LTIMindtree

Whitepaper

# Digital - The New Engine for Automotive Future

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# Table of contents

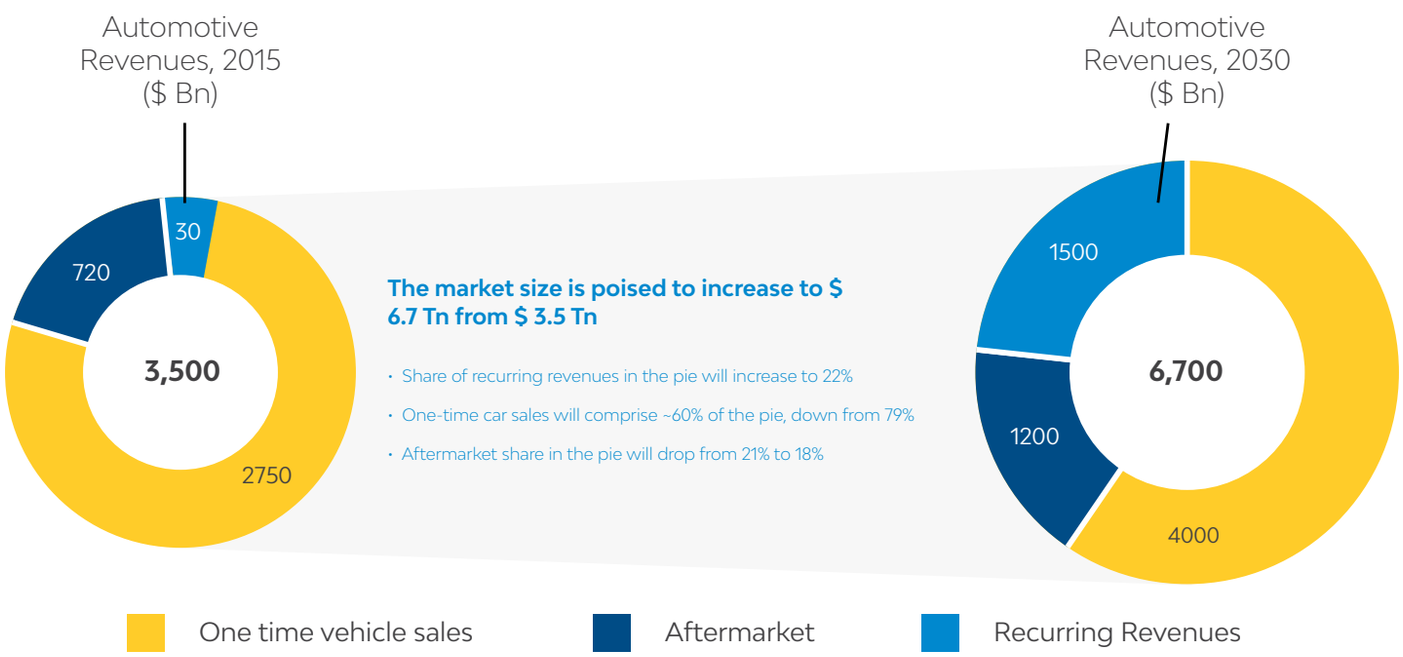
# 1. Introduction

Digital disruption has resulted in the transformation of multiple industries and enterprises around the globe. The automotive industry is going through an accelerated evolution, and so are customer expectations. To meet their growing anticipation, the automotive industry should leverage the power of digital to enhance each customer's experience and buying journey. Cost dynamics, the changing industry landscape, and digital inclination, however, continue to be the biggest challenges for automakers.

This whitepaper explores the ongoing trends in the automotive space and some new opportunities which are open for automakers like shared mobility, autonomous, and electric vehicles.

## New business models can drive the auto sector ahead

According to a report by McKinsey & Company, new business models could expand automotive revenue pools by about 30%. These new services could potentially lead to a USD 1.5 trillion market by 2030.



# 2. Automotive Industry – Shifting Gears

India turns to electric vehicles to beat pollution
**- BBC, 2019**

Self-driving tech company Aurora partners with Fiat Chrysler to build autonomous platforms
**- TechCrunch, 2019**

BMW, Daimler will work together on autonomous vehicles for mid-2020s
**- Forbes, 2019**

Apple in talks for lidar for self-driving cars
**- CNBC, 2019**

Lyft's self-driving vehicles have performed 5,000 passenger rides in Las Vegas
**- Techspot, 2018**

Audi has deployed 1,000 VR showrooms in dealerships worldwide
**-Road to VR, 2018**

Volkswagen and Ford team up on self-driving and electric cars
**- BBC, 2019**

The self-driving pizza - coming to your door fresh from Domino's
**- Diginomica, 2019**

