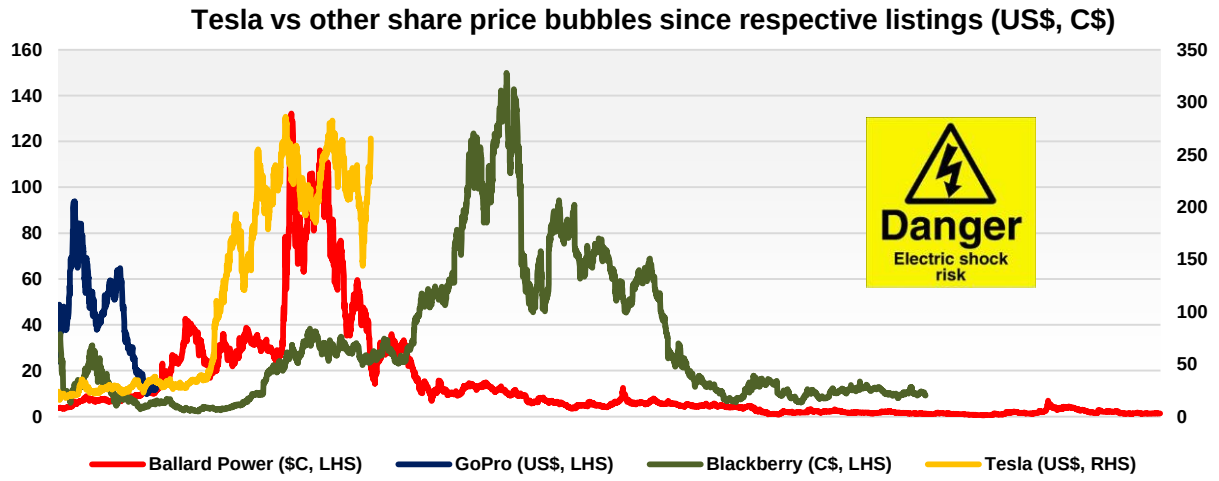
# Tesla

## Electric Shock in waiting?

12th April 2016

Mike Newman




*Source: Custom Products Research, Bloomberg*

### Social Media is turning off people's ability to think, Tesla proves it again

*Musk is a genius of marketing*

Do not get me wrong. Tesla's CEO Elon Musk is a marketing genius. Not for one second do I think the feat of taking almost 200,000 Tesla 3 orders in 24 hours was a fluke. There is no question that the social media frenzy of buying something that is 'doing it differently' has helped Tesla achieve this task. However I am disturbed at how realities rarely seem to get in the way of a good story.

*Tulip Mania?*

Are we experiencing a sense of Tulip Mania with Tesla? When we look at the performance in stocks such as Ballard Power (BLD CN), GoPro (GPRO US) and Blackberry (BB CN) that promised to revolutionise their respective worlds in automotive fuel cells, action cameras and mobile communications the share prices in each has failed to reflect the initial euphoria and hype.

*15 things to consider*

In this report we highlight 15 considerations as to why investors should contemplate realities of Tesla within the automotive market. The idea that Tesla is about to revolutionise the automobile industry in similar ways to Apple (AAPL US), Uber or Airbnb have to their respective markets is highly improbable. Mean reversion is one reason. Tesla has a global market share of c.0.15%. It would need to grow 80x to match Toyota Motor (7203) for share. Having said that Toyota has 66x more revenue than Tesla yet only trades at 5x its market capitalisation, not to mention having record operating margins over 10%. Even stacking Tesla on a price-to-sales ratio (as it makes no profits yet) would make it 18x more expensive than Daimler (DAI) the maker of Mercedes-Benz which is in probably one of its healthiest product cycles for decades. 3x more expensive than Apple. Take your pick (there is a selection in a later section).

*Tesla trades at 18x Mercedes-Benz on PSR*

*Time of greatest confidence is time to get sceptical*

As we once again look at the group think that pervades the financial industry we conclude that history has at times proven not to be on the side of conventional wisdom, or the consensus view, but on the side of those who dissented from them. More significantly, we see too how the sell-side has failed clients by not being rigorous and questioning enough. We have seen so often that the time of greatest 'so called' certainty is, in fact, the time to be most sceptical. If we spent more time on corporate biopsies as financial analysts there would be far fewer autopsies. Let's jump in.

