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THERANOS: BETTING ON BLOOD

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Abstract

Theranos was a Silicon Valley start-up founded by Elizabeth Holmes in 2003. Holmes claimed to have developed a new blood-testing device that had the potential to revolutionize the healthcare industry. She established partnerships with Walgreens and Safeway to make her technology available nationwide. She also secured a prestigious board of directors and an equally impressive investor base that raised over \$700 million at a peak valuation of \$9 billion. However, an investigation by The Wall Street Journal revealed the company had misled investors and endangered patients' lives. In 2018, Theranos collapsed after years of battling lawsuits and federal charges.

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Theranos: Betting on Blood

“One of the most epic failures in corporate governance in the annals of American capitalism”.

- John Carreyrou¹

On June 28, 2019, a crowd of journalists awaited Elizabeth Holmes at the door of the San Jose Federal Court in California for a pre-trial hearing². She was accused of engaging in a multi-million-dollar scheme to defraud investors, doctors, and patients alongside her former partner, Ramesh “Sunny” Balwani. If convicted, the duo could face up to 20 years behind bars³.

Just five years prior, Holmes was the media darling of Silicon Valley and featured on the cover of Forbes, Fortune, and Inc. Magazine⁴. She was the founder of Theranos, a fast-growing biotech start-up that promised to revolutionize healthcare by making blood tests efficient, painless, and affordable. Holmes claimed to have developed a new portable device that could perform a full range of laboratory tests using only a few drops of blood from the finger at a fraction of competitors’ cost⁵. It was a highly disruptive invention that empowered patients with easy access to their health data and shifted the paradigm of modern medicine towards preventive care. The technology had the potential to be lifesaving⁶.

As a result, Holmes was hailed as a visionary⁷. She established partnerships with Walgreens and Safeway to deploy the technology nationwide. To fast-track the company’s success, Holmes carefully built a prestigious board of directors that included former Secretaries of State and other government heavyweights. Money began pouring in and by 2015 Theranos had raised over \$700 million reaching a \$9 billion valuation at its peak⁸. However, it all came crashing down when The Wall Street Journal (WSJ) reporter John Carreyrou published a series of articles questioning Theranos’ technology and practices⁹. The news story prompted investigations by regulatory

agencies, including the Food and Drug Administration (FDA) and the Centers for Medicare and Medicaid Services (CMS) which revealed systematic failures in lab testing that put patients' lives at risk¹⁰. In 2018, Theranos collapsed under the weight of numerous lawsuits and federal charges¹¹.

Dropping Out

Holmes grew up listening to stories of greatness. She was a descendant of the Fleischmanns, one of the wealthiest families in late 19th century America and her great-great-grandfather was a decorated WWI veteran and surgeon who established the Cincinnati General Hospital¹². Her parents had worked for government agencies in Washington, D.C., and had plenty of political connections. Therefore, from a young age, Holmes was driven to succeed. She dreamt not only of becoming a billionaire but also of making a difference in the world¹³.

In 2002, Holmes began studying chemical engineering at Stanford University, where she was named President's Scholar and received a \$3,000 grant to pursue a research project¹⁴. In her freshman year, she met the Senior Associate Dean of Stanford's School of Engineering, Channing Robertson, who was one of the leading experts on drug delivery-devices. Intrigued by Robertson's research, Holmes persuaded him to let her work in his lab alongside PhD students¹⁵. The following summer, she used her fluency in Mandarin to secure an internship at the Genome Institute of Singapore, where she tested patients for SARS, a viral respiratory disease, using only basic methods such as syringes and nasal swabs¹⁶. Convinced that there were more efficient ways to perform blood tests, she developed and patented a solution called the "TheraPatch." It was a wearable diagnostic device designed to administer medication and adjust dosages automatically by continuously sampling and testing patients' blood¹⁷.

Holmes pitched her invention to Stanford Professor of Medicine Dr. Phyllis Gardner, who swiftly dismissed the idea arguing it was inherently flawed¹⁸. However, Robertson was starstruck by Holmes' inventiveness stating "I realized that I could have just as well been looking into the eyes of a Steve Jobs or a Bill Gates"¹⁹. In 2003, eager to fulfill her vision, Holmes dropped out of college and used her tuition money to launch a company called Theranos (a mix of the words "therapy" and "diagnosis"). Robertson quickly joined the board as a technical advisor²⁰.

Seeking Capital

Funding started to fall into place as Robertson introduced Holmes to venture capitalists²¹. In meetings with investors, she insisted on retaining control over the company and stressed that profits would be reinvested back into the business²². Holmes also leveraged family connections, including family-friend and former neighbor Tim Draper, to raise much of the initial capital. Draper was a successful venture capitalist and a partner at DFJ Ventures, a firm known for early investments in companies like Hotmail and Tesla. He invested \$1 million while DFJ put in an additional \$500,000. Real estate financier and long-time family friend Victor Palmieri also invested²³. By early 2005, the company had raised \$6 million following its Series A funding round (**Exhibit 1**)²⁴. Despite the early fundraising success, Holmes failed to sway investors in the healthcare industry. MedVenture Associates and other life-science ventures turned down the opportunity as they questioned the viability of the product and grew apprehensive of Holmes' inability to answer technical questions²⁵.

The Secret Idea

As the TheraPatch proved itself too futuristic, Holmes shifted her vision towards a portable blood testing device that could be placed on patients' homes. The first prototype was developed in 2005 and named Theranos 1.0. To use it, patients would simply prick their fingers, collect a few drops

of blood into a cartridge, and insert it in a box, called a reader. The reader wirelessly connected to Theranos servers which analyzed the data and sent back the test results²⁶. The new idea yielded \$9 million in Series B financing and brought an array of new investors, including the acclaimed venture capitalist Donald Lucas and the founder of Oracle, Larry Ellison (**Exhibit 2**).

However, the level of miniaturization Holmes required the device to have posed significant challenges to her team of engineers. The biggest setback was the small samples of blood which had to be heavily diluted for the process to work, making tests results highly unreliable²⁷. The compartmentalization of information was another constraint, as Holmes discouraged employees from sharing information. As a result, progress was slow, development costs were high, and the company was rapidly burning through cash with nothing but faulty technology to show for it²⁸.

In need of a solution, Holmes licensed the unfinished devices to pharmaceutical companies as a way of helping them evaluate patients' reactions to drugs during clinical trials²⁹. Arguing that the technology could reduce operating costs by up to 30% and guaranteeing "gold standard" accuracy, Holmes secured over five deals with companies such as Pfizer and GlaxoSmithKline³⁰. When pitching to potential investors, Holmes estimated these deals would generate up to \$300 million in revenues over the following 18 months. If she closed another 15 deals, the total revenue could grow to \$1.5 billion (**Exhibit 3**)³¹. In late 2006, Theranos successfully raised another \$30 million during its Series C round.

Yet, Holmes had failed to disclose to investors that the deals were simple pilot studies contingent on product validation by the pharma companies³². Aware of Theranos 1.0's shortcomings, Holmes asked her team to pre-record results on the device's screen to be displayed at the end of each demonstration. As a result of this gimmick, the device seemed to work. The technique was effective in the first live demo to Novartis AG, a large Swiss pharmaceutical. When then Theranos' CFO

Henry Mosley found out, he grew uneasy believing they were deceiving investors. Mosley was already suspicious when Holmes had asked him to approve highly ambitious revenue projections without granting him access to the corresponding business contracts. When he voiced his concerns, Holmes fired him immediately and did not replace him until 2017³³. This was not an isolated incident. It also happened to Ana Arriola who joined Theranos as Chief Design Architect. She was one of several designers Holmes poached from Apple to give Theranos' devices the look and feel of the iPhone³⁴. When Arriola discovered Theranos was doing a study on terminal cancer patients for Pfizer using defective devices, she thought the company was crossing ethical lines. Nonetheless, Holmes was dismissive and pushed ahead with the study. After just a few months with the company, Ana Arriola resigned³⁵.

At this stage, protecting the intellectual property of the company was paramount to its founder. Theranos was clouded in secrecy to the extent that it did not have a website nor had published any peer-reviewed literature validating its technology. Furthermore, Holmes closely controlled the flow of information through non-disclosure agreements, active email surveillance, and social media tracking³⁶. This left most employees unaware of the extent of the device's failures. Those who knew and raised concerns were either sidelined, fired, or met with legal threats³⁷.

The situation worsened when Sunny Balwani joined Theranos in 2009 as President and COO, after lending the company \$12 million to keep it afloat since it was running out of cash³⁸. Balwani was a software engineer who made a fortune during the dotcom bubble as a co-founder of an e-commerce company. He met Holmes in Beijing in 2002 during a Stanford summer program. Despite the 20 years age difference, the pair eventually became romantically involved³⁹. Nonetheless, the true nature of their relationship remained concealed from both the board, the investors and other employees⁴⁰. Within the work environment, Balwani was known for being a

patronizing bully who antagonized employees through his aggressive and confrontational management style. His authoritarian approach earned him the nickname “The Enforcer” as he instilled a culture of fear inside the company. He put immense pressure on his teams, forcing people to work long hours and often made unreasonable demands⁴¹. As with Holmes, those who questioned him or failed to comply with his requests risked being fired. Consequently, Theranos became a revolving door of employees⁴².

A New Way

The plan of outsourcing the technology for clinical trials was collapsing. Deals with pharmaceutical companies would fall through as the flaws in Theranos devices could not be kept hidden during the comprehensive validation stages. After little progress with Theranos 1.0, Holmes developed a second sample processing unit in 2007 labeled the Edison. Inspired by a glue-dispensing robot, the Edison was a printer-size device containing a robotic arm that replicated the process followed by chemists in real labs. It diluted blood samples, added antibodies and reagents, and revealed a result⁴³. In theory, the Edison could run over 200 tests accurately and in real-time with only a drop of blood⁴⁴. Additionally, Theranos created the “nanotainer,” a proprietary glass vial designed as a non-invasive alternative to traditional phlebotomy techniques (**Exhibit 4**). This new technology finally allowed Elizabeth Holmes to focus on the consumer-centric business model she had initially envisioned.

In the U.S., blood-testing had hardly evolved since the 1960s⁴⁵. From a consumer perspective, blood draws continued to be inefficient as they require long needles, large blood samples and results could take up to weeks. Moreover, if patients were not covered by insurance, the process could be very costly⁴⁶. Yet more than 10 billion lab tests were performed annually, of which 70% represented the basis for medical decisions⁴⁷. It was a \$75 billion market, dominated by LabCorp

and Quest, who together had over 40% of market share. These companies enjoyed large economies of scale and had successfully deterred new entrants for more than a decade (**Exhibit 5 and 6**)⁴⁸.

