New Automotive Innovation and Growth Team (NAIGT)

Richard Parry-Jones

Background

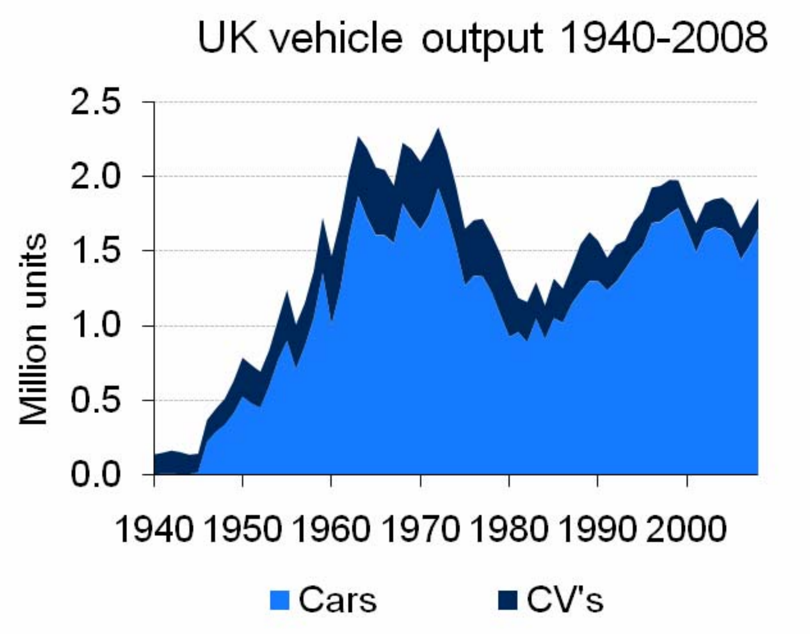
- NAIGT formed April 2008
- Industry-led project facilitated by BERR's Automotive Unit
- Tasked with looking at:
  - opportunities for automotive sector in the UK
  - barriers and obstacles for realising these opportunities
  - strategy and mechanisms for accelerating progress
- Report published May 6th

The car industry

- Global market growing at 2.5% pa, much faster in developing countries
- Huge contributor to manufacturing sector – 1/8th of the manufacturing in the UK is auto-related
- Innovator whose ideas often become the standard for other industries – moving production line, just-in-time inventories, flexible lean production, total preventative maintenance
- Cars account for 90% of all travel – they are here to stay and the industry is embracing the low carbon challenge. We will not solve transport emissions unless we convert the car fleet to low carbon – eventually ultra-low carbon vehicles

Analysis of trends, trajectories and industry leaders' perceptions to ground NAIGT work

- Sector adds £9.5bn to the economy
  - **0.8%** of UK economy
  - **0.6%** of UK employment
  - **13%** of manufactured exports
- Direct UK employment
  - Job multiplier of **8.5**
  - **384,000** direct employment, of which **330,000** could be offshored
- Shift from volume cars to niche vehicles and engines



The UK car industry today

- An industry that has transformed itself in the last decade and is now competitive with global peers
  - Outstanding quality and reliability
  - Excellent labour relations and labour flexibility
  - World class productivity
  - Strong R&D
  - Diverse manufacturer representation
- Embracing the low carbon challenge
- But sub-competitive scale and hollowing out of employment and structure continuing

UK car industry strengths

- Competitive scale on engine production
- Labour Flexibility
- Strong premium brands – second only to Germany globally
- Diverse representation of manufacturers

Flexible labour and capacity are UK's main advantage, but mark a double-edged sword

Industry Leaders' perception of the UK's relative strength vs France, Germany, Italy, Spain

	FGIS	UK	Difference	
Labour flexibility	2.13	3.94	**-1.81**	***Relative advantage for the UK***
Barriers to exit	1.92	3.29	**-1.37**	
Taxes & Tariffs	3.23	3.27	**-0.04**	
Labour productivity	3.19	3.06	**0.13**	***Relative disadvantage for the UK***
Interaction with government	3.44	3.18	**0.26**	
Labour cost	2.38	1.94	**0.44**	
Logistics & infrastructure	3.47	2.88	**0.59**	
Governmental subsidies	3.92	3.31	**0.61**	
Environmental regulation	3.14	2.44	**0.70**	
Quality of R&D resources	4.43	3.71	**0.72**	
Quality of local suppliers	4.00	3.00	**1.00**	
Availability of skilled labour	3.50	2.41	**1.09**	
Skill level of workforce	3.88	2.76	**1.12**	
Availability of local suppliers	4.00	2.53	**1.47**	

