Proceedings of the 6th European Conference on Industrial Engineering and Operations Management Lisbon, Portugal, July 18-20, 2023

Benefits and Effects of Tesla's Direct-to-Customer Sales Model

Jeremy Asuncion, Momo Murphy, Nikolai Prutow, Maxwell Siantar, Jeffrey Tyre-Vigil and Mohamed Awwad

Industrial and Manufacturing Engineering Department
California Polytechnic State University
San Luis Obispo, CA 93407, USA
jrasunci@calpoly.edu, mmurph59@calpoly.edu, nprutow@calpoly.edu, msiantar@calpoly.edu, jtyrevig@calpoly.edu, mawwad@calpoly.edu

Abstract

This paper examines Tesla's unique direct-to-consumer sales strategy in contrast to North America's more common dealership model. Tesla has been a successful company with rising sales and growing more than other automobile manufacturers. Furthermore, their system has received positive feedback from customers, who enjoy the ease of purchase and online options. Tesla's sales strategy also reduces the costs to the company in comparison to traditional dealership models. However, Tesla has faced challenges in the United States regarding the legality of their sales model and is combating this through the courts. Tesla's model has been a great success for them, which has influenced other automobile companies to adopt similar practices to Tesla. In the future, Tesla may advance their direct-to-consumer strategy with new ideas to improve their process.

Keywords

Direct-to-Customer (DTC), Inventory Management, Customer Satisfaction, Automotive Sales and Franchise.

1. Introduction

The use of Electric Vehicles (EVs) in transportation and logistical operations is at the forefront of the war against climate change caused by carbon emissions from internal combustion engine vehicles (Awwad et al. 2018). As an EV manufacturer, Tesla has proven to be innovative in the impenetrable automotive industry. Their ability to create success in a previously barren EV market and become the first automotive company to go public in over 50 years warrants an investigation into the efficacy of Tesla's business model. Tesla has changed the way cars are made and sold. One of the most obvious ways of investigating Tesla's success is how many cars they have sold, both internationally and domestically in the US that has resulted in a peak market cap of over $1.2 trillion which is larger than most legacy auto manufactured combined (Richter 2022). The customer ultimately creates value in the supply chain and "in addition to pandemic-related trends, factors related to customer experience are igniting changes in the automotive industry" (Ryan 2022). Therefore, through investigation and research into how Tesla gets cars into consumers' driveways, it's possible to understand how they have achieved their success.

1.1 Objectives

This paper aims to investigate Tesla's Direct-to-consumer (DTC) market systematically. The intention is to understand how Tesla has used its sales methodology to grow itself into a major brand with worldwide recognition. In addition, this paper will examine various key metrics of Tesla's market performance through a comprehensive literature review, how competitors have reacted and adapted to a changing market, and customer experience and satisfaction with a DTC market. This study should also help bring to light some of the key challenges of selling directly to consumers, as well as potential benefits related to inventory management and the supply chain.

2. Literature Review

To evaluate the efficacy of Tesla's DTC model, academic and news sources were used to track Tesla's legal, economic, and customer approval performance. While Tesla is relatively new in the automotive manufacturing world, there have

been rapid changes in the aforementioned categories, so the sources picked were published within the last ten years. Based on data collection and conclusions drawn by research papers in specific fields, a broader conclusion will be reached about Tesla using a DTC model for automotive sales.

2.1 Sales Metrics

Ever since going public in 2010, Tesla has been a top trend in the EV market, showing growth unlike any other major automotive manufacturer. In June 2021, Tesla's Model 3 became the first electric car to pass one million global sales. The model was the world's best-selling plug-in electric vehicle in 2021 (Carlier 2022). Tesla has effectively proven that there is a viable market for EVs both domestically in the United States and internationally. Tesla has surprised investors quarter after quarter, showing record sales number growth uncharacteristic for the current semiconductor shortage era. Tesla's success could be attributed to its favorable customer sentiment and ability to combat the semiconductor shortage. While Tesla has had a firm hold on the EV market in the United States and early global success, it has recently faced stiff competition in international markets. This could be attributed to the rapid adoption of EV manufacturing in countries outside the United States, such as China and many European manufacturers.

