

The Lifecycle of the Biotech Unicorn Theranos
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The Lifecycle of the Biotech Unicorn Theranos

Introduction

The summer of 2016, after my senior year of high school, I interned at a small health care startup, InnaMed, whose mission was to make lab tests more accessible to a wider group of people. I often heard the founders and engineers make statements like “We need to make sure we’re not the next Theranos” and “Theranos has made it incredibly difficult for other tech startups in the health and medical industry.” I was fascinated by this company they were determined to disassociate from. Two years later in May of 2018, John Carreyrou, a journalist with the Wall Street Journal, authored *Bad Blood: Secrets and Lies in a Silicon Valley Startup*, a non-fiction book detailing the rise and fall of Theranos. This, combined with the release of *The Inventor* this past March, brought my interest in Theranos to a fever pitch. I started wondering, what enabled Theranos to grow to be as large as it did? And why was the fraud not caught sooner? I intend to use the frameworks of Normalized Deviance, Trading Zones, and Structural Secrecy to discuss these questions and hopefully explain the failure of Theranos.

Theranos

Blood can serve as an indicator for any number of conditions, from cholesterol and diabetes to deadly and exotic diseases. But blood tests are expensive and often largely inconvenient. Now imagine a world in which all those potentially life-saving tests could be conducted with the blood drawn from a prick of a finger. That is the world Elizabeth Holmes imagined. In 2003, Holmes founded Theranos, a company that aimed to use the finger prick test for easy and early detection of a wide range of diseases. Within the next ten years, the

company's valuation shot up exponentially to \$9 billion and Forbes identified Holmes as one of America's richest people with a net worth of \$4.5 billion¹.

Theranos offered a portable mini-lab, the Edison, that was designed to allow for early disease detection and prevention. It would collect blood samples from a finger prick in a pair of Nanotainer tubes, and then communicate analysis of the blood via secured and wireless connection to a remote server². The claim was the Edison could take a single drop of blood and conduct over 200 different diagnostic tests. Within the span of a few minutes, users would have the results of hundreds of different blood analyses, such as antigen detection, hormone levels, and even some cancers. And the best part was the low cost—Theranos was charging between a half and a quarter of what independent labs charged, and just one tenth of what hospitals charged³. The technology was deemed revolutionary, its founder hailed a visionary, and the future seemed bright and endless.

Theranos' ascent abruptly halted at its peak in October 2014, with a Wall Street Journal (WSJ) investigative report. The report argued Theranos had failed to develop its ground-breaking finger-prick tests and was instead reliant on other companies for the trials it was conducting and flouting as proof of success. Eventually, it was revealed the Edison had never worked: it produced unreliable results at best and simply didn't work at worst. A long period of fraud investigation by federal prosecutors and the US SEC⁴ followed, which will culminate in a trial set for August 2020.

¹ Worland (2016), *What to Know About Theranos' Rise and Fall*

² *Theranos Medtrack Company Profile* (2018)

³ Worland (2016), *What to Know About Theranos' Rise and Fall*

⁴ Worland (2016), *What to Know About Theranos' Rise and Fall*

Elizabeth Holmes

Elizabeth Holmes, daughter of Noel and Christian Holmes, was born into a prominent Washington, D.C. family. Her father came from a distinguished family, with deep ties in politics and medicine. The Holmes family history heavily influenced Elizabeth, as she later told *The New Yorker* in an interview.⁵ She was bright and promising, excelling in school with a creative entrepreneurial spirit. Her family lost their social standing when her father, Vice President of the energy company Enron, became embroiled in the Enron scandal, and struggled to come to terms with their loss. Elizabeth was their hope they would one day regain their status.

At the age of 18, while studying chemical engineering at Stanford, Holmes filed a patent application for a “medical device for analyte monitoring and drug delivery”. A year later, she dropped out of Stanford to pursue Theranos full-time. Her professors had already begun to view her as a young Steve Jobs, aided by her deep voice and the black turtlenecks she purposefully, perpetually wore. Once her idea for Theranos had been finalized, she went to successful investor Tim Draper, a family friend. With Draper’s guidance and his million-dollar investment, she attracted prominent investors and venture capitalists Larry Ellison and Rupert Murdoch. Soon after, former secretaries of state George Shultz and Henry Kissinger, and former secretary of defense Jim Mattis joined Theranos’ board, creating powerful and well-connected advisory group with no medical or scientific experience⁶.

⁵ Carreyrou (2019). *Bad Blood: Secrets and Lies in a Silicon Valley Startup*

⁶ Matsangou (2019), *Elizabeth Holmes: the Rise and Fall of Silicon Valley’s Spin Doctor*

Entrepreneurship and Silicon Valley

Gender and Normalized Deviance

Entrepreneurship brings to mind scions like Bill Gates, Larry Page, Sergey Brin, and Steve Jobs. These legendary men shaped modern America, giving us a mold to cast all entrepreneurs in—college dropouts, social misfits who became charismatic and powerful *men*. And this is where we can see the STS framework of normalized deviance begin to rear its head. Normalized deviance, or “it’s technically wrong but it’s always worked.” A glass ceiling for women already exists, due largely to the perpetuation of societal views that women are the homemakers and men the breadwinners. These same factors create barriers to entry for women pursuing careers in entrepreneurship⁷.

In 2019, Fortune published a review showing that 482 teams of female founders in the US in 2018 combined raised \$2.88 billion in venture capital (VC). This was only 2.2% of the total \$130 billion of VC money invested in startups that year. All-male teams accounted for 76% of the total funding, and teams with at least one female founder only 12% (including the 2.2% to all-female teams). To top it off, the ten biggest VC raises of the year all went to teams led by men—all the VC female founders received put together was less than Juul (a company with male founders)⁸. These statistics, a marginal improvement over those recorded for 2017, providing definitive evidence of an institutional bias towards male founders over female founders.