Thus, Holmes saw an opportunity to entirely redesign the industry business model. By combining the Edison and the “nanotainer,” blood tests became much simpler. The results would be available within minutes and could be sent directly to consumers. Additionally, by using its own laboratory machines rather than buying third party equipment and supplies, Theranos claimed it could reduce costs by up to 90%⁴⁹. Holmes’ final goal was to have Edison devices “within five miles of every American home”⁵⁰. She believed that by increasing the affordability and convenience of blood testing, patients would get tested more often. As a result, the regular monitoring of health data could enable early detection of diseases and potentially save people’s lives⁵¹.

Partnering Up

In early 2010, Theranos had the chance to enter the mass consumer market by partnering with Walgreens. For the country’s largest drugstore chain, a partnership meant more than just offsetting margin pressures by increasing revenues. It was an opportunity to differentiate itself from its competitors by empowering people to live healthier lives⁵². The mutual interest led the two companies to agree to a pilot program that would put Edison devices in 41 stores by mid-2011⁵³. If successful after a few years, the project would expand to more than 7,500 stores nationwide⁵⁴.

Before closing the deal, Walgreens hired healthcare consultant Kevin Hunter to vet the project. Already skeptical of Theranos’ claims, Hunter requested a simple comparison study to validate the technology. He also asked to see the company’s commercial lab, but Holmes refused. Hunter saw these issues as red flags and told Walgreens that Holmes may have been overstating the device’s capabilities. Walgreens executives dismissed the warning⁵⁵. Not only were they taken by Holmes’

utopian vision, they also feared the missed opportunity would be picked up by its rival, CVS. As a result, Walgreens CFO fast-tracked the project by lending Theranos \$25 million and buying \$50 million worth of cartridges⁵⁶. Over time, Walgreens would invest up to \$140 million in Theranos, mostly in convertible debt instruments, despite not having access to its devices' data nor to the company's financial records⁵⁷.

Holmes also approached Safeway, a leading grocery chain in the United States. The company was struggling with weak results and had been using share buybacks to disguise the poor financial performance by artificially raising its earnings per share⁵⁸. With solutions running out, Theranos emerged as a unique opportunity to drive growth and innovation. Excited with the possibility of having the Edison in his stores, Safeway's CEO Steve Burd signed on as the exclusive supermarket provider of Theranos tests⁵⁹. The deal stipulated that Safeway was to loan Theranos \$30 million and build Wellness Centers in 800 of its stores⁶⁰. These centers were designed to be upscale clinics where customers could have their blood tested. In total, Safeway spent nearly \$350 million in remodeling its stores over a two-year period⁶¹.

In 2011, Holmes tried to secure a deal with the Department of Defense (DoD)⁶². She met the head of the U.S. Central Command, General Mattis at a military event where she briefly pitched her technology and its potential to save soldiers' lives. Mattis was a feverish protector of his troops and promptly agreed to a live field test. However, when officials at the DoD's medical department discovered that Holmes had tried to bypass FDA approval, they blocked the deal. But Mattis was unyielding in his demands and the officials settled for a limited research study to verify the device outside the battlefield. Two years later, Mattis retired and joined Theranos' board of directors⁶³.

Solving the Unsolvable

One simple yet debilitating issue prevailed: the Edison still failed to perform accurately despite being slightly more reliable than Theranos 1.0⁶⁴. Holmes stated that the device could perform a wide range of blood tests when it could only do immunoassays, a class of tests that uses antibodies to measure the concentration of substances in the blood. While these are useful to test for Vitamin D or detect certain cancer markers, they cannot be used in routine tests such as measuring cholesterol or blood sugar levels⁶⁵. The solution was to create the “miniLab,” an enhanced version of the Edison which could do additional classes of tests (**Exhibit 7**). This third-generation device contained a panoply of new instruments, but Holmes insisted it should remain the same size as its predecessor. A team of former NASA engineers now employed at Theranos began assembling a model based on large commercially available analyzers. Holmes was no longer pioneering new ways of testing blood, but rather miniaturizing existing technology⁶⁶.

Nevertheless, the challenges were enormous. The team put together a prototype by 2012 but it frequently malfunctioned. At this point, Theranos had already missed several rollout deadlines and was on the brink of losing its partnerships⁶⁷. Running out of time, Holmes stopped developing the miniLab and started using traditional laboratory equipment⁶⁸. Thus, instead of having its proprietary devices in stores, Theranos would FedEx patients’ blood samples to its Palo Alto lab for analysis. There, it ran most of the tests using conventional machines, such as the Siemens Advia 1800, which had been modified to be compatible with small blood samples⁶⁹. To avoid broader disclosure of the issue, Holmes allegedly set up a secret subsidiary to purchase the commercial analyzers. At the same time, both the board and investors were under the impression that tests were being performed on Theranos’ proprietary technology⁷⁰. When the Wellness Centers opened, only 15 of the 240 tests offered were run on the Edison and patients were having their blood drawn using both the nanotainer collection device and traditional needles^{71,72}.

Corporate Governance at Theranos

Avie Tevanian joined Theranos' board of directors in 2006 (**Exhibit 8**). He was Steve Jobs' former right-hand man at Apple and had only recently retired when Holmes invited him to be part of her project. Captivated by her passion and entrepreneurial spirit, Tevanian invested \$1.5 million in Theranos' preferred stock⁷³. However, after just a few months with the company, he started to get frustrated. The revenue projections Holmes presented to the board were increasingly optimistic and were based on deals that did not seem to materialize. On top of that, there were consistent delays in product rollouts and the CFO had just been fired. When Tevanian queried Holmes about these issues and asked to see copies of the licensing contracts, she deflected his questions claiming the documents were "held under legal review"⁷⁴. During a board meeting in late 2007, Holmes proposed granting special stock to a non-profit foundation that she created for "tax-planning purposes." Tevanian opposed it as he believed it would provide Holmes with additional voting control at the expense of other shareholders. Shortly after the meeting, Tevanian received a call from board chairman Donald Lucas who suggested he should resign as Holmes felt he was "asking too many questions." Tevanian agreed⁷⁵.

Just months after his departure, Theranos' general counsel Michael Esquivel presented evidence that Holmes had exaggerated revenue projections which were "impossible to reconcile with the unfinished state of the product." This time, the board decided to replace Holmes with a more experienced chief executive. However, after confronting her with the verdict, she convinced them otherwise by promising to be more transparent going forward. After managing to hold on to her seat, Holmes fired Esquivel⁷⁶.

When the company faced national expansion five years later, Holmes began an overhaul of the board. The first addition was former Secretary of State George Schultz, who was fascinated by

Holmes' "purity of motivation" and by what Theranos' technology could mean for the healthcare industry. Schultz then persuaded other renowned figures of the North American political scene to join the board, such as former Secretary of State and Nobel laureate Henry Kissinger. "Elizabeth's iron determination and great intellectual ability turned me from a mild skeptic to an enthusiast," Kissinger said⁷⁷. Amidst the board restructure, Holmes pushed for the implementation of a dual-class share structure. In 2013, the company asked investors to consent to a 5-to-1 forward stock split of its Series C1 preferred shares, as it anticipated further capital raises. Class A shareholders would get 1 vote per share, while Class B shareholders would get 100. In addition, all of the Class A stock held by Holmes would be exchanged for Class B, further solidifying her voting power⁷⁸. Nevertheless, the board kept growing and by 2014 it increased from 5 to 12 directors (**Exhibit 9**). According to Fortune magazine, this might have been "the most illustrious board in U.S. corporate history"⁷⁹. Despite receiving stock options in exchange for their positions, the new board members all held very limited roles (**Exhibit 10**)⁸⁰.

Media Sensation

After years of working under a cloak of secrecy, Theranos finally came out of stealth mode. On September 7th, 2013 the WSJ published a story touting Theranos' technology as revolutionary⁸¹. The timing was not left at chance. Holmes had used her board connections to align the article's publication with the Wellness Centres' launch in Walgreens stores just two days after⁸². From then on, Holmes started building a brand. She hired the prominent advertising agency Chiat\Day known for Apple's successful "Think Different" campaign. The company was responsible for the website and marketing campaigns, which set the focus on how Theranos' devices only required a drop of blood. The "nanotainer" instantly became a synonym of painless medicine (**Exhibit 11**)⁸³. In addition, Holmes hired Oscar-winning filmmaker Errol Morris to direct Theranos' commercials.

Thereafter, the company quickly began gaining traction. Holmes was a charismatic young entrepreneur driven by a compelling mission and had over 270 patent applications under her name⁸⁴. Her iconic black turtleneck outfit and decision to drop out of Stanford quickly drew comparisons to Steve Jobs as she strived to create her self-proclaimed “iPod of healthcare”⁸⁵. Holmes also encouraged transparency in pricing and publicly promoted FDA monitoring, but how her technology worked remained a closely held trade secret⁸⁶.

By 2014, money was flowing into Silicon Valley and companies were reaching impressive valuations as investors searched for the “next big thing” (**Exhibit 12** and **13**). Unlike the dotcom bubble years before, companies were staying private and accumulating wealth instead of going public⁸⁷. Ahead of a new fundraising round, Holmes pitched Theranos to Partner Management Fund (PFM), a San Francisco Hedge Fund with a broad healthcare portfolio. In the marketing material provided, Holmes outlined plans to deploy the devices in hospitals, drugstores, doctor’s offices as well as on the battlefield⁸⁸. It also stated that Theranos’ technology had been extensively validated by independent auditors⁸⁹. But this information was misleading. The devices had never passed the DoD research phase and pharma companies had only done “limited exploratory work through a few pilot projects”^{90,91}. Assuming the deals in the pipeline would generate substantial revenues, Balwani sent unaudited financial projections to PFM executives that made a compelling case; he forecasted more than \$100 million in sales for 2014 and \$1 billion in 2015⁹². However, these did not match the projections presented internally to Theranos’ board and employees (**Exhibit 14**)⁹³. Nevertheless, PFM trusted Holmes as it had a prominent board backing her claims (**Exhibit 15**). Thus, in February 2014, PFM invested \$96 million at a \$9 billion valuation believing the company had several catalysts promoting growth⁹⁴. Holmes owned 50% of the company and became the “youngest self-made billionaire in the world.”⁹⁵

Holmes started to feature regularly on magazine covers, TV shows and tech conferences (**Exhibit 16**). Her story as a woman thriving in a male-dominated environment inspired and empowered young women to pursue careers in science and engineering⁹⁶. Accolades soon followed. She was named Time Magazine's one of the 100 most influential people in the world, joined Harvard Medical School Board of Fellows and was named one of "Five Visionary Tech Entrepreneurs Who Are Changing the World" by The New York Times⁹⁷. The extensive media coverage brought along a new wave of investors as Theranos seemed like a winning bet. This time, several high-profile individuals invested, such as billionaire Rupert Murdoch, Carlos Slim, or the Walton family. The publicity also enabled Theranos to strike a deal with health insurance company Capital BlueCross, allowing it to open new Wellness Centers in Pennsylvania.⁹⁸ Moreover, the company landed "strategic alliances" with academic medical center Cleveland Clinic and healthcare organization AmeriHealth Caritas which would make its point-of-care devices widely available to the public⁹⁹. Holmes' lobbying efforts also helped the state of Arizona to pass a bill in 2015, allowing patients to order lab tests without doctors' approval. The law gathered widespread support from legislators, who lauded Holmes' efforts to advance preventative medicine¹⁰⁰. Despite the surging number of deals, the number of life-sciences VCs and corporate ventures onboard remained low.

