



IS TESLA THE DISRUPTOR WE NEED?

VOLUME II



FABERNOVEL

GAFAnemics

In June this year Tesla became the world's most valuable carmaker

is equivalent to all these players combined

Tesla's market capitalization...

210\$Bn >



24\$Bn



36\$Bn

DAIMLER

38\$Bn



34\$Bn

Uber

52\$Bn

As of July 1st.



But it's been a bumpy ride

2013.

Tesla shares started to **take off, as the company posts its first profit.**

2017.

Shares remain in a steady range until 2017, when **things started to wax and wane**, as Musk got vocal on Twitter (setting ambitious production targets, revealing plans to take the company private,...).

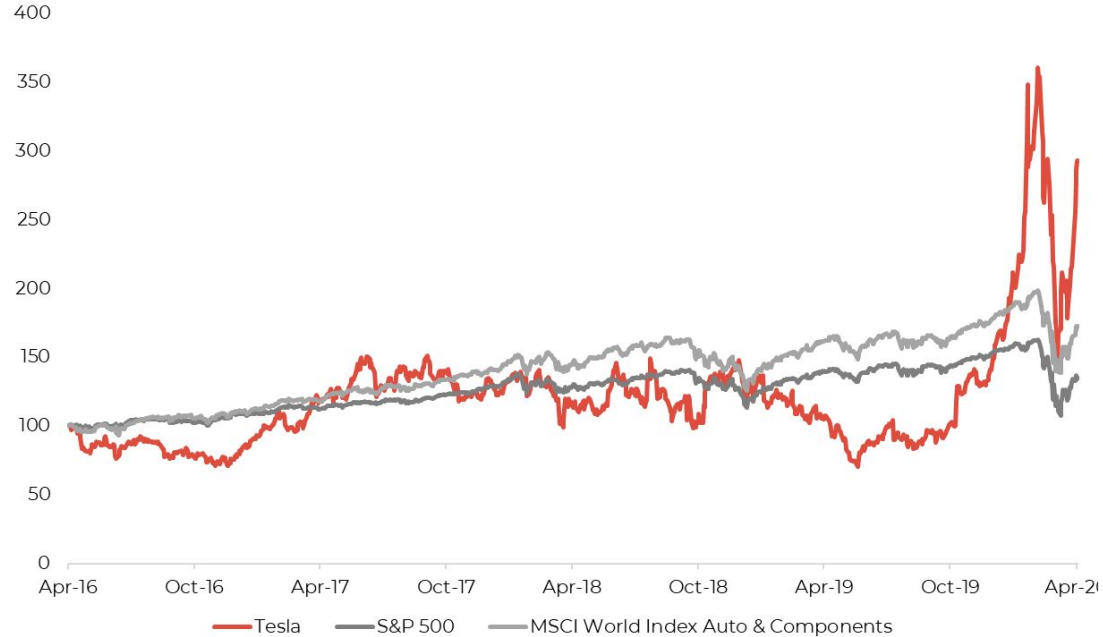
2018-2019.

It impacted the stock throughout 2018 and 2019 did not start any better with the occurrence of **major layoffs & departure of significant members of the executive team.**

mid-2019.

Tesla finally **restored investor trust, as it demonstrated solid production numbers and reached profitability.**

Tesla stock performance relative to S&P 500 and the sector



Tesla is no longer the new kid on the block

In less than two decades, Tesla has become a major player on the automotive and energy markets.

A giant of its own.

\$210Bn

market capitalisation
(as of July 1st)

48,000

employees

N°1

Seller of electric cars in
the world

1M+

cars delivered since
inception (≈40% in 2019)

\$24,7Bn

Revenues in 2019

52%

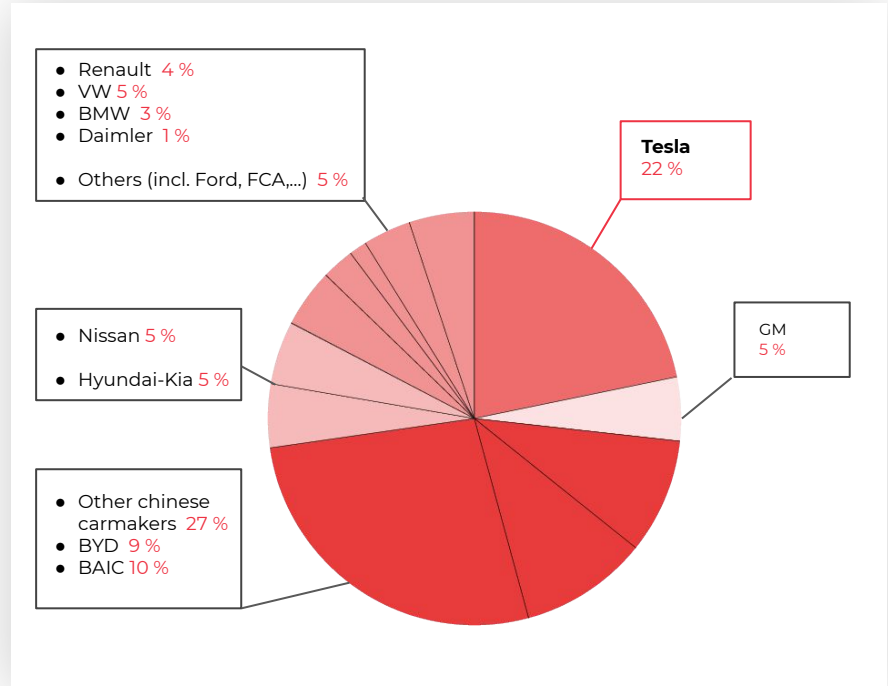
revenue CAGR 2016-19

It is the best-selling electric car manufacturer

With over 367,000 vehicles delivered in 2019 (+50% vs 2018), **Tesla is by far the strongest selling electric car manufacturer**, ahead of the Chinese manufacturer BYD (219,000 vehicles).