*Ducati did it in 2000*

As a brief aside I remember on 0:01am GMT on January 1, 2000 Ducati launched the MH900e limited edition internet order only motorcycle. The first 1,000 units sold in 31 minutes. Another 1,000 sold soon after and I was one of those buyers. I own MH900e model 1970/2000. It lives in the lounge room. Beautiful, isn't she? It is a far cry from Tesla's achievement but the concept of branding is broadly similar despite the difference in impact.


**1. Orders are not Deliveries. Always risks of cancellation**

*Orders aren't deliveries*

The press has fawned over Tesla's Model 3 launch in recent weeks. I noticed that the media frenzy had barely attempted to give a fair and balanced perspective. Some hail the feat of the Model 3 as the equivalent top 6 model by unit sales in the 2015 US passenger car market. In the real world, car sales are generally recorded on delivery or at the very least production. Had it escaped people's attentions that when the car is officially put into production in 2017 the likelihood is that the backlog could take four years to clear. That would get the Tesla 3 to not much better than 40th place on deliveries if all goes to current plan (which could be revised). Add to that the risk of cancellations. As a former aerospace analyst new aircraft launches often came with huge 'order' books but given the large lead times and delivery dates many things could change creating delays or cancellations. It should be noted that one of the biggest bottlenecks to aircraft deliveries wasn't the commonly associated financial problems found with many airlines, but a shortage of pilots. If we get a downturn in the economy perhaps the dream of owning a Model 3 may diminish forcing those buyers to forfeit the $1,000 deposit.

*The aircraft industry boom was eventually slowed by other factors*

**2. The history of Residual Value Guarantees**

*Residual value guarantees*

The Tesla Residual Value Guarantee, while well intentioned carries risks that we saw crucify the leasing arms of the Big 3. After the tech bubble collapsed at the turn of the Century do you remember the *'Keep America Rolling'* programme, which was all about free financing for five years? While sales were helped along nicely, the reality was it stored up pain. As new car sales became harder to achieve, new financial products offered sweeter upfront incentives and buyback guarantees (because cheap finance was everywhere and not a differentiator) helped keep the fire stoked. However as front end incentives kept getting juicier, the cars on guaranteed buybacks were starting to return to market at prices well below the 'guarantee' leaving automotive finance arms in a whole world of hurt and huge losses. Goldberg & Hegde's *Residual Value Risk and Insurance* study in 2009 suggested on average 92% of cars returned to leasing companies recorded losses on return of up to 12%. Any company can guarantee the price of its used product in theory, the question is whether used car buyers will be willing to pay for it. Sadly Tesla does not get a say in what the consumer will be willing to pay. Reading through the guarantee naturally fine-print will taketh away.

*In 2002 leasing companies took residual losses on 92% of returned vehicles*

### 3. Gigafactories vs Bootcamp

*Gigafactories*

The Tesla Gigafactory - vital to support the roll out - is in the construction phase. Hiring has revealed itself as a bottleneck. The Nevada Governor's Office of Economic Development (GOED) claimed 272 people were working at Tesla and Panasonic factories at 2015 year end well under the 700 predicted. At full clip the factory is slated to employ around 6,500. These are best case scenarios. Do you think Toyota perfected JIT and kanban overnight? Do you think it takes minimal time to train line workers? VW once confessed it took them around 5 years to fully train a service bay technician at a dealer. This limited the speed with which it could expand dealers. If Tesla ramps production too quickly it could well backfire (no tailpipe, no pun). Can investors truly have confidence that in such a short space of time that Tesla can learn inside a decade what has taken the better part of 50 years of continuous improvement at Toyota? Also Tesla must decide at what level of annualised production is sustainable over the long term. There is no point building a factory that can churn out 500,000 units in one year if it is to produce 150,000 cars the following year. Factories are high fixed cost assets. If it is built to a scale such that it can't sustain consistent production then efficiency goes down the (power) plug hole (pun intended). Sure Tesla is getting a lot of grants and subsidies but if it can't get the production right, governments will be reluctant to shell out more. While many might liken Tesla to an automotive Apple, remind yourselves that Apple outsources all its production. Ah yes but surely they could just poach some Toyota line managers and it would be sweet. That would be neat but if such a person could not convert workers into the 'Toyota Way' then execution may come up short. Tesla admitted that parts shortages for the Model X slowed production but has vowed the Model 3 won't fall foul of the same. Of course Tesla has no intention to fail on any model in its line up but it introduces a perfect time to discuss the commitment of the supply chain.