Under Fire

After a lengthy investigation into the company, John Carreyrou published an article on the cover of the WSJ in October 2015. It detailed how Theranos was struggling to turn its technology into reality¹⁰¹. For months, Theranos' attorneys had been trying to stonewall the story by intimidating Carreyrou's confidential sources but were unsuccessful¹⁰². The report revealed that Theranos' devices could only perform a fraction of the available tests and the company was using commercial analyzers to run most of the tests. It also exposed the fact employees had tampered with quality

control checks causing validation results to overstate the device's accuracy and reliability. Consequently, numerous patients received erroneous test results (**Exhibit 17**)¹⁰³. The company quickly came under heavy fire from the public and found itself targeted in investigations by the FDA, CMS and the SEC (**Exhibit 18**)¹⁰⁴.

Dealing with a PR Crisis and facing criticism over the lack of medical experts on the board, Holmes decided to reorganise Theranos' governance structure. The board of directors was downsized to 5 members and rearranged into two separate bodies: a governing board and a non-voting board of counsellors with advisory responsibilities¹⁰⁵. Some of the original members of the board, such as Kissinger and Schultz were transferred to the board of counsellors. At the same time, Holmes added the company's legal advisor David Boies to the governing board. Boies was a prominent litigation lawyer and was first hired by Theranos to represent the company in a patent dispute case. Since Boies regularly took a venture capitalist approach to cases, he was paid in stock rather than regular fees¹⁰⁶. Furthermore, Holmes created a scientific board which included medical experts responsible for helping the company improve its operations and build quality infrastructure¹⁰⁷. While this board initially consisted of only four members, it expanded to ten just five months later (**Exhibit 19**)¹⁰⁸.

Unicorn Down

The board overhaul was not enough to deter critics as the WSJ story had set the company down an irreversible path. In January 2016, the CMS warned Theranos its lab posed a safety risk to patients after finding infractions related to deficient practices, inaccurate testing and unqualified personnel¹⁰⁹. A few months later it revoked Theranos' license to operate labs and banned Holmes from the industry for two years¹¹⁰. In an effort to win back investor's confidence, Theranos added two new executives to lead the quality and compliance teams¹¹¹. However, after growing weary of the mounting regulatory troubles and negative publicity, both Safeway and Walgreens terminated

their partnerships with Theranos and shut down all of the Wellness Centers¹¹². This decision cost the company its primary source of revenue, forcing it to lay off 340 employees¹¹³. Deprived of direct access to consumers, Holmes finally unveils the miniLab at a medical conference¹¹⁴. The device which could allegedly analyze blood samples remotely through cloud computing, signaled a shift in the company's business model¹¹⁵. Yet, scientists remained skeptical.

On top of all the federal probes and heavy regulatory sanctions, Theranos was drowning in litigation¹¹⁶. Indictments and class-action lawsuits kept piling up, forcing the company to commit more financial resources to its lawyers than to the development of its technology¹¹⁷. Facing imminent cash shortages, Holmes offered to double investors preferred shares in exchange for their rights to sue¹¹⁸. Yet, the company continued in desperate need of capital to cover existing settlements. As a result, Theranos secured a \$100 million collateralized loan from private equity firm Fortress Group in December 2017¹¹⁹. In March 2018, the SEC accused Holmes and Balwani of “raising more than \$700 million from investors through an elaborate, years-long fraud”¹²⁰. Holmes settled but was forced to surrender voting control of the business, barred from being a director of a public company and paid a \$500,000 fine¹²¹. The situation inevitably took a turn for the worse when the Department of Justice criminally charged Holmes and Balwani with fraud in June 2018¹²². Left with no other choice, Holmes stepped down as CEO¹²³. In a critical state, the company defaulted on the credit facility it had received just one year earlier. Unable to pay both its creditors and shareholders, the new CEO, David Taylor, announced a formal dissolution¹²⁴. The once high-flying unicorn had run out of time.

As of the writing of this case, both Elizabeth Holmes and Ramesh “Sunny” Balwani are scheduled to face trial in federal court in August 2020¹²⁵.

Appendix

Exhibit 1 – Theranos Founding Rounds and Valuation

Date	Type	Stage	Round	Deal Terms	Funding	Valuation
June 2014	Equity	Early Stage	Seed	Conventional Convertible	\$500k	-
December 2004	Equity	Early Stage	Series A	Conventional Convertible	\$5.8M	\$23.5M
February 2006	Equity	Early Stage	Series B	Participating Preferred	\$9.1M	\$41.4M
November 2006	Equity	Expansion	Series C	Participating Preferred	\$32.4M	\$165.4 M
July 2010	Equity	Expansion	Series C1	Participating Preferred	\$45M	\$932M
February 20014	Equity	Later Stage	Series C2	Participating Preferred	\$200M	\$9B
March 2015	Equity	Later Stage	Series C2	Participating Preferred	\$432.7M	\$9B
December 2017	Debt	Later Stage	-	Collateralized Loan	\$100M	-

Disclaimer: Exhibit 1 was compiled using different sources and may contain errors.

Source: *Crunchbase*. 2019. *Crunchbase Inc.*

<https://www.crunchbase.com/organization/theranos#section-lists-featuring-this-company>

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Exhibit 2 – List of known Theranos’ Investors

Investor	Background	Amount	Round
Investments between 2003 and 2013			
DFJ Ventures	Venture Capital Firm (focus on tech)	\$500K	Seed, Series A, B, C
Chang, Esoom Taipei	Multi-billion dollar distribution group; leading distributor of high technology devices in Asia	-	Series A
Jupiter Partners	Venture Capital and Private Equity Firm (focus on tech)	-	Series A
Victor Palmieri	Real Estate Investor	-	Series A
Tim Draper	Venture Capitalist (focus on tech)	\$1M	Series A
Donal L. Lucas	Venture Capital (focus on tech)	-	Series A
ATA Ventures	Early Stage Venture Capital (focus on tech)	-	Series B and C
Larry Ellison / Tako Ventures	Trust Fund / VC firm (focus on biotech)	-	Series B
Ray Bingham, BJ Cassin, Others	Private Equity Firms (focus on tech)	-	Series B
Doll Capital Management	Venture Capital Firm (focus on tech and telecommunications)	-	Series C
Avie Tevanian	Individual Investor / Board Member	\$1.5M	Series C
Investments between 2013 and 2018			
SandBox	Corporate Venture Fund program (manages investments for Blue Cross and Blue Shield insurance plans)	\$1.5M	Series C1
Blue Venture Fund	Corporate Venture Fund program	\$8.5M	Series C1
Richard Kovacevich	Board Member	\$4M	-
Walton Family	Heirs of Walmart founder	\$150M	Series C2
Rupert Murdoch	Executive chairman, 21st Century Fox/News Corp	\$125M	Series C2
Betsy DeVos	U.S. Education Secretary in Trump administration	\$100M	Series C2
Cox Family	Family-controlled conglomerate; Media & Telecomms	\$100M	Series C2
Carlos Slim	Media Investor; Mexican Tycoon	\$30M	Series C2
Andreas Dracopoulos	Greek shipping magnate	\$25M	Series C2
Oppenheimer family	Ex-De beers owners	\$20M	Series C2
Riley Betchel	Ex-chairman of the Bechtel Group	\$6.2M	-
Daniel L. Mosley	Estate attorney at Cravath, Swaine & Moore	\$6M	Series C2
Robert Kraft	New England Patriots owner	\$1M	Series C2
John Elkann	Italian industrialist and owner of Fiat Chrysler	-	Series C2
Robert Colman	Retired Investment Banker specialized in technology deals	-	Series C2
Partner Fund Management	Hedge Fund with a large healthcare portfolio	\$96.1M	Series C2
Fortress Investment Group	Private-equity firm and subsidiary of SoftBank Group	\$100M	-

Note: "-" means that data is not available

Disclaimer: Exhibit 2 was compiled using different sources and may contain errors.

Source: *Crunchbase*. 2019. *Crunchbase Inc.* <https://www.crunchbase.com/organization/theranos#section-lists-featuring-this-company> (accessed September 20, 2019); *Axios*. 2019. *Axios Media.* <https://www.axios.com/exclusive-theranos-2006-pitch-deck-1513299967-ad008bbd-b684-4e3f-9301-5d560668d488.html> (accessed November 3, 2019); **Carreyrou, John, Christopher Weaver and Michael Siconolfi**. 2016. “Big names take hit on Theranos.” *The Wall Street Journal*. November 28. <https://www.wsj.com/articles/big-names-take-hit-on-theranos-1480379536> (accessed December 17, 2019); **Leuty, John**. 2018. “Ultimately, Elizabeth made the decisions’: A look inside Theranos’ ineffective board.” *San Francisco Business Times*. August 7. <https://www.bizjournals.com/sanfrancisco/news/2018/08/07/theranos-elizabeth-holmes-board-kovacevich-shultz.html> (accessed December 16, 2019); **HBS Law**. 2016. *Hagens Berman Sobol Shapiro LLP.* https://www.hbsslw.com/uploads/case_downloads/theranos/11.28.16_theranos_hagens_berman_consolidated_complaint.pdf?fbclid=IwAR027XJB7JgNfDWUGYM3QTC-0xwZ-zLRCF5HPFo5Zwsj-KLCTxdgjjCzpv (accessed November 17, 2019)

Exhibit 3 - Theranos “A Presentation for Investors” (June 2006) - Business Highlights

Theranos Today (Revenue Projections)