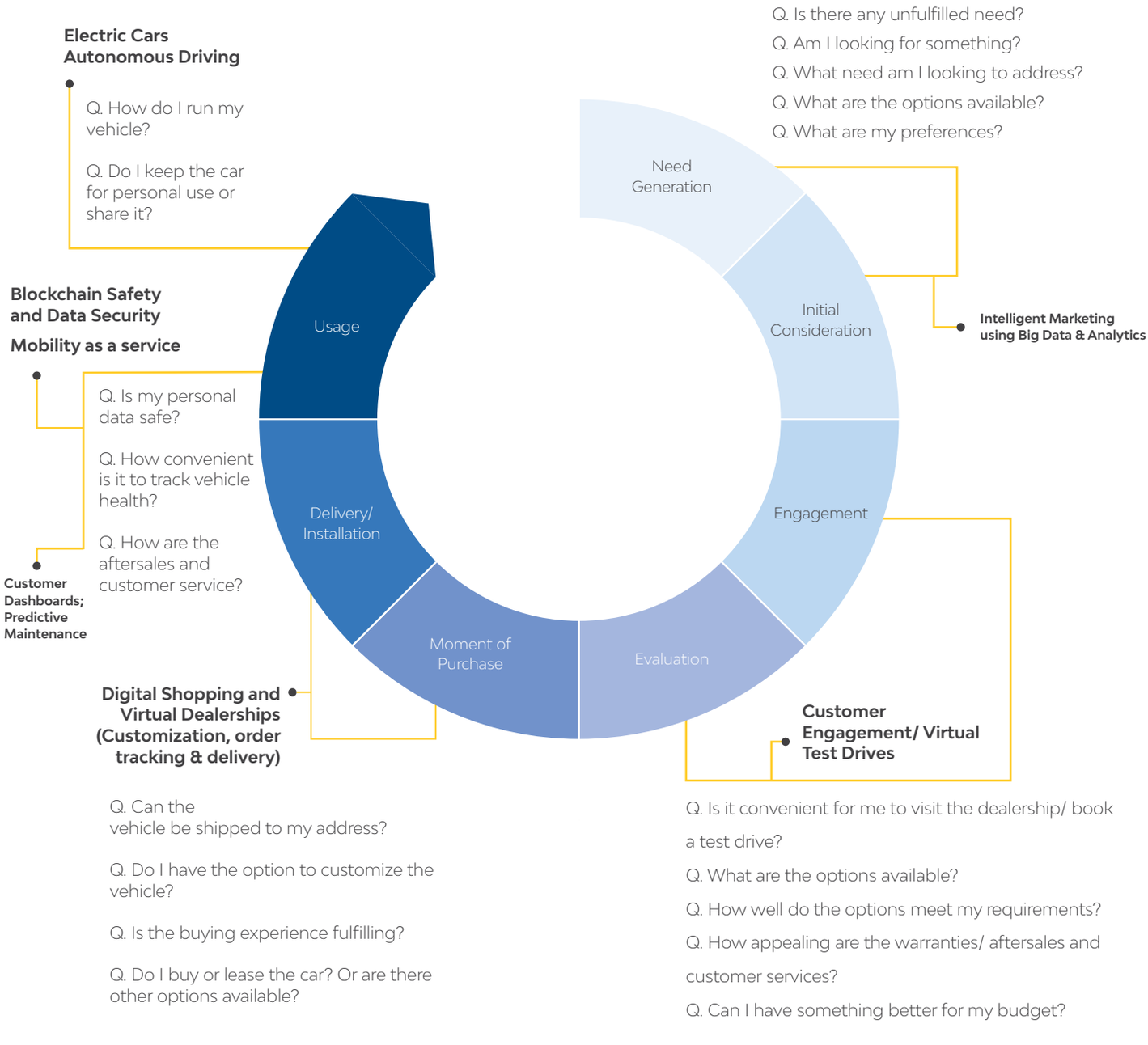
Ericsson, Volvo Cars sign five-year Connected Vehicle Cloud deal
**-Auto Tech Review, 2018**

Uber debuts a new self-driving car with more fail-safes
**-The Verge, 2019**

# 3. Mapping Digital Touchpoints in the Automotive Industry

## Build digital connect with the customer

Creating a customer journey roadmap across all digital touchpoints enables you to understand your customers' sensibilities, challenges, and motivations. Imagine a future where you can create an entire customer journey, which is virtual from start to finish. This means right from selecting the car to getting it delivered at the doorstep, this entire journey can be mapped across various digital touchpoints. Automotive companies will need a comprehensive digital strategy to gather data and important insights at each stage and digital touchpoint to formulate a future game plan for their customers.



