



Understanding the Marketplace

Deliverable 5.2 - Report on the European Automotive Apprenticeship Marketplace



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EXECUTIVE SUMMARY

The aim of this Report is to support the development of a shared understanding of the automotive apprenticeship marketplace in order that the sector can promote apprenticeships effectively and meet identified challenges.

The Report has been developed to help shape thinking and policy development and underpin practical action and intervention within the automotive apprenticeship marketplace.

The growing wave of new technologies and trends is about to redefine mobility. Therefore, it is of vital importance that the millions of Europeans working in the automotive industry are sufficiently prepared. Given the fast pace of developments, and with other world regions keen to take the lead, leveraging the strengths of the EU workforce is of utmost importance.

Simultaneously, domain experts and highly skilled engineers cannot keep up with the pace required to stay in sync with these changes. With the fast pace of industry change, skills grow obsolete quickly. More recent analysis shows the half-life of skills¹ is now only five years. Which means the skills learned today are only half as valuable five years from now.

This underlines the need for **the apprenticeship offer to be flexible enough to respond to these changes**. These changes also imply:

- It is difficult for providers to keep abreast of changing skill requirements
- Future skill requirements are difficult for employers to predict

The evidence of changing skill requirements within the automotive sector shows how **these changes will impact at all skill levels**. This underlines the importance of developing apprenticeships serving the sector at every level, including higher levels, in order to meet these changing needs.

Upskilling and reskilling of existing employees is at least as important as support for new entrants.

This implies the need for appropriately tailored training but also the need to maximise the potential for apprenticeships to support upskilling and provide clear learning pathways between different

¹ This means that every five years, that skill is about half as valuable as it was before
<https://www.weforum.org/agenda/2017/07/skill-reskill-prepare-for-future-of-work/>



levels to facilitate continuous upskilling². It also highlights the need for a more modular and flexible approach to the design and delivery of apprenticeships.

A number of specialist skills are emerging as technology changes within the industry. This implies employers need tailored, **often bite sized solutions to meet their needs**, which in turn has implications for the design of apprenticeships, with a degree of flexibility required³.

Many of the current and likely future skill requirements within the automotive sector are quite complex. It is also the case that apprenticeships need to balance the need for equipping apprentices with the skills required for successful careers in the automotive industry with the need to meet employers specific changing skill requirements. This highlights the importance of not only understanding these requirements in detail, but **the need for a close and continued dialogue between employers in the sector together with schools, colleges, universities and other providers of apprenticeship training to ensure the apprenticeship offer evolves in line with these changing skills requirements**.

Recent research suggests changes relating to **Industry 4.0** are likely to imply the need to attract a higher level of applicant in order to be able to learn rapidly as jobs evolve and also the need to revise qualifications to take account of these changes⁴.

There are also significant implications of digitalisation in relation to the way apprenticeships should be delivered in the future, in particular the increased use of digital technologies as part of apprenticeship programme delivery.

The common skills challenges faced across the EU automotive supply chain further underline **the importance of improving mobility of labour through improved qualification recognition between Member States** and in the case of apprenticeships, through the potential development of a single market for apprentices across the EU by linking regional, national and European apprenticeship initiatives.

² There is evidence that traditional pre-conceptions that apprentices can only be entry-level school leavers or labour-intensive workers are already evolving. See for example <https://www.findcourses.co.uk/inspiration/apprenticeships/using-the-apprenticeship-levy-to-train-existing-staff-13125>

³ The Future of Work Jobs and Skills in 2030; UKCES; Z_punkt and the Centre for Research in Futures and Innovation (CRI-FI)

⁴ Apprenticeships and 'future work': are we ready? Erica Smith, 2019 <https://rdcu.be/bQRlx>



It is well documented that the **automotive sector suffers from a poor image** amongst young people in a number of EU countries. A range of innovative solutions are required to address this.

It is also clear that there is **a gender imbalance across the automotive sector as a whole and particularly in relation to certain occupations** and that more could be done to ensure the industry is an attractive option for all groups⁵. **If the industry is to tackle changing future recruitment and skills challenges effectively it will be crucial that steps are taken not only to tackle the gender imbalance but to ensure the skills of all demographic groups are maximised.**

At present there are a number of aspects of the current apprenticeship market serving the EU automotive sector that impede efficient operation, with a number of factors potentially restricting labour mobility across the EU automotive sector. In particular:

- Some overall apprenticeship models are likely to encourage greater inter-industry mobility than other models.
- Labour mobility is currently further restricted by the wide inter-country variations, not only in terms of the overall apprenticeship models adopted, but in terms of patterns of school-company alternation, typical duration of apprenticeships, volume of in-company training per year, requirements placed on both employers and wider labour market stakeholders and age and educational level eligibility criteria.
- Based on research undertaken as part of the DRIVES project it is clear that understanding and comparing different apprenticeship offers across different EU countries is currently a significant challenge.

These challenges require innovative solutions to help both employers and trainees maximise the value of apprenticeships in meeting fast changing skill requirements.

⁵ <https://www.motortrader.com/motor-trader-news/automotive-news/driving-better-gender-balance-motor-business-15-03-2018>



The EU apprenticeship market poses particular challenges for automotive SME's (which are vital to the efficient functioning of the automotive supply chain) both in relation to greater difficulties in recruiting candidates which meet their particular needs and providing the required learning and development for their employees.

Specifically, SME's often struggle to provide apprenticeship opportunities. Some of the most common reasons cited for this include: a lack of training infrastructure and personnel to supervise apprentices, as well as insufficient expertise and capacity to manage complex rules, employment law and administrative requirements⁶. This implies the need for the development of innovative approaches help SME's attract apprentices and support to ensure the capability to provide the required training support.

Increased globalisation has impacted across all sectors, but particularly in relation to the automotive sector, with **increasingly complex and global Supply Chain Management patterns**. As automotive supply chains become increasingly globalised in nature, by contrast apprenticeships tend to be focussed nationally or even more locally, with wide variations in approach, delivery mechanisms, employer involvement and commitment. This poses challenges for employers when choosing whether to participate in the apprenticeship systems of those countries they operate in, rather than adopt in house models, and for the mobility of apprentices seeking employment across national boundaries. Recognition of apprenticeships by different employers is also a problem in some cases.

This Report has been developed in order to underpin practical action and intervention within the EU automotive apprenticeship marketplace.

⁶ Services for Apprenticeships (SERFA) Erasmus Plus Project Transnational Report; Apprenticeships across eight European countries: Current situation, best practice and SMEs' needs Prepared by Roland Löffler and Martin Mayerl (öibf) May 2017

https://www.serfa-project.eu/sites/default/files/upload/projet/transnational_report_final_version.pdf



A number of potential practical actions to try and tackle issues set out in this report are suggested, which can be summed up under four main headings:

- Establish a central resource enabling access to examples of good practice in terms of apprenticeship design and delivery within the automotive sector in partnership with key stakeholders and building on existing resources⁷.
- Establish an intelligence service to track skills changes for employers and providers and act as an accessible resource for both employers and providers.
- Establish an Apprenticeship comparison tool to try and help both employers and individuals to navigate the apprenticeship landscape and compare offers in different countries.
- Adopt more innovative ways of designing apprenticeships such as ensuring increased flexibility, just in time design to respond to rapid skill changes, and making sure the apprenticeship offer supports upskilling of existing employees as well as new entrants to the sector

⁷ Including the European Centre for the Development of Vocational Training (CEDEFOP) and European Alliance for Apprentices (Eafa)



1 INTRODUCTION

The vehicle of the future will no longer function solely as a mode of transportation. Car usage behaviour, electrification, sharing, autonomy and connectivity are all fundamentally shifting the automotive sector's vision towards the integration of services around the product itself.

This makes sense because the ways that consumers' access, purchase and use cars and other modes of transport are changing rapidly. New technologies and the massive use of the internet will have a huge impact on the use and very concept of mobility. There is also a growing public expectation that greater automation will lead to even higher standards of road safety and higher connectivity of vehicles, together with a wide range of new services. These changes will involve issues surrounding Big data and Cybersecurity, whilst creating a demand for horizontal skills, and necessitating the migration of occupations from other sectors and the emergence of new skill requirements.

In the face of such seismic change The Development and Research on Innovative Vocational Education Skills (DRIVES) project was commissioned to try and support the future-proofing of skills and allow the EU workforce to continue to compete on a global scale. Running from January 2018 until December 2021, the project brings together 24 partners from 11 EU countries with a large automotive presence including the UK, Spain and Italy. Its broad objectives are to:

- Analyse key trends, covering the whole value-chain
- Define future skills and job roles
- Identify skills gaps for foreseen changes
- Analyse the current offering of training/upskilling/reskilling
- Provide clear guidance for education and training providers

A key aim of the DRIVES project is to identify ways of supporting the creation of an effective apprenticeship market serving the automotive sector.

In order to achieve this it is necessary to develop a clear and common understanding of the current apprenticeship marketplace, both in terms of the different models currently operating and the key challenges faced in relation to addressing changing skill requirements and tackling impediments to mobility of labour within the sector.



The aim of this Report is to support the development of a shared understanding of the automotive apprenticeship marketplace in order that the sector can promote apprenticeships effectively and meet identified challenges.

The Report identifies a range of key issues impacting on the automotive sector that have implications for the apprenticeship marketplace serving the sector including:

- Skills related issues such as the pace of skills change, the impact of these changes on different educational levels, the balance between skills needed for new entrants and upskilling of existing employees, the specific nature of changing skill requirements and the particular implications of Industry 4.0 (the fourth industrial revolution)
- The importance of employer, provider and government involvement in the design of apprenticeships to meet changing employer needs
- Recruitment related issues such as image of the sector and the need to improve workforce diversity
- The current apprenticeship offer across different countries and implications for apprenticeship mobility and labour mobility more generally
- The particular challenges facing Small and Medium Enterprises (SME's)
- The implications relating to the global nature of the automotive industry

Specifically, the purpose of this Report is to provide a resource to:

- Enhance understanding of the current nature of the apprenticeship marketplace serving the EU automotive sector
- Highlight the problems and challenges in relation to this marketplace
- Identify potential improvements that could be put in place in relation to the current automotive apprenticeship marketplace at all stages, including; planning, recruitment, support arrangements, employer involvement, tackling skill gaps, monitoring, evaluation, learning from good practice and trans-national networking and working.

The Report also provides a valuable resource to support other strands of work within DRIVES, in particular work strands:

- Concerned with promoting the apprenticeship marketplace to key stakeholders (OEMs and Supply chains) in the automotive sector (Work Package 5.3)
- Which explore approaches that allow the apprenticeship marketplace to meet both the current and future skill needs of the automotive sector (Work Packages 5.4 and 4.1)



The Report includes the following sections:

- Overview of the Automotive Sector in the EU
- Changing Automotive skill needs
- Understanding the EU Apprenticeship Marketplace
- The EU Automotive Apprenticeship Marketplace
- Conclusions and moving forward

These sections are summarised below.

1.1 OVERVIEW OF THE AUTOMOTIVE SECTOR IN THE EU

It is important to understand the current apprenticeship marketplace across Europe and within different EU partner countries in the context of the scale, nature and importance of the automotive sector within each partner country. This section therefore draws on existing evidence in order to provide a relevant ‘thumbnail’ profile of the existing automotive industry in key automotive sector countries in the EU including identification of:

- Key economic figures relating to the sector
- Supply chain characteristics
- Key players and new competitors
- Geographical supply chain patterns

1.2 CHANGING AUTOMOTIVE SKILL NEEDS

The section draws on available evidence together with the results of the DRIVES WP2⁸ Survey in order to identify key changes in terms of skill needs across the sector. The report also examines the specific implications of these changes for apprenticeships. In particular the implications relating to:

- The pace of skills change
- The impact of skills change on different educational levels
- The importance of upskilling and reskilling of existing employees
- The specific nature of skill changes
- The need to reflect changing employer requirements

⁸ This was a major EU wide online survey of employers exploring key drivers of change impacting on the automotive sector and the implications for new and emerging job roles and associated skills.



- The specific implications of Industry 4.0
- The need to improve the image of the sector
- The need to encourage greater workforce diversity

The chapter presents several case studies of innovative practice designed to address specific skills issues impacting on the automotive apprenticeship market.

1.3 THE EXISTING EU APPRENTICESHIP MARKET

This chapter focuses on understanding different apprenticeship models adopted across the EU and the implications of these different approaches for the automotive sector. Although different countries have different apprenticeship models this study uses the following working definition of an apprenticeship

‘systematic, long-term training alternating periods at the workplace and in an education institution or training centre. The apprentice is contractually linked to the employer and receives remuneration (wage or allowance). The employer assumes responsibility for providing the trainee with training leading to a specific occupation’⁹.

In order to understand different apprenticeship models adopted in different EU countries, the chapter focusses on the ‘top 10’ automotive countries measured in relation to direct automotive manufacturing employment and compares the apprenticeship system in each of these selected ‘key automotive countries’ using available information and a standardised assessment criteria, this being:

- Typical duration of apprenticeships
- The minimum volume of in-company training per year
- The requirements on employers in relation to provision of learning and arrangements and responsibilities for accreditation and monitoring
- The minimum age of eligibility, age range eligibility and education level eligibility

The chapter also looks in more detail at the apprenticeship models in these ‘top 10’ countries under the following headings:

⁹ Apprenticeship Schemes in European countries – A cross-nation Review – CEDEFOP 2018



- Overview
- Organisation
- Funding
- Quality Assurance
- Uptake
- Governance

The recently adopted European Framework for Quality and Effective Apprenticeships (EFQEA)¹⁰ recommendations provides a more detailed accepted framework against which the current automotive Apprenticeship marketplace within selected countries can be benchmarked. There are 14 recommendations that have been adopted that form a standardised criterion for both learning and working conditions and framework conditions. This benchmarking process has been applied to 5 key EU automotive countries selected to highlight divergences in approach to apprenticeships.

The analysis identifies a number of factors currently restricting labour mobility across the EU automotive sector at an apprenticeship level including:

- The confusing nature of the current apprenticeship offer
- Different apprenticeship models adopted in different countries and wide variations in delivery approaches
- The specific challenges faced by SME's in relation to involvement in apprenticeships
- The global nature of the automotive industry versus the local focus of apprenticeships

The chapter concludes with some case studies of innovative practice designed to address some of these issues.

¹⁰ <https://ec.europa.eu/esf/transnationality/content/european-framework-quality-and-effective-apprenticeships>

1.4 UNDERSTANDING THE EU AUTOMOTIVE APPRENTICESHIP MARKETPLACE

This section uses a range of different sources to draw up a picture of the current apprenticeship marketplace serving the EU automotive industry including:

- Results of a major online survey of employers undertaken as part of DRIVES WP2¹¹ which provides direct feedback from employers and stakeholders with respect to the current apprenticeship marketplace within the automotive sector.
- Results of an online survey of Vocational Education and Training (VET) providers undertaken as part of DRIVES WP2¹² which provides direct feedback from VET providers involved in delivering training to support the automotive sector
- Detailed analysis of the specific apprenticeship offer serving the automotive sector in three selected countries, these being the UK (England), Germany and Portugal.

1.5 CONCLUSIONS AND MOVING FORWARD

The Report provides a structured basis to help identify:

- The extent to which the current apprenticeship offer is meeting the needs of the automotive industry
- Similarities and differences in the current apprenticeship market in relation to different countries of particular relevance to the automotive sector
- Key challenges moving forward in relation to the planning and delivery of apprenticeships
- Potential opportunities to grow the apprenticeship market
- Potential shared approaches to apprenticeship delivery
- Potential transnational apprenticeship models
- Future skills needs and the role of apprenticeships in supporting the acquisition of technical and soft skills.

¹¹ Insights of the Automotive Sector 2019 - Deliverable 2.7 Forecasting Dissemination Report; Christian Baio, SPIN360, Jakub Stolfa, VSB-TUO, Svatopluk Stolfa, VSB-TUO

https://www.project-drives.eu/Media/Publications/6/Publications_6_20190717_81413.pdf

¹² See DRIVES D2.8 SKILLS NEEDS AND GAPS, Christian Baio, Spin360, 2020

2 OVERVIEW OF THE AUTOMOTIVE SECTOR IN THE EU

It is estimated that over 1 billion cars travel our roads in Europe today and over 90 million new ones are produced annually. This high usage has turned the automotive domain and smart transportation into a key industrial sector for Europe¹³ with 13.8 million jobs, representing 6.1% of total EU employment, producing 21% of the vehicles worldwide and generating a yearly trade balance of over €99 billion. Almost 6.1 million of those motor vehicles were exported in 2018, generating a trade surplus of €84.4 billion for the European Union. Taxation on these vehicles is worth €428 billion per year in the EU15 countries.

At the same time, Europe's automotive industry remains committed to addressing tomorrow's challenges. The automotive sector has been Europe's key driver of knowledge and innovation for many years and worldwide the second biggest R&D sector. EU automakers and suppliers have increased their R&D investments by 6.7%¹³, to reach an all-time high of €57.4 billion per year, representing Europe's largest private contributor to R&D. This makes the automotive sector Europe's number one investor in innovation, responsible for 28% of total EU spending on R&D. Compared to other regions worldwide, the EU auto sector leads the way in terms of R&D investment. Moreover, 8,700 automotive patents were granted by the European Patent Office last year¹³.

The current automotive revolution is driven by the concept of a connected and automated car. These cars communicate with each other, with the local environment, and with the world at large via radio networks and satellites. By implementing real-time connectivity to cloud computing services and new ways of providing information and entertainment the primary function of these cars is evolving from transportation devices to integrated systems in a connected world of things. Embedded cyber-physical systems and Industrial IoT (IIoT) shift the value creation in the automotive domain towards the ICT domain and service orientation.

Thus, the entire industrial sector needs to evolve and adapt at a very fast pace to stay ahead of global competition, while including all stakeholders and addressing societal needs.

¹³ European Automobile Manufacturer Association, The Automobile Industry Pocket Guide 2018 - 2019, 2019.

In order to understand the impact of this revolution the profile of the existing automotive industry has to be understood.

Analysis of this is summarised under the headings below:

- Key economic figures relating to the European Automotive Sector
- Supply chain characteristics
- Key players and new competitors
- Geographical supply chain patterns

2.1 KEY ECONOMIC FIGURES RELATING TO THE EUROPEAN AUTOMOTIVE SECTOR

As already outlined the scope of the European automotive sector is enormous in terms of economic significance. The sector provides direct and indirect jobs to 13.8 million Europeans, representing 6.1% of total EU employment¹³. Moreover, 11.4% of all EU manufacturing jobs are related to the automotive industry. Europe’s automotive sector has been the key driver of knowledge and innovation for many years and responsible for €84.4 billion trade surplus. Also, numbers employed in the sector have risen over the last years (see Figure 1) with a quarter of all cars produced worldwide made in Europe.

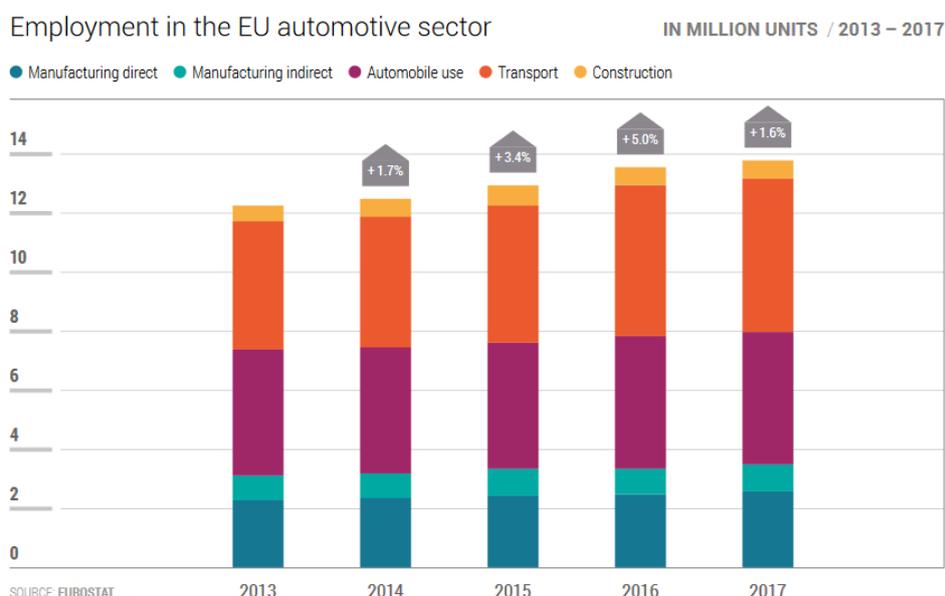
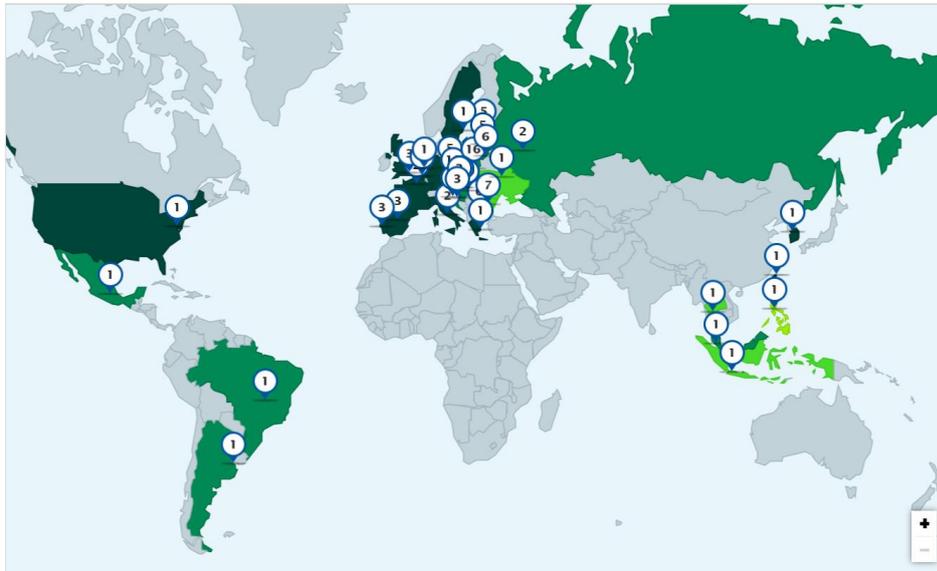


Figure 1 Employment in the EU automotive sector¹³

As further indicated in

As further indicated in Figure 2¹⁴, along with US and Asian countries, the European automotive industry is identified as mainly an innovation-driven economy. The Figure depicts the extent to which each economy is either factor driven (yellow or light green), indicating a rather low innovation oriented industry, or innovation driven (dark green). This in turns points towards the rate of innovation of each respective national economy and thus highlights the importance of engineering, research and innovation activities for these regions rather than other skills.



¹⁴ L. M. Kurekova, The automotive industry in Central Europe: A success?, IZA World of Labor, 2018.

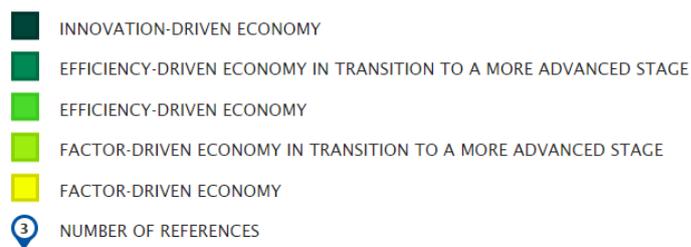


Figure 2 Automotive Industry Economy of Countries¹⁵

2.2 SUPPLY CHAIN CHARACTERISTICS

The automotive sector is amongst the largest, most competitive, and most internationalised of all industries, with high barriers to entry. It is also a classic example of a producer driven commodity chain. It is characterised by integrated production systems that comprise highly specialized, segment-specific, vertically organized transnational companies. The industry has a high intensity in technology, capital, and skills and is logistically demanding due to lean manufacturing and the system of just-in-time parts delivery¹⁴.

The structure of the automotive supply chain is often compared to a pyramid¹⁶. These tiered supply chains are very common due to the very complex end-product and the multiple components and sub-assemblies it consists of and which have to comply with stringent quality, manufacturing and business standards.

On top are the Original Equipment Manufacturer (OEMs) referred to as companies that make the final product for the consumer market (e.g. Audi, BMW, Daimler, VW). Tier 1 companies are directly supplying

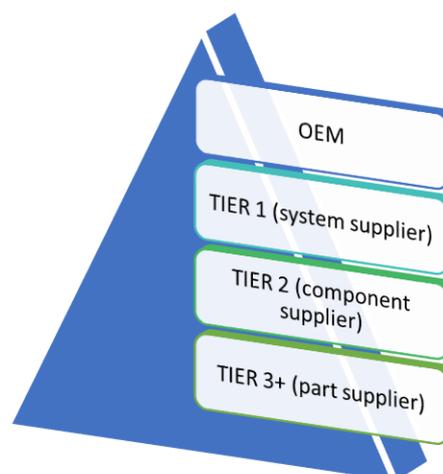


Figure 3 Automotive Supply Chain

OEMs with major vehicle systems (such as drive-train, infotainment, motor units) and are themselves supported by Tier 2 companies (supplying components such as vehicle control units, battery management systems). Therefore, in a typical supply chain OEMs are supplied by Tier 1, which are themselves supported by Tier 2, which are

¹⁵ Institute of Labor Economics, "IZA World of Labor," IZA World of Labor, 2008. [Online]. Available: <https://wol.iza.org/articles/the-automotive-industry-in-central-europe-a-success/map> [Zugriff am 16 07 2019].

¹⁶ H. Broekman, D. Ekert, M. Kollenhof, A. Riel, H. Theisens und R. Winter, Working in the Automotive Industry - Mindeset, Skill set & Tool set for people working in the automotive industry, Lean Six Sigma Academy (LSSA BV), 2017.



supported by Tier 3 and so forth. Tier is a common terminology in the automotive industry and refers to major suppliers of parts.

