A Guide for Manufacturing and Technology Organizations

OVERCOMING INVENTORITIS

THE SILENT KILLER OF INNOVATION

We all have it. Nikola Tesla died from it.
Thomas Edison developed the cure!

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“Overcoming Inventoritis” Book Excerpt

The Silent Killer of Innovation

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Introduction

Are you about to embark on a venture based on an idea for a new product? Preparing to launch a product that has just come out of the development process? Or is it time to do a post mortem on one that has undergone the full cycle without becoming a commercial success? These can be very uncertain and painful times. We know and understand the pain because we have felt it - often. We have also experienced the joys of successful ventures - a much better sensation. Most innovators don't experience as much joy as they would like to. We're here to help change that. The process involves getting into the right mind set, maintaining perspective and avoiding the numerous pitfalls along the way to achieving commercial success.

So whether you're a venture capitalist, a strategic marketer, an R&D manager… or that indefatigable and solitary inventor… we all have much to gain from learning about why innovation fails. Successful outcomes require avoiding the numerous landmines and obstacles found along the journey. Only a small percentage of innovations meet expectations and we want to increase the percentage that do. We would all like to concentrate our resources on those innovations that are likely to succeed. This book is intended for those whose goal is to profit from these activities. It contains hard-earned wisdom that will save you some serious grief, no matter how you're involved in the business of invention.

“Inventoritis” is a term that we found bubbling up in various places among inventors and managers alike. We need to overcome it to achieve successful outcomes in innovation. We didn't find any explicit references to a definition but we did find numerous references to its core meaning. One example stems from famous inventor Thomas Edison's protégé and long-time friend Henry Ford. Ford made excellent observations and expounded on his experiences en route to his status as a legendary car maker.

We've learned that those who exhibit inventoritis are far less likely to achieve commercial success than those who don't. This is not confined to inventors. Sales people with little or no technical expertise can just as easily fall in love with their products and lose perspective. Steve Jobs is a recent example of someone who did but managed to get back on track with a stream of winning products.

So why go through this exercise? To help people and companies get out of their own way and become more effective innovators. There is a need to protect companies and individuals from tainting their own ideas with unhealthy biases. Our core message for company managers is simply that organizations must identify and treat their people to become inventoritis-free to enable greater return on their innovation investments, while simplifying the innovation process.

We are experiencing less uncertainty and pain in our product marketing practice as we continue to develop a better understanding of what works and what doesn't. We hope your innovation process too will improve. As your success rates go up, the pain you experience should go down. That means that our efforts will have been a step toward changing the world to make it a better place.

Chapter

1 Inventoritis Exposed

The Origins of Inventoritis – The Light Bulb as the Symbol of Ideas and Innovation

Thomas Edison is an American hero. He is credited with the invention of the light bulb, and he played a tremendous role in ushering in modern industry worldwide based on his advancements in electrical energy. Electric light greatly changed the way people lived and worked by turning night into day so that offices and factories could operate effectively without being limited to daylight hours. Edison is widely credited with having over 1,000 patents in his name and is often given the moniker: “World’s Greatest Inventor.”

What is not as well known, perhaps, is that Edison’s penchant for invention was rivaled only by his effectiveness as a marketer. He was in the habit of working backward from the market and doing whatever was needed to most expeditiously fill what he found to be the real or actual need. He was known to always be actively researching what everyone else was doing and had done. He sometimes bought and on occasion stole technology from others.

Few people today know or appreciate that Edison did not invent the light bulb. Joseph Swan was installing them in homes and landmarks in England before Edison's first successful test was completed on October 21, 1879, when Edison's carbon filament lamp successfully operated for only 13.5 hours. Additionally, Edison had bought the Canadian and US patent rights filed in 1874 for a carbon filament lamp by a Canadian medical electrician named Henry Woodward and his colleague Mathew Evans. What Edison did was to create the first *commercially viable* filament lamp which, incidentally, did not occur until more than six months after Edison filed his patent. Edison understood the importance and power of a good public relations and media strategy and was able to capture media attention while others were busy working in relative obscurity. He developed his prototype lamps to the degree they could last over 1,200 hours using a carbonized bamboo filament; however, this advancement was not made until several months after he filed his patent application and made the front pages with his early announcements. Edison then developed Direct Current (DC) electrical power systems to energize the light bulbs. Swan sued Edison for patent infringement and eventually won, resulting in Edison having to take Swan in as a partner in the British company.

In his 1930 book, 'Edison As I Know Him,' legendary car maker Henry Ford, a close friend of Edison, described inventoritis without giving it a name. Ford described an inventor as one who "frequently wastes his time and his money trying to extend his invention to uses for which it is not at all suitable." Ford asserted "Edison has never done this." The context and meaning of the term "uses" should not be limited only to technical feasibility but should include commercial viability as well. Edison and Ford always considered commercial viability a requirement for anything they were involved with. Ford built a massively successful enterprise because he understood thoroughly the importance of this principle.