# Adding a touch of digital for OEMs

## Time to rethink supply chain

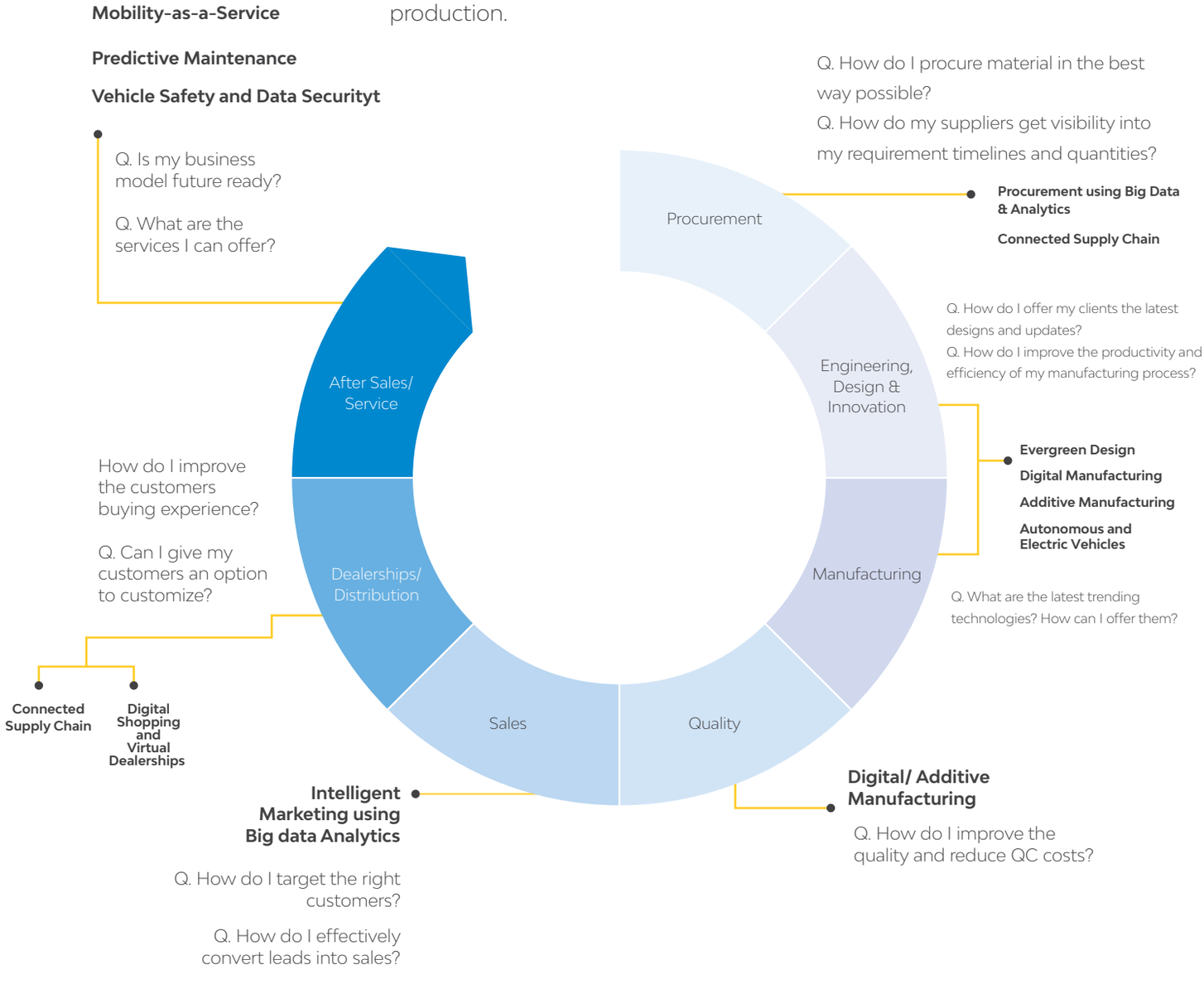
Not just the customers, it's time automotive OEMs and suppliers rethink their alignment and supply chain journey in the digital era. Be it the spare parts or components, they need to ensure the right quantities are available at the right place at the right time.

## Adding value is key

Digital disruption is also being seen in the value chains of automotive OEMs. With advanced technologies like autonomous vehicles, electric cars, and more possibilities of using feasible software in cars, new players are emerging thick and fast. So, the automotive OEMs need to step on the gas pedal and think about rejigging their existing supply chains or creating new ones to foster this evolution and accelerate production.