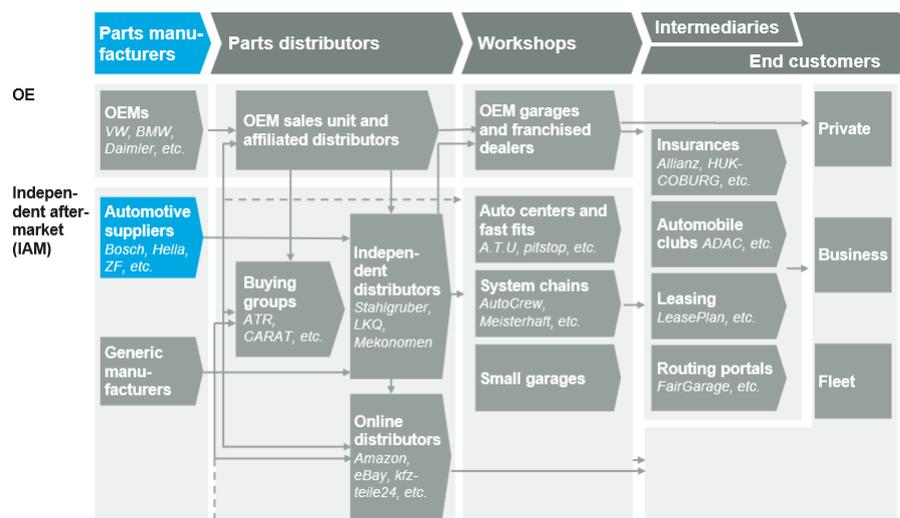
The automotive aftermarket and aftersales sector is a complex, robust and highly competitive market that provides the support network for Europe's millions of cars, vans, trucks and buses. The automotive aftermarket's multi-faceted and diverse segments cover the whole repair, maintenance and service spectrum from parts supply to fitment and servicing.¹³ Vehicle manufacturers are not dominant players in aftermarket maintenance over the lifetime of the average vehicle. Here SME's comprise the mainstay of total aftermarket services.

The aftermarket is the part of the automotive industry sector comprising the automotive services and parts businesses. The service business (maintenance and repair of vehicles) generates about 45% of total aftermarket revenues in Europe, while retailing and wholesaling of vehicle parts make up the remaining 55%. Both businesses together deliver approximately 20% of total automotive revenues.¹⁷ When it comes to the stakeholders involved, the aftermarket is generally split into the OEM network and the independent aftermarket.

As depicted in Figure 4, the aftermarket comprises five distinct stakeholder groups:

- Parts manufacturers such as OEMs, automotive suppliers, and generic manufacturers that produce aftermarket parts and offer services
- Parts distributors, including buying groups, independent distributors, online retailers, and OEMs with their affiliated distributor network
- Workshops, including the OEM workshop networks, auto centres, system chains, and small garages
- Intermediaries, in particular insurance organisations, automobile clubs, leasing companies, and routing portals
- End customers, consisting of the private, business, and fleet market.

¹⁷ McKinsey&Company, The changing aftermarket game - and how automotive suppliers can benefit from arising opportunities, 2017.



SOURCE: McKinsey

Figure 4 Aftermarket stakeholder groups and supplier models¹⁷

2.3 KEY PLAYERS AND NEW COMPETITORS

The automotive OEM and part supplier sector is one of the sectors that are significantly influenced by disruptive trends. However, the leading positions in the industry are still occupied by large global producers. Statista provides several 'top' lists in this regards, e.g. the largest 200 companies in the Automobiles & Automotive Parts sector ranked by revenue¹⁸. This list comprises mainly international players, like Volkswagen, Toyota Motor, and Ford Motor, but also includes many growing companies in the industry, especially Asian companies.

The global car market share by brands in 2018, ranked Japan's Toyota Motor Corporation the world's largest automaker, while Germany's Volkswagen AG was ranked second¹⁸. In the Top10 ranking only three European automotive brands appeared: Volkswagen (2nd), Mercedes (9th) and Renault (10th). Based on Statista calculations of market share values and rankings, global sales of 93.6 million units were achieved in 2018.

¹⁸ Statista, 2019 "Top 200 Companies: Automobiles & Automotive Parts," Available: <https://www.statista.com/study/30861/top-100-automotive-and-automotive-part-companies-global/>

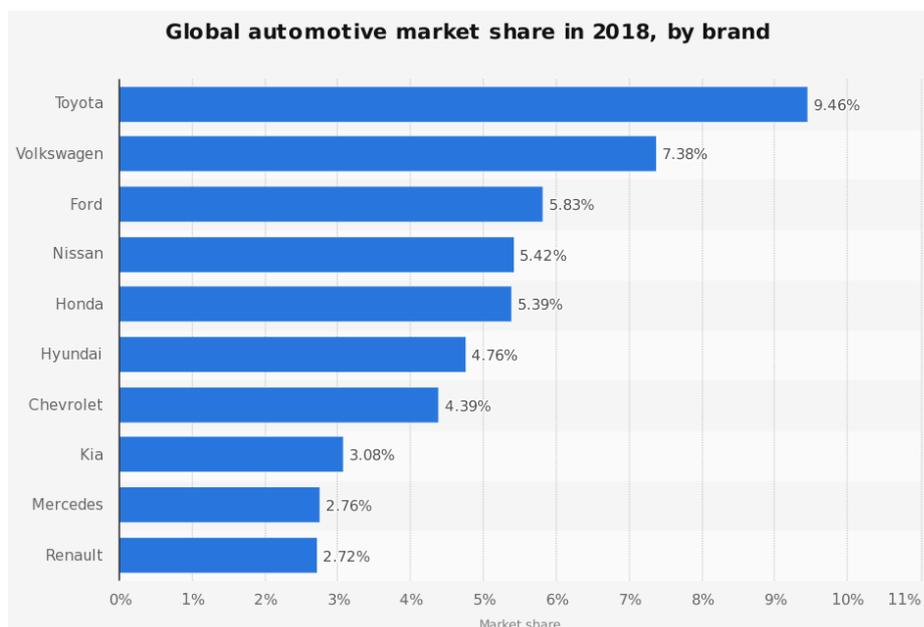


Figure 5 Global automotive market share in 2018 per brand

In terms of the most valuable automotive brands worldwide, 5 European manufacturers are ranked in the Top 10 in 2019¹⁹.

Most valuable automotive brands worldwide by brand value 2019

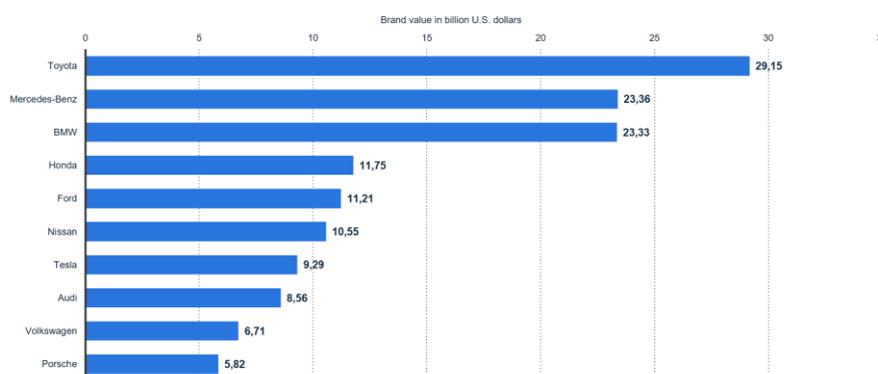


Figure 6 Most valuable automotive brands in 2019 by Kantar Millward Brown¹⁹

The European (based) OEMs: BMW, DAF, Daimler AG, Fiat Chrysler Automobiles, Ford Europe, Honda, Hyundai Europe, Iveco, Jaguar Land Rover, Opel Group, PSA Peugeot Citroën, Renault, Toyota Europe, Volkswagen Group, Volvo Cars and Volvo Group have established their main lobbying and standards group in the EU called European Automobile Manufacturers Association (French: Association des Constructeurs Européens d'Automobiles; abbreviated ACEA)²⁰. The ACEA²¹

¹⁹ Statista, 2019 "Global car market share of the world's largest automobile OEMs in 2018", Available: <https://www.statista.com/statistics/316786/global-market-share-of-the-leading-automakers/>

²⁰ Kantar Millward Brown, "Statista," Kantar Millward Brown, 11 June 2019. [Online]. Available: <https://www.statista.com/statistics/267830/brand-values-of-the-top-10-most-valuable-car-brands/>

²¹ ACEA, "European Automobile Manufacturers Association," [Online]. Available: <https://www.acea.be/>

has its predecessor in the CCMC (Comité des Constructeurs du Marché Commun) founded in October 1972 by French (Citroën, Peugeot, Renault), German (Mercedes, Volkswagen), Italian (Fiat) and British (BLMC) manufacturers.

With regards to automotive suppliers Figure 7 shows that of the Top 10, five suppliers are based in Europe, including the Top 2.

The leading global automotive suppliers based on revenue 2018

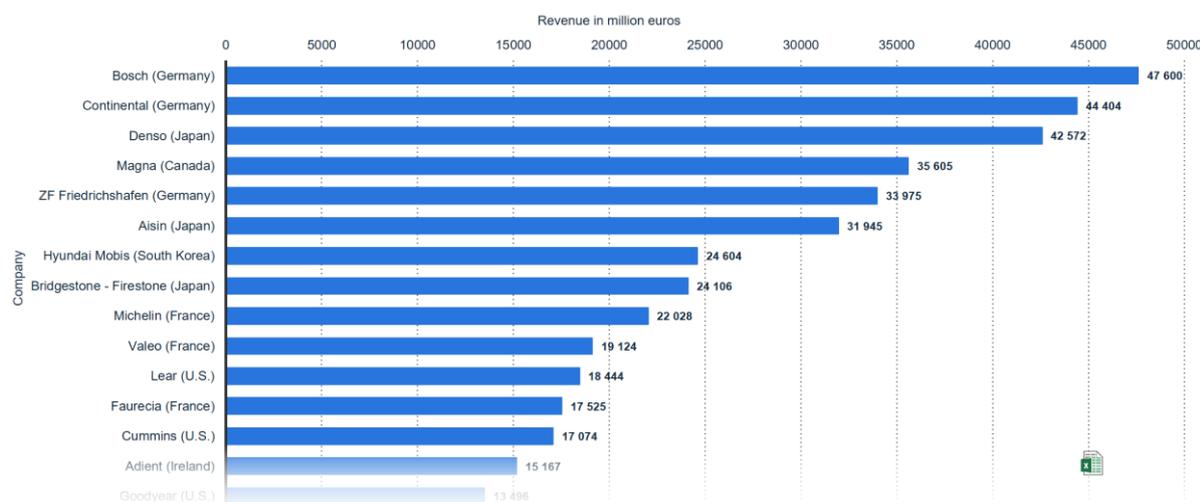


Figure 7 Excerpt of the leading global automotive suppliers from²⁰

New types of competitors to the European automotive domain have emerged from the East, including Chinese technology titans (Baidu or Alibaba) and leading battery technology manufacturers and from West, together with novel mobility providers such as Tesla, Uber and Lyft. Furthermore, traditional car manufacturers find themselves increasingly side-lined in a ‘parasitic’ relationship with tech titans such as Google, Apple and Baidu.

Those new entrants provide disruptive concepts and business models for basic car structures, technology (such as automated driving, voice-assistants like Siri, cloud-based solutions, cyber-protection, etc.) and infotainment systems. Besides the data protection issues that arise when data monopolists enter the car industry, a crucial question is whether car companies can manage to diversify their offer into the technology sector rather than vice versa.

As a counterpoint to these trends, Europe’s automotive industry has a very high level of know-how, expertise, R&D, and highly skilled workers. Therefore the entire domain needs to evolve and adapt at a very fast pace to stay ahead of global competition. This is of particular relevance in relation to

the segments new to the domain, such as embedded cyber-physical systems and Industrial Internet of Things (IIoT), and includes the building of a European battery supply chain for electric vehicles.

Figure 8 show that Europe again is the location of the leading automotive companies in terms of R&D investments worldwide. The European vehicle manufacturers therefore also represent the largest private investor in European Research and Development (R&D), investing an average of 4% of turnover each year on R&D activities, amounting to an annual investment of 20 billion Euros.

EUCAR, the European Council for Automotive Research and Development, serves as an interface between the European Vehicle Manufacturers and the European Commission.

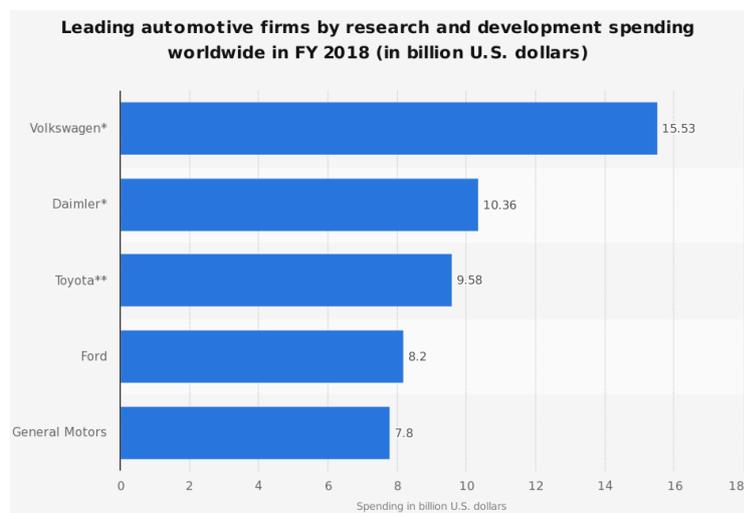


Figure 8 R&D Investments by leading automotive companies²⁰

2.4 GEOGRAPHICAL SUPPLY CHAIN PATTERNS

The automotive industry has operated for the past 100 years on a single business model - producing, selling, and servicing vehicles. But radical changes for the global automotive industry are shifting the industry landscape.

The automobile industry particularly in advanced countries, used to be primarily a national industry. This is why automobile manufacturers in advanced nations developed management strategies that centred on their own country.

This changed during the 1990's when globalisation developed rapidly. Major reforms that ranged from product development to production systems in factories and to component purchase approaches led to the globalisation in the 1990's and a free and rapid expansion of business



activities beyond the framework of one nation. This globalisation of the automobile industry has also underpinned the development of associated global human and financial networks.

The new ecosystem will not continue to work in the same way; but is instead shaping market networks towards a position where companies will play multiple roles in digitally connected ecosystems.

Economic volatility drives the need for a reconfigured and transparent supply chain that will increasingly focus on issues such as the need to tackle climate change, environmental pollution, traffic congestion and safe travel. These factors are forcing automakers to rethink their product mix and business model – thus revamping their supply chain with new offerings. Therefore, as suppliers add more value in innovative solutions, Europe needs to restructure and adjust its capacity to better match the increased demand, and competition emerging from China. The traditional approaches to improve supply chain performance are not working effectively enough, as the work of Confederation in Indian Industry²² and other research²³ indicates.

The major issue of sustainability has become highly relevant in the automotive industry in recent years. Thus, the most successful automotive companies make sustainability and corporate social responsibility (CSR) an integral part of the way their vehicles are marketed, purchased and driven; and thus build-up the supply chain accordingly. Global supply chains have a distinct geography straddling production, distribution and consumption²⁴, and need to address CSR issues.

The other major driver is the transformational introduction by the Internet of things (IoT) and new emerging technologies²⁵. Accordingly, vehicles are evolving in a way that vehicle manufacturers, ICT companies, and other stakeholders take advantage of this opportunity and are looking into ways of collaboration to provide innovative services. The whole value chain of the automotive sector is evolving to integrate emerging actors. In this new ecosystem, different industries need to cooperate and compete simultaneously to address new business opportunities.

²² Confederation of Indian Industry, "Automotive supply chain - Emerging trends for building intelligent supply chain", Confederation of Indian Industry, 2019.

²³ V. FRIGANT und M. ZUMPE, "Are automotive Global Production Networks becoming more global? Comparison of regional and global integration processes based on auto parts trade", <https://mpr.ub.uni-muenchen.de/55727/>, 2014.

²⁴ J.-P. Rodrigue, "The Geography of Global Supply Chains: Evidence from Third Party Logistics," Journal of Supply Chain Management, special issue "Global Sourcing-Other Voices".

²⁵ B. Martínez de Aragon, J. Alonso-Zarate und A. Laya, "How connectivity is transforming the automotive ecosystem", DOI: 10.1002/itl2.14, 2017.

3 CHANGING AUTOMOTIVE SKILL NEEDS

3.1 CHANGING SKILLS

The shortage of expertise already impacts on the automotive industry today and will become a greater challenge in the future. According to an IBM survey²⁶, automotive executives expect the industry to spend over USD 33 billion to reskill their employees by 2030²².

The growing wave of new technologies and trends is about to redefine mobility. Therefore, it is of vital importance that the millions of Europeans working in the automotive industry are sufficiently prepared. Given the fast pace of developments, and with other world regions keen to take the lead, leveraging the strengths of the EU workforce is of utmost importance.

Simultaneously, domain experts and highly skilled engineers cannot keep up with the pace required to stay in sync with these changes. With the fast pace of industry change, skills grow obsolete quickly. More recent analysis shows the half-life of skills²⁷ is now only five years. Which means the skills learned today are only half as valuable five years from now.

The impact of the digital and energy transition on today's jobs and automotive regions is enormous; the 3.4 million high-skilled jobs in automotive manufacturing (representing more than 11% of the EU's total manufacturing employment) are impacted by these changes as well as the entire European automotive supply chain.

The future of the automotive industry is sustainable, smart and shared, and each of these characteristics is associated with both existing and new challengers. Some of the most important trends the industry is currently facing are²⁶:

- **Climate change:** The automotive sector is one of the major contributors to greenhouse gas emissions. The transport sector is responsible for roughly 22 per cent of overall emissions in the EU.
- **Sustainability:** An increasing number of countries are introducing new regulations and frameworks limiting fossil fuel powered combustion engines and promoting electric cars.

²⁶ IBM Institute for Business Values, Automotive 2030 - Racing toward a digital future, Research Insides, 2019.

²⁷ This means that every five years, that skill is about half as valuable as it was before
<https://www.weforum.org/agenda/2017/07/skill-reskill-prepare-for-future-of-work/>



This trend towards greater sustainability is also accompanied by advances in battery storage technology and aiming towards sustainable battery technologies.

- **Autonomous driving:** The car of the future is not only sustainable, it's also smart. Fitted with sensors, cameras and high-tech electronics, the car is becoming a computer on wheels, rather than relying on a human driver.
- **Connected and shared vehicles:** Rather than being an isolated, personal transport solution, it is becoming part of a mixed mobility network together with public transport and bicycles. New mobility platforms and business models are emerging. Instead of selling cars, mobility will be sold.
- **Cultural and demographic changes:** Young people and urban dwellers no longer have a strong desire to own a car, and worry about the inconveniences associated with car ownership.

These trends will all have an impact in terms of changes to existing job roles and associated skills and in a number of cases, in relation to the emergence of new job roles and skill sets. These trends also have implications for EU policy.

The European Sector Skills Council Automotive Industry Report (2013)²⁸ highlights how changes in the EU automotive sector will require a different mix of skills and a permanent upgrading of skills levels and competences. In particular, increased automation and the introduction of new technologies will lead to a shift to more advanced technical skills and more knowledge intensive work at the same time, that manual assembly line jobs will be reduced drastically, or in some cases disappear.

This poses both challenges and opportunities for the reshaping of the apprenticeship offer across the EU. In 2015, the EU Commission set up a new High-Level Group (HLG) for the automotive industry. The High Level Group named GEAR 2030 was formally established on the basis of the Commission Decision 2015/C 6943/2 (19 October 2015).

The objective of the GEAR 2030 High-Level Group was to "help to develop medium and long-term recommendations to address the main challenges and opportunities for the European automotive industry in the run-up to 2030 and beyond."

²⁸ European Sector Skill Council: Report, EU Skill Council Automotive Industry, 2013



The resulting GEAR 2030 Report²⁹ provides detailed insights into the skills and wider labour force challenges facing the industry. The report also identified several steps to tackle the challenges of adapting to new technologies including the need to:

- Support the mobility and transferability of skills;
- Encourage non-formal learning certification; and
- Develop a well-functioning apprenticeship market.

The development of a well-functioning apprenticeship market across the EU is identified as a key component of the package of actions required to address identified challenges facing the sector.

The DRIVES project is seeking help to address this by including it as a key objective of the Project.

The report underlines how the on-going trends in terms of digitalisation, electrification, Computer Aided Design (CAD), the automation of production processes (smart manufacturing & Industry 4.0) and smart mobility, will bring significant structural changes to automotive enterprises and their workforce in the future.

Skills and wider workforce challenges highlighted in the report include:

- Increasing quantitative and qualitative shortages in suitable workers, especially in the areas of engineering, scientific, and soft skills (communication, team leading, consumer-facing skills), linked to the ageing workforce (23% are approaching retirement age)³⁰
- The wide diversity of national education systems and cultures
- The ever-accelerating pace of technological change
- The cut back in recruitment as a consequence of the 2008 economic crisis has slowed down the process of substitution of workers approaching retirement age, creating a skills transfer void, as experienced workers are unable to pass on their knowledge to suitably experienced younger colleagues, before retiring.
- Mobility of talent within the entire automotive value chain is impeded by a lack of vocational qualification recognition and standardised approaches to the validation of non-formal learning among Member States, leading to limited transferability across the EU and the automotive value chain.

²⁹ GEAR 2030, High Level Group on the Competitiveness and Sustainable Growth of the Automotive Industry in the EU, 2017

³⁰ SWD(2016) A New Skills Agenda for Europe



- Challenges amongst SMEs (which are an important part of the European automotive supply chain) are identified, particularly in relation to greater difficulties in recruiting candidates meeting their particular needs and providing the required learning and development for their employees.
- A poorly functioning apprenticeship market, with a lack of clarity and awareness of the required job profiles

A number of skills implications associated with these changes are identified by the report. In particular:

- The move towards electrification will lead to a greater demand for engineers with software and digital skills and most likely a decrease in jobs linked to the production of conventional powertrains (unless the transition to full electric cars is preceded by a prolonged period of hybrid cars which require two powertrains and, thus, more components).
- There will be an increased demand for digital and advanced engineering skills as well as a need to refocus some talent towards basic skills.
- Set against this, a number of traditional job profiles will disappear.

The report also identifies how this in turn has implications for the skills support mechanisms serving the sector including:

- The need for substantial investment in regular upskilling and retraining of staff in order to ensure their effectiveness.
- How changes in approaches must be reflected in both formal and informal education pathways.
- That higher technical education needs to be enhanced in order to address the competence demands associated with digitalisation and electrification.
- How engineering courses currently do not put enough emphasis on fundamental engineering knowledge, such as ICT, programming and system design.

Results from research undertaken as part of the DRIVES project provides a further set of evidence to enhance the understanding of the likely impact of key Drivers of Change on future skill requirements.

In March 2019, DRIVES launched an online survey to support the creation of a strategic roadmap for the sector. Results of this survey³¹ indicate that the Top 15 overall Skills ranked according to the DRIVES Skill Index³². Based on the categorisation adopted, four of the fifteen skills are “Technical”, three are related to “Digitalisation”, with other less frequent occurrences relating to “Electrification”, “Life Cycle/Process Chain”, “Manufacturing” and “Soft Skills” profiles.

In terms of specific skill areas:

- “Big Data / Data Analytics” is ranked first
- “Software Development” is ranked second
- “Technical Knowledge” is ranked third

This underlines the importance of skills required to adapt to technological change in the sector. The first soft skill “Learnability” is ranked seventh.

Overall Skill Index

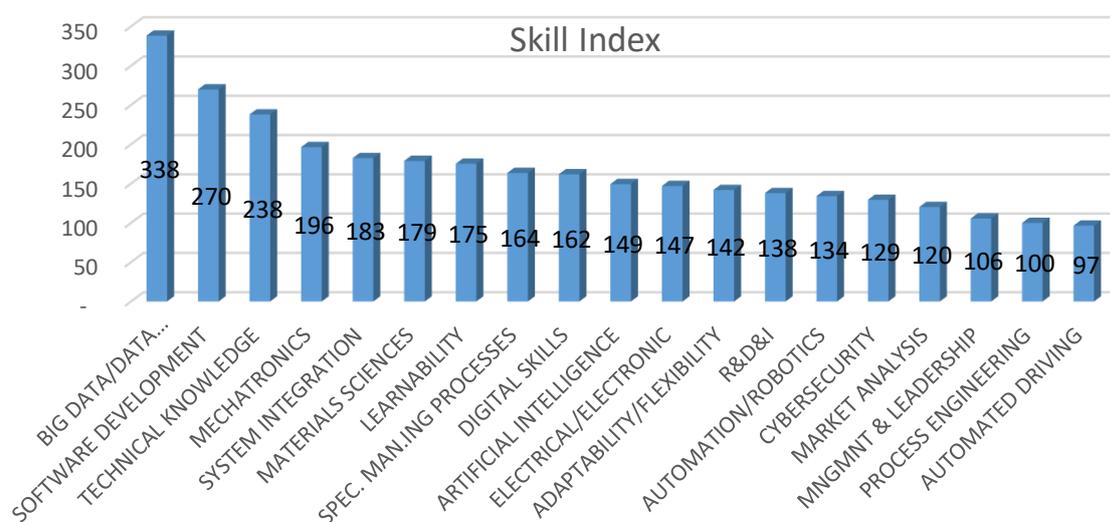


Figure 9 Automotive Industry Economy of Countries³³

³¹ Insights of the Automotive Sector 2019 - Deliverable 2.7 Forecasting Dissemination Report
Christian Baio, SPIN360, Jakub Stolfa, VSB-TUO, Svatopluk Stolfa, VSB-TUO
https://www.project-drives.eu/Media/Publications/6/Publications_6_20190717_81413.pdf

³² This is calculated by multiplication of occurrence of the skills in the results of the survey and the average of linked Drivers of Change to that particular skill.

³³ Insights of the Automotive Sector 2019 - Deliverable 2.7 Forecasting Dissemination Report
Christian Baio, SPIN360, Jakub Stolfa, VSB-TUO, Svatopluk Stolfa, VSB-TUO



The survey also indicates that ‘Continuous training’ and ‘Acquisition of new skills’ were the two Drivers of Change ranked highest in terms of importance by survey respondents, underlining the priority attached to tackling changing skill requirements by automotive employers.

Other recent research³⁴ provides further insights as to the changing nature of skills within the automotive sector. The research indicates:

- In relation to skills required, automotive “hard” skills such as engineering or software development are rated as most critical to organisations success. These technical skills have traditionally been essential, but in future also alternative autonomous capabilities and ICT connectivity features are contributing to the engineering complexity.
- At the same time, entrepreneurial and automotive process and transformation skills are essential as companies need to change into highly efficient high tech companies.
- The automotive industry is rapidly transforming towards Industry 4.0 with massive advancements in technology development and processes.