*Did Toyota learn JIT & kanban overnight?*

*Model X production issues*

### 4. Bringing suppliers to the party as they actually have to believe to commit

*Auto suppliers are wiser now*

Automotive suppliers have learnt from past mistakes. It is no longer a case of taking any business that comes their way. Depending on what model is being produced, profitability can wildly fluctuate. So unlike mobile phone suppliers which can be desperate to get onto a manufacturer's supply list, accepting business is not a fait accompli. Many US auto suppliers were pushed into Chapter 11 by their US OEMs when they were asked for price cuts to compensate for poor selling vehicles. It was a double whammy. Deteriorating capacity utilisation on razor thin margins crushed them twice. Of course for an automotive supplier to commit to production rates, the OEM (in this case Tesla) must make a compelling case for sustainable unit sales. Sure Tesla may have 300,000 orders but unless there is clarity on production rates then price, quality and durability discussions will vary. I am amazed at the naivety to think that auto suppliers are bigger suckers than the tech components industry. Recall the huge delays Boeing suffered through the 787 development program which pushed certain members of the supply chain to the brink of insolvency. Some to the point of refusing to contract under such circumstances ever again and others forced to sell out their stake in the program. Automotive and indeed industrial suppliers are once bitten, twice shy.

*Lessons of the US suppliers*

*Not all suppliers are alike*

### 5. Automobiles carry higher risks of causing death or serious injury

*Automobiles are more lethal than mobile phones*

Products that have a higher risk of causing death and injury means a higher degree of specialisation not to mention the potential for reputational damage and litigation should failure occur e.g. Takata airbags. Even if one factored in minimal risks of mechanical or software failure resulting in death could Tesla face its own Firestone/Ford Explorer type class action? Such a

situation for Tesla so early in its life would undoubtedly carry higher risks than it did for Ford which had so many other product lines to weather the storm. Same went for Toyota during its sticky accelerator scandal which hurt its once formidable image in terms of quality.

**6. Incumbent supplier relationships and reading OEM intentions**

*Relationships of incumbent suppliers and OEMs*

Let us not forget that incumbent car makers have huge R&D centres too. A company like Toyota (which incidentally sold its shares in Tesla) has huge battery technology given its long association in hybrid. I remember driving an electric Ford Fiesta and the Th!nk in Aachen Germany in 2000. The global car makers have all been playing in EVs way longer than Tesla. It is not a question of whether car producers make mistakes – they do – it is just that experience in the car game is important in the long run. I recall when Bosch sold its stake in SB LiMotive to its JV partner Samsung SDI. I'm reminded of analysts espousing the deal as a great win for the Koreans! Excuse me? When a company with over 100 years of experience in the automotive parts industry wants out of a future technology, it is presumably because it has had a massive heads-up from the fromage-grande (Big Cheese) at its OEM customers. Knowing the blue-print to the OEM's future will mean I'll take Bosch's word over the newbie. Everyone wants to look at Tesla as a disruptor. It isn't. Toyota sells 80x more vehicles per annum and with EVs around 1% of total vehicle sales worldwide at the end of 2015 is unlikely to move the needle anytime soon.