Tesla Model 3 alone stands as the best selling electric model in the world.

2019 Global EV sales in volume.



Source : EV-volumes, excluding Plug-in Hybrid Electric Vehicle)



And its technology leadership seems strong

Best powertrain technology






Tesla outperforms all incumbent EVs in terms of range & performance. **Tesla's substantial lead is notably linked to its platform, designed specifically for EVs**, while most competitors are using traditional ones.



In terms of autonomy, Tesla is the uncontested leader: at equal battery size and car weight, no manufacturer does better than Tesla (~20% outperformance in range vs. direct peers, highest range per kWh battery capacity).



In terms of performance (top speed and acceleration), Tesla is also the leader in all categories (Sedan, SUV & Luxury).

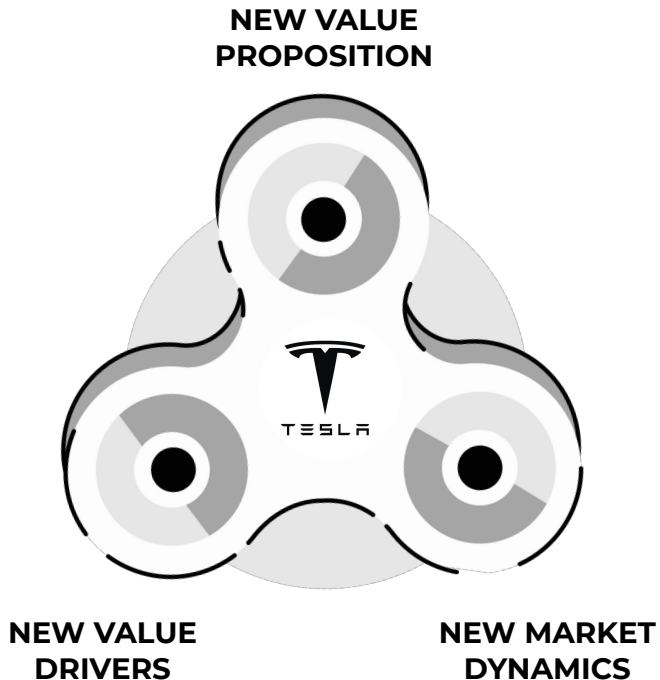
- **Autonomy**
(Model S) 
- **Top speed**
(Model S/X) 
- **0-60 mph**
(Model S) 
- **Peak Charging**
(Porsche Taycan) 
- **AV level 2**
(Autopilot Tesla) 

A dark, sleek car silhouette is centered on a black background. To the left of the car, there is a white lightning bolt graphic. A red dot is positioned at the tip of the lightning bolt, pointing towards the text.

How did Tesla pull this off?



Tesla is a great disruption case study



The impact that Tesla will have is fairly small in and of itself. It will change people's perception perhaps, but it will not in and of itself change the world. **Tesla can be the catalyst for a multi-order of magnitude shift of the entire industry towards electric.**

Elon Musk,
Tesla CEO



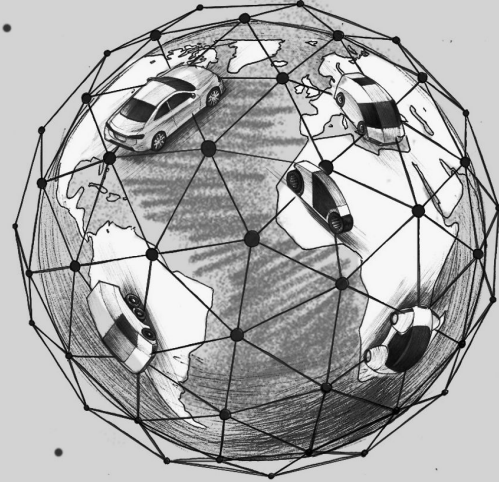
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Theorem #1:
**A bold vision sets a
business in motion.**

Like Facebook, Tesla's most powerful engine is its vision. An ambitious vision shared by all and capable of federating all stakeholders, be it investors, staff or customers.

▮▮ Tesla's mission is to **accelerate** the world's transition to **sustainable energy.**

Mission Statement: Tesla



This is what the world of an average man living in a global transportation and energy smart network looks like.

The End

One vision to rule them all

Because it shares such an ambitious vision, Tesla is able to **bring on board a whole network of actors** that contributes to its success. From investors to customers, different actors create a dynamic and generate a halo of enthusiasm around the products and brand. **A virtuous circle for the company.**

Employees

Musk sells a compelling vision to attract the best engineers willing to work hard to change the world.

Investors

Investors are confident about Tesla's long-term prospects because they value Tesla as a Tech company.

Media

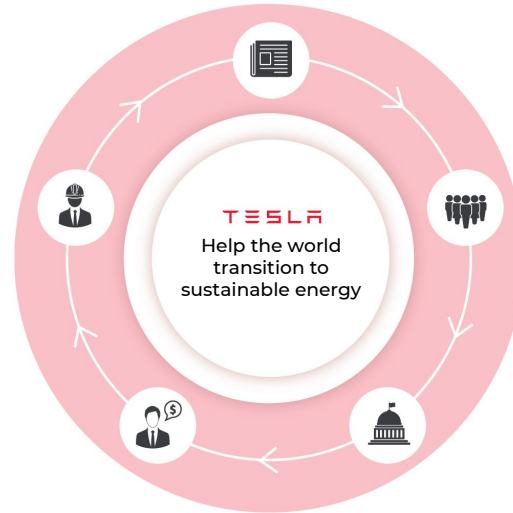
The media continually nurture the company's aura and report on the latest developments at no cost. A great PR strategy.