Focusing on the US market, to illustrate the success of Tesla's unique business model, it is essential to compare it to the competition. Given the smaller scale at which Tesla operates compared to other automotive manufacturers such as GM or Ford, it is hard to draw any meaningful conclusions based on direct sales numbers. However, looking at sales growth year-over-year shows how much of an anomaly Tesla is. According to data from TrueCar, the electric automaker saw a 93.2 percent growth in February 2022 compared to March 2021. In contrast, every other automotive company suffered substantial losses in deliveries year-over-year. Also, in terms of quarterly year-over-year comparisons, Tesla was one of two automakers to see positive gains from Q1 2022 compared to Q1 2021 (Klender 2022). It is clear from the data that while Tesla is not the largest in scale, it is dominant in growth. Tesla has gone from being the first publicly traded auto company in over 50 years to being the 5th largest company in the S&P 500 Index as of April 22, 2022 (Carlier 2022). Furthermore, as outlined in Figure 1, Tesla's growth with its new Model Y has carried on sales to new heights.

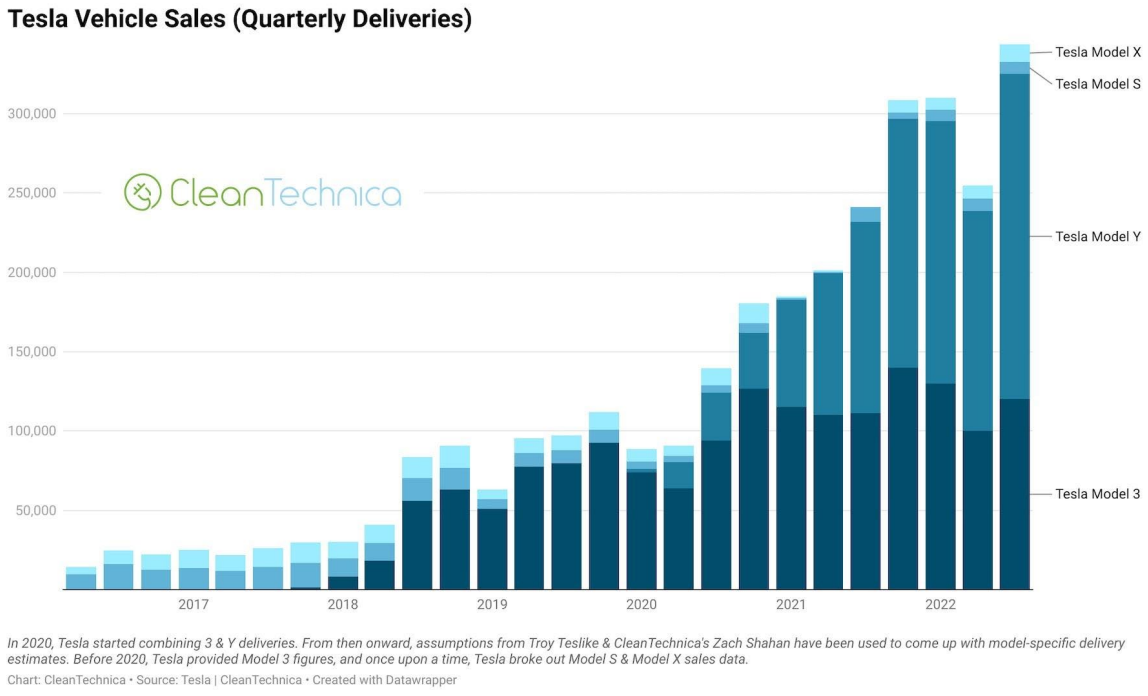

Figure 1. Tesla Vehicle Sales Breakdown by Model.

Overall, Tesla has shown that it can be an innovative leader in the auto industry. Both through selling EVs and also revolutionizing the customer buying experience by utilizing a direct-to-customer model.

