Lifelong Learning Programme

GREEN STAR
GREEN skills for enterprises Sustainable Training for Automotive suppliers clusteR

CONFINDUSTRIA Veneto SIAV S.P.A.
KNOWLEDGE & INNOVATION

GREEN skills for enterprises - Sustainable Training for Automotive suppliers clusteR

Leonardo da Vinci TOI n. 2013-1-IT1-LEOO5-03983

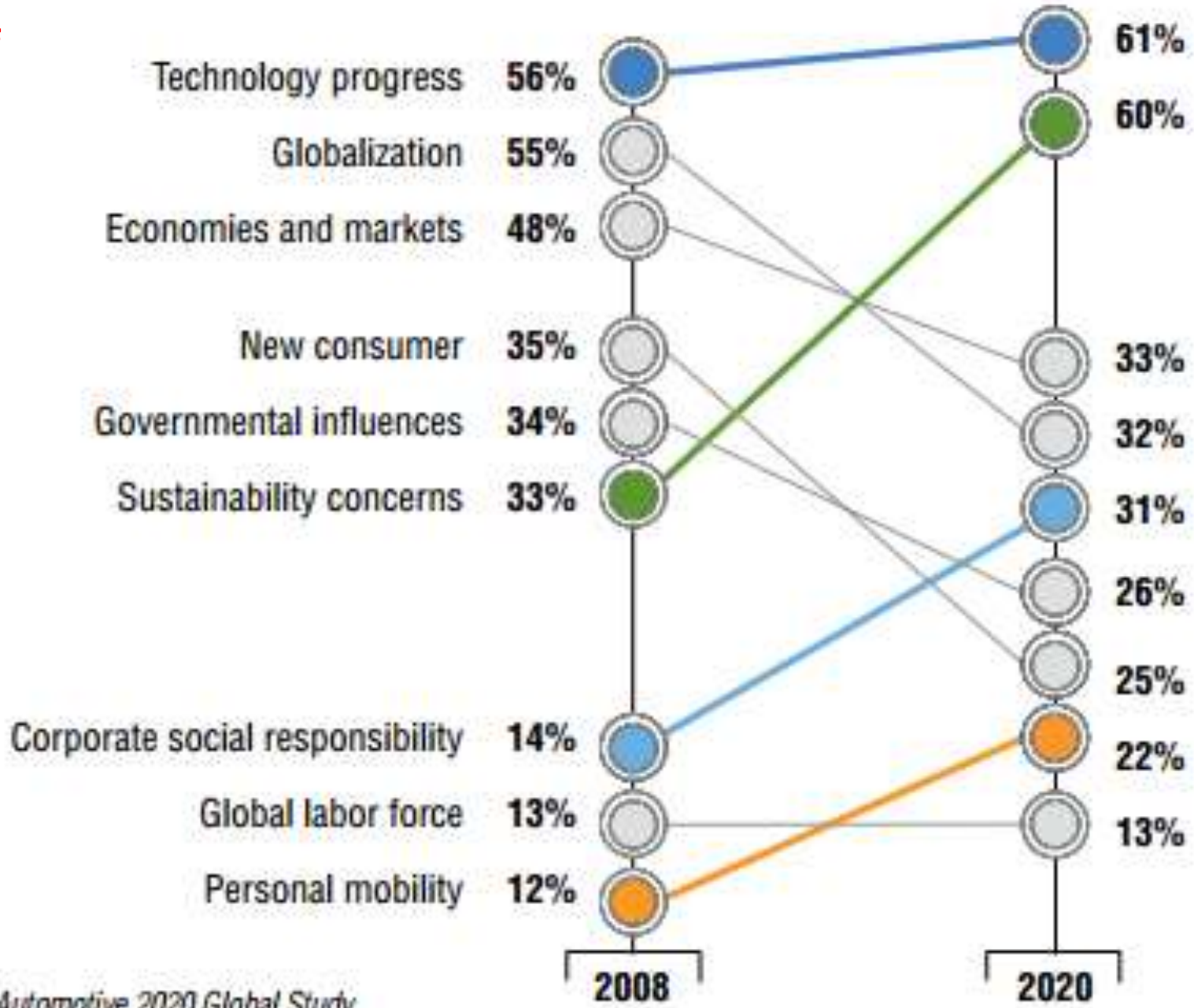
Eco-innovation in SME's automotive suppliers :the emerging and /or neglected relevance

API 23 -9-2015 gbernardi

This project has been funded with support from the European Commission. This contents reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Relevance of green in automotive industry

Anticipated change in external forces impacting the industry, 2008-2020.



