European Sector Skills Council

Automotive Industry

European Skills Council
Automotive Industry

REPORT

CLEPA
European Association of Automotive Suppliers

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EUROPEAN TRADE UNION

ETRMA
EUROPEAN TYRE & RUBBER manufacturers' association

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Contents

1. FOREWORD 6

2. INTRODUCTION AND POLICY RECOMMENDATIONS 10

2.1 Introduction 10

2.2 Policy Recommendations 14

3. THE EUROPEAN AUTOMOTIVE SECTOR 18

4. METHODOLOGY 26

5. PART 1: EMPLOYMENT SITUATION IN THE AUTOMOTIVE SECTOR, INCLUDING FORECASTS & TRENDS 28

5.1 Employment in the automotive sector 29

5.1.1 Employment and manufacture of motor vehicles, trailers and semi-trailers 30

5.1.1.1 Employment and size of enterprises 34

5.1.1.2 Employment and gender 36

5.1.1.3 Employment and age 38

5.1.2 Employment and manufacture of rubber products (NACE C221) and tyres and tubes - retreading and rebuilding of rubber tyres, (NACE C2211), 2012 40

5.1.2.1 Employment and size of enterprises 40

5.1.2.2 Employment and age 44

5.1.2.3 Employment and gender 46

5.1.3 Forecasting at the European level - the automotive sector 48

5.1.3.1 Forecasting at the national level - in EASC partner countries 50

6. PART 2: EVOLUTION OF THE AUTOMOTIVE SECTOR'S OCCUPATIONS AND ASSOCIATED SKILSS 52

6.1 Drivers of change 53

6.1.1 Advanced manufacturing 54

6.1.2 Advanced materials 57

6.1.3 Complex and global supply chains 58

6.1.4 Life cycle design and pollution prevention 60

6.1.5 Active safety, automated driving and connectivity 62

6.1.6 Decarbonisation, hybridisation and electrification 64

6.1.7 Evolution of customer requirements 66

6.2 What knowledge, skills and competences are required for five traditionally representative occupations in the automotive sector? 68
6.2.1 The views of the EASC partners 70
6.2.1.1 Maintenance technician 70
6.2.1.2 CNC operator/tool and die maker 71
6.2.1.3 Paint technician/motor vehicle painter 73
6.2.1.4 Assembly line operative/assembler 74
6.2.1.5 Materials planning analyst 75
6.2.2 Emerging occupations 76
6.2.2.1 Product engineer 76
6.2.2.2 Process engineer 76
6.2.2.3 R&D engineer/technician 76
6.2.2.4 3D printing technician 76
6.2.2.5 Product design and development technician 77

7. PART 3: INNOVATIVE TOOLS, NATIONAL AND REGIONAL STRATEGIES, LOCAL INITIATIVES, METHODS TO MONITOR SKILLS' NEEDS AND ADDRESS SKILL'S MISMATCHES AND GAPS 78
7.1 Innovative tools, national and regional strategies, local initiatives, methods to monitor skills' needs and address skill's mismatches and gaps 78
7.1.1 Meeting skill's needs 79
7.1.1.1 EDUCAM 80
7.1.1.2 Formula student racing project 82
7.1.1.3 Daimler project "green technology" 82
7.1.2 Engaging in new forms of learning 83
7.1.2.1 Automotive industrial partnership - problem-solving in the automotive industry 84
7.1.2.2 Sharing ideas for future survival 84
7.1.2.3 BMW – talent 85
7.1.2.4 IFOCA'S MOOC on rubber technology 85
7.1.3 Developing new qualifications 86
7.1.3.1 Continental – automotive software developers 87
7.1.3.2 Bosch – mechatronics engineering – e-mobility plus 87
7.1.3.3 DEIA – postgraduate qualification in automotive engineering 88
7.1.3.4 Advanced apprenticeship in mechatronic engineering 89
7.1.4 Transferring knowledge and skills 90
7.1.4.1 Space Cowboys - Daimler senior experts 90
7.1.4.2 Inter-generational learning 91
7.1.4.3 Training for apprenticeships 91
7.1.4.4 Jaguar Land Rover – an apprenticeship clearing house 92
7.1.5 Certifying knowledge, skills and competence 92
7.1.5.1 Certification of vocational training courses in the group 93
7.1.6 Addressing and closing the skills' gaps 94
7.1.6.1 BMW – e-mobility 94
7.1.6.2 Managing internal redeployment 95

8. MEMBERS OF THE EUROPEAN AUTOMOTIVE SKILLS COUNCIL 96
8.1 Project consortium 97
8.2 Project supporters 100
8.3 Members of the skills council 102
8.4 Industry Core Group 109

Chapter 1
Foreword

The automotive industry is one of the main driving forces for the European economy:

- *Accounting for almost 7% of the EU's GDP representing 8% of total value added, the sector provides employment to 12 million workers.*
- *European assembly plants produce one in every three cars worldwide and one in every four cars is being exported, resulting in a large trade surplus.*
- *The European automotive sector also is world leader in terms of product innovation: by accounting for 20% of all industrial research funding in Europe, it constantly develops and furthers flexible and modular production systems, high-quality (premium) design, alternative powertrain technologies and the management of complex value chains.*

At the same time, the sector is facing many structural changes, including ever stricter emission standards and decarbonisation as part of new mobility concepts, connectivity and an ever growing share of digital technologies in the added value of cars, changes in consumer preferences, relocation to low-cost countries and development of global manufacturing systems, and last but not least dealing with the implications of an ageing workforce.

A strong and thriving automotive sector capable of tackling these challenges is therefore of strategic importance for the future of Europe's industry and should be a cornerstone in any strategy supporting the re-industrialization of Europe.

- *EASC partners are convinced that the importance of education, skills and training can hardly be underestimated: knowledge has become the dominant production factor and innovation, R&D and competence development are now more important than ever for all industrial policies, whether it be at national or European level. Their quality is of key importance to strengthen the competitiveness of the sector and to increase its added value, while at the same time maintaining and creating high-quality jobs.*

- *The automotive sector is developing ever faster and its future jobs are likely to have a different mix of skills and will require permanent upgrading of skills levels and competences. Indeed, automation and new technologies will entail a shift to more advanced technical skills and more knowledge intensive work. At the same time, standardised manual operations at the assembly line are at risk of disappearing.*

- *Improving the capacity to forecast, anticipate and match future skills and labour market needs is a precondition for the design of efficient employment and training policies. Although it is difficult to predict the future, especially in a sector confronted with a series of technological and societal disruptions, the EASC partners believe that skills shortages and skills mismatch have to be identified and that skills strategies have to be developed and implemented in order to generate innovation, growth and jobs in this sector that is the backbone of Europe's industry.*

- *For the EASC partners a highly-skilled workforce operating under good working conditions and vocational training opportunities providing constant upskilling are of utmost importance to keep pace with the rapid technological developments in the sector.*

The EASC has therefore been set up with the objective to address this Automotive Skills Challenge. The initiative results from the CARS2020 report, which sets the basis for a predictable regulatory framework for the automotive industry in the next decades. The Automotive Skills Council took off with a first networking event in Brussels on 28 January 2015. It was followed by other networking events in Paris (24 June) and Rome (1 October).

By bringing together EASC partners, national observatories, training providers, research institutes and corporations and

using different questionnaires the Skills Council was able to identify the drivers of change, collect data on current and future skills needs and map the impact of structural change on different job profiles.
The results of this research are published in this booklet. However, the EASC partners are convinced that the journey has just begun and that much more questions need to be answered in order to tackle the skills challenge:

How do we anticipate future skills needs? How can we improve coordination between the world of education and the world of work? How can we increase the attractiveness of VET and promote STEM as a priority at all levels of education? How can we quickly respond to changing skills demands? How do we create a culture of lifelong learning? How can we organise retraining of workers at risk of losing their job? How do we achieve excellence in vocational education and training? How can we establish quality systems of work-based learning? How to take into account the growing importance of transversal skills, such as taking initiative, solving problems, team work, taking initiative and thinking critically? How to validate non-formal learning?

To answer all these questions, the EASC partners in the automotive sector aim to continue collaborating on matching and anticipating skills and jobs, and on organising the exchange of information and best practices. Close cooperation between EASC partners, training providers and public authorities will contribute to enhanced “skills intelligence”: the monitoring and forecasting of skills needs, understanding skills mismatches and improving dialogue between education and the labour market. Delivering the right skills to our industry and investing in the employability of its workers are at the heart of our concerns. Therefore, the EASC partners believe that the Automotive Skills Council should become a permanent platform for setting skills agendas and developing the right skills policies in close cooperation with European policymakers.

Finally, we would like to thank colleagues Federico Brugnoli and Jeff Bridgford for establishing the methodology, developing the questionaires, analysing the data and drafting the report.
Special thanks also to Nathalie Gminder from CLEPA for the coordination of this project.

CLEPA European Association of Automotive Suppliers

industriAll EUROPEAN TRADE UNION

ETRMA EUROPEAN TYRE & RUBBER manufacturers' association

ACEA European Automobile Manufacturers Association

CEEMET

Chapter 2
Introduction and Policy Recommendations

2.1 Introduction

The response of the European Union to the financial and economic crisis has been to create the conditions for a more competitive economy with higher employment, by means of its Europe 2020 strategy which aims to 'deliver economic growth that is: "smart", "sustainable", and "inclusive".

The European Union has fixed a series of headline targets to attain these goals. The headline target for employment in the EU is, as follows: 75% of 20-64 year-olds should be in employment by 2020.

Some Member States are well on the way to meeting these targets, but five years on from the financial and economic crisis, employment rates in 22 EU countries were still below 2008 levels[1].

In order to support this strategy the European Commission set up seven Flagship Initiatives, one of which, *An Agenda for New Skills and Jobs*, highlights the need to equip people with the right skills for the jobs of today and tomorrow[2].

The European Commission has subsequently proposed to establish a series of European Sector Skills Councils which are designed to anticipate the need for skills in specific sectors more effectively and to achieve a better match between skills and labour market needs.

Their activities include:

- **drafting reports on the employment situation in particular sectors and developments in the area of skills, and making policy recommendations**
- **building cooperation among organisations that monitor skills developments and helping them to operate more effectively in the countries concerned**
- **taking new action based on the skills information compiled, including creating and disseminating practical tools and setting up skills projects[3]**

[1] http://ec.europa.eu/eurostat/statistics-explained/index.php/Europe_2020_indicators_-_employment
[2] COM/2010/0682 final
[3] http://ec.europa.eu/social/main.jsp?catId=784&langId=en

Following the publication of CARS 2020 Report on the state of play of the outcome of the work of the High Level Group, the European Commission made a commitment to supporting the creation of a European Automotive Skills Council, which would bring together existing national organisations conducting research on skills development and employment in the automotive sector.

The Skills Council would also involve employers' and workers' representatives at European and national levels and education and training providers' organisations. The Skills Council would encourage peer learning based on the exchange of information and good practice as well as providing a platform for dialogue. It would start by analysing trends in automotive employment and skills, which would form the basis of recommendations for policymakers, education, training providers and other stakeholders[4].

Representatives of employers and trade unions in the automotive sector, the European Association of Automotive Suppliers (CLEPA), the European Tyre and Rubber Manufacturers' Association (ETRMA) and IndustriAll respectively, agreed to set up a European Sector Skills Council, with the support of the Council of European Employers of the Metal, Engineering and Technology-based industries (CEEMET) and the European Automobile Manufacturers' Association (ACEA). Its goal is to establish a platform for exchange of information and best practices, supported by quantitative and qualitative analysis, plus recommendations to policymakers.

The Skills Council will contribute with data on the following topics:

- what are the bottlenecks in the sector?
- why is it difficult to have access to certain skills?
- which are the current and future skills needs?
- which types of jobs will appear or disappear in the future?

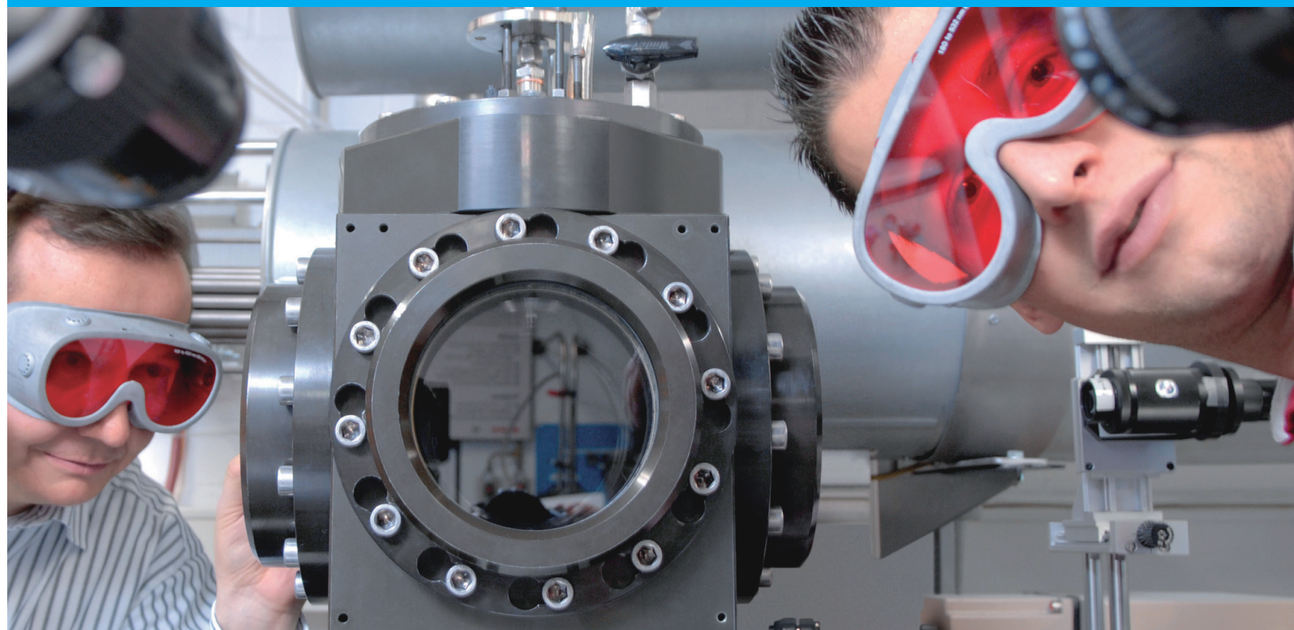
The benefits for the participants in the European Automotive Skills Council will be:

- sharing experiences at the European level
- increasing the visibility of participants to European policymakers
- influencing European employment and skills policies
- improving the possibility of promoting training activities.

[4] http://ec.europa.eu/growth/sectors/automotive/policy-strategy/index_en.htm

The following organisations have agreed to become members of the European Automotive Skills Council (EASC):

- *Automotive Cluster Slovenia (ACS) - http://www.acs-giz.si*
- *Associação de Fabricantes para a Indústria Automóvel (AFIA) - http://www.afia.pt*
- *Asociatia Producatorilor si Importatorilor de Automobile (APIA) - http://www.apia.ro*
- *EDUCAM - http://www.educam.be*
- *Fédération des industries des équipements pour véhicules (FIEV) – www.fiev.fr*
- *Industriegewerkschaft Metall (IG Metall) - https://www.igmetall.de*
- *Odborový svaz KOVO (OS KOVO) - http://www.oskovo.cz*
- *Odborový zväz KOVO (OZ KOVO) - http://www.ozkovo.sk*
- *Przemysłowy Instytut Motoryzacji (PIMOT) - http://www.pimot.eu*
- *Sector Skills Council, Engineering and Manufacturing Technologies (SEMTA) - http://www.semta.org.uk*
- *Asociación Española de Fabricantes de Equipos y Componentes para Automoción (Sernauto) -*
- *http://www.sernauto.es*
- *Skills Alliance for Advanced Manufacturing in the Transport Sector (SkillMan) - http://www.skillman.eu*
- *University of Twente - https://www.utwente.nl*



2.2 Policy Recommendations

The **European Automotive Skills Council** is a stakeholder platform for the exchange of information and best practices on employment and skills in the European automotive industry. It addresses education and training issues of the European workforce and the evolution of skills and competences required for the future of the industry. It also aims at bringing sector specific skills issues to the attention of policy makers.
The European Automotive Skills Council has identified a number of skills-related challenges and therefore put together a list of priorities and recommendations:

1.

A strong automotive industry in Europe relies in equal parts on a supportive and enabling regulatory framework and on the foundations of a highly qualified workforce. This objective will be further supported by the GEAR2030 (former CARS2020) stakeholder initiative. This framework should seek to maintain and promote the technological leadership of the European automotive industry by sustainably furthering the competitiveness of the European industry around a high value added model.

2.

Adapt industrial employment strategies and take into account the specificities of national education systems to counter the effects of a **broader demographic trend of ageing populations** in Europe. This includes:

- **Increasing efforts to attract and retain STEM graduates** to and in the automotive sector, which is experiencing strong competition for talent from sectors such as IT, finance and pharmaceuticals

- Making available national and **European funding for industry initiatives**, such as programmes for the inter-generational transfer of knowledge and practical experience

- **Support training and retraining initiatives** in the framework of the continuous learning/ life-long learning approach of the European Commission in order to ensure long-term employability

- **Removing obstacles to the free movement of graduates and skilled workers** inside the European Union

- Working towards a common framework of references and a **convergence of qualification standards in the European labour market:**
  - by developing tools to make qualifications more transparent, comparable and transferable (e.g. mutual recognition of qualifications, validation of informal learning, a single framework for job profiles, convergence of qualification standards
  - by developing systems for collection/ analysis of data regarding education, training providers, labour market developments, supply of skills/degrees etc.

3.

In addition to demographic change, the European automotive industry faces a number of other challenges which will impact its future in the long term: the increasing importance of certain **drivers of change and their impact on skills and qualifications**, as identified by the European Automotive Skills Council in its Automotive Skills Survey and Final Report:

- advanced materials
- advanced manufacturing
- complex and global supply chains life cycle design and pollution prevention
- active safety, automated
- driving and connectivity
- decarbonisation, electrification and hybridisation

With regard to these drivers, the European automotive industry is already engaged in tackling the following challenges:

- **managing the evolution of qualifications and skill sets** related to said drivers of change e.g. by encouraging up-skilling the existing workforce, introducing re-training and recruitment initiatives to bring new talent to the industry

- **engaging in a long-term approach of sustainable knowledge and skills management**: by ensuring the storage and retrieval of knowledge and the application and sharing of skills in the European automotive industry

- **dealing with emerging and disappearing occupational profiles:** by developing new qualifications and certifying new knowledge, skills and competences, e.g. by meeting the increasing demand for mechatronic and mechemtronic[5] engineers, industrial mechanics, electricians and automotive software developers

[5]Mechatronics (MCT) is a multidisciplinary field of engineering that includes a combination of systems engineering, mechanical engineering, electrical engineering, telecommunications engineering, control engineering and computer engineering.
Mechemtronic (also MeChemTronic) combines mechanical, chemical and electronic engineering.

- integrating comprehensive skills development approaches and **innovative training schemes** into corporate strategies by engaging in new forms of learning (e.g. virtual learning, online learning tools, MOOCs)

- ensuring in particular the **inter-generational transfer of knowledge and skills**

4.

Digitalisation is a universal trend – and a societal challenge: feeding into Europe's growth and jobs agenda, we need to ensure that the new skills required for the new jobs created by the digitalisation of the automotive industry are being taught to those in education and training as well as those already working in the automotive sector in Europe.

In connected manufacturing, skilled workers need expertise in IT, networking and wireless technologies, as well as process design. The automotive industry is preparing for the demands of Industry 4.0 by integrating IT-related topics and required software skills into their training and re-training programmes.

- **IT skills development has to start at level of basic education:** to be able to teach these fundamental skills, schools and teachers need to be equipped with the necessary know-how and the right technical infrastructure

- **The better integration of these skills needs into current curricula** has to be achieved by stronger involvement of companies in the development of training and education programmes, as well as by encouraging closer relations between companies, schools and universities.

- As the automotive industry changes at a much faster pace than the education system, it is of utmost importance to develop flexible pathways between the world of work and the world of education (e.g. lifelong learning, modularised learning systems, bridge systems between school and work).

5.

The European Automotive Skills Council encourages European policy-makers, industry and social dialogue representatives to **continue their close cooperation on the subject of skills in the automotive industry** and is ready to provide its expertise and commitment during future activities. In its future activities, the EASC should focus on:

- further developing cooperation and exchange of good practices among its members
- involving more actively different categories of national and regional stakeholders, which is essential for the implementation of concrete projects

By exploiting the sectorial intelligence developed and the established network of stakeholders, the EASC will strive to develop concrete projects aiming at:

- supporting the implementation of communication strategies toward the new generations, emphasising the career opportunities in the European automotive sector and attracting new skilled workers to the industry, with attention also at raising female participation

- favouring the design and delivery of joint VET programmes, innovating teaching and training methodologies and delivery models, based on the evolving sectorial needs
- creating a framework for a rapid response to the current evolution in business models, processes and sales strategies, in terms of continuous training and competences and qualifications provision

- targeting the storage and retrieval, application and sharing of knowledge and skills specific to the European automotive industry and resident in its companies and employees

The European Commission should complement these actions by supporting the EASC through adequate resources, while keeping its autonomy and ensuring its medium to long term stability.

Chapter 3
The European Automotive Sector

The automotive sector generally refers to the manufacture of motor vehicles, trailers and semi-trailers (Nace C29) which includes the manufacture of motor vehicles (Nace C291; of bodies (coachwork) for motor vehicles (Nace C292); and of parts and accessories for motor vehicles (Nace C293).
In 2012 it generated a turnover of € 846.599 Million throughout the EU-28, and, as can be seen from Figure 1, the motor vehicle, trailer and semi-trailer manufacturing sector in Germany was much larger than that of any other Member State in terms of turnover generated.

It is estimated that in 2012 motor vehicle, trailer and semi-trailer manufacturing was the principal activity of 19,500 enterprises, and although Germany marginally has the most, there is a more even spread, with the United Kingdom close behind, followed by Italy, France and then Spain.