Many inventors who file patents, including the inventors of the zipper (sewing machine inventor Elias Howe in 1851, Whitcomb Judson in 1893, and much later again electrical engineer Gideon Sundback in 1917), fall into the trap of being too far ahead of their time or otherwise being out of tune with the market. The zipper finally started getting good market acceptance around 1930 and has since become one of

the world's best known products – almost a century later. It did little good for its early inventors. Judson showed his version of the zipper to 20 million (20,000,000) people and sold only 20.

Better known among inventors is Nikola Tesla, inventor of Alternating Current (AC) electrical systems. After some great successes, Tesla lost touch with the market and was later pursuing visions that generated much interest and debate but did not yield marketable products. This is one of the worst outcomes people with inventoritis can experience since their monetary gains never equal the strength of their innovative ideas. Tesla experienced this fully.

On the other hand, Edison, through an extensive network, was able to learn the crucial lesson of not misunderstanding the market with his first patented invention. The following story told by Henry Ford[1] shows that he was obviously quite aware of the typical outcome of inventoritis:

In Common With All Inventors

Mr. Edison, in his first patented device concentrated on something which he *thought* was needed, but which, in fact, was of no use to anyone. In 1868, he took out a patent for an arrangement that would quickly and accurately record the vote of a legislative body. He had the impression that Congress in particular needed his invention so that time taken in voting might be used for more valuable purposes. He still laughs about the reception which this, his first child, received in Washington:

> It was exhibited before a committee that had something to do with the Capitol. The chairman of the committee, after seeing how quickly and perfectly it worked, said: 'Young man, if there is any invention on earth that we don't want down here, it is this. One of the greatest weapons in the hands of a minority to prevent bad legislation is filibustering on votes, and this instrument would prevent it.'
>
> I saw the truth in this, because as a press operator I had taken miles of Congressional proceedings, and to this day an enormous amount of time is wasted during each session of the House in

1. Ford, H. & Crowther, S. (1930). Edison As I Know Him. New York: Cosmopolitan Book Corporation. (pp. 56-57).

> foolishly calling the members' names and recording and then adding their votes, when the whole operation could be done in almost a moment by merely pressing a particular button at each desk. For filibustering purposes, however, the present methods are admirable."

That *cured* Edison of inventing things which he *thought ought to be wanted*. Thereafter he kept to things he *knew were wanted* and which would have widespread application.

Congress still does its voting the same way it did in 1868 but Edison was treated by the committee chairman and overcame his early onset of inventoritis. Once thus inoculated, Edison had a lifelong winning streak with almost 100% of his 1,093 lifetime U.S. patents having been tied to commercial successes. The last part of Appendix B focuses on quantifying his success, and Appendix C lists his patents.

Tesla however, went in the other direction. After some breathtaking early successes, he alienated himself from the marketplace and everyone in it. Tesla was the inventor of Alternating Current (AC) electrical systems and technology, which is continually and widely used throughout the world today. He was in direct competition with Edison's Direct Current (DC) technology. Tesla had the superior technology for many electrical power applications, but Edison's technology held the market for some time even after George Westinghouse, inventor of the railway air brake system, backed Tesla. Edison actively resisted changing from his established DC to the superior AC technology but eventually did make the wholesale change based on market demand.

There are many books written about both Edison and Tesla, their lives, inventions, personal and professional successes and failures. The vast majority of these books fall short in encapsulating a common feature, especially in the case of Edison. They generally have missed the point that, although Edison had taken ownership of the term "inventor", he was the best *product marketer* the world had ever known. After his death, Tesla was eventually credited with the invention of radio communication to add to an already impressive list of accomplishments and today, many scientists agree that Tesla was

actually the greater inventor of the two. Yet he lacked the marketing skills of Thomas Edison, forcing his utter brilliance to be remembered only after his death.

A detailed discussion of Edison's lasting rise to prominence, Tesla's early rise then long fall from grace and the “War of the Currents” battle between their rival DC versus AC electrical systems is provided as a case study in Appendix A. Appendix B contains lessons from these historical references while Appendices C & D contain complete lists of Edison and Tesla's respective U.S. patents. The main difference between these two famous inventors is that Edison was a far greater leader than Tesla, while being free from inventoritis. Edison tended to recruit experts while Tesla generally worked alone. Edison had developed sound marketing processes whereas Tesla had not. Had Tesla been free of inventoritis, he might have won the battle of the competing DC and AC electrical power systems without destroying himself in the process.

What Led These Two Prominent Individuals to Such Vastly Different Outcomes? Inventoritis.

Tesla is the poster boy for this disease, arguably being a greater inventor and scientist than Edison, while self-educated Edison was effectively treated by the congressional committee chairman who rejected his first patented invention, the “Electrographic Vote-Recorder.” Edison lived the rest of his life mostly free of inventoritis and still has the reputation of being the World’s Greatest Inventor. Edison understood and consistently applied sound principles of marketing whereas Tesla did not.

Since Edison’s death, the light bulb has become universally recognized as the symbol of ideas and innovation. Many of the current books and web sites on innovation include a picture of a light bulb.

Why is Inventoritis a Big Issue?