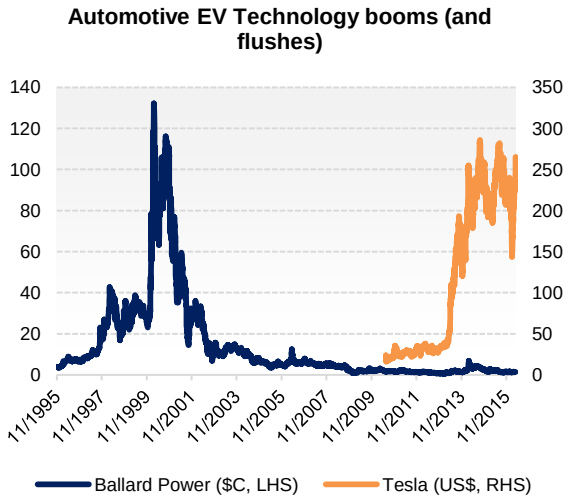
*R&D pools*

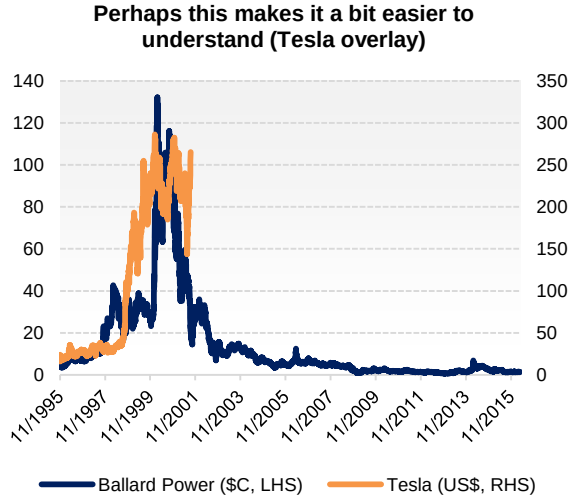
**7. Disruptors often show lots of promise but haven't always fared well**

*The tale of Ballard Power*

Ballard Power (BLD CN) was expected to revolutionise fuel cell EVs (FCEV). The technology was expected to shape the future of the car industry. The hype back in the late 1990s was huge as many thought EVs would be over 10% of the total market by 2010. More than regale the story of Ballard Power perhaps the share price explains it much better. Commercialisation is always the key. Yes, Tesla has commercialised its products but competitors must see the segment as a gap in their own market and will look to fill it. Spoiling the market for Tesla is a strategy in and of itself. Even if it is loss making, car makers will entertain such moves and have far broader infrastructure and existing platforms to develop new product.

*Spoiler strategies*



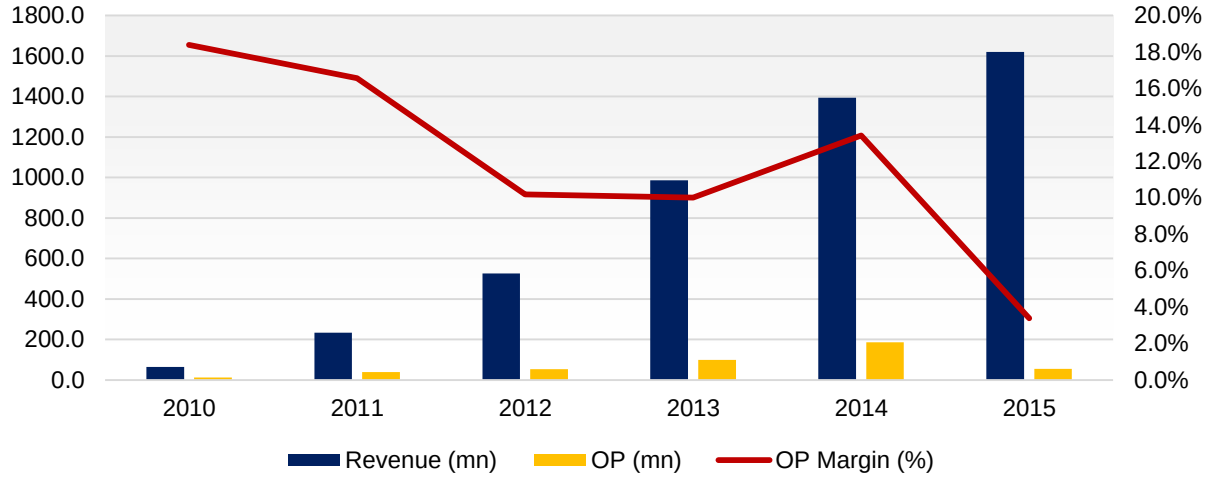




*Source: Bloomberg, Custom Products Research*

*Nikon expected to trump GoPro with its new action camera*

We could even argue that commercial successes such as GoPro (GPRO) can turn upside-down when sleeping giants such as Nikon (7731) wake up to apply its superior in-house technology and quality to an action camera solution (e.g. Nikon KeyMission 360). With features that belittle existing GoPro product the crimped margins have caused an 80% fall in the share price since August 2015 highlights the fickleness of consumers spooking investors. Is Tesla any less at risk of losing out to innovation from makers who have infinitely superior customer and segment information?

