Automotive Supply Base Roadmap Issue 0.0

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Report of a workshop facilitated by Institute for Manufacturing

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1.1 Executive Summary

This report results from a one-day roadmapping workshop to identify priorities for the development of the Automotive Supply Base in the UK. The workshop took place in Cannock, Staffordshire on 9th November 2006. The roadmapping process involves building a layered, forward-looking view of the sector, starting with global producer & supply base trends and drivers, and moving on through a sectoral analysis followed by a review of relevant critical success factors. The graphics on the following pages illustrate these priority areas, linkages and timescales. Note – Depth of shading is used to indicate high importance and strong linkages.

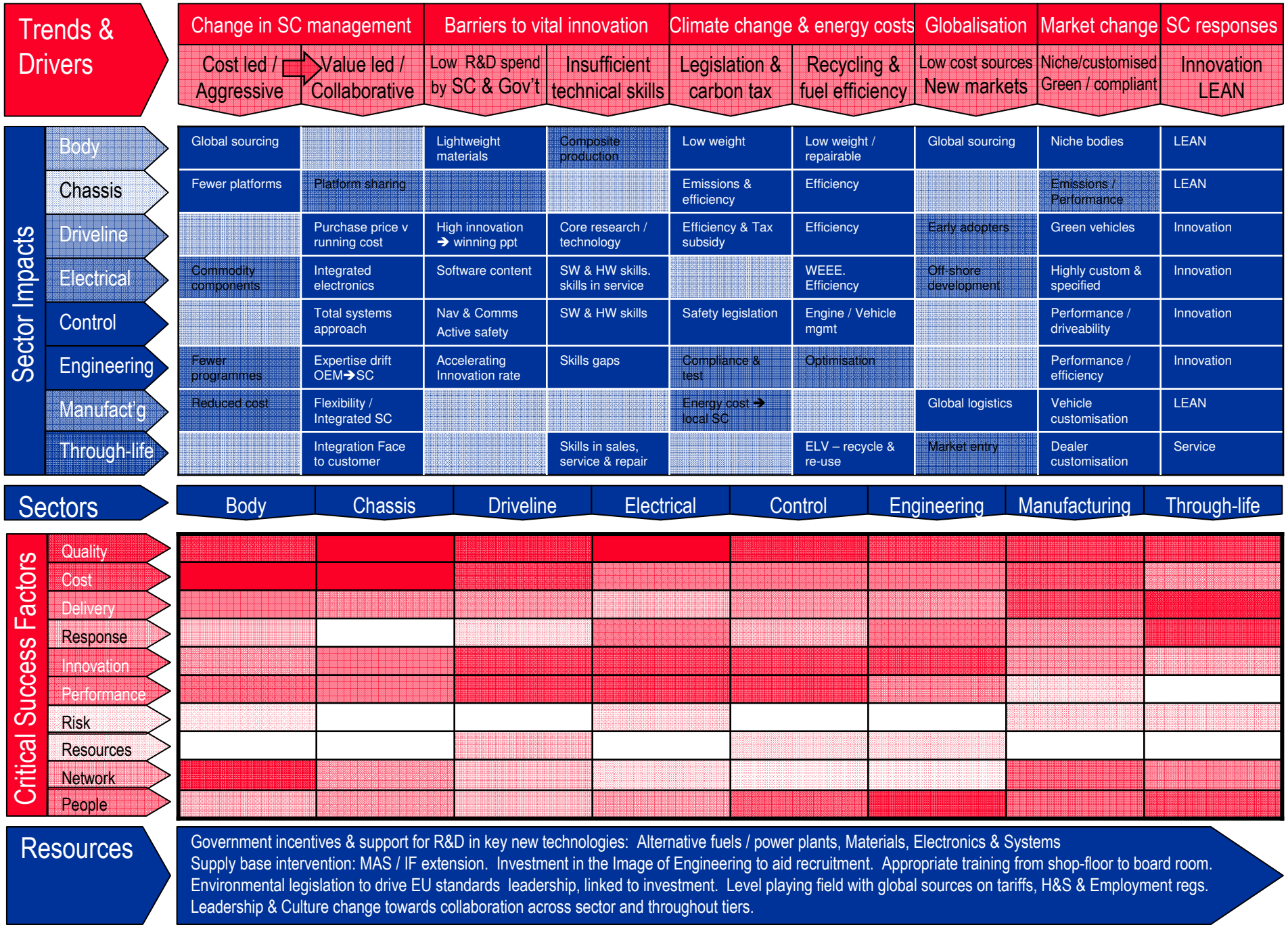
Participants were invited from across both the producer and supplier sides of the industry, as well as relevant government and industry bodies and academia, based on their understanding of the market and their insight into the key issues.

In summary, the workshop found that the automotive industry needs to move to a more collaborative supply chain approach, and away from the cost-focus which is currently driven by the challenge of OEM profitability. Environmental and energy concerns will increasingly dominate the industry, but the UK's ability to lead in critical enabling technologies of new prime movers and advanced materials is undermined by low R&D spend in the supply base and lack of support from government, exacerbated by a lack of key technical skills. Legislation and fiscal measures to encourage fuel efficiency and recycling, and to reduce congestion, will have significant impact. Meanwhile, the supply base is threatened by competition from low-wage economies, and challenged to address the opportunities for growth in these markets, whilst also serving increasingly niche product lines at home. Appropriate responses of Operational effectiveness / LEAN and Innovation will vary by sector.

