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TRANSFORMING IMAGINATION

Empathy & Confrontation

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The Essay won the Award
at

Drucker Challenge Essay Contest 2013

Lessons for Innovators

Innovation = Invention + Exploitation

"successful implementation of creative ideas within an organization"

There are two underlying factors that are present in almost every successful innovation story. Interestingly enough, these factors also figure prominently both in art and science. The first is "empathy", a close, intimate and personal understanding of an entity. Empathy with their human subjects is what artists and writers are known to be good at. Science gives us lessons in empathy of another kind; that it is possible to empathize with non-human entities, even with abstract concepts, to understand its characteristics so well it becomes second nature to the investigator. The second ingredient in innovation is "confrontation". A confrontation is always a clash. This may be a clash of ideas, a clash with existing presuppositions or a clash of two dissimilar reference frames. Confrontation and empathy appear to be antithetical concepts, but for successful innovation both are essential, and in many cases one leads to the other.

According to MIT professor Edward Roberts, "Innovation = Invention + Exploitation". A more general definition has been provided by Theresa Amabile who defined innovation as the "successful implementation of creative ideas within an organization". Hence we can ask two questions of any innovation. What is the new idea? How has it been implemented or exploited? Often the answers to both these questions are the same, for instance in the case of a new trading algorithm that makes a lot of money for an investment bank. However, in many cases, the answers are very different. The first part of innovation, where one has to come up with a novel idea requires the innovator to be a divergent thinker, an artist, an "imagineer" who can dream up novel and potentially useful ideas. The second requires the innovator to be a convergent thinker, more in the mold of a scientist, who can figure out how a good idea can be implemented. So it seems likely that both art and science will have much to offer to the innovator. The most successful scientists and artists displayed abilities both to relate and to reject, to concord and to collide. From the artist one learns to empathize with people and to use confrontations to generate new ideas. From the scientist one learns to empathize with systems and to use confrontations to find solutions. We will see how the twin ingredients of empathy and confrontation combine to provide us with an adequate basis for understanding how good ideas come about and how they can be exploited.

Empathy in Art, Science and Business

"A musician cannot move others unless he too is moved. He must feel all the emotions that he hopes to arouse in his audience, for the revealing of his own humor will stimulate a like mood in the listener"

From art, we learn how important it is to empathize with other human beings. Carl Philip Emanuel Bach, whose work influenced the likes of Mozart, Beethoven and Mendelssohn once said, "A musician cannot move others unless he too is moved. He must feel all the emotions that he hopes to arouse in his audience, for the revealing of his own humor will stimulate a like mood in the listener". We know of writers who lived out their stories. Many of the settings in Charles Dickens's novels were drawn from childhood experiences during the time his father was sent to the Marshalsea debtors' prison. This experience is captured in detail in the novel *Little Dorrit*. George Orwell, on returning to England after several years in Burma as an imperial policeman, made regular visits to the East End of London, dressed as a tramp, to understand the world of poverty. He recorded his experiences in *The Spike* and *Down and Out in Paris and London*. In the 1930s, Orwell conducted sociological investigations on the lives of the working class in England, which he documented in *The Road to Wigan Pier*. "I wanted to submerge myself, to get right down among the oppressed; to be one of them and on their side against the tyrants" he wrote.

From the scientist we learn the value of a deep understanding of the system under study, primarily through the method of experimentation and empirical analysis. In the case of many successful scientists, the empathy was developed very early in life. As a youngster, Carl Linnaeus spent much of his time in the garden studying plants, and in the company of botanical works which he "read day and night, knowing like the back of my hand". Some of the greatest artists possessed a scientific understanding of the medium they worked with. Leonardo da Vinci said, "He who loves practice without theory is like the sailor who boards ship without a rudder and compass and never knows where he may cast." Leonardo often experimented with pigments and plasters, most notably with his fresco, *The Last Supper.* To better understand what they were dealing with, some scientists including many pioneers in the area of physiology and medicine have even experimented on themselves. Sir Henry Head, a 19th century British neurologist who conducted pioneering work into the human sensory system was one such self-experimenter. Head who was described as a "vibrant mix between scientist and artist" was incidentally also an authority on Leonardo da Vinci.

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While studying the physiological basis for sensation, Head and his co-worker realized that patients failed to provide accurate descriptions of their sensations. So he decided to experiment on himself by cutting two cutaneous nerves on his forearm, studying the effects on sensation and pain as the nerves regenerated over the next four years. Developing empathy is often hard work. Thomas Edison famously said that "genius is 1% inspiration and 99% perspiration". Herbert Simon estimated that to be an expert one needed more than 10 years of experience and access to more than 50,000 chunks of information.

What is true of artists and scientists is also true of entrepreneurs and organizations. The chance of success of a new venture is highly correlated with the entrepreneur's knowledge of the market and the industry. To use the seven sources of innovation that Peter Ducker identified in his work *Innovation and Entrepreneurship*, organizations need to em athize with both the human factors and the system factors. Process needs and changing industry structures can be recognized only by organizations that understand the existing technology and processes. To recognize changing customer preferences, an organization need to be among its customers, living among them and talking to them constantly.

