisdom and give collective vision for DHAN. They enjoy functional autonomy to take up the works of DHAN on a larger arena, which could be either vertical or horizontal or both in terms of scale. They emerge as development leaders and provide content leadership in respective fields of practice, which would benefit not only the themes and institutions in DHAN collective, but also other institutions in the development sector.

Processes and Mechanisms for Leadership Development

The three cornerstones of DHAN's HRD philosophy are:

- Individuals working in DHAN are valuable resources, who can make great impact in the society; hence there is a need to invest time and efforts in their development.
- There is a need to humanise organisational life and introduce human values in the organisation.
- Individuals in the organisation need to get self-clarity and prepare themselves as long distance runners in the development work to meet the challenges in the sector. They need to relate with self, their role, their team, organisation, society and the sector.

In this context, DHAN follows the practice of assigning senior colleagues as mentors / field guides to groom younger professionals. Young professionals, while working in unstructured situations such as those that they encounter when they are on the field, need personalised support, timely guidance, space for joint learning and reflection through direct action. They also need to apply their skills on the field so as to consciously build their competencies. Finally they seek advice and counsel to address their concerns. Field guides play a critical role in providing all of this and more, in order to transform young professionals into valuable human resources in the development arena. DHAN believes that each experienced individual in the organisation should play a guiding role to their team members.

Impact of DHAN's unique HRD practices

With unique HRD design and practice, DHAN has demonstrated that development professionals can impact the social equilibrium at the micro level, which would benefit the poor communities. The HR practices also ensure that the professionals stay in the development work for long time, despite the fact that the working conditions are harsh. DHAN has found that the young development professionals look for challenging work and adequate opportunities to be creative. Its HRD processes provide them both of these. Today DHAN has over 800 development professionals who strive hard at the grassroots level to bring about significant and positive changes in the lives of about 1.5 million poor families in

13 Indian states. Their basic skills and aptitudes related to fields such as agriculture, engineering, finance and management are utilised to establish linkages between people's organisations and mainstream institutions (such as banks) for livelihood promotion.

Innovation in Organisation Structure: DHAN Foundation and DHAN Collective

While DHAN remains a lean and seemingly centralised organisation working on evolving innovations and new themes, exclusive thematic institutions promoted for scaling up of innovations, community federations built on different themes, specialised centres created for assisting themes together form DHAN Collective. DHAN Collective is a creative concept to nurture and preserve the culture of collegiality, mutuality and solidarity promoted by DHAN. Shared purpose, core values and resources (human, financial and physical resources) bind DHAN Collective into a cohesive whole. DHAN as a mother institution guides, supports and regulates its family institutions to achieve their respective missions, policies and strategies, while adhering to commonly shared values, which are sacrosanct. Each institution is thus able to define its 'own unique' space, while attempting to create synergy.

The DHAN Collective opens up new leadership spaces within the organisation. For instance, the Kalanjiam Community Banking Program transformed into an institution, 'Kalanjiam Foundation'. Likewise, the Tank-fed Agriculture Development Programme has become Vayalagam Foundation within DHAN Collective. Both these Foundations have taken up the promotional role of scaling-up their respective models (viz., the Kalanjiam and Vayalagam models) of nested institutions and advancing those themes. In a similar manner, Tata-DHAN Academy is getting prepared to become an exclusive thematic institution. This institutional innovation would build effective and efficient institutions fostering excellence and integrity.

Organisation Design

The organisation design facilitates leadership development. The primary feature of DHAN is effective decentralisation, since systems are built around individuals. These individual leaders exercise autonomy and are encouraged to do so. This approach allows needed variation in implementing strategies. The inherent technological diversity and different contexts of work leads to increased specialisation, demanding more autonomy of functioning for such specialised groups. A 'one size fits all' approach will not work in the context of DHAN's work. Similarly, increase in size demands managerial specialities such as strategic planning, funds management and human resource development. These differences too call for differentiation.

While decentralisation is effective for involvement, speedy roll-out of local innovations and quick responses to local realities, it also poses some challenges, which include:

- Achieving economies of scale in areas where each unit cannot afford to develop expensive specialisations.
- Learning from one another to create a learning organisation.
- Giving sharper attention to common and important functions such as initiating and strengthening strategic linkages (with the state, national, international agencies), raising and mobilising resources, human resource development, financial planning, etc.