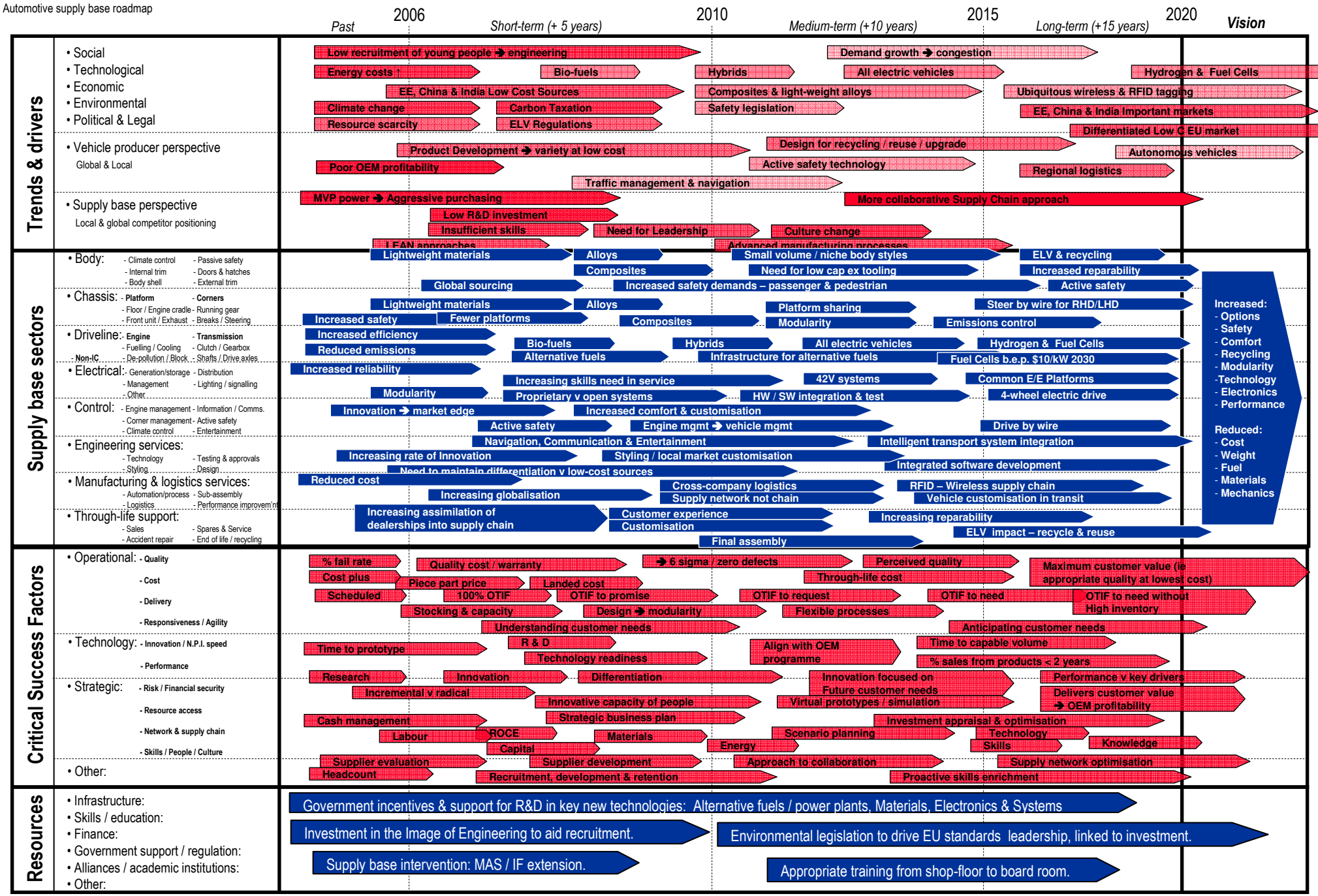
The workshop identified a number of the key pivot-points, opportunities and challenges facing each of the supply base sectors. In doing so, the workshop formed a view of future sector attractiveness in the UK, which indicated a focus towards the more technology-based sectors of control and engineering services, with the driveline and electrical sectors also being favoured, in contrast to more challenging prospects for the chassis and body sectors. The importance of the through-life support of vehicles, from sales to recycling, was also highlighted.

Whilst the established QCD measures of Quality, Cost and Delivery were highlighted as important, these are increasingly seen as entry-level requirements. Future market needs will dictate that successful suppliers also be innovative, responsive and able to deliver product performance and differentiation to add value to the OEM's product and ultimately the end-customer. The underlying importance of people, culture and skills, and of the supply network were also highlighted.

In order to transition to a robust position, the workshop identified a number of supporting resources: Government support and incentives for R&D in key technologies; On-going commitment to performance improvement from IF & MAS; Appropriate skills development from shop-floor to boardroom; and a strategic approach to environmental and other legislation.


Trends & Drivers
Change in SC management
Barriers to vital innovation
Climate change & energy costs
Globalisation
Market change
SC responses
Cost led / Aggressive
Value led / Collaborative
Low R&D spend by SC & Gov't
Insufficient technical skills
Legislation & carbon tax
Recycling & fuel efficiency
Low cost sources New markets
Niche/customised Green / compliant
Innovation LEAN
Sector Impacts
Body
Chassis
Driveline
Electrical
Control
Engineering
Manufact'g
Through-life
Global sourcing
Lightweight materials
Composite production
Low weight
Low weight / repairable
Global sourcing
Niche bodies
LEAN
Fewer platforms
Platform sharing
Emissions & efficiency
Efficiency
Emissions / Performance
LEAN
Purchase price v running cost
High innovation ➔ winning ppt
Core research / technology
Efficiency & Tax subsidy
Efficiency
Early adopters
Green vehicles
Innovation
Commodity components
Integrated electronics
Software content
SW & HW skills. skills in service
WEEE. Efficiency
Off-shore development
Highly custom & specified
Innovation
Total systems approach
Nav & Comms Active safety
SW & HW skills
Safety legislation
Engine / Vehicle mgmt
Performance / driveability
Innovation
Fewer programmes
Expertise drift OEM➔SC
Accelerating Innovation rate
Skills gaps
Compliance & test
Optimisation
Performance / efficiency
Innovation
Reduced cost
Flexibility / Integrated SC
Energy cost ➔ local SC
Global logistics
Vehicle customisation
LEAN
Integration Face to customer
Skills in sales, service & repair
ELV – recycle & re-use
Market entry
Dealer customisation
Service
Sectors
Body
Chassis
Driveline
Electrical
Control
Engineering
Manufacturing
Through-life
Critical Success Factors
Quality
Cost
Delivery
Response
Innovation
Performance
Risk
Resources
Network
People
Resources
Government incentives & support for R&D in key new technologies: Alternative fuels / power plants, Materials, Electronics & Systems
Supply base intervention: MAS / IF extension. Investment in the Image of Engineering to aid recruitment. Appropriate training from shop-floor to board room.
Environmental legislation to drive EU standards leadership, linked to investment. Level playing field with global sources on tariffs, H&S & Employment regs.
Leadership & Culture change towards collaboration across sector and throughout tiers.