Several organizations today recognize the need for empathy in their organizations. Many firms now employee a method called "Empathic design", an an approach to product development that encourages designers to connect emotionally to the users of the product. This approach tries to identify latent needs of users primarily by observing customers use products or services. Empathic design recognizes that users often fail to recognize or remember the problems they encounter when using a product. Moreover, because of biases, or unfamiliarity with the technological possibilities, they are sometimes unable to envision an ideal product or service. Consequently, traditional markets research which relies on inquiry frequently fails to capture true needs and problems of users. Gillette Guard, the first product brought out by Gillette for the Indian market, was developed through the process of empathic design. The company wanted to develop a product that would provide an effective and low-cost shave for consumers who were currently using double-edge razors.

As part of the project, the researchers identified several needs that were unique the Indian market. The development of the product involved thousands of hours of studying consumers who took part in interviews, and test-shaves.

Confrontation and Ideas

"Creativity is merely bissociation; the collision of two apparently unrelated reference frames"

"Creativity is merely bissociation; the collision of two apparently unrelated reference frames" Arthur Koestler said. Good ideas often involve the idea of a collision or a confrontation. The confrontation may be natural or forced. It is always unsettling. The human mind tries to resolve this confrontation and a good idea often emerges as a result of this process. A good way to generate new ideas is to confront assumptions about a product or service. How about inverted vacations, where you 'enjoy' a miserable time so you feel much better when you get back home? Several innovations have resulted from the willingness of innovators to confront prevailing beliefs. In the 19th century, Thomas Edison was one among the many inventors working on developing a practical light-bulb. The common approach was to fabricate the filament out of conductors with low resistance so that that high current would be generated. Edison inverted this assumption and used conductors of very high resistance for the first practical light bulb. New schools of art have emerged by confronting common notions of what art should look like. A work of art that one can learn several lessons on how confrontation can lead to new ideas is Rene Magritte's oil on canvas painting, *La trahison des images*, with the famous words "Ceci n'est pas une Pipe". We are immediately provoked to explain the picture in a creative way. This is also representative of a heuristic tool used by product designers. Can a product look like one thing, but really be something else? A useful product that has come out of thinking this way is a Taser designed to resemble a mobile phone.

Art also provides us with lessons on how confrontations can be actively set up to create new and interesting themes. One of most powerful ways is by the combining of two or more incongruous, unrelated or opposite ideas. Examples of this abound in the works of the Surrealists whose paintings often feature surprising and contradictory juxtapositions. We also find such combinations in Sir John Tenniel's drawings in Lewis Carroll's *Alice* books. In literature, we also find amusing paradoxes which combine incongruous ideas to provide remarkable insight.

"All animals are equal, but some are more equal than others"

In George Orwell's *Animal Farm*, we find that "All animals are equal, but some are more equal than others". Hamlet says, "I must be cruel to be kind". Heller's *Catch-22* is replete with paradoxical statements which combine contradictory ideas for humorous effect, like "The Texan turned out to be good-natured, generous and likable. In three days no one could stand him". Sometimes what are combined are opposite or contradictory attributes in a character. We can observe this pattern in Shakespeare's *As You Like It* where Rosalind is also Ganymede and in Robert Louis Stevenson's *The Strange Case Jekyll and Hyde* where a good doctor is also a vicious brute.

You could ask if the same object can possess different attributes under different contexts. Illusions like those found in MC Escher's paintings *Relativity* and *Reptiles* represents the idea that one's perception of reality frequently depends on the angle of observation. We also encounter this pattern in one of the most celebrated works of literature. Much of the humor in Miguel Cervante's *Don Quixote* derives from the fact that Alonso Quijano views objects and situations differently from the other characters in the book. In the *Choose Your Own Adventure* series of books created by Edward Packard the reader makes choices that determine the outcome of the story. We have parallels for this in business innovation. Several product and business innovations involve combination of contradictory ideas or attributes. The Radiobus, a service in Milan is a taxi at the price of a bus. In 1949, Clarence Kelly Johnson, the director of Lockeed's famed Skunk works lab patented the remarkable variable swept wing aircraft, which combines the attributes of the swept wing and straight wing jet-fighters. In some cases, much like an illusion, the attributes of a product or process can be designed to be context-dependant. One example is the two-tier pricing strategy introduced by Southwest Airlines in 1972 where regular fares were $20 to $26 and fares on weekends and after 7 p.m. on weekends cost $13. A two-tier pricing system was used by Arvind Eye Clinic in India to provide subsidized care for the poor.