2.2 Customer Experience

Tesla's direct-to-consumer (DTC) supply chain model has many benefits, not only to the company, but also to the customer. Many customers who have used Tesla's DTC sales model to get a new car have reported gleaming reviews of the process, comparing it to the oftentimes all-day event that visiting a dealership can be. Consumers also consider the financial aspect of buying directly online as opposed to from a dealership, as cars sold via DTC sales are straight from the manufacturer and can be sold at their listing prices (Hinshaw 2022). One account from a customer who bought a Tesla stated that the whole process was the "easiest big purchase" of their life and that they would investigate buying cars that offer DTC sales in the future (Stenquist 2022). Overall, based on customer reviews, buying a car online is a much more efficient and stress-free avenue for making such a large purchase.

While DTC sales may be the automotive industry's future, car dealerships may still be an aspect of buying a car. However, they will look different than they do today. According to a data analyst at Cox Automotive, consumers want to buy their cars online. However, they would still like to be able to visit dealerships (Stenquist 2022). This would give dealerships the role of providing information about various products and allowing customers to test drive cars, but not actually do the selling of the car.

DTC sales have many advantages, and consumers seem to rate the methodology highly. However, there are some drawbacks to this model. One of the main disadvantages of DTC sales is the serviceability of the cars. Since the car comes to the consumer in the DTC model, there can be fewer dealerships in any given area, which becomes a problem if a car needs to be serviced. Tesla promises to send technicians to customers' homes for small issues with their cars. However, for more significant issues, they must be taken to a Tesla service center, which can be hours away from the consumer. Figure 1 below is a map of Tesla Service Centers and shows how far a person might need to drive to reach a Tesla service center in the United States.

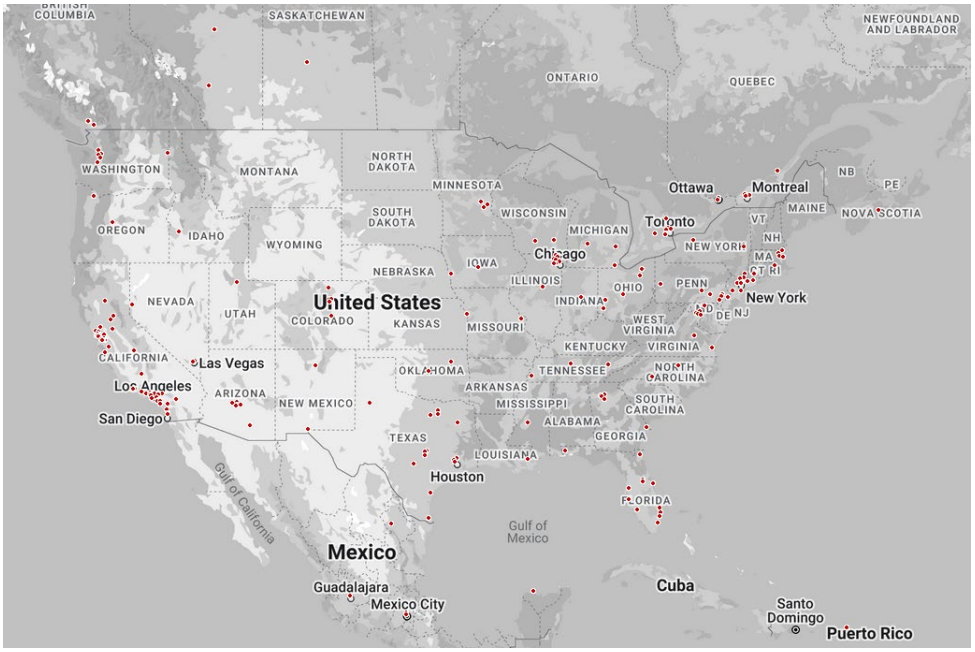

Figure 2. Map of Tesla Service Centers

Tesla currently maintains about 160 service centers around the United States, which is a meager amount compared to other competitors, with over 3,000 dealerships that can service their cars (Stenquist, 2022). For DTC to become the standard for car sales in the future, this problem will need to be solved efficiently and with the customer's experience in mind.