Existing deals

- 6 Deals (5 companies): \$6-12M for validation phase
- 6 Phase IV Clinical Trials: \$20-\$50 million per year
- Total estimated revenue: \$120-\$300 million in 1.5 years

Deals Under Negotiation

- 15 Deals (10 companies and 1 government agency)
- \$12-52M for validation
- \$300-\$750M for phase IVs

Total estimated revenue:
\$120 million - \$1.5 billion

Market Research & Opportunities

Total Available Market (Phase IV Clinical Trials)

- Phase IV Clinical Market: \$39 billion per year
- Number of ongoing trials per year: 600 to 800
- Average Theranos Revenue per trial: \$50 million
- \$7,500 “Information Fee” per patient every four months
- Average: 2,000 to 10,000 patients per trial

Total Available Market (Pharmaceutical Preclinical Market)

- Pre-clinical Market: \$10 billion per year
 - \$5 million annual revenue per research group
 - 133 groups per pharmaceutical company
 - 15 companies of this size

Note: numbers exclude sales to academic institutions (one of largest preclinical segments)

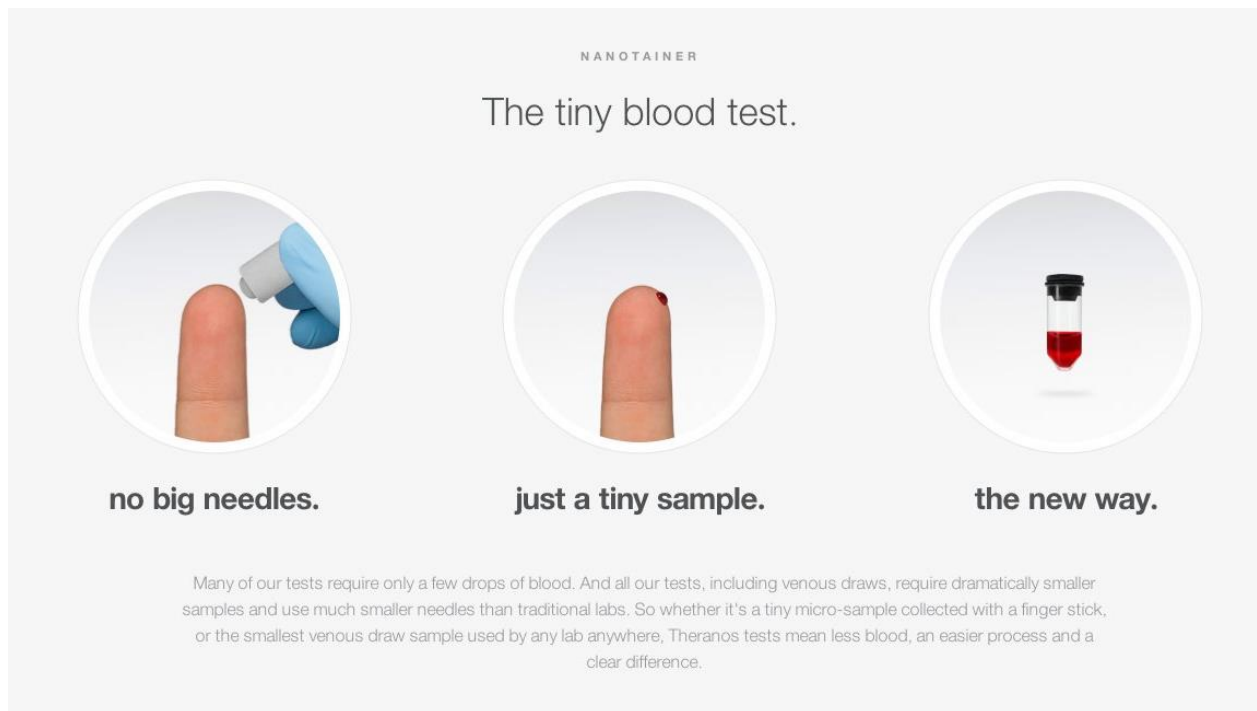
Drivers for Success

- First mover advantage
- Combination of several technology makes reproducing the solution difficult
- Innovation Pipeline: next generation systems
- Strong Customer Base, Speed to Market and Focus on quality
- Patents
- Management and Culture

Source: Adapted from **Axios**. 2019. *Axios Media*. <https://www.axios.com/exclusive-theranos-2006-pitch-deck-1513299967-ad008bbd-b684-4e3f-9301-5d560668d488.html> (accessed November 3, 2019);

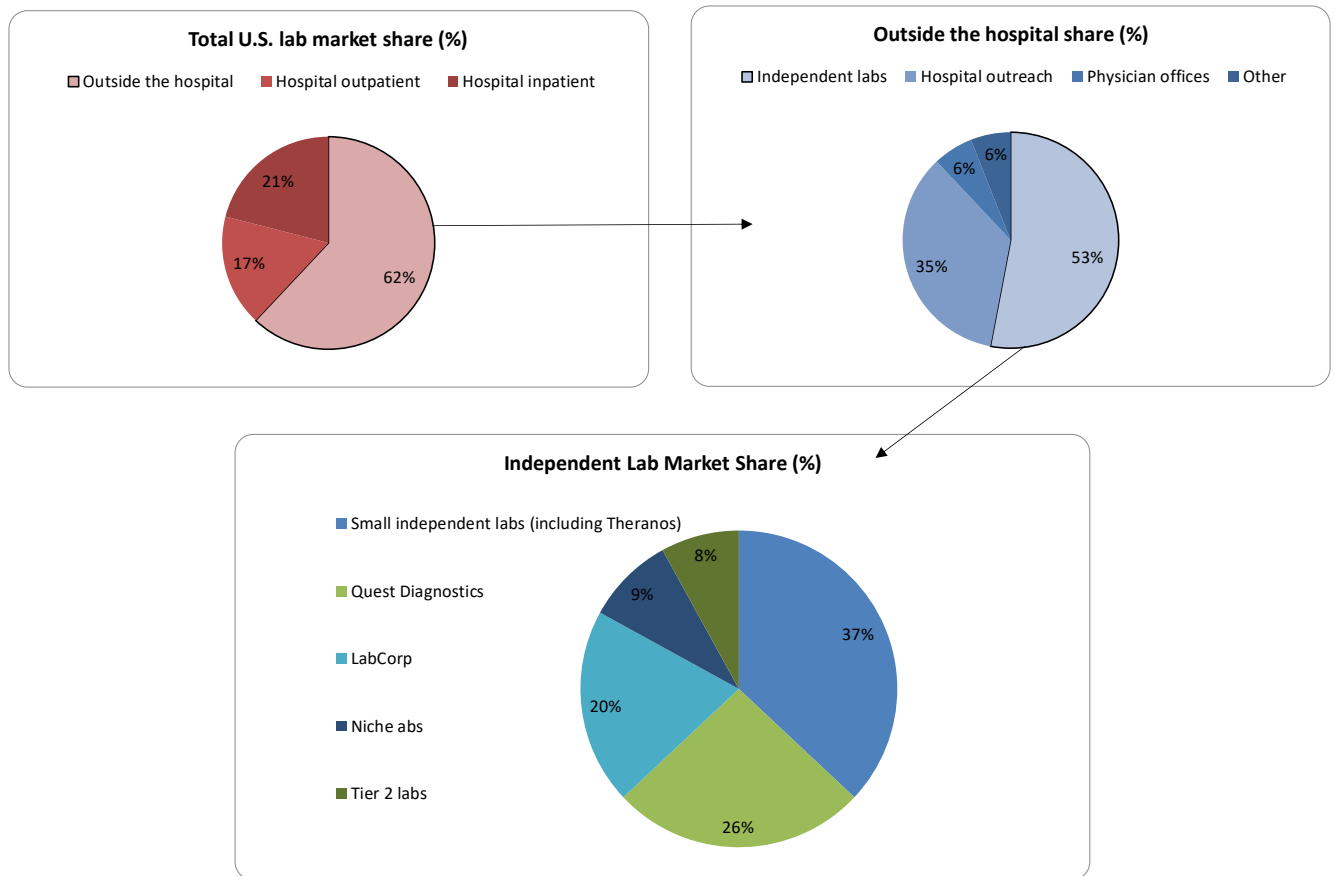
Carreyrou, John. 2018. *Bad Blood: Secrets and Lies in a Silicon Valley Startup*. New York. Alfred A. Knoph.

Exhibit 4 - Theranos sample collection device: the “Nanotainer”



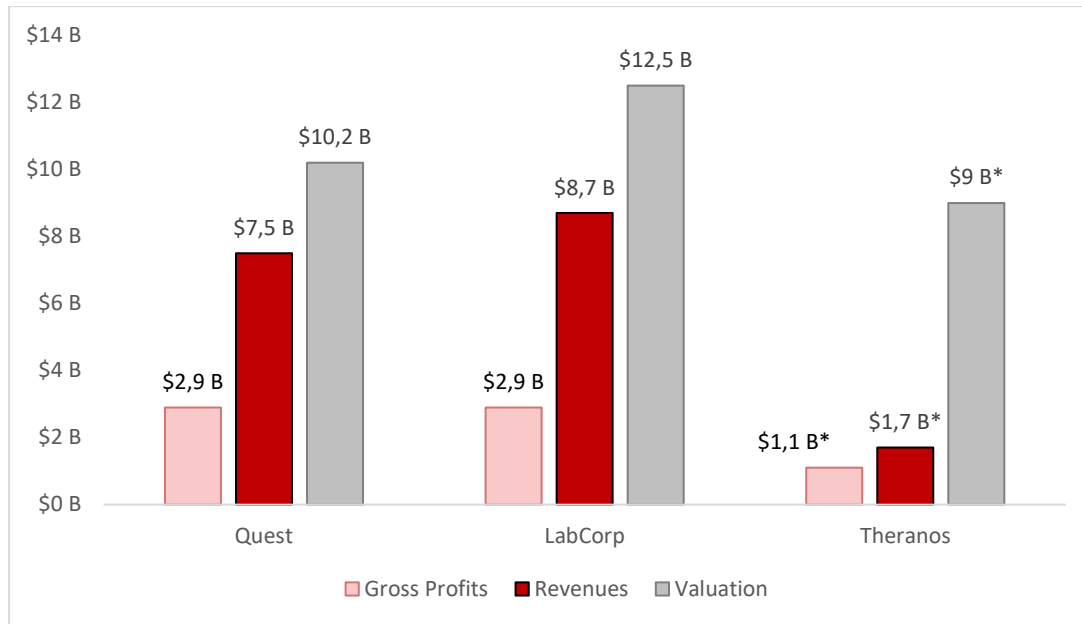
Source: Loria, Kevin. 2015. “Here's exactly what we know about how Theranos' 'revolutionary' technology works.” *Business Insider*. October 17. <https://www.businessinsider.com/how-theranos-revolutionary-technology-works-2015-10> (accessed November 29, 2019)