Automotive supply base roadmap



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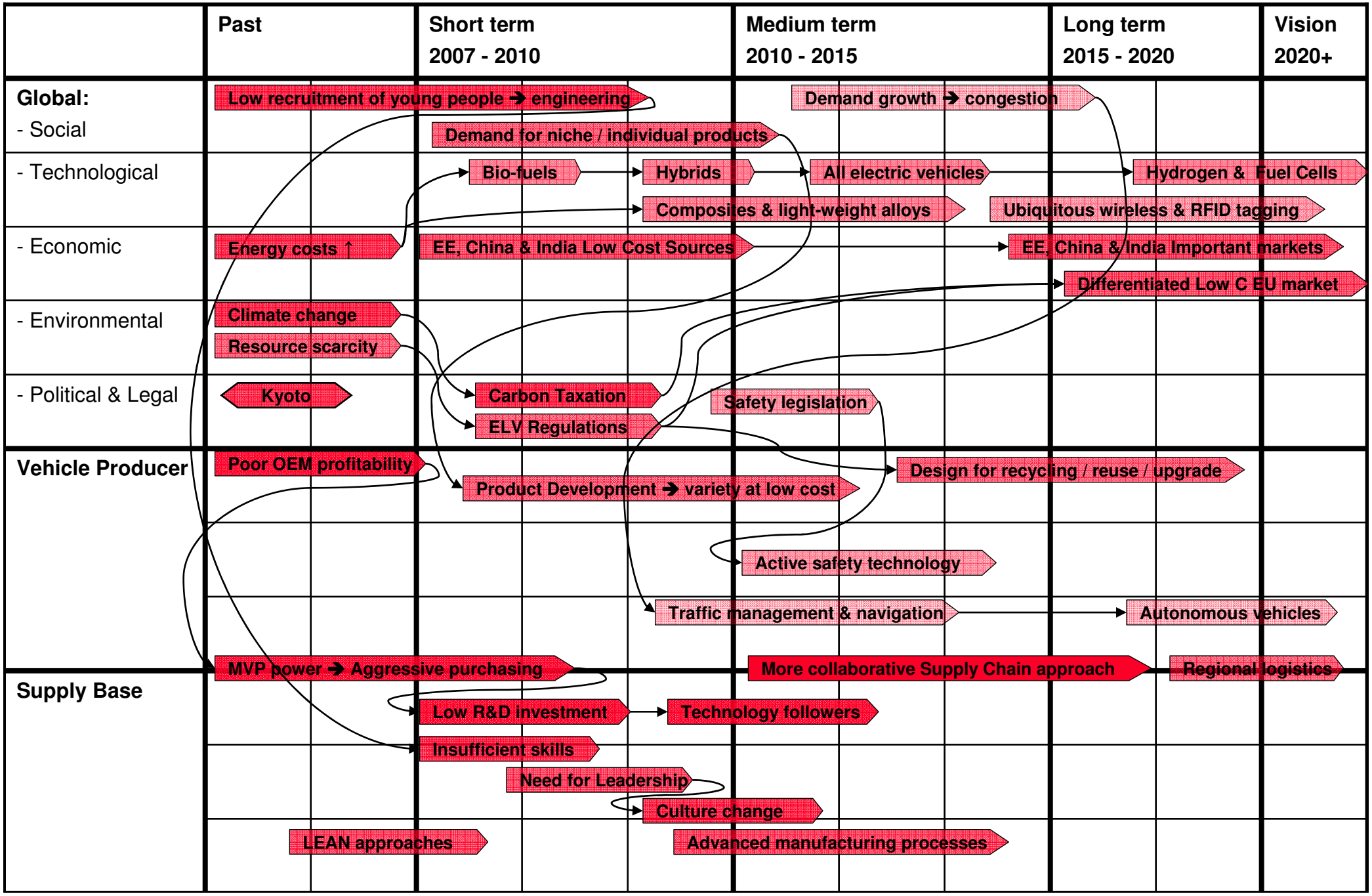
Supply base sectors

- **Body:** - Climate control, - Internal trim, - Body shell, - Passive safety, - Doors & hatches, - External trim
- **Chassis:** - **Platform**, - Floor / Engine cradle, - Front unit / Exhaust, - **Corners**, - Running gear, - Breaks / Steering
- **Driveline:- Engine**, - Fuelling / Cooling, - De-pollution / Block, - **Non-IC**, - **Transmission**, - Clutch / Gearbox, - Shafts / Drive axles
- **Electrical**:- Generation/storage, - Management, - Other, - Distribution, - Lighting / signalling
- **Control:** - Engine management, - Corner management, - Climate control, - Information / Communications, - Active safety, - Entertainment
- **Engineering services:** - Technology, - Styling, - Testing & approvals, - Design
- **Manufacturing & logistics services**: - Automation/process, - Logistics, - Sub-assembly, - Performance improvement
- **Through-life support**: - Sales, - Accident repair, - Spares & Service, - End of life / recycling

Critical Success Factors

- Operational: **- Quality**, **- Cost**, **- Delivery**, **- Responsiveness / Agility**
- Technology: **- Innovation / N.P.I. speed**, **- Performance**
- Strategic: **- Customer relationships**, **- Risk**, **- Resource access**, **- Network & supply chain**
- Other: **- Skills / People / Culture**

2.2 Trends & Drivers



Priority Trends & Drivers

1.	A more collaborative supply chain approach ➔ increased communication **M**	27
2.	Poor OEM profitability & high buying power ➔ aggressive purchasing **P**	17
3.	Insufficient skills in supply base & need for culture change **S**	16
4.	Insufficient R&D investment to ensure leadership in new technologies **S**	14
5.	Environmental concerns & climate change ➔ Legislation & Carbon tax **S➔M**	14
6.	European market differentiation ↑ due to tough environmental legislation **L**	13
7.	Need for leadership to drive culture change & investment in technology skills **M**	13
8.	E Europe, China & India ➔ important markets as well as low-cost sources **L**	12
9.	Advanced manufacturing processes and LEAN approaches **M**	12
10.	Design for recycling, re-use & upgrade of vehicles & systems (ELV ➔ 100%) **L**	11
11.	Product development focus ➔ variety: Low-vol. / niche products at min. cost **S**	10
12.	Alternative fuels and power units Bio ➔ H2, Fuel Cells & Electric vehicles **S➔L**	9
13.	Advanced / lightweight materials eg composites, alloys & coatings **M**	9
14.	Energy costs & environmental factors ➔ local / regional logistics focus **L**	7
15.	Active safety technologies driven by legislation (NCAP) & consumer demand **M**	6
16.	Ubiquitous wireless / RFID infrastructure ➔ logistics & traffic management **L**	5
17.	Growing congestion ➔ car sharing, road pricing & traffic management **M**	5

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P: Past S: Short M: Medium L: Long