"Several of James Dyson's successful inventions like the bag-less vacuum cleaner and the bladeless fan involve the elimination of useful components"

One important way of confronting for new ideas is to ask if an important component in a product or a process can be eliminated. William Thackeray's *Vanity Fair* was suitably subtitled "A Novel without a Hero". *The Gadsby*, a 1939 novel written by Ernest Wright does not contain the letter 'e'. Several innovations have resulted from a conscious attempt to eliminate an important component. Several of James Dyson's successful inventions like the bag-less vacuum cleaner and the bladeless fan involve the elimination of useful components. By eliminating intermediaries in PC distribution, Dell was able to provide products at lower cost compared to competitors. Another way confrontation is achieved is through 'extremization'. Can something be made to possess extreme attribute or characteristics? In art, we have the example of Edvard Munch's paintings. In literature we have Lilliput and Brobdingnag from *Gullivers Travels*. In Swift's classic work we can also spot several other confrontational ideas like flying islands and intelligent horses. There are useful lessons for innovators here as well. A business model with extremized attributes, say low-cost service, can enjoy niche markets. The low-cost airline business model is a good example of this idea.

The primary way science has tested hypothesis is through experiments. Here unusual combinations have often produced remarkable results. Several important medical drugs were discovered this way. The Swiss scientist Fritz Zwicky developed the method of morphological analysis, a system to set up dynamic confrontations that could offer solutions to scientific problems. Among other things, Zwicky applied the method to astronomical studies and the development of jet and rocket propulsion systems. Scientists have often made use of confrontations to question and understand the world around them. "Why should that apple always descend perpendicularly to the ground," Newton famously asked. Sometimes new theories result. "I am enough of an artist to draw freely on my imagination" Einstein once said. His thought experiment or "Gedankenexperiment" where he imagined that he was riding on a photon of light, shining a flashlight in the opposite direction, enabled him to formulate the Theory of Relativity. In some cases a paradox is required to understand a scientific theory. Schrodinger's cat is both alive and dead at the same time. Light exhibits both wave and particle properties.

"Confrontation with external systems sometimes leads new knowledge, something that Peter Drucker identifies to be a source of innovation"

Establishing a connection between unrelated systems or objects can lead to new ideas. Douglas Hofstadter, an expert on thinking and creativity, argues that this comes from our ability for 'gist extraction'. To do this effectively, one needs to both empathize and confront. We know of allegories and metaphors in literature. Often, the ability to make a connection is the often result of years of serious study and analysis. Scientists have used analogies to understand and explain complex systems. In 1923, Louis de Broglie, by drawing an analogy from music, suggested that a way to explain quantized energy levels was that electrons behave like waves. Niels Bohr's model of the atom made an analogy between the atom and the solar system. Confrontation with external systems sometimes leads new knowledge, something that Peter Drucker identifies to be a source of innovation. Quite often, external system in contact is a biological system. Otto Schmitt, who coined the term biomimetics, developed the Schmitt trigger based on his observations of the squid.

The anatomy of the ship worm enabled Marc Isambard Brunel to develop the shield of the Tunnel Boring Machine. Sometimes the contact with the external system is serendipitous. August Kekule claimed that the discovery of the Benzene's rings followed a dream where he saw a snake seizing its tail. A commonly cited story of chance confrontation is that of the Gelredome, home of the Dutch football side Vitesse Arnhem. This stadium features a sliding pitch which can be retracted when not in use.

The story goes that the club was looking to design an indoor stadium where the natural grass surface would receive adequate wind and sunlight. The Chairman of Vitesse, Karel Albers was discussing the problem with the building contractor when a matchbox fell on the floor. This confrontation inspired them to build a stadium with a retractable surface. One of the most celebrated stories is that of Taiichi Ono, the father of the Toyata Production System (TPS) who formulated the Just in Time system after observing how grocery stores restocked items on display shelves.

Empathy and Confrontation in the Business Organization

It is important to encourage 'wild' ideas, while at the same time cultivating the understanding required to convert creative ideas into profitable innovation

The challenge for organizations is to foster the development and co-existence of both high levels of empathy and confrontation. It is important to encourage 'wild' ideas, while at the same time cultivating the understanding required to convert creative ideas into profitable innovation. Let me illustrate this with the story of a brainstorming session at a consumer electronics company. The objective was to identify ideas to improve a phone tablet (or "phtablet") which had a stylus like writing device. The day began with engineers and managers looking at comments posted by consumers on online forums. Several users complained that they found it difficult to write effectively with the stylus on the smooth surface of the tablet. On seeing this, one scientist jokingly suggested that the problem could be easily solved by placing a sheet of paper on top of the screen and writing with the stylus on the paper. However, when the facilitator suggested that that instead of throwing away that idea, the group could try to build on it, workable solutions like a removable transparent surface emerged.

Peter Drucker in *Innovation & Entrepreneurship* spelt out the need for new ventures to possess an understanding of existing business, and also to be separate and different from existing business. Within an existing business, to take advantage of innovation opportunities, organizations should be able to provide a setting where employees can both empathize and confront effectively. Such an environment will foster ideas that are both novel and practical. Two companies that have been immensely successful in doing this are 3M and Google. Google has a 80/20 Innovation Time Off model where employees are encouraged to spend 20% of their time on an innovation project. Many of Google's most successful products including GMail, Google News, Google Talk, and AdSense have out of the 80/20 projects. This approach has proved successful because it allows individual innovators to understand existing technology while at same time work on something that is novel. In such a case, empathy and confrontation can co-exist, much like the best examples of art and science.

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