Clients

Customers agree to pre-pay and wait for their Tesla knowing that they will only be able to get it in 1 or 2 years.

Governments

Administrations are more willing to provide loans to Tesla, tax credits to consumers and set new laws for autonomous vehicles.



Creating a community of believers

Tesla is a community-driven company. Just like Apple it sparks fascination for its products and its brand to create a community of early adopters. Tesla encourages its customers to interact with each other and with the brand to spread the word of its world-changing mission.



Tesla's advertising budget/car.

Tesla doesn't pay advertising anywhere in the world. They crowdsource advertising to their customers. **Average advertising budget per car stands at \$240 in the industry.**



Crowdsource marketing.

Tesla leverages its community of users to create marketing campaigns. In 2017, it set up a contest of Tesla videos on youtube, gather millions of views. Tesla net promoter is way higher than competition, as **90% recommend the product.**



Long term dream strategy.

Tesla always have **at least one "crazy" product** (e.g cybertruck) in the pipe to raise customer expectations and make them dream, while building a more strategic product for the short term.

Selling before producing: crowdfunding on steroids

More than just fans, Tesla believers help finance car production. The company launches pre-order campaigns to collect funds, adapting the crowdfunding strategy to the car manufacturing industry.

Traditional model



Tesla's model



325k

Number of pre-orders for the Model 3 in the week following its unveiling. \$325M have been deposited.

Amounting to
\$14_{Bn}
of implied sales



250k

Number of pre-orders for Cybertruck in the week following its unveiling.

Amounting to
\$12,5_{Bn}
of implied sales

Attracting the dream team

Tesla sells its inspiring vision to attract the best talents, be it corporate superstars poached from competitors or flourishing talents looking for a challenge.

Attracting the brightest minds.

5th Tesla ranks **5th most attractive employer in the US** according to LinkedIn. No other automaker makes the top 50.



SpaceX and Tesla were designed with this vision of motivating a critical mass of talented people to work on inspiring things.

Peter Thiel
CEO, Palantir
Paypal Co-founder (with E. Musk)

Poaching Some industry high profiles.



Franz von Holzhausen

Sr. Design Exec
Ex Director of Design
@Mazda



Gilbert Passin

VP Manufacturing
Ex VP Manufacturing
@Toyota



George Blankenship

Ex VP Design and Store Development
Ex VP Real Estate (Apple Store)
@Apple



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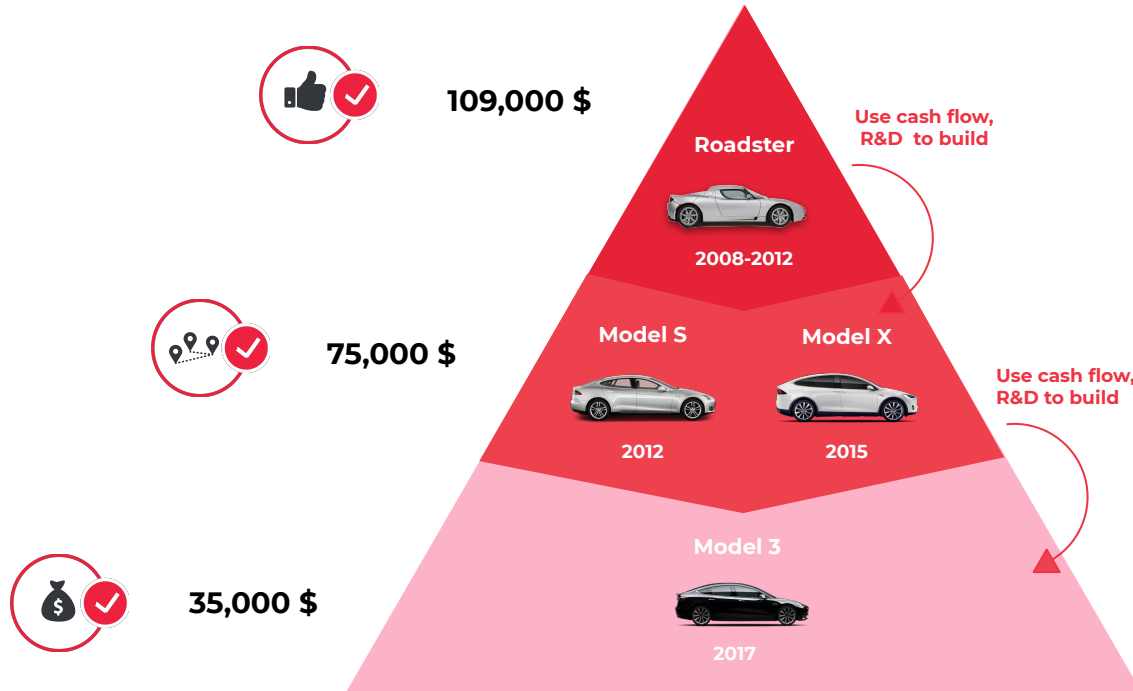
Theorem #2:

**A disruptive integration strategy
to challenge the status quo.**

Rooted in Tesla's philosophy is a strong belief that new technologies can challenge the status quo and achieve things everyone believed impossible.

The anti-disruption theory: a master plan to move from luxury to mainstream

In an era where “disruption” is on everyone’s lips, Tesla is using an old development method: start from an expensive product and move down the cost curve to mass market.



Integrating production to match its ambitions

Tesla launched the first vertically integrated car company since **Ford's River Rouge plant in the 1920s**.

Integrated Production

Most of **key components are built in its Fremont factory** (seats, high-voltage cables, displays, fuses, and other smaller systems).

A large part of Tesla's suppliers are based in the US or San Francisco Bay Area.

Rethinking Organization

All teams (design, assembly, engineering) work in the same factory in constant interaction, and using the same data flow across departments.