According to the differentiation – integration theory of management, the higher the degree of differentiation (specialisation or decentralisation), greater the need for higher order integration (or centralisation). This is the philosophy DHAN seeks to implement. However, the integration is more through hard-wiring the core values, core organisational purpose, etc. At DHAN, which is involved in innovative development work, integration of disparate groups is particularly difficult, because the tasks being undertaken are differentiated within the same person in addition to differentiation of tasks between groups or persons. Consequently, at DHAN, integration is attempted by the individuals, in addition to organisational mechanisms to foster integration. Given the primacy of Integration for effectively delivering on DHAN's mandate, Integration is achieved through the following levers:

- Paying attention and according high importance to the minimum 'central' functions
- Using various integrating mechanisms and
- Developing individuals as 'integrators' (through achieving differentiation – integration balance in their roles)

DHAN has been meeting the increasing challenge of differentiation-integration through innovative integrating mechanisms including, the strategic forum, and the consultative forum (consisting of team leaders), the retreat, as well as cross-locational temporary systems (such as task forces and working groups). These mechanisms, in addition to achieving integration in the organisation, contribute a lot to the building of leadership capacity among a large number of organisational members.

Innovation in Processes

Human Resource Development in DHAN deals with building 3Cs, viz., competence, culture and commitment. Competence can be built on a continuous basis in a culture, which puts primacy on enabling processes. DHAN promotes the culture of OCTAPACE, (an acronym that stands for: Openness, Confrontation, Transparency, Authenticity, Perseverance, Autonomy, Collaboration, and Experimentation). It continuously strives to nurture and build this culture within the organisation at all levels. DHAN practices the principles of self-learning and creates a learning environment to ensure systematic process of learning among individuals, teams and within the organisation. It has several mechanisms and enabling processes to reinforce the core values, which forms the basis of the unique work culture within DHAN, which are now briefly described.

Retreats

All the organisational members participate in the Annual Retreat. During this event each one reflects on their self to look back for analysing and drawing lessons for moving forward. This exercise reinforces the purpose of each one being in DHAN and mutually reinforces the organisational values and principles as a collective and as an individual. The retreat also reinforces the culture of collegiality. The retreat thus serves as a mechanism for recharging through the collective reflection of individuals.

Consultative Forum

The Consultative Forum is a mechanism for consultation in the organisation. Its members are drawn from the middle and senior management. The forum reviews the performance of all the programmes and is involved in planning as well. The forum transacts in a consultative manner and acts as a sounding board for the teams and for the program management. It acts as a grooming ground for second line leaders and builds their organisational-wide perspectives.

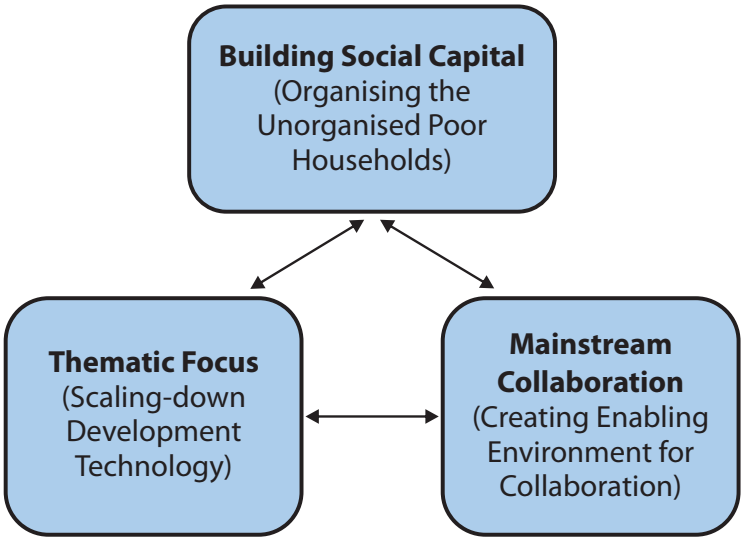
Strategic Forum

The Strategic Forum serves as a mechanism for integration, while providing strategic direction and leadership for the organisation. The forum consists of the Programme Leaders and the Executive Director. The purpose of this forum is to discuss, debate and decide on organisational strategies to steer and lead the organisation for sustained growth and to prepare the organisation to face the future with confidence. Decisions in this forum are made by a process of consensus. The Strategic Forum coordinates the various programs, offers strategic guidance, approves new initiatives, helps maintain the growth of the organisation, advocates policies, assists in networking with national and international agencies, and helps to build collaborations with mainstream agencies.

