



Creativity, Innovation and Invention: A Corporate Inventor's Perspective

By: Art Fry

In February 2002, I was invited to attend the CPSB forum entitled "The Spirit of Invention." I was asked to give a speech that focused on my experiences and insights as an inventor in a large company. I attended a majority of the forum and can say it was an enjoyable and worthwhile experience for me. There were many rich and lasting connections I made with an array of dynamic people, who all had an interest in creativity. I was especially pleased to hear the presentation of another inventor, Dr. Wilson Greatbatch, and to be able to connect with him as an engineer, inventor and dreamer.

I was introduced to the individuals of CPSB through Kimberly Johnson who is one of my co-workers at 3M. She has been qualified to use the creative climate instrument known as the SOQ. Kim is one of the true creative sparks inside 3M today. I am glad we have been able to share our thoughts and experiences with each other through the last half dozen years. Plus, she likes my omelets!

Through this article I'd like to share my personal views on the process of creativity, invention and innovation. A broad set of topics which others have written books about! As such I will continue this topic in a future Communiqué.

An inventor's beliefs

In developing my presentation for the forum, I went back over my experiences and thought about what some of the drivers of my career in 3M had been. From this collage of thoughts, feelings, learnings and experiences I then tried to look at the essence of what invention is and why I, individuals in 3M, and perhaps individuals throughout the world choose to invent.

In this article, I will discuss the fact that to have successful inventions, you have to do things for the "Right Reasons". "Right Reasons" can involve spirituality or moral principals or the fact that a successful society is based on people who are mutually dependant on each other. People who must operate with a balance of consideration of the needs of others as well as self-interest. A dynamic balance, but one that must be maintained. My experience shows that systems fail when they get out of balance. Corporations fail when they lose their wisdom and forget to balance innovation and daily operations.

In my mind a productive way to begin to answer these questions was to first look at my perspectives on humanity in general and the relationship we have to our world. It is my belief that all species have had to evolve and adapt to find some niche in the world that they can inhabit. It takes hundreds of thousands of years for other animals to evolve and adapt their bodies to inhabit a new domain. For example, longer hair, fur or body fat that makes it possible to live in colder regions of the globe. Different digestive systems to eat different foods that must be obtained in different ways. Long necks on giraffes to reach tree leaves or the long fangs and claws of lions to capture and kill prey are other examples.

Before I go further, I should probably provide a bit of explanation as to what I mean by the words adaptation and evolution. To me, adaptation is the change a species makes to fit into different environmental conditions. It is a change of structures, forms, or habits to suit environmental conditions. Adaptations can be inherited within a species and promote increased rates of reproduction and survival. Individual organisms may adapt, but it is more common for it to occur over a couple of generations. To me, evolution is a change in the properties of populations of organisms that always transcends the lifetime of a single individual. Adaptations promote evolution because those that survive produce offspring that naturally use the adaptations and build upon them.

Humans are the most adaptable of all species on earth. We survive in the world through adaptation. Over thousands of years our brains have evolved to the point that now our brains and minds rather than our bodies can adapt to living and obtaining food in most places on the earth. We make clothes to protect us from the cold. In previous centuries, we made tools, like spears and guns to make up for weak bodies and lack of teeth and claws. Perhaps most importantly, we learned complicated communication patterns that allow us to form coalitions to do things as a group that we cannot do individually.

To me, humans are symbiotic beings that are dependant upon each other and the other creatures and resources of this planet. As humans we are social beings and we 'group' in a number of ways that include families, tribes, teams, organizations and social or legal institutions such as marriage and partnerships. It is through communication that our minds have been able to evolve as we create and pass new knowledge from one generation to the next. It is my belief that humans are also evolutionary creatures. As evolutionary creatures, we have a natural disposition to be able to adapt to our surroundings while at the same time we attempt to control and modify it to be more tolerable for us and to ensure our survival now and especially for our children. We do this through our capability to be creative, innovative and ultimately as inventors of newness designed to fulfill a dream, address a challenge, solve a problem or realize an opportunity. These

are the “Right Reasons” to invent since they lead to a better society and world when they are based upon the desire to help and not hurt other humans.

Now I’m sure natural and social scientists (e.g., Edward O. Wilson, Gregory Bateson, Barry Lopez, Murray Gell-Mann, etc.) could provide a richer or more eloquent summary of these thoughts about adaptation and evolution. Simple as they are, these are the thoughts and beliefs that have helped me understand my purpose and worth in this world and have created my ability to survive through adaptation.

Post-it® Notes

I know most of the people reading this article have never met me, but we have had a relationship. I may have invented Post-it® Notes, but if individuals like you hadn’t started using them, they would just be a lab curiosity and not the office tool that they are today. To me, Post-it® Notes were a product innovation. They were developed from a combination of three areas (i.e., paper, tape and adhesives) of interest within 3M. I was able to combine these into what you now know as Post-it® Notes. They became a new tool for you to use. They let you do things like organize, remind, and communicate with greater simplicity and reliability than before. Thus, it allows you to be more effective and yes, I could mark my hymnal easier!

Now let’s move to my definitions of creativity, invention, and innovation. So are Post-it® Notes a creation, an innovation or an invention? To me they are all three and let me explain by first providing you my personal and working definition of these three concepts.

What is the difference between creativity, invention, and innovation?

