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

Lifelong Learning Programme

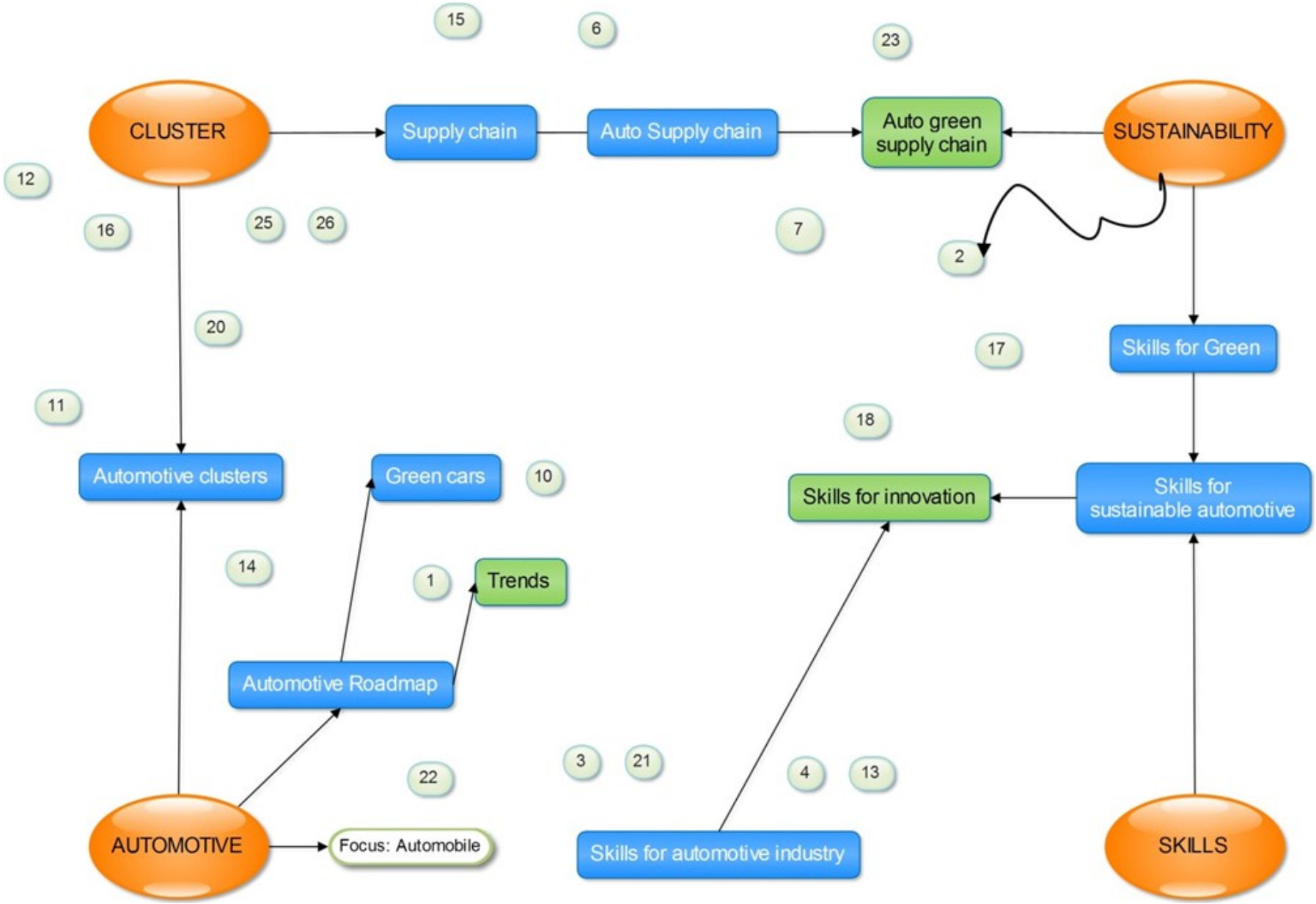
LEONARDO DA VINCI

Leonardo da Vinci TOI n. 2013-1-IT1-LEO05-03983 G73D13000280006

Green skills in automotive suppliers cluster.

Cluster-driven analysis
Literature outcomes

Giovanni Bernardi – 4-6-2014 Dortmund – Focus Group


15
6
23
CLUSTER
Supply chain
Auto Supply chain
Auto green supply chain
SUSTAINABILITY
12
16
25
26
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2
20
17
Skills for Green
11
18
Automotive clusters
Green cars
10
Skills for innovation
Skills for sustainable automotive
14
1
Trends
Automotive Roadmap
3
21
22
4
13
AUTOMOTIVE
Focus: Automobile
Skills for automotive industry
SKILLS