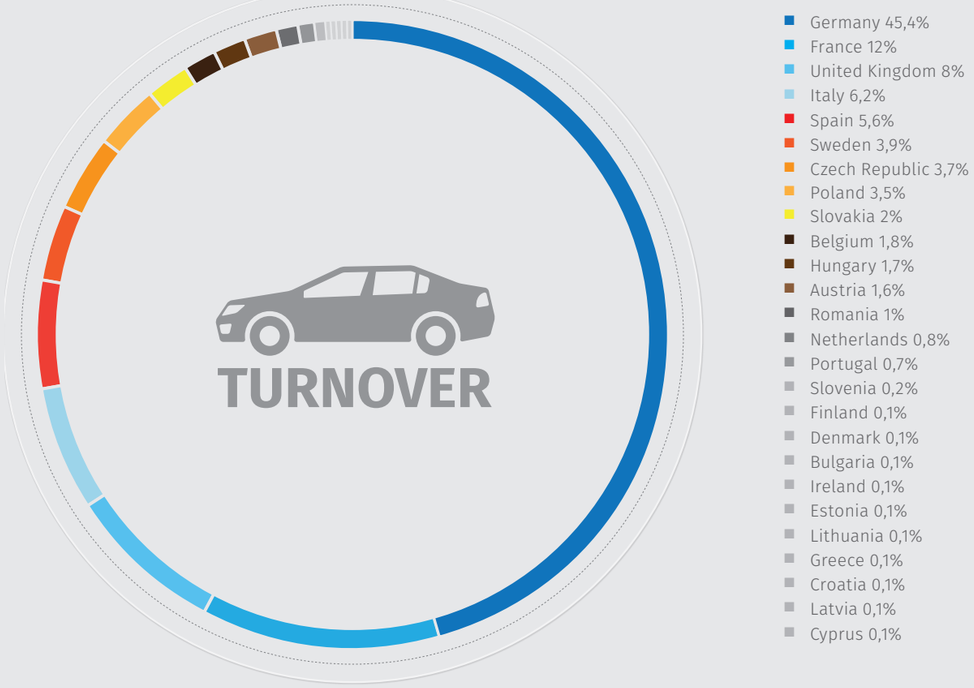


Figure 1: Distribution of turnover in the EU, manufacture of motor vehicles, trailers and semi-trailers (Nace C291, 292, 293), 2012 /**Eurostat sbs_sc_ind_r2**

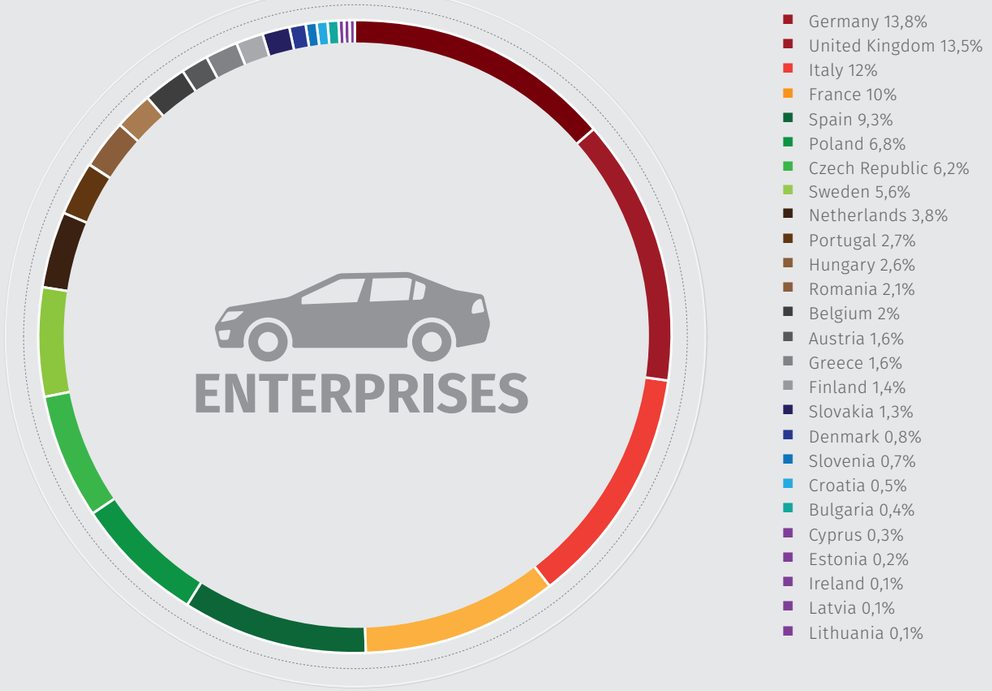


Figure 2: Distribution of enterprises in the EU, manufacture of motor vehicles, trailers and semi-trailers (Nace 291, 292, 293), 2012 /**Eurostat sbs_sc_ind_r2**

The sector also includes the manufacture of rubber products (Nace C221) and more specifically the manufacture of rubber tyres and tubes – retreading and rebuilding of rubber tyres (Nace C2211).). It is estimated (Figure 3) that in 2012 it generated a turnover of € 73.352 Million throughout the EU-28 for the manufacture of rubber products, and the rubber product manufacturing sector in Germany accounts for the largest contribution in terms of turnover generated, followed on this occasion by France and Italy.

It is estimated that in 2012 it generated a turnover of € 45.250 Million throughout the EU-28 for the manufacture of rubber tyres and tubes – retreading and rebuilding of rubber tyres, and, as can be seen from Figure 4, it is the rubber tyre manufacturing sector in Germany that again accounts for the largest contribution, closely followed by France, then at some distance by Italy and Spain.

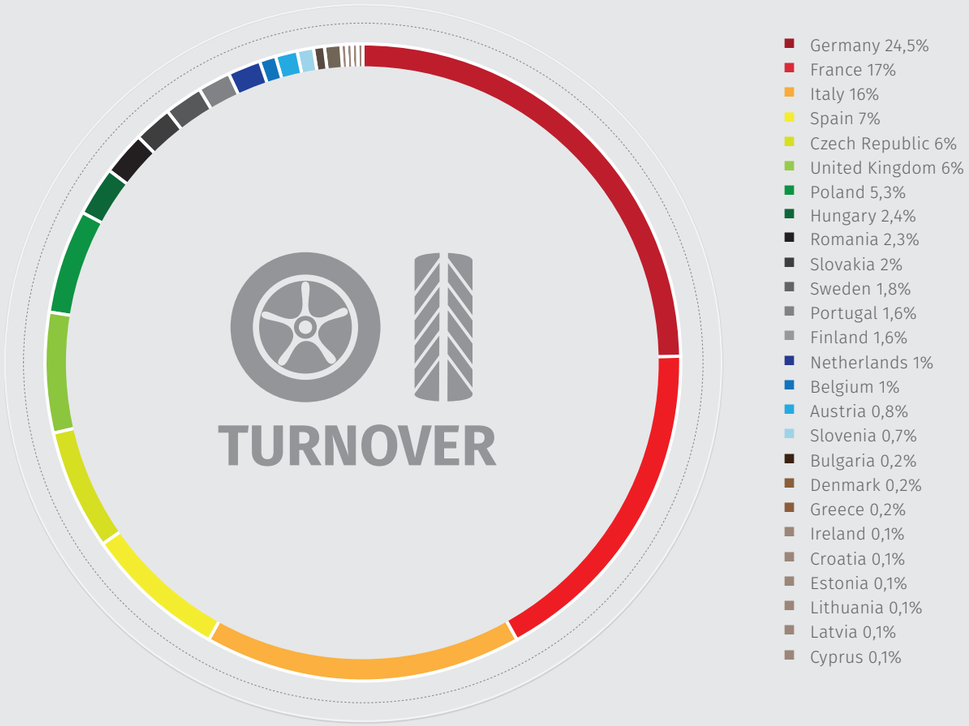


Figure 3: Distribution of turnover in the EU, manufacture of rubber products (Nace C221), 2012 /**Eurostat sbs_sc_ind_r2**

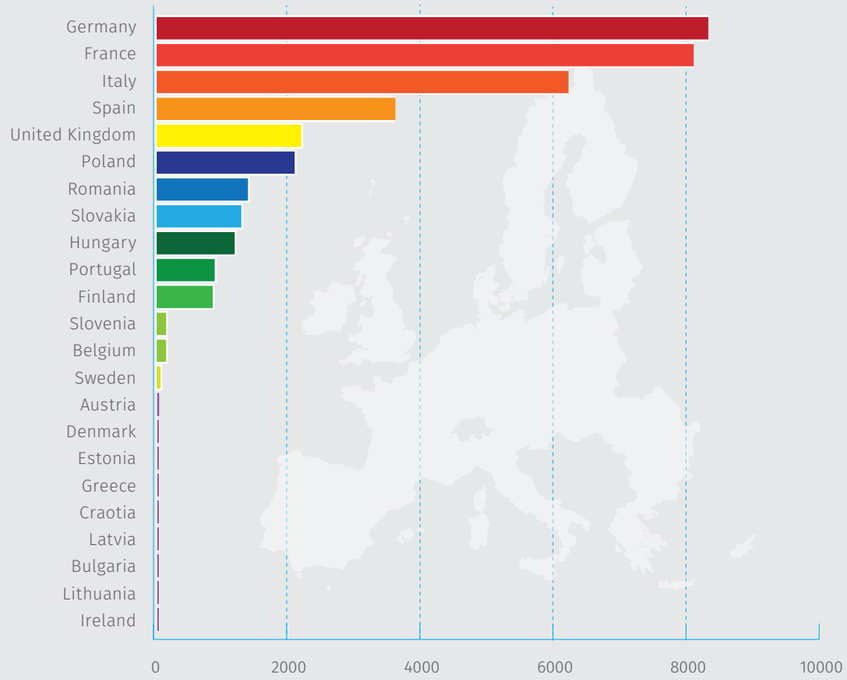


Figure 4: Distribution of turnover in the EU, manufacture of rubber tyres and tubes – retreading and rebuilding of rubber tyres (Nace C2211), 2012 /**Eurostat sbs_sc_ind_r2**

It is estimated that in 2012 rubber products manufacturing was the principal activity of 7,800 enterprises throughout the EU-28, and, as can be seen from Figure 5, Italy has the most, followed by Poland, the Czech Republic and then Spain.

It is estimated that (Figure 6) in 2012 rubber tyre and tube manufacturing was the principal activity of 1,328 enterprises throughout the EU-28, and Germany has the most, followed by Poland, Spain, Italy and Slovakia.

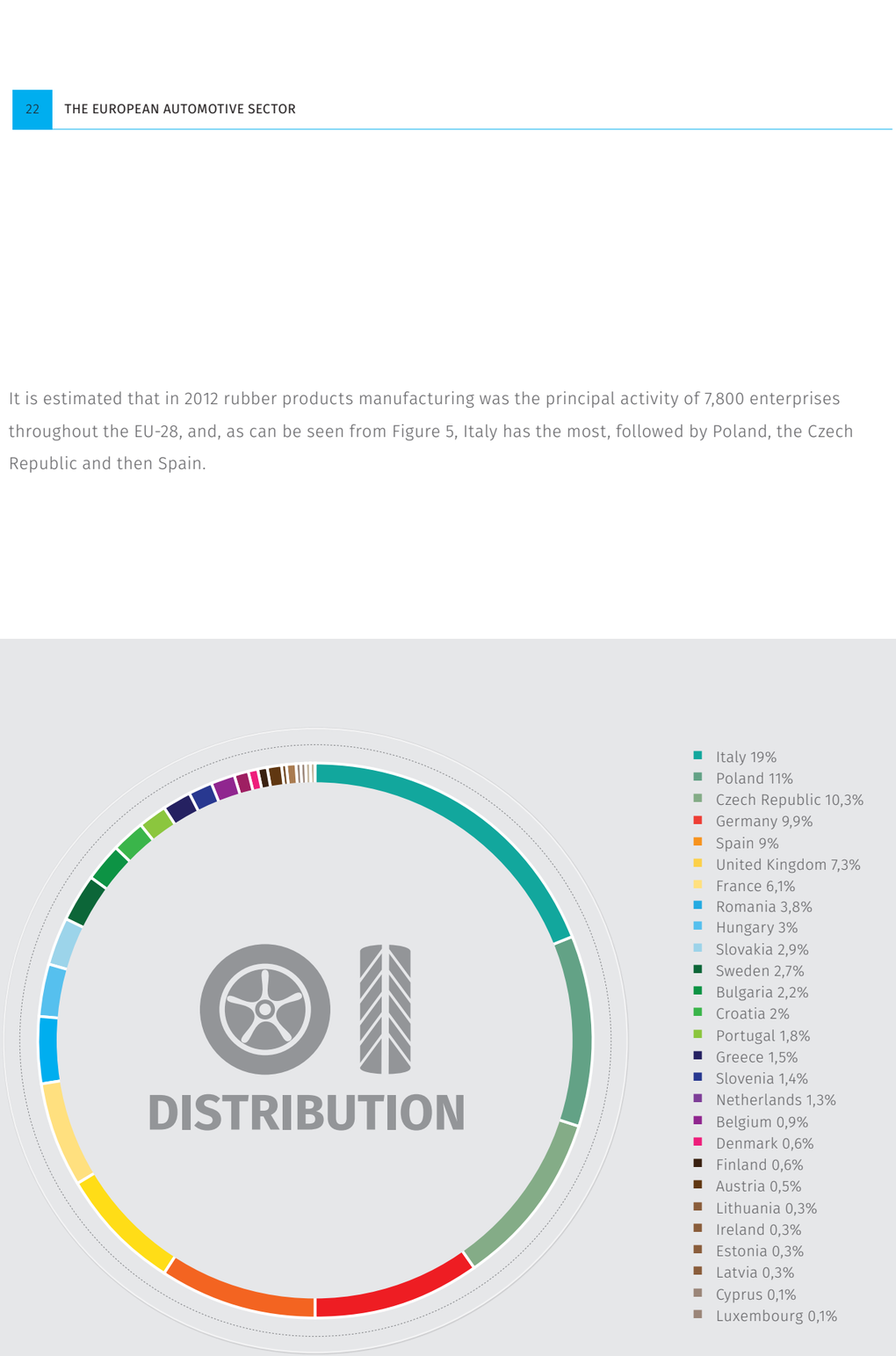


Figure 5: Distribution of enterprises in the EU, manufacture of rubber products (Nace C221), 2012 /**Eurostat sbs_sc_ind_r2**

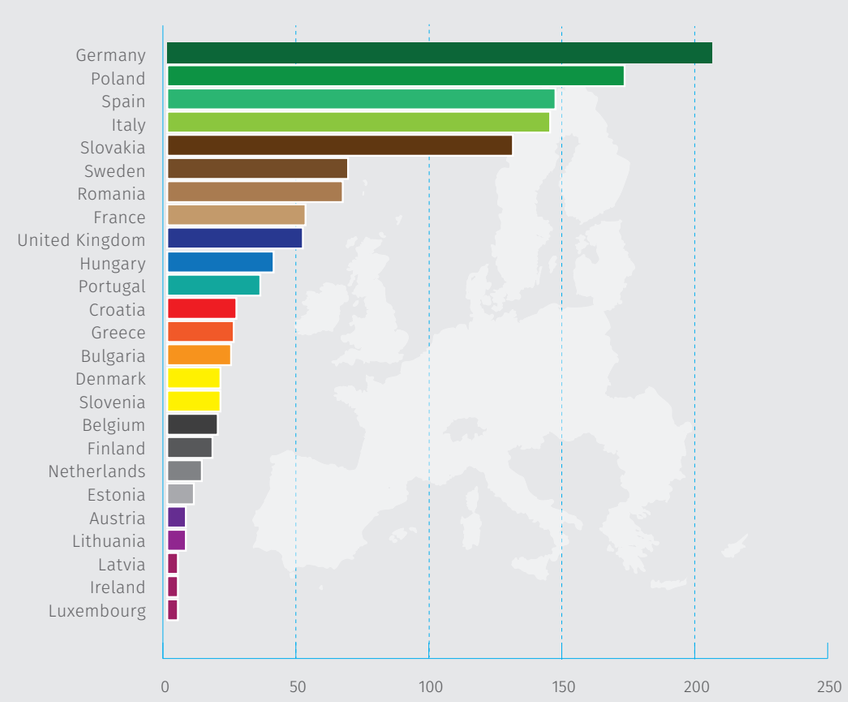


Figure 6: Distribution of enterprises in the EU, manufacture of rubber tyres and tubes – retreading and rebuilding of rubber tyres (Nace C2211), 2012 /**Eurostat sbs_sc_ind_r2**

The two sectors together (Nace C29 and C2211) make a significant contribution to economic and socio-economic development in the European Union. According to Eurostat figures for 2012, just over 2,404,936 persons were employed in 20,809 enterprises that generated total value added of €159 billion.

Including other elements of the manufacturing process, there is an overall figure of 3 million persons directly employed in the automotive sector, and, in addition another 10.7 million indirectly employed, which makes for an overall figure of 12.9 million in all[6].

With regard to the part of the rubber industry related to the automotive sector, on top of the jobs listed in Eurostat, there are a further 800.000 jobs indirectly linked to the sector[7].

Manufacturers in the EU made a total of just over 14 and a half million passenger cars in 2012, which represented 23.2% of all the cars produced throughout the world. This amounts to a steady reduction since 2005, both in terms of overall figures and also global production share. EU manufacturers' share of global production of commercial vehicles stood at 7.7% in 2012. The biggest producer of passenger cars was Germany, by far, followed by France, Spain, the United Kingdom and the Czech Republic. The biggest producer of commercial vehicles was Spain, followed by France, Germany and then Italy[8].

Approximately 4.6 million tonnes of tyres were produced in Europe in 2012, representing about 21% of the world production and 2.6 million tonnes of general rubber goods, 63% of which are destined for the automotive industry[9].
The industrial base of the European automotive industry survived the economic downturn following on from the financial crisis. However its ability to continue to survive will be dependent on its capacity to adapt to the new environment. As the Cars 21 High Level Group on the Competitiveness and Sustainable Growth of the Automotive Industry in the European Union has explained, "smooth adaptation to change in the automotive industry clearly necessitates anticipation of skills needs and availability of human resources. It is essential to ensure that the automotive industry has the suitably skilled workforce in order to avoid skills shortages and mismatches". In addition "anticipation of future skill requirements and consequent adaptation of school curricula and retraining in the context of life-long learning of workers already active in the sector is also crucial for maintaining the high employment in the automotive industry[10]".

This report seeks to provide a platform for adapting to change and anticipating future skill requirements.

[6]Source : ACEA
[7]Source: ETRMA
[8]Source : ACEA
[9]Source: ETRMA
[10]European Commission, Cars 21 High Level Group on the Competitiveness and Sustainable Growth of the Automotive Industry in the European Union, 2012, p 21

Chapter 4
Methodology

The methodology of this report has been established on the basis of the development of gradual cooperation between the founding partners and members of the European Automotive Skills Council (EASC), the Project Support group, industrial corporates and external experts.

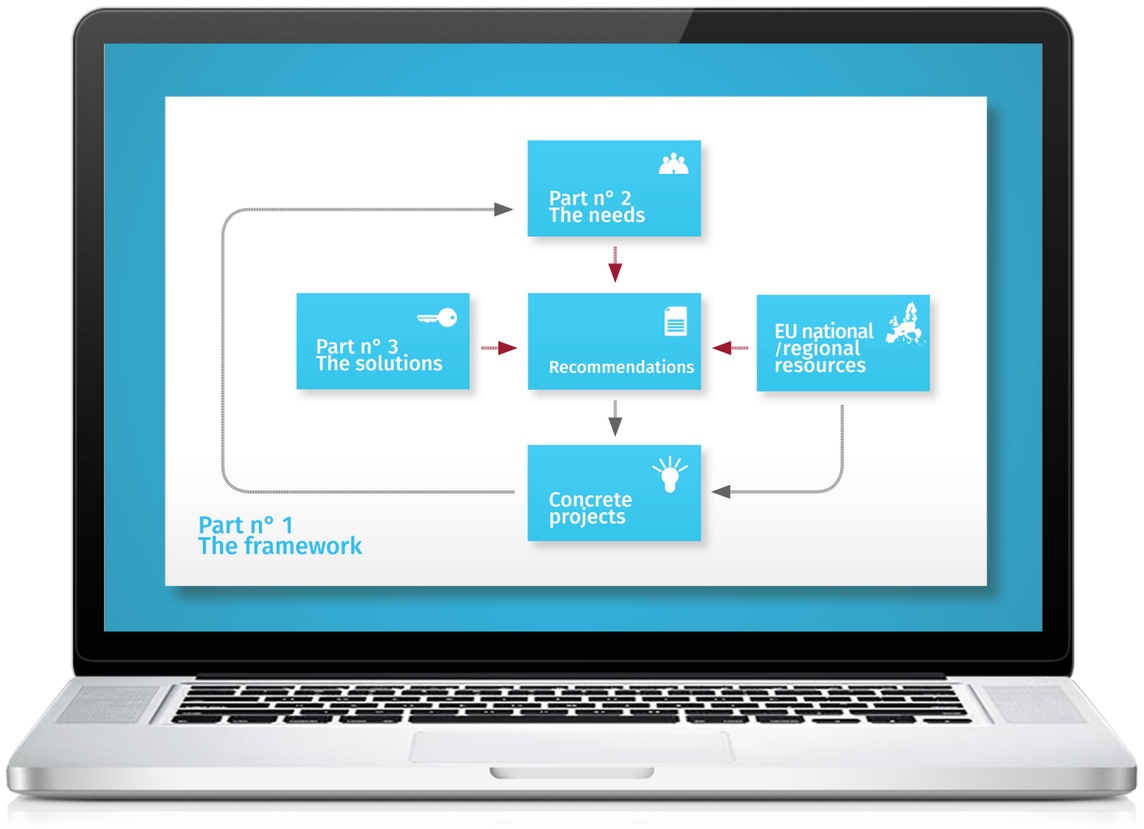
Part 1 - Employment situation of the automotive sector, including forecasts and trends is divided into two parts, manufacture of motor vehicles, trailers and semi-trailers (Nace C29) and the manufacture of rubber products (Nace C221), and more specifically the manufacture of rubber tyres and tubes – retreading and rebuilding of rubber tyres (Nace C2211).

A set of data regarding the structure of employment is to be found in comparative statistics provided by Eurostat for the year 2012.

