Can car manufacturers deal with the uncertainty they will face in the next decade?
The automotive industry is faced with three disruptive trends

- Automation
  - Power train electrification
  - Automated driving
- Connectivity
- Shared economy
Autonomous driving

- **No automation**
  - Lane departure warning
  - Blind spot detection
  - Collision warning

- **Function-specific automation**
  - Cruise control
  - Autonomous emergency braking
  - Lane keeping assist

- **Combined function automation**
  - Adaptive cruise control
  - Lane change assist

- **Limited self-driving automation**
  - Platooning
  - Highway pilot
  - Construction zone assist

- **Full self-driving automation**
  - Fully automated driving – highway, rural roads, city

- ~2020
- >2025
The automotive industry is faced with three disruptive trends

• Automation
• Connectivity
• Shared economy
## Disruptive trends in automotive: connectivity

<table>
<thead>
<tr>
<th>Connectivity will allow for</th>
<th>It requires</th>
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<tbody>
<tr>
<td>• Cloud access</td>
<td>• OEMs operate like IT companies</td>
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<td>• OTA functional upgrades</td>
<td>• Car as part of bigger ECO system</td>
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<tr>
<td>• Extensive and up-to-date map data</td>
<td>• High quality software, uptime, performance, fault tolerant</td>
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<td>• User data and new business models</td>
<td>• Integration of different supplier SW</td>
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<tr>
<td>• Personalised and contextual services</td>
<td>• Scalable, Service Oriented Architecture</td>
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<td>• Car2Car communication</td>
<td>• Paradigm shift in UX</td>
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<tr>
<td>• Car2Infrastructure communication</td>
<td>• Personalisation</td>
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<td></td>
<td>• Mobile integration</td>
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<td></td>
<td>• Security, privacy</td>
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</tbody>
</table>
The automotive industry is faced with three disruptive trends

- Automation
- Connectivity
- Shared economy
  - Changing attitude towards car ownership
  - The rise of mega cities
  - OEMs become mobility provider
  - TaaS will substantially change the value chain
Autonomy versus shared

Mobility as a service

Revenue distribution along the car value chain in billions of U.S. dollars

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Some statements about software development

- There is intrinsic uncertainty in software development
- Goldratt: buffers on critical path lead to waste and longer, less reliable lead times; management by commitment, Gantt are examples of these unnecessary buffers, but also result linked bonus systems
- Reinertsen: to lower variability and congestion, manage your Work In Progress, establish cadence and avoid 100% capacity load
- There are many misconceptions about Agile, there are many non-professionals in industry
- Focus on predictability leads to lower productivity, focus on productivity leads to higher predictability
To make an organisation able to deal with uncertainty

- Make management accept uncertainty rather than deny; avoid prioritization of predictability over productivity
- Focus on cycle time, manage WIP, establish cadence
- Establish incremental development to allow for early feedback and shorter time to break even
- Respect cultural differences
Observations in the automotive industry

- The last 25 years, the industry went through an impressive quality journey, at the cost of innovation;
- The industry is very process oriented, with strong focus on quality and predictability, also reflected in supplier mgt processes (contract execution rather than collaboration)
- Enormous appetite for documentation and traceability (fake learning)
- Enormous waste due to (re)-planning and FF milestone
- Very car centric; system thinking is car focused (eg functional safety); resistance against diversity (SW download, maps, ..)
- Little understanding of software at management levels; Many have difficulty to attract software talent
- Enormous inertia, tendency to keep the good practices
Who will survive?

Car brands

Current suppliers

Others

Higher Returns on Agile
Conclusions

The automotive industry will face more change in the next 10 years than in the past 100 years; the required innovation will bring uncertainty.

The automotive industry will have to learn how to deal with uncertainty. It means processes, leadership, and partner management.

It is not so evident all current players will be able to make this switch and survive.