From the beginning, Elizabeth Holmes was iconic. She was labelled “the next Steve Jobs” while still in college, and worked to live up to that title. As John Carreyrou stated in his book,

⁷ Sullivan and Meek (2012), *Gender and Entrepreneurship: a review and process model*

⁸ Hinchliffe (2019), *In 2018, All Femal Founders Put Together Got \$10 Billion Less Than Juul*

“Her emergence tapped into the public’s hunger to see a female entrepreneur break through in a technology world dominated by men... In Elizabeth Holmes, the Valley had its first female billionaire tech founder.”⁹ Society was basking in the fact that Holmes was living proof they were finally overcoming that normalized deviance. But then it was as if people were overcompensating and working to remove barriers in Holmes’ way to ensure a female founder would finally succeed.

Fake it ‘till you Make it

Silicon Valley today resounds with the mantra “fake it ‘till you make it.” Many companies encourage their employees to “fail fast,” prioritizing fast development and thus rapid increases in revenue over the stability of their product. This has always been the culture of the valley, and today, it is almost expected. This, also, is a perfect example of normalized deviance. Is it better for the users if a company fakes it until they make it? Probably not. But since it has almost always worked out in the past, no one has ever really questioned the viability of structuring a start-up around that culture. This culture directly correlates to Theranos’ longevity¹⁰.

Holmes perpetuated the “fake it ‘till you make it” culture within Theranos as well. Carreyrou found records of several employees who, at some point in their time at Theranos, noted something off with the successful test results produced by the Edison. These employees, although suspicious the device didn’t really work, were assuaged by upper management. They were also certain that even if the device wasn’t working perfectly at the moment, it would work eventually. In addition, no one else seemed to be concerned about the product failure, so there

⁹ Carreyrou (2019). *Bad Blood: Secrets and Lies in a Silicon Valley Startup*

¹⁰ <https://www.gsb.stanford.edu/insights/what-can-we-learn-downfall-theranos>

was no reason to worry.¹¹ Studies have shown that an individual and his/her beliefs can have a strong effect on the beliefs of a group, especially when the individual has some form of advantage over the group¹². Holmes' belief in the eventual success of her product was so absolute that it, coupled with her position of dominance over her employees, would have been enough to convince even those with misgivings that everything would work out in the end.

Theranos' Edison was a product that never really worked. Counterintuitively, that fact was never a deterrent to the company's growth. It was instead assumed the product would eventually work, and so the Theranos marketing teams continued wooing prospective customers, investors, and employees. Holmes never meant for Theranos to be a Ponzi scheme—she truly believed in her technology, and was merely channeling the “fake it ‘till you make it” culture of the valley. Holmes, with her utter and complete belief in herself and her product's ability to be successful, existed within a bubble of denial of her own creation. She refused to contemplate even the idea that the Edison would be a failure, and so continued to push her nonfunctional device. “Fake it ‘till you make it” had become so normalized that Holmes' behavior was deemed completely acceptable.

Trade Secrets and Structural Secrecy

From the beginning, Holmes was incredibly secretive of her technology. Theranos had never even undergone scientific peer review. Digging deeper, it could be seen that Holmes was vindictive and paranoid. In Carreyrou's book, he details firsthand accounts of employees who came to Holmes with concerns and discrepancies they noted across departments. Instead of

¹¹ Carreyrou (2019). *Bad Blood: Secrets and Lies in a Silicon Valley Startup*

¹² Moscovici and Magny (1983). *Minority Influence*

addressing the concerns and discrepancies, employees were either told to mind their own or were fired.¹³ This is a perfect example of how structural secrecy existed within Theranos. Structural secrecy exists when upper management actively works to isolate individuals or groups of individuals within an organization, in order to create ignorance between departments, and exactly how Theranos was structured. No department had direct interactions with other departments, but instead only information directly from management.

The STS frameworks of trading zones can be used to explain how this led to the longevity of the Theranos fraud. Trading zones exist when two disparate groups come together in cooperation. Despite their difference in expertise, they are able to collaborate to successfully design and develop solutions to complex issues. With Theranos, we can imagine a very different story, had the company culture been slightly different. If Theranos had placed even one advisor with a strong background in science or medicine on their board, there would have been a larger push for a proven viable proof of concept before the company went to market. There may even have been fewer investors ready to pour money into the company so early on. Had the Edison been peer-reviewed, its glaring issues would have been revealed much earlier. And had the engineering and marketing teams within the company been privy to the work the other was doing, the product itself may have turned out differently.

Conclusion

Theranos was a unicorn in Silicon Valley, that, at its peak, had a \$9 billion valuation. But, like a true unicorn, the core technology behind Theranos was purely a myth. The

¹³ Carreyrou (2019). *Bad Blood: Secrets and Lies in a Silicon Valley Startup*

unbelievable growth of the company can be very definitively attributed to society's eagerness to see a female founder shine in the same spotlight as Steve Jobs and Larry Page, Silicon Valley's dark and unhealthy "fake it 'till you make it" culture, and the lack of inter-disciplinary cooperation within Theranos. These factors can be very clearly explained using the STS frameworks of normalized deviance and trading zones. During my research, especially as I was reading *Bad Blood: Secrets and Lies in a Silicon Valley Startup*, I noticed the presence of many different individuals and groups of people whose interactions played a large role in Theranos' lifecycle. It would be very interesting to conduct further research and see if we could apply the Actor Network Theory (ANT) framework and specifically analyze the factors that brought about the collapse of Theranos.

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