**GoPro's (GPRO) Revenue & Operating Profitability (US$mn,%)**




*Source: Bloomberg, Custom Products Research*

**8. Product, Product, Product and rear-guard actions from incumbents**

*Car makers are watching*

Have you noticed that Porsche is coming to market with the Mission E EV by the end of the decade? BMW, Audi and Mercedes Benz will surely follow. If they come out at similar price points then 'brand' will become a big swing factor. Tesla is actively pitching itself as the affordable EV (no doubt subsidies and tax incentives for consumers helps). They will in part do this to marginalise Tesla as a defensive measure.

**Porsche Mission E given production green light due in 2020**

*Source: Company Data*

*Narcissistic choices*

To that end it will be negative for near to mid-term margins. If you were presented with the option of buying a Porsche Mission E or a Tesla Model S for the same money there is no question you'd buy the Porsche. If the Porsche was a 20% premium, one might still buy the Porsche over the Tesla for brand reasons. Remember people buy iPhones which are technically inferior to the latest Samsung Galaxy series in spec. However Apple knows it can charge a premium for the brand because in an ever increasingly narcissistic world the badge is more important than the product. In Porsche's case I doubt it will be a compromise because the dynamics, performance and cachet ensure it will be a juicy premium. When you are posing your fluorescent Porsche key fob at the bar it will start a conversation quicker than it will with a Tesla keychain. Not only can you display your wealth but your eco-mentalism at the same time.

*Is it out of Toyota's abilities to create a similar product?*

Do people really think that Toyota (or Lexus for that matter) can't put together a car similar in price, performance and spec to a Tesla? Why do you think the mainstream makers have focused much more on hybrid technology than pure EV? Many car makers push their drivetrain DNA as a major differentiating factor to competitors. If they decide to go full EV then it comes down to design, price and in the end we have proverbial white goods on wheels. Car makers will defend their DNA till the cows come home. They will promote EVs as socially responsible activity but the low residual values is also indicative of the relative lack of interest shown to date.

**9. Mainstream car makers have not put forward best efforts yet but they will**

*Mainstream makers have focused on urban EVs and haven't even tried hard yet*

Full credit to Tesla for offering the first real luxurious EV. Outside of that mainstream car makers' EVs have been far cries from best efforts. Most have been low end snot-boxes (Mitsubishi i-MiEV, Nissan Leaf, Chevy Volt etc.) which actually look relatively expensive to the Tesla in terms of appointments. They were never really designed much beyond use as city run-abouts which would be used for picking the kids up from school and doing the supermarket run. Is it any wonder the 3yr residuals on the city cars have hovered in the 20-30% range as outlined below?

| Make | Model | Average Trade In | Average TE MSRP | Retention after 3 years (%) |
|---|---|---|---|---|
| Tesla | Model S | $50,650 | $88,550 | 57.2% |
| Toyota | RAV4 EV | $24,100 | $50,645 | 47.6% |
| Ford | Focus Electric | $12,708 | $39,995 | 31.8% |
| Chevrolet | Volt | $12,525 | $39,995 | 31.3% |
| Nissan | LEAF | $9,300 | $36,733 | 25.3% |
| Mitsubishi | i-MiEV | $6,166 | $29,975 | 20.6% |

*Source: NADA Used Car Guide, ALD*

*Car makers still have to defend their DNA as a differentiator*

Tesla has actually done the incumbent car market a huge favour by sussing out the true latent demand for luxury-end EVs. If luxury makers place it as a different power plant in their existing line-up they can appease my fossil fuel addictions and the eco-mentalist as well. Mercedes Benz and BMW already have hybrid options in their existing line ups. Tesla has no alternative offering to the other 99% of the market.

**10. Distribution – cars (even EVs) require much more maintenance than mobile phones**

*Toyota has at least 50 years head start on distribution over Tesla*

To use another example, Toyota has distribution clout that has taken over 50 years to develop. Do people understand how dealers make money? Mainly through spare parts and servicing. Not on new car sales. Even if Teslas don't require oil changes and new spark plugs, standard repairs such as brake fluid or brake pads will none-the-less be required. While Tesla may claim lower maintenance, dealership franchises will be harder to come by if the prospect of showroom traffic shrinks. Fossil fuelled cars are ever more reliable and servicing periods extended but dealers still make their crust from the return visits.