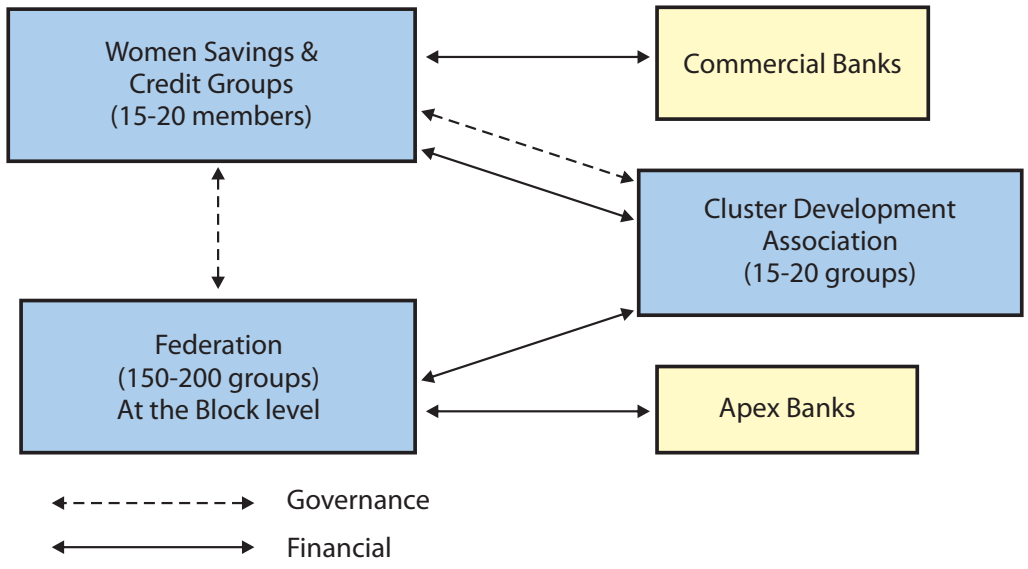
Deep Dive into Three of DHAN's Major Innovations

Overarching philosophy for DHAN's major innovations

DHAN follows 'Enabling Approach' and 'Institution Building Approach', which lay emphasis on self-help, mutuality, community ownership and control over resources and benefits, thereby the interventions, either in microfinance or water, are perceived as means and not



the ends. The ultimate goal is to build Peoples' Organisations using these inputs as vehicles of change and enabling them to sustain the efforts and results for the long-term, even beyond generations.



Localised Peoples' Organisations are built to enhance capabilities of the communities to handle the development processes and their outcomes for ensuring their entitlements by acquiring and enhancing their bargaining power. These Peoples' Organisations provide platforms for nurturing innovations at the grassroots, including scaled-down technologies and contextualising these technologies for addressing the issues of poverty. The Peoples' Organisations work in collaboration with the mainstream agencies and organisations, since such an approach would provide continuity for the work through local resource mobilisation and help the people negotiate and claim entitlements meant for them.

Building localised Peoples' Organisations forms the foundation of all the development themes being implemented by DHAN. These Peoples' Organisations are built on the themes such as Community Banking, Water, Rain-fed farming, ICT (Information and Communication Technology) and Coastal Conservation, among others. These programs graduate through distinct phases of institutional development.

Innovations in Microfinance

Organising the community for poverty reduction through Community Banking theme starts with **social intermediation phase**, wherein the poor women are organised into Self Help Groups (SHGs) after a thorough process of identification, formation, evolving bye-laws, nominating leaders by consensus. A typical SHG has a membership of 15 to 20 residents (either all male or all female) residents of a hamlet. Then these SHGs start with offering savings, credit and insurance (financial services) to the members. Members meet regularly to interact, understand each other, their needs, and priorities in addition to taking up financial services. This phase builds solidarity and basic systems in the grass-root level institutions. In this phase the poor families stop or reduce their dependence on the exploitative money lending system to which they were bound earlier. The SHGs come together at the Panchayat, Block, etc., levels, culminating into federations.

The next logical step is the **Financial Intermediation Phase.** Although financial services start in the previous phase itself, the SHGs now get linked with local commercial banks to mobilise resources for meeting higher amounts of credit needs of its members for strengthening existing livelihoods and initiating new livelihood activities to come out of the vicious cycle of poverty. The poor families who were in subsistence become self-employed.

In the **Livelihood Intermediation phase**, the Network Associations of SHGs and Federations facilitate both forward and backward market linkages. Collective bargaining through scale advantage becomes possible. Subsequently the SHGs and the Federations transform into Civic Institutions with specialised inputs and support to take up education, healthcare and village development needs. This is called **Civic Intermediation phase**. DHAN's role in promotion ends at this stage. Thereafter, DHAN would become a resource institution for support to these

Civic Institutions. Depending on the context, each phase would go on for 3-4 years.