Development and testing activities have been modeled on Thomas Edison's famed Menlo Park laboratory example. This was done on the premise that by establishing systems and processes toward the objective of coming up with winning products through technical research and development activities (R&D), a company would gain a competitive advantage. Vast amounts of money are spent in this area and many companies still pride themselves on the money they spend each year on these activities, usually expressed as a percentage of sales, and typically in the 1% to 15% range. An endless series of winning products is not the normal result. A 2005 Booz Allen Hamilton study[2] of the global top 1,000 R&D spenders found no direct correlation between R&D spending and sales growth, operating profit or shareholder return.

It seems that few companies properly interpreted Edison's example. Microsoft is one that has come quite close, at least in terms of having its marketing strategy properly leading its R&D activities, rather than the other way around. Toyota is also getting it at least partly right by virtue of its lean manufacturing approach. Central to Toyota's lean approach is constant improvement, respect for people and the elimination of all types of waste, including misdirected R&D spending and initiatives.

Innovation giants 3M, HP and Procter and Gamble have been making big publicity splashes with their slogans about innovation and inventiveness while they too have all sorts of problems trying to achieve good results from their R&D spending. 3M had a big hit with its Post-it notes but that had more to do with the tenacity of the inventor than the effectiveness of the company's innovation.process. HP has done quite well overall but not everyone agrees, especially numerous shareholders who got burned from time to time. Consumer products giant Procter and Gamble is revamping its entire R&D process to an open innovation model because spending in the area has been exceeding sales growth with no end in sight.

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2. Jaruzelski, B., Dehoff, K., & Bordia, R. (2005). The Booz Allen Hamilton global innovation 1000: Money isn't everything. Strategy + business magazine issue 41, Winter 2005 Reprint No. 05406. New York: Booz Allen Hamilton.

Ford Motor was the world's biggest R&D spender in 2005 while Microsoft was the biggest one in the previous year. Microsoft seems to be moving forward while Ford seems unable to spend its way out of the innovation rut it is presently stuck in - having lost $12.6 billion in 2006 with few exciting innovations to brag about. Steve Jobs got himself into problems and even got thrown out of his own company. Jobs has since managed to get back on track and is having some great innovation successes at Apple.

Clearly, inventoritis is a big issue where such vast R&D spending produces such unreliable results.

Why We Need to Deal with Issues Caused by Inventoritis

Obtaining more predictable and better results from these substantial R&D investments would lead to competitive advantages. An important metric would be an increase in the percentage or number of innovations that are successfully deployed. Hundreds of thousands of new products are launched worldwide every year, with only a small percentage of the products remaining on the market a couple of years after the launch. Companies that can increase their success rate even a little bit will be able to capture greater market share from their competitors.

How to Identify Inventoritis

An industry metric first introduced in 1992 called the M/E or Grabowski ratio[3] can be used as a measure or at least an indicator of the extent to which organizations are likely exhibiting collective inventoritis.

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3. Grabowski, R.E. (1995). Who is going to buy the darn thing? Proceedings of the IEEE Electro International, June 21, 1995, 69-97.

The M/E ratio was developed by engineer turned marketing consultant Ralph E. Grabowski and is the ratio of marketing to engineering investment. The main component of the marketing investment is the often undervalued discipline of “front-end marketing” that includes conducting market research, gathering competitive intelligence, building the business model and analyzing the payback. Marketing investment for the purposes of the M/E ratio does not include sales and promotion expenses.

Grabowski found that the most successful companies had ratios greater than 1.0, spending more in front-end marketing than in engineering. Failures had ratios often well below that. Copier manufacturer Xerox had a ratio of 0.1 and large computer companies Digital and Wang, that were impacted by the advent of the personal computer, had ratios of 0.004 and 0.001 respectively. Personal computer maker Dell and software company Intuit had ratios of 1.5 based on his comparison. Grabowski found that companies with low ratios tended to have inwardly focused engineering cultures.

Other researchers, such as Robert G. Cooper and Elko J. Kleinschmidt, have been investigating the relative amounts of resources applied toward front-end marketing. They have done considerable research work throughout the past 20 years in the product development field. In one study, they found that only small amounts of money (7%) and work (16%) go into the front-end marketing homework. These findings were presented and discussed by Bill Dean in a case study article he prepared for a direct marketing association. Dean[4] stressed the importance of incorporating focus group testing in the product development process. For Dean's article, he also found research revealing that solid up front marketing homework can increase new product success rates by a whopping 43.2%.

To help develop a clearer picture of where an organization stands relative to its inventoritis issues, a careful examination should be made of the budgeting processes, reward and incentive systems, human resources policies and activities, training programs, innovation recognition systems and strategic planning methodologies.

4. Dean, B. (2005, March 28). Case study: Incorporating focus group research into the product development process. DM News, Article 32310. Retrieved March 31, 2007, from the World Wide Web: http://tinyurl.com/2gh29w

It is also important to be able to identify inventoritis issues at the personal level. Human resources people need to have at least a basic understanding of how it impacts various functions. They must also be able to screen and qualify it within individuals to minimize adverse impacts. Managers should be able to determine suitable methods of identifying these issues within their respective enterprises.