Source: IBM Automotive 2020 Global Study.

Relevance of automotive for global green

The automotive is relevant both in terms of environmental pollution and in the consumption of energy and resources.

road transport account for 23% of total CO_2 emissions in the EU15

For EIPRO study, the transport sector accounts for about 15% of total pollution.

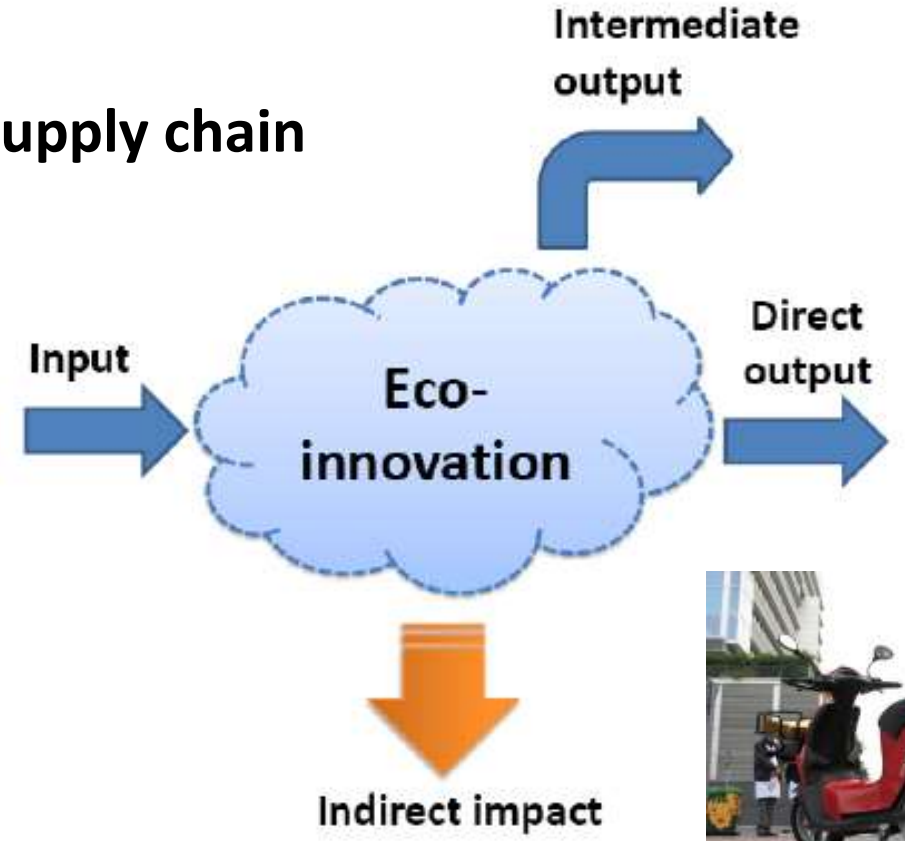
96% of the world's transportation is carbon fuel and account for 40% of the world's oil consumption .

(Mayyas,2012).
(JRC-EIPRO)

This project has been funded with support from the European Commission. This contents reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Inno for green and green for inno

Supply chain



OEM Final Firm

Product/Consumers

nts reflects the views only of the author,
information contained therein.

Lifelong Learning Programme

GREEN STAR
GREEN skills for enterprises Sustainable Training for Automotive suppliers clusteR

CONFINDUSTRIA Veneto SIAV S.P.A.
KNOWLEDGE & INNOVATION

Preassembly phase	Assembly phase	Use phase	Post-use phase
Raw materials extraction, production of secondary materials and their transportation, production of components and subassemblies	Energy use, pollution in assembly processes (especially paint shop), release of waste materials into ground, water, transportation of cars to consumers	Energy use for driving, pollutions emitted, waste (batteries, tires, oil), land use requirements (fuel stations, roads, parking places)	Transportation to dismantling site, energy used, pollution caused by dismantling

Environmental impact

10% **80%** **10%**

This project has been funded with support from the European Commission. This contents reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Chain Complexity

Purchased materials, components and other external input account for a high share of total expenditures (Lee and Klassen, 2008).

Currently the share is between 60 and 80% of the total manufacturing cost, rendering the automotive sector **one of the most supplier-dependent industries** (van Weele, 2010).