UK car industry weaknesses

- No global major headquartered in UK
- Sub-critical scale for car production and R&D
- Tier 1 suppliers only assemble – no R&D or core component manufacturing
- Limited R&D by global majors – Ford the exception
- Ambivalent Government historically

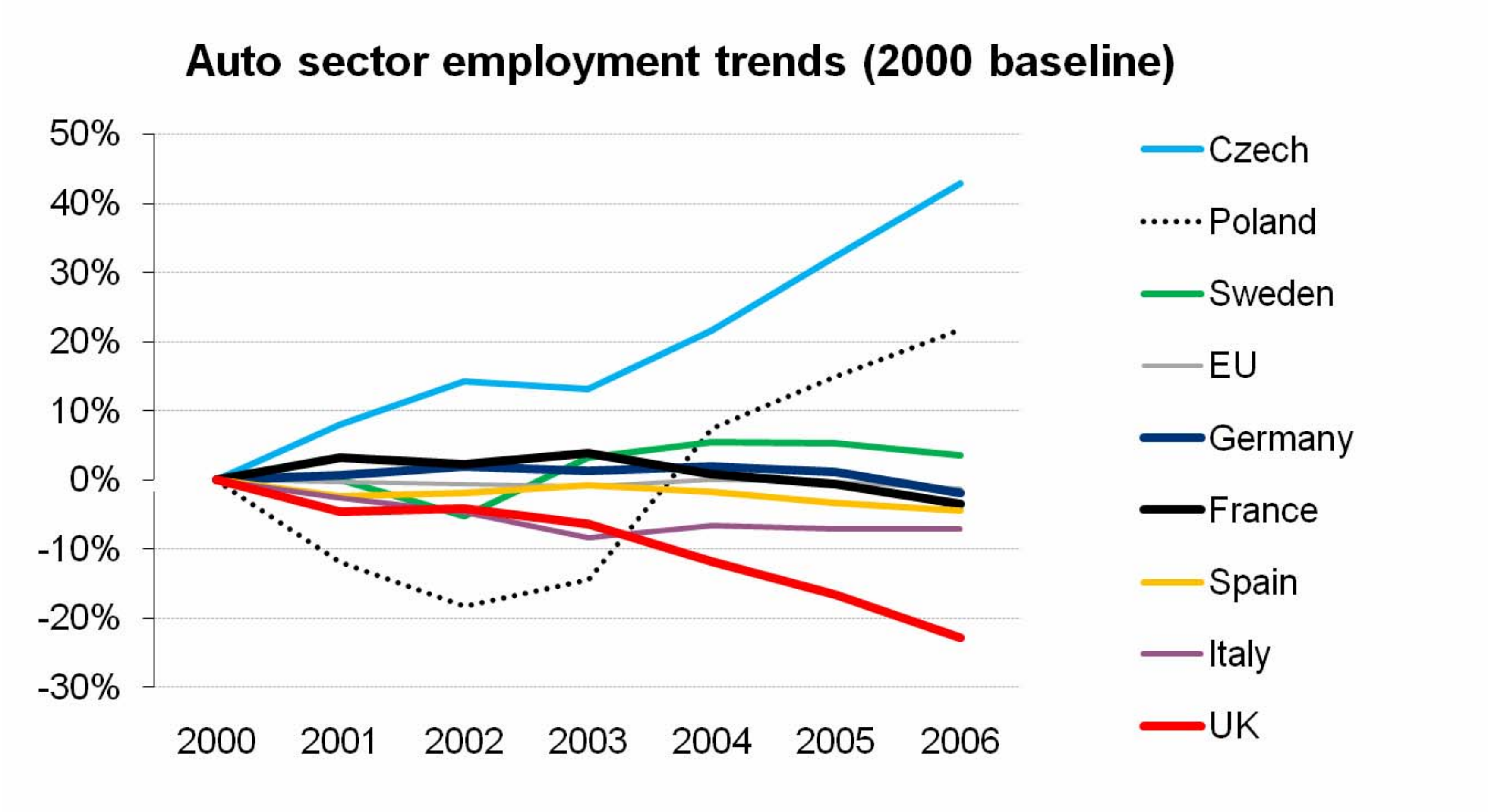
UK auto sector is competitive, but fragile