Inventoritis should not be much of a problem in large hierarchical companies where the innovation activities are tightly managed and people work in carefully defined jobs that are not entrepreneurial in nature. But then again, a scientist or engineer working deep within a large R&D organization with some of these tendencies could have substantial, albeit hidden influences on the product. The following comments made recently to the authors by Ashton Udall, a professional working in product development and manufacturing suggests this:

> “Taken from a product development and manufacturing perspective, I watch companies and inventors make their way through the trade-off process in which they select their optimal combinations of features, costs, materials, and so forth for a product. We've recently worked on a product requiring a rather simple component as simple and as common as a button for a TV remote product or a shoulder strap for a carrying case. With a common component like this, it's probably a good idea to see if one is already being produced out there that might fit with what you had in mind. Avoid the need to spend thousands on tooling for a new component for your product! Take that money and put it in marketing, or keep it as profit, or put it all on Black in the nearest casino. Why design and build a new TV button?
>
> We sourced a nice alternative component, but the specs weren't quite a match (slightly wider than needed). Rather than modify the designs for this (which would only have been an aesthetic modification), the client is still interested in tooling to maintain exactly what was envisioned. This is where inventoritis and its evil

cousin 'designeritis' smack into reality. Multiply this approach a few times within one product development process and you're looking at a surefire way to decrease your profits."

Being able to identify inventoritis in individuals and companies or organizations is a prerequisite to being able to apply solutions. The degree to which symptoms appear may vary, but there is no individual or organization that has not at one time or another experienced the consequences of innovations inflicted by the shortcomings of inventoritis. Better tools are being developed to ascertain the extent to which organizations are at risk of squandering resources applied to innovation.

The objective of this chapter was to expose this silent killer of innovation. Strategies for overcoming it for organizational and individual innovators will be covered in later chapters.

Appendix

B Lessons from Edison vs. Tesla

“Genius is one percent inspiration and 99% perspiration. As a result, a genius is often a talented person who has simply done all of his homework.” This is Thomas Edison's most famous quote. Historians and journalists have almost always held this in the context of his laboratory and seem to forget that a large part of his efforts were invested in product marketing - outside of the scientific work being conducted in the labs.

Edison never lost his focus on doing his homework to understand the market. He also never overlooked the players (e.g., customers, suppliers, and competitors) in the market. Finally, the financial and business aspects, and the sales and marketing requirements, were always accounted for. He worked out effective strategies and executed them. He branded himself by making his name synonymous with the term “inventor” to the exclusion of others so effectively that today, a hundred years later, this connection remains embedded in concrete.

His work ethic is legendary, but one should remember he almost always had several people helping him in the work. When it was likely to take numerous, sometimes thousands of

attempts to get to a satisfactory result on one of his objectives, he would employ an efficient assembly line approach to the task. While working for Edison, Nikola Tesla once described Edison's lab methodology as an “empirical dragnet.” The perspiration was not only Edison's to sweat; rather he shared his release among a number of dedicated workers.

Henry Ford's Perspective on Edison

Legendary car maker Henry Ford knew Edison well from having been an employee for a while, then a close friend for many years afterward. Ford had a unique personal perspective on Edison's broad mindedness, marketing, business and inventive genius, technical expertise and lack of inventoritis. Ford was working as an engineer in one of Edison's early electricity generating stations and knew much about him and his abilities before they had first met.

Ford confirmed this at their first meeting that took place at the 1896 annual convention of the Edison central station executives where they were surrounded by electrical people who were firmly of the opinion that automobiles would be electric. Ford discussed his approach to the automobile powered by a gas engine and was profoundly impacted by Edison's response.

The following story in Ford's words was taken from his 'Edison As I Know Him' book[7] that was published in 1930 while Ford was at the top of his game and his company was at its peak. Ford was selling millions of cars per year with over half the global automotive market share. He had recently completed construction of his manufacturing crown jewel, the massive River Rouge plant, after a decade of construction. In Henry Ford's words:

> Our first actual meeting was at a dinner at the old Manhattan Beach Hotel at Manhattan Beach, which is just a few miles from Coney Island. We were holding an Edison Convention, an annual event to which came the chief engineers and managers of the various

7. Ford, H. & Crowther, S. (1930). Edison as I know him. New York: Cosmopolitan Book Corporation. (pp. 1-7).

Edison plants in order to exchange experiences. I went with Mr. Alexander Dow, the president of the Detroit Edison Company. The dinner table was oval, with Mr. Edison at the head. At his right sat Charles Edgar, president of the Boston Edison Company, and I sat next to him. On the other side of the table were Samuel Insull, who has since become great in the electrical industry; J. W. Lieb, Jr., president of the New York Edison Company; John Van Vleeck, the chief engineer of the New York Company; John L. Beggs, and a number of others of whom my recollection is not so certain.

During the afternoon session, the convention had given itself up largely to discussing the new field that was opening for electricity in the charging of storage batteries for vehicles. The central station men saw in the electric carriage, the horseless carriage that everyone had been looking for.

