ISBN : 81-87053-57-9
Synergy of R&D and Marketing

Identification of Novelty in R&D

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Abstract : Most inventions originate from novel and simple ideas. These ideas which are raw to begin-with are nurtured and nourished by R&D organization before they are tried on a large scale. However, all such ideas may not lead to commercially successful products. Hence there is a need to correctly identify the novelty of an idea before it is commercialized. The paper analyzes some problems associated with the identification of novelty and suggests important criteria that help in transforming novelty to commercial success.

Keywords : *Novelty identification, R&D Management, Idea evaluation, Logic of creativity.*

INTRODUCTION

creation of something that did not exist before is the prime goal of any research establishment. This could be a simple gadget , a complex machine, a new material or product of commercial value. The motivation for invention comes from prospects of monetary gains. This also serves social needs and makes life easier and comfortable. Most inventions originate from novel and simple ideas. As and when such new ideas evolve patents are filed. These are legal document to stop unauthorised use of such ideas for commercial exploitation. Success in R & D is often judged by number of inventions. Every year a large number of patents are filed all over the world. Majority of patents originates from an organised effort on the part of a few establishment or organisation. They have their own ways and means of inviting report by an expert committee are selected for funding. Socio-economic factors are the prime consideration for such

selection. A few amongst these may result in patents and still fewer may be commercially successful.

There are many instance where bold decisions to promote new design and material have led to engineering disaster. Like wise there are cases when the then acknowledged experts failed to judge potential of new ideas which later proved to be highly successful. The problem arises from the fact that the novelty of an idea is judged by either our current knowledge on the subject or proven track record of the potential inventor. Although the limitation of the existing system is well known it is extremely difficult to find an alternative. Possibly a close examination of the past success and failure of the evaluation system in identifying novel/creative ideas may give us a clue.

Ideas are like diamonds- in its raw state it is not at all beautiful. It is the skill of the cutter that reveals the beauty of diamond. Likewise we need someone or a group which could assess the potential of an idea, decide if this is worth pursuing and take necessary steps to make the idea work. Apart from generating new ideas- which can be done by organising discussions to promote creative thinking it is necessary to set up an evaluation system to identify ideas that would work. There is a general belief that novel ideas are those which would draw attention of everyone. In reality it is rarely so. Efforts are required to make them work.

There are four important criteria based on which ideas are selected. It needs to be seen if this is going to bring any benefit to the organisation. Research establishment can no longer continue to function on public fund. There will be incresing demand to make them self-sufficient. There are many instances to show how R & D can turn inventions into industry. Therefore this should be first criterion for selection of an idea. True that ideas, which are likely to bring high benefit, suffer from high risk. This should not be a deterrent for pursuing a bright idea. The idea may be valuable but it may not be beneficial. The value resides in idea, whereas those, affected by the idea enjoy benefits. One needs to examine on what does this depend. What is the durability of benefit? How are the benefits derived? If benefits are attractive we should ascertain what efforts will be required to make it work. Does this vio-

late any regulation? Does this need new technology to be developed?

Next come resources. Do we have them? Often resources required to implement a new idea is grossly underestimated. We need to consider if there are any disruption cost-if attention from ongoing projects is being diverted. In case resources are not available decision is simple. Do not pursue it further.

We also need to see if the idea compatible with the policy, strategy and objective of the organisation. Do we have the people who could undertake the tasks? Are they motivated? The difficulty is that only traditional ideas seem fit for an organisation. It is difficult to get work. If so then see how much effort is required to make this fit. Try to imagine what is best environment/ set-up, which could make this work. Examine how the existing system differs from the ideal one.

Great inventions are outcome of novel ideas given shape by scientists and technologists. Most of us are familiar with the success stories of great scientists. We read them for inspiration and try to follow them to give shape to our imagination. Rarely do we realise they may have miserably failed in many ventures. Thomas Alva Edison, one of the greatest innovators of many scientific equipment made a telephone that never worked. This had a cranking system that was too noisy. Voice transmitted was masked by noise. This shows that all ideas coming from people who are known for their creative skill are not worth considering. All novel ideas may not result in success.

A new idea must compete with other possible ideas. This has to prove its worth. This must go through a preliminary evaluation. This is a part of the creative process that helps shape ideas, makes them better and presentable for further evaluation.

All ideas go through an evaluation process. This is a part of assessment, judgement and decision on the part of the organisation. No disaster is attributable to creative thinking. Whenever disaster occur it is attributed to poor assessment of creative possibilities. However there could be exceptions when one deliberately decides to support creative ideas with high potential and high risk. Nevertheless those which seek to enter this category

must be differently evaluated. A new idea may take only a few seconds to evolve. Yet the evaluation procedure can be long. This is justified because it this procedure that covers the risk. The result of hasty decision to use novel alloys to cut down the weight of commercial aircraft flown by jet engine is well known. Comet aircraft introduced in early fifties met several fatal accidents, which were later found to be due metal fatigue. A new high strength aluminium alloy was smaller than the rivet heads used to join the sheets to build the fuselage. This did not deter aircraft industries from investing more resources to innovate new materials, new design procedures and new methods for stress analysis, new evaluation techniques and test procedures to turn this into one of the safest and efficient mode of public transport.