2.3 Cost to the Company

The direct-to-consumer model can have positive effects on the company. It eliminates the dealership in the supply chain so consumers can buy directly from the manufacturer. This allows the manufacturer to save costs for using a dealership. Ford's CEO has even said that their vehicles cost the company $2000 more when compared to Tesla due to the dealership model (Neiger 2022). These increased costs can be shown in Figure 3. This compares Tesla's general, administrative, and selling costs to Ford, one of Tesla's main competitors in electric vehicle sales. Figure 3 shows that in recent years such as quarter 2 in 2022, Ford's SG&A costs are almost 4 times that of Tesla's (Macrotrends 2022). Ford is a larger company but is only about 50% larger than Tesla. These increased costs could result from having to use dealerships as a middleman for selling vehicles.

Figure 3. Selling, General, and Administrative Expenses for Tesla and Ford

Additionally, car manufacturers lose money from dealerships because they are the first point of contact to provide the customer with other paid services, such as warranties or subscriptions. For example, dealerships can add features such as paint protection or wheel-well liners that they then charge several hundred dollars for (Naughton, 2021). Furthermore, there are other disadvantages to the dealership model that further cause car manufacturers to lose money. Due to dealerships raising prices and marking up their cars at higher prices than what is the listed price, customers can be annoyed by that and are less likely to buy from that manufacturer again. Growth from Knowledge reported that 81% of buyers paid above the suggested selling price and that a fourth of these people would not buy from this manufacturer again (Growth from Knowledge 2022). This loss of goodwill can translate into future lost profits from people moving to different companies for future purchases. Companies want to keep their customers happy, and the dealerships are not helping this by frustrating customers. Compared to Tesla, typical manufacturers don't have as much control over their image from third-party dealerships that represent them.

2.4 Challenges to the DTC Model Faced by Tesla

While there are many benefits surrounding the DTC model, there are also legislative roadblocks that Tesla has faced. From a legislative standpoint, several of the 50 United States of America has laws preventing online or direct-to-customer vehicle sales. Figure 4 illustrates the current states that have laws in place currently preventing customers from purchasing Tesla through its available avenues. As illustrated by the figure, many states towards the center of the US (shown in gray), including high-population states such as Texas, do not have locations where customers can walk into a store and purchase a vehicle (Pogue 2018).

To combat the franchise laws preventing Tesla from building stores, they have shifted their focus to legislative solutions. For example, North Carolina currently has laws in place to prevent automotive manufacturers from selling direct-to-customer. Tesla lobbied in the state to exclude a ban on online sales, which they were successful in preventing (Barmore 2014). At the time Barmore's article was written, Tesla was facing a similar legal battle in Texas. While one can now purchase Tesla online in Texas, there are still no in-person stores that allow customers to live in a brand-new Tesla.

Figure 4. States possessing Tesla dealerships as of 2018

Aside from lobbying, Tesla has also enacted lawsuits against states to open their borders to DTC stores. In Louisiana and Michigan, Tesla presented arguments that state laws restrict its citizens' freedoms by prohibiting DTC sales. The laws in these states originated as methods to prevent manufacturers from arbitrarily shutting down stores but have since been protected by franchises to eliminate competition from manufacturers. Tesla's suit against Louisiana is recent, but this method has led to success in Michigan (Bobrowsky 2022). While Tesla's battle to open storefronts in restricted states is ongoing, their diversified methods have shown consistent progress on the matter.

2.5 Managing Inventory When Using DTC

DTC sales can create an interesting inventory management model that Tesla has used to its favor. Since cars can be sent directly to the customer and not kept at a dealership, Tesla must efficiently manage its inventory to meet customers' demands and needs. One way that Tesla does this is by keeping a waiting list for their cars and limiting their on-hand inventory. Since Tesla does not have a network of dealerships that can store their cars, they must limit the number of cars that they have in inventory and produce their products on demand (QuickBooks 2014).

By shipping straight to the consumer and placing the customer on a waitlist, Tesla also opens the opportunity to add customization to its products. Since the products are not mass-produced and stored in inventory and are instead made to order, customers can choose from various add-on customizations and features. This creates more revenue for Tesla and gives the consumer a unique experience. While the customer waits for their car to arrive, they receive information that pertains to their unique product, from delivery information to instructions on how to utilize their car to its fullest capabilities (EvolvAI 2022). This is a mutually beneficial model as Tesla can limit their inventory capacity while maintaining the customer experience.