However, challenges and opportunities of technology adoption and deployment continue to arise and there are few companies that fully recognise the number one challenge of finding qualified talent. Due to the rapid pace of innovation across the automotive industry, academic institutions are struggling to develop curriculums to match in-demand skills from the industry. The need for educational institutions and industry to partner with one another to close this talent gap for the future workforce is highlighted in this respect³⁶.



Figure 10 Analysis of workforce skills required for Automotive Domain in 2030³⁵

³⁴ T. Fiorelli, K. Dzikczek und T. Schlegel, "Automation Adoption & Implications for the Automotive Workforce," 2019.

³⁵ IBM Institute for Business Values, Automotive 2030 - Racing toward a digital future, Research Insides, 2019

³⁶ T. Fiorelli, K. Dzikczek und T. Schlegel, "Automation Adoption & Implications for the Automotive Workforce", 2019.



- The rapid pace of skills change underlines the increasing importance of workforce upskilling, with, on average, automotive executives indicating that 16% of the workforce will need to be reskilled by 2030 to meet changing digital requirements, with an expected 31% increase in training/reskilling budgets expected to meet these demands³⁷.

The European Sector Skills Council Automotive Industry Report³⁸ provides further evidence of the scale of skills changes impacting on the sector by focussing on how seven key Drivers of Change are likely to impact on five key occupations.

The seven key Drivers of Change are:

- 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

The five key occupations the study focusses on are:

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

The key findings of the study are summarised below under sections 3.1.1 to 3.1.7.

³⁷ T. Fiorelli, K. Dziczek und T. Schlegel, "Automation Adoption & Implications for the Automotive Workforce", 2019.

³⁸ European Sector Skill Council: Report, Eu Skill Council Automotive Industry, 2013



3.1.1 Advanced manufacturing

It is envisaged that the pace of change and level of sophistication in relation to advanced manufacturing will increase due to increasing digitalisation.

Increasing product sophistication in terms of design and technological complexity will be linked to growing dependence on computer technologies such as computer-aided design (CAD), computer-aided engineering (CAE) and computer-aided manufacturing (CAM).

Although automation, together with the use of various control systems for operating equipment as part of automotive manufacturing processes is not new, the increasing significance of robotics in the automotive industry is underlined. Many jobs and processes will need to be redefined.

As a result of the above trends and the impact of Industry 4.0, a range of new skills will be required. The report highlights in particular the following:

- The number of operators will probably shrink in future, as a result of the trend towards modular production³⁹
- There will be a significant impact on the work to be done by maintenance technicians, who will need to understand the causal relation between the different technological sub-processes and be aware of the advantages that new equipment brings directly to the manufacturing process.
- CNC operators/tool and die makers will also need new skills to deal with the introduction of ICT, particularly as tool-making will be considered part of the global manufacturing process and not as isolated activities.
- Lean systems will require highly efficient materials planning, and materials planning analysts will need to play a key role in aligning logistics and production.

³⁹ According to IndustriAll <http://www.industrialunion.org/>



3.1.2 Advanced materials

Modern car parts are increasingly made of lighter materials, aluminium alloys or carbon fibre reinforced plastic instead of steel. The report highlights how changes in the use of advanced materials are likely to impact across a range of job roles including:

- Maintenance technicians who will be required to have a greater understanding of the characteristics of advanced materials and will need to know about the manufacturing processes and machinery required to turn new materials into automotive components.
- CNC operators/tool and die makers will need to improve their knowledge and skills in order to provide high performance tools corresponding to industry norms and standards.
- Paint technicians/motor vehicle painters who will need to develop a greater understanding of the properties of differing advanced materials utilised.
- Material planning analysts will need to have a more sophisticated knowledge of the different material being utilised.

3.1.3 Complex and global supply chains

Supply Chain Management includes logistics management activities and manufacturing operations, “and it drives coordination of processes and activities with and across marketing, sales, product design, and finance and information technology”⁴⁰.

In relation to skills, the greatest impact of increasingly complex and global Supply Chain Management patterns is identified in relation to the materials planning analyst role. In particular, the need for increased knowledge of supply chain conditions, global customer/supply agreements and supply chain management methods in order to guard against the disruption of supply chain flows.

⁴⁰ https://cscmp.org/sites/default/files/user_uploads/resources/downloads/glossary-2013.pdf



3.1.4 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.

In terms of how these changes will impact on key automotive occupations the report indicates:

- Maintenance technicians will need 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 in order to ensure that parts can be recycled.
- Materials planning analysts will need to know the different characteristics of the components and the machinery to ensure that recycling is being carried out appropriately. Changing tyre production approaches will add further competences to the role of material planning analyst, as the supply chain will increase its complexity and integration.

3.1.5 Active safety, automated driving and connectivity

Technologies that promote automated driving and related safety features will require the development of new skills. In the near future, vehicles will be connected, with digital technologies changing the way data is transferred and utilised. These new communication technologies have a key strategic importance in relation to changes in the automotive sector.

In terms of how these changes will impact on key automotive occupations the report indicates:

- 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.

3.1.6 Decarbonisation, hybridisation and electrification

The dominant powertrain is expected to 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 more⁴¹.

These new developments are expected to impact on all the five occupations the study focusses on. The new drive-trains are also expected to require skills not yet available in the labour market.

3.1.7 Evolution of customer requirements

Car manufacturers have moved in the direction of producing cars according to customers' individual requirements. This implies the need for smaller product runs manufactured at the same cost and at the same level of quality.

Customers' requirements are also impacting on the tyre and rubber market in terms of safety, performance, quality and environmental contribution.

In relation to the impact on particular occupations, the report indicates the biggest impacts would probably be on:

- Maintenance specialists linked to the introduction of customer driven innovations, leading to additional measuring equipment requiring maintenance and therefore new knowledge and skills
- Materials planning analysts: As quality requirements increase with the development of new products, the planning analyst will need to take changing parameters relating to machinery into account to avoid disruption in production (bottlenecks, increases internal waste etc.). They will need to ensure that the supply chain functions optimally and dovetails with the manufacturing process, which then leads on seamlessly to the distribution process

⁴¹ ACEA



- Additionally, Assembly line operatives/assemblers will need to gain a better understanding of the properties of the different components.

Specifically, in relation to changing skill requirements amongst automotive production line workers, research undertaken by The Centre for Automotive Research (CAR)⁴² provides further evidence of changing skill requirements based on interviews with human resource executives within the sector.

The research found:

- There is a greater emphasis on “soft skills.” Production line workers are expected to be problem solvers, with the ability to work in collaborative settings. They must be able to understand the “big picture,” and be willing to work for the common success of the enterprise.
- Production workers will be given greater responsibility for continuous improvement and routine maintenance.
- New technologies in powertrain, joining and assembly, and electronics, coupled with faster product cadence, will drive skills changes.
- In skilled trades, there will be fewer classifications, more cross-skilling, and more skill needs in electrical, electronics, and software areas.

In addition to the above, other evidence points to ongoing issues in the sector relating to both the image of the sector and workforce diversity. In particular:

- The GEAR2030 Report⁴³ highlights how the image of the manufacturing sector in the eyes of young talent, and women of all ages, hampers recruitment, with engineering industries struggling to attract young people, particularly female workers.
- A recent article by the Head of Engineering Talent Project at the Royal Academy of Engineering in the UK highlights how the public perception of engineering is a long way from

⁴² The Auto Industry: In Search of New Talent amid Changing Skills Requirements: Today's automobile production line requires highly skilled, flexible workers who can rapidly adjust to change.

Dennis Cuneo, Partner, Fisher & Phillips; Kristin Dzciczk, Director, Industry, Labor & Economics Group, Center for Automotive Research (CAR)

<https://www.areadevelopment.com/Automotive/2013-Auto-Aero-Site-Guide/auto-sector-skilled-workforce-needs-29292741.shtml>

⁴³ GEAR 2030, High Level Group on the Competitiveness and Sustainable Growth of the Automotive Industry in the EU, 2017



the reality, with many young people assuming that engineering involves hard, manual work, and male-dominated workplaces and a limited range of job opportunities⁴⁴.

- In relation to the gender imbalance generally in engineering, recent evidence indicates that within the EU the highest proportion of women in the engineering workforce are found in Latvia (at 30% of the engineering workforce), with the lowest proportion in the UK at about 9%⁴⁵
- The advantages of addressing wider diversity issues including those relating to ethnicity, disability, sexual orientation, socio-economic background and age are also recognised in terms of increasing the supply of suitably skilled workforce members, in order to reduce the engineering skills gap⁴⁶.

3.2 IMPLICATIONS FOR APPRENTICESHIPS

The pace of technological change within the automotive industry is increasing rapidly, which in turn impacts on **the rate of skills change**. With the fast pace of industry change, skills grow obsolete quickly.

This underlines the need for the apprenticeship offer to be flexible enough to respond to these changes. These changes also imply:

- It is difficult for providers to keep abreast of changing skill requirements
- Future skill requirements are difficult for employers to predict

It has also been pointed out that across a wide range of different sectors the pace of technological change highlights the need to adapt learning programmes to reflect the critical importance of an interdisciplinary approach to innovation in the workplace⁴⁷.

⁴⁴ Challenging and changing the image of engineering; The Engineer, 13th August 2019; Daniel Rossall Valentine, Head of Engineering Talent Project, Royal Academy of Engineering and campaign lead for “This is Engineering”.

<https://www.theengineer.co.uk/engineering-image-problem/>

⁴⁵ UK worst in Europe at attracting women into STEM industries/Press Release | Published: 26 October 2017

<https://www.thehrdirector.com/features/stem/uk-women-stem-industries/>

⁴⁶ Increasing diversity and inclusion in engineering – a case study toolkit; Royal Academy of Engineering 2015 <https://www.raeng.org.uk/publications/reports/increasing-diversity-and-inclusion-in-engineering>

⁴⁷ The Future of Work Jobs and Skills in 2030; UKCES; Z_punkt and the Centre for Research in Futures and Innovation (CRI-FI)



Case study 1 provides a good example of how apprenticeship training for Automotive Business Administrators in Germany has recently been updated to reflect fast changing skill requirements.

Case study 2 provides an example of how a company in Austria ensures training of students (potential future employees) involves learning about the latest technologies and challenges facing the company. Although this is not an apprenticeship scheme it has been included to highlight how one company is ensuring students are equipped with up to date skills required by the company.

The evidence of changing skill requirements within the automotive sector shows how **these changes will impact at all skill levels**. This underlines the importance of developing apprenticeships serving the sector at every level, including higher levels, in order to meet these changing needs.

The current situation across the EU with respect to higher level apprenticeships is quite variable. While the apprenticeship offer in France, Italy, Germany and the UK include higher level pathways the focus in Sweden, Romania and Hungary is lower/intermediate level (EQF levels 2-4).

In the UK, higher apprenticeships were first introduced (equivalent to foundation degrees or above) in 2010 and in 2015, Degree Apprenticeships were introduced as part of higher apprenticeship standards, seeing apprentices achieving a full bachelor's or master's degree (Levels 6 and 7)⁴⁸ as a core component of the apprenticeship⁴⁹. Both Higher and Degree Apprenticeships must last a minimum of one year; Degree Apprenticeships in particular will last longer, typically up to four years, though there is no fixed maximum duration.

A range of higher level apprenticeships of relevance to the automotive sector are now either in place in England or under development. The introduction of Degree Apprenticeships in England (UK),⁵⁰ together with those Degree Apprenticeships of particular relevance to the automotive sector is set out as case study 3.

⁴⁸ This is equivalent to EQF levels 6 and 7

⁴⁹ <https://www.allaboutschooleavers.co.uk/articles/article/298/what-is-the-difference-between-a-degree-apprenticeship-a-higher-apprenticeship>

⁵⁰ The Apprenticeship offer together with governance and regulatory arrangements differ in each nation of the UK



Upskilling of existing employees is at least as important as support for new entrants. This implies the need for appropriately tailored training but also the need to maximise the potential for apprenticeships to support upskilling and provide clear learning pathways between different levels to facilitate continuous upskilling and reskilling⁵¹.

Case study 4 provides an example of an innovative approach to encouraging smooth progression from entry level through to higher Apprenticeship levels. The Advanced Engineering, Pathways to Apprenticeship Study programmes were introduced across Wales (UK) from 2012 as a pilot initiative introducing an intensive, Further Education College (FEC) option for young people preparing them for an apprenticeship placement with an employer and providing them with the opportunity to fast-track them through a UK Level 2 Apprenticeship Framework, allowing seamless progression directly into a UK Level 3 or Level 4 Apprenticeship under an employed status.

A number of specialist skills are emerging as technology changes within the industry. This implies employers need tailored; **often bite sized solutions to meet their needs**, which in turn have implications for the design of apprenticeships, with a degree of flexibility required⁵².

A recent international study into workforce development and its links to innovation led by the UK High Value Manufacturing (HVM) Catapult⁵³ concluded that the rapid pace of technological change demands more modular and flexible training courses that can be used to upskill and reskill the existing workforce, sometimes alongside full-time learners. The report also emphasised that training resources must be suitable both for new workforce entrants and to upskill and reskill those already in work.

Case study 5 provides an example of a university in Austria working with employers to help employees meet the particular challenges each employer faces through Life Long Learning for university-level continuing education in engineering and science subjects. Courses are designed by focusing on the needs of target groups in an industrial context and developing innovative subjects and formats to meet these needs. Training is also designed to use up-to-the-minute teaching and

⁵¹ There is evidence that traditional pre-conceptions that apprentices can only be entry-level school leavers or labour-intensive workers are already evolving. See for example <https://www.findcourses.co.uk/inspiration/apprenticeships/using-the-apprenticeship-levy-to-train-existing-staff-13125>

⁵² The Future of Work Jobs and Skills in 2030; UKCES; Z_punkt and the Centre for Research in Futures and Innovation (CRI-FI)

⁵³ Manufacturing the future workforce; High Value Manufacturing (HVM) Catapult, November 2019



learning technologies developed at TU Graz to create flexible learning settings on site⁵⁴. Although the example is not an apprenticeship scheme the case study does provide an insight into how workforce skills development can be delivered flexibly in order to ensure this keeps abreast of fast changing technologies.

Many of the current and likely future skill requirements within the automotive sector are quite complex. It is also the case that apprenticeships need to balance the need for equipping apprentices with the skills required for successful careers in the automotive industry with the need to meet employers' specific changing skill requirements. This highlights the importance of not only understanding these requirements in detail, but **the need for a close and continued dialogue between employers in the sector together with schools, colleges, universities and other providers of apprenticeship training to ensure the apprenticeship offer evolves in line with these changing skills requirements**. Case study 6 provides an example of the Automotive Trailblazer Employer Group in England established to drive the design of apprenticeships to meet the specific skill requirements of the automotive sector.

Case study 7 provides an example from Belgium of an apprenticeship programme serving the Belgian automotive aftersales sector that involves close dialogue between schools, automotive retailers/dealerships, major automotive brands and a specialist provider.

The likely impact of **Industry 4.0** on overall changes to skill requirements has already been highlighted (See 3.1.1). In terms of the potential impacts of these changes on apprenticeships, recent research suggests this is likely to imply the need to attract a higher level of applicant in order to be able to learn rapidly as jobs evolve and also the need to revise qualifications to take account of Industry 4.0 changes⁵⁵. This last point is supported by recent survey work of German companies undertaken between mid-October and December 2017. The research indicates that nearly a third of companies responding to the survey indicated that new training apprenticeship occupations should be created as a result of digitalisation⁵⁶.

⁵⁴ Technical University of Graz: <https://www.tugraz.at/en/studying-and-teaching/degree-and-certificate-programmes/continuing-education/life-long-learning/>

⁵⁵ Apprenticeships and 'future work': are we ready? Erica Smith, 2019 <https://rdcu.be/bQRlx>

⁵⁶ Digitalisation of Apprenticeship in German Companies; 2019 joint Cedefop and OECD symposium The next steps for apprenticeship; October 2019 / Dr. Regina Flake, German Economic Institute



The need to adapt the Apprenticeship offer to meet these changing skill requirements has been recognised in Australia through the introduction of the Industry 4.0 Higher Apprenticeship Programme⁵⁷, which trains technicians to a higher skill covering topics including:

- Advanced manufacturing processes
- Automation and robotics
- Internet of Things
- Cloud computing
- Advanced algorithms
- Smart sensors

Two case studies (8 and 9), one from Spain and one from Finland provide good examples of initiatives developed to tackle the growing need for digital skills within the automotive industry within the EU.

- Case study 8 provides an example of an international learning programme for current workforce upskilling and young graduate digital talent attraction in the automotive industry, based in Spain.
- Case study 9 provides an example of a digital academy established in Finland (MERINOVA Digitalisation Academy⁵⁸). It runs an interdisciplinary programme for university students at VAMK, Novia and University of Vaasa on their last year of studies, seeking internships and thesis work with an emphasis on the Energy Cluster and Digitalisation. The Academy is a unique regional programme managed by universities, digitalisation companies and large international organisations from the local energy cluster EnergyVaasa. It offers students a very interesting programme that enables them to learn from professionals in the energy industry and get the latest knowledge in digitalisation.

Although both these case studies are not apprenticeship schemes they do provide innovative examples of programmes designed to tackle the growing need for digital skills within the automotive industry.

⁵⁷ <https://www.industry.gov.au/funding-and-incentives/manufacturing/industry-40>

⁵⁸ Digitalisation Academy: <https://www.digitalisationacademy.fi/about-academy/>



There are also significant implications of digitalisation in relation to the way apprenticeships should be delivered in the future, in particular the increased use of digital technologies as part of apprenticeship programme delivery. In some countries there has already been a rapid increase in such approaches. For example, evidence indicates that about 1 in 4 companies in Germany already engage intensively in the digitalisation of VET⁵⁹.

The same research⁵⁹ also highlights the scope for adopting a more strategic approach to the digitalisation of apprenticeships. It is pointed out that

- Cooperation between learning venues need to be improved;
- There is significant need for orientation / support (in particular in relation to SMEs); and
- Increased dissemination of examples of good practice can motivate more companies to engage in the digitalisation of their apprenticeships

Case study 10 provides a good example of the innovative use of e learning in relation to two apprentices within a German metalworking company.

The automotive sector across the EU is facing a common set of skills challenges. It is the scale of impact in different areas of automotive supply chain that is likely to differ in each country, linked primarily to differing composition of national and regional automotive supply chains. The common skills challenges faced across the EU automotive supply chain further underline **the importance of improving mobility of labour through improved qualification recognition between Member States** and in the case of apprenticeships, through the potential development of a single market for apprentices across the EU by linking regional, national and European apprenticeship initiatives.

It is well documented that the **automotive sector suffers from a poor image** amongst young people in a number of EU countries (See section 3.1). A range of innovative solutions are required to address this. Case study 11 highlights how a national campaign in the UK, encourages more young people to consider a career as a technician. The campaign links up with World Skills UK to showcase jobs young people may not have considered in order to try and attract young people into the automotive and other industries employing technicians.

It is also clear that there is **a gender imbalance across the automotive sector as a whole and particularly in relation to certain occupations** and that more could be done to ensure the industry is

⁵⁹ Digitalisation of Apprenticeship in German Companies; 2019 joint Cedefop and OECD symposium The next steps for apprenticeship; October 2019 / Dr. Regina Flake, German Economic Institute



an attractive option for all groups⁶⁰. **If the industry is to tackle changing future recruitment and skills challenges effectively it will be crucial that steps are taken not only to tackle the gender imbalance but also to ensure the skills of all demographic groups are maximised.** Case study 12 provides an example from Germany of a programme to successfully encourage refugees into the automotive industry.

⁶⁰ <https://www.motortrader.com/motor-trader-news/automotive-news/driving-better-gender-balance-motor-business-15-03-2018>

3.3 CASE STUDIES

Case study 1: Updating of Apprenticeship training for Automotive Business Administrators (Germany)

This case study provides a good example of how apprenticeship training for Automotive Business Administrators in Germany has recently been updated to reflect fast changing skill requirements⁶¹.

Automobile Business Administrators work predominantly in car dealerships but also at vehicle importers and with automotive manufacturers.

The number of trainees has increased continually since the introduction of the training occupation in 1998. In 2016, over 5,100 people signed a new training contract as an Automobile Business Administrator.

The Federal Institute for Vocational Education and Training (BIBB) has updated the apprenticeship for Automobile Business Administrators in order to reflect changing employer requirements. This provides a good example of an automotive related apprenticeship that has been adapted and updated to meet identified changes in skill requirements.

These changes include greater involvement of the different areas of operation. For example, training in relation to customer service and servicing has been further developed to include aspects of customer mobility and the use of digital information systems. Greater emphasis has also been placed on communication skills, changes to legal frameworks, data protection and data security. An increased focus on sustainability and environmental awareness in relation to the disposal of vehicle components and operating with materials in an environmentally friendly manner has also been introduced.

The updated Apprenticeship has been structured to focus on competencies in relation to company-based working and business processes⁶². All trainees experience the main areas of the operation — parts and accessories, workshop, customer service and servicing, marketing, vehicle trade and distribution, financial services, personnel, and commercial management and control. The current division into areas of operation has been removed.

⁶¹ https://www.bibb.de/en/pressemitteilung_60884.php

⁶² P. Vroonhof, N. Durazzi, J. Secher, J. Stoumann, S. Broek, L. de Haan, I. van den Ende and S. van Loo, “Business cooperating with vocational education and training providers for quality skills and attractive futures” doi: 10.2767/231864, European Union, 2017.

Case study 2: AVL System Engineering Labour (Austria)

AVL is an Austrian-based automotive consulting company and independent research institute. AVL List GmbH is the world's largest independent company for the development, simulation and testing of all types of powertrain systems (hybrid, combustion engine, transmission, electric drive, batteries, fuel cell and control technology), and integration into the vehicle, with more than 10,400 employees worldwide. AVL is increasingly taking on new tasks in the field of assisted and autonomous driving as well as data intelligence. The company provides industry-leading technologies and services based on highest quality and innovation standards to help customers reduce complexity and add value.

AVLs SE (Systems Engineering) Labor⁶³ is a training initiative geared towards brand integration and specific skill training of students prior to employment in AVLs skill teams. The SE Lab Group is not directly involved in daily company business, but run independently on a self-organised basis by participating students. Through this initiative, participating students can develop their individual skills and fields of interest, while at the same time experiencing the different areas of expertise of the development teams in order to establish the best fit between teams and individuals.

The SE Lab currently comprises 33 Students (ranging from EQF level 5 to 7), working on more than 20 projects across 23 divisions of all AVL departments. The students (and potential future employees) come from various fields of studies ranging from computer science & engineering to economics & law and are embedded in an interdisciplinary working environment to support their scientific work, thesis and dissertations, as well as providing Systems Engineering services for the AVL company divisions.

The overall approach of the SE Lab is to maximise the benefits of cross-divisional networks and constant exchange of students. This is achieved through self-managed project work combined with comprehensive project documentation through implementation of continuous mutual training of the students and engineers across departments, together with in-depth collaboration across AVL business units.

The overall aim of the SE Lab is to support the establishment of holistic Systems Engineering approaches across all AVL business units⁶⁴. Development and testing of advanced SE methods, processes and tools in an industrial context together with SE knowledge gain through cross-divisional

⁶³ AVL List GmbH Info-Flyer, Innovators and Incubators Workshop Graz, 2018.

⁶⁴ AVL 4Weeks November 2016



exchange of ideas are seen as key benefits of this approach. The second important aspect for the SE Lab initiative is identified as the education of future Systems Engineers and development of connections between established teams, together with scientific students and young researchers in order to support all AVL employees.



Case study 3 – Degree Apprenticeships (England)

This case study provides a good example of how the apprenticeship offer in England is adapting to higher level skill requirements including those relevant to the automotive sector.

‘Higher Apprenticeships’ were introduced in England in 2010 and refer to all apprenticeships in England that include the achievement of academic and vocational qualifications from UK Level 4 up to bachelor’s and master’s degree at level 6-7⁶⁵.

Degree Apprenticeships are the latest model to be developed as part of higher apprenticeship standards and were introduced in England in 2015, giving apprentices the opportunity to achieve a full bachelor’s or master’s degree (Levels 6 and 7) as a core component of the apprenticeship⁶⁶.

Both Higher and Degree Apprenticeships must last a minimum of one year, but Degree Apprenticeships will typically last up to four years, although there is no fixed maximum duration⁶⁶.

The key aspect of Degree Apprenticeships can be summarised as follows⁶⁷:

- They are designed to introduce students into the world of work and fill high-level skills gaps by tailoring learning to specific business needs.
- They combine full-time paid work and part-time university study to offer candidates the opportunity to gain a full Bachelors or Master’s degree while partaking in practical, on-the-job training.
- They are created by partnerships between employers and universities or colleges.
- Candidates study using whichever flexible study method suits their employer's needs – this can include distance learning, blended learning or block mode learning (where the apprentice takes a period of full-time study away from their full-time work).
- Apprentices hold full-time employment status rather than student status. However, while higher apprentices have the option to gain a Bachelors-level qualification, university study is mandatory in degree apprenticeships.
- As well as receiving a wage throughout the course, an apprentice's tuition fees and training costs are settled between their education institution and employer.

⁶⁵ Level 4 in the UK is equivalent to EQF levels 4 or 5 and UK level 6 and 7 are equivalent to the same EQF levels

⁶⁶ <https://www.allaboutschoolleavers.co.uk/articles/article/288/what-is-a-degree-apprenticeship>

⁶⁷ <https://www.prospects.ac.uk/jobs-and-work-experience/apprenticeships/degree-apprenticeships>



Degree apprenticeships currently developed that are of particular relevance to the automotive sector, given the skills and knowledge sets they cover include⁶⁸:

- Electrical / Electronic Technical Support Engineer
- Embedded Electronic Systems Design and Development Engineer
- Manufacturing Engineer
- Non-Destructive Testing Engineer
- Product Design and Development Engineer
- Systems Engineering

⁶⁸ <https://www.instituteforapprenticeships.org/apprenticeship-standards/>



Case study 4: Pathways to Apprenticeship/Enhanced Engineering Programmes of Study

This case study provides an example of an innovative approach to encouraging smooth progression from entry level through to higher Apprenticeship levels. The Advanced Engineering, Pathways to Apprenticeship Study programmes were introduced across Wales, UK from 2012 as a pilot initiative introducing an intensive, Further Education College (FEC) option for young people preparing them for an apprenticeship placement with an employer. It is a year-long training programme for learners aged between 16 and 25 to fast-track them through a UK Level 2 Apprenticeship Framework (EQF level 3), allowing seamless progression directly into a Level 3 or Level 4 Apprenticeship under an employed status. Its innovative design allowed the Level 2 Framework to consist of either a Level 2 or Level 3 Knowledge Qualification coupled to a Level 2 Competence Skills Qualification.