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2.3 Supply Base Sectors

	Past		Short term 2007 - 2010			Medium term 2010 - 2015			Long term 2015 - 2020		Vision 2020+
Body	Reduction in individual component weight.	Increase in overall vehicle weight.	Advances in light-weight material & composite (e.g. joining, recycling, etc).	Increased use of light-weight & composite materials.	Improved trim – perception of quality.	Manufacturing of smaller volumes less inefficient (lower CapEx).	Niche body styles – small to medium volume. Greater options/ styles for end customer.	ELV Management – Recycling, Re-use & Recovery.			Increased: Options; Safety; Comfort; Recyclability; Reparability.
	30% of OEM profit is in body repair parts.	Increased comfort and safety.	Continued reduction in individual component weight.	Reduced vehicle content.	Reduction in overall vehicle weight.	Global sourcing – increased warehousing Lean supply chains.	Increased safety (passengers & pedestrians).	Increased reparability (e.g. laser stitch welding, adhesives,	Active safety.		Reduced: Weight; Cost.
Chassis	Technology advances.	Increased safety. Increased driveability.	Increased use of light-weight & composite materials.	Continued reduction in weight.		Platform sharing. Increased modularity.	Steering 'by wire' for modular LH/RH drive interchangeability		Beyond platform sharing?	Electronics? New concepts?	Increased: Safety; Comfort; Performance; Recyclability; Modularity.
	Reduced weight.	Economic scale.	Modular systems.	Fewer platforms.		Emission control – after-treatments.					Reduced: Weight; Cost.
Driveline	Increased efficiency.		Increased development of alternate fuels.	Increased efficiency. Reduced emissions.	Reduced fuel consumption (cost of ownership).	Convergence of alternative fuel options infrastructure & market pressure).	Cost-effective, environmental performance (hybrid, low-friction, bio-fuels, ...)		Rising fuel costs – economy v performance?	What is winning next-generation powertrain?	Hydrogen tank cost prohibitive? Fuel cells - $10/kW break point (2030?).
	Reduced emissions.		Hybrids/ cross-over vehicles.	New driveline-chassis structures.	Increased driveability.					Increased: Safety; Efficiency; Performance; Recyclability; Driveability. Reduced: Weight; Cost; Emissions.	
Electrical	Increased reliability.		Technology developments.	Increased service skills required.		Increased reparability.	Common E/E platforms.			Increased: Safety; Performance; Recyclability; Compatibility; Modularity; Reparability .	
			Switch to 42v systems - modular	Technology move to W-Europe (and India & China?)	Proprietary vs shared systems.	Robust HW-SW integration.	Modular systems.				Reduced: Weight; Cost.
Control	Increased performance, comfort & safety.		Innovation increasingly important for competitive edge.	Telematics advances.	Increased comfort & customisation.	4 wheel electric drive	Fewer mechanical components.			Increased: Safety; Performance; Comfort; Customisation; Electronics; Intelligence.	
			Active safety	Technology move to W-Europe (and India & China?)		Drive-by-wire	Intelligent transport systems - awareness				Reduced: Weight; Cost; Mechanics.
Engineering Services	Availability Expertise		Innovation increasingly important for competitive edge.	Maintain technological differentiation versus low-cost countries.	Over legislated product constrains product ideas.	More accurate monitoring of manufacturing operations.		Integrated software development.			High-tech countries and low-cost countries.
			Reinvestment required for longevity	Diversification into other sectors.	Services provided remote from manufacturing base (communications, off-shoring).						
Manufacturing & Logistics Services	Increased flexibility.	Increased globalisation.	Vertical integration of manufacturing at single site.	Increasing ownership of modules, technology development and service provision by 1st & 2nd tiers.	Wireless supply chain tracking (RFID) – increased accuracy & efficiency – reduced cost.	Environmental terrorism?	Whole life-cycle management.	Vehicle customisation (production?) in transit.			
	Reduced cost.		Big potential in emerging markets.	Increased globalisation.	Shared logistics (cross-company, cross-industry)	Increased border control – increased local sourcing?	Diversification.				
Through-life			Increasing assimilation of dealerships into supply chain – service & experience of dealers impacts whole industry.		Increased reparability.	ELV Management – Recycling, Re-use & Recovery.					'Disposable' vehicles?

Supply Base Sectors

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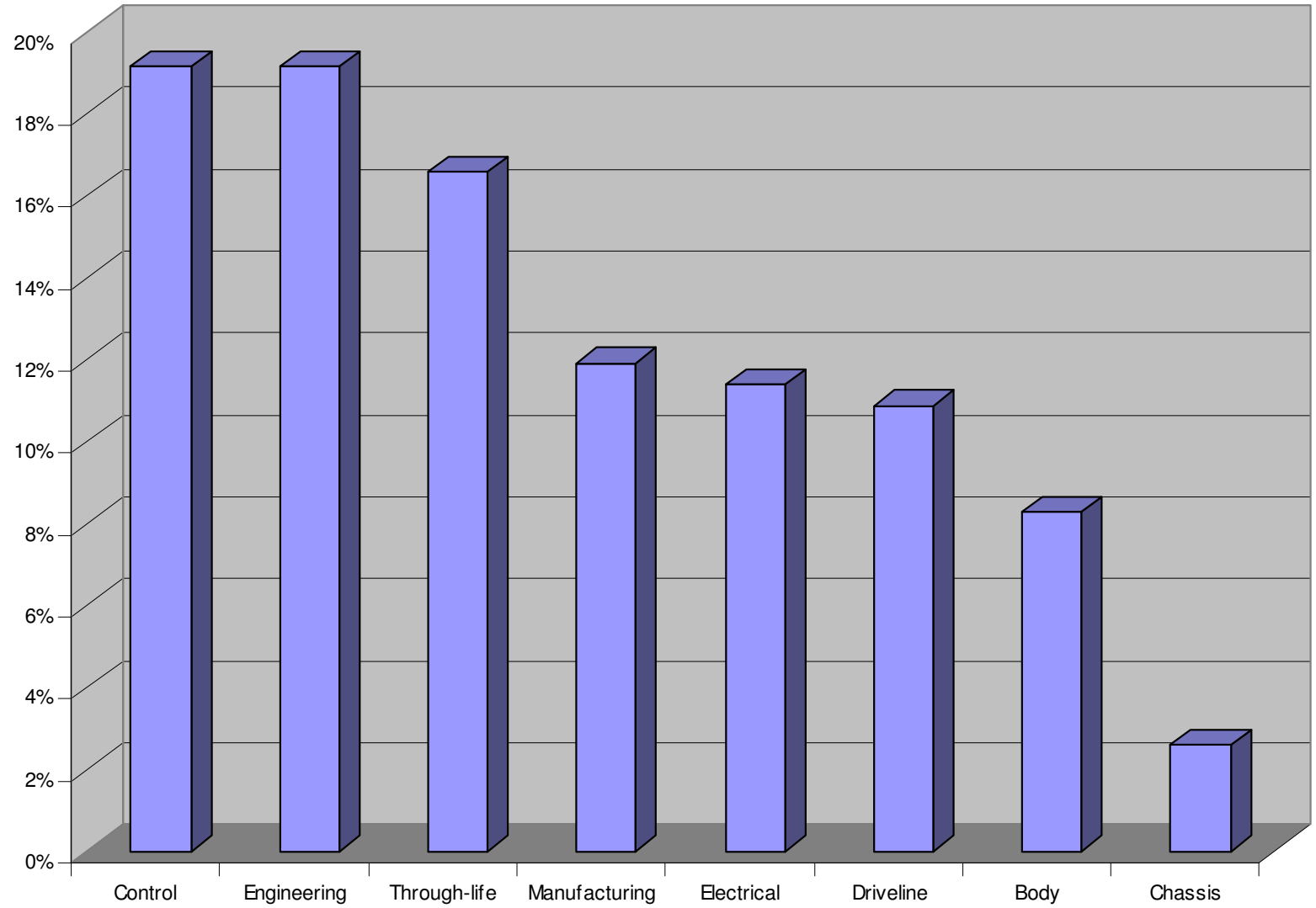
Sector Attractiveness Low High	Past	Short term 2007 - 2010	Medium term 2010 - 2015	Long term 2015 - 2020	Vision 2020+
Body	Lightweight materials	Alloys	Small volume / niche body styles	ELV & recycling	
		Composites	Need for low cap ex tooling	Increased reparability	
		Global sourcing	Increased safety demands – passenger & pedestrian	Active safety	
Chassis	Lightweight materials	Alloys	Platform sharing	Steer by wire for RHD/LHD	
	Increased safety	Composites	Modularity		
	Increased driveability	Fewer platforms	Emissions control		
Driveline	Increased efficiency	Alternative fuels	Infrastructure for alternative fuels		
	Reduced emissions	Bio-fuels	Hybrids	All electric vehicles	Hydrogen & Fuel Cells
					Fuel Cells b.e.p. $10/kW 2030
Electrical	Increased reliability	Increasing skills need in service			
		Proprietary v open systems	HW / SW integration & test		
	Modularity		42V systems	Common E/E Platforms	
Control	Innovation → market edge	Increased comfort & customisation		4-wheel electric drive	
		Active safety	Engine mgmt → vehicle mgmt	Drive by wire	
		Navigation, Communication & Entertainment		Intelligent transport system integration	
Engineering Services	Availability of expertise	Globalisation of e-services via comms / www			
	Increasing rate of Innovation	Styling / local market customisation		Integrated software development	
	Need to maintain differentiation v low-cost sources				
Manufacturing & logistics Services	Increased flexibility	Vertical integration @ assembly site under diverse ownership			
	Reduced cost		Cross-company logistics	RFID – Wireless supply chain	
	Increasing globalisation		Supply network not chain	Vehicle customisation in transit	
Through life	Increasing assimilation of dealerships into supply chain	Customer experience		Increasing reparability	
		Customisation		ELV impact – recycle & reuse	
			Final assembly		