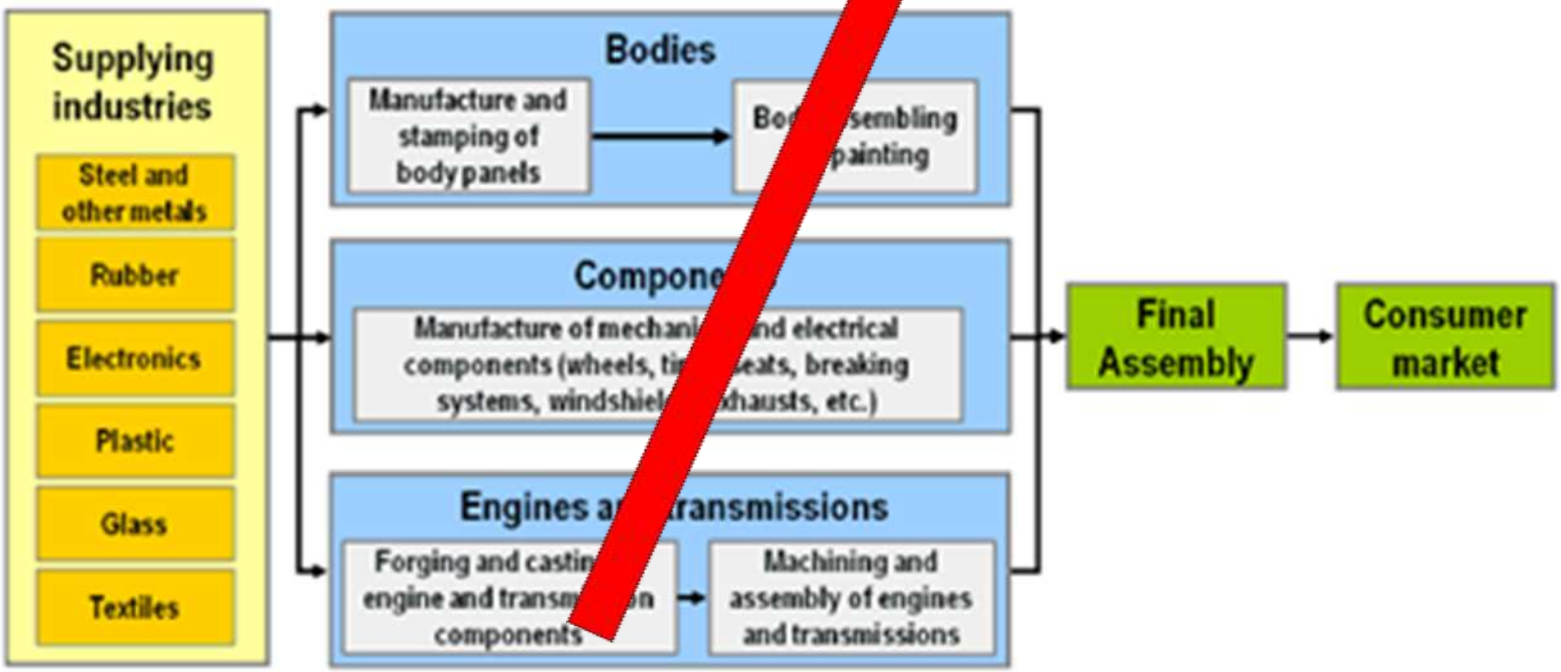
This project has been funded with support from the European Commission. This contents reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Lifelong Learning Programme

GREEN STAR
GREEN skills for enterprises Sustainable Training for Automotive suppliers clusteR

CONFINDUSTRIA Veneto SIAV S.P.A.
KNOWLEDGE & INNOVATION

Boundary of knowledge
MTO vs ETO



Lifelong Learning Programme

GREEN STAR
GREEN skills for enterprises Sustainable Training for Automotive suppliers clusteR

