REVENGE OF THE ELECTRIC CAR IN THE 2020S: A CASE STUDY

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ABSTRACT

To say Elon Musk is a disrupter is quite an understatement. The self-made billionaire has transformed several industries (Electric Vehicles, financial services, space travel, hyperloops, artificial intelligence, etc.). He is also a charismatic marketing genius who is able to create buzz and excitement whenever he speaks or tweets. Tesla is the king of Electric Vehicles (EVs) with a state-of-the-art production factory in California. The company delivered 245,000 vehicles globally, and the Model 3 was the top selling electric car in the United States in 2018. The company turned in a profit for the first time in 2019; and is in the process of building a lithium-battery gigafactory in Nevada and an EV manufacturing facility in China. Between the California and Shanghai factories, Tesla will have the capacity to produce 1 million vehicle a year. The new Roadster, Model Y, and Cybertruck will commence production in 2020. This is all great news for many stakeholders, especially Musk who has never received a paycheck from Tesla. Shareholders voted in 2019 to grant him $2.6 billion in stock options to be vested if Tesla's market value reaches $100 billion by 2028. This could substantially boost the 48-year-old entrepreneur's net worth and make him the richest person on Earth even though he prefers to die on Mars.

Now that Tesla has removed every doubt it can be done, nearly every big name in the industry is trying to get a piece of the electric car market. Major automakers are jumping on the EV bandwagon to capture a piece of the growing pie. Audi, Mercedes, Porsche, and Volvo are rolling out luxurious electric vehicles for the first time. GM, Honda, Nissan, and Toyota are upping their EV game. Tesla will soon compete with a sea of EVs both in the United States and overseas. Only time will tell if Tesla and its boss will keep the crown. The paper highlights the challenges involved in the auto industry in general and the EV niche in particular.

Keywords: Innovation, Entrepreneurship, Self-Made Billionaire, New Product Development, Underdog

INTRODUCTION

The South African-Canadian-American entrepreneur, Elon Musk, is best known for his cosmic imagination and risk-taking drive to bring about a more high-tech world. Musk has an impressive resume and a knack for founding avant-garde companies, with Tesla as the crown jewel. He is the primary investor with 22% of shares and $80 million invested in 2004. Since then, Musk almost single handedly established the electric car market; and now there is no doubt the future of cars is electric. Tesla is the king of EV with a luxurious and innovative product mix: Roadster, Model S, Model X, Model Y, Model 3, and Cybertruck. Global deliveries in 2018 were 245,000 vehicles, and the company's market capitalization was $43 billion. However, Tesla has struggled to become profitable. After a decade of being in the red and billions of dollars in

losses, the company turned a profit for the first time in the third quarter of 2019. The credit goes to the affordable Model 3 and a record delivery of almost 100,000 vehicles to the mass market.

Elon Musk is the world's richest inventor with a net worth of $20 billion. Although Musk is the CEO and Product Architect of Tesla, he has never received a salary from the company. However, his current contractual arrangement could be extremely rewarding if Tesla's market capitalization soars to $100 billion. In January 2019, Tesla shareholders voted to award Musk $2.6 billion in stock options if he manages to hit that market cap in the next 10 years. This is not far-fetched given the company's phenomenal growth in terms of revenues and deliveries. It is safe to say that the self-made billionaire is striving to revolutionize mobility both on Earth and in space, and he might become the world's richest person in the process.

ELON MUSK

Elon Musk is one of the most controversial inventors in history and he is promising to deliver the future today. He is promising to get rid of internal combustion engines and fossil fuels. He is promising 100% self-driving cars with zero emissions. He is promising hyperloops below Earth and colonies on Mars. Fortunately, he has the passion and the money to make it happen. Known for the companies he has founded or developed including PayPal, Tesla, and SpaceX, Elon Musk has had a gigantic impact on multiple industries and is poised to have a major impact on the auto industry in particular. In the 70's there were a lot of concept cars that were slick and futuristic. However, none of them ever became a reality. The genius of Tesla and Musk is that they are rolling out concept cars and selling them as a production cars. People know what they see will become a reality they will get to enjoy. So Musk/Tesla's brand strategy is: We deliver on the future. For instance, when the Model X was launched in 2015, consumers saw humans driving around in pods shaped like huge eggs, with doors that open upwards like wings, and are smart enough to drive themselves without hitting other cars. In 2019, the Cybertruck came along, and it certainly looked like nothing else. It didn't just look "different," it looked like it was literally from another planet. Nevertheless, its price started at $39,900. The average American consumer can afford a 40-grand brand new vehicle and that's why Tesla received 200,000 orders ($8 billion in sales) in just 72 hours. A Cybertruck first impression YouTube video has garnered 10 million views and had 40,000-plus comments in a matter of a few days. You cannot put a price on such publicity. In brief, consumers' faith in Musk's ability to deliver the future today has garnered this loyalty to the Tesla brand.