Tesla is also able to benefit from its low inventory model by reducing the amount of capital it has locked up in its inventory (QuickBooks 2014). Tesla can minimize the money that is sunk into large amounts of inventory and can instead use that money to grow other aspects within their company. This benefit can be seen in some reported forms from 2013 when Tesla released that their inventory management model resulted in savings of over $30 million (QuickBooks 2014). While there has not been a large amount of research into how DTC sales affect inventory management, Tesla is leading the way in discovering how it can use it to its advantage.

2.6 Competitor Response

Tesla's unique sales model has redefined the landscape of the car buying experience, and its success has influenced other automakers to follow suit. According to a New York Times article published in June 2022, "Tesla shifted to

selling cars entirely online in 2019." When they made the decision, many feared "Tesla was making a big mistake" (Stenquist 2022). Despite this criticism, Tesla has since gone on to dominate the electric car market with 68% sales as of August of this year (Lambert 2022). Tesla puts the purchasing experience directly in the hands of its customers, allowing them to customize their vehicles and complete most of the process online, away from the dreaded dealership experience. In fact, a Forbes article published last year references a study that found that "75% of customers surveyed will spend more to buy from a company that offers a good customer experience." The Forbes article also describes the traditional dealership experience as inefficient. In contrast, online, direct-to-customer models relieve a lot of these inefficiencies through "auto-populated contracts and contactless vehicle delivery" (Rains 2021).

To adapt to market changes brought on by various factors including, the pandemic, and the chip shortage, automakers have been forced to change with the times. Because of Tesla and others who followed suit, we are now at a point where "online car shopping appeals to a large proportion of all car buyers." Even so, there is data to support the claim that people don't want to eliminate the dealership experience altogether. More mundane tasks like pricing and contracts are preferred online, but customers still want a physical place to test drive and experience the car's features. Despite this, "the chief executive of Ford Motors, Jim Farley," claimed back in June, when the aforementioned New York Times article was written, that Ford's "distribution and advertising costs per car were about $2,000 higher than Tesla's." To combat this disparity, Farley wanted Ford to "sell cars only online at non-negotiable prices without keeping a large inventory of cars at dealerships" (Stenquist 2022). Tesla has been doing this since 2019, and it is now clear other automakers are looking at Tesla for inspiration.

Since the New York Times article was written, Ford has gone one step further, implementing certain regulations for dealers carrying their vehicles. According to a more recent Wall Street Journal article published in September, "Tesla set the bar for selling EVs when early on it decided to forgo a traditional dealership network." Ford now restricts "some dealers from carrying vehicle inventory on the ground and mandates non-negotiable pricing on Ford's website." To enforce this, Ford is giving nonconforming dealerships until 2024, disallowing any delinquent dealerships from selling their vehicles by 2024 (Eckert 2022).

2.7 Advancing Tesla's DTC Model

With high prices and a shift in consumer behavior driven by the pandemic, Tesla is "shuttering a number of stores in favor of less-expensive locations." As of mid-2021, when this CNBC article was published, Tesla operated "more than 170 galleries and showrooms across the US." That number has only been decreasing since the onset of the pandemic. As time goes on and consumer preferences change, physical stores for all retailers will need to adapt to stay competitive. As a Forbes article from mid-2021 puts it, "to help meet the increase in online demand…some retailers have introduced 'dark stores,' where physical stores are reserved as mini distribution centers solely dedicated to supporting home delivery and customer pickup" (Gottlieb 2021). According to a Nasdaq article, Tesla has also been trying to keep up with increased demand for online services and have focused on "expanding and enhancing IT systems" as well as "reinventing the physical retail experience for customers" (Saraf 2022).

Since the pandemic, auto manufacturers have been rethinking and reimagining the traditional car buying experience. Infiniti, for example, which saw a major decrease in sales, "as much as 59% below the level expected," has introduced a new way to test drive and buy its cars. To combat declining sales, Infiniti began to display its vehicles through videoconferencing. Furthermore, they began offering test drives to their customers' homes. This involves "'bringing test-drive cars–fully-sanitized–to the customer's front door.'" In fact, it was found that "70% of Infiniti customers who are aware of the remote offering want it to continue past the pandemic" (Deighton 2020). While Tesla was the original innovator for the online buying experience, for its simplicity and timeliness, we see that other automakers are being forced to follow suit and, in some cases, are building off Tesla's original model to further increase the convenience factor for its customers. Companies that aren't willing to change will not have the means to stay competitive and relevant in a continuously evolving market.