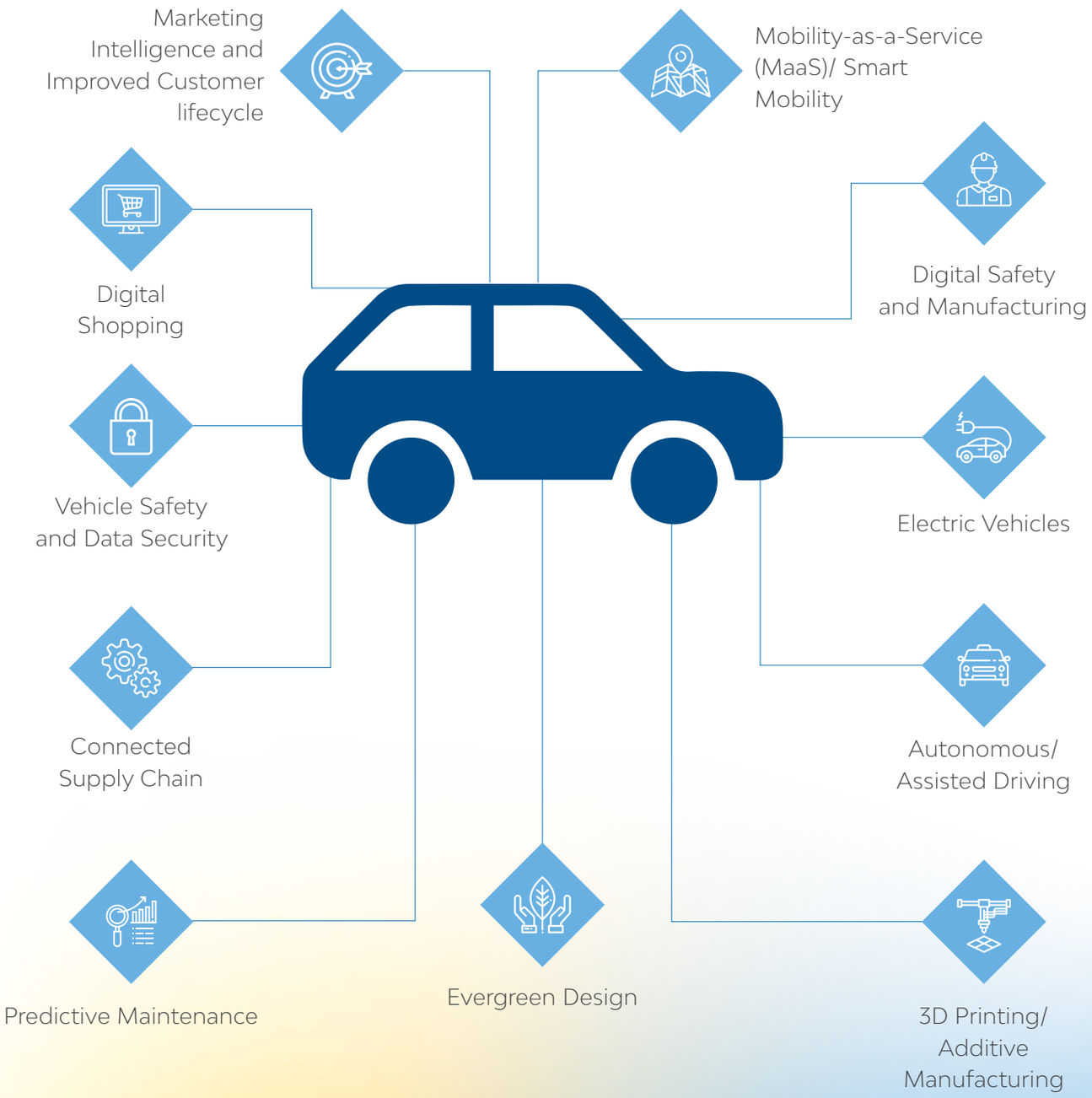
## Customer experience can be the deal maker or breaker in the future

In the future, cars could see personalized designs, shorter product lifecycles, new features, and variants. This could be mission-critical for virtual dealerships of the future in providing superior customer buying experience. The bottom line - in the high-voltage digital age, the automotive OEMs must eat, breathe, sleep digital at each stage.



## 4. Where is the Automotive Industry Headed?

It is clear that OEMs need to align their strategies, now more than ever before, to the dynamic industry landscape and fast-changing customer behavior. But is it possible? The following visual represents a curated collection of the latest digital trends in the automotive industry. At LTIMindtree, we believe there is immense potential for OEMs and consumers to co-exist in the digital ecosystem of the automotive sector.



# 4.1 Marketing Intelligence and Improved Customer Lifecycle

## What's trending?

- Social media has revolutionized consumer behavior. Thanks to the digital age, customers can now access diverse information right from vehicle performance and cost of ownership to financing and aftermarket sales trends.
- Digital has become the focal point for the purchase journey.
- Customers of today expect experience to be consistent across all touchpoints right from vehicle research to the after sales.
- OEMs must innovate to engage their target audience.

## What is the road ahead for automakers?

- Identify specific set of objectives and targets for each activity in implementing a digital strategy.
- Use better CRMs and have better target segmentations and insights.
- Leverage the strength of analytics, AI, and big data to collect and analyze data and provide enhanced predictions with time.
- Offer personalized and consistent customer experiences across the customer lifecycle.

### Market Indicators

**10 Hours**

spent on average by automotive customers on the web to search for information and to decide when and where to buy.

**72% Respondents**

in a survey said that an improved buying experience would make them visit the dealerships more often.

### Self-awareness Questions

1. Does my company have an app through which customers can research about my offered vehicles?
2. Does my company collect user data? If yes, does it have its own capability or is it outsourced to a TPP?
3. Is the data collected at every digital touch point of the customer journey cycle?
4. Is the data from all the touchpoints in the customer lifecycle journey integrated into one single CRM?
5. Do I use Analytics/ AI/ ML to develop predictive models to understand customer demands and target the right set of customers?
6. If yes, do I have an internal team for it or is it outsourced?

# 4.2 Digital Shopping

## What's trending?

- Relying on information from sales staff and dealerships for purchase is passé.
- The internet has changed the customer journey, expectations and buying habits.
- Many automakers are now coming up with virtual showrooms to transform customer experience in dealerships and mobile applications.

## What is the road ahead for automakers?

- Build applications that can provide the same dealership experience remotely using VR technology.
- Have AR-based showrooms that will enable OEMs to showcase cars of all colors and variants.
- Deliver a premium brand experience through seamless integration across all customer-facing channels.
- Enable customers to purchase vehicles and customized parts online.
- Partner with prominent after-sales participants to add complementary services and build a wider customer base.