CONFINDUSTRIA Veneto SIAV S.P.A.
KNOWLEDGE & INNOVATION

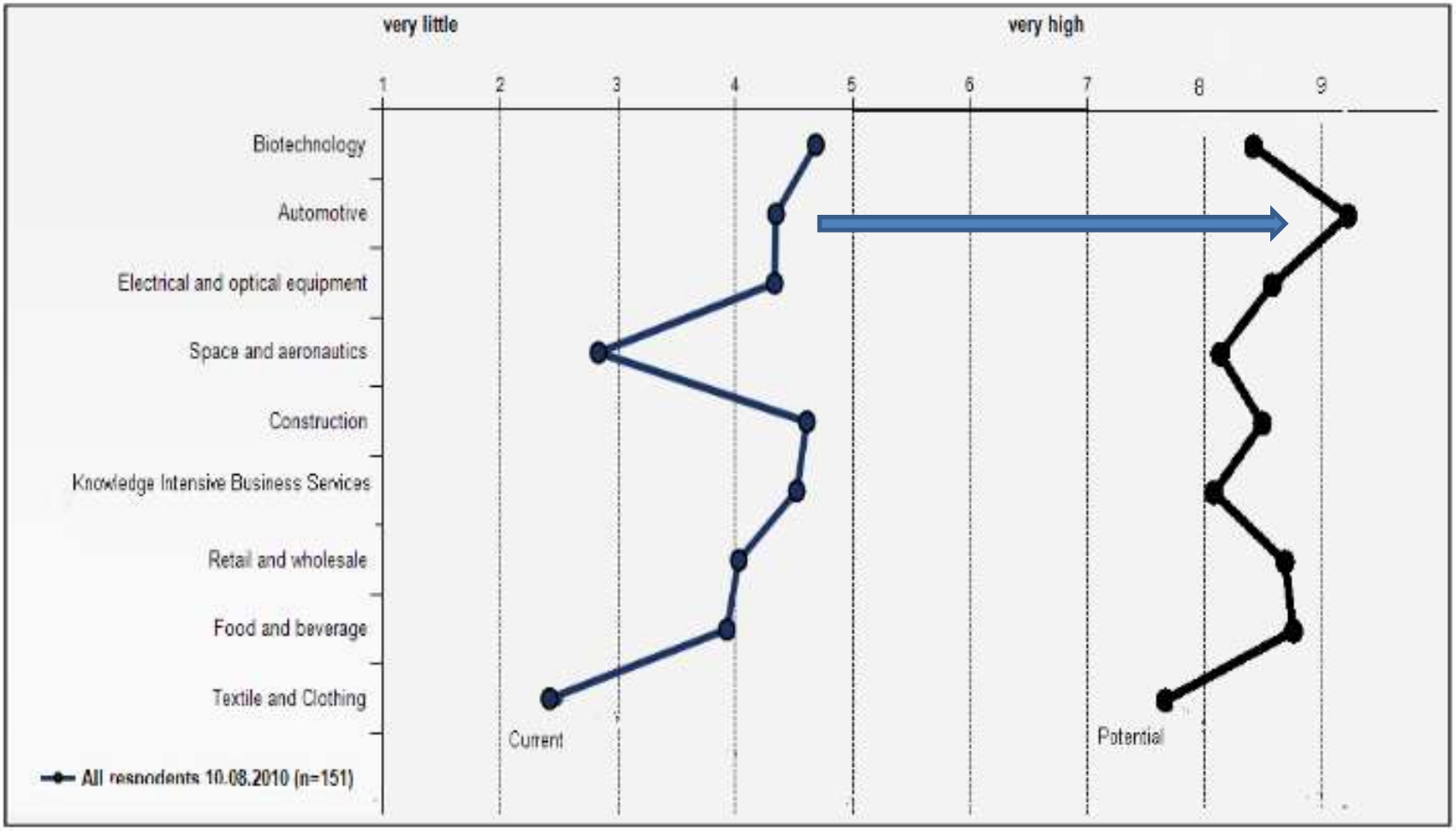
Introduction of a pro-active green strategy within SMEs

- Firstly, it requires resources and skills that, in many cases, are not available in SMEs.
- Secondly, at present it can hardly be justified from an economic and competitive point of view,

- Most customers do not yet wish to pay an additional price for environmentally friendly products/processes, while it is very difficult for SMEs to publicise their efforts in the environmental field to external stakeholders, thus often creating problems in terms of "green" image.