Proposed reports

1. Technology roadmap
2. Driving force (DTI)
3. Driving success - a strategy for growth and sustainability in the UK automotive sector
4. Human Resource and Skill Requirements in the Auto and Auto Component Industry
5. Driving Workforce Change
6. Skills Development and Interfirm learning Linkages under Globalization: Lessons from the Indian Automobile Industry
7. Evaluation of the Most Effective Criteria in Green Supply Chain Management in Automotive Industries
8. Technology and skills in the Aerospace and Automotive Industries
9. Leveraging Training Skills Development in SMEs
10. Foresight vehicle - Technology Roadmap
11. Automotive clustering in Europe
12. The Cluster Initiative Greenbook
13. The Challenges for Sustainable Skills Development in the UK Automotive Supply Sector: Policy and Implementation
14. Innovation Trends and Challenges and Cooperation Possibilities with R&D in Automotive Industry
15. The Automotive Supply Chain: Global Trends and Asian Perspectives
16. Boosting Innovation: the Cluster Approach
17. Skills for green jobs: a global view
18. IMS 2020 Roadmap on innovation, competence development and education
19. Cluster management: a practical guide. Part A overview
20. The cluster policies whitebook
21. Construction of a competency-based curriculum content framework for mechanical technology education program on automotive technology subjects
22. Multinational strategies , local human capital, and global innovation networks in the automotive industry
23. Sustainability in supply chain management: suggestions for the auto industry
24. Green operations initiatives in the automotive industry. An environmental reports analysis and benchmarking study
25. Technology Clusters versus Industry Clusters: Resources, Networks, and Regional Advantages
26. Cluster webography

Automotive

- Technological Road Mapping (TRM) methodology, largely in cooperation with IFM Cambridge allows to understand developing trends within the sector with reference to markets, technologies, systems and resources, depending on the perspective of each specific research project.
- The emerging trends, related to the development of sustainability, concern the product being used, rather than the process.
- Processes are nonetheless considered, particularly in connection with new materials and energy issues and pollution.