They predicted that the cabs and carriages would soon be on the streets by the thousands and would require much attention in the way of recharged batteries and the like, and of course that meant enormous revenues. At dinner the talk continued until Alexander Dow, pointing across the table to me, said: “There's a young fellow who has made a gas car.” Then he went on to tell how he had heard something going pop, pop, pop below his office window and had looked out and seen a small carriage without any horses, and my wife and little boy sitting in it; that then I came out of the plant, got into the seat, and the thing moved off- pop, pop, popping all the way while everyone stopped to look. Someone at the table asked me how I had made my carriage go, and I started to tell, speaking fairly loudly so that those across the table could hear me, for they all stopped talking to listen.

Mr. Edison caught some of it and put his hand to his ear to hear better, for even then he was decidedly deaf. Mr. Lieb saw Mr. Edison trying to hear and motioned to me to pull up a chair from another table and sit beside Mr. Edison and speak up so that all of them could hear. I got up, but just then Mr. Edgar offered to change places with me, putting me next to Mr. Edison. He began to ask me questions which showed that he had already made a study of the gas engine. “Is it a four-cycle engine?” he asked. I told him that it was, and he nodded approval. Then he wanted to know if I exploded the gas in the cylinder by electricity and whether I did it by a contact or by a spark, for that was before spark plugs had been invented. I told him that it was a make-and-break contact that

was bumped apart by the piston, and I drew a diagram for him of the whole contact arrangement which I had on my first car, the one that Mr. Dow had seen. But I said that on the second car, on which I was then working, I had made what we today would call a spark plug, it was really an insulating plug with a make and break mechanism using washers of mica. I drew that too. He said that a spark would give a much surer ignition and a contact. He asked me no end of details and I sketched everything for him, for I have always found that I could convey an idea quicker by sketching than by just describing it.

When I had finished, he brought his fist down on the table with a bang and said: “Young man, that's the thing; you have it. Keep at it. Electric cars must keep near to power stations. The storage battery is too heavy. Steam cars won't do either, for they have to have a boiler and fire. Your car is self-contained (carries its own power plant) no fire, no boiler, no smoke and no steam. You have the thing. Keep at it.”

That bang on the table was worth worlds to me. No man up to then had given me any encouragement. I had hoped that I was headed right, sometimes I knew that I was, sometimes I only wondered if I was, but here all at once and out of a clear sky the greatest inventive genius in the world had given me a complete approval. The man who knew most about electricity in the world had said that for the purpose my gas motor was better than any electric motor could be. It could go long distances, he said, and there would be stations to supply the cars with hydrocarbon. That was the first time I ever heard this term for liquid fuel. And this at a time when all the electrical engineers took it as an established fact that there could be nothing new and worthwhile that did not run by electricity! It was to be the universal power. Of course their expectation could not be fully realized because electricity is not a prime mover.

It was wholly characteristic of Mr. Edison to have the broader vision and to know that, while the uses of electrical power could be extended almost indefinitely in some directions, there were others in which it could be at the best only a makeshift. Not the least among the many remarkable qualities of the Edison mind is its ability constantly to maintain a perspective. He never has any blind enthusiasms. An inventor frequently wastes his time and his money trying to extend his invention to uses for which it is not at all suitable. Edison has never done this. He rides no hobbies. He

> views each problem that comes up as a thing of itself, to be solved in exactly the right way. His approach is no more that of an electrician than that of a chemist. His knowledge is so nearly universal that he cannot be classed as an electrician or a chemist. In fact, Mr. Edison cannot be classified. He knows instinctively what things can be used for and what they cannot be used for.

The last sentence regarding Edison knowing “instinctively what things can be used for…” should be interpreted in the widest possible context since Edison was already famous, highly experienced and a broad thinker by 1896, as was Ford at the time of his much later recollection. Edison viewed the problem from his highly developed market-savvy perspective. When he pounded his fist on the table and gave Ford his considered opinion, he did so with the full weight of his tremendous accrued knowledge and experience. This was a defining moment in automotive history. Ford certainly viewed it that way more than 30 years later.

Ford was crystal clear on Edison's qualities as an outstanding leader. In the same book[8], he wrote:

> He is the leader and no one ever questions his leadership. I believe it is rarely possible for any assistant to get ahead of him on a suggestion - not because he is unwilling to receive suggestions but because in his comments on any experiment he invariably covers the point of the subject so thoroughly that the assistant discovers that his suggestion was only a tiny section of what Mr. Edison already had in mind. He does not have to assert leadership. It is simply unquestioned by any man of real intelligence - and Edison does not for long have near him any person who does not possess far more than average intelligence. He will not tolerate stupidity or long-winded explanations.

Edison's original Menlo Park laboratory facility has been preserved by Henry Ford at the historical Greenfield Village site in Dearborn, Michigan. It is within a 15-minute drive from either Ford Motor Company's world headquarters or the recently revitalized River Rouge

8. Ford, H. & Crowther, S. (1930). Edison as I know him. New York: Cosmopolitan Book Corporation. (pp. 65-66).

Plant where the popular F150 series trucks are currently in production. The reconstituted Menlo Park is also within easy walking distance of the company's main global R&D campus which it is located adjacent to.