Exhibit 5 – The \$75B Lab Market: Breakdown of US Medical Lab Testing Market Share (2015)



Source: Adapted from **Crow, David and Adam Samson.** 2015. “Theranos blood labs under fresh scrutiny on staffing and quality.” *Financial Times*. October 24. <https://www.ft.com/content/67c9b894-7903-11e5-a95a-27d368e1ddf7> (accessed December 10, 2019)

Exhibit 6 – Valuation Comparison – Quest vs. LabCorp vs. Theranos (FY 2015)



*Estimated by Theranos for FY 2015; real value of revenues was less than \$100,000

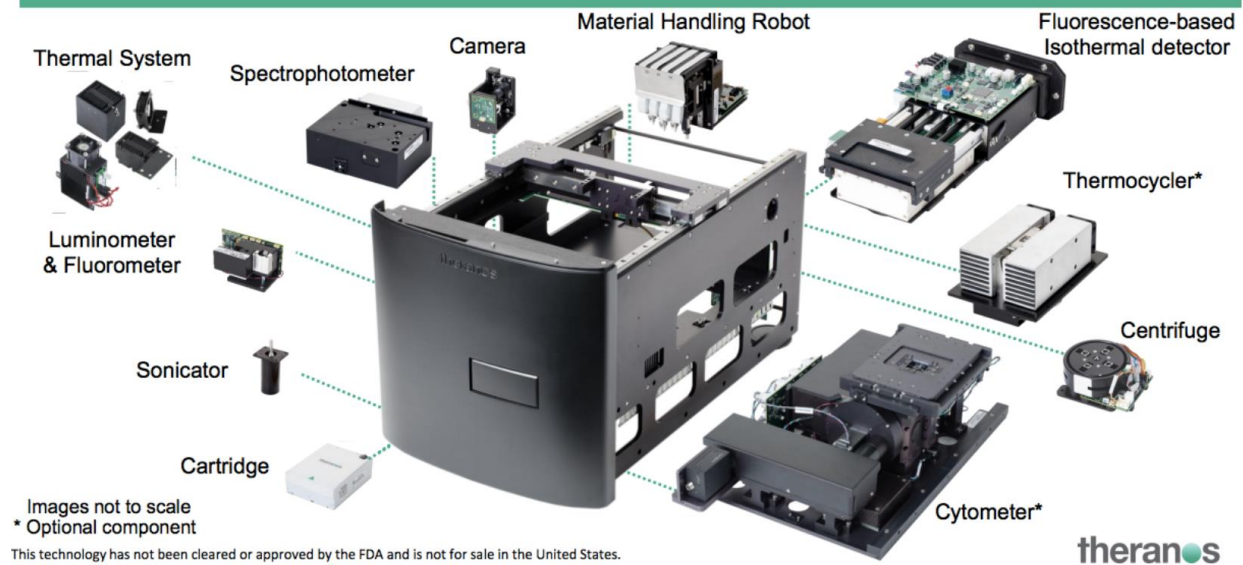
Bloomberg descriptions

Quest Diagnostics Inc: the company provides diagnostic testing services in the United States. It operates a national network of full-service laboratories, rapid response laboratories, and patient service centers. It has 46,000 employees as of 31/12/2018.

Laboratory Corporation (LabCorp): clinical laboratory company that offers laboratory tests used by the medical profession in routine testing, patient diagnosis, and in the monitoring and treatment of disease. It generates most of its revenue from the United States, but also operates in other countries, such as the U.K., Switzerland and Canada. As of December 2018, the firm employed approximately 60,000 people.

Source: Bloomberg; **The United States Attorney’s Office.** 2019. United States Department of Justice. <https://www.justice.gov/usao-ndca/us-v-elizabeth-holmes-et-al> (November 2, 2019)

Theranos Sample Processing Unit (miniLab)



Source: Buhr, Sarah. 2016. “Unpacking the innards of Theranos’s new Zika-detection box.” *Techcrunch*. August 6. <https://techcrunch.com/2016/08/05/unpacking-theranoss-magic-zika-detection-box/> (accessed November 29, 2019)

Exhibit 8 – Theranos Board of Directors (2006)

Member	Background
Elizabeth Holmes <i>(CEO)</i>	Theranos founder and CEO
Donald L. Lucas <i>(Chairman)</i>	Private venture capitalist and early investor in Oracle Corporation. He was Chairman of Oracle (1980 -1990) and served as director in several Silicon Valley tech firms, such as DexCom, PDF Solutions, Spansion, Vimicro International.
Pete Thomas <i>(Director)</i>	Co-founder and Managing Director of ATA Ventures (early investor in Theranos). Over 15 years of experience in venture capital, 10+ years of experience in industry companies such as Intel Corporation. Previously served as director of 6 different companies. Thomas has a BSEE degree from Utah State University and a MS degree in Computer Science from the University of Santa Clara.
Avie Tevanian <i>(Director)</i>	Chief Software Technology Officer at Apple (2003-2006), Vice President of Software Engineering at Apple (1997-2003). Tevanian has a BA in mathematics from the University of Rochester and holds both MS and PhD degrees in computer science from Carnegie Mellon University.
Channing Robertson <i>(Director & Technical Consultant)</i>	Senior Associate Dean and professor of Chemical Engineering at Stanford University. Founding fellow of the American Institute of Medical and Biological Engineering. Robertson holds a BS in Chemical Engineering from the University of California at Berkeley and both a MS & PhD in Chemical Engineering from Stanford University.

Source: Carreyrou, John. 2018. *Bad Blood: Secrets and Lies in a Silicon Valley Startup*. New York. Alfred A. Knoph.; **ATA Ventures.** 2019. *ATA Ventures*. <http://ataventures.com/team/pete-thomas/> (accessed December 15, 2019); **Donald Lucas.** 2019. *N.d. Financial Times Conferences*. http://www.ftconferences.com/userfiles/file/Lucas_Don.pdf (accessed December 15, 2019); **World Health Organisation.** 2019. *WHO*. https://www.who.int/tobacco/global_interaction/tobreg/members/robertson/en/ (accessed November 19, 2019)

Exhibit 9 – Theranos Board of Directors (2014)

Member	Background
Elizabeth Holmes <i>(Chairman & CEO)</i>	Theranos founder, Chairman and CEO
Sunny Balwani <i>(President, COO & Director)</i>	Former founder, President and CTO at CommerceBid.com (1999–2001). Previously, Sunny worked as software engineer for Lotus Development Corporation (IBM) and Microsoft. He holds a BA in Information Systems from the University of Texas at Austin and an MBA from University of California at Berkeley.
George P. Schultz <i>(Director)</i>	Former U.S. Secretary of State (1982–1989), U.S. Secretary of Treasury (1972–1974), first director of the Office of Management and Budget (1970–1972) and U.S. Secretary of Labor (1969–1970). Schultz was also President and director of the Bechtel Group and a former professor of international economics at Stanford University. He is a fellow at the Hoover Institution and a recipient of the Presidential Medal of Freedom. Schultz holds a BA in economics from Princeton University and a PhD in Industrial Economics from MIT.
Gary Roughead <i>(Director)</i>	Former U.S. Navy Admiral who served as the 29 th Chief of Naval Operations. Roughed graduated from the U.S. Naval Academy in 1973 and has since held six operational commands. He is a fellow at the Hoover Institution and the recipient of several awards, including the Defense Distinguished Service Medal, Navy Distinguished Service Medal and Legion of Merit.
William J. Perry <i>(Director)</i>	Former U.S. Secretary of Defense (1994–1997), deputy Secretary of Defense (1993–1994) and undersecretary of Defense for Research and Engineering (1977–1981). Perry is a senior fellow at the Hoover Institution, a professor at Stanford University and a recipient of the Presidential Medal of Freedom. He received a BS and MS from Stanford University and a PhD from Pennsylvania State University, all in mathematics.
Samuel Nunn <i>(Director)</i>	Former U.S. Senator from Georgia (1972–1996) and chairman of the Senate Armed Services Committee (1987–1995). Nunn was also on the Intelligence and Small Business Committees. He served as a board member of the Coca-Cola Company and General Electric Company and is a fellow at the Hoover Institution. He graduated with honors from Emory Law School.
James Mattis <i>(Director)</i>	Former U.S. Marine Corps General who served as Commander of the U.S. Central Command (2010–2013), Commander of U.S. Joint Forces Command (2007–2010) and as NATO’s Supreme Allied Commander for Transformation (2007–2009). Later on, he would also serve as the 26 th U.S. Secretary of Defense (2017–2019) in the Trump Administration. Mattis is a fellow at the Hoover Institution.
Henry A. Kissinger <i>(Director)</i>	Former U.S. Secretary of State (1973–1977), U.S. National Security Advisor (1969–1975) and member of the Defense Policy Board (2001-2016). Kissinger is a fellow at the Hoover Institution, Honor Member of the International Olympic Committee and served on the board of ContiGroup Companies (1988–2014). He is the recipient of the Nobel Peace Prize (1973), the Presidential Medal of Freedom and of a Bronze Star from the U.S. Army. Kissinger holds a BA in Political Science from Harvard College and received an MA and PhD degrees from Harvard University.
William H. Frist, MD <i>(Director)</i>	Former U.S. Senator from Tennessee (1994–2006) and Senate Majority Leader (2003–2006). Frist was a renowned heart and lung transplant surgeon and a professor of surgery at Vanderbilt University. He served as chairman of private equity firm Cressey & Company and held board positions in 3 public companies as well as numerous institutions, including Harvard Medical School Board of Fellows. Frist graduated from Princeton University and Harvard Medical School.
William H. Foege, MD <i>(Director)</i>	Physician and epidemiologist. Foege served as the Director of the Centers for Disease Control and Prevention (1977–1983) as well as Executive Director of The Carter Center (1986–1992). He is also a former professor of International Health at Emory University. Foege received his medical degree from the University of Washington, and his Master of Public Health from Harvard University.
Riley P. Betchel <i>(Director)</i>	Chairman (1990–2017) and former CEO (1990–1996) of Bechtel Group. He is a director of Fremont Investors and a member of Fremont Group’s Board of Advisors. He received a combined JD and MBA degree from Stanford University’s School of Law and Graduate School of Business. Betchel also has a bachelor’s degree in political science and psychology from the University of California at Davis.
Richard Kovacevich <i>(Director)</i>	Former Chairman (2001–2009), President (1998–2005) and CEO (1998–2007) of Wells Fargo. Kovacevich previously served on the boards of directors of Cisco Systems, Target, PetSmart, Northern States Power Company and ReliaStar Financial Corporation. He holds a BS and MS in Industrial Engineering as well as an MBA from Stanford University.

