



Bradley, Foster & Sargent, Inc.

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Elon Musk: The Man with the Midas Touch

“I would like to die thinking that humanity has a bright future. If we can solve sustainable energy and be well on our way to becoming a multiplanetary species with a self-sustaining civilization on another planet – to cope with a worst-case scenario happening and extinguishing human consciousness – then, I think that would be really good.”

Elon Musk, 2015

Five years ago, we wrote an investment commentary about the remarkable life of Steve Jobs and the world he created through Apple Computer. Just as Steve Jobs had a vision to change the world, so does Elon Musk. If anything, Musk has a much grander mission, as he is out to save humanity from itself. So we thought that it would be useful to tell the remarkable story of Elon Musk and how his vision and his goals may impact not only the investment world but indeed our very lives. In doing so, we depend primarily on the biography, *Elon Musk*, written by Ashlee Vance, a South African-born author and former reporter for the *New York Times*. The result of dozens of interviews with Musk and hundreds of meetings with friends, colleagues, employees, and enemies, it is a very well-written biography which describes the good, the bad, and the ugly about Elon Musk. Like Steve Jobs, Musk emerges from the book as a genius with great intensity but also as a visionary whose passion to accomplish his goals often runs roughshod over his colleagues and his family. Unlike Bill Gates and Mark Zuckerberg, whose families sent them to Lakeside School and Phillips Exeter Academy, both prestigious private schools, and then to Harvard, Musk had to put himself through university in Canada and later the U.S. For better or worse, he is very much a self-made man, and one who is larger than life. Vance’s book describes in considerable detail Musk’s involvement in Tesla and the four companies which he started or helped to start. It is an excellent book and a great read. This commentary is meant for those who do not have the time or inclination to read all 400 pages but would like to understand a man whose mission is not only to totally transform the automobile industry through sustainable energy, but also to create colonies in space to save mankind from itself, if things go the wrong way on planet Earth.

Youth (1971-1994)

Elon Musk is the son of Errol Musk and Maye Haldeman. Errol’s family had deep South African roots, while Maye’s family came from Canada. In 1954 Maye’s father, Joshua Haldeman, left Canada and moved his family to Pretoria, South Africa. Maye was an excellent student and beautiful, too (she was a finalist for Miss South Africa). She met Errol Musk at university, and after a seven-year courtship when Errol simply never took no for an answer, Maye agreed to marry him. Elon was born within a year of their marriage, growing up in Pretoria, the seat of the Afrikaner government, when apartheid was the law of the land. Within several years, Elon had a brother, Kimbal, and a sister, Tosca. Even as a child,

Elon had a compulsion to read; some days he would read for ten hours or more. He also seemed to have a photographic memory, and at an early age, he plowed through two sets of encyclopedias. His favorite book, *The Hitchhiker's Guide to the Galaxy*, appeared to have had a profound effect on his developing worldview. At the age of twelve, he designed a science fiction-inspired video game called Blastar, which required 167 lines of instruction to run, and he received \$500 from a South African magazine which highlighted the game.

When Elon was about ten, his family fell apart. Errol and Maye divorced, and Elon chose to live with his father in Pretoria. Over the next five or six years, Elon had a very tough time. A self-described nerd, he was relentlessly harassed and bullied by boys at middle school and the first years of high school in the hyper-masculine Afrikaner culture of the time. Life was not much better at home. Both Elon and Kimbal described their father as a very intense man who sucked the fun out of most childhood activities. Upon graduation from high school, he looked for a way to emigrate to Canada, as Maye was able to pass her citizenship on to her children. So at the age of 17, Elon moved to Canada, both to escape his family situation and to avoid compulsory South African military service, which would have forced him to participate in the apartheid regime.