*How distribution works*

Recall in March 2011 when the earthquake and tsunami forced Japanese domestic auto production into emergency mode. Naturally the disruption in the supply chain caused a sharp dip in unit shipments. The absence of a 5 yen widget can result in an inability to ship a $100,000 car. The analyst community harped on that Hyundai would steal Toyota's lunch for good. Pre-quake, Toyota in the US sold around 115-120 cars per dealer per month. Hyundai averaged around 60.

*A prime example of Toyota's retail muscle*

Over the next 3-4 months Hyundai hit mid 70s levels, similar to capacity constrained Toyota. As it happened the all new Toyota Camry was nearing launch. Six months after the quake, Toyota was selling 140 cars per dealer per month and Hyundai slipped back to the early 60s. This is a lesson on supply chain management and distribution clout. Hyundai is an admirable performer to be sure but Toyota has 30+ years head start to lay out its footprint. How quickly can Tesla establish dealer networks?

**11. Creatures of Habit – Fast Charging sites are around 13.7% of the total**

*Charging stations mostly slow charge*

Open Charge Map, the global public registry of EV charging locations lists 65,566 stations at 38,936 locations. There are charging stations and then there are charging stations. Not all are the 'fast charge' variety, which naturally cost much more to install than the regular charge type. The International Energy Agency (IEA) reports that through the end of 2014 there were 94,000 slow charging points and 15,000 fast charging points or just under 14% of the total. There is still uncertainty on the exact quantity and type of charging stations.

*Range anxiety*

For the consumer a fast charge still takes two hours versus the 5 minutes to brim a fuel tank. A 120kW fast charge could take 1-2 hours for a 300 mile range. A 50kW charger might take 3-4 hours. A 6kW system may take up to 12 hours. Whatever the case, infrastructure will continue to be a bottleneck and drivers will likely get sick and tired of having range anxiety. Not to mention wanting to do an emergency charge, but having to wait in a roadside service area until the current user is finished in over one hour's time.

*PG&E's proposal*

Of course we can argue that charging technology will improve but how much will the infrastructure cost and how easily upgradable are existing sites? In early 2015 PG&E filed a proposal with Californian authorities to install 25,000 regular public charging stations for $654mn or around $26,000 per site. The units themselves are approximately $6,000 with installation the greater cost due to boring, trenching and mounting.

*Fast chargers cost more*

Public fast chargers are more expensive due to the requirement of a 480V transformer. RMI estimates the cost of such Level 3 fast chargers is in the domain of $50,000-$100,000 range. So they are not cheap to roll out. Ultimately someone has to pay for it. The question is who?

**12. If economy claims were like surgeons you'd never rely on them to operate on you**

*Real world figures never match official figures*

Fuel economy or range is perhaps one of the most unreliable claims made by most car makers. Publishing healthy official EPA economy stats in ideal conditions is perfect for sales literature but in reality, traffic, conditions, weight, speed and a variety of other factors (driving style) can massively swing from the reported figures.

*Depends on how you drive – lead foot or pussy foot*

When a colleague took a recent ride in a P85D in HK the driver told him he got a range of no better than 130 miles versus the claimed 250 miles. So half? So what? In HK very hot humid weather probably means the air conditioning works harder and the traffic makes for a lot of stop/ starts, which hurts range. Stop/Starts are much like using your iPhone constantly for an hour as mild steady cruising is like having your mobile on standby. Thrashing a Tesla Model S in 'ludicrous mode' is the equivalent of streaming a lot of video in poor reception. It is all relative.

Range anxiety will be cured over time but unexpected changes to conditions will be a swing factor. Traffic jams, accidents, full charging bays or a lack of fast chargers could have an impact.

**13. Quality – Tesla 'below average'**

*Quality will matter eventually*

Quality. We are confident Tesla will improve over time but according to J.D.Power & Co, the EV maker's reliability is a long way from the best. It currently has a 'below-average' grade. At some stage quality will matter given the price point. Investors and buyers are looking at Tesla a bit like an Apple iPhone. Some think a simple software patch may fix everything. However if electric motors need replacing because durability is not up to par then higher spec pushes cost up. There is a difference between hardware and software. Apple may be able to convince buyers to part with their cash even with lower internal specs than Samsung but cars are a different ball game. Also current owners will live with the experience but if reliability becomes a broader problem then owners may be deterred from buying another in the future. Incumbent car makers are all about growing their customers into long term family members.