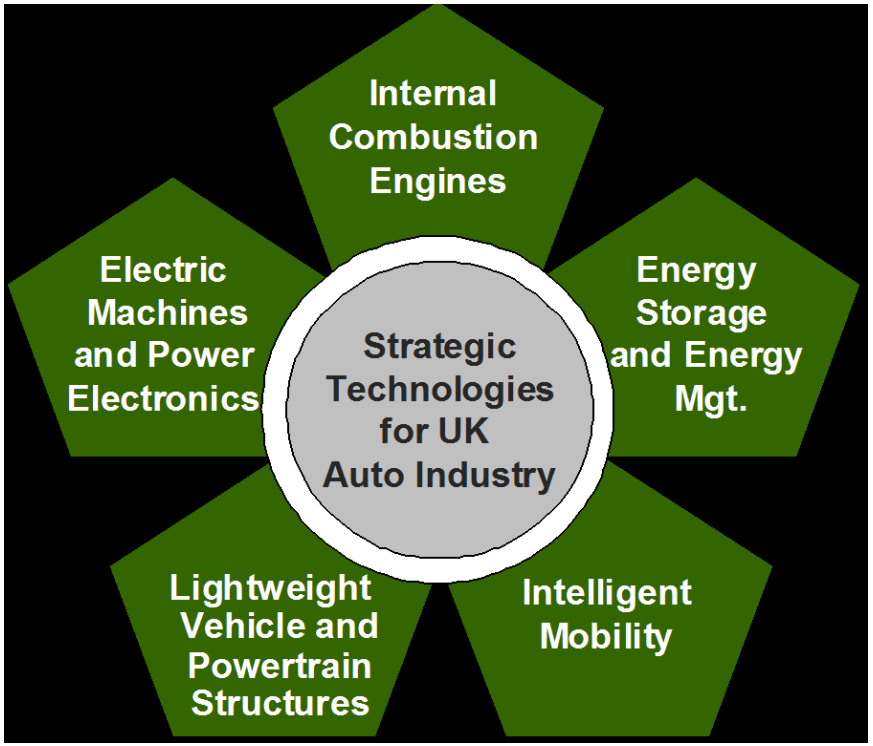
AUTOMOTIVE TRENDS

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

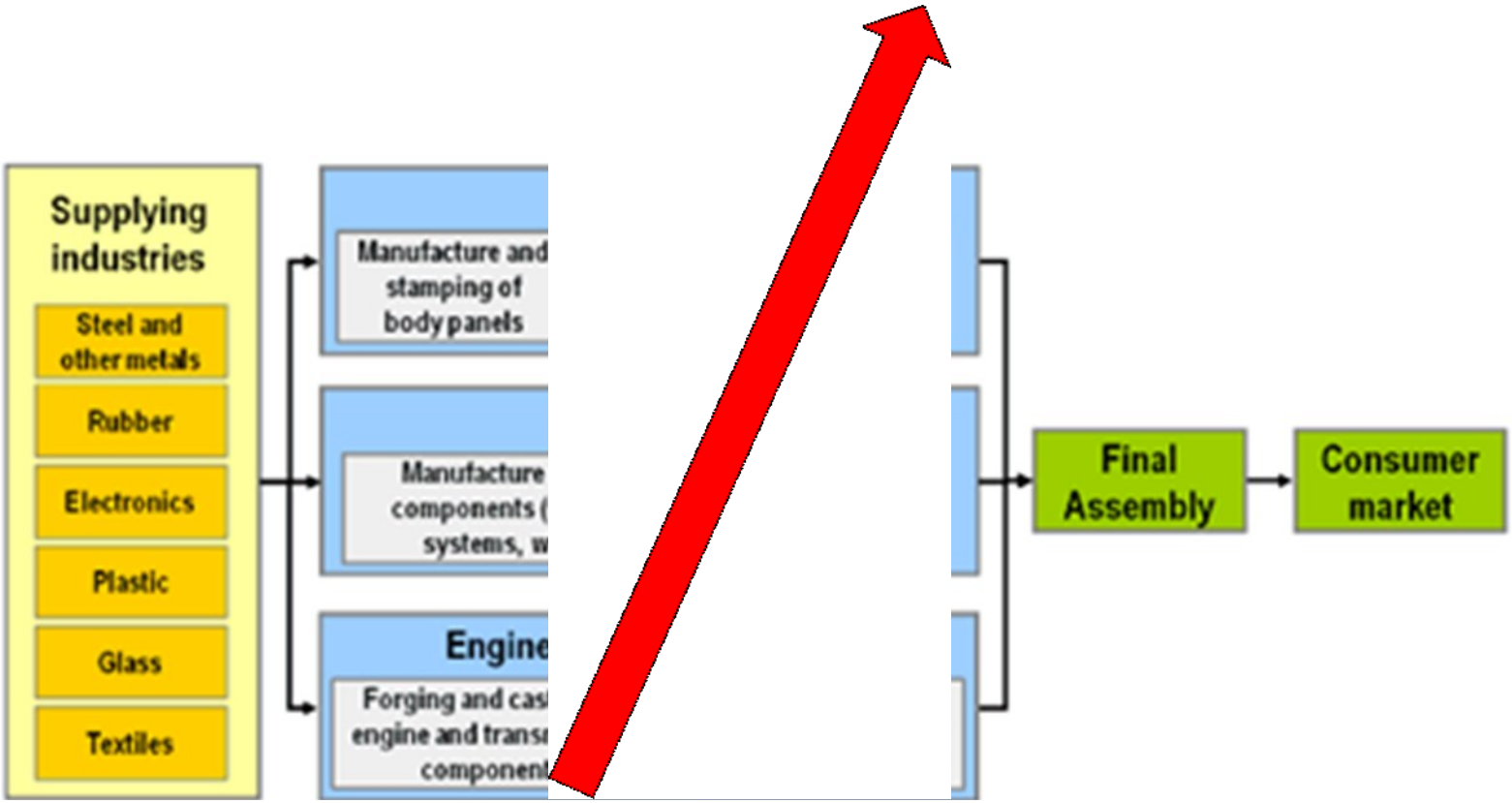


Structural change within the sector

- leading to a new outlook with decentralized assembly of subsystems, therefore to relationships with suppliers / tiers of different levels, up to suppliers of commodities or raw materials.
- offshoring it is still predominant and affecting the modular planning of products, the development of joint platforms within an approach still based on mass production.

- This tendency has been coupled with the shift of engineering skills towards the suppliers, thus taking the final shape shown in the graph below, which is basically the same in almost all supply chains of the final dominating companies (OEM)

Boundary of knowledge
MTO vs ETO



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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**.

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Sustainability

This topic has already been well developed in the previous GT – VET Research

The transition along the chain moves away from the focus on the OEM's final product and towards an increased focus on tier-specific technological solutions

Skills

- Starting from trends highlighted in automotive TRM search results, useful suggestions can be obtained for technical skills requirements, such as:

- **Increasing Electronic Content;**
- **Complicated Engine Designs;**
- **Plastics emerging as a replacement to Metals;**
- **Hybrid Vehicles.**
- ……

- The focus on cluster and on suppliers rather then OEM probably explains the lack of specific literature on green skills for automotive clusters, as these systems bring together several different technological streams, whereas the industry-driven logic was characterized by homogenous technological solutions

- Only one of submitted research (paper no. 4) suggests the identification of skills for green automotive on various hierarchical levels,
- Another suggested research study on skills for automotive has been conducted by Bevis (paper no. 13), who introduces us to the UK's NVQ system for levels 2, 3 and 4

Clusters

1-competitive dimension (Porter ,Ketels) :clusters as a competitive factor at company and regional level

2 -development of a district with common services, shared resources, research centers, towards **an institutionalization of the district in a triple helix perspective**

3 -Clusters become the result of government policies aimed at supporting the economic development of a territory

“Cluster (…) offers new roles for business, government, institutions; and new ways for institutional relationships both in advanced and developing economies”.

Cluster…

- significant clusters combine research, innovation and business for the emergence of "collaborative knowledge".
- so the customer-supplier relationship changes into a “demand-driven learning chain”

Cluster	***Industry***
Localisation *Focused on cooperation* *Long-term collaborations* *Common services* *Overlapped supplier-customer competencies* *Shared supply chains* *Institutional knowledge sharing* *Economies of scope* *Triple helix model* *Basic and funding policies*	*Trans-regional, long chains* *Also global* *OEM-focused* *Sector with network related to final product technologies* *Need of std-competence-encoding, interface modularity* *Also in std components to get economies of scale*