After spending a year traveling throughout Canada trying to connect to his mother's extended family and working odd jobs, he enrolled at Queen's University in Kingston, Ontario in 1989. In 1992, Musk transferred to the University of Pennsylvania on a scholarship. He was a double major, pursuing an economics degree at the Wharton School and a bachelor's degree in physics as well. At Penn, Musk was a straight arrow, rarely drinking and, unlike Steve Jobs, never using drugs. He made a lot of friends, and his only unusual behavior was when he went on video game binges which could last for days. In 1994, he wrote a business plan titled "The Importance of Being Solar," showing his interest in alternative energy even as an undergraduate. He also wrote a research paper on ultracapacitors which focused on a new form of energy storage, a concept he would later use in manufacturing cars and rockets. What stood out at Penn was his ability to master difficult concepts in physics and to connect them to well-written business plans. Having spent two summers interning at start-up firms in Silicon Valley and feeling that his calling lay there, he headed to California after completing his courses in 1994.

A Founder of Zip2 and PayPal (1995-2001)

After holding down several entry level jobs, Elon and his brother, Kimbal, hit on an idea for a start-up. Their idea was to create a business which was essentially the Yellow Pages on the Internet. The Internet was brand new, and most small businesses didn't understand it or why they needed to have a website. The Musk brothers started the business, Zip2, out of a studio apartment in Palo Alto. Musk did all the original coding for the service, and Kimbal did the door-to-door sales. Zip2 was basically an early version of a combination of Yelp and Google Maps. Musk's father gave his sons \$28,000 to help get them through this period. It was a real bootstrap operation, and employees would often find Elon asleep on a cot in his office when they arrived in the morning. In 1996, a venture capital company invested \$3 million in the company. As Zip2 went national and had considerable success courting newspapers, the venture capitalists hired Rich Sorkin as CEO and pushed Musk into the role of chief technology officer. While Musk agreed to the change, he later came to resent surrendering operational control; but the reality was that in school or university, he had never had a leadership position on a team or in any other organization, and he hadn't learned to modify his confrontational style.

Key Events in the Life of Elon Musk

1971	Born in Pretoria, South Africa to Errol and Maye Musk
1989	At age of 17, moves to Canada where for a year he does odd jobs and finally enrolls in Queen's University, Kingston, Ontario
1992	Transfers to University of Pennsylvania on a scholarship, pursuing a degree in economics at the Wharton School and a bachelor's degree in physics
1992-93	Interns two summers in a row with start-ups in Silicon Valley
1994	Graduates from Penn with dual degrees in economics and physics
1995	Creates Zip2, an Internet start-up similar to Yelp, with his brother, Kimbal
1999	Compaq Computers acquires money-losing Zip2 for \$307 million of which Elon Musk's share is \$22 million
1999	Musk co-founds X.com, an Internet banking start-up which later merges with Confinity (the company later changed its name to PayPal)
2001-02	Forced out as CEO of PayPal; Peter Thiel, the new CEO, arranges sale of PayPal to eBay for \$1.5 billion (Musk's share is \$180 million after taxes)
2002	Founds SpaceX whose mission is to be "the Southwest Airlines of Space"
2003	Becomes lead investor in and chairman of Tesla
2008	SpaceX has a successful rocket launch of Falcon 1 following three failed attempts
2008	During the financial Panic in December 2008, SpaceX and Tesla are weeks, even days away from bankruptcy
2008	NASA awards SpaceX a \$1.6 billion contract; Tesla existing investors pony up \$20 million to keep Tesla out of bankruptcy. Musk becomes CEO of Tesla.
2010	Tesla goes public with an Initial Public Offering at \$17 a share
2012	Tesla begins shipping \$100,000 all-electric Model S sedans
2016	Tesla acquires SolarCity for \$2.6 billion
2017	Market value of Tesla stock (\$52 billion) exceeds that of Ford and GM

In 1998, Zip2 was in merger discussions with CitySearch, and Musk disagreed with the way the deal was structured. He wanted to be reinstated as CEO, but the Board rejected the idea and also stripped Musk of his chairman title. As the merger fell apart and Zip2 continued to hemorrhage money, Compaq Computers made a sudden offer to buy Zip2 for \$307 million in cash. Elon and Kimball came away with \$22 million and \$15 million respectively.