*Tesla issues*

Tesla has had certain public issues. In Norway a Tesla caught fire while charging. As the fire is electric, water can't be used as it reacts with the lithium and makes the fire worse. Tesla was forced to reinforce the battery pack underneath with a titanium underbody shield. It is not saying gasoline cars do not catch fire during accidents or refuelling but it does not help with marketing and titanium body shields unexpectedly adds to the bill of materials.

**14. Recalls – how quickly could Tesla react?**

*Risk of recalls*

The risk of recalls could also be a future stumbling block for Tesla. Although fewer moving parts should lead to fewer things to go wrong, there is the risk that if something does go wrong it is possible it could be bigger. In normal fossil fuelled cars, recalls are often limited to a seal, hose or pump which is generally easily accessed, simple and cheap to repair. Or much larger items such as airbags. Embarrassing yes, but the dealer can generally sort it without the car having to be off the road for too long.

*If the battery pack had to be replaced*

If something was to go wrong with a Tesla battery pack (hardware) for whatever reason then replacing such a large item in the belly of the vehicle would likely be a very complex replacement issue. Not least for the repair time and expense of the replacement but the inconvenience to owners having their car off the road for an extended period. Tesla would also be obliged to provide customers with replacement vehicles (torn asunder that they be powered by evil internal

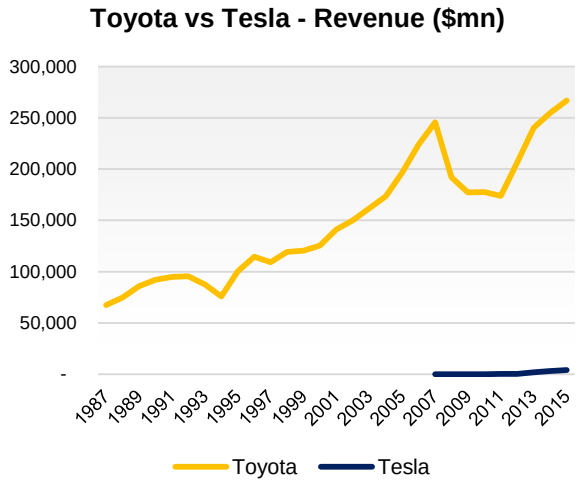
*How would Tesla respond?*

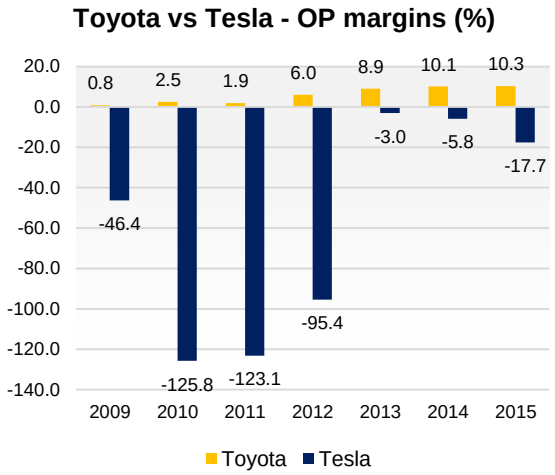
combustion engines) to avoid an angry mob. If battery production was already constrained on new car production, replacement batteries for recalls on existing vehicles would not only take priority (due to safety) but likely cause serious disruptions to new car capacity utilisation rates which could seriously undermine profitability. Regardless of who is ultimately to blame (e.g. supplier, sub-supplier etc.) for any technical recall the damage would likely be much larger for a car maker starting up. It is yet to happen but it would be prudent to prepare for how the company would respond to any such challenge.

**15. Mean reversion – Is Toyota very cheap or Tesla very expensive relative?**

*Mean reversion?*

Toyota sells 80x more cars, has 66x the revenue than Tesla but only trades at c.5x the market capitalisation. While it is fair to say that Tesla has yet to hit its straps, Toyota over the last 30 years lost money in only one year during the Global Financial Crisis. Otherwise Toyota's revenue does not seem at the mercy of the EV market. Operating (OP) margins tell a similar story. Toyota margins have surged from the horrors of GFC to over 10%. Naturally the market is basing Tesla's current valuation on future expected earnings to explain the disparity of market cap to unit volume.