Data for Part 2 - Evolution of the automotive sector's occupations and associated skills - is provided primarily by EASC partners on the basis of a survey questionnaire which investigates the impact that seven drivers (advanced manufacturing; advanced materials; complex and global supply chains; life cycle design, pollution prevention, product recyclability; active safety, automated driving, connectivity; decarbonisation, hybridisation, electrification; and evolution of consumer requirements) have on five traditionally representative occupations in the automotive sector (maintenance technician, CNC operator/tool and die maker, paint technician/motor vehicle painter, assembler, and material planning analyst); on key skills that are required for each of these occupations; and on the generation of new emerging occupations.

Data for Part 3 - Innovative tools, national and regional strategies, local initiatives, methods to monitor skills' needs and address skill mismatch and gaps - is provided by EASC partners on the basis of a survey questionnaire soliciting examples of best practice at the national level on the basis of meeting skills' needs, engaging in new forms of learning, developing new qualifications, transferring knowledge and skills, training for apprenticeships, certifying knowledge, skills and competence and addressing and closing the skills' gap.

An initial draft of the report was circulated to European Social Partners for their comments and approval, prior to the preparation of the final version.



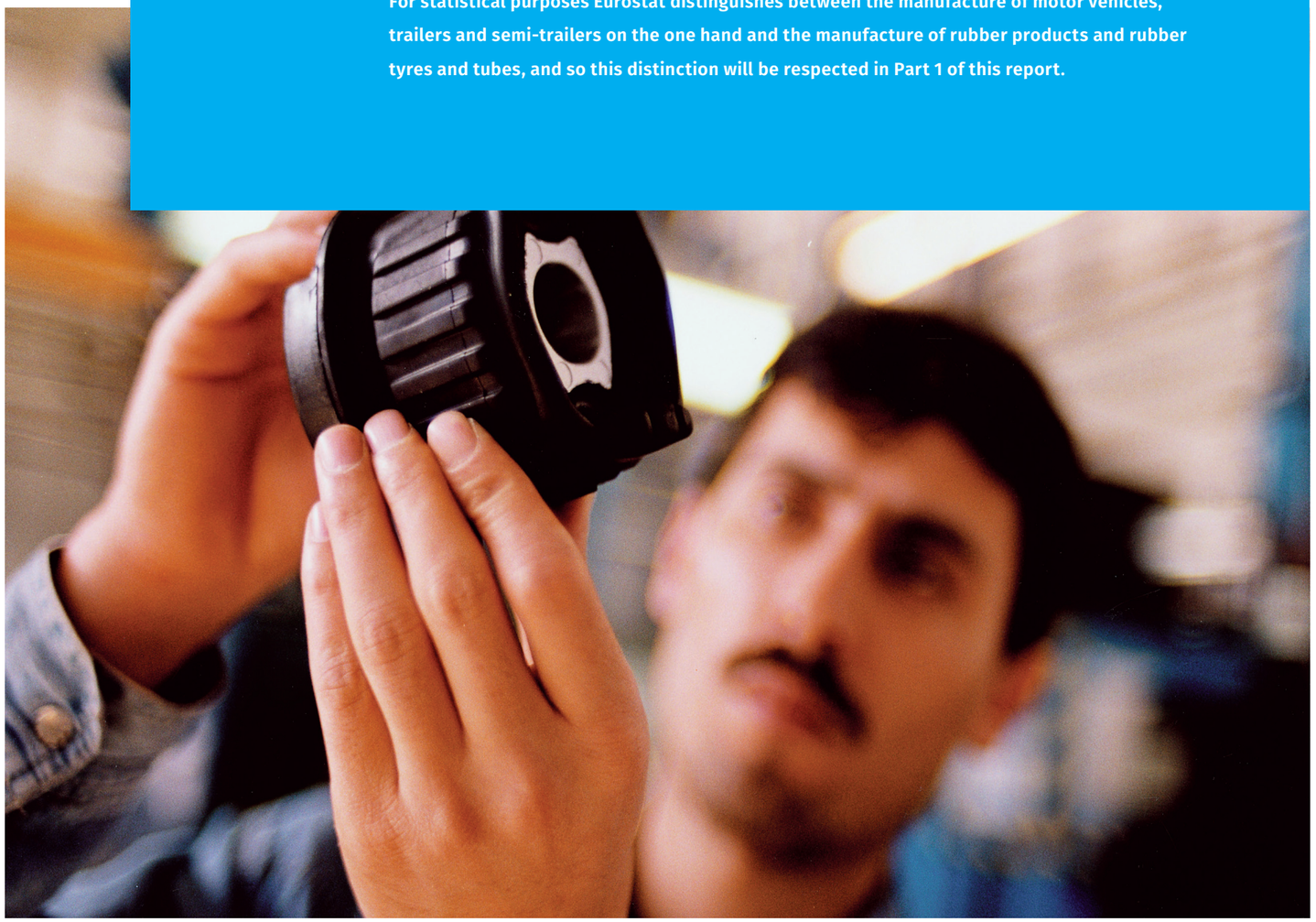
Chapter 5

Part 1: Employment situation in the automotive sector, including forecast & trends

5.1 Employment in the automotive sector

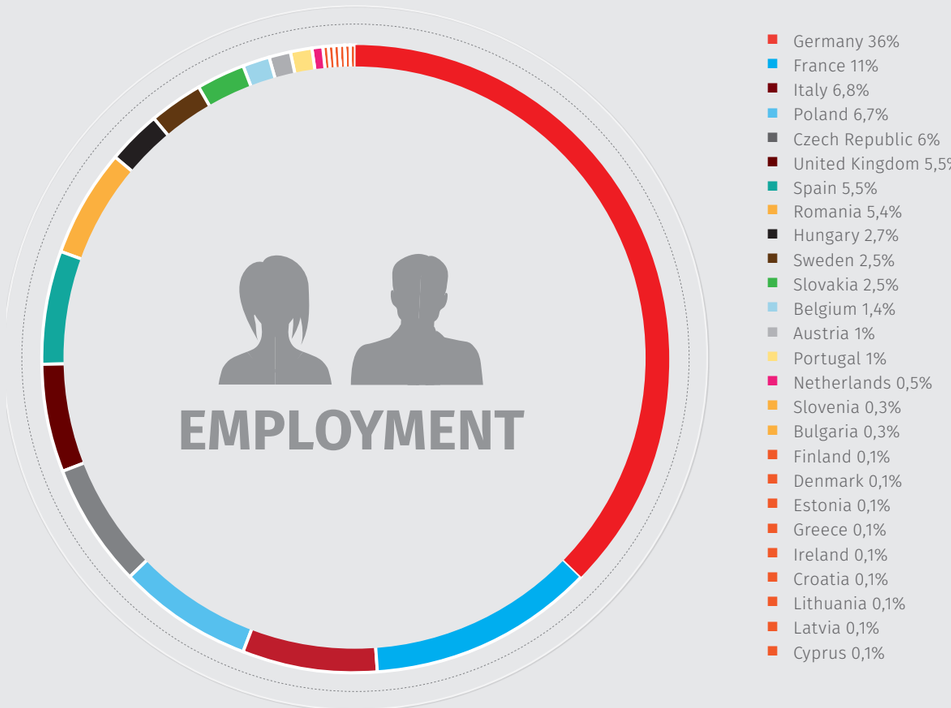
What are the defining elements of the employment situation in the automotive sector in the first part of the decade (2012), and what trends can be identified?

For statistical purposes Eurostat distinguishes between the manufacture of motor vehicles, trailers and semi-trailers on the one hand and the manufacture of rubber products and rubber tyres and tubes, and so this distinction will be respected in Part 1 of this report.



5.1.1 Employment and manufacture of motor vehicles, trailers and semi-trailers

Figure 7: Distribution of persons employed in the EU, manufacture of motor vehicles, trailers and semi-trailers (Nace C291, 292, 293), 2012 /**Eurostat sbs_sc_ind_r2**



As can be seen from **Figure 7** and **Table 1,** just over two and a quarter million persons were employed in the manufacture of motor vehicles, trailers and semi-trailers (Nace C29) in 2012, and employment varies significantly from one Member State to another.

At the one end of the spectrum there are under 5,000 persons employed in Denmark, Estonia, Ireland, Greece, Croatia, Cyprus, Latvia and Lithuania. At the other more than 100,000 are employed in the Czech Republic, Spain, Italy, Poland, Romania and the United Kingdom; more than 200,000 are employed in France; and far ahead of the others Germany employs more than 800,000 persons.

Table 1: Distribution of persons employed, manufacture of motor vehicles, trailers and semi-trailers (Nace C291, 292, 293), 2012

Overall the trend is mixed. Since the onset of the economic crisis there has been a significant reduction in the number of persons employed in the sector in most Member States (-11% in Italy, -13% in the United Kingdom, -17% in Spain and Sweden, -19% in Belgium and -20% in France), with the notable exception of Germany, and a number of Central and Eastern European States, namely, Bulgaria, Latvia, Poland, Romania and Slovakia.

EUROPEAN UNION – 28	2,289,826
BELGIUM	38,432
BULGARIA	12,790
CZECH REPUBLIC	143,227
DENMARK	4,861
GERMANY	812,514
ESTONIA	3,516
IRELAND	2,808
GREECE	2,843
SPAIN	134,604
FRANCE	243,779
CROATIA	1,991
ITALY	162,865
CYPRUS	157
LATVIA	1,489
LITHUANIA	1,657
LUXEMBOURG	:
HUNGARY	69,245
MALTA	:
NETHERLANDS	19,528
AUSTRIA	31,555
POLAND	156,865
PORTUGAL	30,021
ROMANIA	131,084
SLOVENIA	12,970
SLOVAKIA	61,571
FINLAND	7,548
SWEDEN	66,836
UNITED KINGDOM	135,070

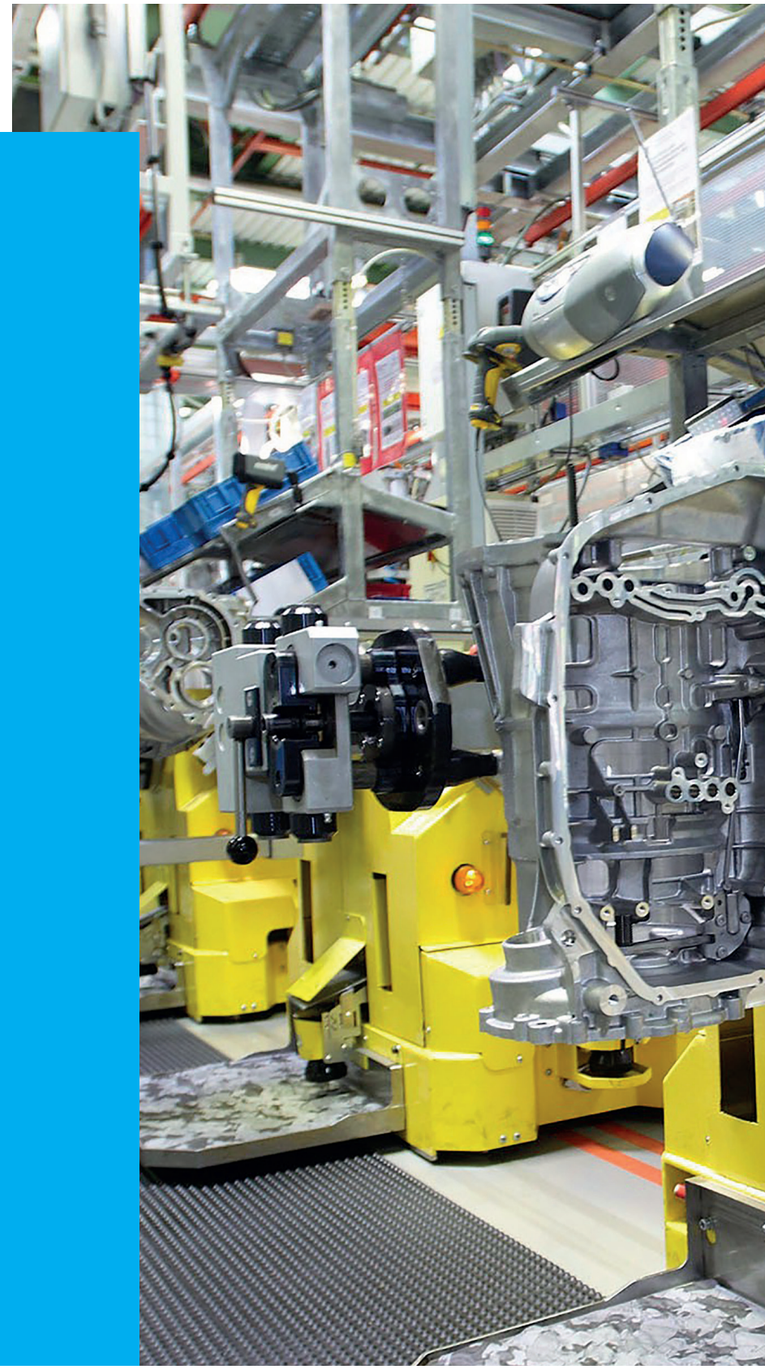
: = not available Source: Eurostat sbs_sc_ind_r2

Table 2: Number of persons employed per subsector, manufacture of motor vehicles, trailers and semi-trailers, (Nace C291, 292, 293), 2012

	Motor vehicles, trailers and semi-trailers (total)	Motor vehicles	Bodies (coachwork) for motor vehicles; trailers and semi-trailers	Parts and accessories for motor vehicles
EUROPEAN UNION – 28	**2,289,826**	**967,261**	**154,639**	**1,045,039**
BELGIUM	38,432	21,453	4,610	12,369
BULGARIA	12,790	0	249	12,541
CZECH REPUBLIC	143,227	34,565	3,600	105,062
DENMARK	4,861	:c	1,684	:c
GERMANY	812,514	495,359	43,082	274,073
ESTONIA	3,516	:	:	2,894
IRELAND	2,808	:	:	2,370
GREECE	2,843	487	1,115	1,241
SPAIN	134,604	60,252	9,287	65,066
FRANCE	243,779	137,115	24,103	82,561
CROATIA	1,991	:c	:c	1,529
ITALY	162,865	60,124	12,000	90,741
CYPRUS	157	0	76	81
LATVIA	1,489	189	477	824
LITHUANIA	1,657	101	543	1,013
LUXEMBOURG	:	0	358	:c
HUNGARY	69,245	14,725	3,013	51,507
MALTA	:	0	0	:c
NETHERLANDS	19,528	9,022	6,071	4,434
AUSTRIA	31,555	14,081	3,981	13,493
POLAND	156,865	30,375	9,180	117,310
PORTUGAL	30,021	5,702	2,355	21,964
ROMANIA	131,084	18,287	1,684	111,113
SLOVENIA	12,970	2,351	1,509	9,110
SLOVAKIA	61,571	16,256	1,482	43,833
FINLAND	7,548	2,339	3,855	1,354
SWEDEN	66,836	44,478	3,802	18,556
UNITED KINGDOM	135,070	:c	16,523	:c

As can be seen from Table 2, in terms of the number of persons employed the share of manufacture of bodies (coachwork) for motor vehicles; trailers and semi-trailers was considerably lower than and that of the other two subsectors. In some Member States, particularly in Central and Eastern Europe – Hungary, Poland, Romania and Slovakia, the number of persons employed in the parts and accessories sector is significantly larger than the number of persons employed in the manufacture of motor vehicles.

:= not available, c=confidential
Source: Eurostat sbs_sc_ind_r2



5.1.1.1 Employment and size of enterprises

Table 3: Numbers of persons employed per size of enterprise, manufacture of motor vehicles, trailers and semi-trailers, (Nace C291, 292, 293), 2012

	Total	0 to 9	10 to 19	20 to 49	50 to 249	250+
EUROPEAN UNION (28)	**2,289,826**	**33,461**	**30,689**	**64,307**	**259,618**	**1,898,996**
BELGIUM	38,432	582	463	1,202	4,649	31,536
BULGARIA	12,790	183	152	394	1,447	10,614
CZECH REPUBLIC	143,227	1,146	742	3,270	16,708	121,361
DENMARK	4,861	389	334	806	1,916	1,416
GERMANY	812,514	4,661	6,945	9,733	51,950	739,225
ESTONIA	3,516	90	105	223	662	2,436
IRELAND	2,808	97	105	172	581	1,853
GREECE	2,843	1,641	:c	:c	434	:cc
SPAIN	134,604	3,748	3,031	5,012	24,237	98,576
FRANCE	243,779	3,394	3,718	7,951	28,782	199,933
CROATIA	1,991	223	147	421	:	:
ITALY	162,865	4,372	5,104	10,682	23,740	118,967
CYPRUS	157	:c	0	:c	0	0
LATVIA	1,489	55	37	102	1,295	0
LITHUANIA	1,657	61	:c	336	632	:c
LUXEMBOURG	:	:c	:c	:c	:cc	0
HUNGARY	69,245	627	463	1,461	9,066	57,628
MALTA	:	:c	0	0	0	:c
NETHERLANDS	19,528	1,355	1,029	2,423	4,423	10,299
AUSTRIA	31,555	518	548	877	5,484	24,128
POLAND	156,865	2,289	1,487	3,159	22,837	127,093
PORTUGAL	30,021	950	600	1,646	5,505	21,320
ROMANIA	131,084	458	771	2,017	8,642	119,196
SLOVENIA	12,970	238	196	434	1,741	10,360
SLOVAKIA	61,571	208	177	653	5,764	54,769
FINLAND	7,548	408	400	993	2,444	3,303
SWEDEN	66,836	1,388	916	2,775	8,450	53,307
UNITED KINGDOM	135,070	4,380	3,219	7,565	28,229	91,676

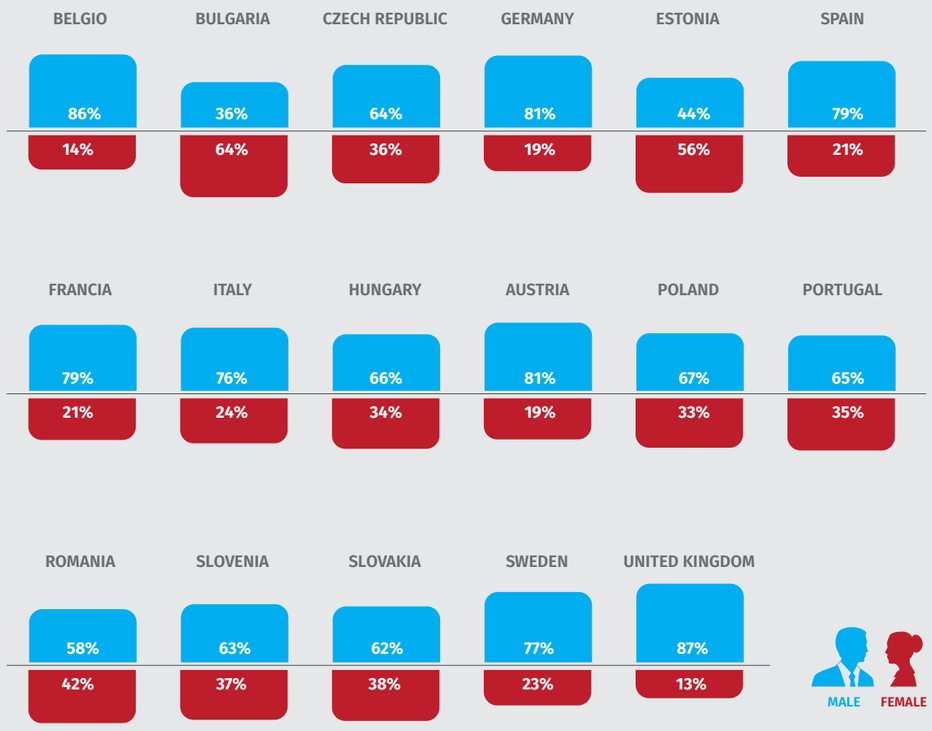
In most Member States the vast majority (over 80%) of persons employed in the manufacture of motor vehicles work in large-sized enterprises (250+), followed by medium-sized enterprises (50-249).

Medium-sized enterprises account for approximately 11%, and micro and small-sized enterprises are in a clear minority.

c=confidential Source: Eurostat sbs_sc_ind_r2

5.1.1.2 Employment and gender

Figure 8: Distribution of persons employed by gender in the EU, manufacture of motor vehicles, trailers and semi-trailers (Nace C291, 292, 293), 2012 /**Eurostat lfsa_egan22d**



As can be seen from **Figure 8** and **Table 4,** there are significantly more men than women working in the manufacture of motor vehicles in all countries, except in Bulgaria and Estonia, and here the figures are considered to be of low reliability.

The proportion is more or less 3:1 for the entire European Union (76:24). However there is a higher proportion of women in some countries, notably the Czech Republic, Hungary, Poland, Portugal, Romania, Slovenia and Slovakia.