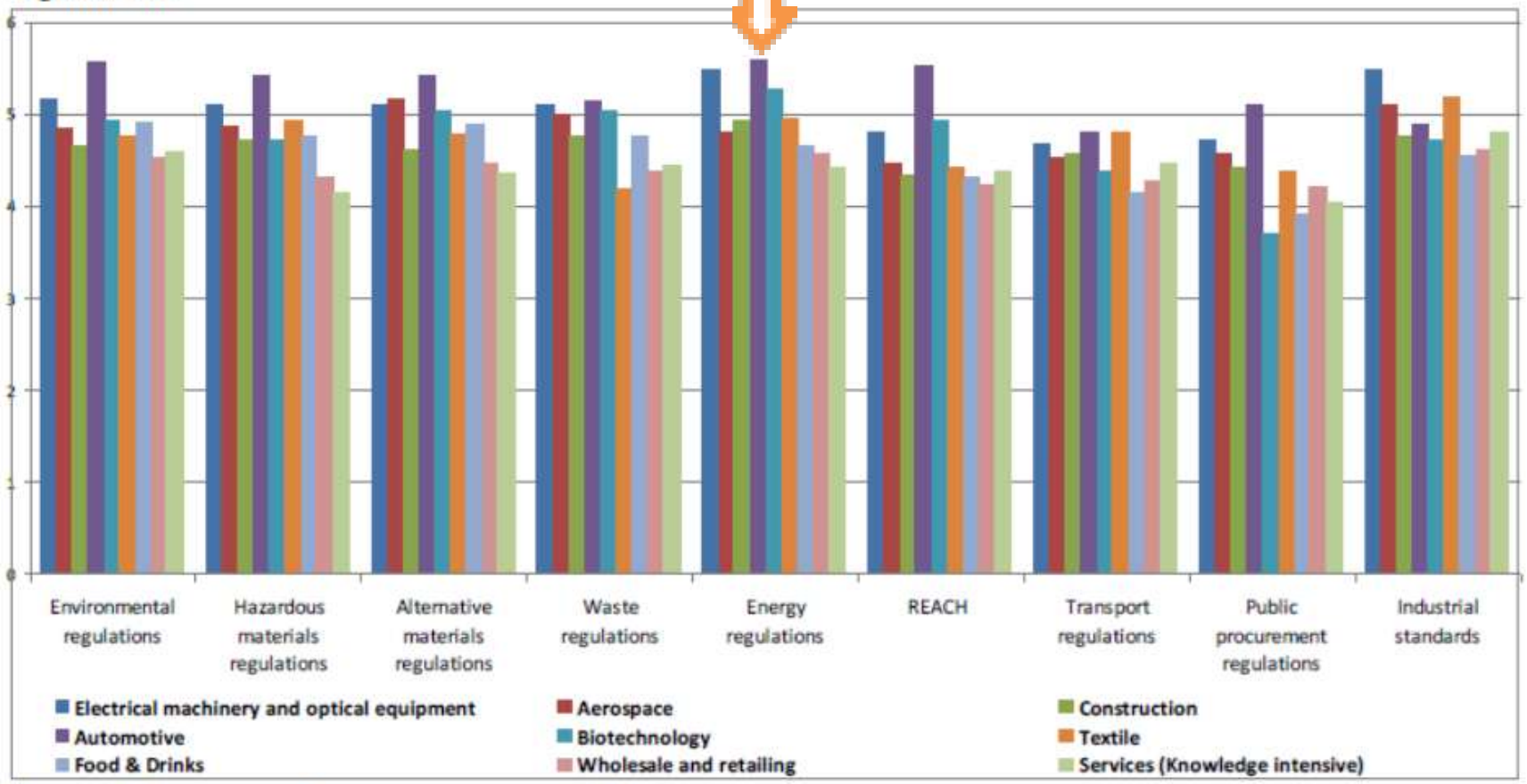
This project has been funded with support from the European Commission. This contents reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Figure 5-4 Eco-innovation diffusion potential in all SIW-II sectors



Source: TNO Eco-innovation futures survey

Figure 4 Effect on eco-innovation in EU economic sectors of selected environmental and energy regulations



Source: Montalvo, Diaz Lopez et al (2011)

Lifelong Learning Programme

GREEN STAR
GREEN skills for enterprises Sustainable Training for Automotive suppliers clusteR

CONFINDUSTRIA Veneto SIAV S.P.A.
KNOWLEDGE & INNOVATION

New skills drivers

CLUSTER

Global impact
Impact LCA phases
High supply industry 80% cost
Changing value chain vs design
Green Supply Chain Management

SUSTAINABILITY

Green culture
Normative diffusion
Design for Environment
Area of greening
(energy,pollution etc)

Industry global evolution
Roles of suppliers
M&A
Re-location
Technology agency
Auto academy

SKILLS

AUTOMOTIVE

New technologies
Short time /evolution
Long time/radical
New product structure
modularity
platform
New transport concept