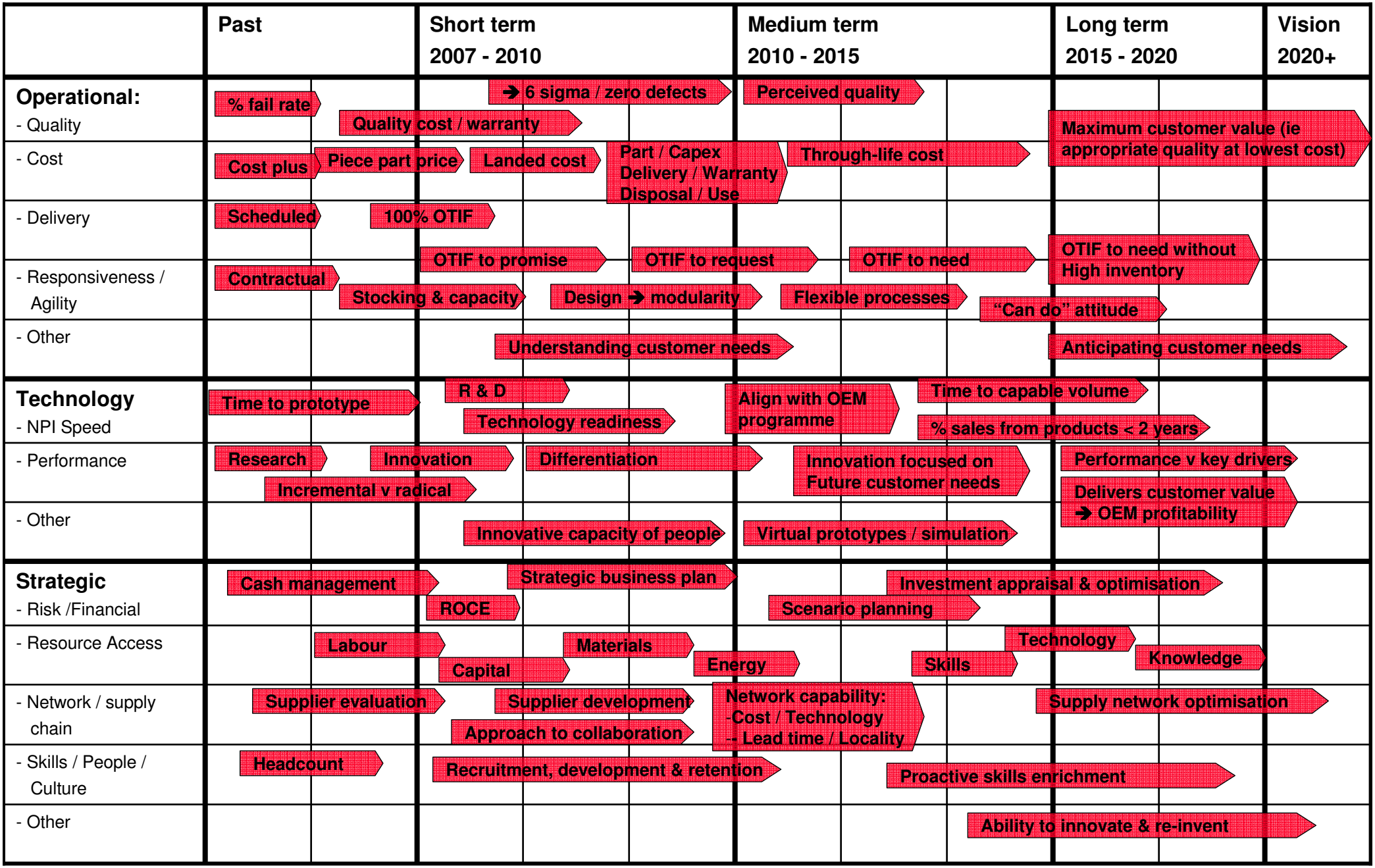
Increased:
- Options
- Safety
- Comfort
- Recycling
- Modularity
- Technology
- Electronics
- Performance