Table 4: Numbers of persons employed by gender, manufacture of motor vehicles, trailers and semi-trailers, (Nace C291, 292, 293), 1000s, 2012[11]

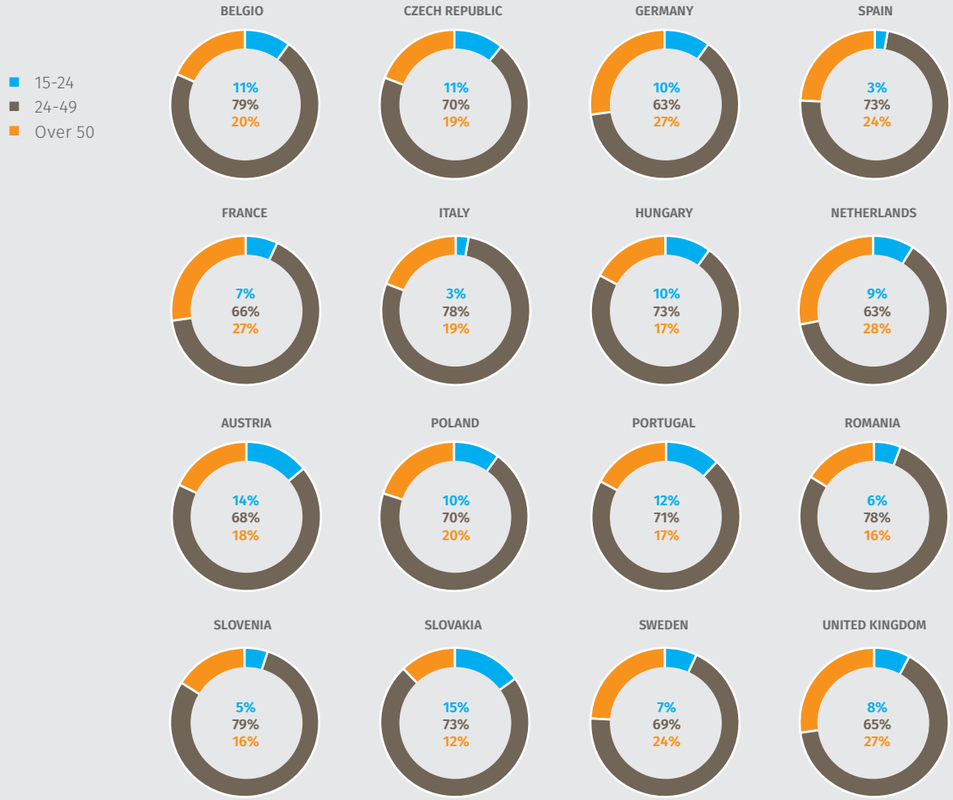
	Total	Males	Females
EUROPEAN UNION (28)	**2,969.0**	**2,253.2**	**715.8**
BELGIUM	51.6	44.4	7.2
BULGARIA	11.7	4.2u	7.4u
CZECH REPUBLIC	193.3	122.8	70.5
DENMARK	5.3	4.4	:u
GERMANY	1,111.7	901.4	210.3
ESTONIA	4.9	2.2u	2.8
IRELAND	3.3	2.2u	:u
GREECE	2.5	2.4	:c
SPAIN	198.1	156.0	42.1
FRANCE	264.1	208.8	55.3
CROATIA	3.2	2.7	:c
ITALY	204.4	155.4	49.0
CYPRUS	:u	:u	:c
LATVIA	:u	:u	:u
LITHUANIA	:u	:u	:u
LUXEMBOURG	:u	:u	:u
HUNGARY	101.1	66.6	34.5
MALTA	:c	:c	:
NETHERLANDS	18.1	16.9	:u
AUSTRIA	36.8	29.6	7.2
POLAND	218.2	146.6	71.5
PORTUGAL	47.2	30.9	16.4
ROMANIA	134.1	78.2	56.0
SLOVENIA	17.6	11.1	6.4
SLOVAKIA	93.3	58.6	34.7
FINLAND	8.4	7.1	:u
SWEDEN	57.7	44.3	13.4
UNITED KINGDOM	178.7u	154.1u	24.6

[11]Please note that the overall figure provided by Eurostat for this table is significantly different from the figure in the previous 3 tables

c-confidential, u-low reliability
Source: Eurostat lfsa_egan22d

5.1.1.3 Employment and age

Figure 9: Distribution of persons employed by age in the EU, manufacture of motor vehicles, trailers and semi-trailers (Nace C291, 292, 293), 2012 /**Eurostat lfsa_egan22d**



As can be seen from **Figure 9** and **Table 5**, there is a significant number of persons aged 50 to 64, around 23%, approaching or starting to approach retirement age.

Given that the lack of skilled labour is a constant concern, employers and policy makers will clearly need to reflect upon ways in which they will deal with this problem, particularly in Member States, such as Denmark, with a significantly higher figure (43%).

It may mean that employers will be faced with a shortage of skilled labour in the sector or it may mean that they will be able to reduce the number of persons employed in the sector.

Table 5: Numbers of persons employed by age, manufacture of motor vehicles, trailers and semi-trailers, (Nace C291, 292, 293), 1000s, 2012[12]

	15 to 24	25 to 49	50 to 64	15 to 64
EUROPEAN UNION (28)	**252.3**	**2,036.7**	**679.9**	**2,969.0**
BELGIUM	5.8	35.7	10.1	51.6
BULGARIA	:u	7.6	:u	11.7
CZECH REPUBLIC	21.6	136.1	35.6	193.3
DENMARK	:u	2.8	2.3	5.3
GERMANY	106.5	712.1	293.1	1,111.7
ESTONIA	:u	3.5	:u	4.9
IRELAND	:u	2.5u	:u	3.3
GREECE	:	2.0u	:cc	2.5u
SPAIN	5.2	144.8	48.1	198.1
FRANCE	18.9	175.8	69.4	264.1
CROATIA	:c	2.9u	:c	3.2u
ITALY	5.1	161.3	38.0	204.4
CYPRUS	:	:c	:u	:u
LATVIA	:	:u	:u	:u
LITHUANIA	:c	:u	:u	:u
LUXEMBOURG	:	:u	:c	:u
HUNGARY	10.0	73.9	17.2	101.1
MALTA	:	:c	:	:c
NETHERLANDS	1.6u	11.6	5.0	18.1
AUSTRIA	5.1u	25.4	6.3	36.8
POLAND	22.8	153.5	41.9	218.2
PORTUGAL	5.4	34.2	7.6	47.2
ROMANIA	8.4u	105.0	20.8	134.1
SLOVENIA	1.0u	13.9	2.7u	17.6
SLOVAKIA	13.5	68.7	11.2	93.3
FINLAND	:u	4.7	3.0u	8.4
SWEDEN	4.2	39.4	14.1	57.7
UNITED KINGDOM	13.6	116.8	48.4	178.7

[12]Please note that the overall figure provided by Eurostat for this table is significantly different from the figure in the previous 4 tables

c-confidential, u-low reliability Source: Eurostat lfsa_egan22d

5.1.2 Employment and manufacture of rubber products (NACE C221) and tyres and tubes – retreading and rebuilding of rubber tyres, (NACE C2211), 2012

Table 6: Number of persons employed, manufacture of rubber products, (Nace C221), 1000s, 2012

EUROPEAN UNION (28)	330,076
BELGIUM	2,415
BULGARIA	3,496
CZECH REPUBLIC	19,564
DENMARK	832
GERMANY	75,516
ESTONIA	796
IRELAND	593
GREECE	1,142
SPAIN	22,036
FRANCE	50,939
CROATIA	978
ITALY	39,946
CYPRUS	17
LATVIA	256
LITHUANIA	540
LUXEMBOURG	:
HUNGARY	10,988
MALTA	:
NETHERLANDS	3,303
AUSTRIA	2,099
POLAND	34,891
PORTUGAL	4,999
ROMANIA	14,056
SLOVENIA	3,251
SLOVAKIA	7,588
FINLAND	2,503
SWEDEN	5,408
UNITED KINGDOM	21,924

: = not available Source: Eurostat sbs_sc_ind_r2

Approximately 330,000 persons were employed in the manufacture of rubber products (Nace C221) in 2012. The most significant numerically is Germany, with over 75,000, followed by France, with over 50,000, Italy, with nearly 40,000, Poland, with nearly 35,000, then Spain, the United Kingdom, the Czech Republic, Romania and Hungary; all the others have less than 10,000 persons employed. Overall the trend is mixed. Since 2008 there has been a reduction in the number of persons employed in the sector in Member States, with the exception of Central and Eastern European countries (Bulgaria, Czech Republic, Estonia, Hungary, Lithuania, Poland, Romania and Slovakia) and marginally Portugal.

5.1.2.1 Employment and size of enterprises

In most Member States the vast majority (60%) of persons employed in the manufacture of rubber products is in large-sized enterprises (250+), followed by medium-sized enterprises (50-249). Micro and small-sized enterprises account for approximately 4.3%, and medium-sized enterprises are in a clear minority (3.7%).

Table 7: Number of persons employed per size of enterprise, manufacture of rubber products, (Nace C221), 2012

2012	Total	From 0 to 9 persons employed	From 10 to 19 persons employed	From 20 to 49 persons employed	From 50 to 249 persons employed	250 persons employed or more
EUROPEAN UNION (28)	330,076	14,301	12,359	22,144	57,264	197,357
BELGIUM	2,415	49	:	551	874	:
BULGARIA	3,496	327	212	509	958	1,490
CZECH REPUBLIC	19,564	:	:	:	:	:
DENMARK	832	:	134	388	:	0
GERMANY	75,516	1,787	2,366	2,705	14,585	54,073
ESTONIA	796	:	:	:	:	:
IRELAND	593	62	39	:	0	:
GREECE	1,142	466	111	:	:	:
SPAIN	22,036	1,373	1,289	2,386	4,058	12,930
FRANCE	50,939	1,300	619	2,397	5,469	41,155
CROATIA	978	298	132	125	423	0
ITALY	39,946	3,287	3,606	4,863	9,141	19,049
CYPRUS	17	17	0	0	0	0
LATVIA	256	53	56	69	78	0
LITHUANIA	540	62	47	83	348	0
LUXEMBOURG	:	:	:	:	:	:
HUNGARY	10,988	437	278	699	1,689	7,885
MALTA	:	0	0	0	:	:
NETHERLANDS	3,303	213	:	555	1,019	:
AUSTRIA	2,099	69	153	159	309	1,409
POLAND	34,891	2,029	812	1,413	5,254	25,383
PORTUGAL	30,021	950	600	1,646	5,505	21,320
ROMANIA	131,084	458	771	2,017	8,642	119,196
SLOVENIA	12,970	238	196	434	1,741	10,360
SLOVAKIA	61,571	208	177	653	5,764	54,769
FINLAND	7,548	408	400	993	2,444	3,303
SWEDEN	66,836	1,388	916	2,775	8,450	53,307
UNITED KINGDOM	135,070	4,380	3,219	7,565	28,229	91,676

: = not available Source: Eurostat sbs_sc_ind_r2

Just over 115,000 persons were employed in the manufacture of rubber tyres and tubes – retreading and rebuilding of rubber tyres products (Nace C2211) in 2012, and employment varies significantly from one Member State to another (Figure 10 and Table 8).

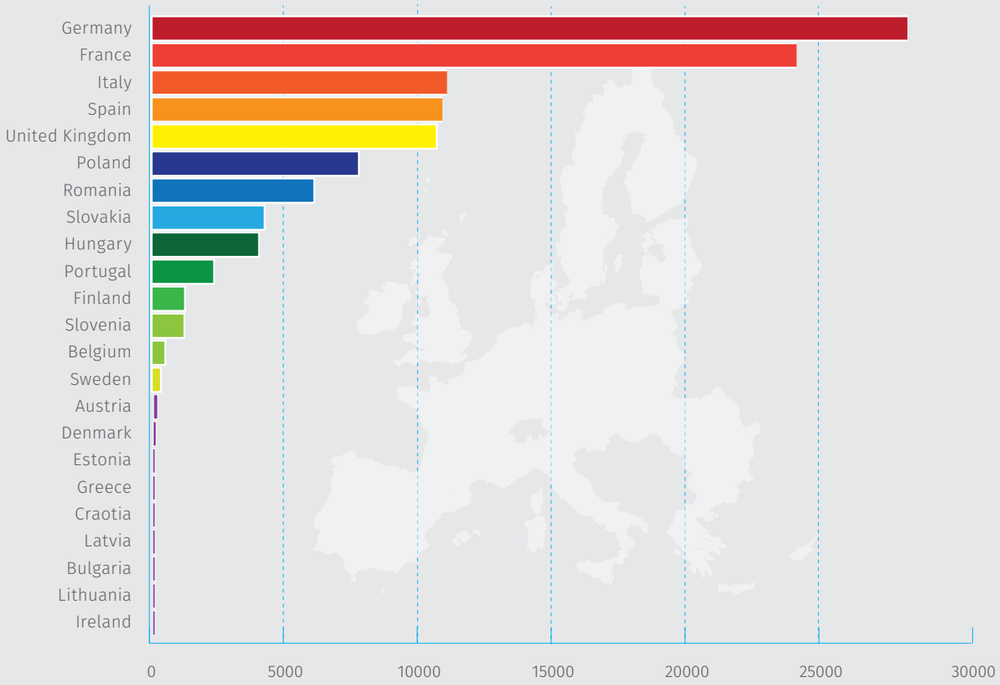


Figure 10: Distribution of persons employed, manufacture of rubber tyres and tubes – retreading and rebuilding of rubber tyres, (Nace C2211), 2012 /**Eurostat sbs_sc_ind_r2**

Table 8: Number of persons employed per subsector, manufacture of motor vehicles, trailers and semi-trailers, (Nace C291, 292, 293), 2012

EUROPEAN UNION (28)	115,110
BULGARIA	669
CZECH REPUBLIC	114
DENMARK	:
GERMANY	96
ESTONIA	24,053
IRELAND	152
GREECE	33
SPAIN	125
FRANCE	11,296
CROATIA	27,672
ITALY	120
CYPRUS	11,712
LATVIA	:
LITHUANIA	52
LUXEMBOURG	85
HUNGARY	:
MALTA	4,306
NETHERLANDS	0
AUSTRIA	:
POLAND	110
PORTUGAL	10,925
ROMANIA	2,411
SLOVENIA	7,646
SLOVAKIA	1,458
FINLAND	4,141
SWEDEN	1,408
UNITED KINGDOM	461
	6,065

: = not available Source: Eurostat sbs_sc_ind_r2

Overall the trend is clear. Since 2008 there has been a reduction in the number of persons employed in the sector in Member States, with the exception of Bulgaria, Estonia, Lithuania, Portugal, Romania and Slovakia.

Eurostat does not specifically publish figures for the distribution of persons employed by age and gender for the manufactures of rubber tyres and tubes – retreading and rebuilding of rubber tyres, but does for the distribution of persons employed by for the manufacture of rubber products. However, given that the vast majority (75%) of the products included in NACE C221 are part of the automotive sector, the employment statistics below can be considered as representative.

5.1.2.2 Employment and age

There is a significant number of persons in the manufacture of rubber products aged over 55 in Germany France, Italy, the United Kingdom and Poland, approaching or starting to approach retirement age. Given that the lack of skilled labour is a constant concern, employers and policy makers will clearly need to reflect upon ways in which they will deal with this problem.

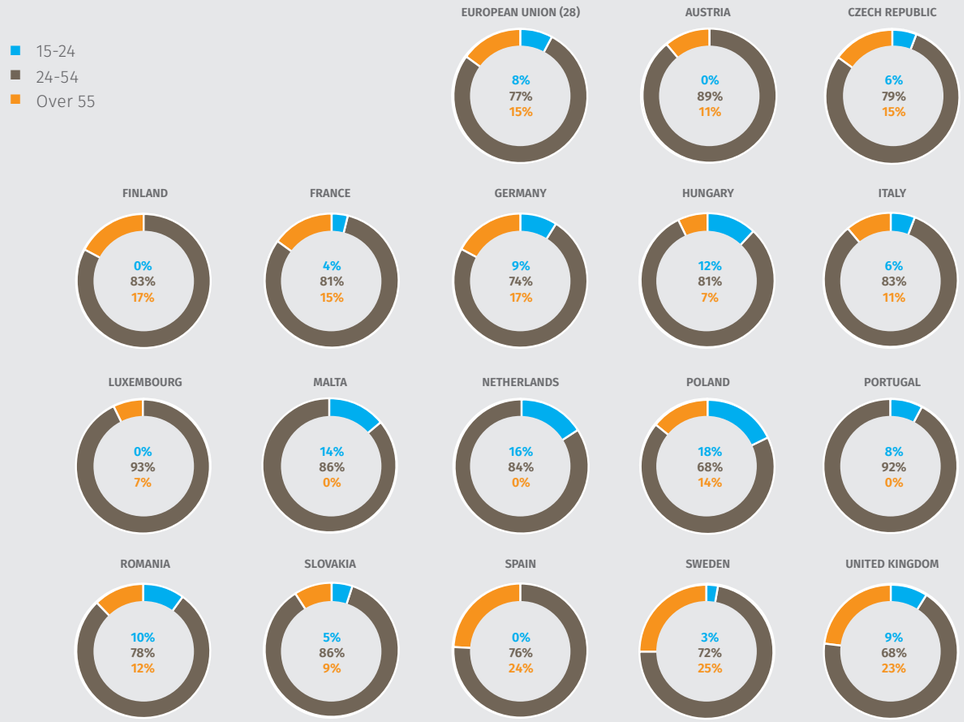


Figura 11: Distribution of persons employed by age, manufacture of rubber products, (Nace C221), %, 2012 /**Eurostat sbs_sc_ind_r2**

5.1.2.3 Employment and gender

There are significantly more men than women working in the manufacture of rubber products in all countries, except in Poland, Romania and Latvia (Figure 11 and Table 9). Estonia however is the only Member State where women are in the majority.

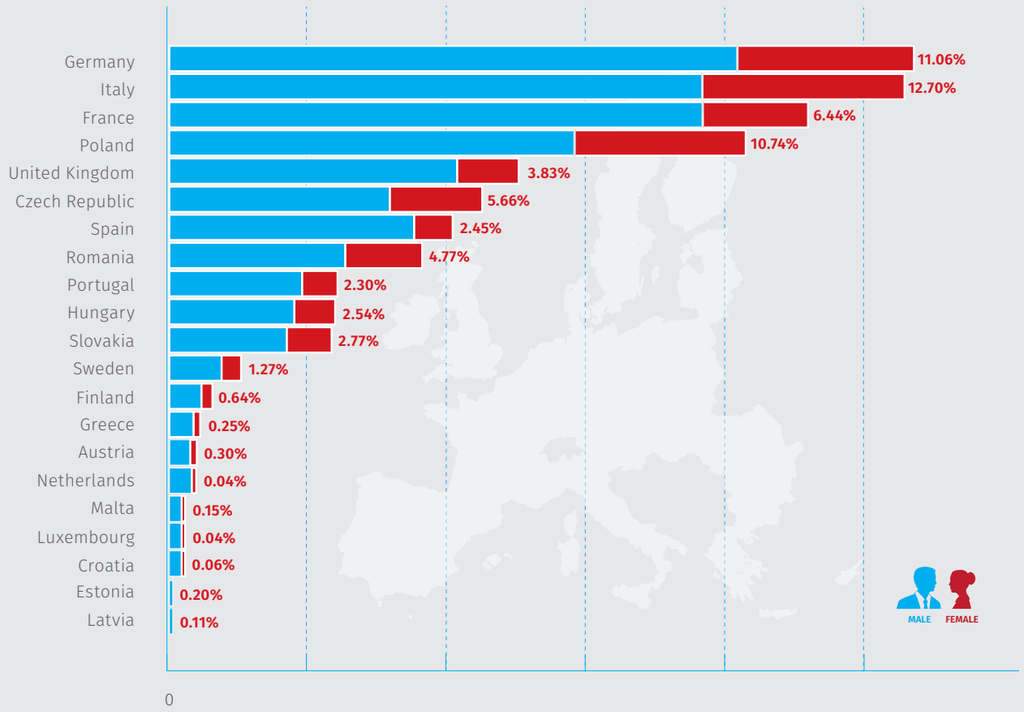


Figure 12: Distribution of persons employed by gender, manufacture of rubber products, (Nace C221), %, 2012 /**Eurostat lfsa_egan22d**

Table 9: Distribution of persons employed by gender, manufacture of manufacture of rubber products, (Nace C221), %, 2012

	males	females	total
GERMANY	76,04%	23,96%	46,15
ITALY	72,07%	27,93%	45,46
FRANCE	83,68%	16,32%	39,45
POLAND	69,94%	30,06%	35,71
UNITED KINGDOM	82,41%	17,59%	21,74
CZECH REPUBLIC	70,62%	29,38%	19,25
SPAIN	86,08%	13,92%	17,62
ROMANIA	69,63%	30,37%	15,71
PORTUGAL	77,94%	22,06%	10,44
HUNGARY	75,22%	24,78%	10,25
SLOVAKIA	72,34%	27,66%	10,03
SWEDEN	72,04%	27,96%	4,56
FINLAND	76,97%	23,03%	2,77
GREECE	86,52%	13,48%	1,86
AUSTRIA	82,90%	17,10%	1,73
NETHERLANDS	97,55%	2,45%	1,53
MALTA	84,91%	15,09%	1,01
LUXEMBOURG	95,90%	4,10%	1,00
CROATIA	93,87%	6,13%	0,97
ESTONIA	34,70%	65,30%	0,31
LATVIA	60,90%	39,10%	0,28

Source: Eurostat lfsa_egan22d

5.1.3 Forecasting at the European level – the automotive sector

The automotive industry attaches great importance to reducing mismatches in the sectoral labour market, however it is difficult to obtain this information. The studies undertaken by or for big multinational companies is not publically available. When it comes to SMEs, they do not have the manpower to undertake such a mammoth task, and at national level there are only a few federated initiatives that could bring forward some work also on their behalf.

Neither CARS 21 nor CARS 2020 make any mention of future employment needs. It remain to be seen whether the initiative launched by the European Commission to set up a High Level Group on Automotive Industry GEAR 2030 to reinforce both the short-term and long-term competitiveness of the European automotive industry will include employment needs[13].

However according to IndustriAll, it is highly likely that employment will be significantly impacted by the following: a further relocation of the sector from Western to Central Europe; a trend to shift value added from original equipment manufacturers to suppliers; the export surplus in the sector, electrification (less complex cars) and hybridisation (more complex cars); the trend towards smaller (and thus simpler) cars; and finally the digitalisation of production processes.

ETRMA has made a projection for the tyre industry. "If we consider an average growth or GDP of 2% and a normal fluctuation of only 3 to 4% the industry has to hire each year up to 15.000 employees. This is not considering an increased fluctuation due to the demographics of our workforce".[14] Furthermore, investments in new tyre plants in Central and Eastern Europe are planned in the next two to three years.