- Loss of scale drives *"hollowing out"* of the component supply chain
- 10,000 UK jobs lost every year
- Some issues have remained over decades:
  - Government ambivalence
  - UK supplier base
  - Availability of skilled workforce
- Trends in R&D and capital investment are a particular concern
- UK is competing as an *assembly* location

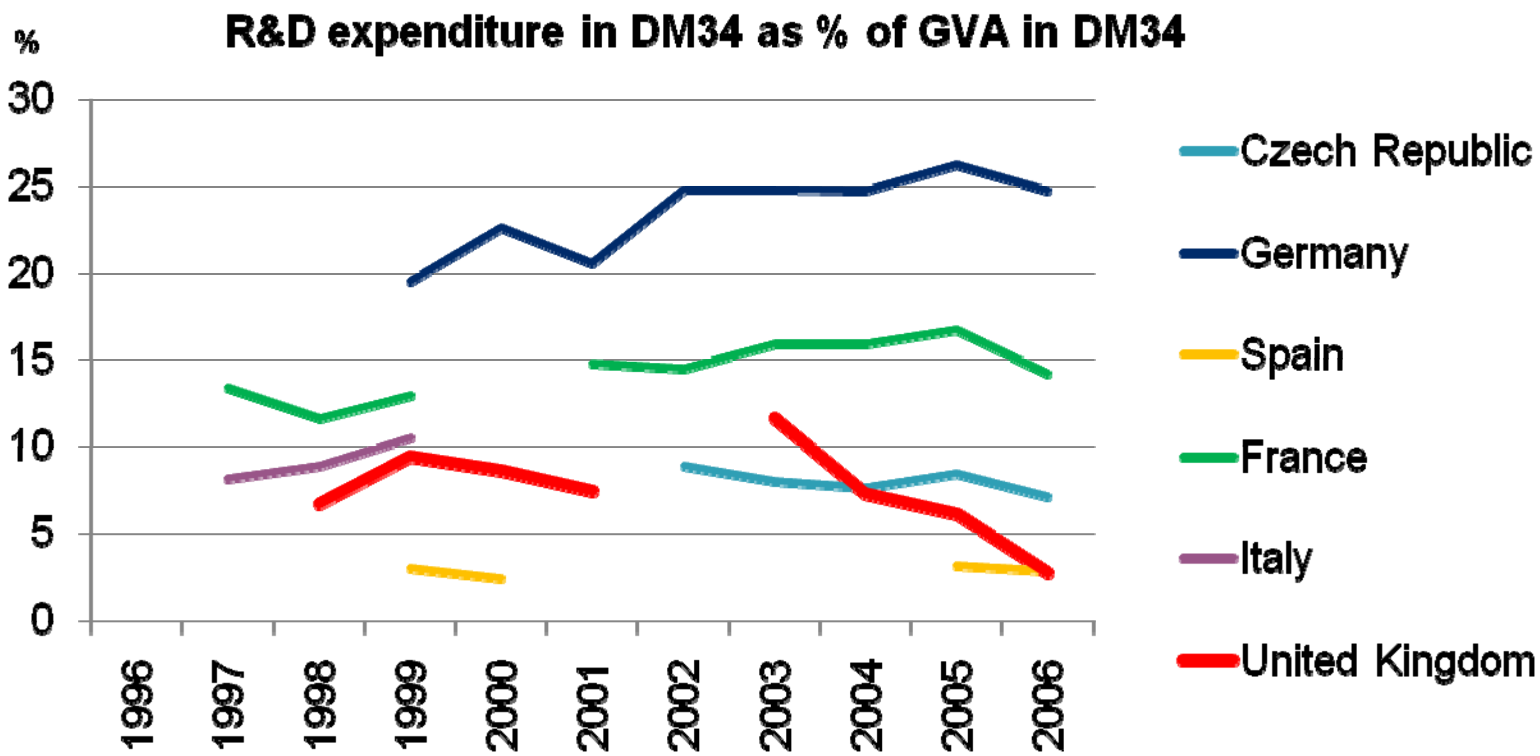
Full report: www-innovation.jbs.cam.ac.uk/publications/reports.html