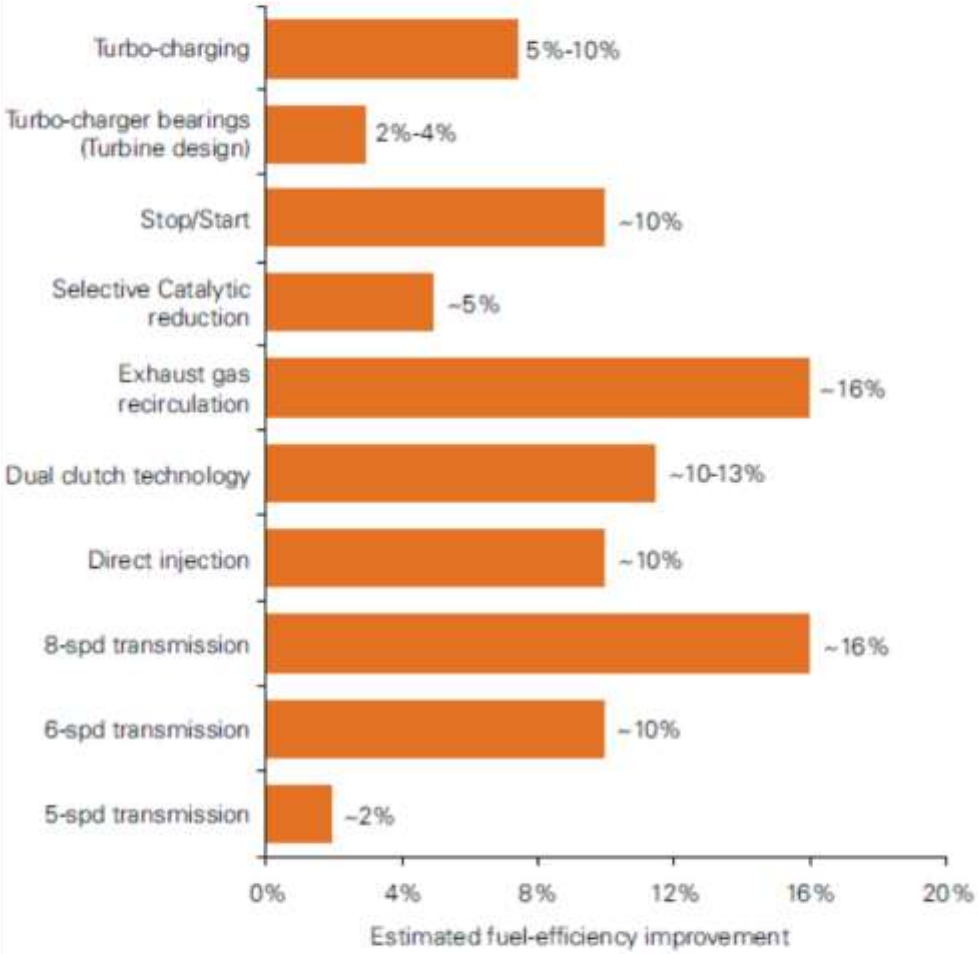
This project has been funded with support from the European Commission. This contents reflects
and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Relevance of Green Supply Chain

- The final green results largely depends on suppliers.
- External pressure and regulations have been driving focal firms to turn towards including small and medium-sized enterprises (SMEs) in the environmental improvement process of entire supply chains, mainly for two reasons.
- Therefore competition is becoming less “firm vs. firm” and more “supply chain vs. supply chain” oriented (Hult et al., 2007).

Various Technologies Under Development are Expected to Increase Fuel Efficiency Between 2% and 16%.

Estimated Fuel Efficiency Improvement from Various Technologies



(a) Improvement indicated represents relative improvement over 4-speed transmission.

Source: 1) Ward's Auto, July 2009; (2) "How Dual-clutch Transmissions Work," HowStuffWorks.com; (3) DetroitDiesel.com.

Green jobs ILO

Green jobs all jobs that are maintained or created in the transition process towards a green economy that are either provided by low-carbon-intensive industries (enterprises) or by industries (enterprises) whose primary output function is to greening economy (ILO 2011)

Green employment effects

Category I:

- Output is low carbon intensive (green sector)
- Occupational activity is directed towards reducing GHG

Example: Worker in solar plant, R&D activity in energy efficiency

Category II:

- Output is low carbon intensive (green sector)
- Occupational activity is NOT directed towards reducing GHG

Example: Teacher, journalist, banker

Category III:

- Output is high carbon intensive (brown sector)
- Occupational activity is directed towards reducing GHG

Example: Chemist developing alternative fertilizers

Category IV:

- Output is high carbon intensive (brown sector)
- Occupational activity is NOT directed towards reducing GHG

Example: Steelworker – steel is supplied to windmill

Table 3. Sydney: What specific "green" skills did your workforce acquire?