The European Commission has recently set up a EU Skills Panorama which is run by Cedefop, the EU Agency for the development of vocational training, and which is described as a "central access point for data, information and intelligence on trends for skills and jobs across Europe". [15]

It produces a series of short Analytical Highlights, one of which is devoted to the automotive sector and clean vehicles. It foresees an overall increase in employment levels in the sector in the EU-28 from 2,242,000 in 2013 to 2,314,000 in 2025, which amounts to 3.2% per year. "Taking account of a substantial need to replace employees leaving the sector due to retirement or for other reasons, an estimated 888,000 automotive jobs will need to be filled from 2013 to 2025." It is expected that the prime beneficiaries of this expansion in automotive employment is expected in Romania (+ 48,040 jobs) and the United Kingdom (+ 33,050 jobs), with above-average employment growth in Finland, Spain and Hungary.[16]

[13] C(2015) 6943 of 19 October 2015
[14] ETRMA
[15] http://euskillspanorama.cedefop.europa.eu/
[16] EU Skills Panorama, 2014, Automotive sector and clean vehicles, Analytical Highlight

In terms of sectors, it features manufacturing, but unfortunately for the purposes of this study the figures are not disaggregated. In terms of occupations, there is a section on metal and electrical trades, but there again the figures are not disaggregated, and so it is not possible to see the developments that may occur in the automotive sector.[17] There is also a section on assemblers, a significant, if declining, grouping occupation within the automotive sector but there again the figures are not disaggregated, and so it is not possible to see the developments that may occur in the automotive sector.[18]

[17] EU Skills Panorama, 2014, Metal and electrical trades, Analytical Highlight
[18] EU Skills Panorama, 2014, Assemblers, Analytical Highlight

5.1.3.1 Forecasting at the national level - in EASC partner countries

In France an important forecasting agency in the metalworking industry exists, the *Observatoire* de la *Metallurgie*. It has set up a technical working group representing both sides of industry which reports to the Joint National Committee for Employment in the metalworking sector.[19] Its role is to analyse and forecast occupations and qualifications within the French metalworking sector. A recent study has examined recruitment needs in the metalworking sector, in response to the Pact for Responsibility, which aims to accelerate business' job creation and accelerate the purchasing power of low income households and which was launched by the French government.[20] The study examines three different scenarios – the status quo, without the Pact for Responsibility; with the benefit of the measures of the Pact for Responsibility; and with the benefit of the measures of the Pact for Responsibility plus other supplementary measures.

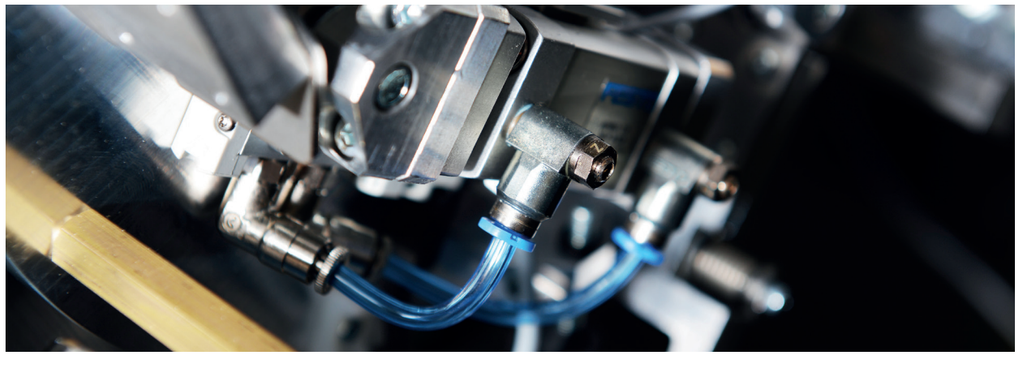
In the first scenario, the status quo, without the Pact for Responsibility, it foresees a reduction in production in the automotive sector of 0.5% per year for the period 2010-2015 and of 0.3% per annum for the period 2015-2020 and a small increase of 0.1% for the period 2020-2025. This would lead to a reduction in overall employment of 3.4% per year in the first period, 2.8% per year in the second period and 3.1% per year in the third. A grim prospect for the industry.

In the second scenario, with the benefit of the measures of the Pact for Responsibility, it foresees a reduction in production in the automotive sector of 0.2% per year for the period 2010-2015, and an increase of 0.6% per annum for the period 2015-2020 and 0.4% for the period 2020-2025. This would lead to an increase in overall employment of 0.3% per year in the first period, 0.9% per year in the second period and 0.3% per year in the third.

In the third scenario, with the benefit of the measures of the Pact for Responsibility plus other supplementary measures, it foresees a reduction in production in the automotive sector of 0.2% per year for the period 2010-2015, and an increase of 1.1% per annum for the period 2015-2020 and 0.6% for the period 2020-2025.

[19] It is made up of representatives of the employers' organisation - l'Union des Industries et Métiers de la Métallurgie UIMM and the five trade union federations - Fédération Générale des Mines et de la Métallurgie CFDT, Fédération des Cadres, de la Maîtrise et des Techniciens de la Métallurgie CFE-CGC, Fédération Nationale CFTC des Syndicats de la Métallurgie et Parties Similaires, la Fédération des Travailleurs de la Métallurgie CGT and Fédération Confédérée FO de la Métallurgie

[20] http://www.gouvernement.fr/sites/default/files/locale/piece-jointe/2014/09/frenchresponsabilitypact-en.pdf



Taking into account other factors such as retirement and mobility in the automotive sector, it foresees a need to recruit 17,400 persons in the period 2016-2020 and 15,100 persons in the period 2021-2025 (according to the first scenario). It foresees a need to recruit 20,200 persons in the period 2016-2020 and 17,400 persons in the period 2021-2025 (according to the second scenario). Finally it foresees a need to recruit 19,700 persons in the period 2016-2020 and 16,700 persons in the period 2021-2025 (according to the third scenario).

The study also forecasts developments according to the different scenarios for different occupations – senior executives, technical engineers and managers, middle ranking managers, supervisors, office workers, skilled workers and unskilled workers – but these figures are not broken down per industrial sector.[21]

Another study, from the United Kingdom, foresees growth in vehicle production and the local sourcing of components for the industry and an increase in employment. By 2020, the UK could be producing two million vehicles a year, compared to its current annual total of around 1.5 million. By 2020, local sourcing of components is expected to increase from current levels of 41% to more than 50%. This could mean that 5,000 more jobs at vehicle and engine producers would be created, along with up to 28,000 in the supply chain, by the early 2020s.[22]

[21] Observatoire de la Métallurgie, Prospective des besoins de recrutement dans la métallurgie à horizon 2025, 2014

[22] "These projected figures are based on the assumption that the UK remains in the EU". Henry, Ian, The future of UK automotive manufacturing in 2025 and beyond, The Society of Motor Manufacturers and Traders, 2015. p 3.

Chapter 6

Part 2: Evolution of the automotive sector's occupations and associated skills

The automotive sector is a significant employer in the European Union, with just over two and a quarter million people, and a further 110,000 employed in the manufacture of tyres.

The sector's occupations and associated skills are evolving rapidly, and in the context of this report the EASC partners have chosen in the first instance to highlight five different traditionally representative occupations:

- Maintenance technician
- CNC operator/tool and die maker
- Paint technician/motor vehicle painter
- Assembly line operative/ assembler
- Materials planning analysis

What are the changes that are occurring in these occupations, and what is driving these changes?

6.1 Drivers of change

EASC partners have identified seven drivers of change, as follows:

- **Advanced manufacturing**
- **Advanced materials**
- **Complex and global supply chains**
- **Life cycle design, pollution prevention and product recyclability**
- **Active safety, automated driving and connectivity**
- **Decarbonisation, hybridisation and electrification**
- **Evolution of customer requirements**

6.1.1 Advanced manufacturing

Firms in the automotive sector are facing constant developments in the area of advanced manufacturing. Integrating the results of technological research into manufacturing products and processes is not new. What is new however is the level of sophistication, brought on primarily by digitalisation, and the speed with which these changes are being introduced.

Products are more sophisticated in terms of design and technological complexity, and processes are more and more dependent on sophisticated computer technologies, such as computer-aided design (CAD), computer-aided engineering (CAE) and computer-aided manufacturing (CAM).

Automation, the use of various control systems for operating equipment as part of a manufacturing process, is certainly not new in the automotive industry, but it has taken on a new significance with the introduction of robotics, with some parts of car manufacturing processes being taken over by robots.

What do automation technologies means for jobs, organisations, and the future of work? A recent study in the McKinsey Quarterly (November 2015) came up with the following four conclusions. Firstly, very few occupations will be automated in their entirety in the near or medium term – the emphasis will be on the automation of certain activities. Automation will not only impact on low-skilled, low-wage employees, but increasingly parts of some of the highest paid occupations. Many jobs and processes will need to be redefined to take advantage of the potential that automation offers. And finally, activities requiring creativity and sensing emotions are core to the human experience and also difficult to automate.

According to IndustriAll, the number of operators will probably shrink in future, as a result of the trend towards modular production whereby ready-made modules are replaced by individual parts; the centrality of the platform strategy, the standardisation of powertrains and the invisible parts of the car; electrification and digitalisation: electronic the replacement of complex (to install) electronic components by ready-made components; and the digitalisation and robotisation of production processes.

According to EASC partners advanced manufacturing will have a significant impact on the work to be done by maintenance technicians. Lean systems require highly efficient materials planning, with a very close link between production and logistics. Technological developments will require skilled technicians who understand the causal relation between the different technological sub-processes and are aware of the advantages that new equipment brings directly to the manufacturing process.

Electricity and electronics are the basis sourcing basis for automation and robotics. New skills will be needed in response to the introduction of ICT in a manufacturing environment and the concepts of Industry 4.0, the fourth industrial revolution. There will be a new need for a combination of knowledge, skills and competences that can be measured against well accepted standards and can be improved by hands-on training.

CNC operators/tool and die

makers will also need new skills to deal with the introduction of ICT in a manufacturing environment, particularly as tool-making will be considered part of the global manufacturing process and not as isolated activities.

They will also need to be more familiar with programming data. They will need to be entrepreneurial in the sense of evaluating every intervention from a cost-benefit perspective.

As direct actors in advanced manufacturing systems, assembly line operatives/ assemblers will be in a position to improve factory productivity and efficiency, but this will be dependent on the number of parts that they will be required to assemble to mount on the cars.

Lean systems will require highly efficient materials planning, and materials planning analysts will need to play a key role in aligning logistics and production.

6.1.2 Advanced materials

Modern car parts are increasingly made of lighter materials, aluminium alloys or carbon fibre reinforced plastic for example instead of steel. In this way consumers can have vehicles that perform well and at the same time are safe to drive. In addition there are other benefits. Lighter materials are particularly attractive for consumers that want features in their cars, such as advanced emission control systems, without increasing the overall weight of the vehicle.

Lighter materials are particularly important for electric cars, as they offset the weight of heavy power systems such as electric batteries and motors without increasing the overall weight of the vehicle. Although there is some debate between steel producers and aluminium producers as to the relative benefits of different types of structural materials, it would seem lighter materials are a key factor in reducing fuel consumption, as it takes less energy to move a light object rather than a heavy one.

According to EASC partners maintenance technicians know the strengths and weaknesses of the materials and should work together with the development team to ensure that they use appropriate materials. They will be required to have a greater understanding of the characteristics of advanced materials. They will need to know about the manufacturing processes and machinery which is required to turn new materials into automotive parts. This will require retraining for already employed maintenance technicians.

The introduction of advanced materials will have significant consequences for tool design and performance and by extension for the work of CNC operators/tool and die makers, as they will have to improve their knowledge and skills to provide high performance tools which correspond to industry norms and standards.

Paint technicians/motor vehicle painters will need a greater understanding of the properties of these materials. Parts made of conventional steel are relatively easy to treat and repair. However arbitrary heating or straining of body components, which was not expected by product designers, can negatively affect the reliability of reshaped parts. Paint technicians/motor vehicle painters will have to learn how to deal with complex parts in modern designs used for local structure optimisation, for example, in front and rear safety zones, side impact zone and for external panels.

Materials portfolios are increasingly more specific and complex, requiring material planning analysts to have a more sophisticated knowledge of the material that they are dealing with.

6.1.3 Complex and global supply chains

Supply Chain Management is defined as "an integrating function with primary responsibility for linking major business functions and business processes within and across companies into a cohesive and high-performing business model.
It includes all of the logistics management activities, as well as manufacturing operations, and it drives coordination of processes and activities with and across marketing, sales, product design, finance and information technology".[24]
Car companies increasingly have a global footprint, but the extent of the globalisation in the different activities is variable. According to a recent survey carried out by PWC, they "typically manage their planning, manufacturing, operational procurement and delivery functions regionally, and their new product development and strategic procurement functions globally. They outsource less than 10% of their planning, sourcing and enabling activities; a relatively low, 15% of their manufacturing and assembly activities; and 10%-35% of their delivery activities."[25]

What is certainly clear is that the issue of global supply chain management and more specifically global supply chain resilience when faced with change has taken on increased significance within automotive companies.[26]

According to EASC partners, this driver has the greatest impact on the activities of the materials planning analyst. Complex supply chains will require highly efficient materials planning, and material planning analysts will need to know well supply chain conditions, including global customer/supply agreements. They will also need to know about methodologies of supply chain management in order to guard against the disruption of supply chain flows and in this way ensure increase the profitability of the process.

The materials planning analyst has to gain overall visibility of the process, and this requires much more than basic track-and-trace functionality. It requires an overall "control tower" approach, bridging the gap between planning and execution on the one hand and the synchronisation of end to end activities from obtaining raw materials to delivering to the end customer.
In the tyre industry needs to have a sense of the impact of import/exports on the supply chain and their financial implications. Clearly the materials planning analyst will need the knowledge, skills and competence to work in multidisciplinary and international teams.

[24] https://cscmp.org/sites/default/files/user_uploads/resources/downloads/glossary-2013.pdf?utm_source=cscmpsite&utm_medium=clicklinks&utm_content=glossary&utm_campaign=GlossaryPDF. P 187

[25] http://www.pwc.com/gx/en/services/advisory/consulting/supply-chain/supply-chain-survey/automotive-findings.html

[26] http://www.logisticsandsupplychain.com/2015/03/vw-set-to-transform-automotive-supply-chains/. http://www.logisticsandsupplychain.com/2015/07/mercedes-benz-sets-out-multi-million-euro-logistics-investment/

6.1.4 Life cycle design and pollution prevention

The process of managing the complete lifecycle of a product from concept to design, manufacture, service and disposal of manufactured products leads to waste reduction, and thus contributes to pollution prevention, whilst at the same time providing opportunities for significant cost reductions.
Right at the start of the life cycle automobile designers are faced with a myriad of questions – what shape should it be? - how safe should it be? – what form of powertrain should it have? - how fast should it go? – how many kilometres will it cover? – how heavy should it be? - all of which have an impact for the prevention of environmental pollution. Then as the process passes to the manufacturing stage, a further set of questions arise – what raw materials will be required? – where do these materials come from? - how will they be extracted? – what type of components will be required? – how will they be combined and assembled?

Choices made by manufacturers will condition the ways in which automobiles in service contribute to pollution prevention, particularly in terms of fuel-saving measures – for example, by providing information about gear selection, by automatically switching off the engine when the vehicle is at a standstill, by ensuring that electrical accessories take less energy from the battery and by providing regenerative braking systems.

Finally there is the question of developing measures to ensure that components from vehicles can be recovered and then re-used. One such example would be the recovery of tyres.

Certain types of tyres (mainly for trucks and buses) are designed in order to be 'retreadable' (to allow the reconditioning of a used tyre by replacing the worn tread with new tread material). Making use of this technology vastly increases the number of kilometres for which the tyre can be used. This means effectively reducing the number of tyre carcasses (and therefore reducing waste) and the amount of resources used (increasing resource efficiency). Furthermore, once tyres reach their end of life, they can be collected and recycled in other industries through energy or material recovery.

What does this mean for the occupations in the sector? According to EASC partners, efficient manufacturing processes will need to be adapted to the new product concepts and to the new recyclable materials, and maintenance technician will have to gain a better understanding of these new materials and acquire new skills required to deal with them.
CNC operators/tool and die makers will need to know about new manufacturing processes and machinery adapted to the new materials used.

Paint technicians/motor vehicle painters will need to know how to deal with new materials so as to ensure that parts can be recycled.
The materials planning analyst will need to know the different characteristics of the components and the machinery to ensure that recycling is being carried out appropriately.

In terms of tyre production will add further competences to the role of material planning analyst as the supply chain will increase its complexity and integration.

6.1.5 Active safety, automated driving and connectivity

Automated driving has moved from the drawing board to private property and now on to the public road under certain conditions.

What are these conditions?

The Nevada Senate has proposed legislation for this eventuality. Bill No. 313 defines an autonomous vehicle as a motor vehicle that is equipped with autonomous technology which in turn is defined as "technology which is installed on a motor vehicle and which has the capability to drive the motor vehicle without the active control or monitoring of a human operator".

If a car is to be driven on a highway in Nevada, it must be:

A

Equipped with a means to engage and disengage the autonomous technology which is easily accessible to the human operator of the autonomous vehicle

B

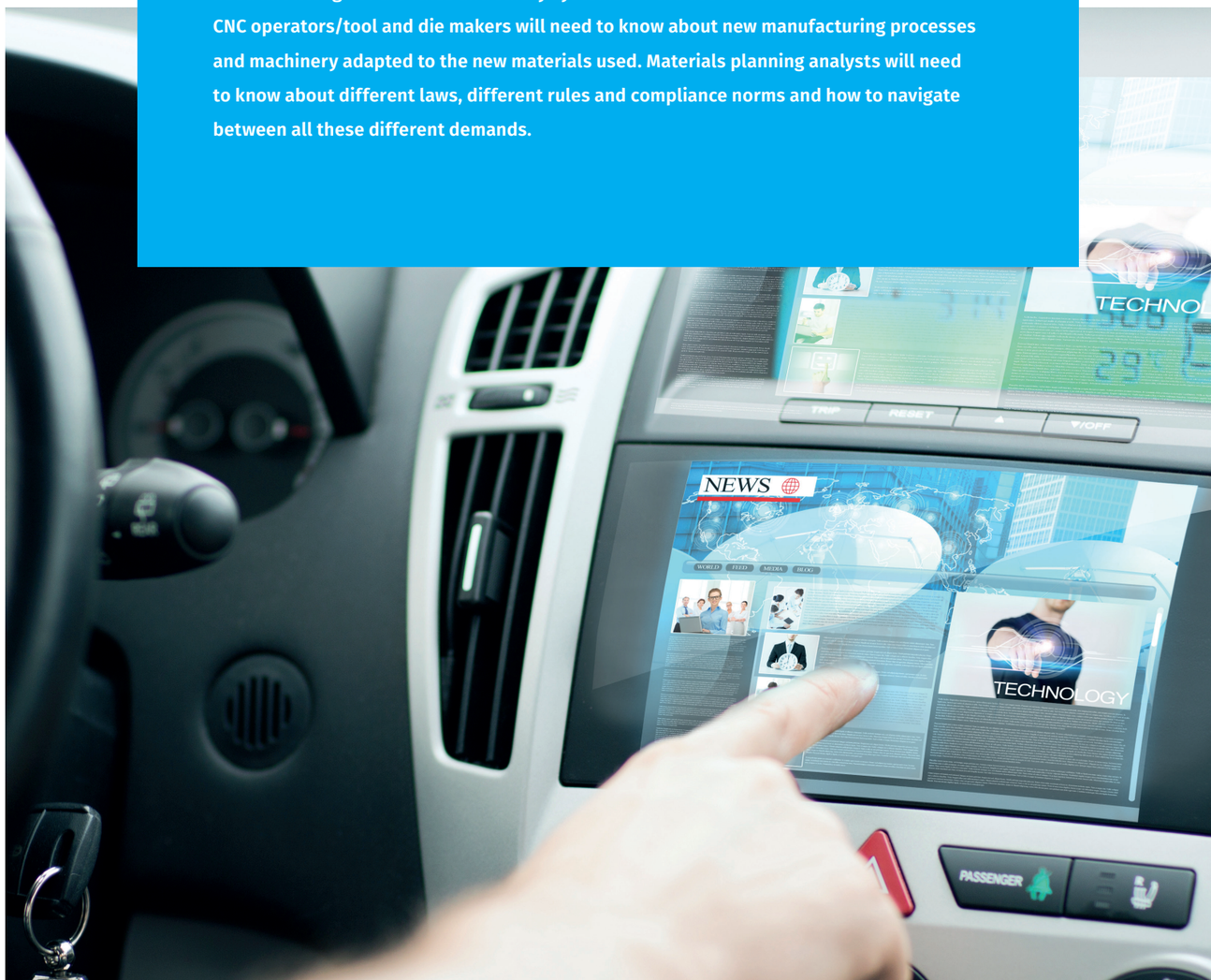
Equipped with a visual indicator located inside the autonomous vehicle which indicates when autonomous technology is operating the autonomous vehicle

C

Equipped with a means to alert the human operator to take manual control of the autonomous vehicle if a failure of the autonomous technology has been detected and such failure affects the ability of the autonomous technology to operate safely the autonomous vehicle [27]

[27] http://leg.state.nv.us/Session/77th2013/Bills/SB/SB313_EN.pdf

In technological terms autonomous vehicles use a combination of radio waves, laser wavers, global positioning and computer vision.
Tyres are the only element that connects the road to the vehicle and has a role also in interactions between vehicles. Furthermore, through ABS (anti-block braking system) and TPMS (tyre pressure monitoring system), tyres are also an active safety device with sensor alerting the driver when a problem occurs.
A number of car manufacturers, such as Mercedes-Benz and Volvo, and non-car manufacturers, such as Google, are in the process of developing prototype autonomous vehicles. According to EASC partners, maintenance technicians will need to know how to combine different technologies and to ensure compliance with safety requirements. They will need knowledge of the rules and safety systems for the use of machine tools.
CNC operators/tool and die makers will need to know about new manufacturing processes and machinery adapted to the new materials used. Materials planning analysts will need to know about different laws, different rules and compliance norms and how to navigate between all these different demands.



6.1.6 Decarbonisation, hybridisation and electrification

Road transport contributes approximately 20% of the EU's total emissions of carbon dioxide - the main greenhouse gas.
The European Union has not introduced mandatory limits for heavy-duty vehicles (HDVs) – trucks, buses and coaches, but it has introduced legislation to limit CO2 emissions for new cars and light commercial vehicles. However, according to IndustriAll, some car manufacturers will find it difficult to hit some of these new targets for some of their models.

As is now known, laboratory tests do not necessarily reflect accurately the amount of air pollution emitted during real driving conditions, and the EU has recently agreed proposals to introduce new real driving emissions tests for air pollutant emissions by diesel cars, with the result that from 1 September 2017 these new real driving emissions (RDE) tests will determine whether a new car model is allowed to be put on the market.