Email: m.holweg@jbs.cam.ac.uk

Shifts in global manufacturing footprint; UK is loosing out disproportionately



Decline in R&D means UK is poorly placed for shift towards low-carbon powertrains



UK car industry opportunities

– Halt the ‘hollowing-out’ process

– Take advantage of the technology revolution that is needed to transform the car fleet to very low carbon emissions

– Pro-active strategic collaboration between industrial players and Government

– Encourage OEMs and Global Tier 1 suppliers to increase R&D in the UK, especially on Low Carbon technologies

NAIGT Vision for the future

- ***A competitive, growing and dynamic industry making a large and increasing contribution to employment and prosperity in the UK, and playing a decisive global role in developing <u>exciting, low carbon vehicle transportation solutions</u>***

Overarching 'Big Ideas'

- **An Automotive Council**
  - A collaborative industry and Government strategic steering partnership to build a stronger UK auto sector
- **Industry Consensus Technology Roadmap**
  - To drive Collaborative R&D efforts with a particular emphasis on Low Carbon technologies and harness Government investment more effectively

Overarching 'Big Ideas'

- **Test Bed UK**
  - A bold low carbon vehicle system pilot to act as a powerful catalyst for increased UK investment
- **Supplier Help**
  - Establish a UK supply chain council to improve collaboration and develop a sourcing roadmap
  - Establish a Manufacturing Institute to help leverage R&D and Manufacturing technology

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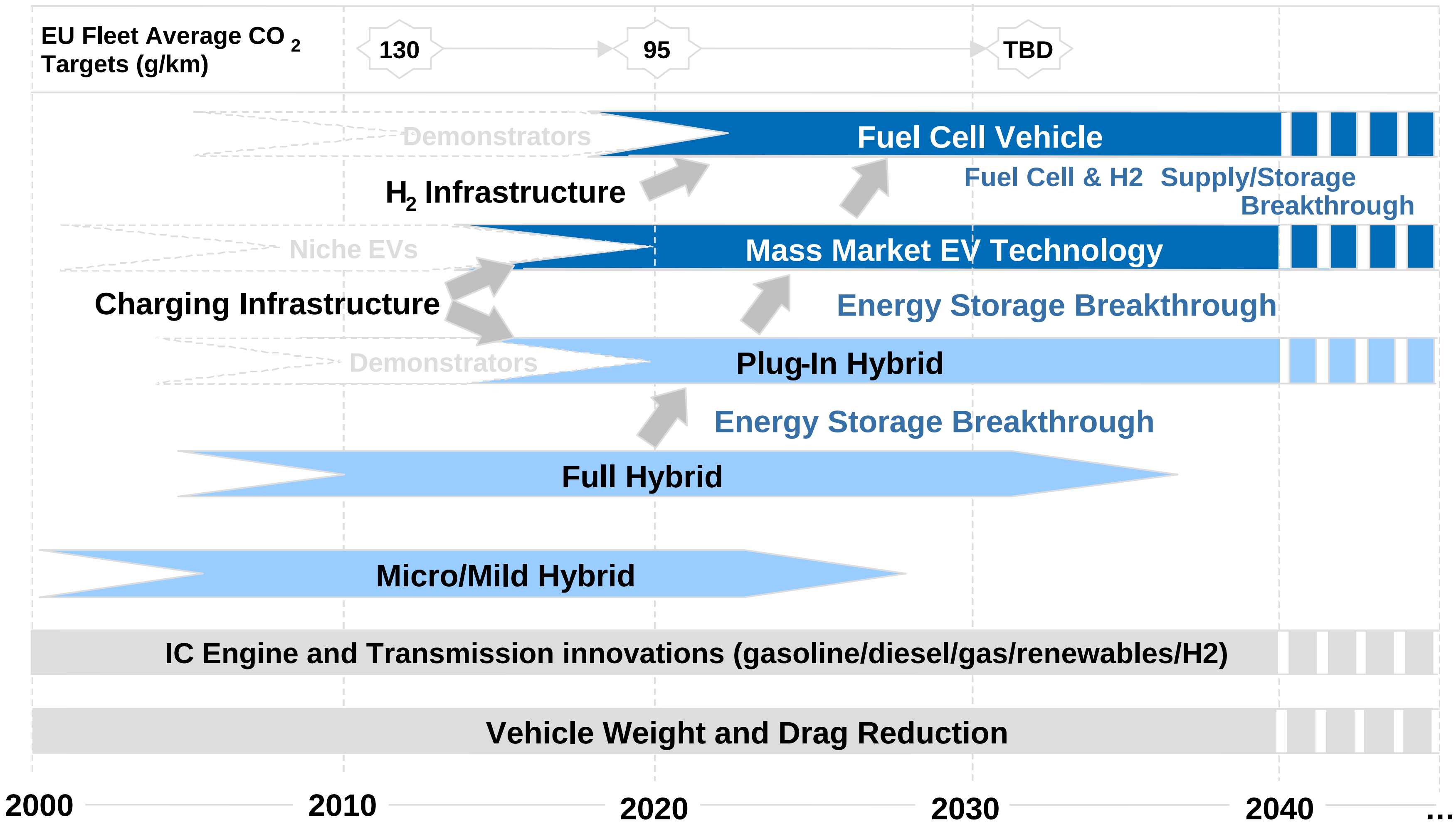
The Consensus Product Roadmap, mutually agreed by OEMs, defines future direction to develop products that will benefit UK plc