Note: average board age was 70 years ; without Holmes and Balwani average age is 76 years

Source: Reingold, Jennifer. 2015. “Theranos’ board: Plenty of political connections, little relevant expertise.” *Fortune*. October 15. <https://fortune.com/2015/10/15/theranos-board->

[leadership/](#) (accessed November 30, 2019); **Feuerstein Adam, Damian Garde and Rebecca Robbins**. “Investigators say his fingerprints are all over financial crime at Theranos. Why is he a virtual ghost?”. *Stat News*. March 19. <https://www.statnews.com/2018/03/19/theranos-ramesh-balwani/> (accessed November 2, 2019); **Hoover Institution**. 2019. *Board of Trustees of Leland Stanford Junior University*. <https://www.hoover.org/fellows> (accessed December 11, 2019); **Bill Frist**. 2019. *Bill Frist*. <http://billfrist.com/extended-biography/> (accessed December 11, 2019); **Henry A. Kissinger**. 2019. *Henry A. Kissinger*. <https://www.henryakissinger.com/> (accessed December 12, 2019); **Emory University**. 2019. *Emory University*. <http://www.ph-leader.emory.edu/people/bio-section-faculty/foege-william.html> (accessed December 14, 2019); **Betchel**. 2019. *Bechtel Corporation*. <https://www.bechtel.com/about-us/leadership/riley-bechtel/> (accessed December 16, 2019); **Hudson Executive Capital**. 2019. *Hudson Executive Capital*. <https://www.hudsonexecutive.com/our-team/> (accessed December 16, 2019)

Exhibit 10 – Partially redacted article by The WSJ about Theranos’ board response to the Crisis

(May 30, 2017)

Court Documents Shed Light on Theranos Board’s Response to Crisis

Two former Theranos Inc. directors said they didn’t follow up on public allegations that the Silicon Valley blood-testing firm was relying on standard technology rather than its much-hyped proprietary device for most tests, according to newly released court documents. (...)

In depositions, the highly decorated former directors—former U.S. Navy Adm. Gary Roughead and former U.S. Secretary of State George Shultz—who were board members when concerns of employees and regulators became public—said they didn’t question Theranos founder Elizabeth Holmes about the matter. Both former directors said (...) that they thought Theranos could do all its patient tests on its proprietary device. Regulators said last year that Theranos only did a dozen types of patient tests on its own system.

“I don’t have the information that would tell me that it’s true or not true,” Mr. Roughead testified on March 24, referring to reports that Theranos relied on standard devices. Asked whether he ever asked Ms. Holmes about the matter, Mr. Roughead said: “I did not ask her directly, no.” Asked whether he questioned anyone else at the company, Mr. Roughead said: “I did not.”

Mr. Shultz separately testified that he “didn’t probe into” whether the firm’s technology was working, adding: “It didn’t occur to me.” He added: “Since I didn’t know, I didn’t have anything to look into.” (...)

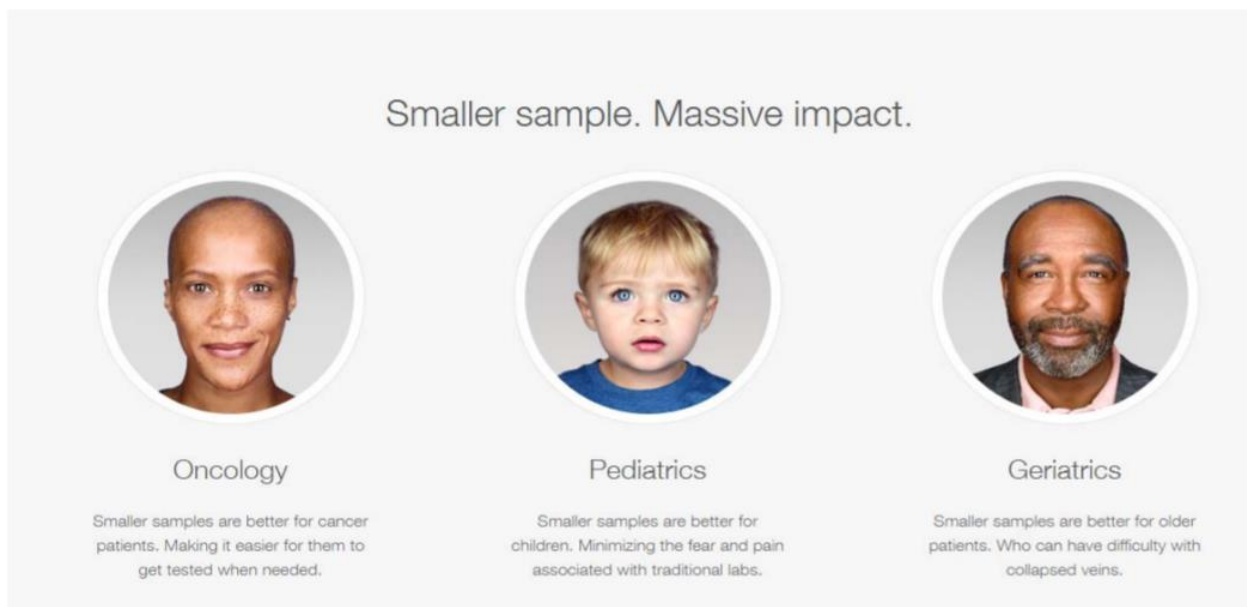
Federal regulators have cited problems with tests Theranos performed on its own devices as well as commercial lab equipment, leading the company to retract nearly one million patient blood-test results over the past year. (...) Ms. **Holmes controls 98.3% of Theranos’ voting shares** and under company rules, **the board can’t make decisions unless she is present**, the records showed. (...)

George Shultz said in his deposition he believed Theranos could run the tests it offered on its own system partly because he had witnessed the device in action. “I also could observe that sometimes it took longer than other times for the machine to do whatever it did,” he said of the demonstrations he saw. “And that was because the things you asked it to do were more complicated than others, but it seemed to do them.”

A (...) lawyer asked Adm. Roughead whether he believed Theranos was accurately performing its tests. “That was my understanding,” he said, adding that he continued to believe that “based on information that was provided to me.”

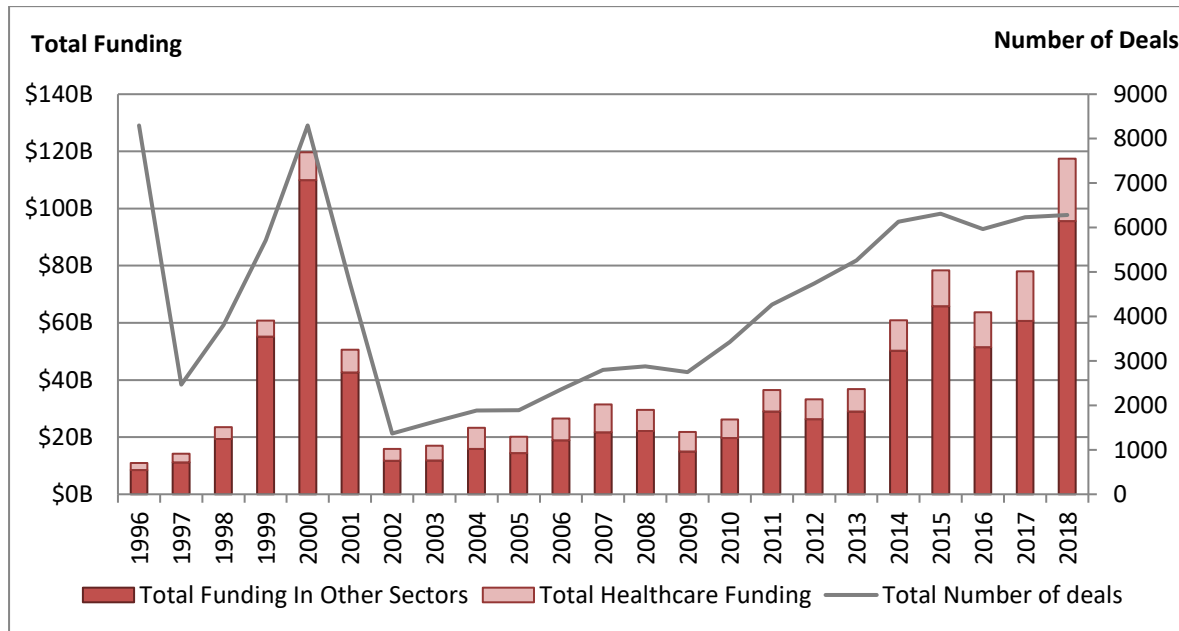
Source: Weaver, Christopher. 2017. “Court Documents Shed Light on Theranos Board’s Response to Crisis.” *The Wall Street Journal*. May 30. <https://www.wsj.com/articles/court-documents-shed-light-on-theranos-boards-response-to-crisis-1496136600?mod=searchresults&page=3&pos=20> (accessed December 12, 2019)