The FECs are approved by Awarding Organisations, due to their resources, as acceptable “sheltered working” environments allowing all programme content to be accessed as if the actions were taking place in a true working environment and all learners attended a work placement for 20% of the programme.

Employers are involved throughout; from planning of content (Knowledge and Competence Modular Design), through to the review and evaluation in an effort to guarantee the learner has the correct attributes to support business needs immediately upon employed status.

Learners were subsidised through Government Grants to attend with no cost to the employer, allowing hard and soft skills gained to be assessed directly by employers.

Due to its successful outcomes and outputs, in 2016 the pilot programme was renamed as the Enhanced Engineering Programme and accepted as a main important element of Apprenticeship design and implementation in Wales.

Key aspects of the programme are:

- Employer Designed
- No Employer Cost
- Right Trainee - Right Time – Right Employer
- Caters for entry ability of Learners to progress at relevant pace for industry need



Case study 5: TU Graz Life Long Learning (Austria)

This case study provides an example of a university in Austria working with employers to help employees meet the particular challenges each employer faces. The case study focuses on Life Long Learning at TU Graz⁶⁹ for university-level continuing education in engineering and science subjects. Courses are designed by focusing on the needs of target groups in an industrial context and developing innovative subjects and formats to meet those needs. Training is also designed using up-to-the-minute teaching and learning technologies developed at TU Graz to create flexible learning settings on site. TU Graz supports companies in bringing their staff up to date with the latest developments in science, commerce and technology. Therefore, continuing education courses can also be organised as in-house training sessions. Furthermore, companies can talk to lecturers and adapt the courses to their individual needs. Together with selected partners, TU Graz offers a continuing education programme with several types of courses. The courses are designed for university and college graduates, experts from industry and TU Graz students. On completion of these courses trainees receive either a certificate of attendance, confirming that they have taken the course, or a TU Graz certificate, if the course ends with an examination. Also, European-wide Certificates (such as ECQA Certified Automotive Quality Manager) are available⁷⁰. These courses and seminars cover a wide range of subjects and have a large practical component, such as:

- AI Essentials
- Automotive Mechatronics
- Automotive Quality Manager
- Big Data Essentials
- High Voltage Engineering: Principles and Practical Application
- International Welding Engineer
- Introduction to Electric Drive Systems

Additionally, part-time master's programmes and university programmes give graduates with relevant degrees and skilled personnel with several years of relevant professional experience in their field the opportunity to gain further qualifications in their area of expertise, or develop a specialisation. The programmes are blocked over a period of several semesters, which means that they are ideal for students who are already working. Some courses have an international focus and

⁶⁹ <https://www.tugraz.at/en/studying-and-teaching/degree-and-certificate-programmes/continuing-education/life-long-learning/>

⁷⁰ <http://www.ecqa.org/index.php?id=386>



are taught in English. Depending on the course and an individuals' level of education, participants graduate with a certificate, as an academic expert or with a Master of Engineering (MEng).

Decisions on admittance to a doctoral programme at TU Graz after completing a master's programme (Master of Engineering)⁷¹ are taken on an individual basis.

⁷¹ <https://www.tugraz.at/en/studying-and-teaching/degree-and-certificate-programmes/continuing-education/part-time-masters-programmes-and-university-programmes/overview-part-time-masters-programmes-and-university-programmes/>

Case study 6: Automotive Trailblazer Group – England

New apprenticeship standards being introduced in England are developed by employer groups known as ‘trailblazers’. These provide a good example of how apprenticeship development in England is adapting to reflect the need for a close and continued dialogue between employers in the sector and providers of apprenticeship training to ensure the apprenticeship offer evolves in line with changing skills requirements.

The Automotive Trailblazer Employer Group was formed in November 2013. The employers who from the group are – Toyota, JLR, Ford, BMW, JCB, Nissan, Perkins, Honda, GTA England (representing SME’s), Siemens, Bentley, Plastic Omnium, Lander Automotive, Mahle, and Sertec. The employers are supported by a range of training providers together with professional institutes and bodies. Both EAL and Pearson support the group from an awarding organisation point of view.

The automotive (and other) Trailblazer Employer Groups were a national UK Government initiative set up to review the skills landscape they worked in and identify occupational roles that could be supported by the development of an apprenticeship standard aligned to national guidance issued in relation to these standards.

Once the employer group has identified the occupational job roles they agree are a priority, they start work on developing the occupational standard assessment plan, end point assessment⁷² and related knowledge, skills and behaviours required by someone to be able to carry out the occupational role.

The standards they have developed to date are:

- 3 pathways within the Engineering Technician standard (Mechatronics Maintenance Technician, Product Design and Development Technician, Toolmaker and Tool and Die Maintenance Technician), Level 2⁷³ Lean manufacturing Operative (sub group)⁷⁴

⁷² The purpose of the end point assessment (EPA) is to test that an apprentice is fully capable of doing their job before they receive their apprenticeship certificate. It also helps to demonstrate that what an apprentice has learned can be applied in the real world. They were introduced in England for apprenticeships following a major review that found that continuous assessment did not allow all apprentices to demonstrate that they can carry out the whole of their job. Employers wanted assurance that former apprentices they employed or planned to employ were fully competent.

<https://apprenticeships.blog.gov.uk/2017/08/14/end-point-assessment/>

⁷³ Note: These are UK levels – UK level 2 is equivalent to EQF level 3



- Level 2 Engineering Operative (sub group)
- Level 3 Metal fabricator (sub group)
- Level 6 Product design and development engineer (degree)
- Level 6 Control technical support engineer (degree), electrical/electronic technical support engineer (degree)
- Level 6 Manufacturing engineer (degree)
- Level 3 Heritage engineering technician
- Level 4 Process leader (sub group)
- Level 4 Propulsion Technician (sub group)

<https://www.instituteforapprenticeships.org/developing-new-apprenticeships/forming-a-trailblazer-group/>

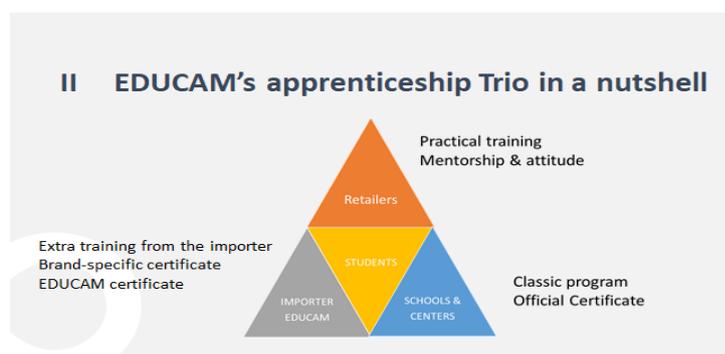
⁷⁴ Where the standard has sub group in brackets this denotes that the standard was developed by a sub group which reported to the larger automotive group.

Case study 7: EDUCAM Tripartite Apprenticeship Case Study - Belgium

EDUCAM is based in Belgium and was established by and for the aftersales automotive sector and related industries. Next to continuous training /updating of skills (500.000 hours/year), the core aims of EDUCAM are to help students access up to date automotive aftersales training and stimulate new young skilled people to take up employment in the aftersales sector. The organisation has 60 trainers, 8 training facilities and represents about 100,000 aftersales workers in Belgium.

The EDUCAM tripartite Apprenticeship links aftersales related workplace training from key brands such as Mercedes (termed the ‘importer’) with additional training provided by EDUCAM and existing school diplomas.

This approach is summarised in the diagram below:



The programme enhances, but does not alter existing school diplomas and is provided free of charge for students and schools. The additional training provided by ‘the importer’ and EDUCAM is delivered while the learner is undertaking their apprenticeship at the workplace (dealership/retailer).

A more detailed overview of the programme is set out below:

SCHOOL / CENTER	RETAILERS	IMPORTER - EDUCAM
First Level trainings First Level practice lessons Theoretical knowledge	Practical skills and behavior	Extra adapted trainings (on demand)
Official Certificate		IMPORTER Certificate EDUCAM Certificate

Funding is provided by EDUCAM who pay for all EDUCAM additional training and the importer/brand pay for 'brand specific' training.

Currently the programme is only operating in Belgium but Mercedes is also working on implementing the same system in the Netherlands, with importers looking at drawing up best practice guidelines for their headquarters in other countries. Benefits of the programme can be summarised as follows:

- It provides high quality industry relevant training
- Helps attract and retain talent into the industry
- Promotes the brand image of participating partners
- Is free for students and schools
- Provides a platform for stimulating dialogue between schools, automotive retailers/dealers and importers
- Provides flexibility of choice for participating students (they can change brands)
- Does not interfere with existing school programmes but provides support to participating schools and teachers
- Enables students to enhance certification by adding both the importers brand and EDUCAM certificates to their school diploma
- Is attractive to car dealers that can prepare potential new employees with the skills, attitude and knowledge required to work in the sector

Brands active in the EDUCAM tripartite apprenticeship:



Four additional major brands are expected to participate in the school year 2020/2021.

Source: Alexis Roelandt, Manager Partnerships, aroelandt@educam.be
www.educam.be

Case study 8: GTI International Master Programme for Automotive Workforce Transition to Future Zero Defect Manufacturing (ZDM) Working Environments: Innovalia “Automotive Engineering in Quality and Metrology” Case Study⁷⁵ - Spain

This case study provides an innovative example of an initiative in Spain developed to tackle the growing need for digital skills within the automotive industry within the EU. Digital transformation spending by businesses worldwide is expected to hit 1.7 trillion dollars in 2019, while 70% of employees have not yet mastered the digital skills they need for their current jobs today and/or their future career development. The automotive sector is identified as being one of the most demanding in terms of quality, improvements to cost-effectiveness, and adoption of zero defect manufacturing strategies to ensure high quality products. This implies the need for implementation of innovative manufacturing processes and tasks incorporating augmented and assisted decision workflows, supported by an increasingly intensive use of digital tools and platforms.

In recognition of this, Gestamp Technology Institute (GTI), in collaboration with Innovalia, established an international learning programme for current workforce upskilling and young graduate digital talent attraction, in order to master digital engineering and manufacturing platforms and ensure a competitive transitioning towards future zero defect manufacturing shop-floor operations and connected factory digital processes. The programme is unique in relation to its international dimension, hosting local and international students from more than 20 countries worldwide making GTI at the vanguard Automotive Intelligence Centre (AIC) in Boroa (Basque Country, Spain) an international hub for highly specialised knowledge and talent development within the automotive sector. The programme centralises training excellence in new Gestamp digital technologies on a global scale; training the workforce for a digital future through active development of new skills and competences.

The “Automotive Engineering in Quality and Metrology” programme has access to over 1600m² of lecturing theatres and high quality training facilities provided by GTI pilot lines and Innovalia Zero Defect Manufacturing (ZDM) Digital Innovation Hub (DIH) teaching factories. Using these facilities, the programme puts in practice a “learning by doing” methodology, firstly providing a solid scientific foundation in relation to metrology, followed by the theoretical-practical knowledge and skills

⁷⁵ Alicia Gonzalez (Director of Innovalia Academy, Automotive Intelligence Center (AIC) Unit, Innovalia). Francisco Alvarez, (Corporate Learning and Development Director at Gestamp), Cayetana Aranzadi (Corporate Learning and Development Talent Attraction Manager at Gestamp), Amaia Elorriaga (Gestamp Technology Institute (GTI) Talent Attraction & International Programs Coordinator)



development for quality system tools, data analytics and cutting-edge industrial metrology digital platforms applied to automatic measurement, reverse engineering and data analytics and statistical process control reporting, utilising real automotive parts.

The students develop knowledge in core resources and abilities according to recognised Standards such as ISO-TS 16949 and other tools and techniques like Lean Six Sigma applied to Industry 4.0, Cyber Physical Production Systems (CPPS) and Industrial Internet of Things (IIoT) manufacturing processes. Following this, and based on the same “learning by doing” methodology, the students complete the upskilling training over six months by further developing and applying the skills and competences gained in a real working environment at any of the Gestamp’s factories and R&D centres worldwide. The programme is not only an international hub of excellence and digital talent attraction for the automotive sector, but also an international digital transformation catalyst at corporate and sectoral level.

By December 2018, more than 4000 students had enrolled in training programmes at GTI. The GTI & Innovalia Academy private partnership has been running for 3 years. 96% of the students finishing the programme have been able to find a job inside the automotive sector.

The Basque Government organisation for employment, Lanbide, which also supports the programme for transitioning of unemployed qualified people towards digital jobs in the automotive sector, has formally endorsed the programme, which was also recognised in 2016 with the “Award to the best skill training initiative” in Spain.

Case study 9: MERINOVA Digitalisation Academy (Finland)

This case study provides a further innovative example of an initiative in Finland developed to tackle the growing digital skill requirements within the EU automotive industry. The Digitalisation Academy⁷⁶ is a unique regional program managed by universities, digitalisation companies and large international organisations from the local energy cluster EnergyVaasa. The interdisciplinary programme is intended for university students at VAMK, Novia and University of Vaasa on their last year of studies, seeking internships and thesis work, with emphasis on the Energy Cluster and Digitalisation. The Academy offers students a highly interesting programme that enables learning from professionals in the energy sector and acquisition of the latest knowledge in digitalisation. The programme is mainly financed by the partner companies and sponsors. The EnergyVaasa cluster⁷⁷ consists of 140 companies, most of them large international companies, enabling good possibilities to work in international projects in Vaasa.

The pilot phase of the programme is running from 2019-2021. The Digitalisation Academy has its own classroom at the Campus in Technobothnia.

Students can get 15 credits (ECTS) when participating, from their own university (VAMK, Novia and University of Vaasa), but to get into the programme, students first need to apply for the programme. Based on the applications 20-24 students (7-8 students per university) will be accepted.

The Academy programme consists of 3 main themes:

- Cyber Security
- Data Science
- Digitalisation.

During the study programme, students receive applied training and participate in different projects about digitalisation (based on these 3 themes), as a part of their general study programme. Students also get subjects for thesis work for their final year.

The Digitalisation Academy uses a study method “flipped classroom” and an online platform called Udemy (www.udemy.com) as tool for learning the basics. Teachers from Industry (mainly experts from partner companies) provide inside knowledge from different projects in the energy industry.

⁷⁶ <https://www.digitalisationacademy.fi/>

⁷⁷ <http://energyvaasa.vaasanseutu.fi/energyvaasa-shortly/>

Case study 10: E-learning use-case study: Germany

This case study provides a good example of the increased use of digital technologies as part of apprenticeship programme delivery. REUTER TECHNOLOGIE GmbH, a Bavarian metalworking company, is heavily involved in the digitisation of the production process and the networking of machines.

The company produces components for vacuum technology and vacuum physics. Employees are specialists in copper processing, vacuum brazing and the production of thermodynamic components.

Two trainees are currently completing their apprenticeship as precision mechanics in this environment. The company report that many trainees find the mathematical requirements in the training difficult, but that young people usually have very good computer knowledge and digital skills, making it easier for them to access information via smartphones or their PC rather than to learn from books. Reuter has set themselves the goal of identifying the interests and learning preferences of young people, which is why e-learning courses have been introduced for the two new trainees.

At REUTER, one hour of e-learning per week is an integral part of the training. The investment in online learning courses to accompany the training was discussed by the management with the team leaders and the training manager before it was purchased. The training manager Marco Roth commented:

"We intensively tested a demo version of eCademy. We found that the multimedia content, such as videos or simulations, complements the content of the vocational school very well. We then asked our trainees whether they could imagine working with the programme,"

"It was important to us not to order e-learning from above - it doesn't make sense to buy a programme that the trainees don't feel like using."

Once a week, the trainees should spend at least one hour working on the multimedia learning content. The exchange between instructor and trainee is also identified as important in e-learning. One of the trainees commented:



"In any case, it is good for me if I can repeat or deepen the theory from the vocational school with the e-learning programme"

All content is presented in three steps. First a general introduction, then an application example – such as an interactive simulation and finally, a test.

However, it was stressed that e-learning needs intensive support, and very important that the young people involved do not work on the programme separately, but that there is a regular exchange of information on learning progress. In order to facilitate this exchange, regular statistics on the software are possible. This includes information on exactly how much time the trainees have spent on which learning content and performance in relation to their test results. This makes it possible to specifically ask why there are difficulties in certain areas and identify if help is needed.

<https://www.kofa.de/dossiers/digital-aus-und-weiterbilden/praxisbeispiele/e-learning-in-der-ausbildung>

Case study 11 – Technicians Make It Happen work with WorldSkills UK

Technicians Make It Happen is a national campaign in the UK to encourage more young people to consider a career as a technician. The campaign has worked with WorldSkills UK for over two years, joining forces to celebrate technical careers and support young people as they join the industry.

Technicians Make It Happen chose to exhibit at WorldSkills UK LIVE – the UK’s largest apprenticeship and skills event – to celebrate the fantastic work technicians do across a range of sectors. The organisation uses the three-day event and 70,000+ footfall to showcase jobs young people may not have considered, bringing along games and imagery to explore the skills they need to become a technician. Through an interactive, hands-on stand, it demonstrates the variety of career paths available for budding technicians. *“We bring simple, fun activities that show young visitors that the skills they use every day could be the very skills that would make them an excellent technician,” says Agnes Donnelly, Communications Officer for Technicians Make It Happen. “Our activities and resources are complemented by the event as a whole. There are connections between our work and the other exhibitors, employers and competitions on show – from BIM to welding and everything in between. Competitions are a great way of showing technical skills in action, helping young people understand how their skills can be used in the real world.”*

Technicians Make It Happen knows that engagement with teachers and lecturers is critical to helping young people kick-start their careers. By getting involved with the Parent and Teacher Hub at WorldSkills UK LIVE, the organisation is able to share information on benchmarking and highlight resources that will help support young people. *“We find that after the event teachers are more aware of our work,” says Agnes. “Our newsletter distribution list always grows and traffic to our website increases, with more people getting in touch for resources or further information.”*

World Skills UK LIVE is also a great opportunity for Technicians Make It Happen to network with apprentice employers. The organisation relies on employers to share case studies and promote the initiative among young learners, and so relishes the opportunity to engage over 200 employers at the event.

<https://www.technicians.org.uk/>

<https://worldskillsuk.org/directions/worldskills-uk-live>

Case study 12 Kofa.de - Refugees in practical training -a project – Germany

This project was preceded by consultation with local companies, municipalities and the Märkischer Arbeitgeberverband, which organised a panel discussion on the subject of 'refugees – an opportunity for the labour market.

The following conclusion was reached as a result of the panel discussion:

"The discussion showed that the joint efforts of the economy, administration, authorities and educational institutions are necessary to give the refugees a chance in the labour and training market. In addition, the framework conditions for integration must be further improved".

(Märkischer Arbeitgeberverband e.V, Iserlohn, 2016)

As part of the refugee project at thyssenkrupp Bilstein, 5 refugees from different countries were qualified for a further 3-month internship in a modular training programme.

This comprised, among other things:

- Improvements in basic knowledge
- Language skills extended (job-related vocabulary in addition to everyday vocabulary),
- German values such as punctuality,
- Practical skills proven through defined work assignments in 3 modules.

A retired skilled worker - Ekkehart Just - and the training workshop of the thyssenkrupp Bilstein company were available to them as instructors in the practical elements of the training.

This marked the beginning of an intensive period for both the prospective interns and the employer. Given it was a small group of 5 possible trainees; the supervisor was able to take optimal care of the individual refugees and answer their questions.

The refugees came with a maximum of 4 years of primary school knowledge and were also partially traumatised. This meant that basic knowledge had to be delivered quickly. The teacher also had to assess the different levels of trainees and decide if they were suitable for working life in the automotive industry.



Individual work assignments were considered in advance so that the teacher could assess the knowledge levels of each refugee. In addition, ambition, punctuality and willingness to learn were also assessed.

Based on this, if a candidate (max. 2) suited the company, they were rewarded with a 3-month internship, which could then be followed by an apprenticeship.

<https://www.kofa.de/storytelling/fluechtlinge-im-praktikum>

https://www.uibk.ac.at/iol/goodvet/2019-08-08-best-practices_engl_final.pdf



4 UNDERSTANDING THE EU APPRENTICESHIP MARKETPLACE

4.1 SIMILARITIES AND DIFFERENCES

This chapter focuses on understanding different apprenticeship models adopted across the EU and the implications of these different approaches for the automotive sector.

In order to do this the chapter focusses on those countries with a significant concentration of automotive sector activity.

For the purposes of this analysis this has been defined as the ‘top 10’ EU countries based on direct automotive employment in 2017. These ten countries are listed below:

Direct Automotive Employment – 2017

- Germany (870,000 jobs)
- France (223,000)
- Poland (203,000)
- United Kingdom (186,000)
- Romania (185,000)
- Czech Republic (177,156)
- Italy (162,876)
- Spain (157,610)
- Hungary (97,688)
- Sweden (79,600)

Figure 11 Direct Automotive Employment – 2017⁷⁸

In order to identify the different apprenticeship models in operation in these ten counties, the chapter draws on a wide range of research undertaken by CEDEFOP. In particular, a major cross nation review was published in 2018 that established a framework for categorising different apprenticeship approaches by country⁷⁹.

⁷⁸ The Automobile Industry Pocket Guide 2019-2020, ACEA

⁷⁹ Apprenticeship Schemes in European countries – A cross-nation Review – CEDEFOP 2018



The study explores different apprenticeship definitions used in different countries and identifies the changes that apprenticeships are undergoing in practice in order to highlight the different functions and purposes that apprenticeship policies fulfil in different countries. As a reference point for this analysis the study uses the following definition of apprenticeships:

'Systematic, long-term training alternating periods at the workplace and in an education institution or training centre. The apprentice is contractually linked to the employer and receives remuneration (wage or allowance). The employer assumes responsibility for providing the trainee with training leading to a specific occupation'⁸⁰.

The CEDEFOP study also:

- Highlights the need for the European Union (EU) and its Member States to identify the most appropriate role of apprenticeships within the wider education and training system and labour market, given the changing nature of the world of work, driven in part by the fourth industrial revolution.
- Evidences the growing commitment of European stakeholders and Member States to apprenticeships since the launch of the European Alliance for Apprenticeships (EAfA) in 2013, with most EU governments having submitted concrete commitments on steps to increase the quantity, quality and supply of apprenticeships by the end of 2017.

One of the key challenges faced when trying to map different apprenticeship models across the EU is that there is currently no shared understanding of what an apprenticeship is across these countries. This is illustrated by Table A1 in Appendix 2, which provides a brief summary of how the terms apprentice or apprenticeships are understood in the national contexts of key automotive sector EU countries.

The CEDEFOP report categorises different apprenticeship models into two main groups based on the main purpose and functions served, these being:

- (A) Apprenticeship as an education and training system which is aimed at providing people with full competency and capability in an occupation or trade (education and training function) suitable for apprenticeships;

⁸⁰ Apprenticeship Schemes in European countries – A cross-nation Review – CEDEFOP 2018



(B) Apprenticeship as a type of VET delivery which is aimed at providing a diverse way to achieve formal VET qualifications by bringing people into the labour market (mixed education and training and employment functions). This category of apprenticeships is further sub divided into three types, these being: those delivered via apprenticeship-specific programmes (B1); apprenticeship as a type of VET delivered as individual learning pathways, with various degrees of flexibility, as full individual pathways (organised fully as apprenticeships, B2) or as partial individual pathways (apprenticeship is combined with other types of VET delivery, B3) on VET programmes or curricula or directly on (occupational) training standards.

A key aspect of apprenticeship systems is that they tend to be characterised by a high degree of involvement of social partners at different levels. This includes activities such as the definition of standards, curriculum development, quality assurance and funding. Their role is identified as central to ensuring that the training content and learning outcomes correspond to the requirements of the labour market and supporting transition into the labour market.⁸¹

The model of training adopted can have a significant impact on the extent of labour mobility between companies and across borders. In particular, the report points out that the in-company training part of apprenticeship as a type of VET delivery in Model B 'may be less or not at all regulated and vary (length-wise and content-wise) from company to company, with in-company training often being firm-specific. As a result, apprenticeships may not be valued beyond the company that provided the placement, with the risk that apprentice employability is confined to internal labour markets.

It is also the case that approaches to apprenticeships are evolving in various countries and consequently the specific planning and delivery mechanisms in place. For example, it is pointed out that in the UK – England, the new employer-designed standards (Trailblazers)⁸² are replacing the apprenticeship frameworks (SASE frameworks). The last date an apprentice could start an apprenticeship framework is 31st July 2020.⁸³ Apprenticeship frameworks incorporate qualifications that can be gained through other types of VET delivery, whereas in the case of Trailblazers,

⁸¹ <https://www.apprenticeship-toolbox.eu/social-partners-companies>

⁸² See Case Study 6

⁸³ <https://www.gov.uk/government/publications/removal-of-apprenticeship-frameworks>



qualifications gained are unique to apprenticeships and driven by employers. This implies a shift from model B to A in the case of the UK - England.

A summary of the incidence of each model within each key automotive sector EU country is outlined in Tables A2 and A3 in Appendix 2.

There are also a number of differences in the planning and delivery of apprenticeships within and between different models. In particular, different patterns in relation to:

- The split between school and company learning (alternation)
- The duration of apprenticeships
- Respective responsibilities of different education, training and labour market stakeholders
- Eligibility by education level and age

The following sections (4.1.1-4.1.4) examine each of these issues in turn.

4.1.1 Presence and form of alternation

As the CEDFOP study indicates, there has been a move away from apprenticeships traditionally based entirely at the employer facilities, with it increasingly common to split learning between the company and school/training provider (alternation).

A summary of different patterns of alternation within key automotive sector EU countries is outlined in Table A4 in Appendix 2.