DHAN as a promotional organisation channelises both human and financial resources for the creation of such localised institutions during the initial years. It helps to build the capacity of the SHGs and Federations to govern their own institutions, and gradually shifts roles to the community and becomes an advisor and mentor.

Impact of DHAN's Innovations in Microfinance

SAVINGS FIRST- Savings-led community banking

The Kalanjiams have exploded the myth that the "Poor cannot save". They have clearly demonstrated the success of the savings–led microfinance model. Savings bring equity and builds ownership by the people at the grass-root level. The savings that the members mobilize in their groups are again lent to members in need of credit to meet their consumption and production needs. Cumulatively, all the members in the Kalanjiams have a savings of Rs.365.80 crores in their institutions.

CREDIT NEXT-Credit for livelihoods

Kalanjiams provide timely credit to women, which has enabled them start business activities, have adequate working capital, have access and control over productive assets, be able to upgrade existing assets, make investment in new assets and to diversify into new activities. With their own savings and credit mobilized from banks (Rs. 869.29 crores), the poor women have generated credit worth Rs. 2091 crores for poverty reduction. 64% per cent of the total loans were deployed towards asset creation and livelihood promotion.

INSURANCE MUST: micro-insurance for addressing vulnerabilities

This is another critical input that addresses the multiple risks and vulnerabilities faced by the poor families through insurance products for life, health, crop and assets. The scale at which the Kalanjiams operate in 13 Indian states has helped design and implement mutual solutions on their own as well as through the mainstream insurance providers. Micro-insurance initiatives have helped reach some four lakh poor families with an annual premium of Rs.40 crore to provide a risk cover to the tune of about Rs. 1200 crores during 2013-14.

PENSION, THE BEST: micro-pension for the aged

DHAN has evolved a micro pension product to demonstrate that the poor can save for their pension. The micro-pension initiative in DHAN focuses on pension literacy to the poor, creating a working model of old age income security, networking and policy advocacy on micro pension. The micro-pension product is offered by 26 federations spread across four themes and four states, benefiting 26,000 women.

Communities meeting the cost of management

By contributing savings and sharing the cost of management, the poor women gain stake in the development efforts, which in fact elevates their self-esteem and brings them ownership. It provides them with legitimacy and voice for their access and equity within and outside their institutions. From the day of inception, the SHGs and Federations start managing their costs and attain financial self-reliance in 5-6 years. Contribution of the poor women to make their institutions financially self-reliant stood at Rs. 67 crores in the past 10 years, which is 33% of the total cost of managing these institutions. As on March 2014, 115 out of 175 Federations have moved towards 100% self-sustainability.

Connecting poor women with the banks

The Kalanjiam Federations have brought the advantage of scale to the banks with a large clientele base in rural areas and made many rural branches vibrant and profitable, and DHAN has proved 'banking with poor is a viable business proposition'. The Kalanjiam Groups have been successful in establishing and nurturing viable and sustainable business linkages with 322 branches of 36 commercial banks. All the Kalanjiams were collectively able to mobilise credit to the tune of Rs. 869.29 crores.

Transparency and accountability

The Kalanjiam Federations facilitate auditing of all the Kalanjiam Groups and disclosure of financial progress to all the members as well as monitoring development and equitable distribution of benefits to everyone. All the meetings held in primary groups and networks are open and decision making is carried out by the consensus of everyone.

Addressing civic needs of the communities

The Federations have started addressing issues pertaining to the quality of life of members, which includes housing, sanitation, and access to electricity, education for their children and healthcare for the family. The Kalanjiams in Madurai, Theni and Salem in Tamil Nadu have established community-managed speciality hospitals that together serve about one lakh member families with the backup of health insurance. The Kalanjiams have deployed 20% of the loan to improve their housing and sanitation. With specialised loan products, 7% of the member families have been supported to get access to electricity connection to their homes, which has considerably enhanced their quality of life.