Compiled from information supplied by Jaguar Land Rover, Ford, Nissan, Tata and Lotus

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Common Research Agenda summary

	SHORT TERM 5 – 10 years from production	MEDIUM TERM 7 – 15 years from production	LONG TERM 10 – 20 years from production
	INDUSTRY		UNIVERSITIES
Propulsion	• IC engine optimisation • Boost systems for downsizing • Flexible valve/actuation for engines/transmissions • Low cost compact e-motors	• Higher efficiency IC engines • Capacitive boost systems • All electric actuation systems • Optimised range extender engine • Lower cost e-motor • Heat energy recovery (e.g. E-turbine)	• Super high efficiency motors (superconducting) • New IC engines with 70%+ thermal efficiency • Advanced heat energy recovery (e.g. thermoelectric) • Motor/Fuel Cell materials
Energy Storage	• Improved quality / durability 200+ Wh/kg & $800/kW.h cost battery systems • Low cost power electronics	• Next gen batteries 300+ Wh/kg and $500/kW.h cost • Flexible power elec. modules • Other forms of energy recovery (mechanical/chemical etc)	• 3rd gen batteries 400+ Wh/kg & $200/kW.h cost • New low cost solid state power conversion systems • Hydrogen storage technology
Vehicle Efficiency	• Lightweight structures and interiors • Low rolling resistance tyres / brakes	• New vehicle classes and configurations • Combination of function to reduce weight / cost • Minimised weight / losses	• Flexible re-configurable multi-utility vehicle concepts • 50% weight reduction from 2008 • Advanced aerodynamic concepts
System Control	• Information enabled control (Topology, V2V, V2I, traffic etc.) • Optimised vehicle energy mgmt. • Intelligent thermal management	• Advanced information enabled control • Intelligent P/T and HVAC mgmt.	• Autonomous P/T and vehicle control integrated with active safety
Energy + Fuel Supply	• Optimised 1st gen biofuels processes • New 2nd gen biofuel processes	• Intelligent energy / re-fuelling infrastructure (e.g. fast charge) • Industrial scale demonstration of new 2nd gen biofuel processes	• 3rd gen biofuel processes • 2nd gen industrial scale biofuel production infrastructure
Processes + Tools	• Process + delivery tool development and connectivity	• Auto-optimisation methods using virtual systems	• Artificial Intelligence to deliver complex multi-criteria system optimisation

