Illuminating Edison's World: An Insider's View of Edison's Pathways to Innovation

by Sarah Miller Caldicott and Praveen Gupta

Praveen Gupta, Editor-at-Large, had an opportunity to speak with Sarah Miller Caldicott, a great grand niece of Thomas Alva Edison, a co-author of *Innovate Like Edison*, and author of *Inventing the Future: What Would Thomas Edison Be Doing Today?* We would like to thank Sarah for sharing her insights as an innovation thought leader with our readers.

PG1: What is the most important aspect of Edison's approach that one can practice to innovate like Edison?

SM1: There are two answers that I would offer - one at the strategic level and the other at the practical level. To be a successful innovator, you need to have a strategic approach in mind as well as a process that you follow. Edison became a successful innovator by understanding needs and trends. He realized after his first commercial failure in 1869 that if he approached innovation simply by inventing from his ideas alone, he would not be successful. In 1869, Edison invented and received a patent for an electronic vote recorder he'd designed for Massachusetts legislature. The recorder worked perfectly. It allowed legislators to record their names, record 'yes' or 'no' to whatever bill was on the floor, then to have that vote sent to the Speaker.

The problem that Edison encountered was not functionality, it was one of fit with the needs of the legislators. He had not spoken with many politicians; he had not connected with what really happens in legislative sessions very deeply. So when he put his ideas into practice and designed this equipment, he had not studied his target audience and did not know what their needs were. Following that failure, he decided that he was going to begin by seeing what was needed and therefore create "utility." He said, "...utility is success." So whether he was doing basic research in the lab, observing activities in the world around him, or watching his customers in their workplace, he was looking at needs and identifying how he could meet those needs with his inventions and innovations. Typically he would then connect those needs to trends he saw at the marketplace, and see how he could create a big new market. These are the strategic pieces that Edison consistently employed.

One step on the practical side of how we can each begin using Edison's innovation approach is to "think visually." Edison would draw his ideas down on paper and often also prototypethem. He would not just use words he would also draw pictures to document his ideas. This way of thinking about concepts takes us beyond two dimensions into three dimensions. It can get us to icons and symbols that can be very helpful in sharing information with others. One of the most important things that Edison did was to share his thinking visually, cutting across language barriers, and engaging employees with diverse skill sets. This was very helpful to him in the laboratory as well as his manufacturing facilities.

PG2: How do you personally use his methodology?

SM2: I find Edison's approaches extremely valuable. I teach these concepts in the executive workshops that I conduct. I find that no matter whether people are technically-oriented or non-technically oriented, drawing images allows them to become engaged in new thinking. Being able to create a visual representation of what is in your mind is a very crucial part of being an innovator. It allows people to use multiple senses.

What we know about neuroscience today tells us that the more ways we store information, the more easily that information is available to us in our memory. As multi-sensory beings, we need to engage the brain in diverse experiential formats rather than just facts. Edison realized

that the brain had certain functions, and that he could maximize his ability to recall things if he wrote down raw words and pictures in his notebooks - creating unique visual images.

PG3: Speaking of the brain, have you discovered if Edison's brain was unique?

SM3: I don't know if such a study has ever been conducted. I also don't know that there would be anything unique about Edison's brain. He was clearly a genius. So there must have been some area that was larger than the rest, perhaps the frontal lobe, which he accessed a great deal with his visualization and by consistently engaging in left and right brain thinking.

PG4: What are your thoughts about the state of innovation globally, when every country is trying to out-innovate others to gain competitive advantage?

SM4: I agree that innovation is the pathway out of the morass that we find ourselves in - whether it is through changes in energy consumption, whether it is through different forms of resource utilization, or whether it is through new cost structures. Regardless, shifting our mindsets and workplace styles from the Industrial Age into the Innovation Age is crucial. Innovation is the guidepost.