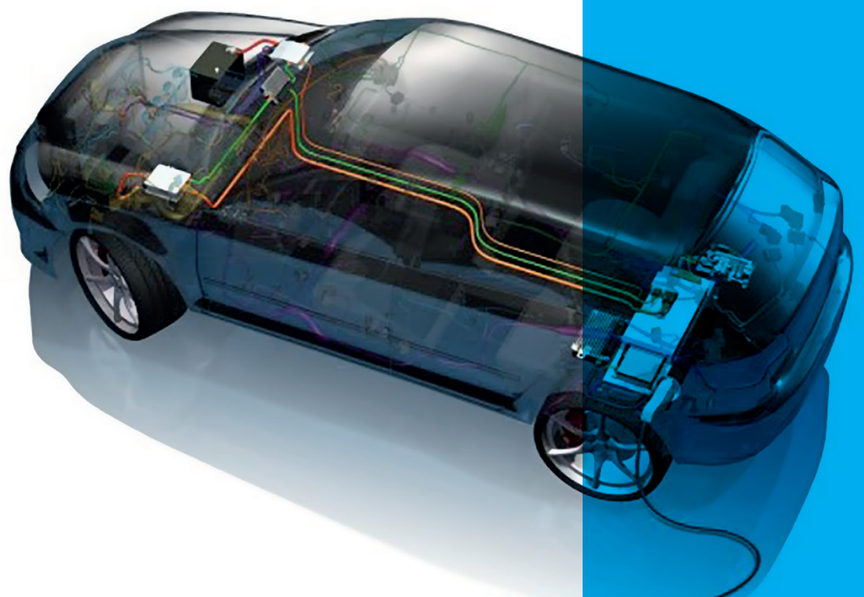
There is some variation within the EU as to the take up of less polluting cars. The most efficient cars were bought in the Netherlands (107 g CO2/km), Greece (108 g CO2/km) and Portugal (109 g CO2/km), while the least efficient cars were bought in Estonia (141 g CO2/km), followed by Latvia (140 g CO2/km) and Bulgaria (136 g CO2/km).[28]

As to electric vehicles there is considerable variety: battery electric vehicles (BEV), which are fully electrically chargeable vehicles and have no other energy source; extended-range electric vehicles (EREV), which use a battery as their main energy source and a combustion engine once the batteries are empty; plug-in hybrid electric vehicles (PHEV), which use a battery as the main energy source, but can also run in common hybrid mode using the combustion engine.

According to ACEA, the dominant powertrain will continue to be the internal combustion engine (ICE) in the mid-term, but electric vehicles (including plug-in hybrids) are expected to penetrate the market more and more. A realistic market share for new electrically chargeable vehicles will be in the range of 2 to 8% by 2020 to 2025.[29]

More and more car manufacturers are developing electrical powertrains – Nissan, Tesla, BMW, Renault, Mitsubishi and Volvo.[30]

This will have clear consequences for employment in the sector. One of the conclusions of the Cars 21 group was that it should be investigated whether in longer-term, the automotive industry might become less labour intensive as the electric vehicle (requiring less parts and therefore less labour input) increase their (sic) market penetration. The new drive-trains will also require skills not yet available on the labour market'.[31]



Hybridisation and electrification are not the only technological means that could contribute to the decarbonisation of transport. Tyres have come a long way by reducing rolling resistance, and further work can be expected in this sense in the future.
This entails great investments in research and development of new materials, and the effects on the workforce are similar to those of the development of advanced materials.

According to EASC partners, these new developments will lead to new processes which will have ramifications for all the five occupations in this study.

Decarbonisation, for example, has increased the complexity of conventional cars, and complex exhaust systems with catalysts and filters require specific skills.

[28] http://www.eea.europa.eu/highlights/new-cars2019-co2-emissions-well
[29] www.acea.be/news/article/electric-vehicles
[30] IndustiAll, Automotive Industry – Facts and Figures, 2014
[31] Electrification brings with it a reduction of powertrain complexity (from ca. 1400 parts in a conventional driveline to ca. 200 parts in an electric one. Op cit?. p 72

6.1.7 Evolution of customer requirements

Customers in the EU have been reticent in recent years to buy new vehicles. The market for passenger cars in the European Union has been in decline. Although new passenger car registrations in the EU rose in 2014, this was the first time since 2007 and from a low base. The market for commercial vehicles in the EU has yo-yoed. New commercial vehicle registrations fell in 2008 and plummeted in 2009, but then rose in 2010 and 2011, only to fall again in 2012 and increase slightly in 2013 and then again in 2014.

The outlook for EU motor vehicle exports however has been more robust. Exports increased significantly in 2010 and 2011, less so in 2012 and 2013, and then fell in 2014.

Car manufacturers have moved in the direction of customisation – producing cars according to customers' individual requirements. This however greatly increases the complexity of the manufacturing process, and requires a balance between the needs of the customer, the dealership, the manufacturer and the component suppliers. The demand for customised products will require that smaller product runs are manufactured at the same cost and at the same level of quality.

Customers' requirements are driving the tyre and rubber market, as customers are both drivers (in the case of replacement sales) and vehicle manufacturers (in the case of original equipment tyres). These requirements cover safety, performance, quality and environmental contribution, making tyres an ever more complex product, whose composition is in constant evolution.

In terms of the occupations identified, the biggest impact would probably be on maintenance specialists and materials planning analysts. The introduction of innovation stemming from new customer requirements leads to additional measuring equipment which will require maintenance and therefore new knowledge and skills. Furthermore, as quality requirements increase with the development of new products, machinery is not always fully adapted, and the planning analyst will need to take all those parameters into account to avoid disruption in production (bottlenecks, increases internal waste etc.).

According to EASC partners this will require assembly line operatives/assemblers to gain a better understanding of the properties of the different components.

The impact will be felt most by materials planning analysts who will need to navigate between the different actors, ensuring that the supply chain functions optimally and dovetails with the manufacturing process which then leads on seamlessly to the distribution process.

6.2 What knowledge, skills and competences are required for five traditionally representative occupations in the automotive sector?

Figure 13 demonstrates the importance of the drivers for the different occupations investigated, in the opinion of EASC partners.

Figure 14 demonstrates the impact of drivers for the different occupations investigated, in the opinion of the EASC partners.

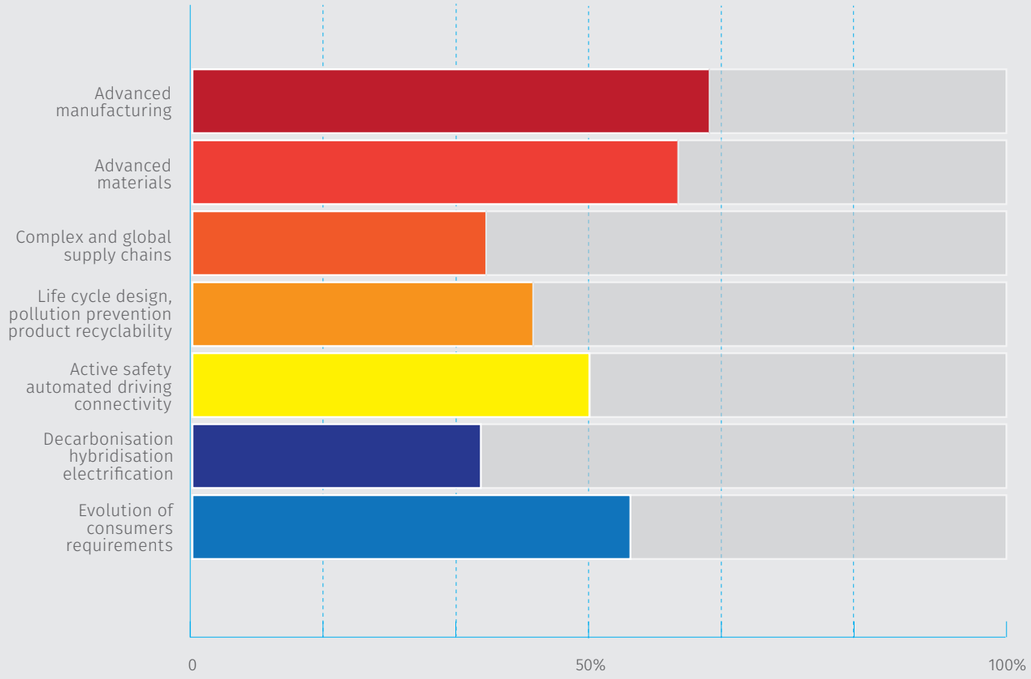


Figure 13: Importance of drivers for all occupations analysed /**Source: EASC partners**

EASC partners were asked to reflect upon a core group of knowledge, skills and competence required to carry out the following occupations and, if appropriate, to add any others they deemed useful:

- **Maintenance technician**
- **CNC operator/tool and die maker**
- **Paint technician/motor vehicle painter**
- **Assembly line operative/assembler**
- **Materials planning analysis**

There is in general something of an overall consensus amongst EASC partners on the core skills and competences that are required for each occupation. However, there are also considerable differences. The list of different skills and competences, whether core or supplementary, is long and heterogeneous, and so they will be listed specifically below for each occupation.

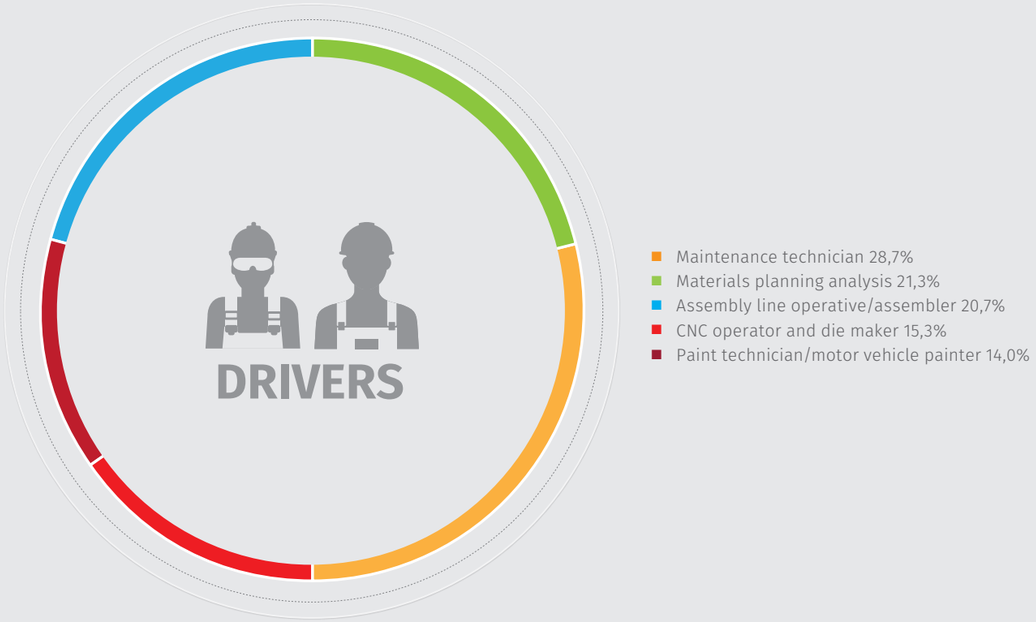


Figure 14: Impact of the drivers for the different occupations /**Source: EASC partners**

6.2.1 The views of the EASC partners

6.2.1.1 Maintenance technician

According to EASC partners, there is a general consensus that a maintenance technician requires a basic set of core skills and competence to carry out the occupation appropriately, as follows:

- using and interpreting metalworking data and documentation
- working effectively and efficiently in a metalworking environment
- carrying out fault diagnosis on mechanical equipment
- maintaining and repairing mechanical equipment
- carrying out preventive maintenance of mechanical equipment
- completing and successfully handing over maintenance activities.

Maintenance technicians are not simply single skilled i.e just maintaining mechanical equipment, as they work on electrical, fluid power, process control equipment/components within a broader engineering system.

One partner made a number of amendments (in italics) and came up with the following list:

- using and interpreting a range of data and documentation within an engineering maintenance environment
- working effectively and efficiently at all times, complying with health and safety and other relevant regulations, directives and guidelines, and following the relevant maintenance schedules to carry out the required work
- carrying out fault diagnosis on equipment by selecting, using and applying diagnostic techniques, tools and aids to locate faults, determining the implications of any fault for other work and for safety considerations and using the evidence gained to draw valid conclusions about the nature and probable cause of the fault
- maintaining and repairing equipment in the specified sequence and in an agreed timescale
- carrying out preventive maintenance of equipment, and reporting any instances where the maintenance activities cannot be fully met or where there are identified defects outside the planned schedule
- completing and successfully handing over maintenance activities and records
- disposing of waste materials in accordance with safe working practices and approved procedures
- carrying out condition monitoring of plant and equipment.

In addition, a maintenance technician should also have:

- skills to deal with mechanical and electronic equipment
- skills to deal with automation processes, robotics (including micro-robotics)

6.2.1.2 CNC operator/tool and die maker

EASC partners were asked to consider what skills and competence were required for a CNC operator/tool and die maker to carry out his/her occupation appropriately, as follows:

- considering the ergonomic, economic and ecological aspects of planning and completing tool-making activities
- working with colleagues in a team and communicating both upstream and downstream
- complying with standards and regulations, technical regulations and operating instructions to ensure product quality and the continuous improvement of workflows
- dealing promptly and effectively with error messages or equipment faults and reporting problems that cannot be solved
- monitoring the computer process and ensuring that production output is to the required specification
- developing computer-aided manufacturing programmes for toolmaking

However consensus was difficult to establish in this case. One partner would have preferred to disassociate CNC operator from tool and die maker, explaining that the former would be classified as semi-skilled, whilst tool and die making is a highly skilled role.

Two partners were of the opinion that the last requirement "developing computer-aided manufacturing programmes for toolmaking" would only be used in very specific cases, and normally this business process would be outsourced. Another considered that quality management would not form part of job requirements for a CNC operator/tool and die maker, as this requires a certain knowledge of statistics. Another partner did not agree with the inclusion of 'considering the ergonomic, economic and ecological aspects of planning and completing tool-making activities'. Another partner did not agree that the first, third, fourth and sixth were key elements, as the first is the work of technologists/engineers who prepare technological data for CNC operators, and the last is technical support work.

One organisation came up with an amended and in parts alternative list (in italics), as follows:

- working safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
- confirming that the machine is set up and ready for the machining activities to be carried out, checking that all safety mechanisms are in place and that the equipment is set correctly for the required operations
- using the correct control program that contains all the relevant and necessary data for the engineering activity to be carried out

and ensure it is correctly loaded into the machine controller

- following the defined procedures for starting and running the operating system
- working with colleagues in a team and communicating both upstream and downstream
- monitoring the computer process and ensuring that the production output is to the required specification, adjusting the equipment and program operating parameters to optimise the outcomes to be achieved
- dealing promptly and effectively with error messages or equipment faults and reporting problems that cannot be solved
- monitoring the computer process and ensuring that production output is to the required specification, carrying out quality sampling checks at suitable intervals and adjusting the equipment and program operating parameters if necessary
- developing computer-aided manufacturing programmes for toolmaking, within agreed control procedures
- saving and backing up the program detail, and storing securely in accordance with organisational requirements
- shutting down the equipment to a safe condition on conclusion of the machining activities

In addition, CNC operators/tool and die makers should also have:

- an understanding of just-in-time production needs
- ICT skills for manufacturing processes
- an ability to evaluate their work from a cost-benefit perspective
- PDCA (plan–do–check–act) competence

6.2.1.3 Paint technician/motor vehicle painter

EASC partners were asked to consider what skills and competence were required for a paint technician/motor vehicle painter to carry out his/her occupation appropriately, as follows:

- ensuring that material surfaces to be treated are suitably prepared for the finishing operations to be carried out
- checking that the finishing equipment and treatment solutions are set up and maintained at satisfactory operating conditions and levels
- carrying out the treatment process in accordance with operating procedures and the component specification
- ensuring that the treated work pieces achieve the required characteristics and meet the finishing specification
- dealing promptly and effectively with problems and reporting problems that cannot be solved
- paying attention to tidiness in the workplace and disposing of waste and excess materials in line with agreed organisational and legal procedures

However, one partner would have preferred to disassociate paint technician from motor vehicle painter, as the former would be considered as being more skilled all round.

One partner agreed with this list and added the following:

- working safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
- shutting down the finishing equipment to a safe condition on completion of the processing activities
- reporting completion of preparations in line with organisational procedures.

Another partner did not agree that "carrying out the treatment process in accordance with operating procedures and the component specification" formed part of the key elements.

In addition, paint technician/motor vehicle painters should also have:

- 5S skills – sort, straighten, shine, standardise, sustain
- team working skills
- an understanding of just-in-time production demands
- an ability to communicate effectively

6.2.1.4 Assembly line operative/ assembler

According to EASC partners, there is a general consensus that an assembly line operative/assembler requires a basic set of skills and competence to carry out the occupation, as follows:

- following the relevant instructions, assembly drawings and any other specifications
- ensuring that the appropriate components are available and that they are in a usable condition
- using the appropriate methods and techniques to assemble the different components in their correct positions
- checking the completed assembly units to ensure that all operations have been completed and that the finished product meets the required specification
- working together with colleagues, both upstream and downstream
- dealing promptly and effectively with risks and delays in assembly line production and reporting problems that cannot be solved.

However two partners were of the opinion that 'using the appropriate methods and techniques to assemble the different components in their correct positions' and 'checking the completed assembly units to ensure that all operations have been completed and that the finished product meets the required specification' were the responsibilities of the operations management team. Another partner was of the opinion that "ensuring that the appropriate components are available and that they are in a usable condition" is the responsibility of the logistics team.

Other partners added "working safely at all times, complying with health and safety, environmental and other relevant regulations and guidelines' and "identifying areas for process and quality improvement".

In addition, assembly line operatives/assemblers should also have:

- an understanding of automatic assembly processes and the ability to reproduce process manually
- when working with tyre assembly machines, a basic knowledge of electronics
- 5S skills – sort, straighten, shine, standardise, sustain
- team working skills
- an understanding of just-in-time production demands
- an ability to communicate effectively.

6.2.1.5 Materials planner analyst

EASC partners were asked to consider what skills and competence were required for a materials planning analyst to carry out his/her occupation appropriately, as follows:

- establishing and coordinating plans for managing and forecasting material needs for production purposes
- using supply chain management concepts to minimise inventory, handling and logistics costs
- understanding and implementing sound financial accounting principles to improve key performance indicators
- developing supply chain communication strategies
- maintaining and managing supplier relationships to ensure materials are shipped properly and on time
- reviewing work orders and scheduling practices to ensure timely delivery.

One partner was of the opinion that 'understanding and implementing sound financial accounting principles to improve key performance indicators' was not a key element for a material planning analyst. However another partner considered that this was important so as to be able to reduce inventory costs.

Another partner felt that the skills for "developing supply chain communication strategies" were not appropriate as this would be the responsibility of the supply chain management specialist within an IT department.

Another partner did not agree that 'understanding and implementing sound financial accounting principles to improve key performance indicators' and 'reviewing work orders and scheduling practices to ensure timely delivery' were parts of a core set.

Another partner added the following:

- working safely at all times, complying with health and safety legislation, regulations, directives and other relevant guidelines
- ensuring that all the necessary information is available to determine the material requirements, and that the information is up to date
- using the information collected to determine the suppliers and their methods of supply
- controlling the delivery and receiving of the materials, ensuring they are checked on arrival and materials are stored in an appropriate location and environment
- using suitable procedures to ensure that adequate stock levels are maintained

6.2.2 Emerging occupations

In addition EASC partners proposed a number of occupations that are emerging to reflect the changes taking place in the automotive sector. The trend is clear from these proposals. The sector is changing dramatically, under the impact of drivers such as advanced manufacturing, advanced materials and complex and global supply chains.

6.2.2.1 Product engineer

A product engineer would need to have the following knowledge, skills and competence:

- knowledge of materials and multi-material design
- knowledge on new design and simulation tools
- knowledge of regulatory aspects
- ability to work in multidisciplinary and international teams
- ability to communicate effectively
- problem solving and project management skills

An R&D engineer/technician would need to have the

6.2.2.2 Process engineer

A product engineer would need to have the following knowledge, skills and competence:

- knowledge of new materials and related processes
- knowledge and experience in mechatronics
- ICT skills for use in production systems
- ability to work in multidisciplinary and international teams
- ability to communicate effectively
- problem solving and project management skills

6.2.2.3 R&D engineer/technician

following knowledge, skills and competence:

- basic understanding of the manufacturing process
- competence in terms of entrepreneurship
- basic knowledge of the ways in which supply chains function
- understanding of technological applications for advanced material and in advanced manufacturing
- understanding of market trends so as to respond to consumer requirements
- ability to work in teams
- ability to communicate effectively

6.2.2.4 3D printing technician

A 3D printing technician would need to have the following knowledge, skills and competence:

- knowledge of software applications and hardware
- knowledge of new materials
- ability to follow relevant instructions, assembly drawings and any other specifications
- ability to use the appropriate methods and techniques to print the different components
- ability to check the completed components so as to ensure that the finished product meets the required specification

- ability to work together with colleagues, both upstream and downstream
- ability to deal promptly and effectively with risks and delays in assembly line production and reporting any problems that occur.

6.2.2.5 Product design & development technician

- A product design and development technician would primarily work on all stages of product creation and modification and need to have the following knowledge, skills and competence:

- working safely at all times, complying with health and safety legislation, regulations, directives and other relevant guidelines

- effectively using and interpreting a range of engineering data sources and documentation

- organising work efficiently and effectively in engineering resources when completing tasks

- producing components and prototypes using a wide range of hand fitting and joining techniques

- preparing and using machining, electrical or electronics equipment, as well as other general or specialist high-tech equipment

- producing assemblies and rigs using a range of materials and techniques

- applying and testing mechanical, electrical and electronic devices and equipment

- maintaining and testing instrumentation within product devices

- using engineering project planning methods within the prototyping context

- using business improvement planning techniques.

In addition EASC partners also suggested other occupations – product developer, locksmith-welder, mechatronic technician, renewable energy specialist and IT manufacturing system operator.

Chapter 7

Part 3: Innovative tools, national and regional strategies, local initiatives, methods to monitor skills' needs and address skills' mismatches and gaps

7.1 Innovative tools, national and regional strategies, local initiatives, methods to monitor skills' needs and address skills' mismatches and gaps

What is being done in terms of innovative tools, national and regional strategies, local initiatives, methods to monitor skills' needs and address skills' mismatches and gaps?

EASC partners have identified a series of different examples of best practice of innovative tools, national and regional strategies, local initiatives, as follows:

- meeting skills' needs
- engaging in new forms of learning
- developing new qualifications
- transferring knowledge and skills
- training for apprenticeships
- certifying knowledge, skills and competence
- addressing and closing the skills' gap.