Reduced:
- Cost
- Weight
- Fuel
- Materials
- Mechanics

Sector attractiveness



2.4 Critical Success Factors



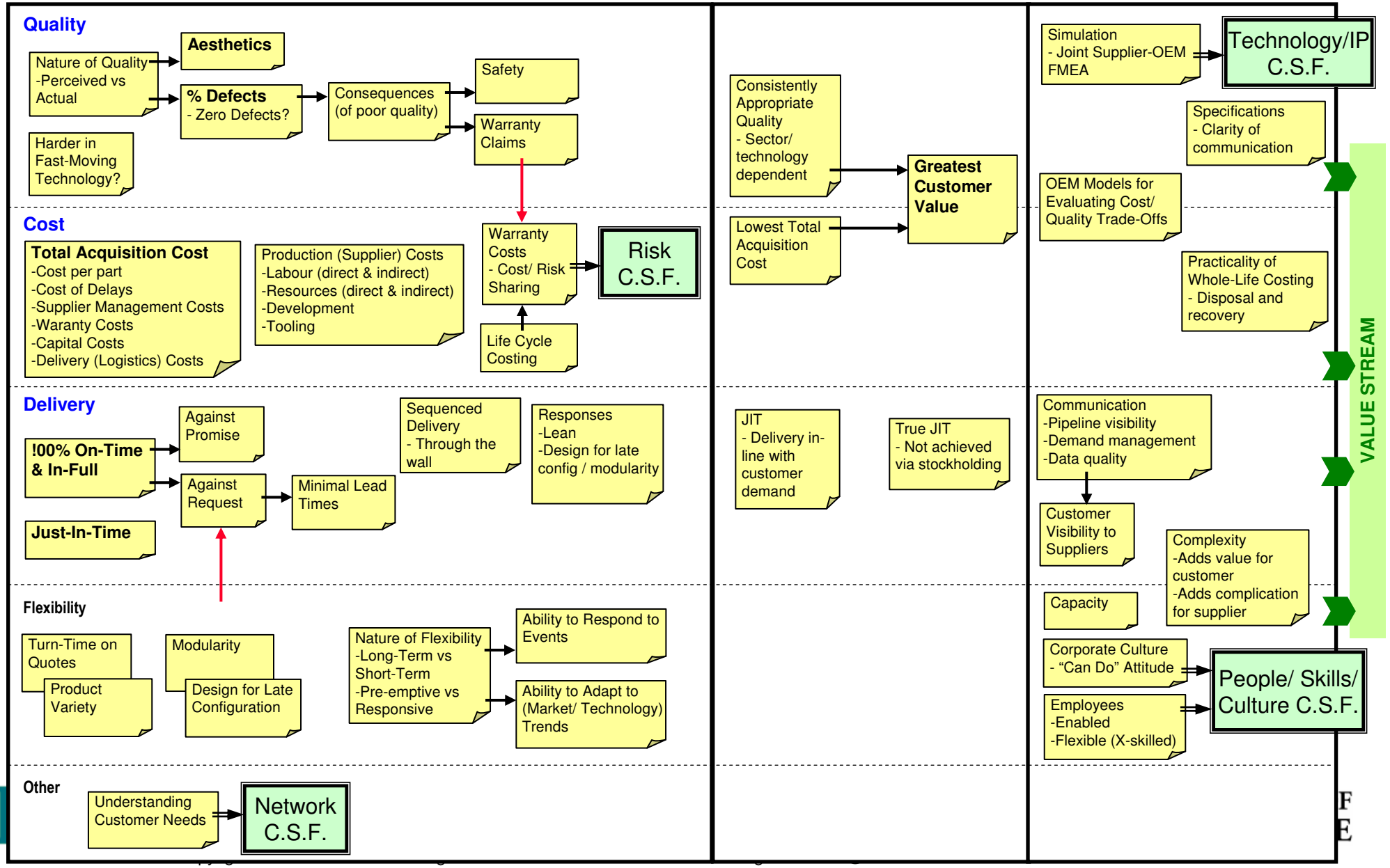
C.S.F. Topic: Operational

1. Brainstorm & cluster C.S.F. concepts & measures

2. Define medium-term targets (2010) 'Entry point' 'world class'

3. Enablers & Barriers