If we look at the state of innovation globally, I see a very uneven playing field. Part of what drives successful innovation is the willingness to take risks and the willingness to shift your thought patterns and your mindset. We don't see that every nation is equally risk-oriented for cultural reasons. It is wonderful to see - especially in the '70's and 80's - how the Japanese moved forward as a nation, and became successful innovators in many industries even though they have a very consensus-driven culture. To innovate in a nation like Japan takes tremendous courage and a willingness to take risks. If we look at Japan, we can see it as a nation that has overcome its own cultural barriers to reach high levels of innovation success.

If we were to look at some European countries, we would see a different pattern. Innovation is more difficult in any nation where you have less emphasis on the protection of ideas and intellectual property, and less emphasis on the entrepreneur. Being able to secure financing, being able to protect ideas - whether it is through patents or trademarks, or trade secrets - we don't see as much vibrancy in Europe. There is less focus around intellectual capital and less encouragement of individuals to take risks. Delving down and diving down to the individual level is hugely important to innovation success. One of the reasons that the US has done well in the past is that we have been able to perpetuate the entrepreneurial spirit. We are willing to look into the future and take risks to achieve things. We foster entrepreneurs. Entrepreneurship is not the same thing as innovation, although the spirit of risk taking is very similar. The spirit of endeavoring something new is common to both entrepreneurship and innovation.

Innovators are pattern thinkers, able to see things in a fresh new way - connecting facts, or research outcomes, or other data - and seeing new patterns that create value. Unless a nation is able to reach down to the level of the individual, I believe their overall innovation success will be more limited.

PG5: What do you think of innovation in China?

SM5: If we go back in history, there are many innovations that China has brought forward to the world. Gunpowder is one common example. I think what has been challenging for China, even in the last 10-20 years, is that intellectual property is not protected and is not valued. China certainly has huge potential to be innovative. They certainly have invested in educational infrastructure. They are graduating huge number of engineers. However, the innovation mindset is not visible. If they are able to shift their mindset and open their society to greater information sharing, they will advance more rapidly along the innovation spectrum.

PG6: Some countries like Greece and Portugal are in financial trouble. What can they do?

SM6: As I was conducting researching for my book "Innovate Like Edison," I looked into the various factors that combine to create a positive or nurturing innovation environment in any given nation. One of these factors is Democracy - or one could call it an "open society" - where weighing in with your opinion is important. There must also be a work ethic that involves persistence, and not an attitude of "What can I get from the government?" or, "What can someone give me to do this?" It is about the bootstrapping of the initiative.

What I don't observe to be true in Greece or Portugal is this raw, grass roots ability of people to create wealth from scratch, or raise money readily from private sources. There is a lack of tenacity to stay the course, or to take an idea to its full fruition. The tendency seems to be more a "waiting for someone else to have an idea" and then somehow fund it. Socialist structures involve greater levels of government support, particularly when individuals are unemployed for long periods of time, thus discouraging an entrepreneurial spirit. This is augmented and magnified if you have a mindset which also focuses on extensive government subsidies, or government payments to individuals.

It is important to instill a sense of vigor, desire, passion, thirst and hunger for creating innovation. If it goes against the culture, it is much more difficult to achieve. It is this cluster of challenges that I see happening in Greece and Portugal today.

PG7: In the US, we have is an entrepreneurial culture and we are also having among the world's largest indebtedness. Why is this happening?

SM7: Our high indebtedness is extremely concerning. There have been some articles written recently about the "false protection" provide by the housing bubble which existed at the turn of the millennium and into the first decade of the 21st century. This bubble allowed us to enjoy low inflation and high home valuations. Now that we have burst through that bubble, the deep challenges of the 2008 financial crisis hit us even harder.

We really need to look at it what it takes to create value in the Innovation Age. Growth can be achieved by spending less, but much of how we orient ourselves is still based on an Industrial Age psyche. It is still more linear, hierarchical, time-based and permission oriented. As we look at Innovation Age structures, they are less hierarchical, much more accelerated and they involve value creation that focuses in many instances on intangible resources and skill sets.

PG8: If you were the Innovation Czar, what would you do tomorrow relating to innovation?