Creating space for community leadership

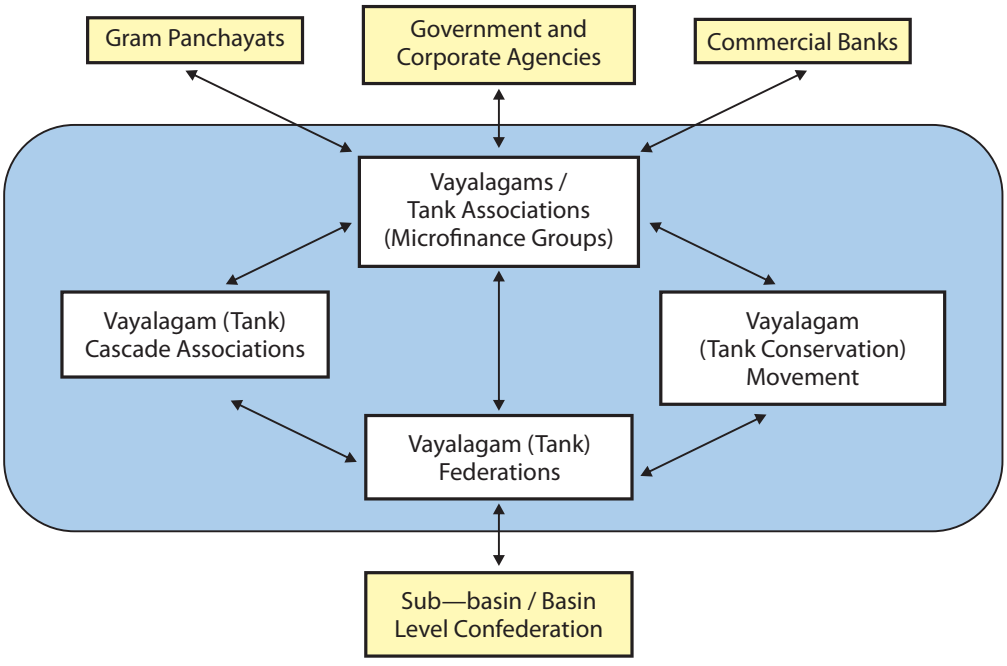
The Kalanjiams and their nested institutions have provided opportunities for the women from poor families to take-up leadership responsibilities and created enabling environment to help them unleash their leadership potential. Leadership rotation and graduation mechanisms expand leadership opportunities in the Kalanjiam institutions. Over 1,50,000 women are currently holding various leadership positions, starting from the primary groups at village level to the Kalanjiam movement at the national level. An equal number of leaders have occupied leadership positions in the past in these organisations, and they continue to guide the present leaders. Thus, unleashing the power of three lakh leaders from the grass-roots has been a phenomenal intangible contribution of DHAN.

Innovations in the Water Sector

More than two decades of intensive engagement of DHAN at the grassroots level in conservation and development of small scale water resources has helped build a community-led water conservation model. Started as an action research project in 1992, the Tank-fed Agriculture Program of DHAN has expanded its approach of working on isolated tanks to tank-based watersheds, reviving chains of tanks in minor river basins to multiply the impact of the renovation and restoration works. DHAN has also evolved scalable models for inland fisheries development, creation of drinking water ponds, as well as low cost and household level water treatment methods.

Impact of Innovations in Water Sector

Promoting Community Governance in Water Resources



The activities under this innovation include: organising the farmers and labourers dependent on each tank into *Vayalagam* Associations, networking them at the cascade level (chain of tanks linked hydrologically) and federating them at the block or district level to take up conservation drive on the large scale, as well as building alliances with private, public and non-profit organisations working on tank systems. So far DHAN has promoted **3800 Farmers' Associations** by organising **282,381 small and marginal farm-families** dependent on tanks in six Indian states, viz., Tamil Nadu, Karnataka, Andhra Pradesh erstwhile, Bihar, Odisha and Puducherry. At each level of the Farmers' Federation, leaders emerged from among the local communities. The organised farmers now work tirelessly to rehabilitate waterbodies in their villages by contributing their money and labour.

Augmenting Storage Capacity of the Tanks

Through the Farmers' Organisations, DHAN facilitates rehabilitation of tanks for not only restoring the physical structures to their originally designed standard, but more importantly, facilitating the proper maintenance of the tanks, efficient water management and implementing improved cropping practices in a sustainable manner.

Enhanced Access to Water for Farming

DHAN has facilitated rehabilitation of **2000 tanks** by mobilizing **Rs. 580 crores** from government and private organisations, and individual philanthropies, and sharing **Rs. 125 crores** as community contribution through cash and labour. Rehabilitation of irrigation tanks to their original storage capacity increases availability of water for more area for cropping. Through these renovation drives, **81,665 hectares** of command area have been ensured with water through the rehabilitated tanks, thereby stabilizing agricultural production.