But why integrate?



Sharing information faster

Launching a new product presents a team with thousands of small decisions. Integration makes sharing integration faster

*E.g. Tesla had the **engineering team walk into the factory gathering feedbacks from workers.***



Accelerating learning cycles

Integrating enables faster cycles of learning and improvement.

*E.g. Tesla made over **50 changes per week** to the same car model.*

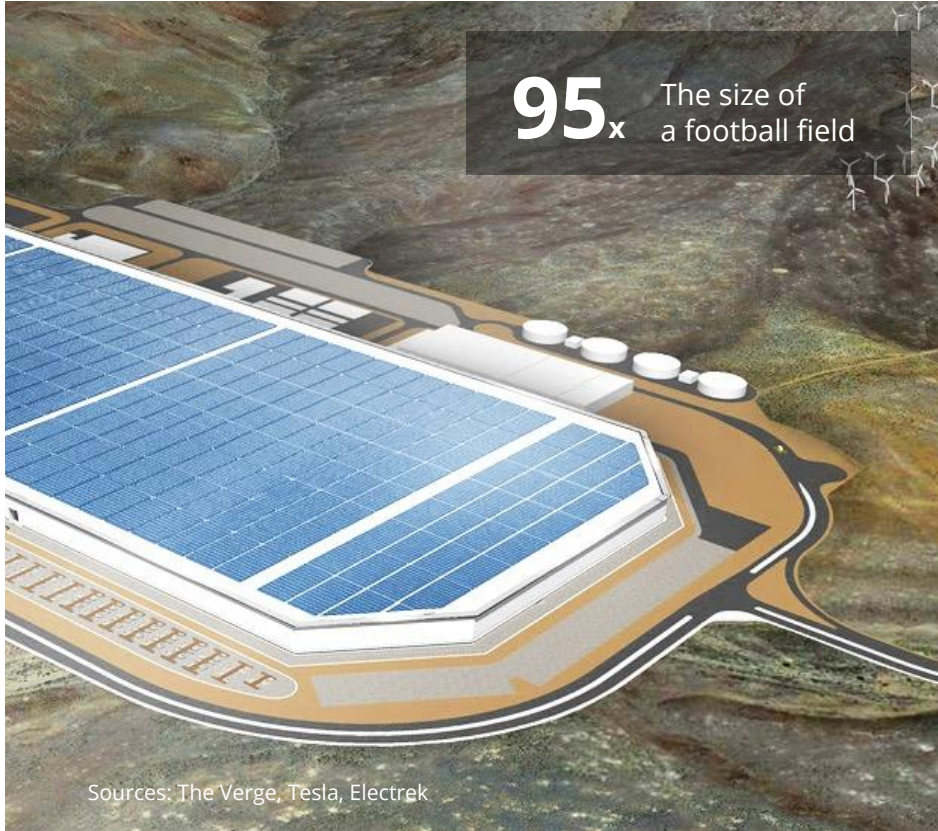


Bringing frontier tech to market

When you build something yourself, you are able to build tech that is not available on the market.

*E.g. Tesla's **ludicrous mode (full acceleration)** is a result of its internal research in safety fuses.*

Integrating production to match its ambitions



Thanks to its 4 Gigafactories (Nevada, New York, Shanghai, and soon Berlin) Tesla has the highest degree of vertical integration, reducing dependency on suppliers.

\$5_{Bn} Cost of one gigafactory

Driving down costs

35% decrease in battery cells cost

driving technology advantage

100
\$/kWh Key battery cost milestone achieved by Tesla, when market average is 160\$/kWh.

So far, Tesla's strategy has paid off: better battery packs at lower costs



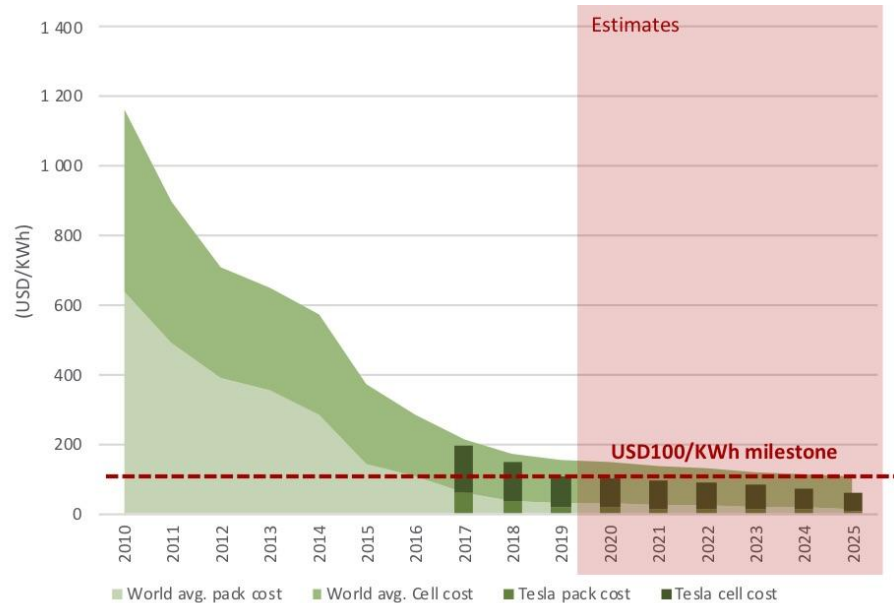
Today: reduced battery design cost.

Tesla has a first mover advantage on the cost of batteries in \$ per KWH Tesla should be around 100-110\$ (market average at 160). This is getting close to the \$100/kWh milestone that many industry observers consider to be the “magic number” that will bring EVs to cost parity with ICE vehicles without subsidies and break through the mass market.

