

UKTI Automotive *Investment* Organisation

The car re-invented?





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Background: The UK automotive environment

The future of the car will be determined in countries with a strong automotive foundation

The UK situation

Since 2009, the fastest European growth for:

- Car production (+ 50%, now higher than France)
- UK Production will double between 2010 and 2020
- Sales (+ 24%), now 37% ahead of third-placed France

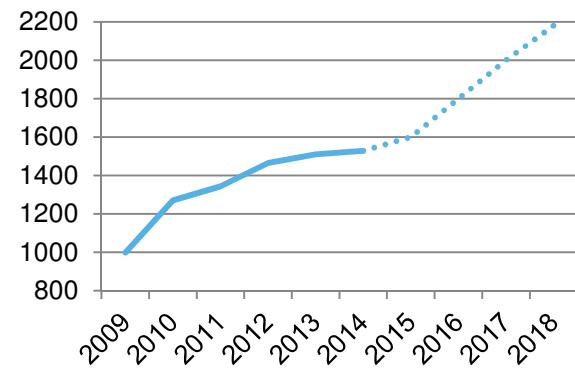
Also rapidly increasing local content:

- Up from 36% in 2012 to 41% in 2015

A technology leader – European No. 1 in EVs for both:

- Production (25% of total EU)
- Sales (20% of total EU)

**UK car production
(000)**





The role of the Automotive Investment Organisation

The AIO was set up in 2013 to drive overseas investment into the UK car industry in the fields of Supply Chain and R&D

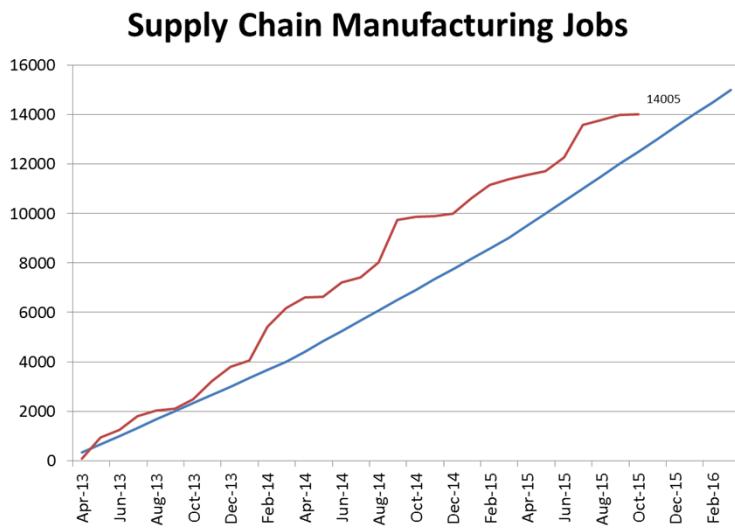
- The one-stop shop for automotive investors, making the UK the easiest place to set up or expand.
- A trusted, no-cost intermediary between suppliers and OEMs, using our broad contacts

How are we doing?

Over 14,000 jobs created since 2013 in projects we have helped bring to the UK

In 2013, £3 billion of annual parts purchasing was identified that could be re-shored

Today, £1 billion of that total has been brought back to the UK





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UK is an OEM investment magnet : over £1.3bn in 2015

- **Jaguar Land Rover - £600million investment in West Midlands**
- **London Taxi Company - £250 million investment and 1,000 jobs in Coventry**
- **Honda - £200 million investment for Swindon to be global production hub for Civic five-door**
- **Nissan - £100 million investment in the next-generation Juke in Sunderland**
- **Ford - £180 million investment in a new family of engines at Bridgend**



- Supply chain is also booming, with £10 billion invested since 2012...