On the other hand, the fact that Tesla's fate is closely linked to Musk's actions is a double-edged sword. Musk is still leading the field in innovation, but he is rebellious and nonconformist. For instance, Musk hopes to die on Mars not Earth! Should he leave the company or suddenly sell his 38.6 million Tesla shares, the stock price will fall dramatically. Musk has arguably too much responsibility serving as Tesla and SpaceX CEO, plus running the Boring Company and OpenAI, which raises the risk of him being pulled in too many directions. Musk is also an unpredictable person. The controversial rocket scientist smoked weed during a live interview causing Tesla's shares to crash and key executives to quit (Mitchell, 2018). Then he settled with the SEC in September 2018 for making alleged "false statements" about a plan to

take Tesla private, and had to step down as chairman. Musk took the deal to avoid a treacherous battle with the agency that may have cost him his CEO position as well (Goldstein, 2018).

TESLA

Founded in 2003 and named after the engineering genius Nikola Tesla[i], the California-based company aims to transition the world to electric mobility by manufacturing and mainstreaming electric vehicles (EVs). Commercial production started in 2008 when the Tesla Roadster was debuted. Then Tesla introduced Model S in 2012, Model X in 2015, Model 3 in 2017, Model Y and Cybetruck in 2019. The company went public in 2010 and has roughly 50,000 employees. Global deliveries in 2018 were about 250,000 vehicles. As of 2019, Tesla had a market value of $43 billion. Musk is the primary investor with 22% of shares and $80 million invested (Alvarez, 2019).

Table 1: Number of Tesla Vehicles Delivered Worldwide (2016 – 2019)

Quarter/Year	Vehicles
Q1 2016	14,820
Q2 2016	14,370
Q3 2016	24,500
Q4 2016	22,200
Q1 2017	25,000
Q2 2017	22,000
Q3 2017	26,150
Q4 2017	29,870
Q1 2018	29,980
Q2 2018	40,740
Q3 2018	83,500
Q4 2018	90,700
Q1 2019	63,000
Q2 2019	95,200
Q3 2019	97,000
Q4 2019	105,000 (Forecast)

Source**:** Statistica

It has been a bumpy ride for Tesla and Musk. The first Roadster was scheduled to be delivered in 2006. However, production was delayed and the first 100 vehicles were delivered almost 2 years later in 2008. The Roadster came with a price tag that most people could not afford ($100,000). The price was a message not only about the car, but also the owner. Musk's initial strategy was to position Tesla as a premium product and create a luxury image before gradually producing affordable vehicles for the mass market. His next move was to offer more reasonably priced sedans. Model S was introduced in 2012, and Model X in 2015. In 2017, more than 500,000 orders have been placed for the highly anticipated Model 3. In November 2019, Musk unveiled his company's first electric pickup truck. The Cybertruck is Tesla's sixth vehicle and definitely its most peculiar. Musk taunted Ford and Porsche when he boasted his futuristic

truck's torque and speed in a controversial tweet. Then he decided to double down on his new truck's superiority and escalate the war by another provocative tweet boasting a "tug of war" video showing a Cybertruck pulling an F-150 uphill with ease. The tweet garnered 14 million views; and more than 200,000 orders were placed within 72 hours (Liao, 2019). Ford was not very happy with the video and has requested a rematch claiming the first one was not fair.