With newly-acquired confidence, Musk searched for another industry where he could make his mark. He decided to start an Internet bank. His new start-up was called X.com, into which he poured the majority of his newfound wealth. Once again, there was a major conflict between Musk and another founder, Harris Fricker, who split from the company and took key engineers with him. Musk was left with a shell of a company and a handful of employees. Musk convinced one key venture capitalist to invest in his vision and was successful in recruiting more engineers. X.com launched in 1999, and by year-end more than 200,000 people had become clients of the bank, in which one could move money around with a few clicks of the mouse or an email. In short order, X.com had a major competitor, Confinity, which designed a payment system called PayPal. Confinity was started by Peter Thiel (also a key early investor in Facebook) and Max Levchin. After ruinous competition, X.com and Confinity decided to join forces. Once again a backroom coup occurred, as some of X.com's key employees forced Musk out and brought Peter Thiel in as CEO. With his poor interpersonal skills, Musk continued to be his own worst enemy. Initially fighting against his removal, Musk finally accepted the coup with grace and even continued as an advisor to PayPal. Later he invested even more in the company. In July, 2002, eBay paid \$1.5 billion for PayPal. As the largest investor, Musk netted \$180 million after taxes on the sale of PayPal to eBay.

SpaceX: The Company Which Would Help Colonize Mars (2001-2008)

In 2001, Musk became involved in a nonprofit group called the Mars Society which was dedicated to exploring and settling the Red Planet. Having just turned 30 and with a net worth of more than \$180 million, Musk was searching for meaning in his life. Increasingly, his quest centered on rescuing mankind from an apocalyptic future by establishing colonies in outer space. During 2001 and 2002, he showed a willingness to spend \$25 million or more in what effectively would be a PR stunt to send a rocket to Mars. Appalled to find out that NASA seemed to have no serious interest in investigating Mars at all, his goal was to create great excitement and publicity around a mission to Mars in order to get the U.S. back into space exploration. In February, 2002, he journeyed with several highly knowledgeable American space program experts to Moscow with the goal of buying ICBMs (which could be retooled for space travel) from the Russians. The Russians wanted \$8 million for each rocket. Musk stormed out of the meeting, angered by the way the Russians were treating him and by the exorbitant price. On the plane back from Moscow, Musk stunned his colleagues by showing them a spreadsheet that he had built on his laptop, which detailed in great depth the cost of the materials needed to build, assemble and launch a rocket. According to his calculations, he could undercut existing launch companies by building medium-sized rockets that would target the market specializing in carrying smaller satellites and research payloads to space. His colleagues on the trip were astonished by the amazing amount of study and research Musk had done in the months leading up to the Moscow trip. Thus was born SpaceX, whose mission, according to Musk, would be to become "the Southwest Airlines of space." Some years later, in 2013, Musk wrote in a memo to his staff a more expansive definition of the mission of SpaceX: "Creating the technology to establish life on Mars is and always has been the fundamental goal of SpaceX."

In his biography of Musk, Vance writes: “Zip2, PayPal, Tesla, SolarCity – they are all expressions of Musk. SpaceX is Musk. Its foibles emanate directly from him, as do its successes. Part of this comes from Musk’s maniacal attention to detail and involvement in every SpaceX endeavor... Employees fear Musk. They adore Musk. They give up their lives for Musk, and they usually do all of this simultaneously.” Musk’s total involvement is shown in the fact that he interviewed almost every one of SpaceX’s first 1,000 employees, from janitors to engineers. He intimidates his employees by his physical size, his intensity, his huge ego, and his ability to absorb huge amounts of information with nearly flawless recall. He also routinely uses crude language, employing the F-word with great frequency. He sets nearly impossible goals and expects his team to achieve them. And they usually do accomplish these overly optimistic goals, because Musk has a way of getting the employees to buy into the project so they own it themselves. The downside is that Musk will not take no for an answer. As one of his employees says, “You don’t tell Elon you can’t do something. That will get you kicked out of the room.” This stubborn refusal to accept more realistic goals has repeatedly caused Musk to publicize outrageously optimistic timelines, which often must be walked back, as happened frequently with SpaceX’s rocket launches.