3. Conclusion

Tesla's unique direct-to-consumer model has been a success for the company and has enabled them to influence the automotive market in multiple ways. Tesla was one of the first US companies to sell electric vehicles widely and has been able to dominate this market in the US, while other major manufacturers are only now starting to catch up on designing electric vehicles. Additionally, their direct-to-consumer system has reduced their on-hand inventory while still meeting customers' demand through their use of online selling, where customers get placed on a waiting list. This

enables buyers to customize their orders, giving them a unique and personalized experience while keeping inventory levels low. Tesla's direct-to-customer sales have been received positively by the general public, who enjoyed this more than the usual system at a car dealership. However, one disadvantage of this model is the lack of outreach and accessibility Tesla has. Customers may not be able to test drive a vehicle before purchasing it and may have difficulty servicing their vehicle easily. These disadvantages will need to be addressed by Tesla as they continue to expand. Tesla has also experienced legal challenges in opening its stores throughout the United States. However, as time goes on, they are making progress with that through the use of lobbying and lawsuits.

Overall, Tesla has experienced success with this new and unique car-selling system. They have reduced their costs from traditional automotive selling methods by eliminating the dealership and handling sales themselves. Furthermore, some of these practices, such as online sales, have spread to other companies that have begun to adapt their dealerships to work in different ways than just selling cars. Tesla's innovation and unique approach to sales have allowed them to experience more growth than they would have otherwise had and influenced the automobile market to adapt to modern selling practices.

References

Awwad, M., Shekhar, A., & Iyer, A. Sustainable Last-Mile Logistics Operation in the Era of Ecommerce. In The *Proceedings of the International Conference on Industrial Engineering and Operations Management*, pp. 584-591, Washington D.C., United States of America, September 21-29, 2018.

Barmore, C., Tesla Unplugged: Automobile Franchise Laws and the Threat to the Electric Vehicle Market, *Virginia Journal of Law & Technology*, vol. 18, no. 2, pp.185-228, 2013-2014.

Bobrowsky, M., Tesla Sues to Sell Cars Directly to Consumers in Louisiana, Available: https://on.wsj.com/3FDN0LG, August 29, 2022.

Carlier, M., Tesla: Statistics and Facts, Available: https://bit.ly/3VMN55o, September 16, 2022.

Deighton, K., Auto Makers in Lockdown Test Drive the Modern Car-Buying Experience, Available: https://on.wsj.com/3BgIAYv, June 21, 2020.

Eckert, N., Ford Reveals New EV-Selling Rules to Dealers, Available: https://on.wsj.com/3iOb8lM, September 14, 2022.

Gottlieb, D., Rethinking the Role of the Physical Store, Available: https://bit.ly/3Hn9Jgg, July 27, 2022.

Hinshaw, Is Tesla's Customer Experience Driving Car Dealers over the Edge?, Available: https://bit.ly/3uGcVM8.

Klender, J., Tesla Stands Alone in Year-over-Year Growth among Major Automakers, Available: https://bit.ly/3Fe3clo, March 30, 2022.

Lambert, F., Tesla (TSLA) still dominates US electric car market with 68% market share, Available: https://bit.ly/3PesC6X, August 15, 2022.

Macrotrends, Stock Comparison Tool, Available: https://bit.ly/3Y8kA3z.

Naughton, N. Car Dealers Are Selling More Vehicles Above the Sticker Price, Available: https://on.wsj.com/3UH4Tx9, June 29, 2021.

Neiger, C. Tesla Is Right to Sell Directly to Consumers -- Here's Why, Available: https://bit.ly/3FCm7HJ, September 30, 2022.

Paying above MSRP leaves car buyers with strong negative feelings toward auto brands, dealerships, Available: https://bit.ly/3UHVzJB, August 8, 2022.