Table 2: Tesla Models

Model	0-60 MPH (Seconds)	Top Speed (MPH)	Range (Miles)	Price (USD)
Roadster	1.9	250	620	200,000-260,000
Model S	2.4	160	370	90,000-110,000
Model X	4.4	155	325	85,000-105,000
Model Y	5.5	130	300	47,000-57,000
Model 3	5.3	140	300	39,000-49,000
Cybertruck	6.5	110	250	40,000-70,000

Source**:** Tesla Homepage (November 2019)

Another distinguishing characteristic of Tesla is the experience of buying and owning the vehicle. Tesla customers do not go to a dealership or haggle with a pushy salesperson. Tesla sells its vehicles directly through its own stores and website. Typically, the stores are placed in upscale malls or wealthy suburbs, very close to the Apple stores on which they were modeled after. The sales people are not compensated on commission and are there simply to answer questions. Regardless of how the vehicle is purchased (in store or online), Tesla would bring it to the buyer's home, office, or anywhere else they wanted it. The company also offers customers the option of picking their cars up from the factory in Silicon Valley and inviting their friends and family to a complimentary tour of the facility. If something goes wrong with the car, Tesla's engineers would tap into the car via the Internet and download software updates. All new Tesla cars come standard with advanced hardware capable of providing autopilot. It is noteworthy that the self-driving feature has allegedly caused numerous crashes. Despite the adverse media attention, Tesla has unequivocally defended its autopilot feature. Musk has even boasted that by 2022, Tesla would "probably" stop producing cars with steering wheels or pedals, implying that self-driving cars will be the most desired vehicle type by then (Ottley, 2019).

Regardless of all this hype, Tesla has been in the red from inception until late 2019. Selling a lot more vehicles wasn't translating into profits. Table 3 shows how revenues grew from nearly $15 million in 2008 to $21.5 billion in 2018. Although this may seem like phenomenal growth, the company has lost $3 billion over the last 3 years alone. Tesla maybe making quality, luxurious, and futuristic vehicles; but the company is no exemplar of financial stability.

Table 3: Tesla Revenues and Losses (2008 - 2018)

Year	Revenue (USD)	Operating Expenses	Non-Operating Expenses	Pre-Tax Income
2008	14,742,000	93,246,000	4,181,000	(82,685,000)
2009	111,900,000	163,840,000	3,817,000	(55,714,000)
2010	116,700,000	263,582,000	7,317,000	(154,155,000)
2011	204,200,000	455,730,000	2,434,000	(253,922,000)
2012	413,260,000	807,539,000	1,794,000	(396,077,000)
2013	1,997,790,000	2,074,799,000	10,143,000	(71,426,000)
2014	3,198,360,000	3,385,045,000	97,947,000	(284,636,000)
2015	4,046,020,000	4,762,654,000	158,995,000	(875,264,000)
2016	7,000,130,000	7,667,472,000	79,008,000	(746,348,000)
2017	11,758,750,000	13,390,840,000	576,946,000	(2,209,032,000)
2018	21,461,270,000	21,849,340,000	616,672,000	(1,004,745,000)

Source**:** Macrotrends (2019)

Things turned around for the first time in 2019 when Tesla defied all expectations and achieved $143 million profitability in the third quarter ($1.86 earnings per share versus expected losses of 42 cents per share). That's a breakthrough for the decade-old automaker and its boss who became $2 billion richer that day because of the stock's abrupt spike (Stillman, 2019). Between June and September 2019, Tesla delivered a record 97,000 vehicles to customers. The company is on a smooth ride to sell at least 360,000 vehicles by the end of 2019. Thanks to a strong performance of its Model 3 sedan. Approximately 6,000 cars per week found new homes during the quarter, contributing to the company's bottom line (Liedtke, 2019).

This is good news to many stakeholders, especially Elon Musk who has never taken a paycheck from Tesla, refusing his $56,000 minimum salary every year. In March 2019, Tesla shareholders approved a new payment plan awarding Musk $2.6 billion in stock options, if (and only if) Tesla hits the $100 billion market value cap in the next decade. The $2.6 billion amount was March 21 current stock valuation. Then for the next 10 years, Tesla won't pay its boss anything (no salary, bonus, or stock) until the company reaches that $100 billion market capitalization. If Musk meets the challenge, he could net more than $184 billion by 2028. If and when that happens, Musk could potentially surpass Amazon's CEO, Jeff Bezos[ii], as the richest person in the world (Wieczner, 2018).