### Self-awareness Questions

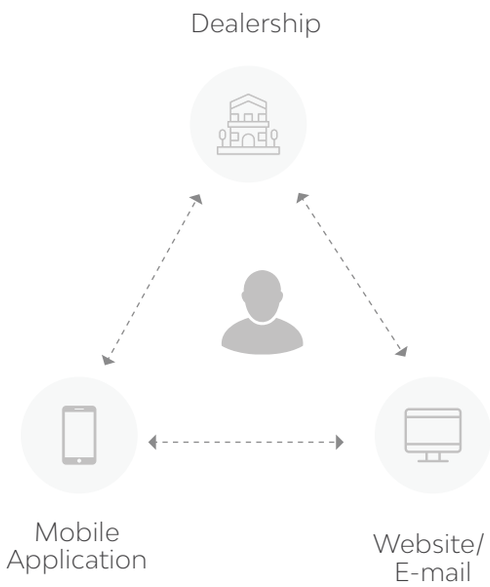
1. Do I have an app or a website that offers personalized online shopping for my customers?
2. Does my app offer vehicle walkthrough/ virtual test drive using VR?
3. Does my app incentivize customers depending on their usage?
4. Does my app collect user data and recommend what accessories/ customizations customers can buy/ do from/ on the app?

### Market Indicators

Among a few other companies that have started AR/ VR in their customer-facing channels to enhance experience.

**88%**

Survey respondents say they can no longer rely on traditional sales channels to drive growth.




**Integrated customer facing channels**

# 4.3 Vehicle Safety and Data Security

## What's trending?

- Vehicle Safety and Data Security are hot topics, ever since an experiment of hacking an internet-connected jeep off the road took place.
- Data Connectivity services are predicted to have a market share of over USD 100 billion by 2030.
- The growth of connected cars is on the rise. It is estimated that 77 million such cars will be on the road by 2022, according to IHS automotive.

## What is the road ahead for automakers?

- Leverage emerging technologies like Blockchain to secure data and make it tamper-proof.
- Harness Blockchain technology, which will enable companies to address the data security challenges by recording every event on a distributed ledger.
- Date on every such ledger is secure, immutable and irrevocable.
- Use Analytics and Machine learning to detect potential data breach and build strategies to mitigate it.
- Carry out regular audits within organization to identify possible risks and fraud.

### Market Indicators

NASA has decided to implement Blockchain technology to boost cyber security and prevent data breach, denial-of-service, and other attacks on air traffic services.

**$176 Bn**

Market Research firm Gartner's estimate of Blockchain's business value add by 2025.

**Blockchain-based vehicle safety and data security**

### Self-awareness Questions

1. Am I working on autonomous vehicle or connected cars?
2. Is the data collected from customers tamper-proof?
3. Are there stringent checks on data security to ensure there is no data breach?

## 4.4 Connected Supply Chain

### What's trending?

- Visibility shortages are one of the biggest concerns related to the risks inherent in the extended supply chain.
- Companies often struggle when it comes to mastering procurement and information flows, which becomes a major roadblock for companies with their tiers. This increases dependency on other stakeholders of the chain.
- Teams working in silos make the chain inflexible and decrease the decision-making speed of the chain.
- OEMs are coming up with intelligent and connected supply chain solutions to tackle this complex and dynamic environment.

### What is the road ahead for automakers?

- Use smart devices and sensors to increase the visibility of the network, alleviate risk and manage rising complexity.
- Apply advanced analytics, simulation, and modelling tools to evaluate the risks and complexity of the network and act on better insight.
- Integrate various participants in the supply chain using technologies like blockchain to make collaborative decisions in real time.
- Use intelligent supply chains to provide a responsive and a flexible framework that empowers OEMs to adapt to the dynamic business environment.

Market Indicators

**<30 minutes**

Amazon's fully electric drones that can fly up to 15 miles and deliver packages under five pounds to customers in less than 30 minutes

### Self-awareness Questions

1. Are all the processes between participants paperless?
2. Do I have end-to-end visibility of my raw material, WIP, and finished goods?
3. Do I get real-time alerts of delays in any part of the supply chain?
4. How easy or difficult is it to onboard and off-board new suppliers/ dealers?
5. Is the data from all participants in the supply chain integrated?

## 4.5 Predictive Maintenance

### What's trending?

- Digital disruption has enabled collection of customer data at every step of their buying journey.
- To add to the convenience of customers, automakers are using this data to reduce breakdown risk/ downtime through predictive maintenance.
- With growing mobility services, consumers are more willing to sharing their data to trusted entities in return for comfort and convenience.

### What is the road ahead for automakers?

- OEMs can use IOT solutions and sensors in the vehicles to get regular reports of the vehicle behavior.
- Anomalies in normal behavior can be detected and reported both to the manufacturer as well as the customer via applications.
- Proactive reporting will increase the customers' trust and loyalty for a manufacturer.