There is not time or space to recount the whole story of SpaceX’s development into the remarkable rocket company that it is today. But in brief, by April, 2002, Musk founded SpaceX and purchased an old warehouse in El Segundo, Los Angeles. Musk declared that SpaceX would build a rocket named the Falcon 1 for \$6.9 million, and it would be able to carry a 1,400-pound payload. The launch was projected to take place in November, 2003 – 18 months from start to finish. Musk has never adhered to the business precept, under promise and over deliver. In fact, it took almost four years until the first launch of the Falcon 1, and in March, 2006, the Falcon 1 soared into the sky from its launch pad in the Kwajalein Atoll only to tumble back to Earth after 25 seconds. Musk was undaunted. In a post mortem, he wrote, “SpaceX is in for the long haul, and come hell or high water, we are going to make this work.” It took several additional failed launches and 2½ more years, but on September 28, 2008, the Falcon 1 made its first successful launch – almost five years after Musk’s original target date. But he had done it.

Tesla (2003-2008)

In 2003, three visionaries, Martin Eberhard, Marc Tarpenning and Ian Wright, banded together to form a company which would produce an electric car. Eberhard came up with a name for the company, Tesla Motors, to pay homage to Nikola Tesla, the pioneer and inventor of the electric motor. As they sought investors to build the first prototype, they approached Musk, who by this time was widely known in Silicon Valley. Musk shared their larger goal of ending America’s addiction to oil. He was the perfect investor, as he also understood what they were trying to do from an engineering perspective and had funds to invest. Musk wrote a check for \$6.5 million, becoming the largest investor in the company as well as its chairman. Commencing in October, 2004, the Tesla team began building a prototype Roadster. And within four months, an electric car, using a Lotus chassis, was built by 18 people. Musk drove the car around and came away happy enough to invest \$9 million more, as Tesla raised an additional \$13 million to build Roadsters for consumers. Over the next several years, Tesla developed remarkable lithium-ion battery technology, which gave it an enormous competitive advantage over other automobile companies. In 2006, Tesla displayed two Roadster prototypes – two-seat convertibles that could accelerate from zero to 60 in about four seconds. However, as Tesla sought to bring the Roadster into production, they had great difficulty bringing the cost of the car below \$200,000, while they had planned to sell the car to consumers for \$85,000. Coming into 2008, when both GM and Chrysler declared bankruptcy, Tesla was running out of

money. The original business plan in 2004 projected it would cost \$25 million to develop the Roadster. Instead it cost \$140 million.

2008: Near-Death Experience

2008 was the year of living dangerously for Elon Musk. Not only did Tesla and SpaceX come within days of not being able to meet payroll but his family life disintegrated as well. Musk had married Justine Wellman in 2000. Their son, Nevada, was born in 2003, and at ten weeks, he died of SIDS. This tragedy made for a very difficult period for both Elon and Justine, and they quickly decided to have more children. Within the next five years, Justine gave birth to five sons – first twins and then triplets. But Elon threw himself increasingly into his work. He was consumed by it, routinely working 15-hour days, seven days a week. By 2007, their marriage was on the rocks, and as 2008 unfolded, SpaceX and Tesla were running out of money. When Musk started SpaceX and Tesla, he was worth nearly \$200 million. By mid-2008, he had poured most of his fortune into these two companies, as both were burning millions of dollars each month.

In June 2008, Musk filed for divorce. Justine, a writer, was deeply wounded by the unkind way that Musk had divorced her and began to blog about many of Musk's unpleasant character traits. Musk went from being viewed as one of Silicon Valley's genuine technology rock stars to a hardline, mean and unfeeling workaholic. Musk became depressed as things spiraled out of control on all fronts, but he was rescued by a young British actress, Talulah Riley, whom he met in the summer of 2008. Months later, they were married (later they divorced, remarried and divorced again). By the Fall of 2008, both of Musk's companies were in deep trouble. SpaceX had attempted three rocket launches, all unsuccessful, and a fourth unsuccessful try would mean the company would need to fold. Even with a successful launch, they would run out of money by year-end – without a U.S. government contract. Tesla was also desperately in need of a financial infusion. And the financial Panic of 2008 had brought most financial transactions to a standstill.