Tank-based Watershed Development

An individual tank with its own catchment, water spread and command area is an integral part of a watershed within which it is situated. A cascade of tanks forms a micro-watershed by itself as the tanks are interlinked, often by a common stream or by the surplus water of an upper tank feeding a lower one. Over the last two decades DHAN has been constantly advocating inclusion of tanks in the conventional watershed treatment plan. Started on a pilot basis in Chittoor district of Andhra Pradesh erstwhile in 1997, the tank-based watershed model demonstrated its impact, which has made the Government to include it in the revised guidelines for watershed. DHAN has taken up development works in **100 Watersheds** under various Central and State Government Schemes benefitting **75,900 hectares** of land.

Farm ponds for life-saving-irrigation

While the tanks serve irrigation water needs of the farmers in the entire command area, creation of farm ponds would supplement the irrigation needs of each farm, creating space for the farmers to go in for diversified cropping. Besides irrigation, the farm ponds are used in multiple ways such as fodder production for livestock, raise vegetable crop on its bunds and for fish rearing. DHAN has supported over **5000 farm families** to construct farm ponds in their fields to provide life-saving irrigation to crops during critical phases of water need, thereby securing their livelihoods.

Creating Access to drinking water

In the water-starved southern region of Tamil Nadu, where the ground water is saline and unfit for drinking, harvesting and storing the rain water is the only way out of this otherwise intractable situation. In this region, through Vayalagam Associations, DHAN has supported the revival of age-old practice of constructing ponds for drinking water, domestic purposes and for animals. Drinking water ponds have been constructed in **300 villages**, and over **120,000 people** now have access to drinking water.

Sanitation and Safe Drinking Water

Next to ensuring access to drinking water, DHAN addresses the issues of quality of drinking water, as more than 80% of the diseases among the poor communities are attributed directly or indirectly to unsafe water, for which at least 25-30% of family's income is drained towards healthcare expenses. DHAN promotes low-cost household water treatment technology like bio-sand filters, benefiting about 15,000 poor households. During 2013-14 alone 9,112 households were assisted to construct toilets with financial assistance of Rs. 157

crore and another 1,895 families were assisted to install household tap-water connection with the assistance of Rs. 19 crore. Both these interventions have benefited 51,200 people.

Endowments for Sustainable Management of Water Resources

DHAN has made an institutional arrangement in the form of endowment funds at each Tank Farmers' Association for the sustainability of the association and for future maintenance of tanks. With the support of traditional philanthropies like Sir Ratan Tata Trust (SRTT), Mumbai, DHAN has mobilised Rs 10 crore as Endowment grant to 500 Tank Farmers Associations, which was matched by the community with their contribution of another Rs. 10 crore. The income from the secured investments of Rs. 20 crore is used for maintenance of tank structures after their rehabilitation by the local-level Associations.

Innovation in Building Human Capital for the Development Sector

Human capital is central among all the other forms of capital, as the capacity and capability of a person determines how best the other forms of capital such as physical, financial, natural and social capital are put into appropriate use. Social capital is the manifestation of human capital, where the enabled human resources come together and help each other to achieve the common purpose of poverty reduction. DHAN values human capital as the prime mover in sustaining for generations the institutions built by it. As an HRD organisation, DHAN has created exclusive institutions to work on building and disseminating knowledge by way of educational and training programmes, not only for the themes within DHAN, but also to educate other stakeholders including NGOs, Banks and various governmental agencies.

Tata DHAN Academy

The Tata-Dhan Academy, an institution for Development Management, is the result of a partnership between the DHAN and Sir Ratan Tata Trust, Mumbai. The Academy offers a two-year postgraduate program in development management (PDM). The emphasis is on the principles of 'practitioners to teach', and 'learning and building knowledge' through action-reflection-action mode and on building high quality techno-managerial competence supported by appropriate motivations, values and attitudes to work with people, particularly the disadvantaged. It has created space for enabling both seasoned and budding practitioners to use the knowledge and disseminate it to other organisations and educational institutions, as well as apply this knowledge to further the mission of DHAN. It has promoted specialised centres to work on mutual insurance, disaster risk reduction and water issues. The Academy anchors Madurai Symposium, a biennial event, which functions as knowledge building and dissemination platform.