THE AUTO INDUSTRY

The automobile manufacturing industry has witnessed bumpy roads over the five years to 2019. Revenues have been stagnant and many companies are in the red. Major players include Audi, Fiat Chrysler, Ford, General Motors, Honda, Mercedes Benz, and Toyota. These companies compete primarily on the basis of price, fuel economy, reliability, styling, and utility.

Table 4: Automobile Industry Revenue Growth (2005 – 2019)

Year	Revenue ($ million)	Growth %
2005	114,143.7	0.0
2006	118,143.0	3.5
2007	103,503.3	-12.4
2008	96,822.0	-6.5
2009	60,645.7	-37.4
2010	84,591.5	39.5
2011	94,458.4	11.7
2012	122,839.7	30.0
2013	127,758.1	4.0
2014	135,121.4	5.8
2015	134,445.7	-0.5
2016	138,571.4	3.1
2017	123,508.4	-10.9
2018	112,384.1	-9.0
2019	112,540.2	0.1

Source: IBIS World (2019)

Over the five years to 2024, the industry is expected to continue its struggle. Automakers are projected to continue producing fewer and fewer internal combustion engine cars. As consumers become increasingly environmentally conscious, major players have focused operations on the production of hybrid and electric cars. This product category is set to generate the greatest revenue moving forward. The conventional automobile industry is in the mature stage of its life cycle. Industry output has decreased despite overall economic improvements and rising consumer confidence. Compact vehicles, midsize sedans, and SUVs have been doing poorly. When coupled with brand consolidation, the result is a phasing out of many inefficient vehicles as major players restructure to meet consumer preference. The largest technological change in this industry's products has been more widespread availability of green technologies. Each year, many automakers are reintroducing vehicle makes and platforms to include hybrid or electric versions. The increased production of green vehicles shows a general trend that the industry is heading in. This might be the only factor keeping the industry from getting into the decline stage.

WILL MUSK'S PASSION PAY OFF?

Despite a considerable net worth hovering around $20 billion, Musk has never taken a paycheck from Tesla, snubbing his $56,000 minimum salary every year. Musk invested 80 million from his PayPal earnings in 2004, then he was awarded $2.6 billion in stock options (valued at today's stock price) to be vested if (and only if) Tesla's market value hits $100 billion by the end of 2028. Under the new payment plan, Musk is the major shareholder in Tesla with 38.6 million shares or 20% of all outstanding shares. In late November 2019, Tesla shares hovered around $330 putting Musk's stake in the company at $12.7 billion. Musk has struggled

for a decade to prove that building and selling electric cars can be a sustainably profitable business. Tesla turned in a profit for the first time in the third quarter of 2019, and Musk is optimistic that once the Shanghai factory starts production, Tesla will have the capacity to deliver 1 million car a year. Musk is also the CEO and major shareholder in SpaceX with a 54% stake. His next generation spacecraft, Starship, may eventually take humans to Mars for a mere $100 grand for a one-way ticket. Students born in the 2000s will certainly see this in their lifetime. The impact on Musk's net worth will be astronomical if this borderline science fiction materializes!

Some students may contend that if Model 3 along with the new models do well in the United States, China, and Europe; it is not far-fetched that Musk's stake in Tesla could exceed $80 billion by 2028. Other students will argue that gasoline engines are going to remain very relevant for a long time. Even with this push towards electrification, the point where we get to a full battery-electric fleet across the country is very far away. Regardless of the hype generated by Tesla, even the most optimistic forecasts call for full EVs to account for only around 8 percent of the U.S. market by 2025. They represent less than 2 percent today. Also, some students will be skeptical of the 1 million number, given Tesla sold about 250,000 vehicles globally in 2018.

The bottom line is that it will be much easier to answer this question in the future. The one thing we know today is that Musk he has a knack for theatrics. The tech guru seems to be overly optimistic with a tendency to overpromise. And if you are doubting this, watch how he announced the Tesla Cybertruck or SpaceX Starship in November 2019. We have to respect his boldness, but that doesn't mean it's going to be successful.

WHO WILL COME OUT ON TOP?

Tesla is currently the king of EVs. Tesla's Model 3 is on the leading edge of auto technology, but is priced at only $35,000. The upcoming Cybertruck is expected to disrupt the pickup truck market, and is priced at only $40,000. In 2019, Tesla was approved to build a manufacturing facility in China, and is wrapping up a lithium-battery gigafactory in Nevada. Revenues and deliveries are growing at an exponential rate. In brief, Tesla is the industry leader and has proven that electric cars can be fast, luxurious, and even affordable.

