AUTONOMOUS DRIVING TECHNOLOGY
GLOBAL REGULATORY LANDSCAPE
DEFINED LEVELS OF AUTOMATION (FOR ROAD VEHICLES)

<table>
<thead>
<tr>
<th>Level</th>
<th>Automation</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>L0</td>
<td>Driver only</td>
<td>Driver continuously in control of speed and direction</td>
</tr>
<tr>
<td>L1</td>
<td>Assisted</td>
<td>Driver continuously performs the longitudinal or lateral dynamic driving task</td>
</tr>
<tr>
<td>L2</td>
<td>Partial automation</td>
<td>Driver must monitor the dynamic driving task and the driving environment at all times</td>
</tr>
<tr>
<td>L3</td>
<td>Conditional automation</td>
<td>Driver does not need to monitor the dynamic driving task nor the driving environment at all times; must always be in a position to resume control</td>
</tr>
<tr>
<td>L4</td>
<td>High automation</td>
<td>Driver is not required during defined use case</td>
</tr>
<tr>
<td>L5</td>
<td>Full automation</td>
<td>System performs the lateral and longitudinal dynamic driving task in all situations encountered during the entire journey. No driver required</td>
</tr>
</tbody>
</table>

**Example**
- L0: N/A
- L1: Park Assist
- L2: Traffic jam Assist
- L3: Highway Patrol
- L4: Urban Automated Driving
- L5: Full end-to-end journey

**Source:**
KPMG and the Society of Motor Manufacturers & Traders (SMMT), Connected and Autonomous Vehicles: The UK Economic Opportunity (March 2015)
KEY REGULATORY ISSUES

- Driver / Control
- Product Liability
- Road Safety
- Technical Standards
- Risk Insurability
- Intelligent Transport Systems
- Traffic Rules
- Regulatory Competence
- Data Privacy
- Cyber Security
- Road Testing
- ?
US REGULATORY FRAMEWORK AND ISSUES

FEDERAL REGULATION

• National Highway Traffic Safety Administration (NHTSA)
• Federal Motor Vehicle Safety Standards (FMVSS)
• "SELF DRIVE Act" / "AV START Act" (pending)

STATE REGULATION
(Testing / Deployment)
SELF DRIVE Act (US House Bill)

• Replaces state "patchwork" with uniform federal regulation, to promote innovation/testing/safety of AVs

• Key provisions include
  – AV design, testing, safety and performance regulated at federal level (NHTSA)
  – States retain authority to regulate AV registration, licensing, driver education, insurance, inspections and traffic laws
  – NHTSA to issue new/update safety standards
  – Additional AV exemptions from current vehicle standards
  – Requires written cybersecurity/privacy plans

• Passed in US House of Representatives 6 Sept. 2017 (broad bipartisan support)
• Now under US Senate consideration (with Senate bill)
FEDERAL REGULATION

AV START Act (US Senate Bill)
• Similar to SELF DRIVE Act
• Key provisions include
  – AV design, testing, safety and performance regulated at federal level (NHTSA) (with broader preemption provisions)
  – Under Senate bill, states also would retain authority to regulate AV registration, licensing, driver education, insurance, inspections and traffic laws
  – Federal government to propose new safety standards for AVs
  – Additional AV exemptions from current vehicle standards
  – Requires more detail (than House bill) in written cybersecurity/privacy plans
• Introduced in September 2017; passed Senate Committee on 4 October 2017 (with broad bipartisan support in Committee)
• Momentum currently stalled, with no timetable for Senate vote
FEDERAL REGULATION

NHTSA AV Guidance

- Initial guidance issued September 2016 (guidelines/best practices for the development, testing and deployment of AVs on public roads)
  - Clarifies and delineates federal and state roles in HAV regulation.
  - Provides best practices for state legislators, including considerations in areas such as applications and permission tests, registration and titling, working with public safety officials and liability and insurance.
  - Encourages but doesn’t require self-disclosure of Voluntary Safety Self-Assessments
- Federal agencies holding consultations to identify "regulatory barriers" to AV testing and information regarding AV-related infrastructure issues and requirements
- US DOT holding "AV Policy Summit" on 1 March 2018 to discuss issues relating to next AV guidance document (anticipated in 2018)

Federal Motor Vehicle Safety Standards (FMVSS)

- Current framework based on human driver/conventional vehicle design, but revisions/exemptions to address AVs anticipated
OVERVIEW OF STATE REGULATION
SELECTED US AV TESTING