DHAN People Academy

DHAN's strategies of promoting people's organisations are centred on building capacities of leaders, members and staff. The DHAN People Academy was initiated in 2003 to create an enabling environment for the field workers and peoples' leaders for learning. The Academy facilitates learning, building on the experience available, and participant-centered education. It lays high emphasis on building appropriate attitudes and skills for the field staff drawn from various people institutions and in developing leadership in community-based people institutions. DHAN People Academy offers a number of short training and exposure programs for leaders and staff on various aspects of Peoples' Organisations.

District-level DHAN Resource Centres

The prime feature of DHAN is effective decentralisation, since DHAN strongly believes that systems are built around highly motivated individuals. DHAN has 40 regional offices across the countries that are anchored by team leaders. Each regional office works through 5 to 8 federations. The federations are managed by project executives from DHAN. The regional offices exercise autonomy and it allows needed variation in implementing various strategies. The regional offices also serve as DHAN Resource Centres (DRCs) to impart training at all levels including to community members, leaders and field associates. They also offer structured training programs to other NGOs.

The Journey Continues

Two decades of DHAN's journey in fulfilling its mission of building institutions for poverty reduction

centered on human capital has resulted in a number of innovative and proven processes and methods in the realm of institution building. All its innovations such as community banking for addressing the issues of poverty, rebuilding community governance in water resources, preparing motivated professionals for working in the development sector, hardwiring values and ethics in all the organisational members, etc., have been tested for their results, adaptability in different contexts and have been demonstrated on a large scale at the national level. DHAN continues to guide and motivate the institutions built by it, through constant innovation, in order to find new ways to enhance the rigor and impact of their work.

In the next five years, DHAN has planned to reach two million poor households by organising them into 500 independent peoples' institutions and move half-a-million households out of poverty by enhancing their livelihoods. It aspires to build and share knowledge through networking and impact policies from the learning generated by large scale community-led practice. DHAN, as a learning organisation, would continue to focus its efforts in finding new ways of working to enhance the impact of its work on the community, forge new partnerships to scale up its innovations, as well as continue to attract and groom motivated young professionals for grassroots development work.

Lessons from the Innovation Journey of DHAN

Building capacity to innovate

Achieving scale in growth needs substantial investment in human capital. This necessitates strengthening of local capacity to innovate both in methods and processes, while implementing a program. Innovations in processes will often influence innovations in coming up with new to the world products. Communities and people institutions, when empowered and exposed to a wide range of best practices, can adopt and adapt practices that are best suited to their contexts.

Partnerships yield synergy

DHAN cherishes collaboration as its core value because the collaborative process enables the partners to combine their complementary knowledge, skills, and resources, making it possible to accomplish much more than efforts of any single organisation can achieve. DHAN partners with a wide range of public and private institutions including banks, insurance companies, government agencies, private organisations and corporate bodies. The development of partnerships is a continuous process, which demands active participation from both sides that is founded on trust. Effective partnerships foster continuity, consistency and sustainability of any developmental effort in any sphere.

No ready-made blue prints and quick-fix solutions

Often, managers expect immediacy of results, quick-fix solutions and highly visible impact very quickly, preferably the very next day after any innovative initiatives are launched. This is also true in the development field. This myopic approach limits long-term and focused interventions that are built on social capital. There are no universal solutions that are applicable across different contexts. It is in this context that processes become very important. In the context of social development, this becomes even more true, as there are often diverse stakeholders, often with disparate objectives, whose interests have to somehow be made to converge, which requires enormous patience on the part of those driving the innovations. Scaling-up of innovation should, therefore, involve multiplication through adaptation, and not by mere replication.

Community Governance and Professional Management

DHAN's model of community governance is grounded on the principles of self-help, mutuality, transparency, ecological consciousness, gender sensitivity, self-reliance, collaboration and collective action. Following democratic practices at every stage of the decision making forms the foundation of community governance. While the governance rests with the communities to preserve their identities and ensure democratic practices, management of those organisations require state-of-the-art systems for planning and coordination, financial and logistical management, technological interventions, as well as for research and development. All this cannot be done without strong professional support.

3Cs (Culture, Competence and Commitment) Matter

DHAN believes that shared vision stimulates peoples' aspirations and builds resilience to rise to the challenges. This vision is driven by culture, competence and commitment of the staff to take up development as a way of life rather than just a profession or merely as a job. It develops homogeneity in thinking and opens new vistas to the staff to identify, generate and act on their development innovations. It reinforces their personal responsibility to work for collective growth. It involves meaningful dialogue, debate, and discussions in an effort to solve the problems that arise in the course of implementing a development theme.