Exhibit 11 – Example of Theranos Marketing Campaign



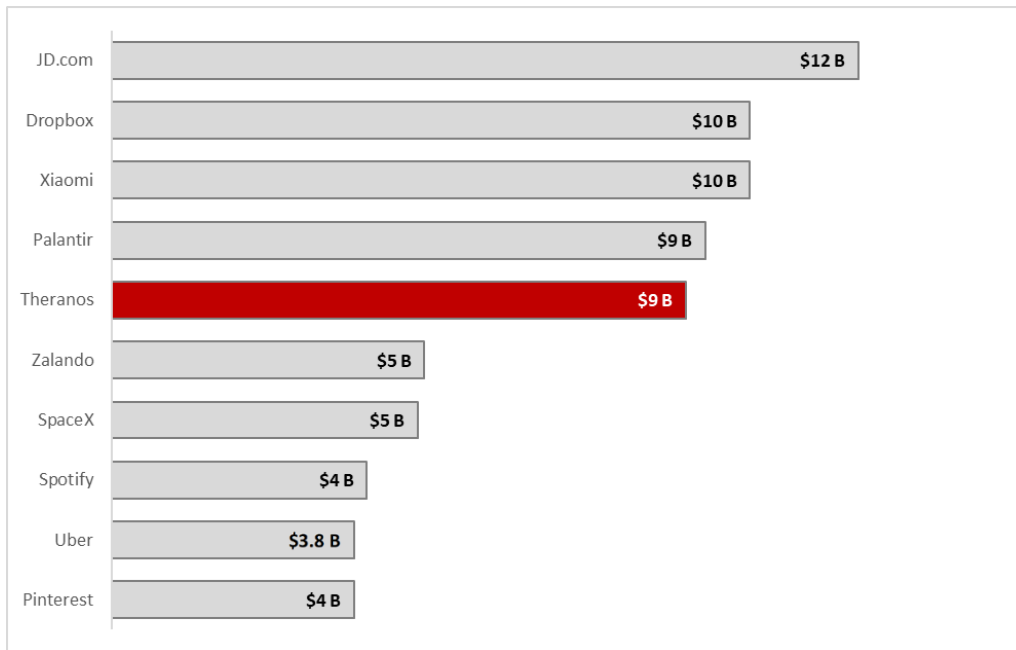
Source: HBS Law. 2016. *Hagens Berman Sobol Shapiro LLP*. https://www.hbsslaw.com/uploads/case_downloads/theranos/11.28.16_theranos_hagens_berman_consolidated_complaint.pdf?fbclid=IwAR027XJB7JgNfDWUGYM3QTC-0xwZ-zLRCF5HPFo5Zwsj-KLCTxdgjjCzpv (accessed November 17, 2019)

Exhibit 12 – Venture Funding Investment in the U.S. by year (1996-2018)



Source: US MoneyTree Reporting. 2019. PWC.
<https://www.pwc.com/us/en/industries/technology/moneytree.html> (accessed November 12, 2019)

Exhibit 13 – Most Valuable Startups in the World, “Billion Dollar Club” (February 2014)



Source: Allison, Scott, Chris Canipe and Sarah Slobin. 2015. "The Billion Dollar Startup Club." *The Wall Street Journal*. February 15. https://www.wsj.com/graphics/billion-dollar-club/?fbclid=IwAR1g4GYCTwphK6iHrDYv7IQhx1fBKwlzseUfaXS7d_BBcgm82weKk-HuHCM (accessed November 16, 2019)

Exhibit 14 – Theranos Revenue Projections (2014 - 2015)

Projections		Revenue	Gross Profits
Sunny	2014	\$261 M	\$165 M
	2015	\$1,680 M	\$1,080 M
Internal Control	2014	\$50 M	\$35 M
	2015	\$1,340 M	\$100 M

Main sources of revenue: pharmaceutical services (\$40M), lab services for hospitals (\$9M), lab services for doctors' offices (\$9M)

Real revenues generated in 2014: \$100,000

Source: Carreyrou, John. 2018. *Bad Blood: Secrets and Lies in a Silicon Valley Startup*. New York. Alfred A. Knoph.; Robinson, Matt and Rebecca Spalding. 2018. "Blood, Fraud and Money Led to Theranos CEO's Fall from Grace." *Bloomberg*. March 14. <https://www.bloomberg.com/news/articles/2018-03-14/theranos-ceo-holmes-accused-of-fraud-by-sec-jeraxw6a?sref=HkUZcIkG> (accessed October 20, 2019); Carreyrou, John. 2018. "SEC Charges Theranos CEO Elizabeth Holmes With Fraud". *The Wall Street Journal*. March 14. <https://www.wsj.com/articles/sec-charges-theranos-and-founder-elizabeth-holmes-with-fraud-1521045648> (accessed December 15, 2019)

Exhibit 15 - Example of board support: Henry Kissinger Profile on Elizabeth Holmes, Time Magazine (April 2015)

APRIL 15, 2015

Elizabeth Holmes' is a story that could happen only in America. After her sophomore year she left Stanford to devote herself to a vision of health care available as a basic human right. When I was introduced to Elizabeth by George Shultz, her plan sounded like an undergraduate's dream. I told her she had only two prospects: total failure or vast success. There would be no middle ground.

Elizabeth accepted only one option: making a difference. Striking, somewhat ethereal, iron-willed, she is on the verge of achieving her vision—through a new method of blood testing that significantly reduces costs, tests for a whole range of infections and is mobile and can therefore be easily transported to underdeveloped regions.

Striving for prevention and early detection, she is dedicated to transforming health care around the world. She manages an expanding global business by the refusal to be daunted by any obstacle.

Elizabeth is in the process of turning an undergraduate's vision into a global reality. That she combines fierce and single-minded dedication with great charm makes her a formidable advocate. Others will judge the technical aspects of Theranos, but the social implications are vast.

Kissinger is a former U.S. Secretary of State and a Theranos board member

Source: Scott, Matthew. 2015. "Elizabeth Holmes." *Times*. April 2015. <https://time.com/3822734/elizabeth-holmes-2015-time-100/> (accessed November 13, 2019)

Exhibit 16 - Timeline of Theranos Media Coverage (2013 – 2015)

Date	Description
September 7, 2013	The Wall Street Journal publishes a story titled “Elizabeth Holmes: The Breakthrough of Instant Diagnosis”, describing the company’s technology for the first time
September 9, 2013	Walgreens and Theranos publicly announce their partnership, opening the first Wellness Centers in Phoenix, Arizona
February 18, 2014	Wired magazine publishes an interview with Elizabeth Holmes. She lists her fear of needles and desire to change the healthcare system as reasons for starting the company
June 12, 2014	Holmes makes the cover of Fortune magazine with the headline “This CEO is out for blood”.
July 8, 2014	USA Today runs a rousing profile story on Elizabeth Holmes and Theranos technology
August 29, 2014	Holmes features in Fortunes' "40 Under 40" list
September 8, 2014	Holmes performs a live demonstration of the blood testing technology on stage at TechCrunch Disrupt
September 10, 2014	Holmes speaks at TEDMED about how her technology can help individuals anticipate and prevent diseases
September 29, 2014	Holmes is included in Forbes' 400 wealthiest list. Her net worth is estimated to be \$4.5 billion
October 8, 2014	Holmes takes the stage at Fortune's Most Powerful Women Summit
December 3, 2014	Holmes is interviewed on stage at Fortune's MPW Next Gen Summit
December 4, 2014	Holmes is the youngest recipient of the prestigious Horatio Alger Award. It honors the achievements of outstanding Americans who have succeeded in spite of adversity.
December 8, 2014	The New Yorker releases a profile on Elizabeth Holmes
March 17, 2015	The World Economic Forum names Elizabeth Holmes as part of the 2015 class of Young Global Leaders
April 16, 2015	CBS This Morning interviews Holmes with the headline “The world's youngest self-made female billionaire”; Holmes is named as one of Time magazine's 100 Most Influential People
May 11, 2015	President Obama names Elizabeth Holmes as Presidential Ambassador for Global Entrepreneurship
May 28, 2015	Elizabeth Holmes joins Harvard Medical School's Board of Fellows
June 3, 2015	Holmes is interviewed on a segment of "Charlie Rose", a TV show known for interviewing noteworthy people in fields such as business, politics, sports or science

Exhibit 16 (continued) - Timeline of Theranos Media Coverage (2013 – 2015)

Date	Description
July 23, 2015	U.S. Vice President Joe Biden visits Theranos' lab facility. Biden praises the company as inspirational and a driving force in the medical industry. He states that both him and President Obama share Holmes' vision
September 29, 2015	Holmes is ranked #121 in Forbes 400 with an estimated net worth of \$4.5 billion
September 30, 2015	Holmes is interviewed by Bill Clinton on the Clinton Global Initiative event, alongside Jack Ma and Chelsea Clinton
October, 2015	Holmes is featured on the cover of Inc. under the title “The Next Steve Jobs”
October 5, 2015	Holmes receives the Under 30 Doers Award at Forbes' Under 30 Summit in Philadelphia
October 12, 2015	The New York Times names Elizabeth Holmes as one of the "Five Visionary Tech Entrepreneurs Who Are Changing the World"
October 14, 2015	Senator John McCain visits Theranos' lab and labels its technology as innovative

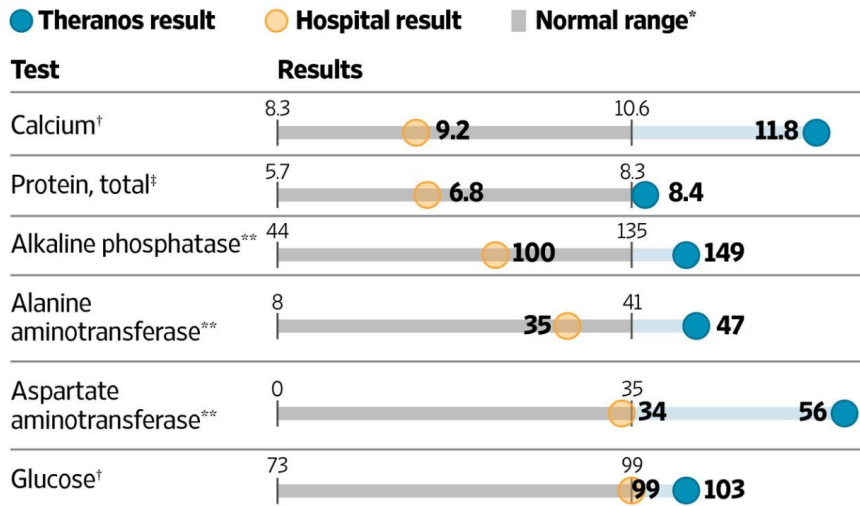
Source: A **Theranos Timeline**. 2019. The New York Times. <https://www.nytimes.com/2016/07/09/business/theranos-elizabeth-holmes-timeline.html> (accessed December 17, 2019); **Keshavan, Meghana and Neil Versel**. 2016. “Theranos Doomsday Clock: A full timeline of its rise and fall.” *MedCity News*. February 5. <https://medcitynews.com/2016/02/theranos-doomsday-clock-full-timeline-rise-fall/> (accessed December 17, 2019); **Kulwin, Noah**. 2015. “Theranos CEO Elizabeth Holmes's Five Best Cover Story Appearances, Ranked.” *Recode*. October 26. <https://www.vox.com/2015/10/26/11620036/theranos-ceo-elizabeth-holmess-five-best-cover-story-appearances> (accessed December 17, 2019); **Shivakumar, Felicia**. 2014. “Jon Shieber gets some blood work done with Elizabeth Holmes of Theranos.” *TechCrunch*. <https://techcrunch.com/video/jon-shieber-gets-some-blood-work-done-with-elizabeth-holmes-of-theranos-2/> (accessed December 17, 2019); **Kelly, Heather and Jackie Wattles**. 2018. “The rise and fall of Elizabeth Holmes.” *CNN Business*. March 15. <https://money.cnn.com/2018/03/14/technology/theranos-elizabeth-holmes-timeline/index.html> (accessed December 17, 2019); **Fortune Live Media**. 2019. *Fortune*. <https://fortuneconferences.com/most-powerful-women-summit-2014/2014-agenda/#day-3> (accessed December 19, 2019); **Twitter**. 2019. *Twitter, Inc.*