Knowledge on certifications and standards	81.5%
Waste minimisation	77.8%
Energy efficiency	74.1%
Green procurement	59.3%
Technical use of new equipment	59.3%
Green management	55.6%
Measurement of greenhouse gas (GHG) emissions	29.6%
New low-carbon processes	14.8%
Carbon finance	14.8%

Source: Miranda, G., et al. (2011c), "Climate Change, Employment and Local Development in Sydney, Australia", OECD Local Economic and Employment Development (LEED) Working Papers, No. 2011/14, OECD Publishing.

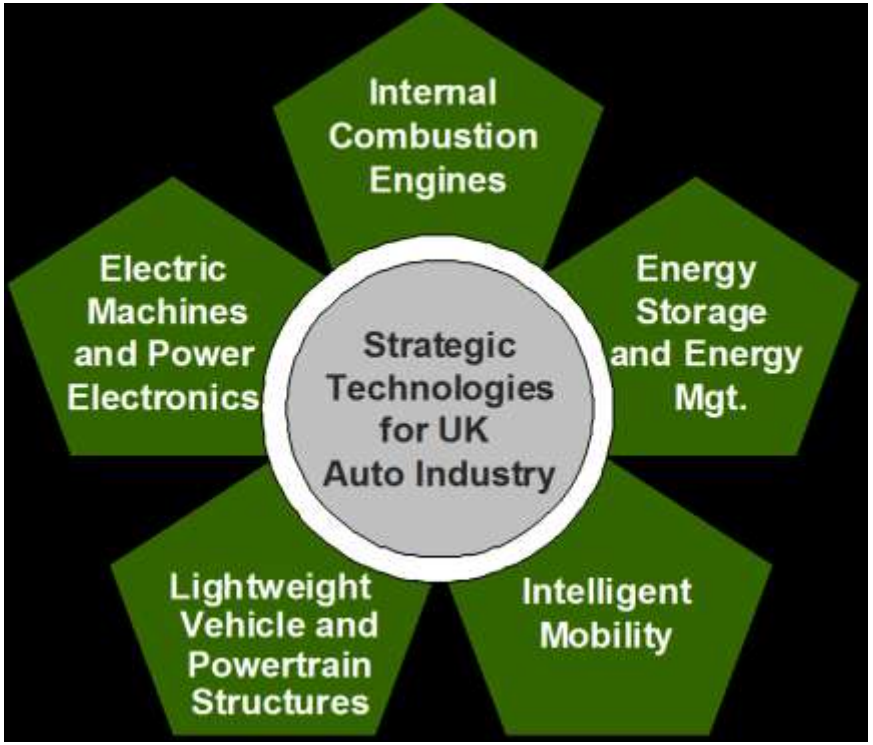
AUTOMOTIVE TRENDS

Engine and powertrain (E&PT)
Hybrid, electric and alternatively fuelled vehicles (HEV)
Advanced software, sensors, electronics and telematics (ASSET)
Advanced structures and materials (FASMAT)
Design and manufacturing processes (DMaP)

GT-VET

Save and reduce input of resources: **Sub-module <u>Energy</u>**
Save and reduce input of resources: **Sub-module <u>Raw Material</u>**
Prevent and reduce emissions pollution and noise: **Sub-module <u>Noise</u>**
Utilize store and dispose of waste materials: **Sub-module <u>Waste</u>**

Workstreams of Automotive UK Council



The IMPORTANCE of the DESIGN STAGE:

70% of costs of product development, manufacture and use are decided in early design stages
(1991 National Research Council Report titled "Improving Engineering Design")

Examples:

GM truck transmissions: 70% of costs decided at design stage

Rolls Royce: 80% of costs decided at design stage, as determined from an average among 2000 parts

Likewise, it is clear that most decisions that affect future environmental impacts are made at the design stage.