**Market Indicators**

**73% Consumers**

are willing to pay for predictive maintenance services globally. However, the spread ranges from 78% in China to 71% in the USA.

| Collect | Predict | React |
|---|---|---|
| • Gather real-time data with the help of sensors installed on machines.<br>• Transfer data to the Cloud via WiFi hotspot. | • Process the collected data.<br>• Use the data in a prediction model to predict maintenance scenarios. | • Ensure necessary action is taken on the prediction results.<br>• Inform/ guide maintenance teams or trigger auto-reactions. |

### Self-awareness Questions

1. Do my vehicles/ machines have retrofitted sensors that send/ capture data on various KPIs?
2. Is this data used to provide real time alerts of any potential damage to the parts in the car?
3. Is the customer sent maintenance alerts proactively based on vehicle condition?
4. Has this improved the customer loyalty/satisfaction?

## 4.6 Autonomous or Assisted Driving

### What's trending?

- The development of autonomous vehicles is now on a fast track, thanks to ML, AI, and deep neural networks.
- Safety is still a concern when it comes to autonomous driving.
- Assisted driving is already mainstream in premium vehicles and touted to substantially reduce accidents and insurance costs in the years to come.

### What is the road ahead for automakers?

- Leverage the power of technologies from AI, ML to GPS to sensors, cameras, connectivity, and algorithms. This will make autonomous vehicles capable of handling real-world scenarios.
- Demonstrate capability in offering the safest and most convenient autonomous vehicles.
- Make the user interface and experience simple yet immersive, and offer personalization to engage the user in an autonomous vehicle.

### Market Indicators

**15%**

of new cars sold in 2030 could be fully autonomous if the technological and regulatory issues are resolved*.

**50%**

of new vehicles sold could be conditionally autonomous (where the driver may take occasional control) during the same period*.

### Self-awareness Questions

1. Are we looking at rolling out autonomous vehicles in the near future?
2. Do we or our partners have the technological expertise that would be required (AI, ML, Deep Neural Networks, etc.)?
3. Do we have the infrastructure required to build and support autonomous vehicles?
4. Have we made any substantial efforts towards building autonomous cars (even concepts)?
5. If yes, did we face any major issues? How did we resolve these issues?

# 4.7 Electric Vehicles

## What's trending?

- Stricter emission regulations are in place due to rising environmental concerns.
- Manufacturers have been innovating to reduce battery costs.
- Governments are promoting EV adoption by improving the charging infrastructure and offering consumer incentives.
- With growing environmental concern, electric vehicles are gaining customer acceptance.

## What is the road ahead for automakers?

- The components in an EV are far simpler and lesser in number as compared to a conventional vehicle.
- This would enable not just Tier 1 auto suppliers, but also new entrants such as tech companies to join the EV race.
- The OEMs will need to rethink their strategies to face the potential future competition by partnering with digital companies.

### Market Indicators

**10-15%**

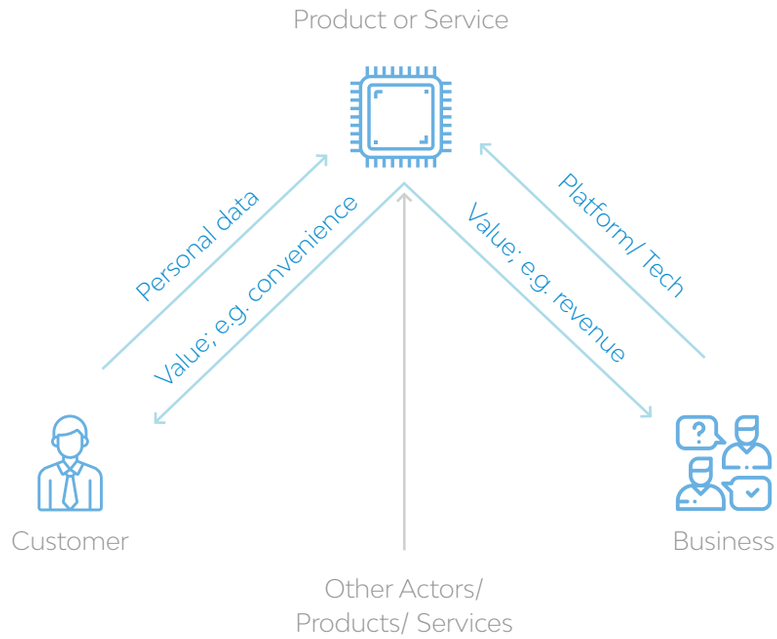
Of new vehicle sales could be EVs by 2030, according to a study.

**$150 - 200** per kWh

Battery costs reduction expected over the next decade, offering EVs cost competitiveness with conventional vehicles*.

### Self-awareness Questions

1. Are we looking at rolling out electric vehicles in the near future?
2. Do we or our partners have the technological expertise that would be required?
3. Do we have the infrastructure required to build and support electric cars?
4. Have we made any substantial efforts towards building electric vehicles?
5. If yes, did we face any major issues? How did we resolve these issues?




**Co-creating value with partner ecosystems**

# 4.8 Digital Safety and Manufacturing

## What's trending?

- AR is being offered as an enhancement in car design today. The technology can display maps and offer route suggestion to the driver right on the windscreen.
- The technology is expected to further mature and improve driver and vehicle safety. For example, the driver can look around the vehicle and beyond other vehicles too with the help of Augmented Reality.
- AR and VR-based wearables will become imperative tools to design vehicles and improve maintenance.