SM8: I would create a three-year window to revamp our educational system as an urgent priority. We do not have enough momentum right now around shifting our educational curricula. We are not focusing on the kinds of skills students will need in the global economy. Students in Generation Y are capable of a lot more than they are challenged to do in the classroom. The world of teaching still focuses on textbooks, and teachers teaching from the front of the classroom. Certainly, advances have been made. Certainly, the Internet is being used more now than even five years ago.

But in high schools, we are not connecting with students - as our 32% dropout rate attests. In middle schools, we are not connecting with students in ways they are now accustomed to seeking and gaining information. We are not helping them to create knowledge. Whoever is best at creating knowledge in the next 5-10 years will win in the Innovation Age.

PG9: What changes would you recommend for these educational institutions?

SM9: I think we have challenges related to the teachers' unions. I don't believe these structures are contemporary, or in line with the realities of a global economy. I also don't believe we have enough incentives for good teachers to stay in the system, or for outstanding new teachers to

enter the system in a way that allows them to have a rapid, positive impact. It is not even so much about pay as it is about allowing new styles and teaching approaches in the classroom.

I believe a part of what drives great teachers is the desire to interact with students, to learn from them, and also have a level of satisfaction that you've brought them to a new place of understanding beyond where they started in your class. If a teacher is given new tools to do this - more access to the Internet and more experiential, multimedia courseware - I think these would be very powerful incentives for new teachers to enter the system. Unions would structurally be less important.

PG10: Everybody talks about innovation. What would you recommend for individuals at home, school and work to do to pursue innovation?

SM10: Real innovation begins by shifting our perceptual awareness and how we process information. I would begin by getting a notebook and writing down observations and thoughts as my day is progressing, or - at a minimum - at the end of every day. I do this in various forms, i.e. using an i-Pad, a smart phone, or a notebook. Edison was very tenacious about keeping multiple notebooks. As you begin writing and updating your notebook entries, you begin expanding the neural networks in your brain. You begin perceiving things more deeply, creating new associations between the things you are writing down.

I would add to this innovation skill a second one, which is the ability to observe and monitor trends. Start building on trends you read in the newspaper, or online. Jot these trends down in your notebook. Connecting trends helps us to see the future. If we are able to begin writing ideas down and seeing a new future, we are able to also consider needs associated with it. Amplify your picture by making some guesses: Where are things going? What would a shift in "x" do - for example - to shift the types of transportation that would be needed in the future? How could we modify public transportation systems?

Start to ask some of these big questions, then write your thoughts down in your notebook. Draw out an idea of what a futuristic transport system would look like. Or cut out magazine pictures and make a collage. Keep experimenting and guessing. Share your ideas with others. These steps are crucial to developing an innovative mind. It doesn't matter if you are "right." It is your ability to see new patterns that's crucial.

PG11: In today's age when we are trying to become paperless. Should we still keep notebooks?

SM11: I get this question a lot. Certainly, writing and drawing can be done on a Tablet. Many have drawing functions. You can have also download images onto a Tablet, or get apps for your Tablet to bring in news clips or images from the Internet. You can also monitor trends, or search for them. If you'd rather not use a Tablet for writing, you can use a smartphone platform. Working with paper, however, is still a very common approach for people when they are first jotting something down. It's really hard to totally eliminate a paper trail.

PG12: Would there be a difference in drawing on a Tablet versus on paper?

SM13: Yes. There is a difference. The brain processes these actions differently. More of the brain lights up when drawing or writing by hand. Interestingly, a lot of young designers in the fashion world are now designing on computers and digital surfaces. Perhaps an analogy is the transition that was made in the 1990's in the world of cartoons, moving away from hand drawn individual cells to computer-generated animated cells.

Do you lose something in the transition? Yes, you do. Is there a tradeoff? Yes, and sometimes you're willing to make it because of speed - or the ability to forward your ideas to others digitally. Going forward, hopefully we can create input to digital formats that will be closer to manual drawing than what most people have access to today. That way, the robust brain

patterns between drawing on a computer and drawing on paper will be more similar.

PG14: What can you tell our readers about the Edison Awards?