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UK Supply chain growing



Tenneco



Haldex



Guhring



Plastic Omnium



IAC



Covpress/UYT



Gestamp



TRW



Mecaplast



Vantec



Ricardo



Amtek



Unipres



Lear



ElringKlinger



Nifco



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Europe's thriving tech centre

Technology

World No. 1 in motorsport

European No. 1 in aerospace (and world No.2)

World No.1. in small satellites

Research and Development

Europe's best universities (4 of the world's top 10)

Government/Industry investments into specific areas:

£1 billion investment into low carbon propulsion (APC)

£40 million into vehicle light weighting in 2015

£200 million into Connected and Autonomous Vehicles (CAVs)

Catapult networks: HVMC, Digital, Transport Systems, Satellite Applications





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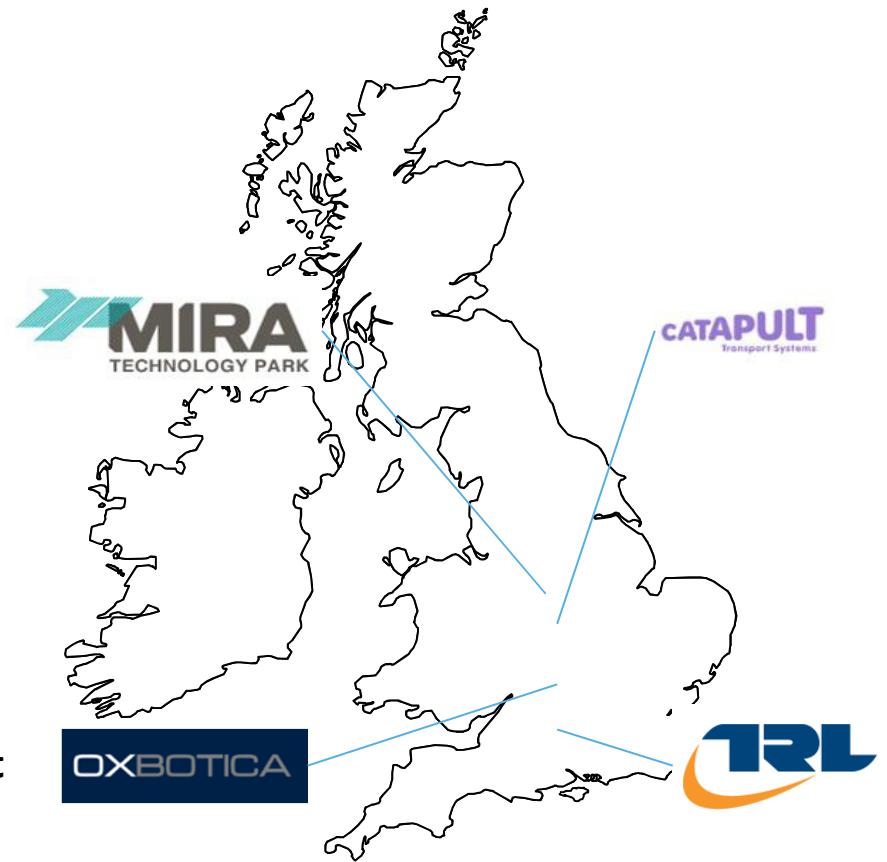
UK CAV Centres of Excellence

Transport Systems Catapult: developing end-to-end mobility across all modes of transport.

Horiba MIRA: Europe's only independent facility for developing and validating CAV technologies

TRL: Specialists in ITS, with decades of experience in developing traffic solutions.

Oxford University/Oxbotica: World leader in robotics, it has developed an autonomous Nissan Leaf.





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UK as a centre of CAV development

Leading technology:

40% of all EU large software companies are UK (EU data)

7 of 10 F1 teams based in UK

F1 technology transfer, e.g. telematics

History of IT leadership: Europe's early adopter from home PCs to Internet Shopping

World leader in insurance and legal services

European leader in cyber-security



Receptive consumers:

World leader in online shopping (£1968 per head in UK, £1171 in US, £218 in Italy)

Highest use of internet TV in Europe

Early adopters from home PCs to smartphones



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Government commitment to CAV

£200 million fund for connected vehicles

To test IM, companies only have to

- inform Highways England
- arrange public liability insurance
- abide by industry's own code of practice



£19 million fund for three current tests:

Autonomous vehicles in London, Milton Keynes, Bristol

Oxford University is a world leader in robotics

Pragmatic data protection rules for Big Data



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UK auto is strongly positioned

Policy continuity

Policy coherence

Agreed strategy for automotive

Transformed innovation network

Focus on key capabilities:

- **Low carbon propulsion**
- **Connected and Autonomous Vehicles**
- **Light weighting**

Successful organisations:

- **Automotive Council**
- **Innovate UK**
- **Advanced Propulsion Centre**
- **Centre for Connected and Autonomous Vehicles**





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Challenges, Opportunities and Disruptions

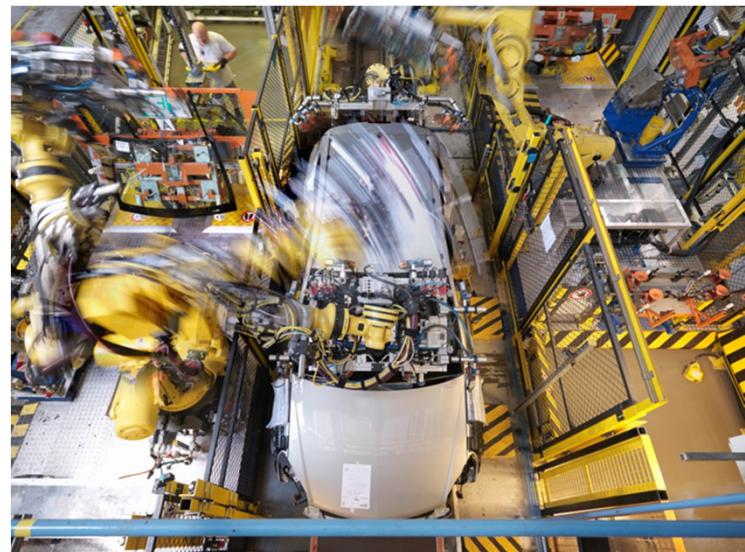
Connected cars need connected industries

Complex regulatory environment

Traditional ownership model under threat

However...

Car industry has a record of adaptation and innovation





Connected cars need connected industries

For any connected car to be fully autonomous, every car has to be connected in some way

Even legacy cars will need to have a simple beacon to transmit where it is – like an old TV being retrofitted with a set-top box

To make CAVs happen, the car industry has to work with other industries:

Telecoms

Electronics

Road Infrastructure

Other forms of transport for seamless journeys

Mobile payment systems - e.g. Pay as You Go car usage



Source: Cisco IBSG Automotive 2011

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Complex technical and regulatory environment

The car industry can look slow compared to Silicon Valley, so will it be out-evolved?

The car industry takes longer because it needs to test more :

Even Elon Musk warned Apple that making cars is hard: "You can't just go to a supplier like Foxconn and say: build me a car."

One chipmaker said upgrading from telecoms to auto costs \$500m

Phones and computers can be rebooted but cars cannot

Bill Gates said that if cars evolved like computers, they would cost \$25 and do 1000 mpg

GM replied: they would crash twice a day and need to be restarted at random intervals

A modern premium car has 100 million lines of code. A 787 has 6.5 million lines.





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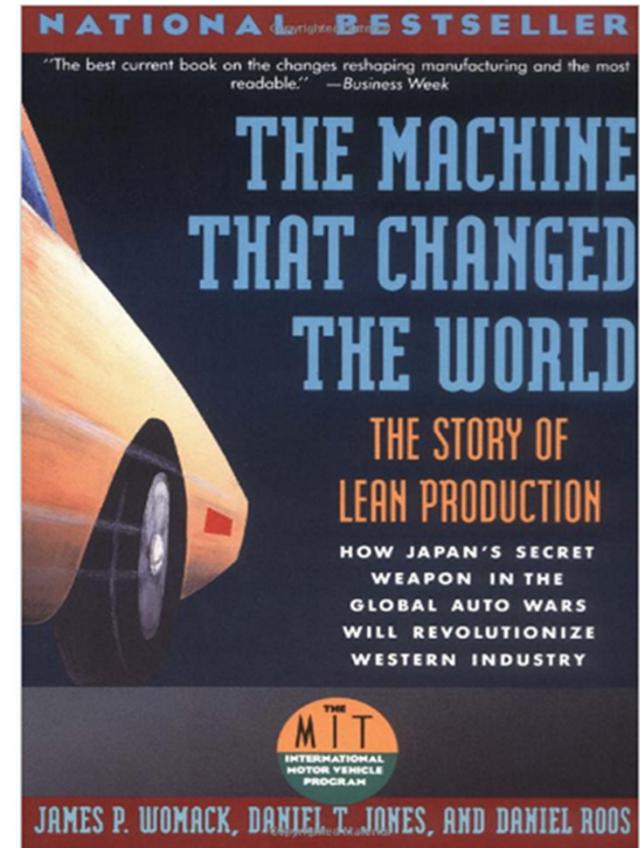
Industry record of adaptation and innovation