4.1.2 Duration of apprenticeship training

The duration of apprenticeship training is often linked to the need to ensure necessary learning outcomes are achieved but also to fit company requirements. In practice, duration of apprenticeships vary from about 6 months to up to 5 years within the key automotive sector EU countries analysed.

A summary of different patterns of apprenticeship duration within key automotive sector EU countries is outlined in Tables A5 and A6 in Appendix 2.

4.1.3 Responsibility sharing between education and training and the labour market

A range of different education, training and labour market stakeholders can be involved in the administration and delivery of apprenticeships, often with wide variations in the nature and extent of involvement, including the extent of involvement and responsibilities of:

- Labour market representatives in accreditation of training companies and/or monitoring of in-company training;
- Companies with respect to different aspects of in-company training delivery such as accreditation, engagement of apprentices, and sanctions in the case of failure to provide training.

A summary of different patterns of responsibility between different education, training and labour market stakeholders within key automotive sector EU countries is outlined in Tables A7 and A8 in Appendix 2.

4.1.4 Eligibility by education level and age

A summary of different patterns of eligibility to apprenticeships by education level and age within key automotive sector EU countries is outlined in Tables A9 and A10 in Appendix 2.



4.2 KEY AUTOMOTIVE COUNTRY APPRENTICESHIP SNAPSHOTS

Building on the comparison of different apprenticeship models currently in place across key automotive sector countries outlined above, this section looks at the apprenticeship models in each of these ten countries in more detail under the following headings.

- Overview
- Organisation
- Funding
- Quality Assurance
- Uptake
- Governance

4.2.1 Overview

Germany

In Germany, until recently, the dual apprenticeship system has been the main pathway for young people to enter the labour market, with about 500,000 new apprenticeship contracts completed every year⁸⁴.

Depending on the occupation it is also a widely accepted option for young people qualified to university entrance level.

Historically, the system developed out of the medieval guild system⁸⁵.

The relatively smooth transition into employment and the resulting low youth unemployment are seen as important strengths of the apprenticeship system. However, more recently there has been an increasing trend towards academic studies. Traditionally young people entering the

⁸⁴ <https://www.apprenticeship-toolbox.eu/germany/apprenticeship-system-in-germany>

⁸⁵ See ERASMUS+-Project “National Authorities for Apprenticeships: Policy learning and support to promoting apprenticeship systems and VET policy experimentation under the European Alliance for Apprenticeship”
Authors: Isabelle Le Mouillour, Verena Schneider, BIBB 2015



apprenticeship system have outnumbered higher education entrants, but in 2011 the numbers were even for the first time, and since then higher education enrolments have dominated⁸⁶.

Italy

Apprenticeships were first introduced in Italy in 1955 as an employment contract for young people. Following multiple subsequent reforms, major changes were introduced from the late 1990s, when youth employment measures started to be conceived and designed in connection to education and training policies. The current structure of three different apprenticeship schemes⁸⁷ dates back to 2003⁸⁸.

All apprenticeship schemes are defined as open-ended employment contracts with apprentices fully entitled to rights and obligations of regular standard employees.

Poland

Apprenticeships in Poland are organised in small and medium enterprises, mainly in handicrafts.

Under the dual Apprenticeship system learners spend the majority of time acquiring skills at employers' premises, (mainly craftsmen) after a contract is signed between an employer and an apprentice (juvenile worker 16-18 year olds)⁸⁹.

France

The French VET system offers several apprenticeship-type schemes and structured work-based learning programmes.

⁸⁶ <https://www.apprenticeship-toolbox.eu/germany/apprenticeship-system-in-germany>

⁸⁷ Apprenticeship for vocational qualifications and diplomas, upper secondary education diplomas and high technical specialisation certificates; Occupation-oriented apprenticeship; Higher education and research apprenticeship

⁸⁸ Source: Apprenticeship-type schemes and structured work-based learning programmes – Italy; ReferNet Italy/ Isfol, 2014. https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_IT_2014_WBL.pdf

⁸⁹ Source: Apprenticeship-type schemes and structured work-based learning programmes – Poland https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_PL_2014_WBL.pdf



However, there are two main apprenticeship schemes in France: the contrat d'apprentissage⁹⁰ and the contrat de professionnalisation⁹¹, both contracts signed between an employer and an employee⁹².

Sweden

Unlike many other European countries Sweden has historically chosen to organise apprenticeship training within the framework of secondary schools. Given this, most apprenticeships take place within the Swedish education system.

All pupils in Sweden in upper secondary schools vocational programmes and within special needs upper secondary schools national programmes undertake part of their training at a workplace. This can also occur within adult education and in college preparatory programmes⁹³.

Hungary

There is a strong tradition of apprenticeship training in Hungary historically. Since the beginning of the 2000s every government has supported apprenticeship training and numbers participating have increased⁹⁴.

⁹⁰ The contrat d'apprentissage is an employment contract that has been available in France since 1919. It was modified and redefined in 1971. Its duration ranges from 1 to 3 years, depending on the target credential or diploma and the initial level of the employee. Its objective is to enable young people aged 16 to 25 to follow a general education curriculum, both theoretical and practical, in order to acquire a professional qualification based on a diploma or a professional credential. This contract alternates periods of learning in training centres (centres de formation par apprentissage–CFA) and periods of work to develop 'know-how'. See: Apprenticeship-type schemes and structured work-based learning programmes – France; ReferNet France https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_FR_2014_WBL.pdf

⁹¹ The objective of the contrat de professionalization is to provide access to employment through the acquisition of a professional qualification (certificate, diploma, degree...) recognized by the State and/or a professional sector. The contract alternates periods of general and technological education with training providers, and periods working in an activity related to the qualification. See: Apprenticeship-type schemes and structured work-based learning programmes – France; ReferNet France https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_FR_2014_WBL.pdf

⁹² Source: Apprenticeship-type schemes and structured work-based learning programmes – France; ReferNet France https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_FR_2014_WBL.pdf

⁹³ Source: EACEA National Policies Platform; Trainees and Apprenticeships - Sweden <https://eacea.ec.europa.eu/national-policies/en/content/youthwiki/35-traineeships-and-apprenticeships-sweden>



It is not a separate pathway in Hungary. Rather, it is an optional way of organising the practical training part of an IVET programme at a company.

Apprenticeship training is most typical in vocational schools (szakiskola, SZI) programmes training for skilled manual jobs

Romania

An apprenticeship is vocational training at the workplace that is conducted on the basis of an apprenticeship contract. In the national context, apprenticeships are not considered as part of IVET⁹⁵.

Spain

In Spain the term used for apprenticeships is ‘dual vocational education and training’ (formación profesional dual) and is defined through legislation⁹⁶. It can involve an ‘apprenticeship contract’ where learners have the status of employees or a cooperation agreement between training centres and companies where learners are not employees but can receive a grant or allowance. Dual vocational training was regulated in 2012 and it has been introduced progressively since then. By 2014 some dual vocational training was delivered in all the Autonomous Communities.

Czech Republic

There is no formal apprenticeship programme in the Czech Republic that includes a contract between the apprentice and the employer and there is no shared responsibility between employer and the school related to the training delivered. However, there is a VET programme leading to what is termed an ‘apprenticeship certificate’. Schools are exclusively responsible for education and training and a high proportion of theory in comparison with practical training is evident in the curriculum.

⁹⁴ Apprenticeship-type schemes and structured work-based learning programmes - Hungary; Observatory Centre for Educational Development, Corvinus University of Budapest, 2014
https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_HU_2014_WBL.pdf

⁹⁵ Cerkez, E.B.; Stroie, D.C.; Vladut, Z.E. (2016). Vocational education and training in Europe –Romania. Cedefop ReferNet VET in Europe reports. http://libserver.cedefop.europa.eu/vetelib/2016/2016_CR_RO.pdf

⁹⁶ <https://www.cedefop.europa.eu/de/publications-and-resources/data-visualisations/apprenticeship-schemes/country-fiches/spain>



However, practical, work-based training and work placements are integrated into IVET curricula as a mandatory part⁹⁷.

UK

Responsibilities for skills and training policies in the UK are devolved to each nation. This section focusses on apprenticeships in England (Rather than Scotland, Wales and Northern Ireland).

Apprenticeships in England take between one and four years to complete and are available in 1,500 occupations across more than 170 industries, including the Automotive sector. There are two different types of apprenticeships in England: frameworks and standards. Apprenticeship frameworks are being progressively phased out and replaced by the newer apprenticeship standards, with the last start date for an apprenticeship standard 31st July 2020.⁹⁸

4.2.2 Organisation

Germany

The dual system forms the core element of vocational training and is usually of three years' duration. Every young person who has completed full-time compulsory school has access to dual training which can take place within both companies and vocational schools. The dual system covers every sector and provides broad basic vocational training and imparts occupational competences in around 329 recognised training occupations. The central characteristic of the German dual system of vocational education and training is the close partnership between employers, trade unions and the government. The employers and the unions assume responsibility through their co-determination in the shaping of vocational education and training. The willingness of enterprises and companies to

⁹⁷<https://www.cedefop.europa.eu/hu/publications-and-resources/data-visualisations/apprenticeship-schemes/country-fiches/czech-republic>

⁹⁸ House of Commons Briefing Paper, Number CBP 03052, 7 January 2019 - Apprenticeships and skills policy in England; Andrew Powell
<http://researchbriefings.files.parliament.uk/documents/SN03052/SN03052.pdf>



take responsibility could not be realised without co-determination, which forms the basis of a working ‘public-private partnership’⁹⁹.

Italy

Apprenticeships in Italy can be split into three types¹⁰⁰:

- Type 1 apprenticeship: ‘Apprenticeship for vocational qualifications and diplomas, upper secondary education diplomas and high technical specialisation certificates’. This is for those aged 15 to 25 and may be applied to vocational education and training (VET) programmes at upper- and post-secondary levels
- Type 2 apprenticeship: ‘Occupation-oriented apprenticeship’. This is a scheme outside the VET system, which leads to an occupational qualification recognised by the national sectoral collective agreement applied in the hiring company. It is for those aged 18 to 29.
- Type 3 apprenticeship: ‘Higher education and research apprenticeship’. This is for those aged 18 to 29 and includes two sub-types:
 - apprenticeship for higher education and training, which leads to university degrees, including doctorates, and higher technical institute diplomas.
 - apprenticeship for research activities, which leads to a contractual qualification outside the education and training systems.

⁹⁹ Source: Apprenticeship-type schemes and structured work-based learning programmes Germany; ReferNet Germany

https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_DE_2014_WBL.pdf

¹⁰⁰ Apprenticeship review ITALY: Building education and training opportunities through apprenticeships; The European Centre for the Development of Vocational Training (Cedefop)

https://www.cedefop.europa.eu/files/4159_en_executive_summary.pdf



Poland

There are two forms of apprenticeship training in Poland¹⁰¹:

- Occupational training (nauka zawodu) which aims to prepare an apprentice to work as a qualified worker or a journeyman and covers practical training at the employer's and theoretical education realised at school, at the employer's premises or in Centres for Education and Professional Development called ODiDZ;
- Training to perform a specific job (przyuczenie do wykonywania określonej pracy) which aims to prepare an apprentice to work as a vocationally trained worker and may apply only to some selected activities related to occupational training

The main condition to participate in apprenticeship training is completion of a lower secondary school and being at least 16 years old. The employer is obliged to conclude a written contract for apprenticeship training with an apprentice which should specify the type of apprenticeship training; duration and place of apprenticeship training; way of providing theoretical training and remuneration.

Spain

The regulatory framework to develop 'Apprenticeship-type schemes and structured work-based learning programmes' within the education system is developed at the regional level. In general, the on-the job training module is organised through a formal agreement (quality charter) between the training centre and the company. In many cases agreements are pre-signed with the Chambers, as interim commitments with the companies. The agreement is not a labour contract¹⁰².

¹⁰¹ Source: Apprenticeship-type schemes and structured work-based learning programmes – Poland
https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_PL_2014_WBL.pdf

¹⁰² Source: Apprenticeship-type schemes and structured work-based learning programmes – Spain; ReferNet Spain
https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_ES_2014_WBL.pdf



France

Apprenticeship is a work/study programme combining practical training at a company with theoretical classes delivered by an Apprentice Training Centre (CFA – centre de formation d'apprentis). Apprenticeship is based on a work contract that binds an employer and an apprentice who, as he/she is paid a wage, is subject to the rules of the Labour Code and the same collective conventions as other employees. Apprenticeships are carried out in a wide variety of professional sectors, including the automobile industry. During the programme, apprentices spend a third of their time at a CFA and the other two thirds at a company. CFA classes take up at least 400 hours a year, with apprentices following courses provided for and defined in school curricula. When at the company for which they work, apprentices are under the responsibility of a mentor who provides them with support and passes on his/her knowhow¹⁰³.

Sweden

The Swedish VET system offers 12 national vocational programmes that aim at preparing students for the labour market and can be pursued through two different modes of delivery: the school-based scheme (skolförslagutbildning) that includes compulsory in-company training, or apprenticeship education (lärlingsutbildning). The school-based and the apprenticeship schemes lead to the same vocational diploma (yrkesexamen) and largely share the same curriculum, as well as admission and diploma requirements and goals. Both schemes require students to spend time in a workplace but in different proportions. In the apprenticeship scheme, at least 50% of the total time, calculated from the moment the student starts the apprenticeship training, should be spent in the workplace. Apprenticeships in Sweden were first introduced with a stable legal basis in 2011, as part of school reform that aimed at bringing VET closer to the labour market and making it more attractive¹⁰⁴.

¹⁰³ Source: EACEA National Policies Platform; Trainees and Apprenticeships – France
<https://eacea.ec.europa.eu/national-policies/en/content/youthwiki/35-traineeships-and-apprenticeships-france>

¹⁰⁴ Source: Flash thematic country review on apprenticeships in SWEDEN; Publications Office of the European Union, 2018 - The European Centre for the Development of Vocational Training (Cedefop)
https://www.cedefop.europa.eu/files/4169_en_0.pdf



Hungary

In Hungary, upper and post-secondary VET is offered in vocational schools (szakiskola, SZI) and secondary vocational schools (szakközépiskola, SZKI). Apprenticeships can take place through both routes, although it is more common through the SZI route¹⁰⁵.

Apprenticeship training based on a training contract (tanulószerződés) is concluded by the student and the company.

Romania

A special law on apprenticeships has been in force since 2003, with the last amendments in 2013. According to the special law that regulates the institution of apprenticeships in Romania, apprenticeships are regarded as a special and distinct form of vocational training combining employment, in the form of a closed-end, determined duration contract, with vocational training, to be provided by the employer-both practical and theoretical. Those eligible for an apprenticeship are individuals aged 16-25, provided that they have no prior qualification in the trade for which they are seeking an apprenticeship contract¹⁰⁶.

Czech Republic

The Czech VET system is organised into three broad school-based VET programmes, which are part of the secondary and post-secondary educational system:

- Three-year secondary education ending in a final exam resulting in what is called an 'apprenticeship' certificate (ISCED 3C level).
- Four-year secondary education with a vocational component (ISCED 3A Level) which results in what is called a 'maturita' certificate.

¹⁰⁵ Apprenticeship-type schemes and structured work-based learning programmes - Hungary; ; Observatory Centre for Educational Development, Corvinus University of Budapest, 2014
https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_HU_2014_WBL.pdf

¹⁰⁶ Cerkez, E.B.; Stroie, D.C.; Vladut, Z.E. (2016). Vocational education and training in Europe –Romania. Cedefop ReferNet VET in Europe reports. http://libserver.cedefop.europa.eu/vetelib/2016/2016_CR_RO.pdf



- Three to three and a half year tertiary VET education (ISCED 5B), which aims to provide practically oriented professional education as an alternative to traditionally more academic higher education.

The VET programme leading to an ‘apprenticeship certificate’ requires students to spend at least 36% to 46% minimum time on practical training, which can take place in school workshops, other model environments or in companies¹⁰⁷.

UK

Apprenticeship standards were introduced in response to the 2012 Richard Review of Apprenticeships¹⁰⁸, which stated that apprenticeship outcomes should be “meaningful and relevant for employers”. Standards are developed by “trailblazer” groups that represent groups of employers and sector organisations, and will always include an end-point assessment. The first standards were introduced in September 2014¹⁰⁹.

In contrast, frameworks which are being phased out have been developed by sector bodies, and are primarily qualification-focused. This means that, as reported by the Institute for Apprenticeships, it’s possible for an apprentice to achieve all qualifications in the framework, yet not actually obtain the skills they need to carry out their job. Apprentices are assessed throughout the apprenticeship for frameworks, and there is not a requirement for an end-point assessment¹¹⁰.

¹⁰⁷ <https://www.cedefop.europa.eu/hu/publications-and-resources/data-visualisations/apprenticeship-schemes/country-fiches/czech-republic>

¹⁰⁸ <https://www.gov.uk/government/news/the-richard-review-of-apprenticeships>

¹⁰⁹ House of Commons Briefing Paper, Number CBP 03052, 7 January 2019 - Apprenticeships and skills policy in England; Andrew Powell
<http://researchbriefings.files.parliament.uk/documents/SN03052/SN03052.pdf>

¹¹⁰ <https://apprenticeships.blog.gov.uk/2017/08/01/apprenticeship-frameworks-and-standards-the-main-differences/>



4.2.3 Funding

Germany

In Germany companies participate voluntarily in apprenticeship training and bear its costs. The Federal States fund the vocational schools (mainly teaching staff salaries) together with local authorities (equipment and infrastructure). Inter-company training centres are financed by the federal government, the federal states, the responsible chambers or specific funds. The chambers get their funding through the dues of the compulsory member companies¹¹¹.

Romania

Funding for formal traineeship and apprenticeship programmes (within the legal framework) is through a special social insurance fund and paid by the National Employment Agency. The employer can receive a subsidy from the National Employment Agency monthly for each apprentice or trainee, but not for the interns. This subsidy is of 65 Euro (300lei) each month for each apprentice and 160 Euro (750 lei) each month for each trainee¹¹².

France

Apprentices receive a salary paid by the employer, which represents a percentage of the minimum wage (SMIC). The amount varies, largely depending on the length of the contract.

To encourage the use of apprenticeship contracts, multiple financial subsidies have been introduced. The main two are the prime à l'apprentissage (apprenticeship allowance) –a minimum of €1,000 paid by a local authority (the regional council) –and the apprenticeship tax credit, an amount of €1,600 per apprentice per year paid by central government. In addition to these subsidies, apprenticeship contracts are fully or partially exempt from social security charges, which are funded by central

¹¹¹ Source: ERASMUS+-Project “National Authorities for Apprenticeships: Policy learning and support to promoting apprenticeship systems and VET policy experimentation under the European Alliance for Apprenticeship” Authors: Isabelle Le Mouillour, Verena Schneider, BIBB 2015
<https://www.apprenticeship-toolbox.eu/germany/apprenticeship-system-in-germany>

¹¹² Source: EACEA National Policies Platform; Trainees and Apprenticeships - Romania
<https://eacea.ec.europa.eu/national-policies/en/content/youthwiki/35-traineeships-and-apprenticeships-romania>



government. Finally, there are also more specific subsidies, notably for apprentices with ‘disabilities’¹¹³.

Reforms introduced in 2018 included certain modifications to apprenticeship training, particularly in relation to funding of apprentice training centres (CFA)¹¹⁴.

Sweden

Each apprenticeship position is funded by a government grant from the state budget administered by the Swedish National Agency for Education. Government subsidies can be given for apprenticeship education at upper secondary school, municipal adult education and special education for adults. The maximum amount of support is 50 000 Swedish kronor (4 800 euro) per apprentice per year¹¹⁵.

Hungary

Apprenticeship training at an enterprise is financed by the company. Companies can, however, deduct the training costs from their (mandatory) contribution to the vocational training (szakképzési hozzájárulás, SZH), and can also get further expenses reimbursed from the training sub-fund of the National Employment Fund (Nemzeti Foglalkoztatási Alap, NFA). According to surveys, on average, the per capita support covers about three quarters of training costs¹¹⁶.

¹¹³ Source: Apprenticeship-type schemes and structured work-based learning programmes – France; ReferNet France
https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_FR_2014_WBL.pdf

¹¹⁴ Source: EACEA National Policies Platform; Trainees and Apprenticeships – France
<https://eacea.ec.europa.eu/national-policies/en/content/youthwiki/35-traineeships-and-apprenticeships-france>

¹¹⁵ Source: EACEA National Policies Platform; Trainees and Apprenticeships - Sweden
<https://eacea.ec.europa.eu/national-policies/en/content/youthwiki/35-traineeships-and-apprenticeships-sweden>

¹¹⁶ Apprenticeship-type schemes and structured work-based learning programmes - Hungary; Observatory Centre for Educational Development, Corvinus University of Budapest, 2014
https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_HU_2014_WBL.pdf



Spain

In Spain, apprentices are not remunerated and therefore companies do not have to pay apprentices a wage. They are however reimbursed for the cost of running a training centre through public funding.¹¹⁷.

Italy

Employers are partially compensated to take on apprenticeships through a reduction of the social security contributions¹¹⁸.

Poland

VET education is jointly funded by employers and the Labour Fund, a special fund under the jurisdiction of the Ministry of Labour¹¹⁹.

Czech Republic

Tax incentives for companies co-operating with schools in relation to VET were introduced in 2014¹²⁰.

¹¹⁷ Services for Apprenticeships (SERFA) Erasmus Plus Project Transnational Report; Apprenticeships across eight European countries: Current situation, best practice and SMEs' needs Prepared by Roland Löffler and Martin Mayerl (öibf) May 2017
https://www.serfa-project.eu/sites/default/files/upload/projet/transnational_report_final_version.pdf

¹¹⁸ The Cost-Effectiveness of Apprenticeship Schemes - Making the Business Case For Apprenticeships; Final Report May 2016; BUSINESSEUROPE; CEEP; UEAPME
http://erc-online.eu/wp-content/uploads/2016/05/Employers_Final-Report-on-Apprenticeships-May-2016.pdf

¹¹⁹ National Report on Apprenticeship in Poland; Services for Apprenticeships (SERFA); Prepared by the OIC Poland Foundation; June 2017
https://www.serfa-project.eu/sites/default/files/upload/projet/poland_national_report.pdf

¹²⁰ Apprenticeship-type schemes and structured work-based learning programmes - Czech Republic ; Cedefop, ReferNet, Mgr. Martina Kaňáková (NÚV)
https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_CZ_2014_WBL.pdf



UK

On 6 April 2017 the apprenticeship levy came into effect with all UK employers with a pay bill of over £3 million per year paying the levy. The levy is set at 0.5% of the value of the employer's pay bill, minus an apprenticeship levy allowance of £15,000 per financial year. The levy is paid into an apprenticeship service account, and funds in this account must be spent on apprenticeship training and assessment. Apprenticeship levy funds will be used to pay for the training and assessment for employers paying the levy (up to an agreed upper limit). Employers who do not pay the levy will pay 10% of the cost of training and assessment with the government contributing the remaining 90% (up to an agreed upper limit)¹²¹.

4.2.4 Quality Assurance

Germany

In Germany there is a system of recognised training occupations or vocational education and training (VET) standards. The German term Ausbildungsberuf (training occupation) describes a key element of the training and education system which comprises a vocational education and training standard, occupational characteristics, a training plan of two or three years and a qualification framework. The standard defines the context and time frame of the training courses for the state-recognised occupations, like training specifications and assessment requirements. In addition, participating enterprises are informed by the schools or the vocational school teachers about the school performance of their trainees. The training contract between the company and the trainee also defines their respective rights and obligations, thereby providing a further way of assuring the quality of training¹²².

¹²¹ House of Commons Briefing Paper, Number CBP 03052, 7 January 2019 - Apprenticeships and skills policy in England; Andrew Powell
<http://researchbriefings.files.parliament.uk/documents/SN03052/SN03052.pdf>

¹²² Source: Apprenticeship-type schemes and structured work-based learning programmes Germany; ReferNet Germany
https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_DE_2014_WBL.pdf



Italy

There is no systemic quality assurance system for apprenticeships in Italy, although there are some mechanisms in place to monitor on and off the job training and skills acquisition. In particular, training activities must be defined within an Individual training plan, which is used to certify knowledge and skills acquired. The Individual training plan is also used by inspectors to verify if the apprentice's training is conducted properly. The role played by competent tutors in ensuring quality of training provided by the enterprise is also emphasised¹²³.

Poland

In case of designated (classified) VET occupations, examination requirements and learning outcomes are defined in the core curriculum for VET. In case of other occupations not classified in this way apprenticeship training quality standards are designed by the Polish Craft Association¹²⁴.

Romania

Host organisations/employers need to undertake their own quality assurance and evaluation, but there is no information available on this¹²⁵.

Spain

The formal responsibility for the assessment of the apprenticeship and other WBL learning outcomes is the tutor-teacher of the training centre, taking into account the company tutor-trainer report, his/her own visits to the premises and information from the student¹²⁶.

¹²³Source: Apprenticeship-type schemes and structured work-based learning programmes – Italy; ReferNet Italy/ Isfol, 2014
https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_IT_2014_WBL.pdf

¹²⁴ Source: Apprenticeship-type schemes and structured work-based learning programmes – Poland
https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_PL_2014_WBL.pdf

¹²⁵ Source: EACEA National Policies Platform; Trainees and Apprenticeships - Romania
<https://eacea.ec.europa.eu/national-policies/en/content/youthwiki/35-traineeships-and-apprenticeships-romania>

¹²⁶ Source: Apprenticeship-type schemes and structured work-based learning programmes – Spain; ReferNet Spain
https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_ES_2014_WBL.pdf



France

Currently, regions that coordinate and implement apprenticeship programmes and policies can create systems for evaluating the quality of apprenticeship schemes.

In addition, the 2018 the apprenticeship system reform modifies the governance of the apprenticeship training centres (CFA), particularly in relation to the quality of training offered. In particular, the reform introduces a certification system for the apprenticeship training centres (CFA). As of 1 January 2020, any new apprenticeship training centre will need a quality certification in order to open¹²⁷.

Sweden

School providers have the main responsibility for ensuring the quality of traineeships and apprenticeships and also ensuring the workplace is a good working environment and fulfils the current working requirements¹²⁸.

Hungary

Quality assurance of company-based training is the duty of the Chamber of Commerce. Initial and 'midway' inspections are implemented. The initial inspection aims to confirm that the company is in fact capable of providing training in terms of human resources, material conditions and the required educational documents. The objective of the midway inspection is to check if legal regulations are still observed, as well as to ensure the standard of training¹²⁹.