Ford had the original chair Edison sat in nailed to the floor in front of the last place he used it, his workstation. Menlo Park and the “inventor's” chair are still in place today, open to the public for tours. The chair is fixed in front of a table containing a series of the most advanced batteries of the day. Ford relocated Menlo Park to preserve this important part of the Edison historical record in a very tangible way. He believed the Edison example to be of great importance and historical significance. He appears to have gotten it right.

Unfortunately, the Ford Motor Company is currently in serious financial trouble and might collapse or become absorbed within the next few years. The company took $12.7 billion in losses and sales declined to $160 billion in 2006, down from $177 billion in sales with a small profit the previous year. These are the highest losses recorded in the company's 103-year history. Inventoritis has been part of the problem. The Ford executives and R&D people should revisit the preserved Menlo Park that is located in their midst. Chapter 4 looks into the current inventoritis issues at the company.

Edison's Ten Point Method of Marketing

Edison used process to market products effectively. Throughout his long and productive life, he was able to maintain perspective and not lose touch with the market. His methods, applied over a long period of time, helped him to usher in the age of electricity. Ten essential elements of his method of marketing form what we refer to as the Edison Ten Point Method of Marketing. He had things going so well over his lifetime that he became branded: the world's most famous inventor, a moniker which remains ever so strong even today. There has never been a more effective product marketer than Thomas Edison.

The Edison Ten Point Method of Marketing:

1. He knew the customer.
2. He was an excellent networker and understood networking theory (a diverse network he could influence or ask for feedback).
3. He understood that execution is everything (he ran projects the same whether they had a patent or not).
4. He was extremely teachable and had a strong commitment to self-improvement.
5. He invented or improved upon many marketing concepts and techniques.
6. He had a world-class set of advisors who were not afraid to exercise candor. (Henry Ford, Harvey Firestone, etc.).
7. He knew how to manage his brand effectively (public relations, media photos, media kits, the use of “show rooms” etc.).
8. He knew how to attract world-class talent (employed Tesla).
9. He controlled credible channels (distribution and media).
10. He knew how to price products and opportunities effectively.

To successfully employ the Edison Method of Marketing, one must be free of inventoritis and have sufficient leadership capabilities. Notice that having a ton of money is not part of the method. Edison was not born independently wealthy. By applying sound processes, he was able to attract whatever financial resources he needed to carry out his aims.

The Tesla Death Ray Method of Marketing

A striking feature of many people of extraordinary talent or brilliance is that though their focus may remain great in one area, it often leaves them vulnerable to deficiencies in other areas. Nikola Tesla embodied this to the extreme. Known for his technical brilliance, he was not a balanced person and was unable to maintain a balanced perspective.

Tesla was anti-business, anti-establishment, asocial and had no marketing process. Tesla did not appear to match well with any of the points on the Edison Ten Point Method of Marketing.

Arguments have been made that because Edison was ahead of Tesla by about 15 years in building his reputation and a very strong position, Tesla was at a serious disadvantage. This argument is a poor one in light of the contrasting example of Henry Ford. Ford also started out as an Edison employee. He applied much of what he had learned from Edison and developed a business based on gasoline-powered engine automotive technology, competing directly with Edison's electric automobile technology. Ford built his business into one of the world's greatest companies without burning his bridge to Edison.

Tesla could have likewise developed a productive mutually-beneficial relationship with Edison rather than continually attack the man and his works, inadvertently destroying himself in the process. As an alternative, Tesla could have played a strong second, much like in the car rental business where Avis actively markets being the #2 car rental company while Hertz has been the market leader. Avis has been running its current “We Try Harder” advertising campaign for over 40 years quite successfully.

Tesla had severe inventoritis and serves well as a model for this condition. He did a variety of things to destroy his chances of success. In Tesla's attempts to invent and market doomsday devices and death rays, he became widely viewed as a mad scientist. He effectively turned these weapons on himself, at least from a marketing perspective. The elements of his dreadful inventoritis condition form our Tesla Death Ray Method of Marketing. Anyone interested in effectively marketing an idea, invention or product and building wealth should carefully avoid Tesla's death ray.

Tesla's problems stemmed from two main areas:

1. **Tesla had no formal marketing process.** Unlike Edison who had developed the process outlined in the previous section, Tesla had none. He did not properly evaluate or consider the commercial viability of his ideas and inventions. He alienated the media by drawing their attention to outlandish ideas and schemes instead of using every available opportunity to promote

marketable products. There was no apparent strategy and it did not appear that Tesla put his commercial goals first. Nor did he seem to understand branding, unlike Edison who was always developing his brands for light bulbs, phonographs, and various other products and inventions.

2. **Tesla was not an effective leader.** He did not have a solid team and did not empower or invest in others. Instead, Tesla seemed to care more about himself than the market or customer. He was also dishonest in his dealings with others to whom he was accountable - like J. P. Morgan. Furthermore, Tesla aggressively attacked Edison with no clear objective or post-war strategy.