In the early 1980s it was fashionable to say all car making would go to low cost countries – cars were just metal boxes

The industry then renewed itself on technology and stayed ahead

It can do it again with CAVs:

For the CAV revolution, it wants to be at the table – not be on the menu





The traditional ownership model under threat

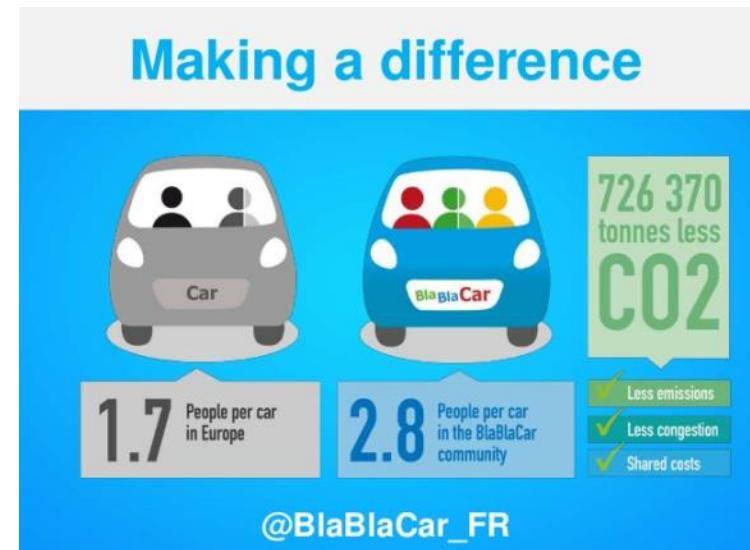
There is an underlying trend towards usage, not ownership

CAVs are part of Intelligent Mobility – being able to seamlessly integrate different modes of transport

With the centrality of cars reducing, and more shared ownership models, European new car sales may reduce

However, most of the value chain lies outside the manufacturing:

If the car companies can get a good share of the CAV operators' market, their revenues can be protected.





It's not all about the technology

The public thinks Silicon Valley will rule the world

“Google/Tesla/ whoever has the technology to leave the car industry behind.”

That is not the problem – car companies know how to integrate new technology:

Compare a current supermini to its predecessor from 1980.

The real problems for the industry are societal and developing new business models (both B2B and B2C)





Societal Issues

Regulatory: No-one yet allows members of the public to use CAVs

Behavioural: How will the public react to a CAV – too cautiously or too recklessly (“it’s not allowed to run me over”?)

How does a CAV work with legacy cars? Obeying every traffic rule could cause huge frustration

Insurance – if two CAVs crash is it automatically a product liability issue?

Cyber security – if businesses struggle to keep names and addresses secure, how do they safeguard CAVs?

The unexpected: platooned trucks appear to encourage other drivers to get too close to each other





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Business Model - Consumers

Car industry has tried buying into car rental, aftermarket, dealerships...

but not always unqualified successes

Traditionally, the interests of the production line win out, because that is where the costs are.

However OEMs are going to have to change:

The proportion of total value in making the vehicle will fall

They have to be involved in the operation of CAVs

They don't want to be Vodafone's contract assembler





An Aerospace Lesson?

The car industry has taken lots of technology from aircraft, from disc brakes to “by-wire” controls

But the lesson for CAVs is the connected aero engine

Rolls-Royce does not describe itself as an engine manufacturer

It “Sells Power by the Hour” – now an RR trademark

Aero engines send information back to a control centre in real time and Rolls-Royce charges for the time power is being generated

It has removed the distinction between manufacturing and services





Conclusion

The pace of technological change is accelerating massively

But the new technology is not a qualitative change

Ironically the life of a car engineer may therefore change least

It is the business strategists, regulators and drivers that face the real challenges.

The connected car is not the revolution, the way the car is used will be the revolution

The car companies will still be key players – if they become as good at mobility services as they are at design and manufacturing cars.