¹²⁷ Source: EACEA National Policies Platform; Trainees and Apprenticeships – France
<https://eacea.ec.europa.eu/national-policies/en/content/youthwiki/35-traineeships-and-apprenticeships-france>

¹²⁸ Source: EACEA National Policies Platform; Trainees and Apprenticeships - Sweden
<https://eacea.ec.europa.eu/national-policies/en/content/youthwiki/35-traineeships-and-apprenticeships-sweden>

¹²⁹ Apprenticeship-type schemes and structured work-based learning programmes - Hungary; Observatory Centre for Educational Development, Corvinus University of Budapest, 2014
https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_HU_2014_WBL.pdf



Czech Republic

Secondary school quality assurance measures are covered by legislation and conducted through both external evaluation and self-evaluation. In addition, each newly established school is evaluated by the MŠMT (Ministry of Education, Youth and Sports). The Czech School Inspectorate (Česká školní inspekce – ČŠI) is the national evaluation authority and carries out the external evaluation¹³⁰.

UK

The Institute for Apprenticeships and Technical Education (the Institute) is the body charged with overseeing the external quality assurance (EQA) of End-Point Assessments (the ‘exam’ taken by apprentices at the end of their training). To do this the Institute can approve other organisations to deliver EQA. These other organisations can be employer-led groups, professional bodies, the Office of Qualifications and Examinations Regulation (Ofqual), the Office for Standards in Education, Children's Services and Skills (Ofsted), or the Quality Assurance Agency (QAA) for integrated degree apprenticeships¹³¹.

4.2.5 Uptake

This section presents data on recent apprenticeship uptake within each key EU automotive country. There is no standardised set of EU wide apprenticeship data currently available, so the level of detail and date of data presented varies by country.

¹³⁰ Apprenticeship-type schemes and structured work-based learning programmes - Czech Republic ; Cedefop, ReferNet, Mgr. Martina Kaňáková (NÚV)
https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_CZ_2014_WBL.pdf

¹³¹ The Institute talks quality assurance in apprenticeships
Posted by: Alex Morris, Posted on: 1 March 2019.
<https://apprenticeships.blog.gov.uk/2019/03/01/the-institute-talks-quality-assurance-in-apprenticeships/>



Germany

Key figures relating to apprenticeship uptake in Germany are as follows¹³²:

- A total of 1.34 million persons were in an apprenticeship in 2014.
- During the training year 2016/17, the number of newly-concluded apprenticeship contracts was 520,300.
- At the end of the year 2015, 427,496 companies participated in the apprenticeship system, representing 20% of all companies in Germany.

Italy

In 2012 a total of almost 470,000 apprentices were employed (stock data) in Italy¹³³.

Spain

More than 100,000 agreements are signed every year relating to on-the job training modules organised through a formal agreement (quality charter) between training centres and companies¹³⁴.

France

At the end of 2013, there were 385,000 apprenticeship contracts and 155,000 professionalisation contracts, a combined total of 541,000 recipients. This is equivalent to almost one job in four in the relevant age group (16-25)¹³⁵.

¹³² Source: ERASMUS+-Project “National Authorities for Apprenticeships: Policy learning and support to promoting apprenticeship systems and VET policy experimentation under the European Alliance for Apprenticeship” Authors: Isabelle Le Mouillour, Verena Schneider, BIBB 2015
<https://www.apprenticeship-toolbox.eu/germany/apprenticeship-system-in-germany>

¹³³ Source: Apprenticeship-type schemes and structured work-based learning programmes – Italy; ReferNet Italy/ Isfol, 2014
https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_IT_2014_WBL.pdf

¹³⁴ Source: Apprenticeship-type schemes and structured work-based learning programmes – Spain; ReferNet Spain
https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_ES_2014_WBL.pdf

¹³⁵ Source: Apprenticeship-type schemes and structured work-based learning programmes – France; ReferNet France
https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_FR_2014_WBL.pdf



Sweden

The number of upper secondary VET students enrolled in the apprenticeship scheme has grown steadily since its introduction in 2011, with an average annual increase of over 1,000 students, from 5,600 in 2013/14 to 10,300 in 2017/18¹³⁶.

Hungary

The number of students holding a training contract in the VET years of vocational school (SZI) programmes 2001-2013 indicates an increase from 8,931 in 2001/2 to 42,840 in 2013/14¹³⁷.

Romania

Uptake of apprenticeships in Romania has been quite slow, despite the intention to attract more companies. During 2015 only 129 apprenticeship contracts were concluded¹³⁸.

Poland

In 2013, based on data from the Chamber of Crafts, 78,440 young workers participated in apprenticeship training in 24,702 enterprises. Of these, 76,045 were undergoing occupational training¹³⁹.

¹³⁶ Source: Flash thematic country review on apprenticeships in SWEDEN; Publications Office of the European Union, 2018 - The European Centre for the Development of Vocational Training (Cedefop)
https://www.cedefop.europa.eu/files/4169_en_0.pdf

¹³⁷ Apprenticeship-type schemes and structured work-based learning programmes - Hungary; Observatory Centre for Educational Development, Corvinus University of Budapest, 2014
https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_HU_2014_WBL.pdf

¹³⁸ Cerkez, E.B.; Stroie, D.C.; Vladut, Z.E. (2016). Vocational education and training in Europe –Romania. Cedefop ReferNet VET in Europe reports. http://libserver.cedefop.europa.eu/vetelib/2016/2016_CR_RO.pdf

¹³⁹ Apprenticeship-type schemes and structured work-based learning programmes – Poland – Cedefop-ReferNet; Ludmiła Łopacińska - 2014
https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_PL_2014_WBL.pdf



UK

In 2018/19, there were 742,400 people participating in an apprenticeship in England, with 393,400 apprenticeship starts and 185,100 apprenticeship achievements¹⁴⁰. The Government set a target of 3 million new apprenticeship starts between 2015 and 2020¹⁴¹.

4.2.6 Governance

Germany

Vocational education and training is shaped by the cooperation of the participating stakeholders. In particular, the dual system of vocational education and training in Germany is characterised by its corporatism and the division of educational policy responsibility between the Federal government, the Länder and the social partners¹⁴².

Italy

The Italian apprenticeship system is governed both at national and regional level. The Minister of Labour and Social Policy has the authority to define the national legislative framework and establish strategic policies in collaboration with local Authorities and Social Partners, and to allocate public funds to Regions and Autonomous Provinces. Regions have exclusive jurisdiction over vocational training and for regulating apprenticeship system at local level, in accordance with the provisions of the national legislation¹⁴³.

Poland

¹⁴⁰ House of Commons Briefing Paper, Number 06113, 6 February 2020; Apprenticeship Statistics, Niamh Foley

¹⁴¹ House of Commons Briefing Paper, Number CBP 03052, 7 January 2019 - Apprenticeships and skills policy in England; Andrew Powell

<http://researchbriefings.files.parliament.uk/documents/SN03052/SN03052.pdf>

¹⁴² Source: Apprenticeship-type schemes and structured work-based learning programmes Germany; ReferNet Germany

https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_DE_2014_WBL.pdf

¹⁴³ Source: Apprenticeship-type schemes and structured work-based learning programmes – Italy; ReferNet Italy/ Isfol, 2014

https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_IT_2014_WBL.pdf



The management and administration of the VET system in Poland has a three-level structure: national (Ministries), partially regional (school superintendent – kurator, mainly in the area of pedagogical supervision) and district authorities (governing upper secondary schools)¹⁴⁴.

Spain

The contractual framework for work activity in traineeships and apprenticeships is set out in the Guide of Contracts of the Spanish Public Employment Service, regulating both the Traineeship Contract and the Contract for Training and Apprenticeships. The promotion of traineeships and apprenticeships takes place mainly at sub-national level, with the Autonomous Regions, local administrations and education agencies the main actors¹⁴⁵.

France

The governance of apprenticeship policy in France involves a wide range of players¹⁴⁶:

- Central government, which sets the legal and educational framework for apprenticeship and contributes to its funding,
- The academic authorities, accountable to the Ministry of Education, which both monitor apprenticeship and also run apprentice training centres (CFAs);
- The regions, which are responsible for regional apprenticeship policy. They contribute to the funding of apprenticeship contracts through the ‘apprenticeship allowance’, and of the CFAs through subsidies. Similarly, they license and monitor the opening of CFAs and subsequently inspect their activity;
- The social partners, who promote apprenticeship through employment and training management tools in professional sectors and companies, by setting priorities and funding for the professionalisation contracts. Professional sectors can also run CFAs.

¹⁴⁴ Source: Apprenticeship-type schemes and structured work-based learning programmes – Poland
https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_PL_2014_WBL.pdf

¹⁴⁵ Source: EACEA National Policies Platform; Trainees and Apprenticeships – Spain
<https://eacea.ec.europa.eu/national-policies/en/content/youthwiki/35-traineeships-and-apprenticeships-spain>

¹⁴⁶ Source: Apprenticeship-type schemes and structured work-based learning programmes – France; ReferNet France
https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_FR_2014_WBL.pdf



Sweden

Schools are responsible for most of the implementation tasks (both administrative and content-wise) of apprenticeships in upper secondary education. They have responsibility for the administration and coordination of the scheme and for learning that takes place both at school and at companies, including identifying and defining the learning outcomes, organising, planning and following up apprentice progress, and allocating an apprentice to a company. The legal contract between the school and employer is mandated by the National Agency for Education¹⁴⁷.

Hungary

Since apprenticeship training is not a separate pathway, the general governance system and regulatory framework are the same in any initial vocational education and training IVET programme, irrespective of where practical training takes place. The Hungarian Chamber of Commerce and Industry is responsible for assisting students in finding practical training opportunities at companies and for the accreditation and registration of enterprises providing practical training, the countersigning (validation) and registration of training contracts, and the inspection of training provision¹⁴⁸.

Romania

Employers must sign a contract for training services with an authorised training provider, which includes providing professional training and organising exams for graduation upon completion of the apprenticeship contract. The contract for training services is concluded for the same period as the apprenticeship contract¹⁴⁹.

¹⁴⁷ Source: Flash thematic country review on apprenticeships in SWEDEN; Publications Office of the European Union, 2018 - The European Centre for the Development of Vocational Training (Cedefop)

https://www.cedefop.europa.eu/files/4169_en_0.pdf

¹⁴⁸ Apprenticeship-type schemes and structured work-based learning programmes - Hungary; Observatory Centre for Educational Development, Corvinus University of Budapest, 2014

https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_HU_2014_WBL.pdf

¹⁴⁹ Cerkez, E.B.; Stroie, D.C.; Vladut, Z.E. (2016). Vocational education and training in Europe –Romania.

Cedefop ReferNet VET in Europe reports. http://libserver.cedefop.europa.eu/vetelib/2016/2016_CR_RO.pdf



Czech Republic

The Ministry of Education, Youth and Sports (MŠMT) is the main body responsible for IVET. At regional level, self-governing bodies—regional assembly and regional council (zastupitelstvo kraje, rada kraje) are directly responsible for establishing and closing down public VET schools at upper secondary and tertiary professional levels. In the course of the last decade, the role of social partners in VET has been gradually strengthened in relation to shaping the content as well as objectives of VET and evaluation of outcomes¹⁵⁰.

UK

The Department for Business, Innovation and Skills was replaced by the Department for Business, Energy and Industrial Strategy in July 2016. With this change responsibility for apprenticeships and skills, along with higher and further education policy, was transferred to the Department for Education¹⁵¹.

The Institute for Apprenticeships and Technical Education is an employer led crown Non Departmental Public Body. The Institute for Apprenticeships oversee the development, approval and publication of apprenticeship standards and assessment plans as well as the occupational maps for apprenticeships¹⁵².

¹⁵⁰ Apprenticeship-type schemes and structured work-based learning programmes - Czech Republic ; Cedefop, ReferNet, Mgr. Martina Kaňáková (NÚV)

https://cumulus.cedefop.europa.eu/files/vetelib/2015/ReferNet_CZ_2014_WBL.pdf

¹⁵¹ House of Commons Briefing Paper, Number CBP 03052, 7 January 2019 - Apprenticeships and skills policy in England; Andrew Powell

<http://researchbriefings.files.parliament.uk/documents/SN03052/SN03052.pdf>

<http://researchbriefings.files.parliament.uk/documents/SN03052/SN03052.pdf>

¹⁵² <https://www.instituteforapprenticeships.org/about/what-we-do/>



4.3 SUMMARY

The section below summarises some of the key differences and similarities in apprenticeship policy and implementation across the ten key automotive sector countries under the following headings:

- Different apprenticeship models
- Uptake
- Main target groups
- Involvement of employers
- Quality assurance
- Funding
- Curricula
- Legal framework
- Governance
- Patterns of alternation
- Duration of apprenticeships
- Minimum volume of in company training per year
- Other differences and similarities

4.3.1 Different apprenticeship models

In relation to different apprenticeship models (See Section 4.1 and Tables A2 and A3 in Appendix 2 for more details):

- Two of the key EU automotive countries operate apprenticeships through Model A: Apprenticeship as an education and training system. These are Germany and Poland.
- A total of seven key EU automotive countries operate apprenticeships through Model B: A type of VET delivery within the formal VET system, these being:
 - B2 Model: Full apprenticeship individual pathways (only) – France, Romania, UK (both England and Scotland)
 - B3: Full and partial apprenticeship individual pathways – Spain, Hungary, Italy and Sweden

In the case of the other key automotive sector country (Czech Republic), there is no formal apprenticeship programme in the Czech Republic that includes a contract between the apprentice and the employer and there is no shared responsibility between employer and the school related to



the training delivered. On this basis the Czech Republic was excluded from the CEDEFOP Cross Nation Review, so is not included in any of the above models. However, there is a VET programme leading to what is termed an ‘apprenticeship certificate’ and the Czech Republic has been included in the analysis of apprenticeship models set out in this Report.

4.3.2 Uptake

There are wide variations in terms of the importance of apprenticeships in the ten key automotive countries in terms of the contribution to overall workforce training.

Looking at numbers of apprentices (in all sectors) as a proportion of total numbers employed indicates that the estimated figure for Germany is 3% of all those employed, 2.8% in the UK, 2% in Italy and 1.9% in France, but only 0.5% in Spain and Poland, 0.2% in Sweden and less than 0.1% in Hungary and Romania.

Czech Republic	N/a
France	1.9%
Germany	3.0%
Hungary	<0.1%
Italy	2.0%
Poland	0.5%
Romania	<0.1%
Spain	0.5%
Sweden	0.2%
United Kingdom	2.8%

Figure 12 Apprentices as a proportion of total numbers employed¹⁵³

There are also distinct differences in trends in numbers of apprentices. While in the UK the numbers of apprentices in training has increased markedly over the last decade (although the latest data indicates some decline), in Germany the number of apprentices has experienced a longer-term decline¹⁵⁴.

¹⁵³ Sources: See ‘uptake’ section for sources relating to numbers of apprentices. For numbers employed see: <https://tradingeconomics.com/country-list/employed-persons?continent=europe>

¹⁵⁴ Services for Apprenticeships (SERFA) Erasmus Plus Project Transnational Report; Apprenticeships across eight European countries: Current situation, best practice and SMEs’ needs Prepared by Roland Löffler and Martin Mayerl (öibf) May 2017



4.3.3 Main target groups

In relation to the main apprentice target groups, both the minimum age of eligibility, age range eligibility and education level eligibility also diverge widely, as set out in Tables A9-A10 of Appendix 2.

Specifically in relation to age, Germany has experienced a rise in the age of apprentices in the last years. In the UK, most of the apprentices are older than 20 years old¹⁵⁵. By contrast, the target group in Poland is 16-18.

4.3.4 Involvement of employers

Both the requirements on employers in relation to provision of learning and arrangements and responsibilities for accreditation and monitoring also vary widely as set out in Tables A7 and A8 in Appendix 2.

The minimum volume of in-company training per year also varies widely (where this is specified), ranging from 33% in Spain to 70% in Germany (See Tables A5 and A6 in Appendix 2).

https://www.serfa-project.eu/sites/default/files/upload/projet/transnational_report_final_version.pdf

¹⁵⁵ Services for Apprenticeships (SERFA) Erasmus Plus Project Transnational Report; Apprenticeships across eight European countries: Current situation, best practice and SMEs' needs Prepared by Roland Löffler and Martin Mayerl (öibf) May 2017

https://www.serfa-project.eu/sites/default/files/upload/projet/transnational_report_final_version.pdf



4.3.5 Quality assurance

Approaches to apprenticeship quality assurance vary widely across nations with:

- No systemic quality assurance system for apprenticeships in Italy
- Host organisations/employers responsible for their own quality assurance and evaluation in Romania
- Tutors/teachers of the training centres responsible in Spain
- School providers responsible in Sweden
- The Chamber of Commerce responsible in Hungary
- The Institute for Apprenticeships and Technical Education is the body charged with overseeing external quality assurance apprenticeship of End-Point Assessments in the UK

4.3.6 Funding

A mixture of different funding arrangements are evident across the different EU nations including approaches that place funding responsibilities entirely or partially with employers, entirely as a government responsibility or through tax subsidies, social security funding or partial government reimbursements. These arrangements include the following:

- In Germany companies participate voluntarily in apprenticeship training and bear its costs. This is also the case in Hungary although training costs and some further expenses can be reimbursed.
- In Poland, VET education is jointly funded by employers and the Labour Fund, a special fund under the jurisdiction of the Ministry of Labour.
- In the UK employers with a pay bill of over £3 million per year pay a levy. For employers who do not pay the levy, costs are largely provided through government funding.
- Romania - Special social insurance fund covers the cost. In Italy employers are partially compensated to take on apprenticeships through a reduction of the social security contributions and in Spain employers training costs are reimbursed through public funding. Sweden - Each apprenticeship position is funded by a government grant from the state budget administered by the Swedish National Agency for Education



- France - To encourage the use of apprenticeship contracts, multiple financial subsidies are in place. In the Czech Republic there are tax incentives for companies co-operating with schools in relation to VET.

4.3.7 Curricula

There are wide variations between countries regarding both the definition and content of curricula¹⁵⁶.

- In Germany the basis for company training is defined by a training regulation for each company which defines the required learning outcomes at the end of the training period, with a high level of involvement of social partners (chambers and employee representatives.)
- In the United Kingdom employers with support of professional bodies drive the development of professional standards. This results in a short description of standards including the learning outcome (competence profile), duration and assessment plan.
- In France, Spain and Poland, core curricula for the VET programmes are in place that need to be followed.

¹⁵⁶ Services for Apprenticeships (SERFA) Erasmus Plus Project Transnational Report; Apprenticeships across eight European countries: Current situation, best practice and SMEs' needs Prepared by Roland Löffler and Martin Mayerl (öibf) May 2017

https://www.serfa-project.eu/sites/default/files/upload/projet/transnational_report_final_version.pdf



4.3.8 Legal framework

A number of key automotive sector countries have historically well-established legal apprenticeship frameworks including Germany, and France. Some other countries such as Spain and Poland have introduced apprenticeship schemes much more recently and are still going through a process of implementation, adaption and change. In the case of the UK, where apprenticeships are long established a major reorganisation of the apprenticeship system has been taking place¹⁵⁷.

4.3.9 Governance

The different governance arrangements for apprenticeships across the ten key automotive sector EU countries can be summarised as follows:

- The dual system of vocational education and training in Germany is characterised by its corporatism and the division of educational policy responsibility between the Federal government, federal states (Länder) and the social partners.
- The Italian and Czech apprenticeship system is governed both at national and regional level, while in Poland there is also involvement of district authorities. In France the governance of apprenticeship policy involves a wide range of central government, regional and other organisations, while in Spain the promotion of apprenticeships takes place mainly at sub-national level, with the Autonomous Regions, local administrations and education agencies the main actors.
- Schools are responsible for most of the implementation tasks in Sweden
- In Hungary apprenticeship governance (together with all IVET programmes) are the responsibility of the Hungarian Chamber of Commerce and Industry
- Employers must sign a contract for training services with an authorised training provider in Romania
- In the UK the Institute for Apprenticeships (a non-governmental body) oversee the development, approval and publication of apprenticeship standards and assessment plans as well as the occupational maps for apprenticeships.

¹⁵⁷ Services for Apprenticeships (SERFA) Erasmus Plus Project Transnational Report; Apprenticeships across eight European countries: Current situation, best practice and SMEs' needs Prepared by Roland Löffler and Martin Mayerl (öibf) May 2017

https://www.serfa-project.eu/sites/default/files/upload/projet/transnational_report_final_version.pdf



4.3.10 Patterns of alternation

In terms of patterns of alternation within key automotive sector EU countries in the case of:

- Hungary, Italy and Sweden alternation between school and company is compulsory but varies on a case by case basis
- France, Romania, UK and Spain School attendance is not compulsory
- Germany, patterns are quite variable

4.3.11 Duration of apprenticeships

In relation to typical duration of apprenticeships, again there are wide variations ranging from:

- 6 months to 4 years in France
- 6 months to 5 years in Italy
- 1-3 years in Romania and England
- 2 years in Spain
- Three years in the case of Poland, Hungary and Sweden
- 3-3.5 years in Germany

4.3.12 Minimum volume of in-company training

The minimum volume of in-company¹⁵⁸ training per year, where this is specified, ranges from 33% in Spain to 70% in Germany.

4.3.13 Other differences and similarities

Both the requirements on employers in relation to provision of learning and arrangements and responsibilities for accreditation and monitoring also vary widely (as set out in Tables A7 and A8 in Appendix 2).

Both the minimum age of eligibility, age range eligibility and education level eligibility also diverge widely, as set out in Tables A9-A10 in Appendix 2.

¹⁵⁸ Training undertaken at the workplace



4.4 BENCHMARKING EACH APPRENTICESHIP SYSTEM SUMMARY

In March 2018 the European Framework for Quality and Effective Apprenticeships (EFQEA)¹⁵⁹ adopted the following recommendations in relation to ensuring the development and adoption of high quality apprenticeships across the EU.

Criteria for learning and working conditions:

- Written agreement
- Learning outcomes
- Pedagogical support
- Workplace component
- Pay and/or compensation
- Social protection
- Work, health and safety conditions

Criteria for framework conditions:

- Regulatory framework
- Involvement of social partners
- Support for companies
- Flexible pathways and mobility
- Career guidance and awareness raising
- Transparency
- Quality assurance and tracking of apprentices

This framework provides a further criterion for benchmarking the differences and similarities of current practice within the EU with respect to apprenticeships.

This benchmarking process has been applied to 6 key EU automotive countries selected to highlight divergences in approach to apprenticeships, these being Sweden, Spain, Portugal, Czech Republic, Germany and the UK. These countries were selected in order to represent different approaches to apprenticeships and also to reflect a range of differing sizes in terms of automotive sector employment. The results of this assessment are summarised in the diagram below.

¹⁵⁹ <https://ec.europa.eu/esf/transnationality/content/european-framework-quality-and-effective-apprenticeships>

The assessment is based on available evidence and points generally to higher scores in Germany and the UK, reflecting the relatively formalised apprenticeship infrastructures in both countries and somewhat lower scores in the Czech Republic, Spain and Sweden. However, it should be noted these assessments should only be treated as a guide, given the current difficulties involved in the assessment process based on information available.

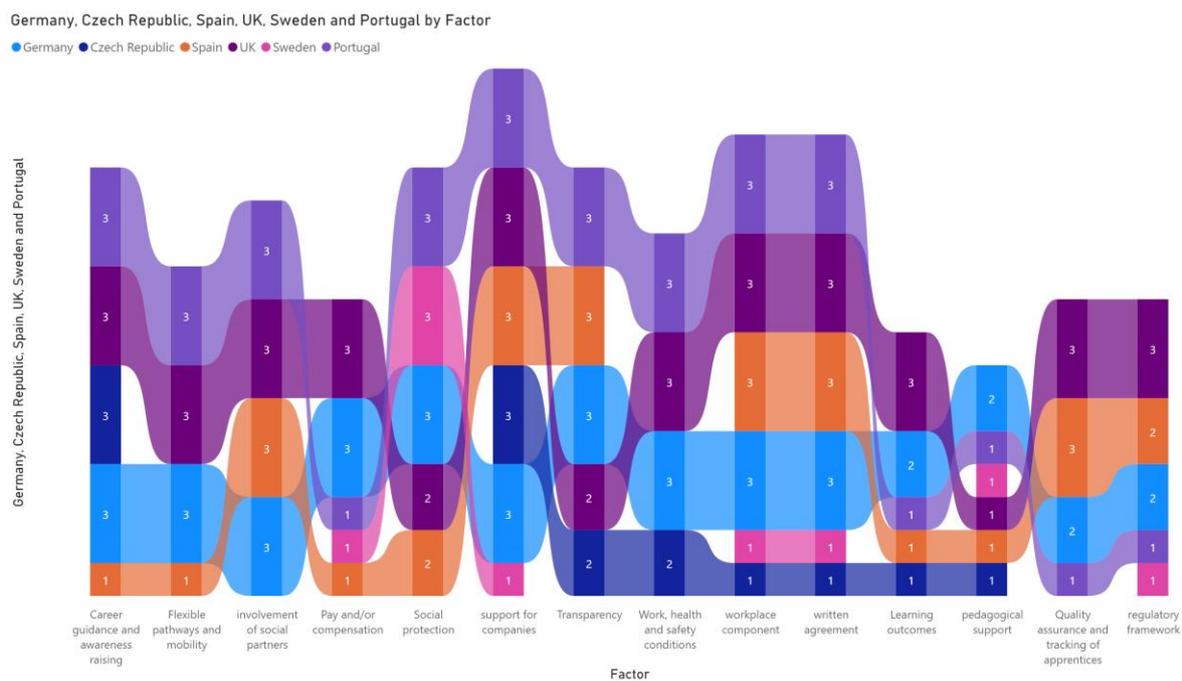


Figure 13 Benchmarking the apprenticeship systems from six different countries

4.5 IMPLICATIONS FOR APPRENTICESHIPS SERVING THE EU AUTOMOTIVE SECTOR

At present there are a number of aspects of the current apprenticeship market serving the EU automotive sector that impede efficient operation, with a number of factors potentially restricting labour mobility across the EU automotive sector. In particular:

- Some overall apprenticeship models are likely to encourage greater inter-industry mobility than other models. In relation to the countries focussed on in this Report it is possible to split apprenticeship models into two broad types¹⁶⁰ these being:

¹⁶⁰ See Apprenticeship Schemes in European countries – A cross-nation Review – CEDEFOP 2018



- An approach towards apprenticeships that fits the criteria of an education and training system which is aimed at providing people with full competency and capability in an occupation or trade suitable for apprenticeships (Model A).
- Apprenticeship as a type of VET delivery aimed at providing a diverse way to achieve formal VET qualifications by bringing people into the labour market (Model B).
- Countries that have adopted an approach towards apprenticeships that fits the criteria of Model A are likely to provide apprentices with greater prospects for mobility between companies than those countries adopting the Model B approach, typified by less regulation and greater variations in apprenticeship length and content.
- Labour mobility is currently further restricted by the wide inter-country variations, not only in terms of the overall apprenticeship models adopted, but in terms of patterns of school-company alternation, typical duration of apprenticeships, volume of in-company training per year, requirements placed on both employers and wider labour market stakeholders and age and educational level eligibility criteria.
- Based on research undertaken as part of the DRIVES project it is clear that within individual EU nations, skills provision serving the automotive sector can be characterised by a complicated mix of colleges, universities, private providers and employers' own training which can be particularly confusing for employers and potential trainees alike. Understanding and comparing different apprenticeship offers across different EU countries is currently a significantly more difficult challenge.