Pogue, D. (2018, October 15). *Why You Can't Buy a Tesla in These States*. Yahoo! Finance. Available: https://yhoo.it/3uC6DgU, October 15, 2018.

Rains, A., Dealership Customer Experience: The Key to Keeping Business In The World of Online-Only Retailers, Available: https://bit.ly/3P9QUPz, September 20, 2021.

Richter, F., Tesla's Market Cap Drop Is Bigger Than the Legacy Car Industry, Available: https://www.statista.com/chart/29002/tesla-market-capitalization/, December 21, 2022.

Ryan, T., The History of Automotive Retail and a Guide to the Dealership of the Future, Available: https://bit.ly/3Hqpov9, March 31, 2022.

Saraf, S., Tesla Sales Model Gains Momentum; Will Others Join the Race?, Available: https://bit.ly/3UCXwa8, May 2, 2022.

Shahan, Z., Tesla Quarterly Sales Charts Rise Again, Available: https://cleantechnica.com/2022/10/02/tesla-quarterly-sales-charts-rise-again-9-charts/, October 2, 2022.

Stenquist, P., Why You Might Buy Your Next Car Online, Available: https://nyti.ms/3Pew5Cv, June 21, 2022.

Tesla Customer Experience and Journey: CX Lessons to Follow., Available: https://blog.evolv.ai/cx-lessons-from-teslas-customer-obsession.

Tesla Supply Chain - Custom-build World Class Supply Chain, Available: https://quickbooks.intuit.com/r/supply-chain/tesla-custom-built-supply-chain/, September 14, 2014.

Thomas, L., Tesla reportedly moving out of malls dealing with another blow to shopping center owners, Available: https://cnb.cx/3uBWvVh.

2022 Map of Tesla Service Centers, Available: https://bit.ly/3W0XJ8b.

Biography

Jeremy Asuncion is a senior undergraduate at California Polytechnic State University San Luis Obispo studying manufacturing engineering. During his time at Cal Poly and professional experience, Jeremy has gained experience with a wide range of manufacturing processes, working with automated systems and design for manufacturing through various projects. His passion is collaborating with people and solving new problems.

Momo Murphy is a senior undergraduate at California Polytechnic State University studying Manufacturing Engineering. She has gained experience with supply chain logistics through internship opportunities while at Cal Poly and is an experienced lab technician in the CNC Machining labs on campus

Nikolai Prutow is a senior undergraduate studying Manufacturing Engineering with a minor in Computer Science at California Polytechnic State University in San Luis Obispo, California. He has experience with continuous improvement in the healthcare and manufacturing industry through internship experiences, as well as gained manufacturing knowledge through his classes and personal projects.

Maxwell Siantar is a senior undergraduate student of Manufacturing Engineering at California Polytechnic State University (Cal Poly), San Luis Obispo, with a background in the Automotive industry. During his time at Cal Poly, Maxwell also supported logistics for the automotive aftermarket company Battle Garage Racing Service, where he gained experience in the world of sales and support for vehicle components.

Jeffrey Tyre-Vigil is a senior undergraduate studying Manufacturing Engineering at California Polytechnic State University in San Luis Obispo, California. Through his coursework and internship, he has gained experience with a wide range of manufacturing techniques and applications. Additionally, he has worked with the business side of manufacturing, including the supply chain and logistics necessary, from sourcing raw materials to delivery of the final product.

Mohamed Awwad is an Assistant Professor in the Department of Industrial and Manufacturing Engineering at California Polytechnic State University (Cal Poly), San Luis Obispo, CA. He received his Ph.D. and MS degrees in Industrial Engineering from the University of Central Florida, Orlando, FL, USA. Additionally, he holds MS and BS degrees in Mechanical Engineering from Cairo University, Egypt. Before joining Cal Poly, San Luis Obispo, Dr. Awwad held several teaching and research positions at the State University of New York at Buffalo (SUNY Buffalo), the University of Missouri, Florida Polytechnic University, and the University of Central Florida. His research and teaching interests include applied operations research, logistics & supply chain, blockchain technology, distribution center design, unconventional logistics systems design, and OR applications in healthcare and the military.