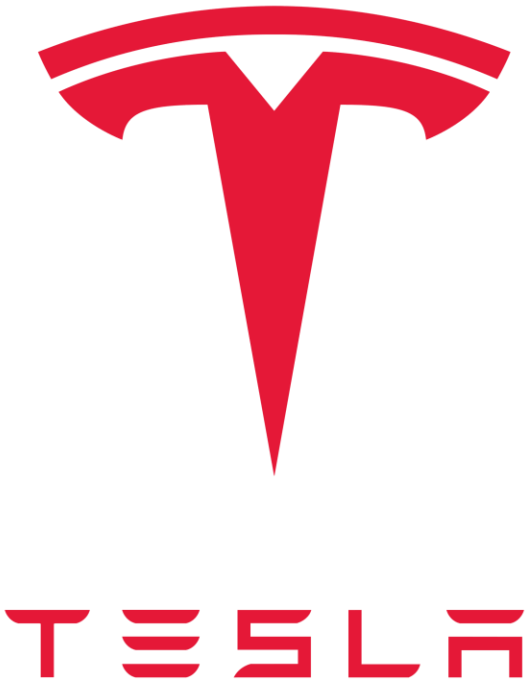
Executive Summary



Changes in the value chain strategy in production of cars:

Tesla 2.0 vs Tesla 1.0

Pod C - Team 10

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Assessing Tesla's value chain
Changes in the value chain strategy in production of cars in Tesla 2.0 vs Tesla 1.0

Executive Summary

Since its incorporation in 2003[1], Tesla has journeyed away from being a virtual corporation, transitioned from offshoring to reshoring and localizing, and consolidated disintegrated operations into vertically integrated automation-focused value chain.

With the objective to understand what drove the changes, we looked into Tesla 1.0 (initial years of launching Roadster in 2007) and the key changes, change drivers and their impacts that have shaped Tesla 2.0 (years of Tesla launching subsequent models – Model S, X, 3 and Y). Our scope is limited to changes in their value chain, with focus on production and supply chain management.

Tesla 1.0 outsourced manufacturing of hardware while insourced upstream activities like software and product designs. Outsourcing, however, brought challenges including language barriers, unavailability of parts, unsophisticated suppliers, hidden costs, lags due to geographically dispersed operations, and delays in final deliveries.

The challenges triggered a thorough network analysis leading to a reversal of their value chain. Fast forward 9 years, Tesla's productivity frontier has grown significantly - they launched Model S in 2012, followed by Model X in 2016, Model 3 in 2017 and the latest, Model Y in 2020[2].

Key changes made in their production line:

i. Vertical integration.
ii. Localized supply chain.
iii. Automated production.

Since 2012, their margins have shot up and the number of units delivered each year grew exponentially, evidencing the positive impacts of the changes (Fig1; *Source: 10K reports 2012 - 2022*).

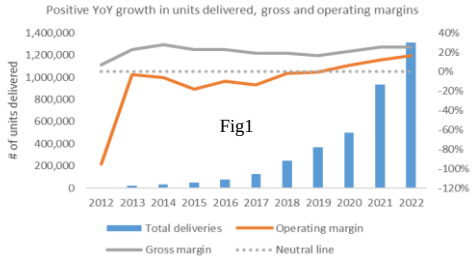

Fig1

The changes, change drivers and their impacts:

i. **Vertical integration**: Tesla 2.0 insourced most of their hardware - from electric powertrains to batteries and self-driving software and constructed gigafactories to support their operations.
Drivers: To create, capture and sustain greater value, Tesla needed to take control of their design, production and delivery which was not feasible under a disintegrated supply chain. Automobile parts are bulky which needed dedicated suppliers and added to logistical cost. Tesla's products being non-standard, they required tighter integration and coordination between designers and suppliers.
Impacts: Greater integration of design, manufacturing and engineering teams enhanced efficiencies and enabled faster response to supply chain and market dynamics. Tesla 2.0 can capture downstream value and reduce costs and dependency on suppliers. Vertical integration helped Tesla cope with global chip shortage and supply chain issues that hit other automakers much harder during the pandemic[3].
Unlike Tesla 1.0, Tesla 2.0 can make modifications to the chassis as and when battery technology is improved. The shortened time to validate design expedited proof of concepts and time to market led to year-on-year incremental deliveries and sales, leading to a greater market share.
The integrated management continues its quest to reduce unit cost per kilowatt hour and reduce investment per gigawatt hour – striving to cut battery price by half to enable Tesla to sell Model 2 at a price point of $25,000 in 2024[4].

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ii. **Localized supply chain**: Tesla 2.0 localized supply chain by sourcing materials closer to their production facilities. Tesla currently has seven factories of which five are gigafactories located in China, Germany, and the USA[5].
Drivers: Offshoring/ outsourcing led to long supply chain, higher logistics costs and extended lead time which added up inventory in distribution chain. Tesla needed to be able to do high-level of customization at a faster response rate. The higher-than-anticipated total landed cost was not justifiable as they were transitioning from start-up to growth stage.
Impacts: Localization enabled them to have an agile and resilient supply chain. Having suppliers on the ground reduced shipping costs, improved production efficiencies and minimized carbon footprint, e.g., by insourcing battery raw materials from US and Canada for its plant in Nevada, US, it reduced supply chain distance by 80% from 20,000-30,000 kilometers to 5,000 kilometers[6]. With controlled costs, Tesla can competitively price the batteries and continuously innovate to improve the energy density, durability, and life cycle. The success of localization is reflected in their Shanghai operations where within two years of production, localization rate reached 95%[7].

iii. **Automated production**: Tesla automated major parts of their production process, while keeping human involvement at optimum level so as to create synergy between the two.
Drivers: Tesla aimed at minimizing human errors, while enabling faster output. Tesla 1.0 churned out 2,500 cars in 5 years, an average of 500 cars per year. This was not scalable enough with the speed at which Tesla wanted to grow.
Impacts: Automation reduced assembly time and reliance on external die cast manufacturers. It simplified the manufacturing process and gave Tesla a competitive advantage so it could focus on research and development. Tesla has a target to increase vehicle deliveries by roughly 50% every year and aims to reach 20 million units in 2030[8]. The fastest route to this is increased efficiency. It wants to achieve 5x-10x more output per manufacturing square feet compared to traditional car makers[9]. Its recent installation of world's biggest casting machine, Giga Press, has replaced 70 different parts of Model Y with a single rear body piece resulting in 40% cost savings[10][11].

Conclusion

The changes brought about by Tesla 2.0 have revolutionized the automobile industry. It has touched every aspect of the value chain, starting with raw materials procurement speeded up with localization, inbound logistics getting more efficient with vertical integration, component manufacturing and assembling getting expedited with automation, outbound logistics positively impacted with a faster product output, warehousing and distribution becoming more efficient with faster inventory turnover and retail operations getting leaner with AI-enabled 'online shopping for cars'.

During their latest investor day event on 01 March 2023, Tesla announced their upcoming master plan, highlights of which are cutting assembly costs by half in future, opening another gigafactory in Mexico and adopting an 'unboxed' model of assembling cars[12] - a clear reflection of their innovative and disruptive ways to growth and sustainability.

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