100\$ per KWH

Key battery cost milestone achieved by Tesla

Tesla cost for Li-ion battery packs vs industry average.



Management, the hacker way

Traditional management is being disrupted by applying principles from the Hacker culture.

Hacking PRODUCTION TIMING

Elon Musk is famous for setting very **ambitious goals and deadlines**, in order to drive and pressure its production teams.

Cars are often introduced when the prototypes are not ready, in order to drive customer adoption before car production.

Hacking MEETINGS

Tesla cultures favors action over meetings & sharing times. In a famous email in 2019, Musk define the company dogma on meetings:

1. No large meetings.
2. If you're not adding value to a meeting, leave.
3. No frequent meetings.

Hacking HIERARCHY

The anti-handbook handbook: every employee must maximize its performance level even if it implies bypassing your direct boss and pushing key matters to the top.

Innovation is more rewarded than obedience.



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Theorem #3:
A “software company”
model.

Applying the secret recipe of Silicon Valley startups, Tesla is including software in all its products, making them incredibly more efficient and unlocking new market-defining features.

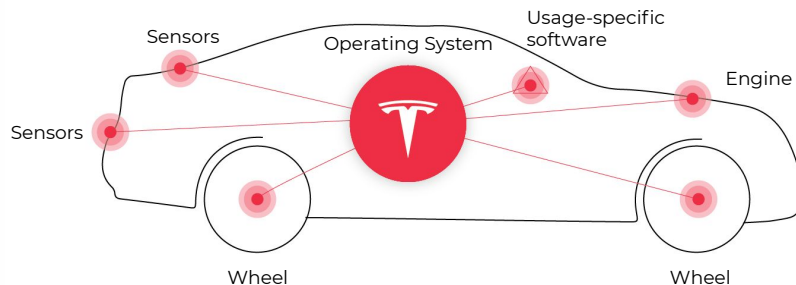
The car

Building the whole car around software

Beyond driving the car, software controls all aspects of the Tesla cars' operation and experience. When most automakers outsource their software (e.g Volkswagen makes 10% of software in-house) Tesla makes 100% of software in-house.

From the powertrain to the warning chimes in the car...**the level of integration that the software has into the rest of the Model S is really impressive.** Tesla is a benchmark for what we do here.

TJ Giuli
Former Head of Software
at Ford



- **Attract premium buyers**
- **improve car profitability with options**
- **3-5 year lead compared to incumbents**

The factory

Building the whole factory around automation



The **Factory Software team** is responsible for building infrastructure solutions that allow the company to redefine manufacturing and production (e.g engineer process automation, virtualized testing)



Tesla heavily relies on machine automation and acquired market leader **Grohmann** and startup **Perbix** to integrate the needed skills.

One goal: Efficiency

Tesla's original goal is to make factories more efficient by a factor of

10 to 100

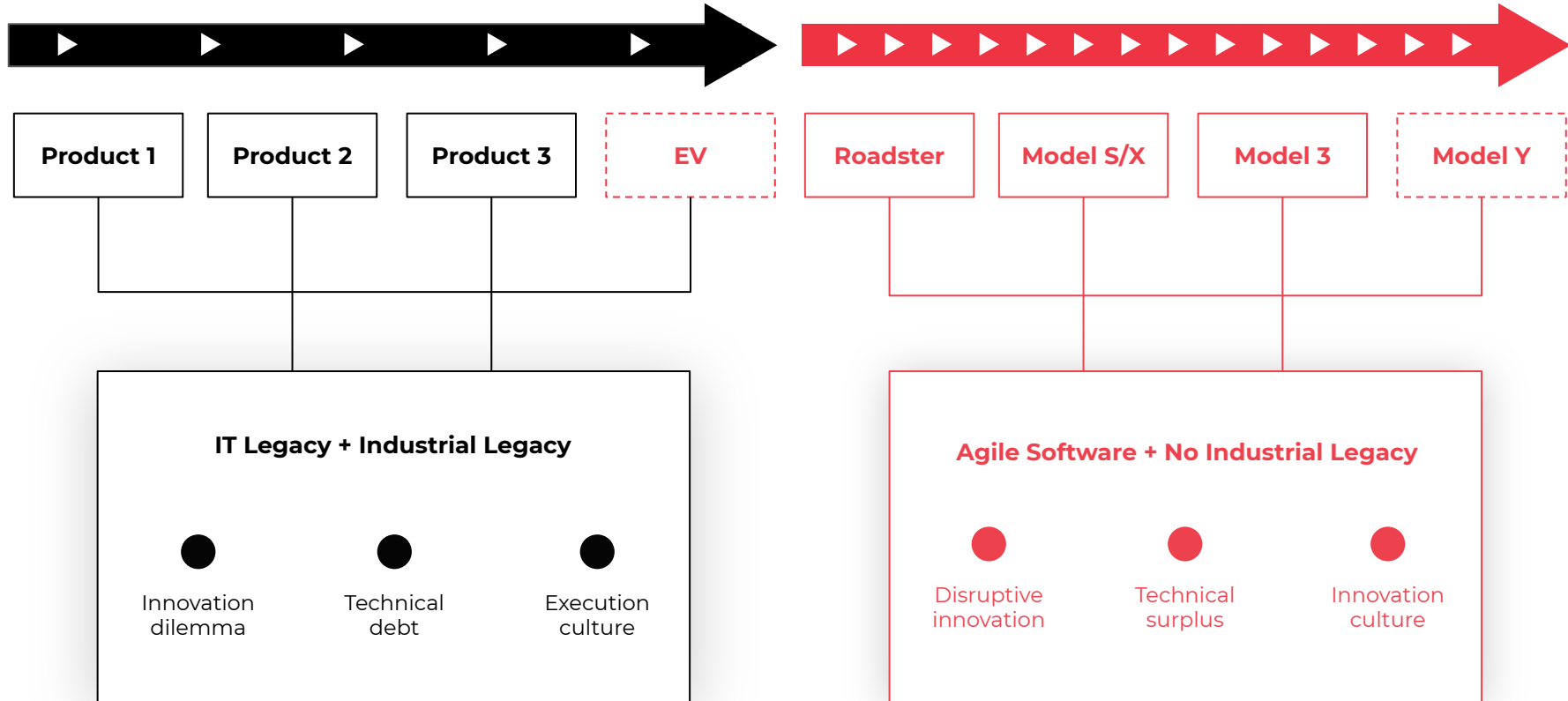


Tesla... [focuses] heavily on designing the machine that makes the machine - **turning the factory itself into a product.**

The Gigafactory is essentially designed like a very high density, multi-layered integrated circuit.
Like an advanced CPU.