SM14: The Edison Awards were established in 1987 by the American Marketing Association (AMA). The Edison Awards existed primarily in its first 12 to 13 years to recognize outstanding contribution in Consumer Package Goods and certain other areas of technology-driven services. Oddly, in 1999, the AMA discontinued the Edison Awards just as the new millennium began.

In 2009, a colleague and I reinstated the Edison Awards, and contemporized them for today's marketplace. I was involved for three years as Chairperson of the Edison Awards, and am currently serving on the Steering Committee.

The Edison Awards are intended to recognize innovations and innovators. In addition to recognizing initiatives in various categories - such as Transportation, Electronics and Computers, Lifestyle and Social Impact, and Consumer Package Goods - the Edison Awards also recognizes individuals via the Edison Achievement Awards.

An Edison Achievement Award typically goes to two individuals each year who have demonstrated over the course of their career a dedication to innovation, or an innovation-forward mindset. Past recipients include: A G Lafley of P&G; Dr. Susan Desmond-Hellman of Genentech; Dr. Susan Hockfield of MIT; David Kelly of IDEO; and Alan Mulally of Ford. Our goal is not only to recognize the products or services that represent the outcome of a team effort, but to celebrate what it really takes to be an outstanding innovator in the realm of leadership - as the head of a corporation, or a non-profit organization, or an educational institution. Overall, I believe it is important to recognize both the individual and the team in the world of innovation.

PG15: What are some common themes that you are observing amongst winners of the Edison Award?

SM15: One of the things that we do as a part of the nomination process is to have each team that brings forward a nomination to answer questions related to Thomas Edison's own "Five Competencies of Innovation." These five competencies stem from the research that I did for my book Innovate Like Edison. We ask nominees to select one of the five competencies as most representative of their effort.

The two common themes we see are the role of collaboration as a crucial guide, and the notion of solving a longstanding problem by really pushing new boundaries. Teams are often trying to do something that has not been endeavored before, or are going about solving a problem by tackling it from a completely different angle. Those are the two most common themes we see.

PG16: Have you looked into some of the Edison Award winner's innovation performance over a sustained period of time?

SM16: This is something we have not yet had the resources to do. What is true is that some of our Edison Award winners have received an Edison Award multiple times over the course of their careers. We have some individuals who have been winners on two or three different teams in different years. It is interesting to see some of these repeats - that is really fascinating. I would love to be able do that kind of tracking but we have not have this opportunity as of yet.

PG17: How does it feel to be related to Edison, and how does it affect you by having this connection?

SM17: I am related to Thomas Edison through marriage. So the relationship in my family is not a DNA relationship. My great great aunt, Mina Miller Edison, married Thomas Edison in 1886. She was 20 and Edison was 39 - and already a world-famous inventor. Mina and Thomas had

three children together. Importantly, Mina also served as a stepmother to Edison's first three children from his marriage to Mary Stillwell, who passed away in 1884. Imagine that you had three children when you were 20! And then had three more children! Mina was pivotal in Edison's life not only to help nurture his genius, but to help him with the logistics of his own personal world, and navigate what it meant to be a father to a large and complex family.

What does it mean to me to be a great grand niece of Thomas Edison? I find it truly fascinating. I think the Edison legacy is one of the most extraordinary legacies in American history. It is very daunting and humbling to be a part of it. I also believe that it's crucial for the US to reestablish awareness of some of these core innovation legacies. Our passion for innovation is what helped build our country from the ground up.

There are many extraordinary innovators we can draw inspiration from in this regard. Though Edison is one of the best known, we can go back to Andrew Carnegie, Henry Ford, John Rockefeller, and many other great industrialists of the late 1800's and early 1900's when the US was even more innovation-forward than it is now. As a nation, we were more prolific of patents and new ideas at the turn of the 20th century than at any other time in our history.

I think we can benefit today from remembering the contributions of these great innovators. This is where we came from. This is our heritage. Drawing on these strengths, and tapping into that core passion for innovation is what I try to inspire people to do every day in my work.

PG18: What do you think of Tesla?