## What is the road ahead for automakers?

- Given the trend, the OEMs will have to embrace the latest tech innovations to enhance manufacturing as well as user experience and engagement.
- To do so, they will have to discard the arbitrary view of competition and consider collaboration within an emerging ecosystem.

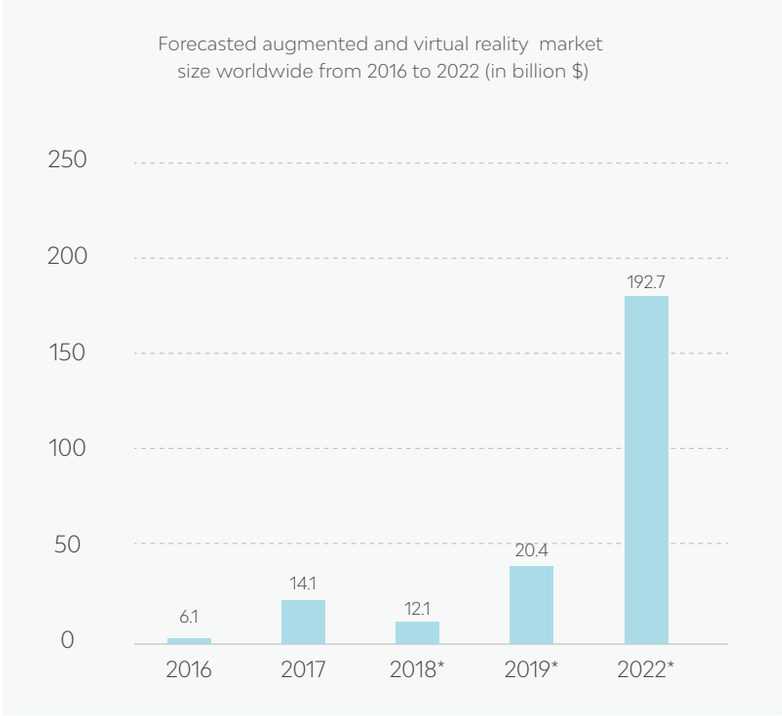
### Market Indicators

**$192.7 Bn**

The worldwide AR/ VR market is expected to grow at around 800% from $20.4 Bn in 2019 to $192.7 Bn in 2022*.

**14%**

In 2022, out of the above, Engineering and Design (manufacturing) is expected to represent 14% of the AR/VR market*.




### Self-awareness Questions

1. How advanced are our current QC, safety and manufacturing processes?
2. Have we considered using/ are using AR/VR for manufacturing and enhancing the safety features in vehicles and plants?
3. Do we or our partners have the technological expertise that would be required?
4. Have we made any substantial efforts toward employing AR for manufacturing and safety purposes?
5. If yes, did we face any major issues? How did we resolve these issues?

## 4.9 3D Printing or Additive Manufacturing

### What's trending?

- 3D printing has gained massive traction lately and is set to grow in years to come.
- Advancement in additive manufacturing tech has enabled automakers to design and fabricate parts with complex geometries, which was difficult using traditional manufacturing techniques, with relative ease.
- The cost and development time of prototypes and durable parts is reducing, thus allowing for newer ways of producing certain parts.

### What is the road ahead for automakers?

- 3D Printing/ Additive Manufacturing technologies have proved their mettle in the automotive field.
- Automotive manufacturers will eventually have to adopt 3D printing, at least partly if not completely.
- With the implementation costs going down, OEMs could look at managing this tech in-house after a vendor/ partner showcases a POC (Proof of Concept).
- Moving forward, parts can be replenished quickly using the technology at the manufacturing plants or directly at service centers.

### Market Indicators

An automotive giant recently printed its 500,000th part with a 3D printer, which was an engine cover for one of its new flagship models. According to the company's website, traditional methods would take 4 months and $500,000, but with 3D printing, the same process takes four days and $3,000.

An aircraft manufacturer has made more than 20,000 3D printed parts for 10 different military and commercial planes. One of their mid-sized commercial aircrafts has 30 3D printed parts, including air ducts and hinges, which is a record for the industry.

### Self-awareness Questions

1. What are the areas we think can benefit with the use of additive manufacturing?
2. Do we or our partners have the technological expertise that would be required?
3. Have we made any substantial efforts towards employing 3D Printing/ additive manufacturing in our plant and aftermarket operations?
4. If yes, did we face any major issues? How did we resolve these issues?

# 4.10 Evergreen Design

## What's trending?

- Vehicles now have sensors to capture a plethora of info and data ranging from proximity, rain, depth, and temperature to terrain and driver behavior.
- In the future, utilizing this data to develop and offer over-the-air updates to vehicles will help keep the vehicle design and features fresh and relevant.
- This feature will help companies to offer proactive services and updates to customers without having them visit the service center.

## What is the road ahead for automakers?

- Businesses need to develop a comprehensive strategy centered around the collection and use of customer and vehicle data to gain a competitive edge.
- This approach would enable manufacturers deploy solutions such as evergreen design and real-time personalization based on consumer preferences.
- Access to customer's personal data also means that businesses should be vigilant and take necessary measures for data security and manipulation.