These challenges require innovative solutions to help both employers and trainees maximise the value of apprenticeships in meeting fast changing skill requirements.

The EU apprenticeship market poses particular challenges for automotive SME's (which are vital to the efficient functioning of the automotive supply chain) both in relation to greater difficulties in recruiting candidates which meet their particular needs and providing the required learning and development for their employees.

Specifically, SME's often struggle to provide apprenticeship opportunities. Some of the most common reasons cited for this include: a lack of training infrastructure and personnel to supervise apprentices, as well as insufficient expertise and capacity to manage complex rules, employment



law and administrative requirements¹⁶¹. This implies the need for the development of innovative approaches to help SME's attract apprentices and support to ensure the capability to provide the required training support.

Recent action research undertaken as part of the EU Erasmus funded COTRAIN project¹⁶² relating to collaborative approaches to apprenticeship training further underline the particular challenges SME's face and how collaborative arrangements can benefit apprentices, SME's and industry as a whole¹⁶³.

In relation to challenges faced by SME's trying to train apprentices alone the research¹⁶⁴ highlights issues relating to the:

- Increased workload apprenticeships generate;
- Involvement of in-company trainers;
- Impact of training on daily production activities;
- Lack of resources of many SME's and that they often do not have all the equipment and machines required for teaching the occupation targeted.

Given the complex nature of supply chains associated with the companies in the automotive sector, it is also clear that SME's in particular are often quite specialised and therefore cannot provide apprentices with the range of skills in a work environment that might be appropriate to complete particular apprenticeship programmes.

The position of SME's undertaking vocational training in an industrial context using a 'one-company' vocational training system is summed up as¹⁶⁵, either SMEs cannot train apprentices, or if they train them, part of the training programme will not be covered on a real production line, with the necessary time to practice, repeat gestures and acquire skills.

¹⁶¹ Services for Apprenticeships (SERFA) Erasmus Plus Project Transnational Report; Apprenticeships across eight European countries: Current situation, best practice and SMEs' needs Prepared by Roland Löfflerand and Martin Mayerl (öibf) May 2017

https://www.serfa-project.eu/sites/default/files/upload/projet/transnational_report_final_version.pdf

¹⁶² The idea behind developing the COTRAIN project was to contribute to increasing the quality of dual training, based on an understanding of the inadequacies of a "one-company one-training" model in relation to tackling skills mismatches

¹⁶³ 2019 joint Cedefop and OECD symposium: The next steps for apprenticeship; 7 October 2019, Paris: Creating collaborative training - Learning and working in a network of companies to meet training requirements more adequately; CoTrain; Cepag, Isabelle Michel, Education/Training Advisor COTRAIN project manager

¹⁶⁴ Creating Collaborative Training - Methodological guide; Edited by Isabelle Michel(CEPAG, Be)

https://www.cepag.be/sites/default/files/pages/methodological_guide_-_final_version_1.pdf

¹⁶⁵ Creating Collaborative Training - Methodological guide; Edited by Isabelle Michel(CEPAG, Be)

https://www.cepag.be/sites/default/files/pages/methodological_guide_-_final_version_1.pdf



The same research¹⁶⁶ also highlights how SME's (and other companies) can improve their training and education capacity through shared arrangements with other companies. In particular, such arrangements can make it possible for apprentices to gain a complete knowledge and awareness regarding the entire work process, from design to production and maintenance. Two case studies highlight different ways of trying to address these issues:

- Case study 13 highlights how a collaborative training agreement between two companies in Italy, one specialising in technical drawings and in innovative mechanical production technologies and the other in electric upsetting and forging benefited both the companies involved and the trainee¹⁶⁷.
- Case study 14 highlights a 'Shared Apprenticeship' training model in Wales where a central management organisation holds the responsibility of the apprentices training contract but where apprentices move between different employers who share the responsibility for the Apprentice's true work experience and performance criteria.

Increased globalisation has impacted across all sectors, but particularly in relation to the automotive sector, with **increasingly complex and global Supply Chain Management patterns**.

As automotive supply chains become increasingly globalised in nature, by contrast apprenticeships tend to be focussed nationally or even more locally, with wide variations in approach, delivery mechanisms, employer involvement and commitment. This poses challenges for employers when choosing whether to participate in the apprenticeship systems of those countries they operate in and for the mobility of apprentices seeking employment across national boundaries. Recognition of apprenticeships by different employers is also a problem in some cases.

Recent research undertaken in relation to the future direction of apprenticeships¹⁶⁸ highlights the challenges this can pose for apprenticeships. The report points out that many workers are employed

¹⁶⁶ Creating Collaborative Training - Methodological guide; Edited by Isabelle Michel(CEPAG, Be)
https://www.cepag.be/sites/default/files/pages/methodological_guide_-_final_version_1.pdf

¹⁶⁷ Creating Collaborative Training - Methodological guide; Edited by Isabelle Michel(CEPAG, Be)
https://www.cepag.be/sites/default/files/pages/methodological_guide_-_final_version_1.pdf

¹⁶⁸ Apprenticeships and 'future work': are we ready? Erica Smith; First published: 21 January 2019
<https://doi.org/10.1111/ijtd.12145>



in companies whose headquarters are in other countries, and hence their employers may or may not choose to participate in the apprenticeship systems of the country of operation.

This underlines the importance of developing a single market for automotive apprentices across the EU by linking regional, national and European apprenticeship initiatives.

Further work undertaken in Germany¹⁶⁹ has examined the different training strategies adopted by German companies operating in other countries. Based on interviews with a number of these companies four different strategies were identified, as follows:

- Strategy A (orientation towards German competence standards [dual training]): Independent implementation of the basic concept of dual German training, largely without considering the standards of the country in which the company is active.
- Strategy B (country-specific competence orientation with integration of dual elements): This strategy pursues the case-by-case integration of (German) dual elements into the (school) training system already existing in the respective country, taking local institutions and local conditions into account.
- Strategy C (Dual enrichment based on the national vocational training system): This involves the introduction of dual training elements that primarily meet the company-specific needs of the company. Orientation towards German or foreign curricula is not mandatory. However, the transfer of this training concept into the state vocational training system of the respective country is not ruled out.
- Strategy D (imparting vocational knowledge): This form of training is purely job-related. It is primarily practical vocational qualifications that are needed in the respective workplace that are taught.

Case study 15 provides an example of how one German multinational automotive company has approached this issue by adopting strategy A and rolling out their German apprenticeship model to their operations in Mexico.

¹⁶⁹ Fachkräftesicherung deutscher Unternehmen im Ausland –Erfahrungen bei der Übertragung dualer Ausbildungselemente Unterstützt durch die Robert-Bosch-Stiftung
Körbel, Markus; Pierenkemper, Sarah; Zibrowius, Michael
Institut der deutschen Wirtschaft Köln



4.6 CASE STUDIES

Case Study 13 – Collaborative training COTRAIN example (Italy) – Example of Salvatore

Collaborative training is the term used when one company provides vocational training in collaboration with another company, or other companies, based on the complementarity of their activities. This case study highlights the potential benefits of collaborative training with an example drawn from the COTRAIN European action-research project pilot activities in Italy¹⁷⁰.

Collaborative training is already quite common in certain countries including Austria and Germany.

This COTRAIN example involved one student, Salvatore, and two companies. Salvatore started in X MEM, where he stayed for 104 training hours. After that, he continued his training with Elettrostamperie Poppi for 120 training hours. Salvatore then returned to X MEM for the last 76 training hours, finishing his practical courses following his individual training plan.

The Lead company (A) • X MEM SRL is a very innovative company specialising in technical drawings and in mechanical production technologies and plants. It follows the complete mechanical design process: analysis, 2D and 3D projects for a number of sectors including automotive, as well as 2D and 3D assistance of CAD hardware and software.

The first step of the practical courses in X MEM allowed Salvatore to increase his awareness regarding the whole mechanical drawing process and technologies in use. He also had the opportunity to gain specific skills and expertise, concerning both mechanical design and concept and physical design of mechanical elements, and applying the knowledge and capabilities learnt during the theoretical part of the course in a practical setting. Salvatore also had the opportunity to use advanced design software (even more advanced than the one available in the VET centre's labs), enhancing his own competence profile and increasing future employment prospects.

The Collaborative company (B) • Elettrostamperie Poppi Srl is a production company specialised in the electric upsetting and forging of all kinds of parts based on drawings, and using all types of steel. Salvatore joined the production department enabling him to deepen his knowledge and skills

¹⁷⁰ https://www.cepag.be/sites/default/files/pages/methodological_guide_-_final_version_1.pdf



concerning the technology of materials, specifics of the production process, production techniques and systems for developing moulds.

Returning to Company A • Salvatore brought with him his newly acquired knowledge and capabilities. Salvatore could carry out technical drawings with a better awareness of the entire production process, from idea to implementation. He also had the opportunity of evaluating how design could take into account certain aspects of the production phase and specific needs in order to reduce production time and, most of all, to reduce non-compliance of the final product.

In terms of the outcomes of this approach, benefits for both the intern and participating employers were identified. In particular:

- In relation to the intern, the work experience carried out in two different professional contexts was extremely useful in reinforcing organisational and relational competences, not only technical skills.
- Regarding the core of the mechanical process, thanks to the rotation in two companies – the one specialised in design and technical drawings, the other in production – the intern acquired knowledge relating to the whole supply chain, not only the concept phase of the process itself.
- The evaluation indicated that both companies considered COTRAIN to be a powerful tool for reinforcing their competitiveness in the medium to long term, thanks to the new competences brought by the intern as well as the new relation (potential commercial partnership) built with the other company.



Case study 14: Shared Apprenticeships - Wales¹⁷¹

Shared Apprenticeships were a UK government initiative developed, implemented and managed with the support of the Engineering Sector Skills Council (Enginuity). The pilot (2008) was intended to test the viability of operating a Shared Apprentice Scheme of 90 Apprentices in the engineering sector and operated from three geographic locations, one in each of North, Mid and South West Wales.

A 'Shared Apprenticeship' is a training model where a central management organisation holds the responsibility of the apprentices training contract but where apprentices move between different employers who share the responsibility for the Apprentice's true work experience and performance criteria.

The innovative approach was used to support mainly, Small to Medium Enterprises (SME's) overcome some of the challenges outlined in section 4.2 of this report that such employers face when trying to employ apprentices. Specifically, the approach was used to support SME's wishing to employ apprentices but struggling with the following: -

- Not having the facilities to offer the range of content for a full apprenticeship outcome
- Only wishing to train and employ a fractional apprenticeship trainee due to amount of work available in relation to the company business plan
- Rurality of companies trying to entice trainees into underrepresented regions.

Overall, implementation and delivery were very successful. Outcomes for Apprentices in the pilots, appeared to be stronger than for Apprentices in standard Apprenticeships.

A wage subsidy from the Welsh Government helped engineering sector employers and strongly incentivised their participation. The pilot programme established robust recruitment procedures to ensure that high calibre apprenticeship candidates were recruited. Employer engagement was on-going to ensure there were ample placements available for apprentices and to build sustainability into the Shared Apprentice approach.

The role of training officers and training managers was deemed critical in ensuring good communications between apprentices, employers and training providers, and in providing additional support to apprentices experiencing problems

¹⁷¹ <https://dera.ioe.ac.uk/19750/1/140319-evaluation-shared-apprenticeship-pilots-en.pdf>



Gaining experience of working with different employers was viewed by apprentices as being a strength of the Shared Apprenticeship pilot and they were highly satisfied with their learning and employment experiences.

Most employers who have experienced the Shared approach and of traditional Apprenticeships believed that the Shared Apprenticeship programme compared very well with the traditional Apprenticeship modes of delivery.

Case study 15: German VET system transfer to other countries¹⁷²

This case study provides an example of a German multinational automotive company rolling out their German apprenticeship model to their operations in Puebla in Mexico.

In cooperation with the German-Mexican chamber of commerce and industry (CAMEXA) collaboration commenced in 2012 to train toolmakers and industrial mechanics at a training centre and at German supplier companies; based on the German dual training framework. Mexico could not assure the required German level for the training and it was not the goal to obtain a Mexican recognition /certification of the degree, therefore no agreements with the Mexican state were necessary and the German oriented competence training could be established.

Since 2012 approximately 25 trainees of the German car manufacturer's cluster in Puebla are trained every year at the training centre. Apprentices receive a German vocational qualification which is audited by AHK (CAMEXA). The training centre has been built up by the initiating company to carry out training for its own needs and currently for 15 additional different customers.

¹⁷² Fachkräftesicherung deutscher Unternehmen im Ausland –Erfahrungen bei der Übertragung dualer Ausbildungselemente Unterstützt durch die Robert-Bosch-Stiftung
Körbel, Markus; Pierenkemper, Sarah; Zibrowius, Michael
Institut der deutschen Wirtschaft Köln



5 THE EU AUTOMOTIVE APPRENTICESHIP MARKETPLACE

This chapter uses a range of different sources to draw up a picture of the current apprenticeship marketplace serving the EU automotive industry including:

- Results of a major online survey of automotive employers undertaken as part of the DRIVES Project¹⁷³ which provides direct feedback from employers and stakeholders with respect to the current apprenticeship marketplace within the automotive sector.
- Results of an online survey of VET providers supporting the automotive sector undertaken as part of the DRIVES Project¹⁷⁴ which provides direct feedback from VET providers involved in delivering training to support the automotive sector.
- Detailed analysis of the specific apprenticeship offer serving the automotive sector in three selected countries, these being the UK (England) Germany and Portugal based on research undertaken as part of this Report.

5.1 FEEDBACK FROM AUTOMOTIVE EMPLOYERS IN RELATION TO APPRENTICESHIPS

A key component of the DRIVES project has been the gathering of direct feedback from employers and stakeholders. This has been achieved through a major online survey of employers undertaken as part of the DRIVES Project.

The survey included a number of questions relating directly to apprenticeships which provide valuable insights into the current apprenticeship marketplace within the EU automotive sector, particularly in relation to:

- The uptake of apprenticeships within the sector
- Expectations in relation to uptake over the next 5 years
- The current and likely future occupational profile of apprentices
- Methods of recruitment, effectiveness of these methods and recruitment challenges

¹⁷³ Insights of the Automotive Sector 2019 - Deliverable 2.7 Forecasting Dissemination Report
Christian Baio, SPIN360, Jakub Stolfa, VSB-TUO, Svatopluk Stolfa, VSB-TUO
https://www.project-drives.eu/Media/Publications/6/Publications_6_20190717_81413.pdf

¹⁷⁴ See DRIVES D2.8 SKILLS NEEDS AND GAPS, Christian Baio, Spin360, 2020



5.1.1 The uptake of apprenticeships within the sector

Figure 14 indicates that 39% of all automotive enterprises responding to the survey employed at least one apprentice. Of these, almost 6 in 10 enterprises (59%) employed 10 or fewer apprentices, almost a fifth (19%) employed between 11-49 apprentices and a total of 22% employed 50 or more apprentices.

Number of apprentices currently employed

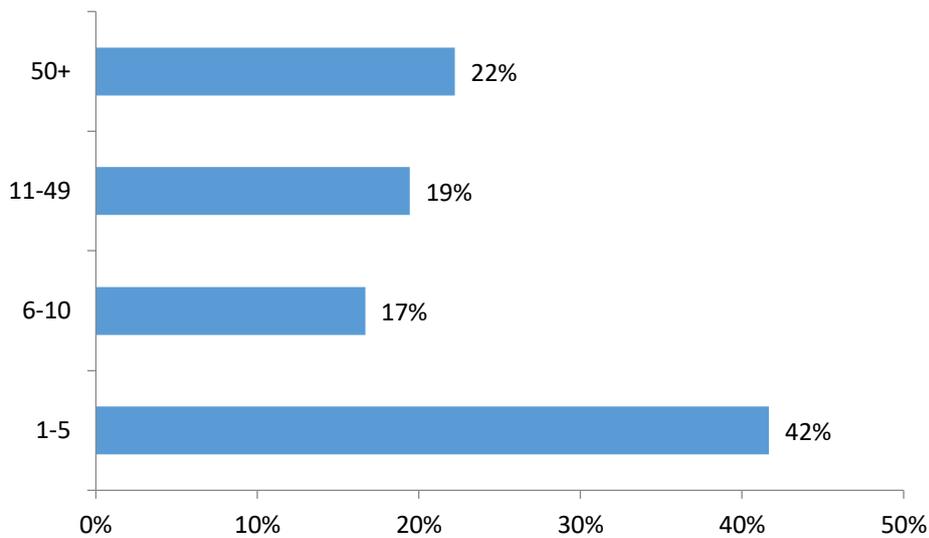


Figure 14 Number of apprentices currently employed¹⁷⁵

Base: 72 respondents employing at least one apprentice

Participation levels in the apprenticeship system is strongly linked to enterprise size. The relatively low proportion of micro enterprises (14%) employing apprentices is likely to be linked to the well documented challenges faced by small companies in terms of employing apprentices, including difficulties faced recruiting apprentices as well as providing the learning and development support required (See Figure 15).

¹⁷⁵ DRIVES WP2 Survey

Percentage of all enterprises employing at least one apprentice by enterprise size

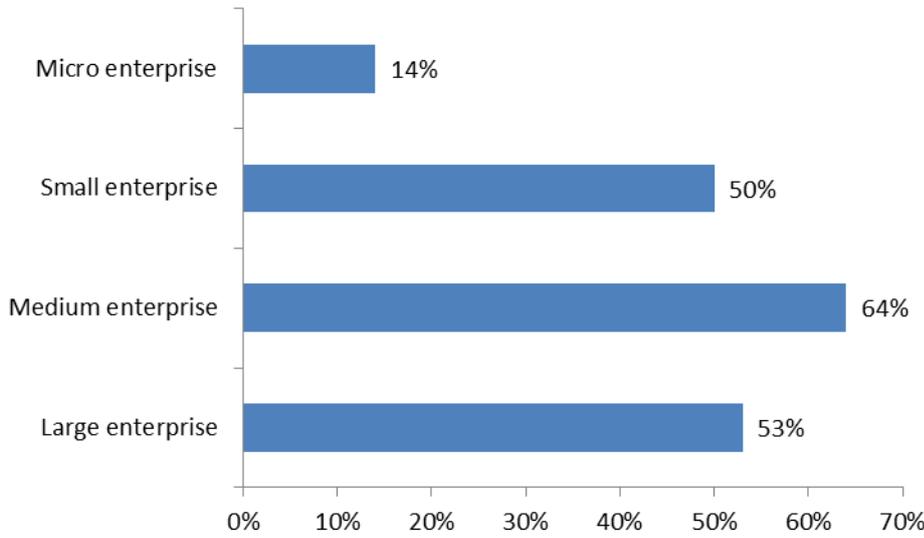


Figure 15 Percentage of all enterprises employing at least one apprentice by enterprise size¹⁷⁶

Not surprisingly, the number of apprentices employed is also strongly linked to enterprise size, with the likelihood of employing any apprentices increasing as enterprise size increases together, with the likelihood of employing a greater number of apprentices (See Figure 16).

Number of apprentices by enterprise size

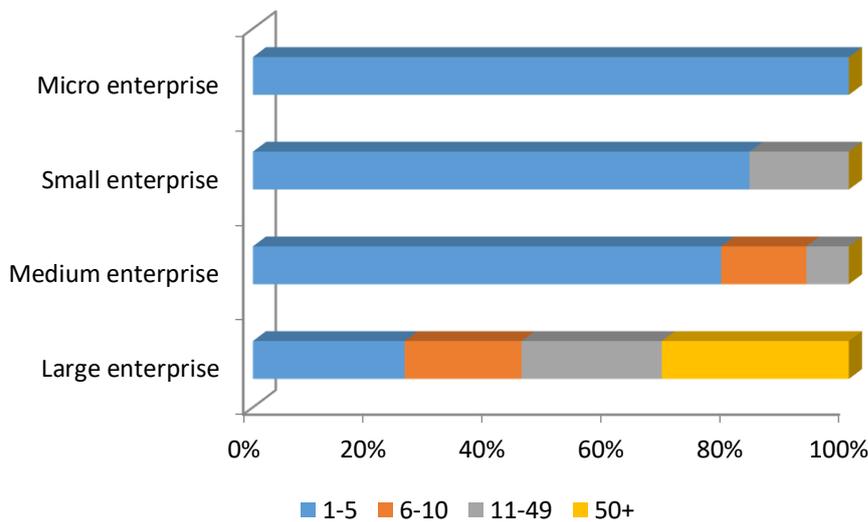


Figure 16 Number of apprentices by enterprise size¹⁷⁶

Base: 72 respondents employing at least one apprentice

¹⁷⁶ DRIVES WP2 Survey

Analysis of apprenticeship participation by sub sector¹⁷⁷ points to participation of enterprises across all key areas of the automotive value chain.

5.1.2 Expectations in relation to future apprenticeship uptake

95 enterprises responded to the question, ‘what do you expect to happen to the number of apprentices you employ over the next 5 years?’ Of these enterprises, just over half expected numbers to remain stable over this period, but a significant positive net balance of enterprises expected an increase, or significant increase, rather than a decrease, or significant decrease (a positive net balance of +46% (See Figure 17).

What do you expect to happen to the number of apprentices you employ over the next 5 years?

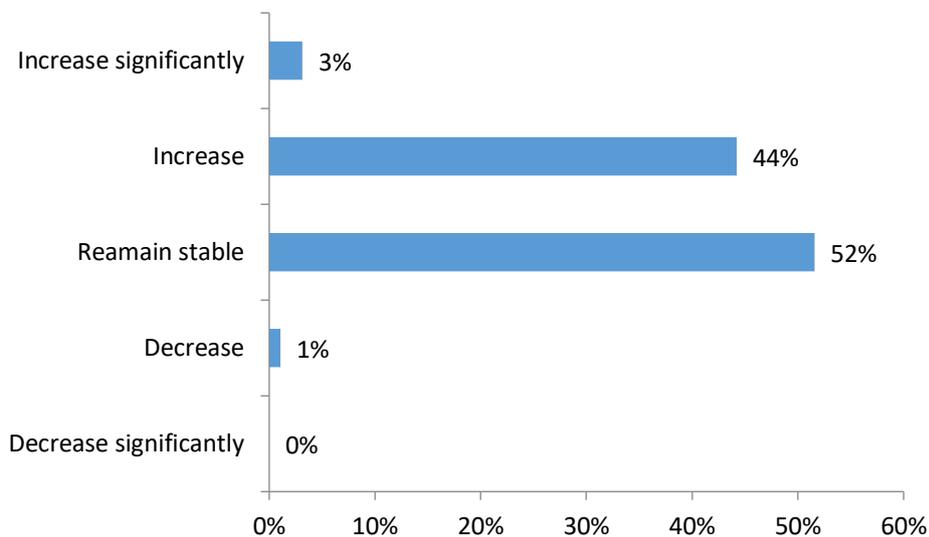


Figure 17 What do you expect to happen to the number of apprentices you employ over the next 5 years?¹⁷⁸

5.1.3 The current and likely future occupational profile of apprentices

Survey respondents indicate apprentices are employed in a wide range of roles including:

- Engineering related roles (Mechatronics, innovation, design, development, maintenance, process and product)
- Production
- Quality and testing

¹⁷⁷ NACE code

¹⁷⁸ DRIVES WP2 Survey



- CAD
- R & D
- Specific technical roles (rubber production, welding)
- Sales/customer service
- Logistics
- IT/Data management
- HR/administrative

When enterprises were asked to indicate what new roles they thought there might be opportunities to recruit apprentices into over the next 5 years, a wide range of suggestions were made.

These were a mixture of:

- Roles already common place throughout the automotive sector, including engineering functions; sales/after sales; design; IT; assembly/production; maintenance; logistics; accounts/ finance/ administration and hardware/software expertise
- Emerging roles or roles less well known currently, including virtual reality; digital roles; big data analytics; robotics and sensory fusion (often linked to autonomous vehicles).

5.1.4 Methods of recruitment, effectiveness of methods and recruitment challenges

Figure 18 indicates that the most frequently cited methods to recruit apprentices were use of 'links with educational institutes or training providers' (64% of all respondents) and 'online job boards and websites' (63%). This was followed by 'recruitment events' and 'social networks, such as Facebook and LinkedIn' (47%).

More than a third of enterprises responding indicated more informal 'word of mouth' (35%) methods were used and 12% used 'advertising in newspapers/other press'.

By far the least frequently used method was 'use of the Drop'pin@EURES or other EU recruitment services' (2%), probably linked to the relatively localised focus of much apprenticeship recruitment.

What are the main methods currently used by your organisation to recruit apprentices?