KEY (ENTRY LEVEL) SUCCESS FACTORS

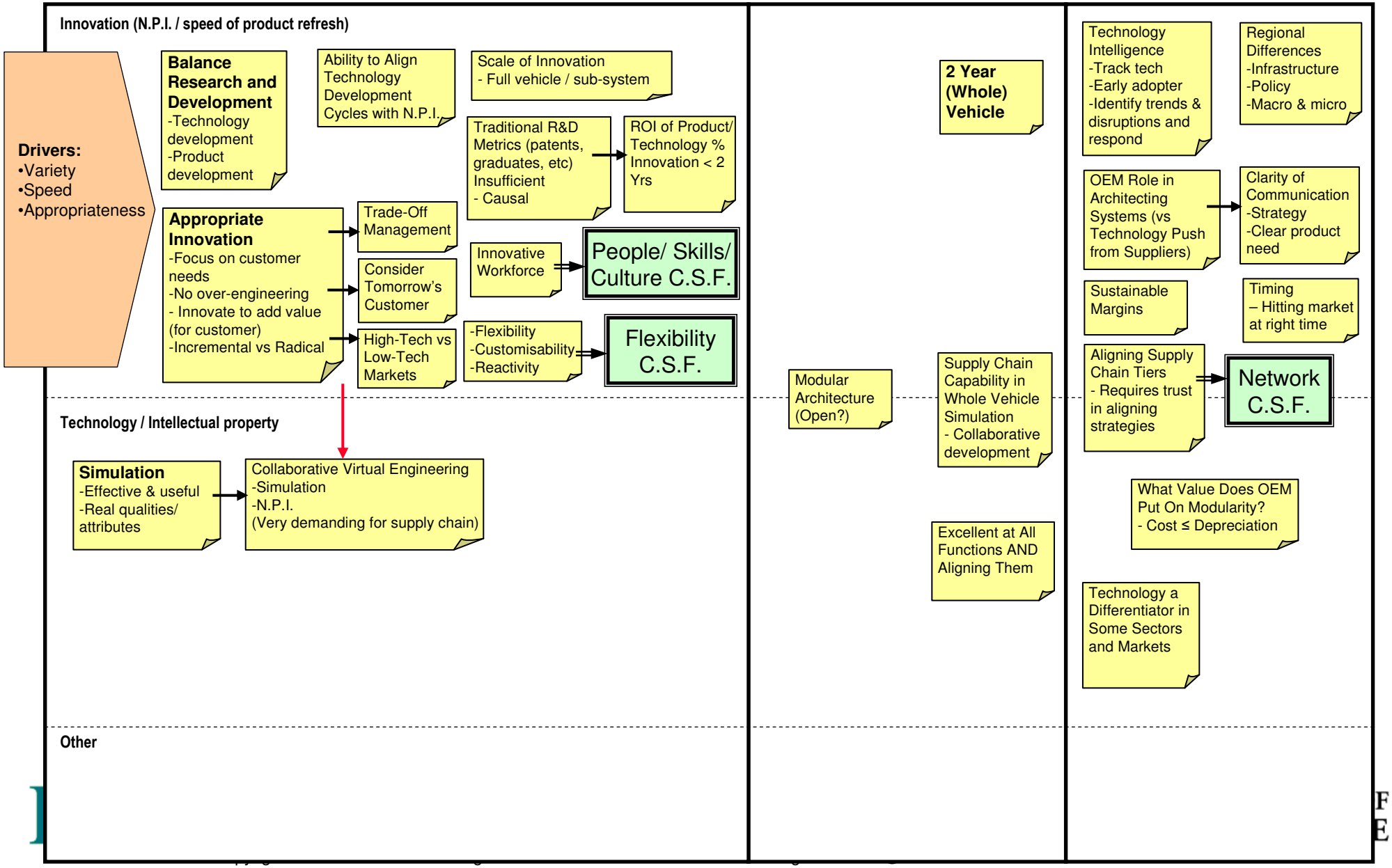


C.S.F. Topic: Technology

1. Brainstorm & cluster C.S.F. concepts & measures

2. Define medium-term targets (2010) 'Entry point' 'world class'

3. Enablers & Barriers

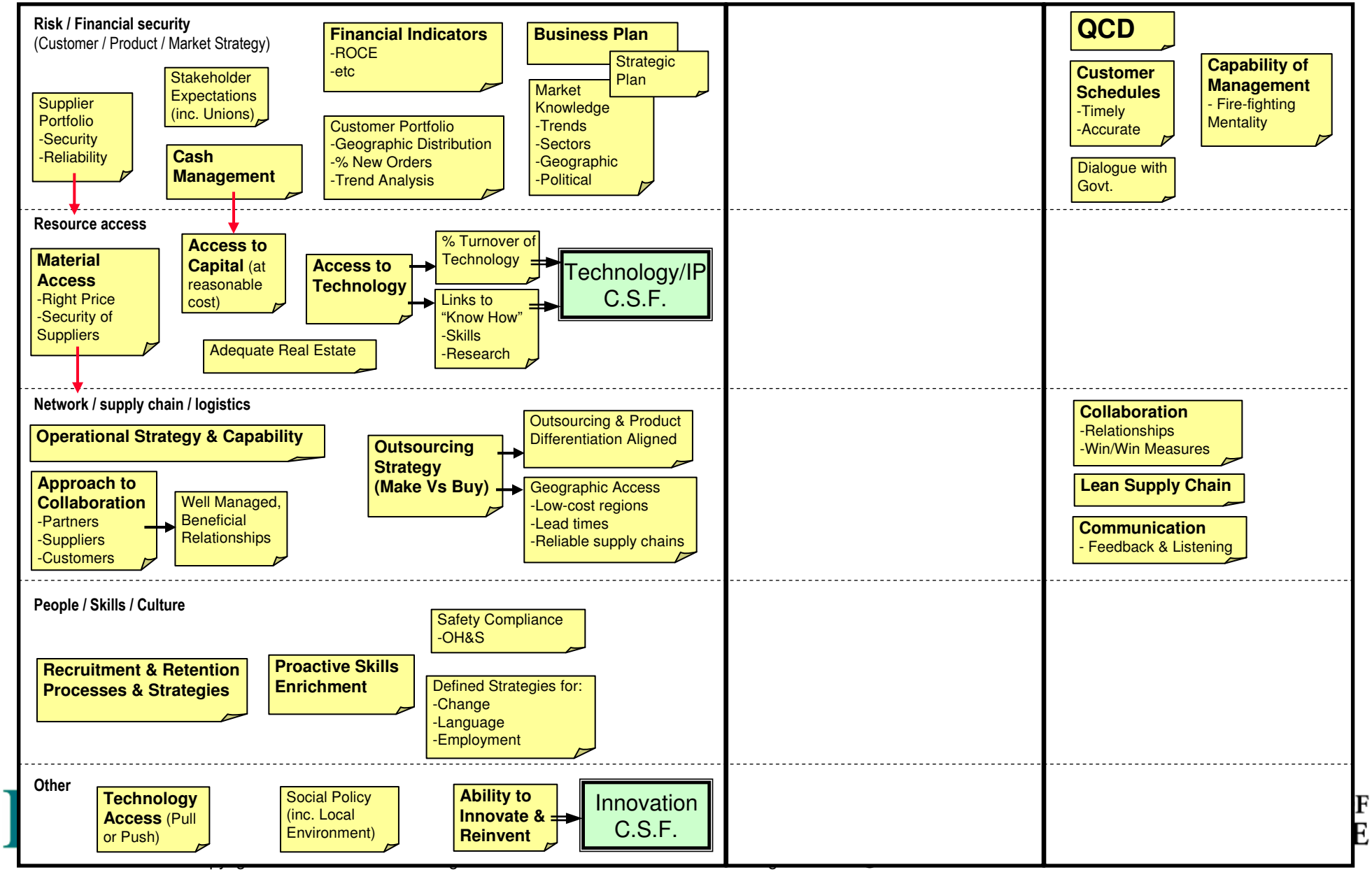


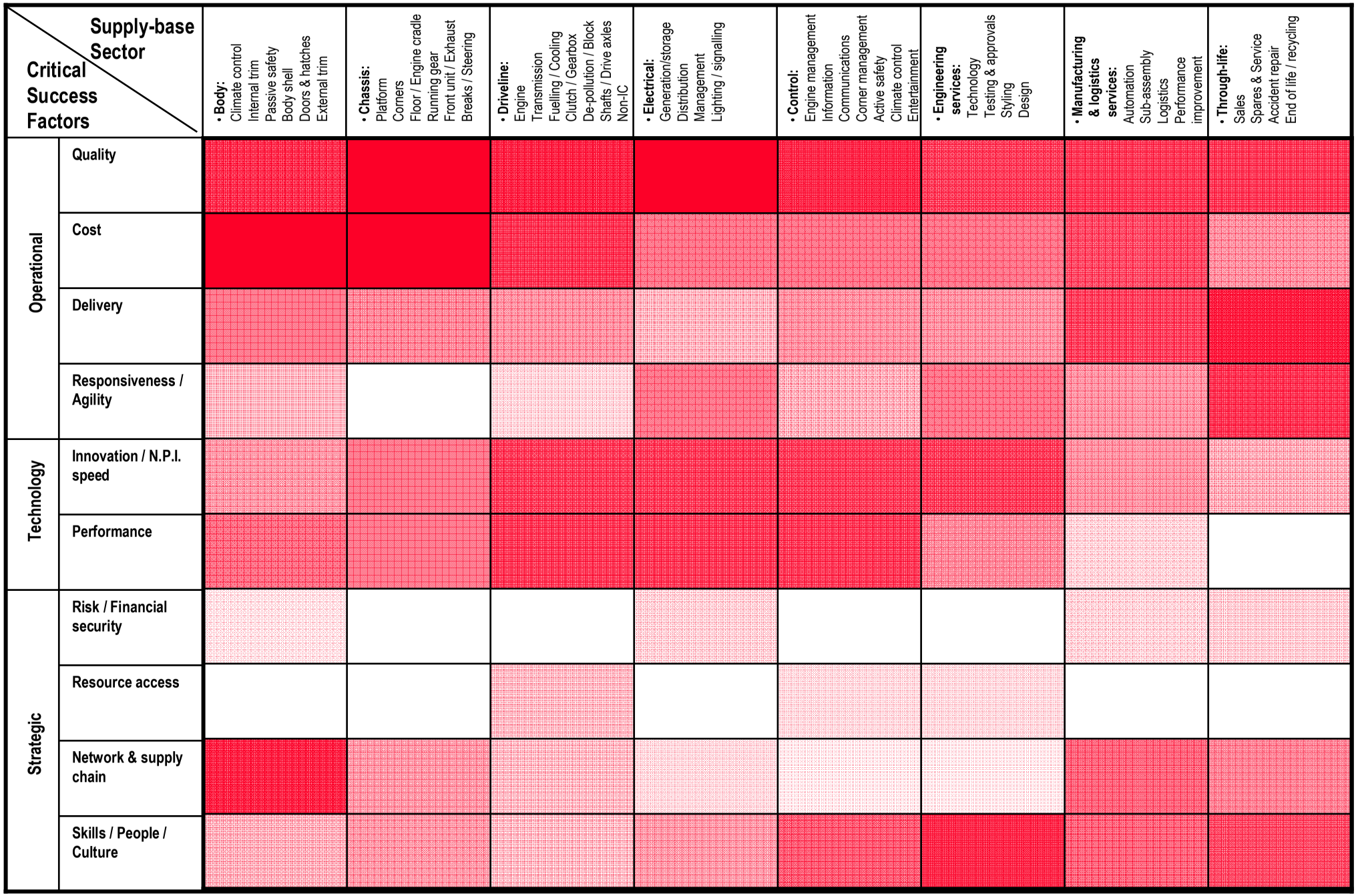
C.S.F. Topic: Strategic