However, the California electric car company will soon have formidable EV competition from premium brands it does not have today. However, with a new wave of electric cars already on the market or coming from Audi, BMW, Fiat, GM, Hyundai, Mercedes, Nissan, Porsche, Jaguar, and Volvo; Tesla will have to prove itself in a crowded field of competitors. For example, Audi's first-ever EV, the $75,000 e-Tron, is already contributing nearly 5% of the automaker's sales mix. Boeing and Porsche even announced they are jointly developing a flying EV concept for urban settings (Rosevear, 2019). General Motors anticipates the launch of its steering wheel-free, electric Chevy Bolt in 2020. Volvo XC90 self-driving EVs are coming out around the same time. BMW is pushing its "i" models, with the catchy slogan: "Innovation starts with i". Fiat is expected to do well with its all new 500e model. The same goes for the Hyundai Kona. Mercedes is cutting 10,000 jobs around the world to put more resources in EVs as the industry races toward its electric future. The German giant is rolling out its first EV, EQC, in 2020. The Amazon-backed Michigan-based startup, Rivian, is in the process of producing all-electric pickups and SUV. Amazon has ordered 100,000 electric delivery vans, to hit the roads in

2021 and 2022 (Dawson & Naughton, 2019). Toyota announced six new EV models launching for 2020–2025 to meet global demand (Greimel, 2019).

In conclusion, the paper highlights the complexity of mainstreaming futuristic products to the mass market. The paper also attempts to predict who will dominate the EV market in the future. Tesla has a chance to be the dominant EV firm and is a leader in autonomous vehicle technology, but it will probably have to fight harder to maintain its leadership. The competitive landscape is suddenly getting crowded. But Tesla has Elon Musk and the first-mover advantage.

LECTURE NOTES/DISCUSSION QUESTIONS

Tesla is a marketing case study in endless motion. The author typically starts the case discussion by asking students to go to Tesla's website and spend a few minutes browsing the available models and even customize their own Tesla. This approach triggers a conversation about innovation, creativity, and visionary entrepreneurs. Depending on the scope and time of the class, the instructor can play clips from the two classic documentaries: "Who Killed the Electric Car?" and "Revenge of the Electric Car". This should naturally lead to a debate about the future of EVs and who will dominate that market.

Another approach that the author has found valuable in generating discussion is to poll students: "Would you consider purchasing an EV?" or "What comes to your mind when you hear or see the Tesla brand?" or "What do you think of Elon Musk?" This will get students to talk about their perceptions of both Tesla and Musk. Students could also be asked to browse the websites of other major automakers and check the strides they are making in the EV category. The instructor may ask students to go online after the discussion is over and find updates on Tesla's current deliveries, revenues, and profitability. Finally, since the case has brought up the possibility of Musk becoming the richest person in the world in the next decade, students could be asked to check out his net worth in real time. It would be intriguing to see if his passion for and bet on Tesla has paid off. And if he hasn't beaten Jeff Bezos, students could locate his Roadster in space. After all, it is the only car orbiting the solar system and it should be there for millions of years. As a middle-aged man myself, I believe that having your car in outer space is a more ego-booster than being the richest man in history!

1. How did Elon Musk evolve as a maverick entrepreneur?

Elon Musk, (1971-), is a technology entrepreneur and engineer. Arguably, the South African/Canadian/American tech guru has single handedly revolutionized a number of industries. Over the last 25 years, Musk has built an inspiring resume that would normally take many lifetimes to accomplish. Some of the titles held included:

- Founder of The Boring Company
- Co-founder of Neuralink
- Co-founder of OpenAI
- Co-founder of SolarCity
- Co-founder, CEO, Product Architect of Tesla, Inc.
- Founder, CEO, Lead Designer of SpaceX
- Founder of X.com (now PayPal)
- Co-founder of Zip2