As I define it, creativity is novel ideas that are communicated, useful, and appealing. Creativity occurs when an individual visualizes a new pattern in their mind. It is the ability of the mind to recognize these new patterns and to generate new patterns that create the basis for a new product or service. It is the ability of humans to then communicate these patterns to other humans. When I had the idea for making a bookmark while singing in the church choir, it was a creative idea, but not an innovation. Typically, creativity is a fuzzy idea and can’t be clarified until it is made into a prototype, where you can touch it and test it

and show it to others. At this point the creation becomes an invention. Thus I define invention as the stage where a creative idea has been reduced to practice.

When I made samples of bookmarks, gave them to others to use, and had tested them carefully; when we put them on the store shelves for sale, they were still not an innovation. They only became an innovation when people like yourself, bought a pad, used it up, and bought a second pad. By then you had changed your habit pattern and adopted it into your life.

People hate to change. However, innovation is about changing a pattern for doing something. We work very hard and study a long time to learn patterns. Sometimes we follow them even when a better plan or innovation is right there for us to use. You only change when the perceived pain level gets high enough.

Innovation is a new pattern or path or even paradigm that is adopted by an individual or a society. It is where the customers change their old patterns and use the new product. An established pattern that you adopt. A path that was right there all along, but it was new for you and an innovation in your life. A new product that you start using, like Post-it Notes. You become part of the innovation. It can be a new course that changes your work. A new pattern that you create that may affect only you, or your peers. Where you encounter and solve a problem that everyone else stepped around, because it took extra effort to fix. A new pattern that affects the lives of many people. This can be something that an individual does, or most often, the work of a group of people, ---working in concert,--- infected with the same vision and goal.

For 3M, innovation is the act of working through all of the obstacles and problems in the path of turning a creative idea into a business. It is complete only when everyone affected by it has worked through their problems. This means raw material suppliers, 3M management, the distributor chain, and the customers. This can mean a lot of learning and hard work for everyone concerned. Creativity is that 1% inspiration that Thomas Edison spoke of and invention and innovation are the 99% perspiration. There must be barriers for the customers and we must have ways to overcome them. What we sell is our skill in overcoming barriers. Barriers for others become our strength. Both as corporations and as individuals, we make a living by supplying products or skills that are valuable to our customer. If it were easy, our customers would do it themselves. The more difficult or undesirable the task, the greater the reward. We may be the first to do something, but if it is easy, we just invite a lot of competition. The trick then is to make products with barriers we can get over but our customers or competitors can't.

Innovation Wisdom

You are involved with innovation in one way or another, and it is only natural to be curious about other innovators. "What are the lessons that they learned? How can I use those lessons to solve my problems? Is there a way to become a more successful innovator?" So perhaps one of the reasons you are reading this article is to gain new information about trends or opportunities or land mines to avoid. You are reading this perhaps with the hope of gaining wisdom. You know that life in general and management in particular demands wisdom.

To me wisdom is the ability to see the connections between things that you previously thought were not connected. We see that something we do for good reasons, can have unexpected good or bad effects on other things. Sharing that wisdom helps others to replicate the good decisions or help them from making the same mistakes. It is easy to make decisions if you are a zealot or a fundamentalist or an imbecile.

Wise decisions require careful consideration from different viewpoints. Wisdom requires broad knowledge for an individual, but some of the things we deal with are so complex that we need the communicated and collective wisdom of other people.

Business Wisdom

Not that I will dispense wisdom to you in this article so much as I will provide some tools for you to make wise decisions as they relate to creativity, innovation, and invention. First I ask the questions: Why are we in business? Why do we invent things? Why innovate?

I will begin answering these questions by mentioning a couple of business basics that you all know, but which often get overlooked when folks focus on their own specialized thing. The first basic is that humans are symbiotic beings, dependant on one another and on the other creatures and resources of this planet. We live and flourish in a symbiotic society. Competition is insignificant as compared to our symbiotic networks. We rely on other people to provide products and services we could not possibly do for ourselves. Will Rogers once stated that "We are all ignorant. Just on different subjects". We all depend on other people, that for the most part, we do not even know. They give us our quality of life. Our safety is in their hands. This is evident in the fact that when I was first asked to write about Innovation, I called our CEO and asked if it was OK if I spoke about the culture of 3M that promotes innovation. He said, "Certainly!"

The second business basic is that we all make a living by producing a product or service that customers will buy because it fulfills a perceived need or pain they want to overcome. Some products are too complex for one person, so we join together in corporations to make those products for the customers. For individuals and corporations, our income is from customers who pay us for giving them the product or service they need. Our rewards come from the customer for giving him or her the right product. If someone else offers a better buy, they won't buy from us. If they could do it themselves, they wouldn't buy it from us.

When we work together to do complex tasks, it is easy to forget who the primary customer is and what the primary product is for them. The primary product is the one we sell to the primary customer. You may define your customer as the one you give your work to and the one you have to please to get a raise, but he or she is the secondary customer.

Sometimes corporations or individuals get so focused on making and selling their present products that they don't notice that customers needs have changed and they require a different product or service. Individuals must innovate when they see changes that must be made in their work, and corporations must innovate to provide useful products to meet the changing needs of customers.

Summary

Through this article I have given you the basics and the framework that I use in my capacity as a corporate inventor. My beliefs as an inventor and my understanding of creativity, invention and innovation guide my work. As do my convictions regarding innovation wisdom, business wisdom and doing things for the "Right Reason".

In part two of this article I will look at innovating and operating in a company. I'll also explore the importance of culture and how it supports innovation. Last, but not least, I'll look at innovators as leaders.