- Nevada: Self-driving buses in downtown Las Vegas
- California: 50 autonomous vehicle testing permits
- Arizona: Waymo, GM testing. Uber relocation to Arizona
- Washington: Waymo testing
- Iowa, Wisconsin, Michigan: Uber's self-driving Volvos in Pittsburgh
- Pennsylvania: Uber's self-driving Volvos in Pittsburgh
- Colorado: EasyMile Shuttles
- Texas: Waymo testing
- Florida
- Maryland
- North Carolina
- Boston: NuTonomy on the streets in Boston
EU REGULATORY FRAMEWORK

International agreements and standards

- General principles and road safety requirements (1949 Geneva Convention on Road Traffic; 1968 Vienna Convention on Road Traffic)
- Technical requirements (1958 UN Agreement on Uniform Technical Prescriptions; 1998 UN Agreement on Global Technical Regulations)

EU Regulations and Directives

- Driving licences, professional drivers
- Technical requirements
- Product liability
  - Requirement for insurance
  - Data protection
  - State aid

Member State rules and enforcement
# ASIA REGULATORY FRAMEWORK

## Japan

“I can tell you that in 2020 Tokyo, self-driving cars will be running around, and you will be able to use them to move around”
Prime Minister Abe, 2017

- Public-Private ITS Initiative/Roadmaps since 2014
- National Police Agency rules for testing autonomous vehicles on public roads, April 2017
- Aim to establish regulatory framework during regular Diet session in 2019
- Bus and robo-taxi trials

## Singapore

- Smart Nation Strategy
- Road Traffic (Amendment) Act 2017
- The Committee on the Future Economy (CFE) encourages the government to promote R&D in this area
- Singapore Autonomous Vehicle Initiative (SAVI)
- December 2017 – first autonomous vehicle test centre
- Autonomous buses and on-demand shuttles by 2022
## ASIA REGULATORY FRAMEWORK

### South Korea
- Amended Korea Automobile Management Act – permits testing on all city roads except safety zones
- Self-driving public bus – "Zero Shuttle"
- K-City – reported to be the world’s largest test bed for self-driving cars
- 5G – Pyeongchang 2018

### China
- Draft national regulations for road tests
- Draft Strategy for Innovation and Development of Intelligent Vehicles
- Draft national standards for self-driving cars
- Three year plans: Ministry of Industry and Information Technology and NDRC
- December 2017 - testing in Beijing & Guangzhou
- January 2018 - licenses issued to allow testing in road tested in Shanghai
Product liability claims are generally based on three theories:

**MANUFACTURING DEFECT**
- Arises where product diverges from manufacturer’s intended design
- **EXAMPLE**: Braking system fails in a particular vehicle due to production or installation error

**DESIGN DEFECT**
- Arises where the entire product line has a design flaw that causes injury
- **EXAMPLE**: Airbags do not deploy correctly, despite having been produced to specification

**INADEQUATE WARNINGS OR INSTRUCTIONS**
- Failure to warn of product’s risks / failure to provide adequate instructions for product use
- **EXAMPLE**: Failure to note rollover risk in ATV or failure to provide adequate warnings/instructions for vehicle maintenance
AUTONOMOUS DRIVING TECHNOLOGY
M&A TRENDS
AMENITIES
- Cabin safety
- Occupant entertainment
- Human-vehicle interaction

ENVIRONMENT
- Emissions
- Weather
- Accidents

PERFORMANCE
- Speed and distance
- Wear and Tear
- Road condition

COMMUNICATIONS
- Transmitters and receivers
- Vehicle to vehicle
- Vehicle to cloud
- Vehicle to street furniture

NAVIGATION
- Sensors
- GPS
- Inbuilt map
- External inbound data

PROPULSION
- Motor
- Drive train
BIG DATA ANALYTICS

Transforming driver experience

- Journey with in-car entertainment
- Lowering the risk of traffic incidents
- Better co-ordination of traffic in urban areas
- Efficient travel leading to lower fuel costs
- Potential reduction in car insurance premiums

Transforming car manufacturers’ businesses

- Targeted advertising
- Creating new products (selling data)
- Pay-as-you-go insurance
- Driving engagement and customer experience
- R&D design improvements

Vehicle performance data

Maintenance data

Vehicle tracking

Destination and navigation data

Driving style

Traffic conditions

Vehicle performance data

Maintenance data

Vehicle tracking

Destination and navigation data

Driving style

Traffic conditions
NEW MARKET PLAYERS

Traditional automotive industry

- Long development cycles
- Replacement of defective parts
- Zero fault strategy
- Linear supply contracts
- Pure buyer market