***M.P. Vasimalai**, Executive Director of DHAN Foundation is a post graduate in Agriculture and a management graduate from the Indian Institute of Management, Ahmedabad. He has over three decades of experience in development work and one of the key people in setting up PRADAN. He was instrumental in setting up DHAN Foundation in 1997. He has specialised in community organisation, designing development interventions in the fields of natural resource management, livelihood promotion and institutional development. He has travelled extensively within and outside India and has participated/ presented papers on these themes. He is also holding various positions in national and international forums, working groups, task forces and missions of Central and State governments. His areas of interest are institution building, leadership development and promoting various development themes for poverty reduction.*

***P. Krishnamurthi** is a graduate in Agricultural Sciences, and post graduate in Psychology. He is presently leading Centre for Development Communication in DHAN Foundation. For the past 18 years he is involved in promoting information and communication as a tool for development through designing communication packages for enhancing field action and facilitating policy advocacy in the thematic interventions of DHAN. He is currently engaged in promoting community owned and managed media centres with a mixed model of ICT based village information centres, community radio and community video . He is in the network of various development communication initiatives in the country, actively involved in promoting community radio. He is the anchor of Development Film Festival organised every year at Madurai. He teaches courses in Communication for Professionals. His areas of interest are alternative media, development journalism and campaigning on development issues.*

INVITATION FOR CONTRIBUTION TO THE LDA JOURNAL OF MANAGEMENT

Theme for the 8th issue

Gen Y in the workplace

"The philosophy of the school room in one generation will be the philosophy of government in the next."

— Abraham Lincoln

Irrespective of the Corporate entity you are in, the chances of youth / Gen Y forming majority of your workforce is increasing. These youngsters, full of energy, hopes and dreams are optimistic about the future. They have the advantage of being tech savvy.

Filled with new ideas and, more importantly, the understanding of how to put them into action, they have a bright and innovative vision for the future. Given the right opportunity and supportive environment at the workplace they will use their full potential at the workplace and catapult your business into a new era.

Considering the fact that Gen Y can be a fantastic asset to your business, through the next issue we would like to bring forth to the readers your views on the "Power of Youth in the Workplace".

Considering the importance of the topic we invite the readers to contribute articles to our next edition of the journal.

While not limiting, we suggest the following themes:

1. Managing Generation Y in the Workplace
2. Generations in the workplace
3. Any other theme on the topic the readers may have …

Guidelines to authors

Contents & writing style:

1. Articles should be original work of the author(s) written in professional style (similar to a white paper or working paper) with proper acknowledgments and references to original sources.

2. The article should focus on the practical aspect of business theory and implications for real life business situations.

3. Incorporation of managerial experience & opinions, analysis of case studies, applied research studies, literature reviews, concept analysis, and book reviews would be welcome.

4. Recommended length of the article is 4,000 to 7,000 words excluding charts, tables and other graphics.

5. Article should be typed in Times New Roman font size 12, with 1.5 line spacing and with margins of one inch on all sides.

6. The language used in the article should be lucid & clear. The writing must be concise and sentences should be short. It should be free from any bias including gender bias.

7. Authors should avoid passive voice. Use of active verbs is recommended to keep the article lively.

8. Authors should limit the levels of headings within an article to two or at most three. Avoid lengthy headings and do not number the headings

9. Use single quotation marks, reserving double quotes for quoted words within a quotation.

10. Consistency should be observed in hyphenation.

11. Avoid use of footnotes and or endnotes. If imperative, they should be numbered in the text superscript for. eg. MBO2 and provide them together under the heading NOTES at the end of the article. (NOTES should be used only for foot/end notes should not be used for citation of references).

12. Wherever possible, key issues, theories, methodologies and other background material or collateral nature and case illustration should be present in a box to highlight their importance as well as to ensure they do not interfere with the flow of main text.

13. Use of figures, charts, tables, diagrams will be appreciated and they should be in black and white in colour. They should be serial numbered, sequentially (using Arabic numerals with a brief title and labeled axis) following references to them in the text. Indicative references to the exhibits may be provided in the body of the text at the appropriate places and may be numbered consecutively. Illustrations are also welcome.

Submission Of Articles

1. The soft copy of the manuscript should be sent in MS word format to the under mentioned email ids:
   Rajashree.chakraborty@larsentoubro.com
   Preeti.menon@larsentoubro.com

2. The contact person is Ms. Rajashree Chakraborty and the contact number of LDA is 02114-302211.

3. The contact person at Powai is Ms. Preeti Menon and the contact number is 022-67053942 .

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