Often we adopt a point system to evaluate and identify novel ideas suitable for the organisation. This procedure does not clearly reflect strength and weakness of the idea. Nor can we ascertain its usefulness. An alternate approach could be to group them according to their merits so that it is easy to arrive at a decision. Possibly these could be grouped as Directly usable. Good but not for us, Good but not now, needs more work etc. Some may be put as Powerful but not usable e.g. those not meeting environmental regulations, those that amount to cannibalisation of exiting product: ideas in this category should be preserved and reviewed occasionally. There may be a few that could be interesting but unusual. They may have has stimulating & creative value even if never used. Some may be of weak value: workable but has low benefit. Responsibility is on the part of the group or the person who has proposed the idea to show it has high value. Some idea may attract attention because of high novelty. But full evaluation may show it is weak. We must be careful from unworkable ideas: those having fundamental impossibility. They must be rejected. Creative indulgence should not seek to keep such ideas alive.

Frank Whittle patented in 1930 a new idea of a jet engine. This was to be built for high speed and high altitude flight where normal piston engine will not work because of cold and thin air. The idea was indeed attractive. However it could not be built because material which would withstand the temperature were

not available. An expert committee was set up to suggest necessary steps to taken to develop such an alloy. This committee looked at all the possibilities and concluded that with the then available techniques it is impossible to make an alloy which can give the thrust per unit weight expected out of it so that the engine could fly. Thus the committee felt that the idea is not worth pursuing. However within a year of its report jet engine did fly in 1939. The material used was nickel base alloy made by Mond Nickel Company.

Directly usable ideas also need to be tested. This is necessary to build basis for support. Test results may be more motivating than an idea on its way. In 1856 Henry Bessesmer made public announcement of a new process which reduced eventually the price of steel to one fifth of its former cost. This also made possible to produce steel in large quantities. His proposal involved blowing of air through molten iron to burn away impurities - an idea that must have appeared fantastic and dangerous to the then iron manufacturers. His initial attempts to produce steel resulted in brittle products full of blowholes. A suggestion from his Robert Mushet to add an iron-maganese alloy called Spiegeleisen before it was cast into ingots did the trick. This quietened the wild steel and reduced blowholes and prevented brittleness. So much so that this continued to be the main steel making process for over a century. Later the problem associated with nitrogen pickup in steel was overcome by blowing pure oxygen in place of air. But this could be possible only with the availability of tonnage oxygen at reasonable cost. Often idea to develop new process and innovation comes from local constraint. Successful operation of Bessemer process required presence of 1.8% phosphorus in iron to obtain necessary increase in temperature. However by blowing oxygen iron having lower phosphorus can be converted to steel. No wonder this innovation came from Linz and Donaitz in Austria where the available ores have lower phosphorous.

There is a general feeling that creativity is a natural talent. Some people have it others do not have. There is nothing you can do about it except to employ people who have this natural talent. Remove inhibition and fear so that they can mess around and something useful will happen. There are historical anecdotes

to support such beliefs.

The discovery of stainless steel is well known. In 1913 Harry Brearly of Sheffield was experimenting with alloy steel for gun barrels. Amongst the samples he put aside as being unsuitable was one having 14% Cr. Few months later he saw in the pile of scrap most of the test pieces had rusted except the chromium steel. This was still bright. This led to the development of stainless steel as typified by our present day cutlery.

Do we need to wait for such accidents to happen for innovation? Can we not promote occurrence of such incidents? The current thinking is that proper training does improve creative skill of people. In most of the successful organisations such training has become a common practice. This helps a group to evolve a novel approach to solve current problem facing their organisation by collective thinking. This does not mean that everyone going through this exercise will become a Sachin Tendulkar. However for training to succeed we need willing students, skilled teachers and proper method. Just messing around and encouraging people to have crazy idea may not be good enough. We need to under stand the logic of creativity. There are specialists, who offer formal training in lateral thinking, which is a specific and deliberate approach to serious creativity. There are programs for training trainers to be able to pass on the skills of lateral thinking to their students. In order to promote generation of novel ideas and their successful implementation there is a need of proper training. The right expert should offer this to the right people. In a meeting to promote creative thinking to solve a specific problem, provocation often help generate innovative solution. Suppose we were considering river pollution. Someone puts forth - "the factory should be down stream of itself." This is a provocative statement, which would seem utterly impossible. From this comes the concept of input and output of the factory. It is normal for it to draw water from upstream and release effluent into downstream. This suggests if a factory is built on a river the input must be downstream of the output so that the factory is the first to taste its own pollution and therefore be more concerned to minimise effluent pollution. In hindsight the idea is perfectly logical. Today we do hear about new technologies being implemented in industries to achieve zero emission.