Musk grew up in Pretoria, South Africa. When he was 12, he taught himself to code, and even sold the source code for his first video game for $500. After finishing high school, he moved to Canada to attend Queen's University in Ontario. In 1990, he transferred to the University of Pennsylvania, where he received two bachelor degrees (in economics and physics). When Musk was at college, he fed himself for less than $1 a day. In 1995, he moved to California to pursue his PhD in applied physics at Stanford University; but dropped out within days to found an internet startup with his brother, Kimbal. They started Zip2, a city guide software for newspapers, with a $28,000 loan from their father. In 1999, they sold Zip2 for $307 million, and Elon walked out with $22 million. He invested his Zip2 earnings to co-found X.com, an online banking service. The start-up quickly merged with its rival and became PayPal. In 2002, eBay bought PayPal for $1.5 billion, and Musk netted $180 million. He used $100 million of his earnings to found SpaceX, an aerospace manufacturer and space transport services company. Meanwhile, he invested the remaining $80 million in Tesla, an EV manufacturer, in 2004, the year after it was founded, and became its CEO and product architect. In 2006, he co-founded SolarCity, a solar energy services company (now a subsidiary of Tesla) and functioned as its chairman. In 2015, Musk co-founded OpenAI, a nonprofit research company that aims to promote artificial intelligence. In July 2016, he co-founded Neuralink, a neuro-technology company focused on developing brain–computer interfaces. In December 2016, Musk founded The Boring Company, an infrastructure and tunnel-construction company, specializing in building hyperloops.

Musk has overtly articulated that the mission statements of Tesla, SolarCity, OpenAI, and SpaceX stem from his vision to change the world and humanity. His goals include combating climate change through sustainable energy production and consumption. With a gigantic net worth hovering around $20 billion[iii], Musk is the world's richest rocket scientist. The notorious workaholic who will turn 49 on June 28, 2020, has expressed he won't rest until we have escaped Earth and colonized Mars! His goal is to drop the cost of the trip to Mars from $10 billion per person today to just $100,000 by 2024. According to him, people should be able to sell their

homes on Earth and move to Mars, and save money in the process. In other words, the cost of living on Mars will be less than Earth at one point in the future

2. **Develop a SWOT analysis for Tesla.**

Strengths: - Current dominant player in electric cars. - Location in Silicon Valley. - Strong brand and customer loyalty. - Elon Musk's ingenuity and passion. - Car resale value. - Autonomous driving technology.	**Weaknesses:** - Limited number of charging stations. - Poor financial performance. - Logistical problems delaying deliveries. - Car service limitation. - High prices (some models).
Opportunities: - Gigafactory can supply competitors with batteries. - Depletion of oil reserves or drastic increase in oil prices. - Innovation and R&D. - Chinese booming EV market and global sales expanison. - Ride-sharing services. - Growing demand for green products.	**Threats**: - More automakers focusing on EVs. - Development of hydrogen-powered cars. - Laws regulating self-driving cars and local dealerships. - Economic slowdown. Another recession would hurt sales.

3. **Elon Musk is a passionate entrepreneur who runs Tesla for "free". Do you think this passion will pay off and make him the richest person in the world?**

Despite a considerable net worth hovering around $20 billion, Musk has never taken a paycheck from Tesla, snubbing his $56,000 minimum salary every year. Musk invested 80 million from his PayPal earnings in 2004, then he was awarded $2.6 billion in stock options (valued at today's stock price) to be vested if (and only if) Tesla's market value hits $100 billion by the end of 2028. Under the new payment plan, Musk is the major shareholder in Tesla with 38.6 million shares or 20% of all outstanding shares. In late November 2019, Tesla shares hovered around $330 putting Musk's stake in the company at $12.7 billion. Musk has struggled for a decade to prove that building and selling electric cars can be a sustainably profitable business. Tesla turned in a profit for the first time in the third quarter of 2019, and Musk is optimistic that once the Shanghai factory starts production, Tesla will have the capacity to deliver 1 million car a year. Musk is also the CEO and major shareholder in SpaceX with a 54% stake. His next generation spacecraft, Starship, may eventually take humans to Mars for a mere $100 grand for a one-way ticket. Students born in the 2000s will certainly see this in their

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END NOTES

[1] Nikola Tesla (1856–1943) was a Serbian-American inventor known for designing the alternating-current (AC) electric system, which is the predominant electrical system used across the world today.

[1] Jeffrey Bezos is an American internet entrepreneur, who founded Amazon in 1994.

[1] Musk was the 23rd wealthiest American in 2019 according to Forbes.

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