On September 28, 2008, the fourth launch of a SpaceX rocket took place and was a smashing success. Most of SpaceX's 500 employees were in tears as they watched the successful launch, having worked for six years to see their dream come true. But there was still the problem of the looming shutdown of SpaceX for lack of funds. Then in December, 2008, following President Obama's electoral victory, SpaceX received a \$1.6 billion payment for twelve upcoming flights to the space station. SpaceX was saved and has never looked back.

Meanwhile, Tesla was going through its own near-death spiral. A website, *The Truth About Cars*, began a "Tesla Death Watch" in May, 2008 and continued posting about Tesla's troubles throughout the year. Burning through about \$4 million per month, Tesla needed to close another major round of funding to stay alive beyond year-end 2008. Musk leaned on all of his friends to invest in the company and began to liquidate his remaining assets, which included his stock in SolarCity and another family start-up called Everdream. Miraculously, Everdream was acquired by Dell in late 2008, and Musk reaped over \$10 million from the deal. By the 11th hour, Musk had cobbled together about \$12 million, and he asked existing investors to match this amount to save Tesla, as no new investors could be found. As Christmas neared, Musk knew that if he could not close this deal, Tesla would be bankrupt by year-end. The financing came together on Christmas Eve, 2008 – literally hours before Tesla would have had to file for bankruptcy. One of Musk's friends, venture capitalist Antonio Gracias, said of Musk during this period, "He has the ability to work harder and endure more stress than anyone I've ever met. What he went through in 2008 would have broken anyone else. He didn't just survive. He kept working and stayed focused."

Tesla (2009-2017)

Tesla continued to struggle in 2009. Manufacturing problems and quality issues plagued the production of the Roadster. From 2009 until the Model S was ready for the market in 2012, Tesla sold only 2,500 cars. Throughout this period, Tesla was cash flow negative, and Musk was continually in search of more funding. In 2009, Mercedes Benz came to Tesla's rescue when they purchased a 10% stake in Tesla for \$50 million. Mercedes was very interested in Tesla's battery technology. Later that year, Mercedes ordered 4,000 battery packs for their test vehicles in Germany and formed a strategic partnership with Tesla to provide battery packs for 1,000 Daimler Smart cars. Toyota later became a customer as well and bought a 2.5% stake in Tesla. In 2010, the Obama Administration's Department of Energy made a \$450 million loan to Tesla. Also in 2010, Tesla went public, raising \$226 million from investors despite the \$300 million of accumulated losses over the previous seven years. Where did all this money go? The money was spent on ramping up the company's manufacturing capacity to produce the Model S, a sedan which Tesla had started working on in 2009. Musk wanted it to be manufactured as much as possible in-house, relying on as few outside suppliers as possible. To cut costs, Musk sought to hire smart people who could outthink and outwork the competition. It was at this point that Musk made a brilliant hire, bringing on board Franz von Holzhausen. Born in Connecticut, von Holzhausen had worked at VW, GM, and Mazda. In the span of about three months, von Holzhausen designed about 95% of what is today the Model S.

Launched in 2012, the Model S was a game changer. It stunned the automobile industry. Here was a sleek, well-engineered, electric car that could go 300 miles without needing to recharge its battery, and accelerate from zero to 60 miles per hour in four seconds or less. The Model S was every bit as much a disruptive technology for the automobile industry as were the iPhone for the communication and social media industry, and Amazon for the retail industry. However, Tesla's problem was that it could not manufacture enough cars to meet the demand or produce positive cash flow. Consequently, Musk had to go to his great friend, Larry Page at Google, during the first quarter of 2013 to ask if Google would consider buying Tesla to save it from its financial problems. The purchase price was rumored to be around \$6 billion. Once again, however, Tesla survived without the deal, as hundreds of Tesla employees-turned-car-salesmen quickly sold a huge number of cars within 14 days, resulting in Tesla having its first profitable quarter for the three months ending March 31, 2013. When the financials were reported in May, 2013 with Tesla achieving sales of \$562 million and delivering a profit of \$11 million, the stock soared from \$30 to \$130 a share by July, as the shorts in the stock were routed. Tesla also used its positive cash flow to repay the loan from the Department of Energy.