The company

Like pure software companies, Tesla had no IT & industrial legacy



The battle for the car OS will be key

How does Tesla compare with the rest of the pack?



2013: "Autopilot is a good thing to have in planes, and we should have it in cars".

2009: Google self driving car project began with Toyota prius cars.

2015: Uber just announced its own self-driving project.

General Motors bought the startup Cruise in 2016.



R&D ratio at 5% of revenues. They are efficient as they can use their entire fleets to improve Autopilot overtime.

Estimation: **\$3.5 billion spent** by Waymo.

More than **\$1.5 billion raised**, including funds from softbank and Toyota.

More than **\$7.25 billion raised** in partnerships with Softbank and Honda.



With autopilot: **1 accident every 4.9 million kilometres** vs 766.400km US average

Waymo has the **best disengagement rate**: once every 17.730km.

Uber ATG is running behind schedule following a **fatal accident**.

Second lowest disengagement rate (once every 8.086km, 321% better in one year).



In 2019 Tesla only reported 19 miles with autonomous cars in California. But Tesla also reported **1 billion kilometres driven with autopilot engaged** (Nov. 2018).

Over **20 million miles on real-world roads** (1,5 million in California in 2019 and 10 billion miles driven in simulation).

In 2018 Uber declared more than **a million miles** driven with its autonomous cars.

In 2019 Cruise reported **310.000 miles** on real world roads in California. Cruises deploys the equivalent of 30.000 virtual vehicles.



Medium & Long distance

Medium & Long distance

Micromobility & Medium

Micromobility & Medium

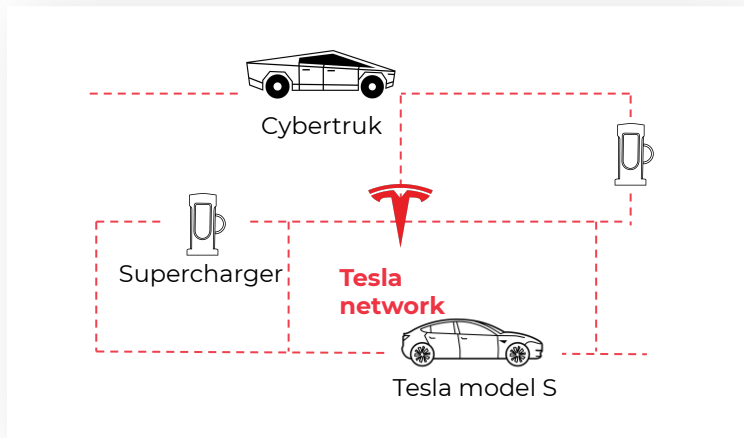


Tesla has very few alliances. They can't share budgets but less bureaucracy for strategic decisions.

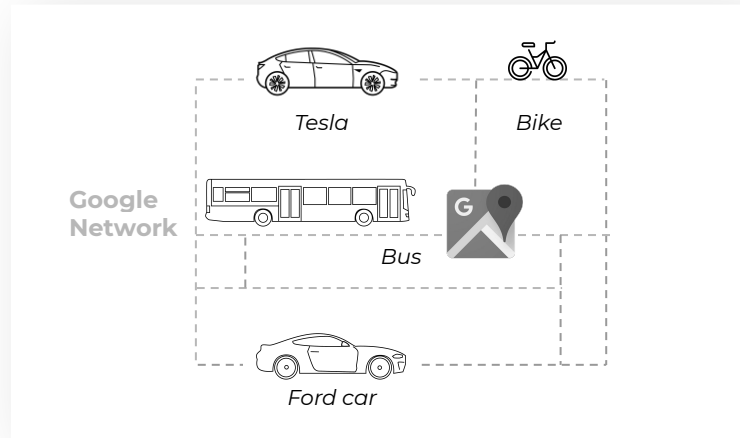


Because software will determine the Tesla's long-term future

The apple of cars?



Or a mere carmaker running on Waymo?



Tesla & Apple have lots of similarities

- Community & brand.
- disruptive software differentiated product.
- integrated production & ecosystem.
- Shift from product to service business model.

Tomorrow

Tesla cars will be running on Tesla OS and available on demand on the Tesla Network. Just like Apple, controlling product, service and distribution?

Alphabet is best positioned to become the leading mobility platform in the next 10 years:

- Most advanced autonomous driving technology (Waymo)
- Leading mobility platform with over a billion users on Gmaps & a great mapping technology.
- OS controlling 80% of smartphone market.

Tomorrow

Tesla might merely be just a provider on Google's mobility platform?



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Tesla sure disrupted the auto industry.
But is this the disruption we need ?

How sexy is Tesla really for the environment?