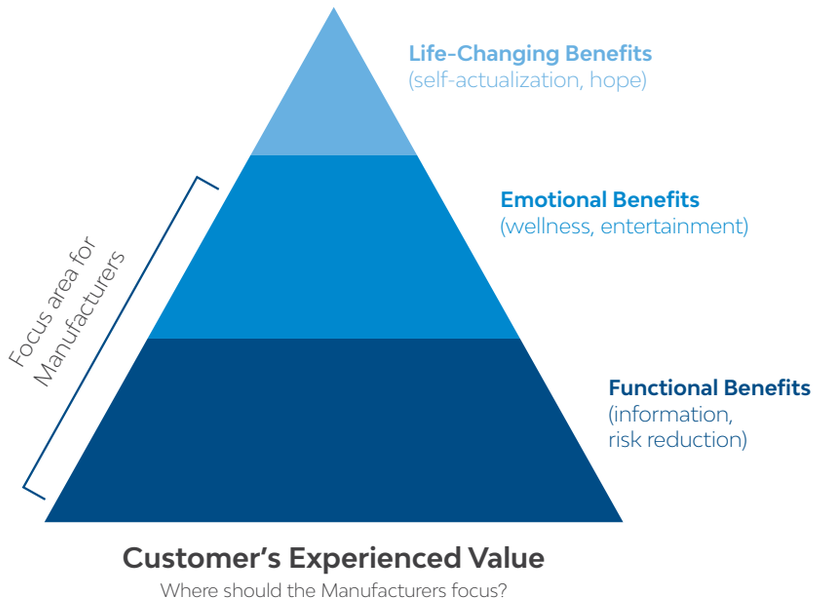
### Market Indicators

In the future, data will prove to be the digital currency for Automotive which can be used over and over by multiple departments*.

In the US, people spend an average of 46 minutes per day in their car. Automakers are using collected data to work on ways to provide consumers with a personalized driving experience*.

### Self-awareness Questions

1. How frequently are customers required to visit service centers for software upgrades? How important are these upgrades?
2. Do we or our partners have the capability to do these updates over-the-air?
3. Are our vehicles equipped with the necessary hardware to make such over-the-air updates possible?
4. What other updates can we provide our customers over-the-air?



# 4.11 Mobility-as-a-Service (MaaS) or Smart Mobility

## What's trending?

- In a MaaS distribution model, a person's transportation needs are met through an interface managed by the service provider.
- Multiple transportation options are bundled, and an integrated solution is presented to the user through an app.
- The transportation options include mass transit, car sharing, ride-hailing, and so on
- The emerging trend of Mobility-as-a-Service is set to overtake the concept of car ownership in urban areas.

## What is the road ahead for automakers?

- Manufacturers need to be prepared to face the challenge of reduced demand from individual and private vehicle owners.
- The revenue pool will see a shift from traditional vehicle sales to on-demand mobility services and data-driven services.
- OEMs will have to develop software capability or leverage partner ecosystem to match the market to take advantage of these opportunities.

### Market Indicators

**$1.5 Tn**

Automotive revenue pools are expected to increase by about 30% ($1.5 Tn) because of new business models*.

**10%**

It is expected that 1 out of 10 cars sold in 2030 will potentially be a shared vehicle, giving rise to the perfect market for mobility solutions*

### Self-awareness Questions

1. Are we already observing a shift in our consumers and vehicle use?
2. Looking at the MaaS diagram, what are the missing pieces in our current ecosystem?
3. Do we and our partners have the capability to fill these gaps and build a smart mobility ecosystem for our customers?
4. Is our website, mobile app capable enough to add an MaaS module?


**Key Stakeholders in a Smart Mobility Ecosystem**

# 5. Summary

Going by the trends in this paper, it would be safe to say that the auto industry is changing by the minute. As new technologies like sensors, augmented reality and 3D printing foray into the market, automakers of today must take a serious approach towards their digital journey.

## Challenges and opportunities galore

While digital and tech poses plenty of challenges for automakers, there lies a huge opportunity for them to form new partnerships with new entities. These can offer automakers fresher thought processes, new-age tools and technologies and enhanced experiences for the digital customer of today. Automakers should create collaborative ecosystems if they want to stay ahead of the curve. This includes co-developing future-ready cars and concepts. Going solo for automakers will not make the cut anymore.

## User experience – a key to the digital auto shopper of today and tomorrow

The auto shoppers of today are well-informed thanks to the digital age. They are not going to dealerships without doing their homework, which includes online research, reviews, and videos. The challenge for marketers is to up not just their dealership experience, but also their digital strategy. This will help them generate leads on various online and digital platforms from the on-the-go auto shoppers of today who consume information, anywhere and anytime.

## An autonomous future for automakers

With newer sensors and dynamic technology arriving in the auto industry every day, the cars of tomorrow will be digitally connected and, of course, autonomous. This means creating accident-free roadways and transportation. The biggest challenge though, lies in ensuring data security and checking manipulation and malfunction of these emerging technologies.

## Road diversion from ownership to co-ownership

Today's millennials are all about ride-sharing and car-pooling. With the advent of apps like Uber and Lyft, the future of mobility is changing fast and how. Automakers needs to shift focus from individual ownership to co-ownership and innovative mobility solutions for today and tomorrow.

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- **Source: Futurice
- *Source: Statista
- *Source: medium.com

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