SM18: Tesla was an extraordinary genius. And his genius was certainly recognized by Edison. Tesla was an amazing thinker in his own right. Unfortunately, Tesla and Edison ultimately did not get along, and Tesla worked in one of Edison's labs for just a brief time. The challenge they had was that Tesla insisted on working alone. In Edison's laboratory, working solo was not the predominant culture. Edison's lab was a collaborative place.

Tesla was also almost completely unwilling to write down his ideas or formulations. He kept much of these in his head. This was challenging, because it was almost impossible to build a broader knowledge base in the lab by taking that approach. So there were fundamental work style differences between Edison and Tesla. That is a key reason why they did not get along.

Tesla today has a legacy of his own. The challenge for Tesla's memory now is that, because he was not in the habit of writing down his ideas and observations, it is not easy to draw forward what Tesla brought to the world, such as the early stages of wireless communications. What we primarily see and appreciate is that Tesla created over 40 patents that provided the foundational infrastructure for Alternating Current. These patents are what George Westinghouse purchased to build his own electrical empire.

PG19: Would you give Tesla an Edison Award?

SM19: Tesla received many awards. In fact he received an award that had Edison's name on it during Edison's lifetime. (http://www.tfcbooks.com/tesla/1917-05-08.htm).

The competition between Alternating Current and Direct Current was really stiff, and ultimately goes back to needs and trends. The US market needed power that could be propagated over long distances because the nation was growing, and populations were becoming spread over greater geographic distances. Although Direct Current, which Edison designed and advocated, was a safer and more efficient system, it could not be transported over long distances. That's why it failed to beat out the Alternating Current option.

But Direct Current is still used today in many capacities, and has come back into vogue because of the growing use of alternative energies. It is fascinating to see the resurgence of

Direct Current in the 21st century. Edison would be thrilled with this. He was truly a visionary, and talked to Henry Ford about "wind power" and "sun power" in 1931. He felt alternatives to oil were crucial to future power generation capabilities for the nation. Edison was concerned that we would wait too long to tap them, and that oil reserves would be running out by the time we wised up. Unfortunately, he was right!

Sarah Caldicott: A great grandniece of Thomas Edison and his second wife Mina Miller Edison, Sarah Miller Caldicott has been surrounded by creativity and innovation throughout her life. When she was seven years old, Sarah learned of her unique relationship to her great aunt Mina Miller, and Mina's world-famous husband Thomas Edison. Curious about why Edison phonograph and cylindrical records in her home worked so differently from the small plastic record player that spun 45's and was LP's, she wondered, "How did they get this way?"

Intrigued by Sarah went on to learn about the accomplishments of Mina Miller Edison's father-Sarah's great, great grandfather, Lewis Miller (1829-1899) - an agricultural equipment inventor whose Buckeye Mower & Reaper dramatically improved productivity of American farmers in the 1850's and beyond, later inspiring development of the modern Combine Harvester. A recipient of 92 patents, Lewis Miller was inducted into the National Inventors Hall of Fame in 2006, and co-founded the Chautauqua Institution in Chautauqua, New York in 1874 - a place Sarah and her family still visit every year.

Co-author of a groundbreaking book on Thomas Edison's innovation best practices, entitled Innovate Like Edison: The Success System of America's Greatest Inventor, Sarah speaks to audiences across the country, and leads executive seminars on how to embed Edison's five Competencies of Innovation in their organizations. Sarah's new book of Inventing the Future: What Would Thomas Edison Be Doing Today? is due for release November 2011.

Sarah received her MBA from the Amos Tuck School of Business, began her 20-year career as a Marketing executive with brand-driven firms including Pepsico and Uniliver. For 12 years, Sarah spearheaded domestic and international rollouts of mass brands including Cycle, Suave, Salon, Selectives, and Degree. While serving as an International Marketing Director for Uniliver's Helene Curtis subsidiary, Sarah's team pioneered the company's first international re-launch of its flagship Finesse brand across three continents, requiring coordination with global advertising agencies DDB Needham Worldwide and Dentsu.

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