S

E

X

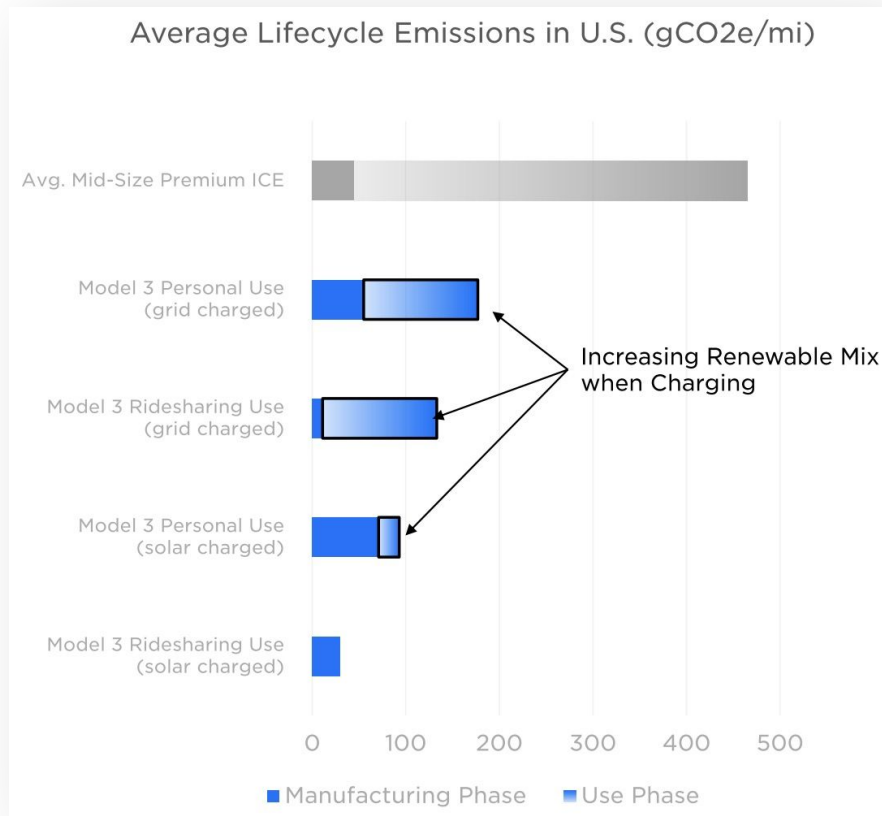
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 The battery challenge.

#PEISERTDESIGN

Tesla's electric cars are surely a first step forward



A necessity to improve our energy mix and car lifecycle

40,000km

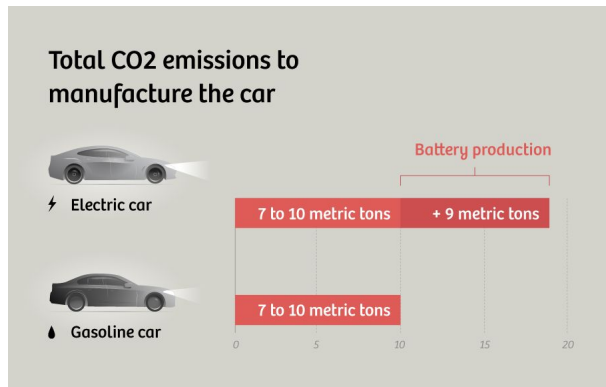
Based on EU energy mix, **emissions associated with the production of a battery** implies that the most economical ICE vehicles have a lead of some **40,000 kilometres before their emissions reach those of the production of an electric car alone.**

In countries relying on coal as primary energy source, equilibrium can never be reached.

But improvements must not hide the pollution shift

The battery's production has a heavy ecological impact. **An EV is therefore born with a heavy ecological debt.**

From car use to car production



These figures highlight the **critical issue of battery recycling** and increasing car lifecycle

from one extractivism to another

Lithium

1/3+ of lithium production come from **South American brine, depleting water supply** for local communities.

Cobalt

More than half of the world's production comes from **Congolese mines with rudimentary safety conditions** and which often **exploit children**.

Permanent magnet

These magnets require **rare-earth elements** extracted and processed in China, resulting in significant **toxic discharges**.



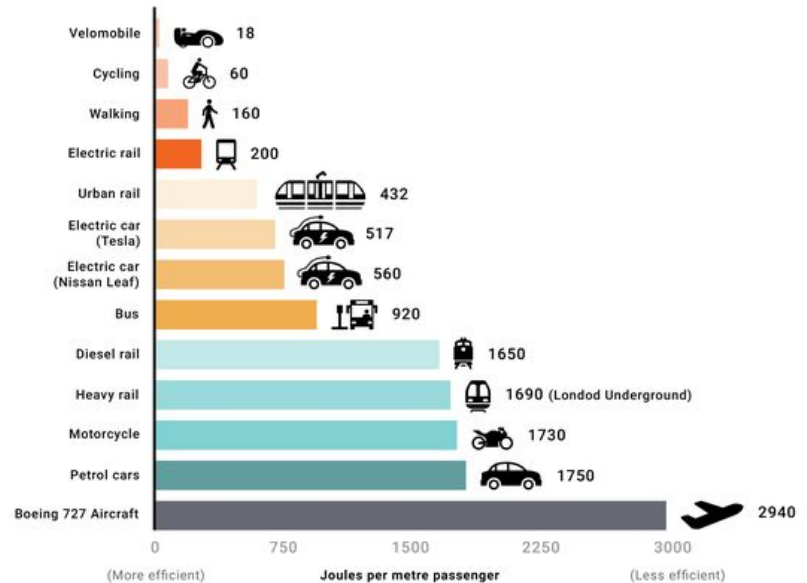
Whatever its fuel, maybe the car is the problem

Beyond ICE, most negative externalities reside in the car itself

Cars are a sub-optimized asset

- The **average number of people per car is 1.5** in the US, while average capacity is around 5.*
- In France average passenger per car dropped to 1.2 today*