During the first two quarters of 2017, Tesla will average sales of approximately 25,000 cars per quarter. Then with the launching of the Model 3 (with a price target of \$35,000 compared to \$100,000 for the Model S) in the second half of this year, production is projected to more than triple from roughly 110,000 cars this year to 400,000 or more in 2018. Tesla has had negative free cash flow every year from 2009 through 2016, and with its large capital expenditures including its lithium-ion Gigafactory in Nevada, cash flow will likely be negative in 2017 – and despite projected sales of \$20 billion next year, negative in 2018 as well. Some see Tesla's purchase of SolarCity in 2016 as a distraction, but at a price of only \$2.6 billion, it is not a major factor in Tesla's financial picture. What is amazing is the pent-up demand for Tesla cars. Almost 400,000 people have put down deposits on the Model 3. Much of Tesla's financial future rests on the successful launch of the Model 3, but whether it is this year or two years from now, our bet is that Musk will succeed in making the Model 3 a success. Some analysts project that Tesla will finally turn the corner in 2018 and earn \$1 per share. With the stock currently trading in the range of \$300-\$330 per

share, investors clearly own Tesla for its anticipated earnings in 2020 and beyond. Aside from valuation, another potential problem is Tesla's future profitability without government subsidies and tax credits.

Should Investors Buy Tesla at the Current Price?

In our view, there is only one reason to own Tesla at this extremely rich valuation. And that reason is Elon Musk! He is a remarkable visionary and entrepreneur. Whatever he has touched has turned to gold. He has the Midas touch. Investors want to own Tesla because Musk thinks outside the box and appears to be able to conform reality to his vision of the future. Investors also want to own the stock because they see Tesla as a technology, rather than an automobile, company. While a number of auto analysts are lukewarm on Tesla, technology analysts are more positive. Tencent, the giant Chinese social media company with the largest market capitalization of any Chinese stock, recently bought 5% of Tesla stock on the open market at a cost of \$1.8 billion. Why? Because they see Tesla as a technology company which can help Tencent in China.

Musk is an amazingly talented man. He has a tireless work ethic. He is exceptionally smart and has an ability to understand concepts both as an engineer and an entrepreneur. He has extraordinary willpower. Musk has been quoted as saying: "My mentality is that of a samurai. I would rather commit seppuku than fail." He understands how to use and manipulate the press. He is now a media sensation, with more Twitter followers than Tim Cook or former President Bill Clinton. As the largest stockholder in Tesla, his net worth is now over \$10 billion. But money is not his primary motivation. He is obsessed with saving mankind from an apocalyptic future by bringing man to Mars in his lifetime. This definitely separates him from other titans like Gates, Jobs, and Zuckerberg. On the negative side, his drive, intensity, willpower, and large physical presence (he is over six feet tall) are intimidating. While his employees revere him, they think that he is incredibly difficult to work for, often acting capriciously and cruelly. Vance quotes one former employee: "Elon's worst trait by far, in my opinion, is a complete lack of loyalty or human connection. Many of us worked tirelessly for him for years and were tossed to the curb like a piece of litter without a second thought." In 2014 Musk fired his executive assistant, Mary Beth Brown, after she had devoted over 11 years of her life to him. Her sacking became legendary at Tesla.

But look at what Musk has accomplished. SpaceX now launches rockets almost every month and remarkably has found a way to bring the main bodies of the rockets back to earth so that they can be reused. The Tesla brand has almost single-handedly created an electric vehicle market in the U.S. which could well encompass 50% of all automobiles in the next 25 years. Tesla has literally changed the industry. And this year, Tesla, while still losing money, has a market capitalization exceeding that of Ford's and equal to that of General Motors. Should investors own Tesla stock? In the stock market, it is axiomatic that there are wonderful companies which are not necessarily good stocks to own. That happens primarily when investors bid up the price of the stock to the sky. While being great admirers of Elon Musk and what he has accomplished with Tesla and other companies, we, at Bradley, Foster & Sargent, believe that it will be difficult to make money purchasing Tesla at this price; but at the right price, we could see owning Tesla in client portfolios.

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