Some argue that Tesla was a man ahead of his time. Tesla himself made this claim on occasion. It simply isn't true. Tesla's marketable ideas were either exploited in his day or could have been at the time. His motors and AC electrical system certainly were, and he did very well by it. He could have similarly exploited his radio and fluorescent lighting inventions but instead went off on weird tangents. These important technologies were developed by others while he lived.

The problems Tesla encountered are as applicable to companies and organizations as they are to individual inventors. Poor leadership and unsound processes within companies or organizations often lead to resources being applied to innovations that become wasted.

Commercial Success Rates: Edison vs. Tesla

There is quite a large body of knowledge contained in the lifetime accumulation of patents granted to Thomas Edison and Nikola Tesla. One can learn a great deal about what was going on technologically at that time as the world entered the age of electricity. Equally interesting is the knowledge than can be gained from a review of their patents carried out with the objective of examining and quantifying which went commercial and also seeing which ones were duds.

Edison received 1,093 U.S. patents over a 64-year period from 1869 to 1933 beginning at age 22. Edison was filing patents until the day he died in 1931 at age 84, with a couple patents issued a year or two after his death. Edison's record for the lifetime number of patents issued to an individual still stands a century later. Appendix C is a complete list of Edison's U.S. patents.

Tesla received 112 U.S. patents over a shorter 42-year period beginning at age 30, as soon as he left Edison's employ in 1886. His last patent was granted in 1928, 15 years before he died in 1943 at age 87. While in Edison's employ from 1884 to 1886, like any of Edison's other employees, Tesla would have worked on Edison's inventions and not necessarily have been named as a co-inventor on any of those patents. Appendix D is a complete list of Tesla's U.S. patents.

A review of the patent lists for each of Edison and Tesla shows the areas they were working in at various times. It also reveals how each of them had multiple patents in various areas. For example, Edison had over a hundred patents in each of the telegraphy, electric light, phonographs and power generation areas. Likewise, Tesla had most of his patents in the areas of power generation, electric motors, high voltage and frequency AC, and radio/wireless power. The data for the two respective lists came from the United States Patent and Trademark Office[9], except for the last two columns that were prepared by the authors while reviewing the numerous patents.

Each of the patents listed chronologically in the appendices carry an indication as to whether or not they had any “commercial relevance.” They were also each identified with an “application category” such as telegraphy, power generation, electric lighting, telephony, electric motors, engines, instrumentation, cement making or power distribution.

For the patent lists, “commercial relevance” is not the same thing as “commercial success.” It would be too arduous a task to go through the historical financial records relating to each of the several hundred patents to determine if they were each individually profitable. It is especially difficult with there being complex licensing arrangements and multiple companies involved over different time periods.

9. United States Patent and Trademark Office: Washington DC. www.uspto.gov

Additionally, for the many patents relating to improvements, manufacturing processes and materials, it is impossible to break them apart to quantify the commercial value of each one. Many of the required records are not available.

Commercial relevance was determined mainly by whether or not the invention was put to commercial use. For the vast majority of the patents which were for improvements in one of the application areas such as electric lights or power generation, if the patents were tied to an area such as these that were generally commercial areas, the patent would usually be counted as commercially relevant. This was done except where the patent was one for something that did not have a use within a commercial application area or never did get sold, licensed or put into commercial production. Patents for both Edison and Tesla that did not have commercial relevance included those for pyromagnetics, flying machines and some types of power generation.

Other examples in the case of Edison included his first patent that was for a vote recording machine, and later patents for vocal engines and vacuum fruit preservers. Edison's numerous patents in mineral processing were commercially relevant because, although he lost money in the iron ore aspect, these were large commercial operations and the technologies had additional commercial applications such as for cement making in which he also had a stake.

In his later years, Tesla had obtained patents in a number of new areas that never became commercially relevant. These include patents for wireless power distribution, check valves, perpetual free energy, pumps, turbines, ice insulation and fountains.

There is also considerable debate as to whether or not Tesla's nine patents shown in the “radio/wireless power” application category were commercially relevant. For this analysis, they are not counted as commercially relevant because Tesla never derived any commercial products from them. J.P. Morgan paid Tesla a considerable amount of money from about 1901 to 1904 to deliver radio, which Tesla never did. In the meantime, Guglielmo Marconi developed the radio industry, building up American Marconi that later became part of the Radio Corporation of America (RCA), owned mainly by General Electric. The

U.S. Supreme Court eventually credited Tesla over Marconi with the invention of radio, a few months after Tesla died and six years after Marconi died.

But that does not overcome the fact that Tesla never developed commercial products or business in the radio field from his 1900s patents. Tesla also did some engineering work for RCA after Marconi died. He was kept under strict control while at RCA and did not do any patenting there. The whole radio affair was a messy one for Tesla.