And cars have a poor energy efficiency



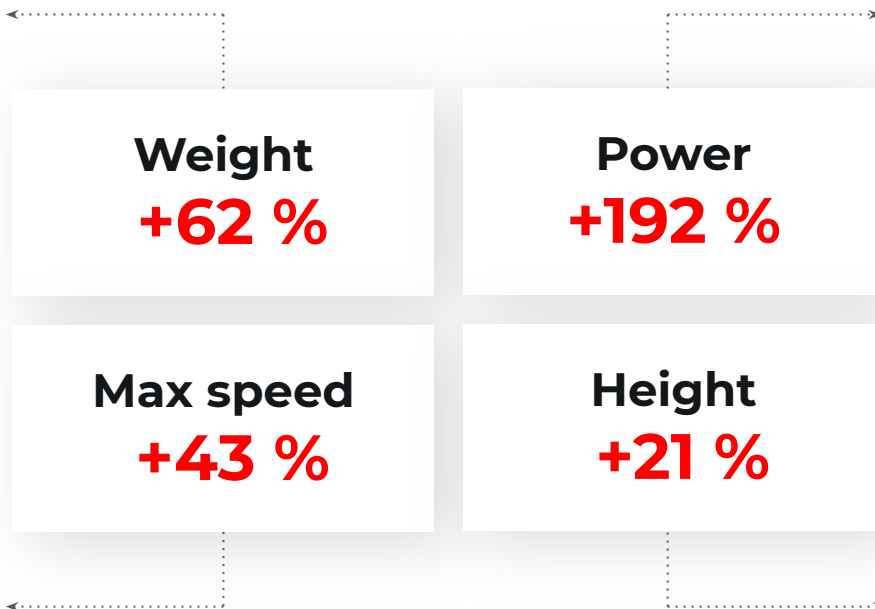
Source: English Wikipedia (Energy efficiency in transport).
Based on Banister et al. (1997), Hughes (1993), Stead (2000), CEC (1992), Scholl, Schipper and Kland (1994).
Data: Sustainable Transport and public policy.

* figures in US: US Department of Energy, Transportation Data Book 2016

* figures in France: Ademe

And our cars keep getting bigger, heavier, faster

Increased weight is mainly **justified by improvements in security** that led to a drop in death rates



Nearly x3 for horse power to compensate for increased weight and improve speed & acceleration

183km/h average max speed, when highways are capped at 130 call for sobriety

SUV vehicles doped automakers margins over the last decade, yet resulting in poorer energy efficiency

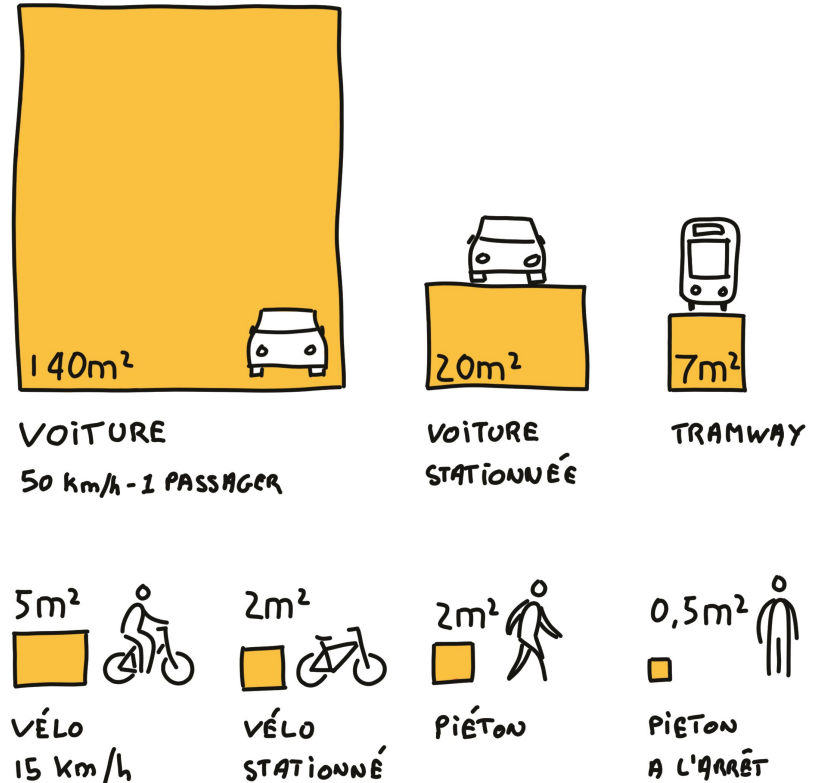


Other externalities include extensive land use

Cars are both inefficient energetically and spatially

While they are extremely flexible for the user, cars are not an efficient way of optimizing urban space compared to other means of transportation.

Cars have long contributed to urban sprawl, as we have built our cities around them.



Is this the future of mobility?

- Personal car
- Minimum 3,800 kg
- Faster, larger,

Yet... still **better than an F-150!**



Cars have shaped our cities, it's time to rethink the model

We need to design cities around a new mobility framework

Culdesac

Become a resident Book a VR tour (480) 210 - 6004 Menu

TRANSPORTATION AND MOBILITY

How you move defines how you live

Culdesac Tempe is designed to make car-free living seamless. From ordering takeout for a night in, to jumping on a scooter just outside your door, we're bringing together the best of mobility and delivery services so that zero private cars means zero hassle.

Light rail Rideshare Bikeshare Scooters
Car rental Delivery services

↓ NEXT: BECOME A RESIDENT

The era of omnipresent cars, associated with a lifestyle based on the ownership of a vehicle as an element of social status, is faltering.

Car-free living program, microtransit, polycentric-city framework....

A growing number of real estate developers, local authorities and communities are getting rid of personal cars in their projects through new regulation, human-centric design and new mobility partnership.