Software / IT industry

- Short development cycles
- Software updates
- "Software is never faultless"
- Multi-party licensing models
- Mixed vendors vs platforms

Network providers

Telecoms

Software / IT companies

Electronics

Map producers

Infotainment

Vehicle performance data

Vehicle tracking data

Destination and navigation data

Driving style software updates

Traffic data

GPS data

User preferences

Network providers

Map producers

Infotainment

Electronics

Software / IT companies

Telecoms

Network providers

Telecoms
Warranty rights (contractual recourse in the supply chain)

"Innocent Bystander"
THE NEW SUPPLY CHAIN

- Contractual claims (warranty rights etc.)
- Tort claims/Product liability claims
SNAPSHOT OF THE MARKET

Worldwide:

• High levels of M&A activity and a fast moving landscape, as auto manufacturers look to transition into the tech-heavy autonomous vehicle space

• In 2017, automotive M&A deal value was up 29.9% to $53.2 billion.¹ "Auto-tech" accounted for 43.9%, with deal value increasing more than five-fold from $5.3 billion in 2016 to $26.7 billion in 2017. Trend anticipated to continue in 2018.

• Some high profile examples in 2017:

  - Samsung Electronics / Harman International Industries $8 billion March 2017 Connected car technology
  - C K Holdings/ Calsonic Kansai $4 billion May 2017 Automobile manufacturer
  - Intel / Mobileye $15 billion August 2017 In car camera system
  - Valeo / FTE Automotive $917 million October 2017 Automotive artificial intelligence

¹ Source: PwC Deals, Global Automotive Deals Insights Year-End 2017
CROSS-INDUSTRY COLLABORATION

INVESTMENT
PURCHASE
PARTNERSHIP

HERBERTSMITHFREEHILLS.COM
## 10 MOST FUNDED SELF-DRIVING STARTUPS IN 2017

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Company</th>
<th>Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NIO</td>
<td>$2.1 billion</td>
</tr>
<tr>
<td>2</td>
<td>Argo.ai</td>
<td>$1 billion</td>
</tr>
<tr>
<td>3</td>
<td>Future Mobility</td>
<td>$200 million</td>
</tr>
<tr>
<td>4</td>
<td>Nauto</td>
<td>$174 million</td>
</tr>
<tr>
<td>5</td>
<td>WM Motors</td>
<td>$150 million</td>
</tr>
<tr>
<td>6</td>
<td>ClearMotion</td>
<td>$130 million</td>
</tr>
<tr>
<td>7</td>
<td>Brain Corp</td>
<td>$125 million</td>
</tr>
<tr>
<td>8</td>
<td>TuSimple</td>
<td>$83 million</td>
</tr>
<tr>
<td>9</td>
<td>Innoviz Technologies</td>
<td>$82 million</td>
</tr>
<tr>
<td>10</td>
<td>Drive.ai</td>
<td>$77 million</td>
</tr>
</tbody>
</table>
TRENDS AND OBSERVATIONS (1)

• Vertical integration: bolt-on acquisitions of smaller tech companies or specialist component manufacturers by larger car makers to build capability in areas necessary to develop a semi- or fully-automated vehicle. M&A is key to close technology gaps.

• Target technologies include in particular:
  – LiDAR
    vision software and auditory software,
  – 3D and intelligent mapping
  – Cybersecurity
  – AI / robotics / machine learning,
  – Big data collection / processing
  – GPS
  – Infotainment and displays
  – Vehicle to vehicle (V2V) and vehicle to infrastructure (V2I) communications
  – Computer chips

• Some manufacturers have undertaken a string of deals (Ford, GM, Delphi)
TRENDS AND OBSERVATIONS (2)

• Cross-sector deals: convergence of automotive, technology and energy sectors. 57% of Automotive companies are planning cross-sector deals (E&Y). Automakers and disrupters also invest in companies carrying out complementary businesses.

• Targets are typically young companies (<5yrs); often start-ups spun out of larger companies or engineering departments of large research universities.