The commercialization numbers for Edison are very impressive. He only had 10 duds out of his 1,093 patents for an overall lifetime failure rate of 1% (10/1,093**=>**0.9%). His failure rate decreased as he became older and more experienced. He only had one dud out of 400 in his last 40 years for a ¼% (0.25%) failure rate during that long period. Edison's patents were like a steady stream of press releases, announcing successes in various areas.

This later failure was for a helicopter he patented in 1910. The detail on Edison's helicopter is that in 1880 he did build a rotor system and experiment with various blade designs, spinning them while measuring the forces, etc. He determined it needed a powerful engine with a certain power to weight ratio such as did not exist at the time to make it work. He was, of course, correct.

Edison did not patent it then. The 1910 patent (30 years later) was at the time that others were getting closer, so filing a patent was probably more of a hedge strategy than anything else. He was on the right track and if he wasn't so heavily involved in phonograph developments, battery technologies, and pioneering massive cement manufacturing and mineral processing industries at the time, he probably would have gone in deep enough to maybe come up with a suitable engine and the other technologies needed to make the helicopter work.

Tesla's commercialization success numbers were almost as impressive as Edison's while he was involved with Westinghouse from about 1888 to 1897, under George Westinghouse's leadership. Tesla obtained 85 patents prior to leaving Westinghouse to truly go out on his own in 1898 when he moved to Colorado Springs, Colorado for a year or so to do high voltage experiments. Of these 85 early patents, only 4 were duds, providing for a low 5% failure rate (4/85**=>**4.7%).

Of the remaining 27 patents Tesla obtained from 1900 onward when he was basically out on his own, only five were commercially relevant. His failure rate shot up to a staggering 80% (22/27**=>**81.4%). His five successful patents were for instrumentation products he developed over about a 10-year period for the Waltham Watch Company of Waltham, Massachusetts. Each of those five patents were issued as having been assigned to Waltham which means they were likely already assigned at the time of the initial patent application. This suggests Tesla was not really doing the work for his own account but was rather working for a patron. That counts as being commercially relevant because Waltham advertised and produced these products with Tesla having been paid for his work in the process. None of the other 27 patents were similarly assigned. Nor were they otherwise developed into commercial products or applications.

Some of Tesla's duds in those later years remain controversial. Various scientists and engineers have built and tested some of them, finding them deficient. For example, Tesla's 1920 patent titled “Valvular Conduit” for a check valve designed for use with various fluids, and some suggest high energy particle beams, simply does not work. His turbine and pump patents yield inefficient machines that have never gone into production. His two ice insulation patents seem ridiculous when one considers the prospects of insulating high power electrical conductors by freezing them in ice, especially in comparison to other types of insulation including those available in his day. His two “Radiant Energy” patents in the perpetual free energy application area amounted to little more than making solar panels by coating a metal sheet with a transparent insulator and hooking up capacitors to them to produce electricity. It doesn't work. Tesla never developed a business selling his patented lightning rods. Nor did he produce or sell his flying machines for which he took out two patents.

Last, but not the least impractical, is his patent for a new type of fountain. In the patent specification, Tesla criticizes the popular fountains of his day as being boring, inefficient and unimpressive. His design was for a non-artistic high-powered water fountain. Owning one would be like having a circular version of Niagara Falls in one's yard.

Beyond those covered in his patents, there are apparently some mysterious Tesla inventions for which there were and still are large ready markets, such as cars than run forever without carrying fuel. Unfortunately, none of these alleged products ever appeared on the market.

While Tesla was working for a highly market savvy Edison or Westinghouse, his creative abilities were effectively channeled into producing some of the greatest technological developments in history. He was working on inventions that were in tune with the market with predictable positive results from which he made enormous amounts of money. When on his own, his results became far less predictable and he got himself into all sorts of expensive difficulties. His innovation success rate plummeted.

Chapter 2 contains quantitative data that reveals Tesla's later 80% failure rate is approximately the same as that of the typical modern corporation. The numbers clearly suggest modern industry has adopted the Tesla approach to innovation rather than the extremely successful one employed by Edison with its less than 1% failure rate.

Appendix

C Complete List of Thomas Edison's 1,093 United States Patents

Check out all his patents at this url:

Actual: http://happyabout.info/OvercomingInventoritis-ThomasEdisonsPatents.pdf

Clickable: http://tinyurl.com/yqzhw3

Appendix

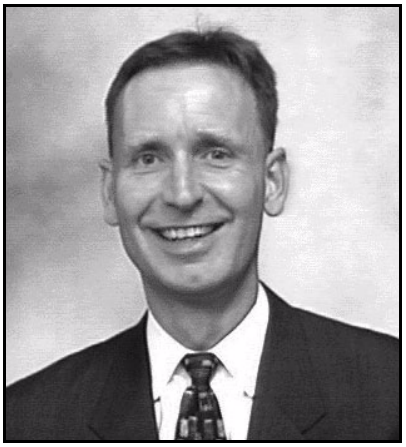
D Complete List of Nikola Tesla's 112 United States Patents

Check out all his patents at this url:

Actual: http://happyabout.info/OvercomingInventoritis-NikolaTeslaPatents.pdf

Clickable: http://tinyurl.com/2cxl2s

About the Authors



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