DFE

- According to Curtis and Walker the definition of designing for sustainability involves balancing social, ethical and environmental issues alongside economic factors within the product or service development process .
- It ensures that the needs of both the business customer and society are met while protecting the ecosystem.
- This definition highlights the inherent complexity in sustainability accounting and tracking efforts
- DFE

Design for recyclability

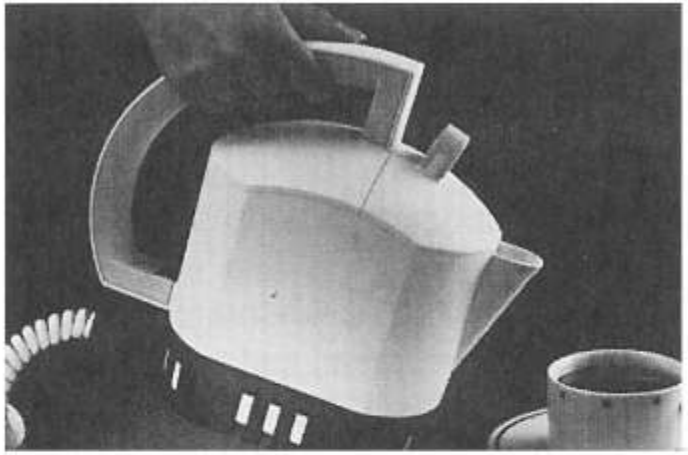
Design for energy efficiency

Design to minimize material usage

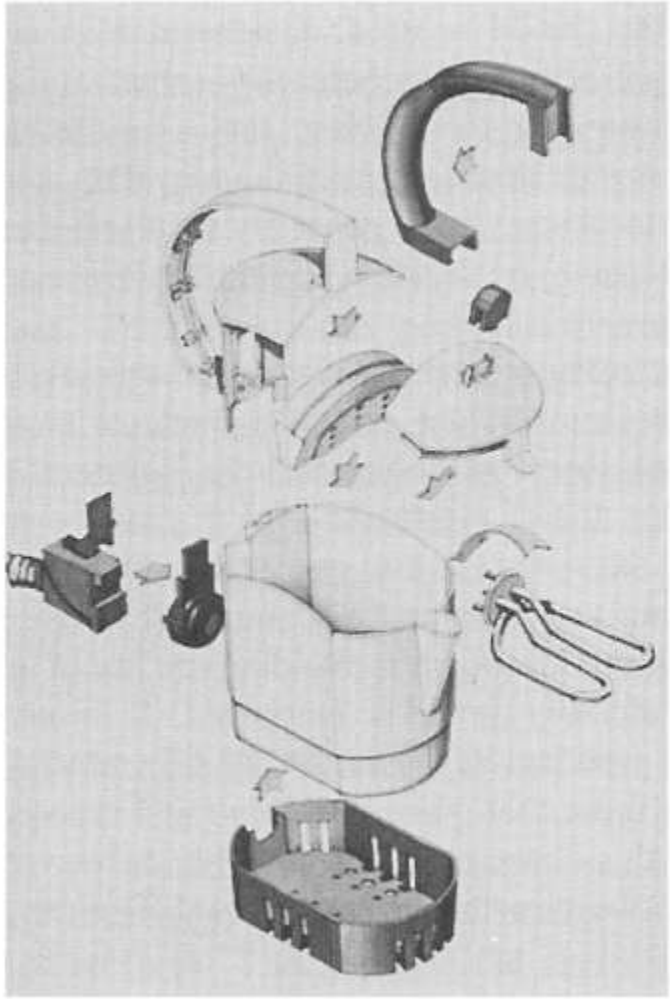
Design for durability

Design for energy efficiency

Design for disassembly



Tea kettle designed for disassembly by Polymer Solutions, Inc., for Great British Kettles Ltd.
(From Graedel & Allenby, *Industrial Ecology*, 1995, page 270)



Consequences

1 sustainability becomes a matter related to the supply chain and the green topic is inextricably associated with the *green supply chain*.

2 suppliers are increasingly becoming suppliers of competence embedded in the supplied components and in its design, rather than mere suppliers of production capacity.

3 design for environment (DFE) skills shall also belong to the suppliers' competences, e.g. to SMEs

The project proposal principally suggested to top suppliers or tiers, rather than to final assemblers and OEMs, appears to be **robust**.

Lifelong Learning Programme
LLP LEONARDO DA VINCI
Leonardo da Vinci TOI n. 2013-1-IT1-LEOO5-03983 CUP code n. G73D13000280006
GREEN STAR
GREEN skills for enterprises Sustainable Training for Automotive suppliers clusteR

GREEN is beautiful

But at the end of the day (*alla fine della giostra*) **cost is the final benchmark that automakers use to decide between potential suppliers**

The only completely green car