• M&A is one strategy among others in corporate playbook. Other trends have been observed:
  – development of in-house R&D programmes (e.g. Ford, Valeo)
  – Hiring talent from competitors or from academia – key individuals or whole teams (e.g. several high profile moves by top engineers working on self-driving technologies at Google, Tesla and Apple)
  – Minority equity investments (e.g. Apple / Didi Chuxing)
  – In-licensing agreement (e.g. Microsoft / Toyota)
  – Strategic alliance / MoU plus investment (e.g. Toyota and Uber)
  – Publicly funded initiatives (e.g. in France by Business France and BPI FRANCE)
  – Partnerships with research universities (e.g. French automakers and VEDECOM)
  – Pooling resources with other auto manufacturers (e.g. Nissan / Renault)
POTENTIAL DEAL STRUCTURES

OUTLOOK

• Key considerations: pursuing growth opportunities whilst managing risks and costs
• Traditional M&A structure (100% ownership) may not be the best solution (or may not be available)
• Expect increase in creative collaborations: "You’ll see acquisitions, but there will also be partnerships and joint ventures (JVs), licensing deals and investments."°

STRUCTURE

• The most frequently used acquisition structures are:
  – Minority investments
  – Staged investment: buyer takes a minority stake and right to acquire remaining shares/controlling interest (through put and call and/or convertible bonds)
  – Acquisition of a majority stake (Seller retains minority interest)
  – Acquisition of 100%
  – Joint ventures
These structures are often mixed with commercial agreements e.g. to provide support and resources in return for ROFR on new IP/technology.
• Strategic partnerships / consortium / MoU

COMMERCIAL DRIVERS

• Acquiring and integrating innovative new technologies
• Expediting route to market
• Complementing (or accelerating) in-house R&D efforts
• Desire to manage risks in rapidly developing sector
• Desire to manage costs in capital intensive R&D projects
• Leverage experience / skill set of counterparty

OUR ADVICE

• Conduct diligence: regulatory issues, ABC, reputational concerns
• Choose the best structure: tax, regulatory approvals and ongoing requirements, financial reporting, repatriation of profits
• Incentive for the key managers
• Understand what your "end game" is at the outset
• Get the governance framework right from the start: operational responsibilities, business plan, funding, decision making conflicts, "step-in" rights, minority protections
• Early planning on integration post acquisition (separate division or part of existing)
• IT protection

° EY Capital Insights – Deal Drivers: Auto M&A transforms the industry
The contents of this publication, current at the date of publication set out in this document, are for reference purposes only. They do not constitute legal advice and should not be relied upon as such. Specific legal advice about your specific circumstances should always be sought separately before taking any action based on this publication.

Herbert Smith Freehills LLP and its affiliated and subsidiary businesses and firms and Herbert Smith Freehills, an Australian Partnership, are separate member firms of the international legal practice known as Herbert Smith Freehills.

© Herbert Smith Freehills LLP 2018
BANGKOK
Herbert Smith Freehills (Thailand) Ltd

BEIJING
Herbert Smith Freehills LLP
Beijing Representative Office (UK)

BELFAST
Herbert Smith Freehills LLP

BERLIN
Herbert Smith Freehills Germany LLP

BRISBANE
Herbert Smith Freehills

BRUSSELS
Herbert Smith Freehills LLP

DUBAI
Herbert Smith Freehills LLP

DÜSSELDORF
Herbert Smith Freehills Germany LLP

FRANKFURT
Herbert Smith Freehills Germany LLP

HONG KONG
Herbert Smith Freehills

JAKARTA
Hsiwara Buntamin and Tandjung
Herbert Smith Freehills LLP associated firm

JOHANNESBURG
Herbert Smith Freehills South Africa LLP

KUALA LUMPUR
Herbert Smith Freehills LLP
LLPC01019-FGN

LONDON
Herbert Smith Freehills LLP

MADRID
Herbert Smith Freehills Spain LLP

MELBOURNE
Herbert Smith Freehills

MILAN
Studio Legale Associato in association with
Herbert Smith Freehills LLP

MOSCOW
Herbert Smith Freehills CIS LLP

NEW YORK
Herbert Smith Freehills New York LLP

PARIS
Herbert Smith Freehills Paris LLP

PERTH
Herbert Smith Freehills

RIYADH
The Law Office of Nasser Al-Hamdan
Herbert Smith Freehills LLP associated firm

SEOUL
Herbert Smith Freehills LLP
Foreign Legal Consultant Office

SHANGHAI
Herbert Smith Freehills LLP
Shanghai Representative Office (UK)

SINGAPORE
Herbert Smith Freehills LLP

SYDNEY
Herbert Smith Freehills

TOKYO
Herbert Smith Freehills