7.1.1 Meeting skill's project

Meeting skills' needs presupposes an understanding of what the labour market requires and how training providers can best meet these needs.

At the national level sector skills councils are equipped to monitor labour market developments in the different sectors, inter alia, making employment forecasts, identifying new occupations, establishing occupational standards, defining the content of qualifications, advising on training programmes and monitoring training standards. One such body is EDUCAM, which provides an overall service for the automobile sector in Belgium.

7.1.1.1 EDUCAM

EDUCAM was created twenty years ago on the basis of a positive partnership between employers' organisations and trade unions in the car maintenance sector in Belgium.
It is a specialist organisation monitoring the different developments in the automobile industry and translating the occupational standards decided upon in different sectoral agreements into training programmes and skills development activities.
It also provides pedagogical support for a variety of companies in the sector via a team of different experts with extensive practical and technical skills and pedagogical experience.

These teams offer a variety of different training activities on specific technical subjects or on soft skills, such as communication, team-leading, mentoring, in Dutch, French or German (or even English on request), either in their training centres or on the job directly in different working environments.

Vocational education and training requires a balance between the theoretical which is often classroom-based and the practical which is normally work-based.
Clearly though this distinction is too rigid, and it is important to make a clear link between the theoretical and the practical, to learn the theoretical and try out its practical implementation or to engage in practical activity and learn some of the theory that underpins it.
Skills needs can be met directly in an imaginative way through initial vocational education and training programmes, as the UPM Racing project shows, where the skills required for the race track can be transferred into training in the university.

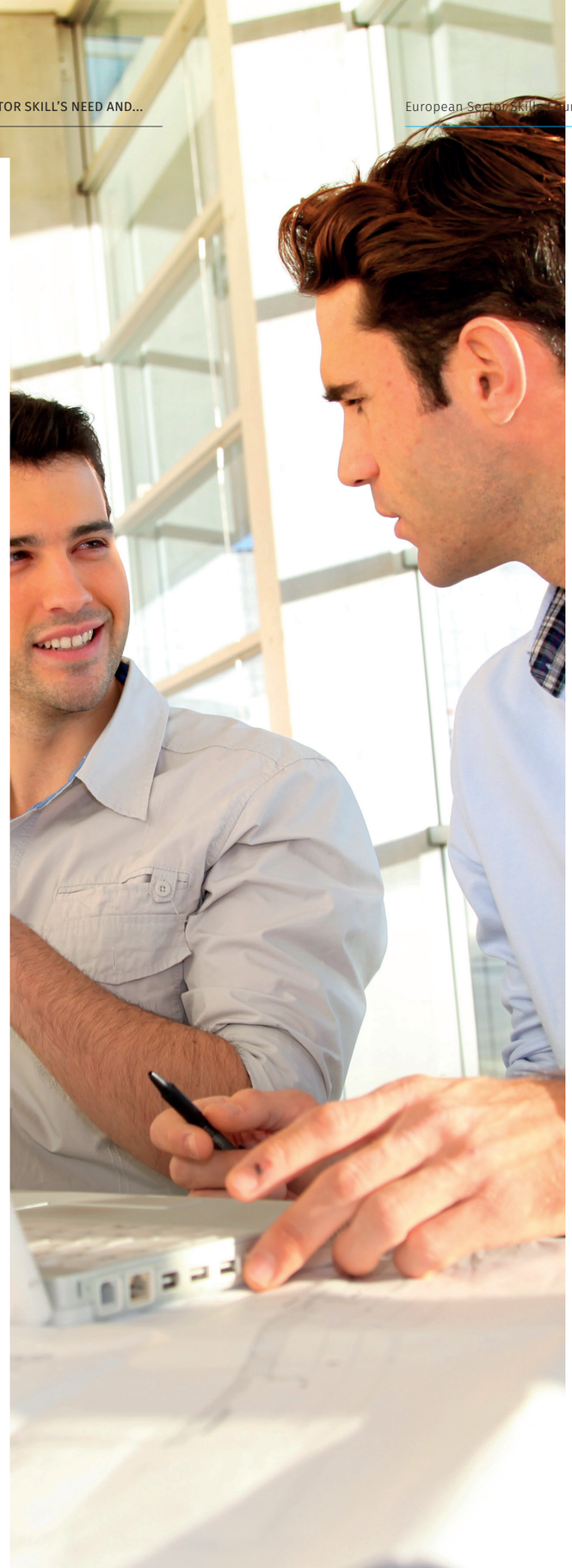
Another approach to this issue is to start with the practical, with a development in society, to identify the skills that are needed and then, as with the Daimler project 'green technology', to teach them in an ongoing way in the workplace through initial and continuing vocational education and training.

7.1.1.2 Formula student racing project

The Formula Student racing project invites engineering students to design, build, test and race a single seater racing car. It takes them out of the classroom and gives them an opportunity to apply their theoretical studies to real work experiences. In this way it encourages them to deal with all aspects of the automotive industry in a multidisciplinary way, including research, design, manufacturing, testing, developing, marketing, management and finances.
In addition it requires them to use a series of skills appropriate to a real life working environment – working in teams and competing with other groups of students, communicating with one another, managing a project and making the link between study and practical work.
Another advantage is that the project brings the students participants out into the open for automotive companies to see, thereby increasing their job placement opportunities. The project offers companies within the motorsports, automotive and supplier industries a clear indication of the quality of the students' education and training.

7.1.1.3 Daimler project "green technology"

In plants such as the Daimler facility in Sindelfingen, which builds the S 400 Hybrid, extensive expertise is already the norm in assembly operations that employ many highly skilled technicians.
However, at other locations the changes are in their infancy, and that is why Daimler has developed practical solutions to accelerate the process of acquiring green technology expertise.
Daimler offers a flexible green technology qualification concept which ranges from basic information sessions on alternative drive trains to much longer programs and which provides trainees with the technical and safety knowledge required for the production of new Mercedes drive systems.
Between 2010 and 2013, with further ongoing activities in 2014 and 2015, more than 84,000 employees were trained in alternative drive train technology and lightweight construction.



7.1.2 Engaging in new forms of learning

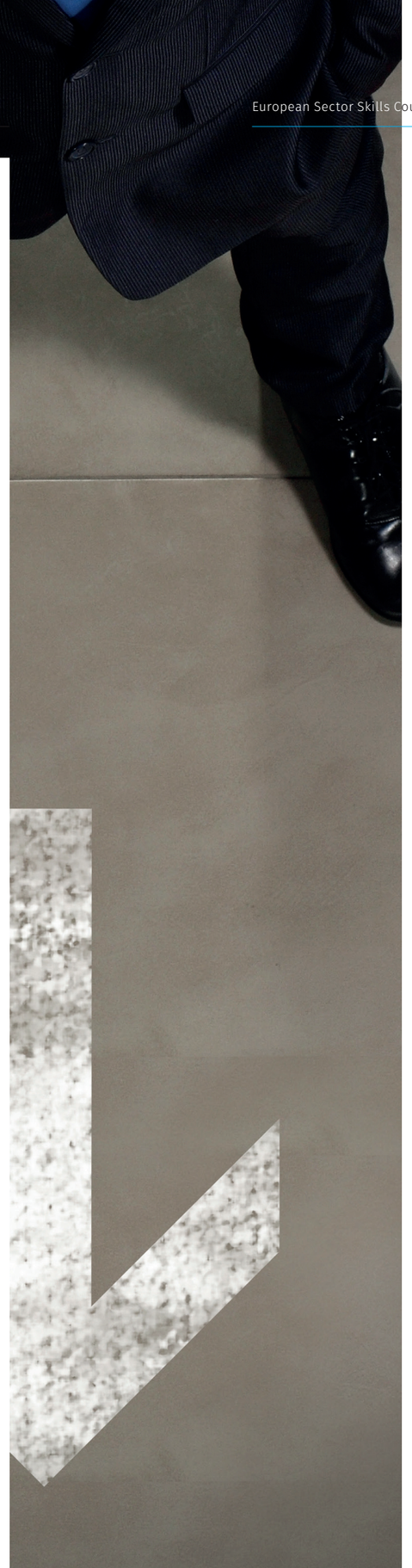
Different people learn in different ways, and learning styles are often classified as visual, auditory, and kinaesthetic – what you see, what you hear and what you do. The learning environment plays an important role too. Some learn better in the classroom, some on the job, other prefer the flexibility of web-based tools.
Some may learn from methods such as problem-solving exercises, which can encompass a variety of different but interrelated tasks, as can be seen from the Automotive Industrial Partnership project. Others, and particularly adults, have already amassed a variety of attributes on the basis of the life experiences that they already have, and peer-to peer learning is an often used method, where they can learn in part at least from each other, as is the case in the Belgian example.
Others may benefit from an approach, starting with the development of professional and personal skills, which builds up motivation and self-esteem, as in the case of the BMW TalEnt project.
A growing trend is the one of Massive Open Online Courses, which allow students to learn in their own time and at their own pace, like the first MOOC on Rubber Technology set up by IFOCA (Institut national de formation & d'enseignement professionnel du caoutchouc).

7.1.2.1 Automotive industrial partnership - problem-solving in the automotive industry

Manufacturers in the automotive industry are well used to problem solving methods, but because each company deals with this issue differently, there has been no consistency in reaching solutions which can be transferred across the entire automotive sector. Now a single industry-wide initiative with rigorous certification requirements, based on training and resolving real problems, has been pioneered by the Automotive Industrial Partnership.
The Advanced Problem Solving programme takes the tools from the Six-Sigma (a well-known approach used by the manufacturing sector to reduce productivity defects) and embeds them into whichever problem solving methodology is being applied.
The course lasts ten months and is a combination of classroom based learning, on-site coaching, project work and presentations. In this way employees can apply their learning as they progress through the course on work-based projects which offer real business benefits.

7.1.2.2 Sharing ideas for future

A Belgian project has been set up to create awareness of the latest developments and innovations in the industry to and provide an accurate knowledge base.
The idea is that all stakeholders within the training process can learn a lot from each other if an easy way of sharing and exchanging knowledge, experiences and opinions can be established.
Employees within the automotive industry will be able to learn from their own environment and seek acceptance for these new ideas from society by learning through influential models. In this way they will be able to improve their craftsmanship and skills through a process of training - by training and a continuous development.
For this approach to be successful it will be necessary to develop a dedicated team of (international) trainers specialised in designing training programs and related course materials.



7.1.2.3 BMW - talent

BMW has set up an initiative "Talent-orientated learning & development" process, which leads to a broad based qualification for the development of professional and personal skills.
This initiative allows for more flexibility during the vocational training process, thus making it possible for trainees in individual cases to review their options and change from one occupational programme to another after the first year of training, thus helping to reduce risks of non-completion of the training.
Moreover with an emphasis on the development of personal skills, it improves the motivation and self-esteem of the apprentices.
In addition it makes it possible to find a better fit between the concrete job offers at the end of the training and the skills of the apprentices, and this reduces the length of the period of adjustment required between the end of the vocational training and the beginning of the job.

7.1.2.4 IFOCA'S MOOC on the rubber technology

IFOCA is the education institute of reference in France for the rubber value chain and it already provides several qualifications at all levels from VET to engineering degrees and post engineering on rubber science and technology.
At the end of 2015, IFOCA engaged in a new activity to further enlarge its audience and education outreach by launching the first MOOC on Rubber Technology. Classes will beginning in February 2016 (and registrations close in March 2016).
MOOCs are massive open online courses aimed at unlimited participation with open access via the web. The course focuses on rubber and its physical and chemical characteristics and it is geared, amongst others, to the new employees in the rubber sector as well as to those that are considering starting their studies on the subject.

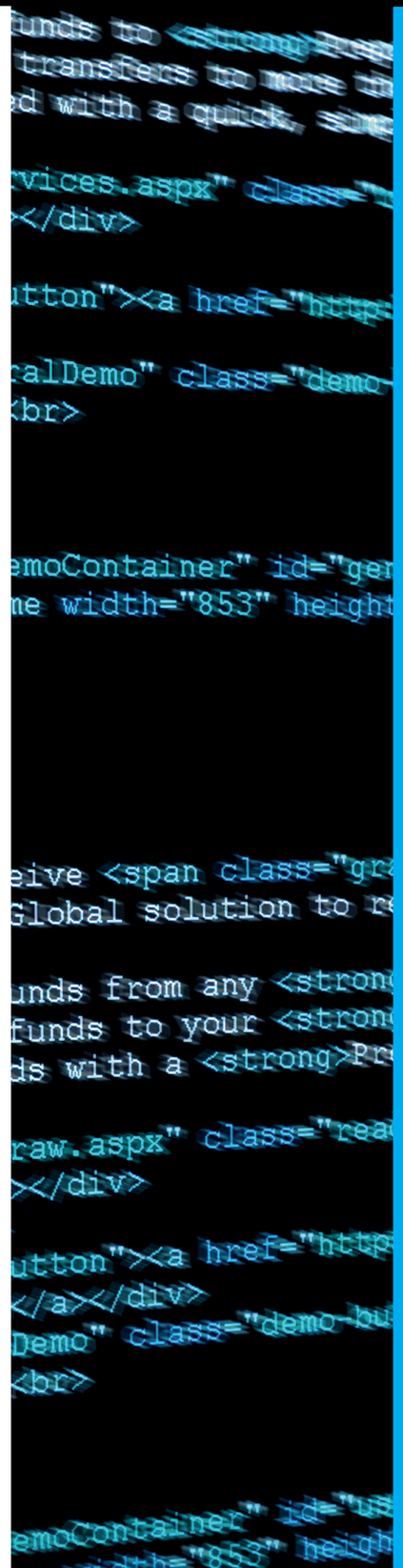
One specific part of the course is dedicated to exploring what it means to work in the rubber sector which should help students to orientate their future career choices.
On top of tests all along the Course, its completion will be subject to a final exam, which will result in the release of an IFOCA certificate.

7.1.3 Developing qualifications

A qualification can be described as the formal endpoint of a process whereby learners successfully demonstrate that they have achieved certain learning outcomes in line with previously expressed standards.
Qualifications are used to demonstrate that learners have the knowledge, skills and competence to do a job, or a part of a job. Companies, vocational training institutions and universities are engaged in training engineers, and some of them are offering courses which lead to qualifications in different subjects of importance to the automotive sector.

Two companies - Continental, the multinational tyre-making company, and Bosch, the engineering and electronics company – have recently set up new innovative qualifications, the former in automotive software development and the latter in mechatronics engineering with a specialism in e-mobility. Working in the other direction, the University of Deusto in Bilbao, offers a postgraduate Diploma de Especialización en Ingeniería de Automoción, and the Institut des Sciences et Techniques des Yvelines offers a 3-year advanced apprenticeship in mechatronic engineering.

Continental has recently devised a new qualification with its trade unions, the Works Council, the Chamber of Commerce and Industry and the Federal Institute for Vocational Education and Training to train automotive software developers.



7.1.3.1 Continental - automotive software developers

Continental has recently devised a new qualification to train automotive software developers, and. 28 places have been made available at nine sites cross Germany. The training programme will last three years.

The content of the training is geared toward mathematical technical software developers (MATSE) and provides additional training in embedded software development and electronics.
On successful completion of the course the graduates obtain the IHK (chamber of industry and commerce) qualification as mathematical technical software developers and receive a certificate from the vocational school.
Previously, you would need a degree if you wanted to become a software developer. Trained technicians have been the exception to date. We are therefore delighted to be able to offer opportunities for people who want to develop their skills without going to university, or for those who may have interrupted their studies in order to work, according to Frank Michael Hell, chair of Continental's group works council.
Bosch has set up a B.Eng in Mechatronics Engineering – e-mobility plus, in cooperation with the Esslingen University of Applied Sciences.

7.1.3.2 Bosch – mechatronics engineering – e-mobility plus

Bosch already has 400 practitioners and researchers working on the development of systems and components for electric powertrains and recently launched a new campaign to take on new recruits in this area. It recently developed a new qualification to train mechatronics engineers in the area of electronic mobility so that it can continue to develop automotive technology in hybrid vehicles and concepts for electro-mobility.

The training is a combination of practical skills carried out in the Robert Bosch Hybrid Centre in Schwieberdingen and theoretical study covering basic science subjects, such as mathematics, physics, electrical engineering and technical mechanics, with specialisations later in, inter alia, digital technology, information technology, microprocessor technology, electronic design, control technology, software engineering and soft skills.
On successful completion of this five-year course graduates obtain a vocational training as a mechatronics engineer followed by a B.Eng in Mechatronics Engineering form the Esslingen University of Applied Sciences.

7.1.3.3 DEIA - postgraduate qualification in automotive engineerring

The Automotive Intelligence Center (AIC) - a research and training organisation set up with the support of Basque provincial government, the University of Deusto in Bilbao and a series of local automotive companies (e.g. Gestamp in Spain) have set up a postgraduate degree in Automotive Engineering, targeted at graduates in Industrial Engineering and experienced persons already working in the industry who want to acquire or expand their specific knowledge of the automotive industry.

The course covers five areas linked to the automotive industry: management and production techniques; automotive technologies; materials and manufacturing processes; vehicle dynamics and design and manufacture; and business practices. The first semester takes place in the university, and the second in a Basque company.

The success rate is high, and 90% of the students are employed at the end of the programme, in product and process engineering.

7.1.3.4 Advanced apprenticeship in mechatronic engineering

The University of Deusto in Bilbao, offers a postgraduate Diploma de Especialización en Ingeniería de Automoción which gives learners an opportunity to demonstrate what they know and what they can do in terms of automotive engineering on the basis of formal education and industrial experience, and another institute of higher education, the Institut des Sciences et Techniques des Yvelines, has set up a 3-year advanced apprenticeship in mechatronic engineering.
This course was set up by a consortium consisting of companies (Renault, PSA, Motorola, GKN, Valeo, Schneider Electric, Delphi, Johnson Control, ABB, Connectors International, Tyco Electronics, CIMLEC Industries and Schefenacker), professional bodies (the Association of Engineering Industries of the Ile de France, the Federation of Vehicle Equipment Industries) and the Institut des Sciences et Techniques des Yvelines and Ingénieurs2000.

The apprentices, generally 30 in number per year, are employed on a 3-year contract and are paid for the entire period. They spend 50% of their time in a company, are required to work as 'normal' employees and reach the same level of competence as equivalent staff in the company. The other 50% of the time they attend the university and study four different areas – general science, engineering science, mechatronic science and management.

On successful completion of the apprenticeship they obtain the equivalent of a Master's degree.

7.1.4 Transferring knowledge and skills

Manufacturing companies are faced with the challenge of spreading knowledge, skills and competence around their organisations. This task becomes even more urgent in the automotive industry, when companies notice that qualified technicians and engineers are on the point of retiring, and in many cases valuable company-related skills and experience will be lost.

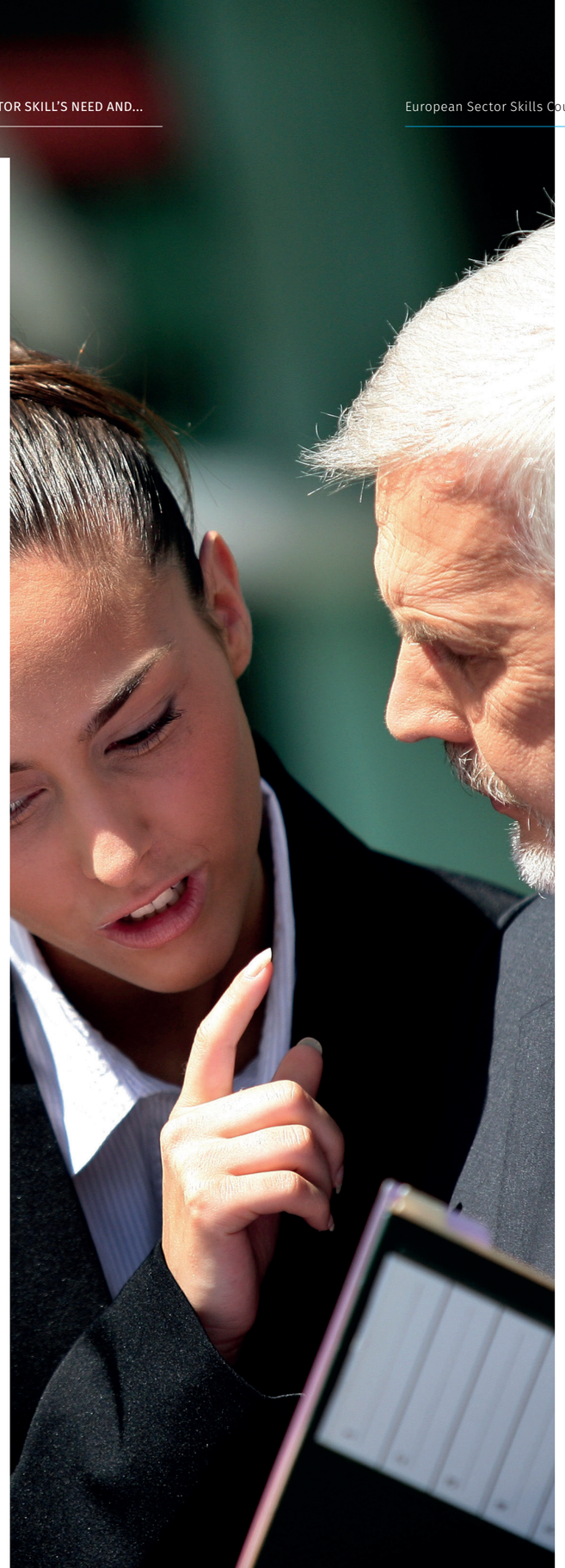
It is not difficult to identify the engineers and technicians who are about to retire, but it requires some considerable effort to identify the knowledge and skills that they have and that companies want to retain. Then there is the issue of identifying the potential beneficiaries of the transfer of the knowledge and skills. The next step is to design a scheme that enables the sharing of knowledge and skills to take place.

Daimler has been involved in a couple of initiatives to transfer knowledge and skills, firstly based on the knowledge and experience of retired employees, and, secondly based on the mixing of employees with different levels of experience and from different age groups.