<https://twitter.com/senjohnmccain/status/654714209360437249?lang=en> (accessed December 17, 2019); **Parr, Rebecca**. 2015. "Vice President Joe Biden visits biotech firm Theranos' Newark production facility." *The Mercury News*. August 12. <https://www.mercurynews.com/2015/07/23/vice-president-joe-biden-visits-biotech-firm-theranoss-newark-production-facility/> (accessed December 16, 2019); **Della Cava, Marco**. 2014. "Change Agents: Elizabeth Holmes wants your blood." *USA Today*. July 8. <https://eu.usatoday.com/story/tech/2014/07/08/change-agents-elizabeth-holmes-theranos-blood-testing-revolution/12183437/> (accessed October 30, 2019); **Hedgecock, Sarah**. 2015. "Elizabeth Holmes on using business to change the world." *Forbes*. October 5. <https://www.forbes.com/sites/sarahhedgecock/2015/10/05/elizabeth-holmes-on-using-business-to-change-the-world/> (accessed December 16, 2019); **The Benefactor**. 2015. Harvard Medical School. https://hms.harvard.edu/sites/default/files/Benefactor_Fall%202015.pdf (accessed December 16, 2019); **Tau, Byron**. 2015. "Meet President Obama's Entrepreneurship Ambassadors." *The Wall Street Journal*. May 11. <https://blogs.wsj.com/washwire/2015/05/11/meet-president-obamas-entrepreneurship-ambassadors/> (accessed November 19, 2019)

Exhibit 17 – Theranos Abnormal Test Results (Sample From 1 Patient)

Same Patient, Different Results

For one Arizona woman, Theranos found abnormally high levels for six tests. Hospital tests two days later were normal. Theranos says variation across labs is commonplace and can be caused by medicines and diet.



*As stated by Theranos †in milligrams per deciliter ‡in grams per deciliter
 **liver enzyme test, in units per liter
 Sources: Theranos and HonorHealth Scottsdale Shea Medical Center via Nicole Sundene and Maureen Glunz
 THE WALL STREET JOURNAL.

Source: Carreyrou, John. 2015. “Hot startup Theranos has struggled with its blood-test technology.” *The Wall Street Journal*. October 16. <https://www.wsj.com/articles/theranos-has-struggled-with-blood-tests-1444881901> (accessed November 2, 2019)

Exhibit 18 - Timeline of Theranos Downfall (2015 – 2018)

Date	Description
July 2, 2015	Theranos receives its first and only clearance from the FDA (agency responsible for regulating medical devices). The finger prick technology is cleared to be used in herpes virus tests
October 15, 2015	WSJ publishes a front-cover story questioning the accuracy of Theranos blood tests and detailing flaws in its proprietary technology
October 27, 2015	Theranos suspends the use of the “nanotainer” after the FDA publicly reported it as an “uncleared medical device” and cited the company for unsuitable quality and safety controls in its laboratories
October 28, 2015	Theranos announces the creation of a new Governing Board, a Board of Counselors and a Scientific and Medical Advisory Board
November 10, 2015	Safeway deal falls through after Theranos repeatedly missed roll out deadlines and executives questioned the validity of Theranos’ test results
January 27, 2016	CMS (responsible for overseeing lab testing) states that it has found five major infractions in Theranos’ lab which pose "immediate jeopardy to patient health and safety". The agency gave Theranos 10 days to correct the issues
March 28, 2016	A peer-review study published in the Journal of Clinical Investigation found that Theranos tests were considerably less accurate and reliable than its competitors
March 31, 2016	CMS releases a 121-page report on Theranos’ lab in Newark citing the use of unqualified personnel, failure to ensure quality-control checks, inappropriate storage of samples and poor blood-testing accuracy
April 18, 2016	SEC starts investigating the company
May 11, 2016	Balwani leaves the company amid regulatory probes. His departure follows Theranos' announcement of a broader board reorganization
May 18, 2016	Theranos voids all blood test results run on the Edison (2014-2015) and issues thousands of corrected reports to doctors and patients
June 1, 2016	Forbes revises Theranos valuation down to \$800 million and lowers Holmes' net worth estimate to \$0
June 12, 2016	Walgreens terminates its partnership with Theranos.
July 7, 2016	CMS revokes Theranos' CLIA license to operate labs and bans Holmes from the blood-testing industry for two years.
July 21, 2016	Theranos names two new compliance executives
August 1, 2016	Holmes officially announces the miniLab at the American Association for Clinical Chemistry (AACC) annual meeting. The new version of the device would be used outside centralized clinical labs, such as in intensive-care units. Attendees were expecting Holmes to address concerns over Theranos existing technology instead

Exhibit 18 (continued) - Timeline of Theranos Downfall (2015 – 2018)

October 5, 2016	Theranos announces it will close its blood-testing facilities (clinical labs and Wellness Centers) cut its workforce by more than 40% (340 employees)
October 10, 2016	Partner Management Fund sues Theranos for “fraudulently inducing” the investment through “a series of lies”. The VC firm who had invested \$96.1 million, settled 7 months later for \$43 million
November 8, 2016	Walgreens files a \$140 million lawsuit against Theranos for breach of contract. The case is settled 9 months later for an estimated \$30 million
January 6, 2017	Theranos lays off an additional 155 employees, which represents close to 41% of the remaining staff
April 18, 2017	Theranos settles with the CMS for \$30,000 and pays \$4.65 million to the state of Arizona reimbursement fund
May 1, 2017	Theranos settles lawsuit with PFM for \$43 million; the lawsuit was restricting Theranos ability to proceed with a tender offer of preferred shares to investors who agreed not to sue. Theranos made an ultimatum to PFM and threatened to file for bankruptcy protection if the fund did not agree to swap additional preferred shares for its rights to sue
December 23, 2017	Theranos secures \$100 million in debt financing from Fortress Investment Group. The loan was collateralized by patents, granted Fortress warrants for the company’s equity and required Theranos to produce audited financial statements
March 14, 2018	SEC presses civil charges against Holmes and Balwani for fraud in which they "exaggerated or made false statements about the company’s technology, business, and financial performance". Holmes later settled and agreed to pay a \$500,000 penalty without admitting wrongdoing. She forfeited voting control of the company, returned 18.9 million shares to shareholders (converted Class B to Class A shares) and was barred from serving as an officer/director of a public company for 10 years
April 10, 2018	Theranos lays off most of its remaining workforce (125 people) in an effort to avoid bankruptcy
June 15, 2018	The U.S. Department of Justice files criminal charges against Holmes and Balwani, accusing them of two counts of conspiracy to commit wire fraud and nine counts of wire fraud. Holmes steps down as CEO but remains as chairman of the board. The company's general counsel, David Taylor, was appointed as her replacement
September, 2018	Theranos tried to secure a bid to sell the company after 80 potential buyers reached out, 17 of which executed NDAs. Despite Theranos assistance with due diligence and numerous follow-on conversations, none of the leads materialized in a transaction
September 5, 2018	The company defaults on the Fortress loan following a covenant breach and formally dissolves. Theranos tries to negotiate a settlement in which Fortress would take ownership of Theranos’ intellectual property while allowing the remaining cash (\$5 million) to be distributed to other unsecured creditors which were owed at least \$60 million. There would be no distribution to shareholders

Source: Radovanovic, Dragan and Lydia Ramsey. 2016. “The rise, fall, and pivot of Theranos, in one graphic.” *Business Insider*. October 18. <https://www.businessinsider.com/timeline-of-theranos-controversy-2016-10> (accessed November 12, 2019); **Thiha Tun, Zaw.** 2019. “Theranos: A fallen unicorn.” *Investopedia*. August 27. <https://www.investopedia.com/articles/investing/020116/theranos-fallen-unicorn.asp> (accessed December 12, 2019); **Leiva, Ludmila.** 2019. “Keep Track of The Theranos Scandal With This Detailed Timeline.” *Refinery*. January 30. <https://www.refinery29.com/en-us/2019/01/222855/theranos-scandal-timeline-what-happened-elizabeth-holmes-documentary> (accessed November 23, 2019); **Crow, David and Leslie Hook.** 2016. “Theranos faces investor lawsuit over ‘series of lies’.” *Financial Times*. October 11. <https://www.ft.com/content/5126fd88-8f49-11e6-a72e-b428cb934b78>; **Carreyrou, John.** 2018. “Blood-Testing Firm Theranos to Dissolve.” *The Wall Street Journal*. September 5. <https://www.wsj.com/articles/blood-testing-firm-theranos-to-dissolve-1536115130> (accessed November 3, 2019); **Carreyrou, John.** 2016. “Theranos Makes Case to Laboratory Experts”. *The Wall Street Journal*. August 1. <https://www.wsj.com/articles/theranos-founder-elizabeth-holmes-introduces-new-blood-testing-device-1470089582> (accessed October 23, 2019)

Exhibit 19 – Scientific and Medical Advisory Board (April 2016)

Scientific and Medical Advisory Board	
Members	Background
William H. Foege	Former Director of the U.S. Center for Disease Control and Prevention (CDC)
David Helfet, MD	Orthopedic trauma surgeon at the Hospital for Special Surgery and New York-Presbyterian Hospital and professor at Weill Cornell Medical College
Susan A. Evans, PhD, FACB	Former president of the American Association For Clinical Chemistry (AACC)
Ann M. Gronowski, PhD, DABCC	Professor of pathology and immunology as well as obstetrics and gynecology at Washington University School of Medicine
Larry J. Kricka, D. Phil,	Professor of pathology and laboratory medicine at the University of Pennsylvania
Jack Ladenson, PhD, DABCC	Professor of clinical chemistry, pathology, and immunology
Andy O. Miller, MD	Doctor of internal medicine at the Hospital for Special Surgery and professor at Weill Cornell Medical College
Steven Spitalnik, MD	Professor of pathology and cell biology at Columbia University

Source: Ramsey, Lydia. 2016. “Theranos just made a crucial move that could help its reputation”. *Business Insider*. April 7. <https://www.businessinsider.com/theranos-adds-members-to-scientific-and-medical-advisory-board-2016-4> (accessed November 21, 2019)

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