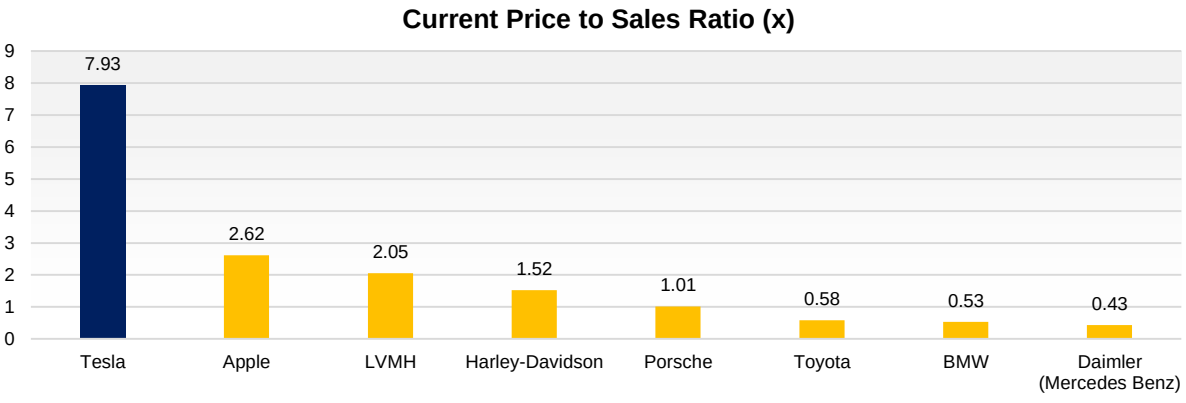



*Source: Custom Products Research, Bloomberg*

*PSR is 3-18x pricier with Tesla*

As operating income is negative for Tesla does comparing its share price to revenue per share show anything? We stacked Tesla against luxury car makers such as Porsche, BMW, Mercedes-Benz and Harley-Davidson as well as luxury goods makers such as LVMH and Apple and the result was the EV maker is between 3 and 18x higher. Please see the following chart.




*Source: Custom Products Research, Bloomberg*

**Summary**

*We do not fault Tesla*

We do not fault Tesla for one second for its pioneering work in EVs. They have attractive product and have a unique selling property. Elon Musk is an incredible negotiator and marketer. The products are selling well and filling a niche in the luxury EV market. Ultimately Tesla will be fighting amongst the automotive giants which have enormous resources, experience, distribution, and existing platforms to respond. Change in the automotive world rarely happens overnight but when it does the impacts are immense. Much like we have seen in major military battles superior weapons, tactics and strategy have often been undone by the sheer weight of numbers, changes in weather and retaliation when the enemy least expects it. Global auto makers have seen what Tesla has done and unlike the huge market share of Apple, Tesla will unlikely ever achieve those figures in the automotive world despite some investors having a blind belief that Tesla (currently less than 0.2% market share) will somehow achieve similar market greatness.

*Change rarely happens overnight*

The 15 potential hiccups are of course 'what ifs'. Sadly the media in its typical biased group-think way ends up reporting sensationalist headlines with little thought out substance beneath.

*More automation means fewer freedom*

Tesla is indicative of a larger problem with today's society. I've heard many owners revel in its self-parking and eventual self-driving functions. We've already seen what hackers can do to 'automated cars'. If cars go fully automated, we yet again dumb down our ability to function as humans. Yet another form of control gets taken away.

*Maybe I am missing the point*

Maybe I am missing the point. Maybe the majority are happy to consume news as a bogus headline which misleads the content of the article? Maybe some want to be zombies? The digital world just makes us lazier. Perhaps the irony of all this automated technology takes me back to a company I used to cover as an equity analyst. Their business was all about automating safety such that the car would automatically brake, swerve or stop if the driver failed to respond. Is that just an offset to the multitude of drivers these days still too busy gazing at a text or message on their smartphones instead of driving?

*The consumer will be judge and jury*

Ultimately the consumer will be the judge of Tesla's success or failure. Stars have aligned very nicely for the EV maker but when things appear to be perfect, it is often a good time to sit back, redress and evaluate assumptions. In all walks of life, how often have we seen people fall into the trap of confirmation bias which ultimately leads to their downfall? Will Tesla become the automotive equivalent of GoPro, Ballard Power or Blackberry? Time will tell but as we know the momentum in positive media articles, press releases and share prices suggests a lot is being priced in.

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