7.1.4.1 Space Cowboys - Daimler senior experts

Retired employees have supported specific departments like production, R&D and IT with their expertise and their skills on a voluntary and temporary basis and pooled their experience so as to contribute to the transfer of knowledge to younger generations.

This project was set up in May 2013, and over 500 senior experts have registered their interest in participating.



7.1.4.2 Inter-generational learning

In order to meet the increasing demand for tool and die makers, the Mercedes-Benz plant in Bremen has set up a dedicated program to train apprentices alongside experienced production workers. The older employees benefit from young persons' know-how in new technologies and learning styles, and the youngsters get a better understanding of processes and company structures.

This intergenerational learning yielded positive results also concerning the practice of working in teams and contributing to a learning atmosphere.

7.14.3 Training for apprenticeships

Apprenticeships cannot solve the problems of youth unemployment on their own, but they can bridge the gap between school and the labour market, and they offer a tried and tested way of helping young people into work.

There is often an imbalance between supply and demand however. Some companies have places but cannot find apprentices to fill them. Others have too many candidates, and some apprentices cannot find an employer willing to take them on. Jaguar Land Rover (JLR) has set up a scheme to alleviate the problem - a clearing house to match apprentice applicants that have not been able to join JLR with opportunities with companies in the JLR supply chain.

7.1.4.4 Jaguar Land Rover – an apprenticeship clearing house

JLR is a member of the Automotive Industrial Partnership which brings together the leading UK-based original equipment manufacturers and UK public sector bodies.

The demand for places at Jaguar Land Rover (JLR), the UK's largest automotive apprenticeship provider, is very high, and it outstrips the company's ability to provide apprenticeship places, even though it generally takes on 200 apprentices per year. So what can be done with the many good quality applicants that are not successful?

A new initiative, which is being led by the Automotive Industrial Partnership (an industry and government collaboration to address skills issues), is to ensure that talent is retained within the automotive industry by matching high calibre apprentice applicants that have not been able to join JLR, with opportunities with companies in the JLR supply chain.

The first stage of the pilot project is to understand what supply chain employers need and what their recruitment processes are; then to engage in online system development; and thirdly to support candidates and employers through the process. Once the pilot is completed, the model developed could be shared and replicated to address other skills priority areas, such as graduate recruitment.

7.1.5 Certifying knowledge, skills and competence

In a working environment employees often need to be certified to demonstrate that they are able to do a job or part of a job competently, normally by completing some form of training programme and then passing some form of examination or assessment.

For employees certification gives them an opportunity to demonstrate what they know and what they can do. It also provides an opportunity for career development within their company and in addition for possible salary increases. Moreover it gives them a qualification which could be recognised by other potential employers in the future.
As this initiative undertaken by a French company shows, certifying learning is attractive for employers because it gives them an opportunity to assess the knowledge, skills and competence of their workforce and to see what skills exist within the company to address these future labour market needs. In addition it enables them to have a better understanding of the abilities of potential employees.

7.1.5.1 Certification of vocational training courses in the group

In 2010 a French company introduced a corporate method focused on the certification of vocational training curricula, with the aim of identifying the associated technical skills, the target level for each job position and the related training curricula necessary for skills development.

To date 100 (out of 110) vocational training curricula have been certified within the French company, and this corresponds to more than 90% of the persons employed.

The advantage of this initiative is that it makes it possible to manage skills developments in terms of the company's needs and prospective market trends. It speeds up the process and the skills enhancement of its employees, starting from an initial stage (through a tailor-made induction programme) up to other stages of an employee's career.
In addition it optimises development activities and targets training requirements more effectively. Finally it identifies pools of existing skills that employees have.

7.1.6 Addressing and closing the skills' gaps

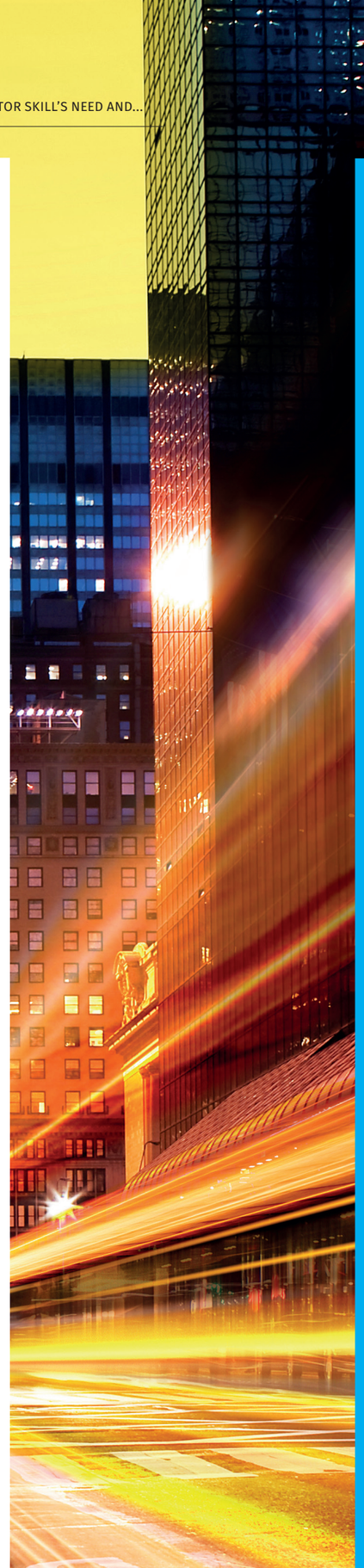
In order to address and close the skills' gaps, stakeholders require a clear understanding of the skills' needed by the sector and the ways in which training providers can respond. There is an urgent need for a more rigorous approach to the analysis and anticipation of demand for jobs and related skills. The countries with strong labour market information systems demonstrate that the systems can be easily adjusted to incorporate this requirement.

In BMW they have agreed to provide training for a range of new technologies: e-mobility, high voltage technology, battery technology, automotive engineering, safety technologies and electrical and electronic engineering. As the case – managing internal redeployment - shows, a French company has identified a skills gap in terms of 'in demand' jobs and then has moved to fill this gap by up skilling employees from "at risk" occupations, which in turn makes it easier to manage internal redeployment and also reduce the risk of redundancy.

7.1.6.1 BMW - e-mobility

BMW has set up another initiative "e-mobility" which has improved health and safety within the company and improved competence in a range of new technologies: e-mobility, high voltage technology, battery technology, automotive engineering, safety technologies and electrical and electronic engineering.

The program is a combination of theory and practice with many practical exercises and is divided into a series of different modules, leading up to a final assessment process. It has been considered a success, because it responds to a demand for qualification, it improves existing safety standards and it has encouraged intensive cooperation between all the process partners in designing the content of the training. Around 30,000 persons employed in the company have benefited from this program.



7.1.6.2 Managing internal redeployment

In 2012 a French company launched a scheme "Top Competences" which aimed to help employees who were willing to switch from "at-risk" jobs to "in demand" jobs within the company throughout Europe. It succeeded in developing an effective redeployment scheme designed to develop the skills and competence of employees in 'at-risk' job positions. In this way it helped to manage overstaffing in certain parts of the company and improve measures to improve employability.

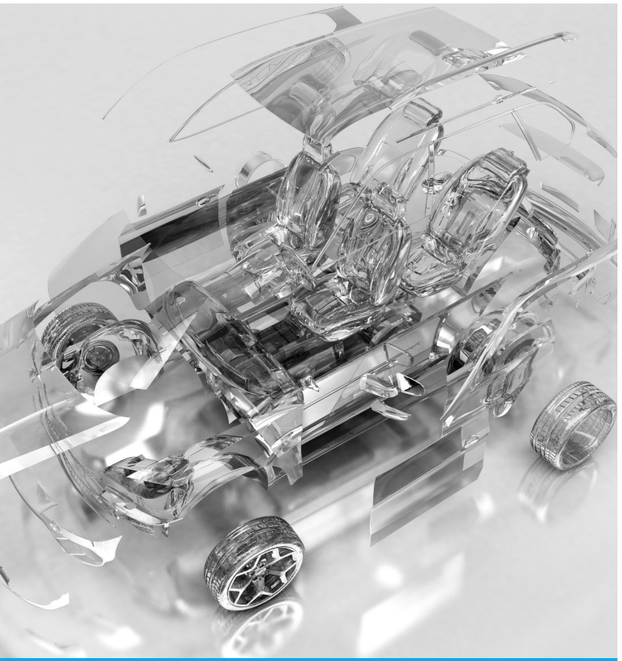
Since the scheme started in 2012 more than over 2,600 employees in "at-risk" positions have benefited from personalised training curricula for redeployment into 'on demand' job positions within the company.

The success of the scheme has been dependent on a rapid implementation of the training curricula required, efficient communication and cooperation between the different actors and the Corporate University to proceed with the induction of the employees concerned, and an accurate forward-looking vision of the job positions in demand over a period of three years.

Chapter 8

Members of the European Automotive Skills Council

The European Automotive Skills Council is coordinated by representatives of employers and trade unions in the automotive sector, the European Association of Automotive Suppliers (CLEPA), the European Tyre and Rubber Manufacturers' Association (ETRMA) and IndustriAll respectively.



The work of the European Automotive Skills Council is supported by the Council of European Employers of the Metal, Engineering and Technology-based Industries (CEEMET) and the European Automobile Manufacturers' Association (ACEA).

The European Automotive Skills Council has members coming from 13 different Member States, representing national sector skills councils, employers' organisations, trade unions, training providers and a research institute.

The European Automotive Skills Council has also developed an Industry Core Group made up of a series of major multinational companies.

8.1 Project consortium

1

CLEPA

CLEPA
European Association of Automotive Suppliers

CLEPA is the European Association of Automotive Suppliers.
116 of the world's most prominent suppliers for car parts, systems and modules and 23 National trade associations and European sector associations are members of CLEPA, representing more than 3 thousand companies, employing more than 5 million people and covering all products and services within the automotive supply chain. Based in Brussels, Belgium, CLEPA is recognised as the natural discussion partner by the European Institutions, United Nations and fellow associations (ACEA, JAMA, MEMA, etc).

Facts about the European automotive industry:

- Some 12 million people are employed in the European automotive industry
- European automotive suppliers directly employ 5 million people
- European automotive suppliers invest €18billion in RDI per year. They are the biggest private investors in research and innovation
- Per year, 18 million vehicles are manufactured in Europe, contributing to the stability and growth of the European economy

2

ETRMA

Established in 1959, ETRMA is devoted to advocating the interests of the tyre and rubber manufacturing industries with the European Union Institutions and other international organisations. ETRMA contributes to ensuring the development, competitiveness and growth of the tyre and rubber industry, in contributing to all the initiatives in favour of health, safety & environment protection, transport and road safety and access to third markets in coordination with the European public authorities.

The industry provides direct employment for more than 350,000 people in the EU and supports another 800,000 jobs in related sectors. The tyre and rubber sector's turnover in 2013 is estimated at € 72 billion, of which up to 5% continues to be invested in R&D, annually. The product portfolio of its members is extensive, ranging from tyres (all vehicle types), other automotive and construction rubber products to pharmaceutical, baby care, food contact applications, etc.

3

IndustriALL

IndustriAll European Trade Union represents 7.1 million workers across supply chains in manufacturing, mining and energy sectors at the European level. Almost 200 affiliated organisations from 39 European countries are representative bodies for their industries.

IndustriAll Europe focuses the economic and social interests of workers in the metal industry at European level. IndustriAll Europe advocates a social Europe characterised by democracy, freedom, social justice and solidarity.

It also defends and promotes the ability of the European social model to face up to future challenges.
At the same time it supports Europe's political and economic integration, whilst bearing in mind the unions' traditions and roots in the culture of their own respective nation states.

8.2 Project supporters

1

ACEA

The European Automobile Manufacturers' Association (ACEA) represents the 15 Europe-based car, van, truck and bus makers. Based in Brussels since 1991, ACEA works with a variety of institutional, non-governmental, research and civil society partners - as well as with a number of industry associations with related interests, to ensure the economic environmental and social sustainability of the automobile industry.
ACEA's members are BMW Group, DAF Trucks, Daimler, Fiat Chrysler Automobiles, Ford of Europe, Hyundai Motor Europe, Iveco, Jaguar Land Rover, Opel Group, PSA Peugeot Citroën, Renault Group, Toyota Motor Europe, Volkswagen Group, Volvo Cars, Volvo group.

2

CEEMET

Set up in 1962, CEEMET is the European employers' organisation representing the interests of the metal, engineering and technology-based industries, with a particular focus on labour market policy and industrial relations issues.
Its members are national employers' organisations and federations, representing 200,000 member companies across Europe, the vast majority of which are SMEs, providing employment for 35 million people, covering all products within the metal, engineering and technology-based sectors. Together, these companies make up the largest industrial sector in Europe, both in terms of employment levels and added value, and are therefore vital in driving forward and securing Europe's future prosperity.
Based in Brussels, Belgium, CEEMET is a recognised consultation body and discussion partner of the European Institutions and other stakeholders.

8.3 Member of the Skill Council

1

ACS (Slovenia, member of the former AQUA Skills Alliance)

ACS is a business association bringing together Slovenian automotive suppliers. Its members' aim is to reinforce competitiveness and create greater added value. It is the central communication point for the automotive cluster and provides support for its members to integrate into the global automotive industry and to improve the range of their products and services. It aims to improve the efficiency of its members by providing adequate research and development and co-operating with expert development and scientific institutions both in Slovenia and abroad.
AQUA, the Knowledge Alliance for Training Quality and Excellence in Automotive, is one of four pilot projects under the ERASMUS+ Sector Skills Alliances programme. This sustainable strategic alliance was formed for the implementation and Europe-wide deployment of modern certified VET Curricula in Quality, Functional Safety, and Reliability on an organisational level.

2

AFIA (Portugal)

Since its foundation in 1979, the Associação de Fabricantes para a Indústria Automóvel (Manufacturers Association for the Automotive Industry) represents suppliers from the automotive industry based in Portugal both at national and international levels. AFIA helps to develop its members as suppliers to the automotive industry, by:

- representing them towards industrial and public authorities and the media
- disseminating information about the sector and the market
- creating opportunities for suppliers to exchange information and strengthen relations
- initiating activities to increase competence and to support internationalisation
- supporting foreign buyers in finding Portuguese suppliers
- supporting foreign investors in the start-up and integration of new activities

3

APIA (Romania)

APIA, the Romanian Automotive Manufacturers and Importers Association, acts as a forum of debate for its members, aiming to develop programmes and point of views regarding different topics that are of interest for the Romanian automotive industry. Since 1996, APIA is a full right member of the International Organisation of Motor Vehicle Manufacturers (OICA), the forum of the world motor vehicle manufacturers. Today, APIA gathers the most important companies operating in the automotive industry - national manufacturers, the importers of motor vehicles - , as well as other companies acting in the field of spare parts, accessories or lubricants.

4

EDUCAM (Belgium)

EDUCAM is the knowledge and training institute for the mobility sector in Belgium. Established in 1990, EDUCAM's goal is to provide enough qualified staff in the mobility sector. We provide training and exams in the automotive industry. In addition we strive to complement and strengthen the link between vocational education and the labour market. To achieve this, we guide the more than 10,000 companies where students can learn the trade, and we work alongside regional training centres on the content of their courses. These activities are established in the market under two titles: EDUCAM Partner and EDUCAM Service. A third strategic issue is examination and certification in the mobility sector. EDUCAM was created by collective bargaining and is managed by social partners.

5

FIEV (France)

From its origins, in 1910, when it represented a mere hundred subcontractors producing components designed by domestic car manufacturers, to the present day, the Fédération des Industries des Equipements pour Véhicules (FIEV) has been the mouthpiece for a globalised sector which designs and manufactures components, modules and systems for vehicles produced on all markets, as well as technical inspection and maintenance equipment used at service stations and repair shops. Recognised by the sector, the French authorities and European and international institutions, FIEV's role is to represent, defend, advise and help its members by offering them a wide range of services in the technical, economic, commercial, financial, legal, fiscal, employment and international fields. The numerous committees and specialised working parties operating in the Federation enable members to exchange experience and move forward together in all these areas.

6

IG Metall (Germany)

With more than 2.3 million members, IG Metall is the largest trade union in Europe. With more than 125,000 shop stewards, (European) works councils and youth representatives in more than 18,000 companies, we campaign on behalf of those employed in metalworking and electrical industries, iron and steel, textiles and clothing, information technology, wood and plastic and in temporary and agency work. We bring together skilled workers, white-collar workers, trainees, engineers and many other employees. IG Metall aims to exert an influence on operational and sectoral policy, negotiate collective agreements and shape policy development to achieve fair working and living conditions.

IG Metall is also involved in European policy to influence decision-making processes in Brussels and Strasbourg in the interests of employees. Our aim is to establish a social Europe. Together with the European trade union movement, we are the voice for a politically united, economically strong and socially just Europe. The European team in Frankfurt and Brussels represents the interests of IG Metall in relation to the European institutions, in particular the European Parliament, the European Commission and the European Council.

7

OS KOVO (Czech Republic)

OS KOVO – the Czech Metalworkers´ Federation – was established in 1990 and represents the interests of workers in the metal industry of the Czech Republic. Since 1991 OS KOVO is also active at European level (originally in the EMF, more recently IndustriAll European Trade Union) and at the international level (originally in the IMF, more recently IndustriALL Global Union) structure. With 77,787 members, OS KOVO is also a member of the Czech Moravian Confederation of Trade Unions (CMKOS) at national level and member of the Czech Tripartite Committee. The sectors covered by OS KOVO are: automotive, steel, metalworking, mechanical engineering, aircraft, electric and electro technical, etc. Other important activities are undertaken for apprentices and young people. OS KOVO is a trade union organisation under Art. 9a of Act No. 83/1990 Coll.

8

OZ KOVO (Slovakia)

OZ KOVO is a trade union organisation under Art. 9a of Act No. 83/1990 Coll., as amended. The Slovak abbreviation of Trade Union KOVO is OZ KOVO (in Slovak Odborový zväz KOVO).

OZ KOVO brings together members from the mechanical engineering, electrical and metalworking industries, from services and the public road transportation sectors. Since its establishment, OZ KOVO has had permanent representatives in the supreme bodies of the Confederation of Trade Unions of the Slovak Republic.

At present, OZ KOVO has more than 62,000 members and it is the biggest trade union confederation in Slovakia.

OZ KOVO is active at the international level also. It maintains a long-term cooperation with international trade union federations - IndustriAll European Trade Union, IndustriAll Global Union, EPSU and PSI.

9

PIMOT (Poland)

The Automotive Industry Institute (PIMOT) is a modern research and development institute, actively participating in the process of transformation and development of Polish science and economy. The Institute is supervised by the Ministry of Development.

Since 1972 the Automotive Industry Institute has been conducting scientific research and development work in the fields of:

- motorisation;
- fuels and biofuels, alternative fuels, and lubricants.

PIMOT has been authorised by the Minister appropriate for transport issues and by international organisations to perform tests for conformity with over 40 UN ECE Regulations and EU Directives. The high quality of the tests carried out has been confirmed by ISO certificates and by accreditation of the test procedures by the Polish Centre for Accreditation.

10

SEMTA (UK)

SEMTA – The Science, Engineering, Manufacturing and Technologies Alliance - is a not-for-profit Sector Skills Council responsible for engineering skills for the future of the UK's most advanced sectors. Established in 1964 and led by employers, its job is to transform the skills and productivity of the people who power engineering and advanced manufacturing technologies sectors, enabling UK industry to compete on the global stage.

SEMTA is committed to inspiring the next generation of engineers, showcasing the best of British engineering talent and driving excellence in STEM teaching through The STEM Alliance, an innovative initiative which aligns further education with industry needs.

SEMTA represents 145,800 Advanced Manufacturing and Engineering employers in the United Kingdom.

SEMTA collaborates closely with the British trade union Unite

11

Sernauto (Spain)

Sernauto is the Spanish Association of Automotive Equipment and Components Manufacturers. Established in 1967, it represents members' interests vis-a-vis public administration and public and private organisations. It is the reference point for discussing sectoral issues and a meeting point for companies.

Moreover, Sernauto develops an awareness-raising task about sectoral issues vis-a-vis public opinion and public administration, informs its associates on all issues that could affect their companies and aims at promoting the sector in and outside Spain.

The associated companies represent over 85% or the sector's turnover in Spain. In the EASC, Sernauto also represents the Automotive Sector Forum Spain, a tripartite organism. Sernauto collaborates closely with the Spanish trade unions in the sector.

12

SkillMan (UK/DK/IT)

Established at the beginning of 2015, the Sector Skills Alliance on Advanced Manufacturing for the Transport Sector, SkillMan is engaged in developing innovative educational curricula and qualifications in line with industry-led skills demand in 3 different areas:

- robotics, automated production lines, cooperation between human and robotics
- composite and lightweight materials, maintenance of new generation aircrafts
- wireless technologies and Industry 4.0 and ICT profiles involved in the digitalisation of production processes

Coordinator: CSCS

Industrial partners: Jaguar Land Rover (UK); FIAT Research Center (IT), Scandinavian Airlines Systems (DK, Italian National Council of Research (IT)

Education providers: TEC (DK), Birmingham Metropolitan College (UK), CSCS (IT)

Awarding Bodies: Excellence, Achievement & Learning (UK), Industrens Uddannelser (DK), CEPAS (IT)

13

UNIVERSITY OF TWENTE.

University of Twente (Netherlands)

The University of Twente was founded in 1961 as the Technische Hogeschool Twente, the Netherlands' third higher vocational institute of technology later to become a university.

The Faculty of Engineering Technology includes Mechanical Engineering, Civil Engineering and Industrial Design Engineering. The University of Twente is represented by Prof. Dr. Anke Blume, chair of the Elastomer and Engineering Technology department, who works part-time for the university and part-time for Evonik, where she is responsible for the intellectual property of Evonik as regards the use of silica and silanes in rubber applications.

8.4 Industry Core Group

The European Automotive Skills Council has set up, according to its statutes, an Industry Core Group, with the aim of fostering participation from automotive corporate representatives, to maximise synergies and to secure long-term commitment from the industry in the framework of the EASC. Members of the Industry Core Group such as Bosch, Continental, Gestamp, Jaguar Land Rover and Pirelli have contributed to the Automotive Skills Survey and Report by providing best practice examples and sharing their automotive skills expertise.

Pictures: CLEPA - ETRMA - IndustriALL - image bank

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Automotive Industry

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