Creating a Winning Framework – Present State

- Present industry situation fragile:
  - Weak business case for new/inward investment.
  - No structural cost advantage compared to European or BRIC manufacturing locations – hollowing out of supply base.
  - Labour flexibility positive but works against UK in recession (e.g. short-time working subsidies transfer jobs to Europe).
  - Lack of domestic critical mass/demand growth.
  - Key decision-makers are not UK-based.
- But there are positives:
  - Major improvements in productivity/quality over 20 years
  - Still significant contributor to national prosperity/R&D
  - Low carbon technologies provide catalyst for change
  - Temporary window for exporters from weaker sterling

Creating a Winning Framework - Challenges

- Sector profile/legacy image problem – presently weakly articulated taxpayer case for car industry support as part of industrial activism – e.g. technology investment.
- Influencing (overseas) decision-makers – much stronger UK investment offer needed to attract Tier 1's.
- Short-term issues (demand, credit availability) undermining ability of UK industry to invest in future
- Massive subsidies by European and US to their domestic manufacturers – many focussed on accelerating low carbon technology -- are increasing UK competitive disadvantage
- Industry now at tipping point.

Creating a Winning Framework - Recommendations

- Strengthen certainty and credibility:
  - Establish an Automotive Council – provide policy governance and execution tracking
  - Automotive Council to establish a long-term Automotive Framework to 2025
  - BERR Automotive unit to coordinate government response

- Improve UK investment offer:
  - Simplify and maximize incentive offers tied to framework.
  - Co-funding of carbon reduction projects
  - Focus public procurement to encourage UK industrial development

Creating a Winning Framework - Recommendations

- Widen collaboration
  - Cross sector (e.g. auto/aerospace/energy/renewables) and business-university science and research

- Promote positive automotive industry image
  - Through SMMT/Industry insight -- starting from school through higher education and wider public.

- Get monetary and fiscal message right
  - Learn from crisis to create more robust credit systems
  - Align national and local tax systems to policy

Creating a Winning Framework - Recommendations

- Protect flexible labour markets
  - Including provision of short-term wage subsidy systems as exist in European competitors

- Expand and deepen skills provision
  - Sector skills (SEMTA) workplace offerings linking right through STEM-based higher education.

Supply Chain Expert Group programme

- Four main research themes

  - Competitive supply chains
    - Lessons of national SCG programme and new pilots with Japanese VMs following the 'Sakamoto Report'
  - Supply chain competencies and capabilities
    - UK supply chains have "hollowed out" with loss of the high value added production and development at Tier 2/3 level
  - Research and Innovation – Academia/Industry collaboration
    - Current systems are complex, not focused on benefit to UK plc
  - Attracting R&D, etc from VMs and Tier1s
    - Significant and differentiating action is required if VMs/key suppliers are to see UK as a 'second home'

Recommendations

- Establish a UK Automotive Supply Chain Council, with the following key responsibilities
  - Establish a continuous national supply chain groups programme with easy access to business support
  - Establish a Sourcing Roadmap to identify value adding opportunities to reverse the current 'hollowing out' trend
  - Look for opportunities for the niche vehicle and supply industry as development sources for emerging low carbon technologies
  - Promote the UK supply chain internationally, leveraging Test Bed UK

Recommendations

- Establish a UK Institute for Manufacturing Technology to provide a focal point for revitalising automotive supply chain manufacturing, with a two-step approach
  - Pull together a core of existing high quality institutions and facilities, with revised and coordinated funding streams, to make a statement of intent for UK manufacturing revival
  - Use this as a blueprint for industry/university collaborative research and progressively implement across the UK

Example establishments include: Warwick Manufacturing Group; Cambridge Institute for Manufacturing; Manufacturing Technology Centre, Coventry; Advanced Materials research Institute, Sheffield; Advanced Forming and Forging Centre, Strathclyde; plus support from a Business School

Status

- Report published May 6th
- Positive informal response from Government
- Official response awaited, expected late October
- Informally, recommendations being actioned
- Preparations being made to achieve rapid launch in November