1. Brainstorm & cluster C.S.F. concepts & measures

2. Define medium-term targets (2010)
'Entry point' 'world class'

3. Enablers & Barriers





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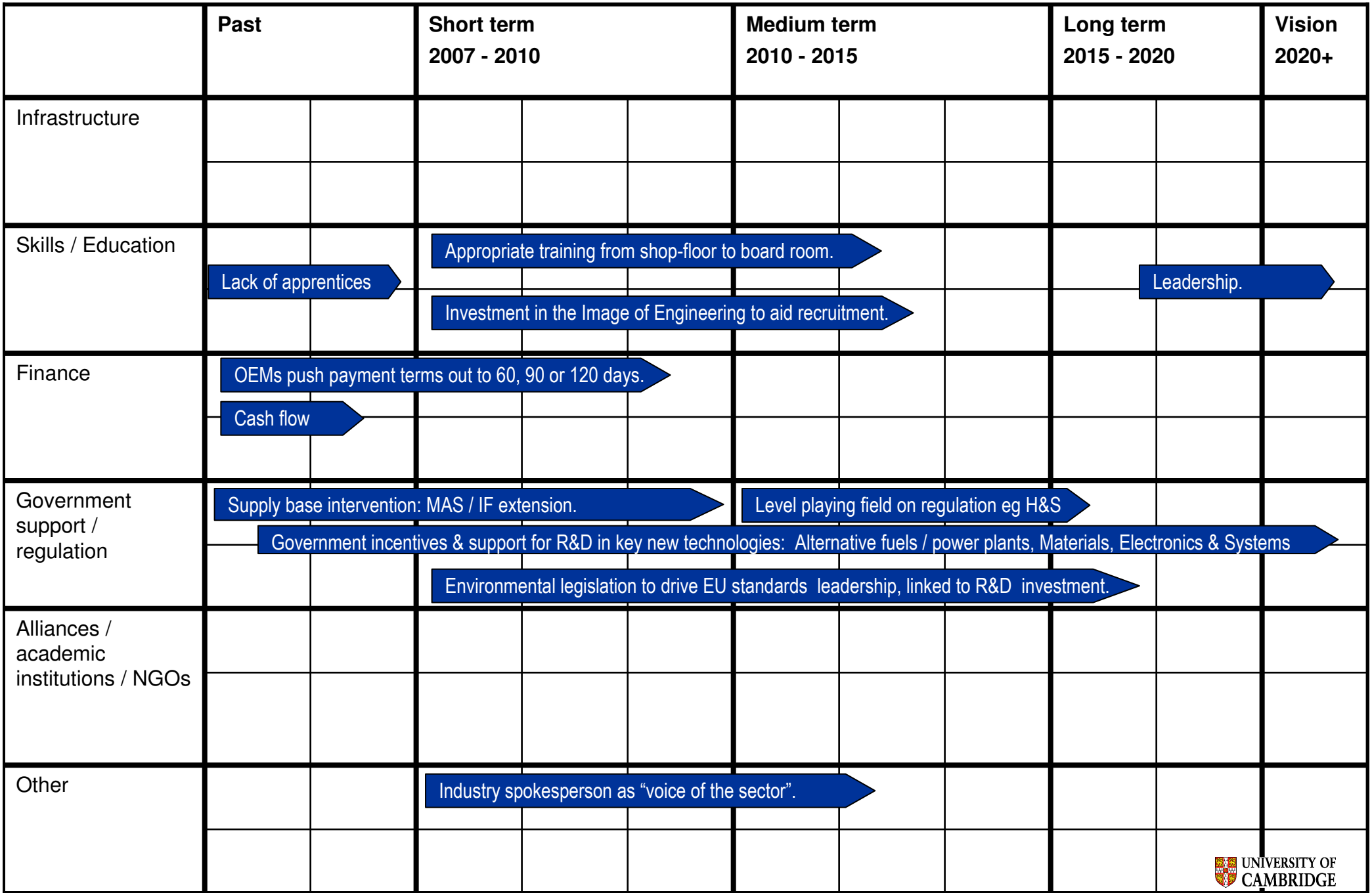
2.5 Resources & Enablers



3. Contributors

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