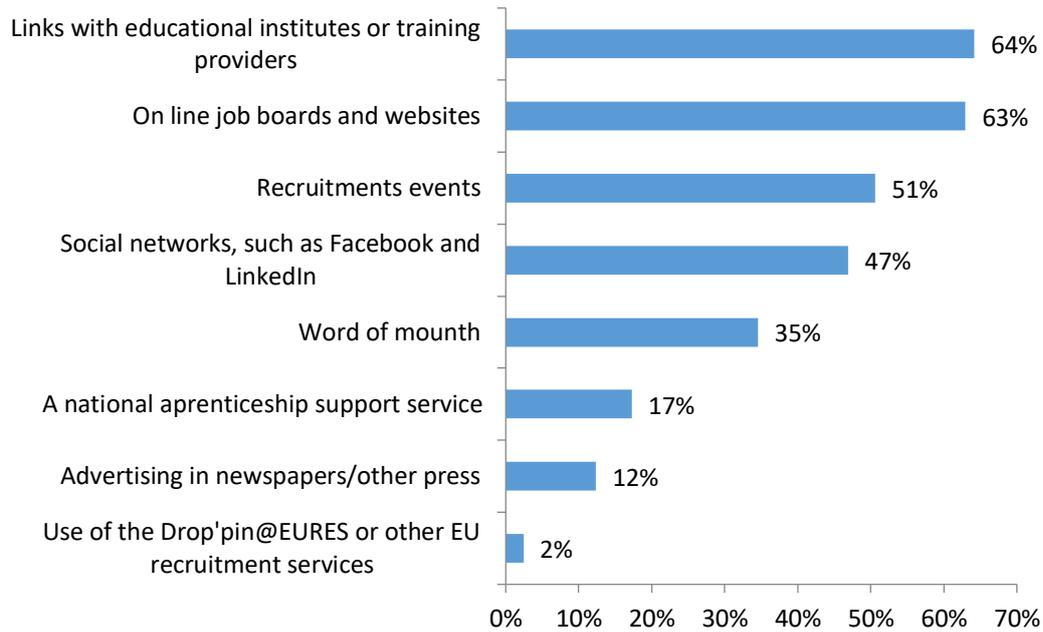


Figure 18 What are the main methods currently used by your organisation to recruit apprentices?¹⁷⁹

Base: 81 enterprises responding to the question

Note: Enterprises often used more than one method, so % figures do not add to 100%

Respondents were generally satisfied with the methods used to recruit apprentices as outlined in Figure 19. When those enterprises employing apprentices were asked about the effectiveness of methods currently used to recruit apprentices, a positive net balance of +79% indicated these methods were effective, or very effective, rather than not effective, or not effective at all. Just over a fifth of respondents had no opinion either way on this.

However, almost two thirds (63%) of these enterprises answered yes to the question, 'would your organisation be interested in a service that matches apprenticeship candidates with vacancies in your organisation and other companies in the automotive sector?' - pointing to widespread recognition of the potential to improve current recruitment approaches.

¹⁷⁹ DRIVES WP2 Survey

Overall, how effective would you say the methods you currently use to recruit apprentices are?

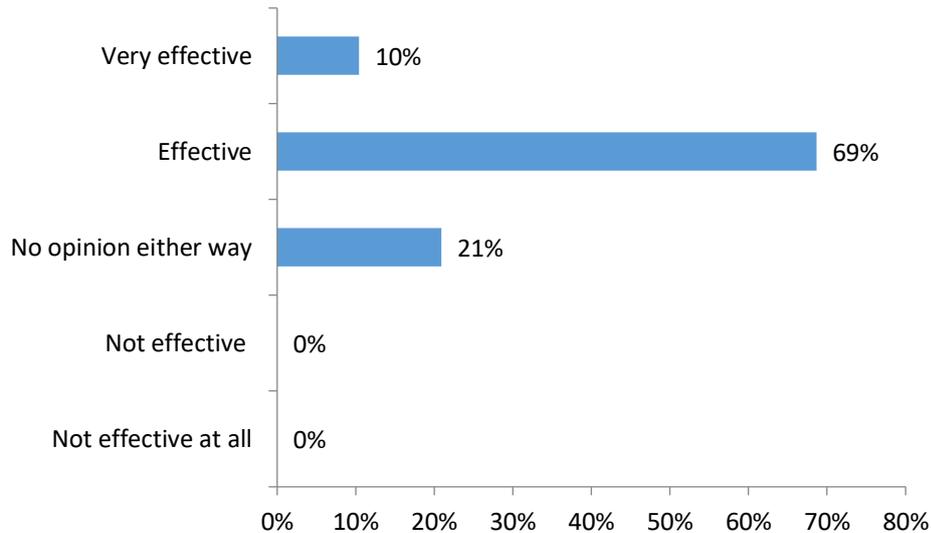


Figure 19 Analysis of workforce skills required for Automotive Domain in 2030¹⁸⁰

Base: 67 respondents employing at least one apprentice and responding to the question

A wide range of issues were cited by enterprises in relation to challenges faced¹⁸¹ when recruiting including:

- The need to make the sector more attractive to young people/lack of interest amongst young people
- Finding recruits with the right attitude
- Competition for the best candidates/with other companies
- Lack of existing apprenticeships in certain EU countries
- Difficulties accessing accurate information on the profile, skills and competences of candidates/evaluating the potential of candidates
- Internal company limitations/capabilities
- Lack of IAG/careers advice in schools
- Lack of certain skills amongst candidates (language skills, soft skills, specific technical skills)
- Difficulties combining class based and company based schedules

¹⁸⁰ DRIVES WP2 Survey

¹⁸¹ There were 38 responses to this question

5.2 FEEDBACK FROM VET PROVIDERS

The results of an online survey of VET providers undertaken as part of the DRIVES Project provide an insight into the prevalence of apprenticeship provision serving the automotive sector. The survey indicates that:

- Just over half of VET organisations responding to the survey indicated that they currently offer courses for Apprentices within the Automotive sector. Looking at the apprenticeship offer in more detail, almost half of these organisations offer this provision at EQF level 3, more than 8 in 10 at EQF level 4, 22% at level 5, 19% at level 6 and 7% at level 7.
- A quarter of private companies responding to the survey currently offer courses for Apprentices within the Automotive sector, with half indicating this was not the case and the remaining quarter didn't know. 67% of those private companies offering this provision do so at EQF level 3, all at EQF level 4, 33% at level 5 and the same proportion at 6.

5.3 DETAILED ANALYSIS OF THE SPECIFIC APPRENTICESHIP OFFER SERVING THE AUTOMOTIVE SECTOR IN THREE SELECTED COUNTRIES

This section sets out the results of analysis of the specific apprenticeship offer serving the automotive sector in three selected countries, these being the UK (England) Germany and Portugal.

The countries were selected as they have each developed different approaches to apprenticeships generally and have strong automotive sectors. The analysis has been undertaken in order to:

- Provide a more detailed understanding of the specific apprenticeship offer serving the automotive sector in these three selected countries
- Provide an insight into the scale of apprenticeship take up in relation to the automotive sector relative to the size of the workforce
- Examine the respective focus of the current apprenticeship offer in relation to educational level
- Identify the extent to which the current apprenticeship offer is addressing new and emerging skills rather than traditional skills associated with the sector.

Apprenticeship data relating to uptake on to automotive apprenticeships or those strongly related to the automotive sector were examined. Taking the latest year the data was available for from each



country a combined total of just over 71,000 relevant apprentice starts were recorded, 62% from Germany, 32% from England and 1% from Portugal.

Just over a quarter of these apprenticeships were accounted for by those supporting the automotive sector directly rather than a wider range of sectors including the automotive sector.

While this analysis should only be treated as indicative it does provide an insight as to the current scale of apprenticeship training and the focus of this training in relation to different skill areas and EQF levels.

If those apprenticeships supporting the automotive sector directly are considered it is clear that almost all current provision focusses on EQF levels 4 and below (98% of apprenticeship starts) with only 2% of this provision at EQF level 5 or above measured on this basis.

In terms of skill areas, more work is planned as part of the DRIVES project to try and identify the extent to which the current offer is meeting new and emerging skill requirements. However, there is some evidence that the apprenticeship offer is evolving to try and meet new skills. For example, in England, for R&D technology/vehicle development, the existing apprenticeship offer includes Level 6 Product Design and Development Engineer, Level 6 Control Technical Support Engineer and Level 6 Electrical/Electronic Technical Support Engineer Apprenticeships. For Software Engineers, Data Analysts and Network Engineers a Level 6 Digital and Technology Solutions apprenticeship is available.

Apprenticeships relating to Automation and Controls Engineer Technician (Approved July 2019), Lean Manufacturing Operative (Approved July 2019) and Propulsion Technician (Approved September 2018) have also recently been approved but these are, for the most part, not reflected in available apprenticeship start data yet.

Appendix 2 sets out a series of Tables for the UK (England), Germany and Portugal relating to the specific apprenticeship offer in each of these countries.

- Tables A11-13 provide information on the annual number of apprenticeship starts for each specific apprenticeship of direct relevance to the automotive sector. In some cases these



apprenticeships are specific to the automotive sector. In other cases they support a number of sectors including the automotive sector (such as Engineering Operative)

- Tables A14-16 provide information on the level¹⁸² and typical duration of each specific apprenticeship
- Tables A17-18 provide information on the sectors the apprenticeship supports and an overview of the focus of the apprenticeship in the case of England and Germany
- Tables A19-20 provide links to further sources of information on each specific apprenticeship for England and Germany

¹⁸² The Table relating to England currently relates to UK levels rather than EQF levels



6 CONCLUSIONS AND MOVING FORWARD

This Report has been developed in order to underpin practical action and intervention within the EU automotive apprenticeship marketplace.

The specific aims of the Report are to provide a resource to:

- **Enhance understanding of the current nature of the apprenticeship marketplace serving the EU automotive sector:** Chapter 4 of this Report provides a detailed review of similarities and differences in the apprenticeship marketplace across ten EU countries of particular importance in relation to the EU automotive sector, while chapter 5 examines the particular automotive apprenticeship offer in 3 selected countries.
- **Highlight the problems and challenges in relation to this marketplace**

Chapter 3 identifies:

- A range of skill related issues with important implications for apprenticeships within the automotive sector including those relating to the pace of skills change, the impact of these changes on different educational levels, the balance between skills needed for new entrants and upskilling of existing employees, the specific nature of changing skill requirements and the particular implications of Industry 4.0
- The importance of employer involvement in the design of apprenticeships to meet changing employer needs
- Recruitment related issues such as image of the sector and the need to improve workforce diversity which both have implications for apprenticeship marketplace.



Chapter 4 identifies how:

- Difficult it is to understand and compare different apprenticeship offers across different EU countries for employees and trainees alike
- Labour mobility is restricted by wide inter-country variations, not only in terms of the overall apprenticeship models adopted, but in terms of patterns of school-company alternation, typical duration of apprenticeships, volume of in-company training per year, requirements placed on both employers and wider labour market stakeholders and age and educational level eligibility criteria.
- The EU apprenticeship market poses particular challenges for automotive SME's both in relation to greater difficulties in recruiting candidates meeting their particular needs and providing the required learning and development opportunities for their apprentices.
- The increasingly globalised nature of the automotive sector contrasts with apprenticeships that tend to be focussed nationally, which poses particular challenges for employers when choosing whether to participate in the apprenticeship systems of those countries they operate in and for the mobility of apprentices seeking employment across national boundaries.

Chapter 5 identifies:

- potential improvements that could be put in place in relation to the current automotive apprenticeship marketplace at all stages, including in relation to planning, recruitment, support arrangements, employer involvement, tackling skill gaps, monitoring, evaluation, learning from good practice and trans-national networking and working.



A number of potential practical actions to try and tackle these issues are suggested, which can be summed up under four main headings:

1. Set up a centralised resource with examples of good practice

A number of examples of innovative practice have been highlighted in the Report including in relation to dealing with the challenges faced by SME's, implementing apprenticeships across national borders, initiatives aimed at tackling diversity issues, and responding to Industry 4.0. A range of easily accessible examples of particular relevance to the automotive sector located on one site would provide a valuable resource for employers, providers and others involved in trying to develop and implement apprenticeships to meet the fast changing requirements of the sector.

Setting up such a centralised resource clearly has potential links with the DRIVES Apprenticeship LinkedIn Group (DAAN)¹⁸³ and would need to build on and be undertaken in collaboration with the European Alliance for Apprenticeships (EAfA)¹⁸⁴ and CEDEFOP¹⁸⁵ to ensure existing resources are maximised.

The Report includes both examples of apprenticeships and examples of relevance to apprenticeships within the automotive sector. It will be important to agree the basis for further collection of good practice examples moving forward.

2. Establish an intelligence service to track skills changes for employers and providers and act as an accessible resource for both employers and providers.

The difficulties faced by both employers and providers in identifying how automotive sector related skills are changing and the implications of these changes for provision is well documented in this report.

¹⁸³ The DRIVES WP5.1 DAAN LinkedIn Group has been established in order to share ideas, approaches and activities pertaining to apprenticeships in the EU's automotive sector. This forum welcomes contributions that relate to both youth and adult apprenticeships.

<https://www.linkedin.com/groups/8814397/>

¹⁸⁴ The European Alliance for Apprenticeships (EAfA) is a multi-stakeholder platform aiming at:

- Strengthening the **quality, supply and image** of apprenticeships in Europe
- Promoting the **mobility of apprentices**

These aims are promoted through [national commitments](#) and [voluntary pledges](#) from stakeholders.

<https://ec.europa.eu/social/main.jsp?catId=1147&intPageld=5235&langId=en>

¹⁸⁵ <https://www.cedefop.europa.eu/en>



An important aspect of work being undertaken as part of the DRIVES Project is to identify how key outcomes from the Project can be sustained after funding ceases. Establishing self-sustaining, forward looking automotive skills intelligence service needs to be an important component of DRIVES sustainability plans. This would help employers, providers and other stakeholders identify how the training needs to adapt to meet changing skill requirements and could provide a valuable resource for those specifically involved in trying to develop and implement apprenticeships in the sector

Although each country has its own established processes for apprenticeship development we are suggesting that an intelligence service focussed on identifying changing automotive skills could feed into these different processes.

How this works in practice will need to be specified in detail as part of the ongoing DRIVES Project, but a dynamic two way process of information to and feedback from key labour market stakeholders will need to be built in as an important aspect of this. Given the ambitious nature of this objective it may be more practical to focus in particular on key local and regional clusters of automotive activity including regions with smart specialisation strategies (S3)¹⁸⁶ in relation to the automotive sector. Establishing links with Centres of Vocational Excellence will also be important as will developing links with the ‘Pact for Skills’ recently announced by the EU “to generate new concrete commitments to invest in up- and re-skilling”.¹⁸⁷

3. Establish an Apprenticeship comparison tool to try and help both employers and individuals to navigate the apprenticeship landscape and compare offers in different countries.

As this report has identified such comparison is very difficult at present. A key component of the DRIVES Project is the establishment of an online brokerage tool to source training serving specific new and evolving job roles within the EU automotive sector. The purpose of this tool is to simplify the search and matching of training with the needs of the automotive sector and to widen access to all stakeholders. This is termed the DRIVES Framework. It has been agreed that the scope of the Framework will be extended to encompass apprenticeships in order to help comparison of different

¹⁸⁶ Smart specialisation is an innovative approach that aims to boost growth and jobs in Europe, by enabling each region to identify and develop its own competitive advantages. See https://ec.europa.eu/regional_policy/sources/docgener/guides/smart_spec/strength_innov_regions_en.pdf

¹⁸⁷ See <https://all-digital.org/eu-commissioner-pact-for-skills-at-all-digital-event-ilas-in-the-2020s/>



apprenticeship offers. It is envisaged this will enable simple comparison between different apprenticeships in relation to:

- EQF level
- Job role(s) covered
- Occupation(s) covered
- Relevant skills/skills domains
- Duration of apprenticeship
- Countries apprenticeship is available
- Provider type/location

We would argue that a tool that enables comparison of relevant apprenticeships in different countries in one place would be of value to both employers and individuals:

- From the point of view of an individual, at the moment it is difficult to identify how an automotive related apprenticeship taken in one country would improve labour market prospects within the automotive sector in other countries.
- From the point of view of an employer, the automotive market is international with many companies having a footprint operating across several different countries, with the implication being that the company has to engage with a number of different apprenticeship systems.

We would suggest that the proposed Apprenticeship Comparison Tool will help both individuals and employers address these issues.

We are currently piloting a methodology for presenting and comparing the specific apprenticeship offers serving the automotive sector using data from Germany and England to test how this can work in practice, with a view to extending this to other countries.

4. Adopting more innovative ways of designing apprenticeships such as ensuring increased flexibility, just in time design to respond to rapid skill changes, and making sure the apprenticeship offer supports upskilling of existing employees as well as new entrants to the sector. As a basis for discussion we have put forward one suggestion highlighting how the design of apprenticeships could be improved by adopting an approach comprising self-contained modules which would make it easier for employers and trainees to opt into the specific skills they require.



The 'practical suggestion' below provides one example of a suggested innovation to the current approach to apprenticeship design. We are planning to develop a number of other practical suggestions through consultation over the coming months.

Moving Forward:

We are using the dissemination of this 'Main Report' and the associated 'Key Issues Report' as a way of provoking discussion and feedback and as part of a further process of information and ideas gathering.

By clicking on the link below we plan to gather a much wider set of feedback on:

- The proposed recommendations contained in this Report
- Other suggestions of practical action to improve the current apprenticeship offer serving the automotive sector
- Examples of good practice

We are proposing that the results of this will be published as a separate report in 2021, once this process is completed.

We would be grateful if you could spend a few minutes to provide your feedback on the information and ideas set out in this Main Report and/or the associated Key Issues Report by clicking on the link below:

<https://drives-survey.vsb.cz/s/f5a356f2d9ae4222>

Practical Suggestion: Towards a more flexible approach to apprenticeship design

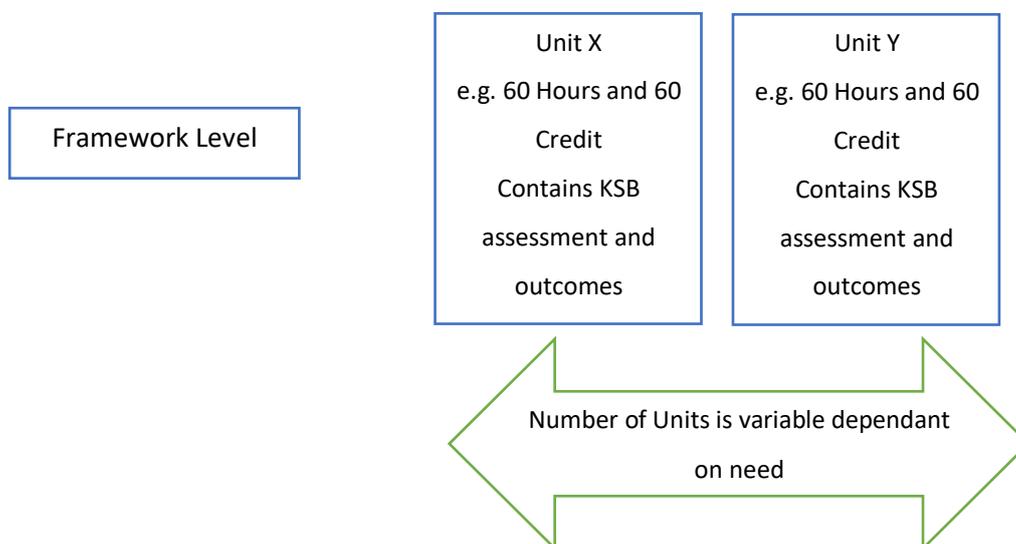
At present the apprenticeship offer across the EU is confusing, often with little flexibility in meeting the ever-changing skills requirements of industry, with comparison of the different offers between countries highly problematic.

Apprenticeship systems based on a funding mechanism directly linked to achieving a complete apprenticeship framework before progression (as is currently the case in many countries) is surely not fit for purpose in meeting industry needs for skills development of new staff and upskilling of existing staff. It defines that all learners have the same ability and will follow the same content apart from being allowed to choose different Skills units, but underpinned by a common Knowledge Qualification.

A key concern is that the ‘knowledge’ outcome is separate to the ‘skills’ outcome and does not allow a skill module to be undertaken in isolation or as part of a tailored upskilling package without reference to the knowledge “underpinning” element.

There is a need to allow learners to top-up or upskill which may be an element of an apprenticeship framework but not the whole framework. Improvement in the concept of modular delivery and funding is therefore needed in apprenticeship designs for the future.

In order to stimulate discussion and help tackle this issue we have suggested a new approach to apprenticeship design, the key elements of which are summarised as follows:





Any new structure at all Levels must have:

Skills modular units which are self – contained, with a ‘knowledge’ element (as well as ‘skills’ and ‘behaviour’ elements) included. This will allow credit to be applied at level and size and can be accessed as standalone or grouped to guarantee the right learning and skills for the right company at the right time. With this model each unit would contain a knowledge, skills and behaviour assessment and outcomes (KSB) and, because of its self-containment, could be offered as a module as part of the apprenticeship or as a module for upskilling to existing staff, or both.

By adopting a self-contained learning and assessment module structure, apprenticeship programmes can be designed specifically for the trainee and individual company need (inclusive of SMEs) meeting individual progression possibilities. The modules could be delivered in the Workplace, Further Education organisations or a combination of both and each would allow learners/trainees to build credit and level towards an industry agreed outcome deemed as the “Competence Threshold”.

The key benefits of this approach can be summarised as follows:

- The differential between apprenticeships and upskilling of existing workers that currently exist would no longer be relevant as both can attain skills using the same modular delivery.
- Apprenticeship frameworks can be traversed and allow access of different levels to form an individually designed apprenticeship outcome consisting of various modules from different levels of a framework. This allows total flexibility of design to meet learner and company need.
- Funding is easier to apply to a credit-based outcome. The module would have a common credit and therefore common funding policy.
- It would make it easier for SME’s to participate by allowing them to opt for modules that are relevant to the skill and level requirements of trainee and company.
- Comparability of apprenticeships across national boundaries would become much easier as all countries could state the maximum credit needed to achieve an apprenticeship outcome but not be restricted to a single level descriptor.
- Mobility of of labour would improve at all levels as skills analysis would easily identify employee skill needs and an appropriate option to address this need.



The Table below summarises the key issues identified in the Report under 12 key themes, these being:

- The pace of skills change
- The impact of skills change on different educational levels
- The importance of upskilling and reskilling of existing employees
- The specific nature of skill changes
- Apprenticeships need to reflect employer needs
- The implications of Industry 4.0
- The confusing nature of the current apprenticeship offer across different nations
- The need to encourage learning from good practice
- The need to improve the image of the sector
- The need to encourage greater workforce diversity
- Challenges faced by SME's
- The global nature of the automotive industry versus the local focus of apprenticeships

Against each of these issues the Table sets out more detailed initial ideas on practical actions designed to tackle the specific issue and/or case studies highlighting innovative ways which have been put in place to try and tackle the issues highlighted.



Summary of issues and potential solutions

Theme	Specific issues to be addressed	Potential solutions
<p>The pace of skills change</p>	<p>The pace of technological change is increasing which impacts on the rate of skills change. This means:</p> <ul style="list-style-type: none"> • It is difficult for providers to keep abreast of changing skill requirements • Future skill requirements are difficult for employers to predict • Apprenticeships need to be flexible enough to adapt to these changes without long delays 	<p>Establish an intelligence service to track skills changes for employers and providers and act as an accessible resource for both employers and providers.</p> <p>This could be achieved by taking forward the idea of establishing such a service as part of the DRIVES Sustainability plans.</p> <p>Case study 1 provides a good example of how apprenticeship training for Automotive Business Administrators in Germany has recently been updated to reflect fast changing skill requirements.</p> <p>Case study 2 provides an example of how a company in Austria ensures training of students who are potential future employees are involved in learning about the latest technologies and challenges facing the company</p>



<p>The impact of skills change on different educational levels</p>	<p>Skills change will impact at all educational levels. In a number of EU countries the historical focus of apprenticeships has been on entry level/lower level skills. Whilst this is very important, the impact of skills changes will be felt at all levels, including higher levels. This needs to be reflected in the apprenticeship offer</p>	<p>Develop apprenticeship offers that straddle all levels. The introduction of Degree Apprenticeships in England together with those Degree Apprenticeships of particular relevance to the automotive sector is set out as case study 3.</p>
<p>The importance of upskilling and reskilling of existing employees</p>	<p>Upskilling and reskilling of existing employees is at least as important as support for new entrants. This implies the need for the apprenticeship offer to support clear progression routes to higher skills levels. It also underlines the need for a flexible and modular approach to the design and delivery of learning.</p>	<p>Case study 4 provides an example of an innovative approach to encouraging smooth progression from entry level through to higher Apprenticeship levels in Wales (UK).</p>
<p>The specific nature of skill changes</p>	<p>A number of specialist skills are emerging as technology changes within the industry. This implies employers need tailored; often bite sized solutions to meet their needs. This has implications for the design of apprenticeships, with a degree of flexibility</p>	<p>Case study 5 provides an example of a university in Austria working with employers to help employees meet the particular challenges each employer faces</p>



	required.	
Apprenticeships need to reflect employer needs	Apprenticeships need to balance the need for equipping apprentices with the skills required for successful careers in the automotive industry with the need to meet employers specific changing skill requirements	<p>Involve both employers and providers (colleges, schools, universities and others) directly in the design of automotive apprenticeships.</p> <p>Case study 6 provides an example of the Automotive Trailblazer Employer Group in England established to drive the design of apprenticeships to meet the specific skill requirements of the automotive sector.</p> <p>Case study 7 provides an example from Belgium of a programme serving the automotive aftersales sector that involves close dialogue between schools, automotive retailers/dealerships, major automotive brands and a specialist provider.</p>
The implications of Industry 4.0	<p>These changes are likely to imply the need to attract a higher level of applicant in order to be able to learn rapidly as jobs evolve and also the need to revise qualifications to take account of Industry 4.0 changes.</p> <p>There are also significant implications of digitalisation in relation to the way apprenticeships should be delivered in the future, in particular the</p>	<p>Two case studies, one from Spain and one from Finland provide good examples of initiatives developed to tackle the growing need for digital skills within the automotive industry within the EU.</p> <ul style="list-style-type: none"> Case study 8 provides an example of an international learning programme for current workforce upskilling and young graduate digital talent attraction in the automotive industry, based in Spain



	<p>increased use of digital technologies as part of the delivery of apprenticeship programmes.</p>	<ul style="list-style-type: none"> • Case study 9 provides an example of a digital academy established in Finland • Case study 10 provides a good example of the innovative use of e learning in relation to two trainees within a German metalworking company.
<p>The confusing nature of the current apprenticeship offer across different nations</p>	<p>The current apprenticeship provision is complicated for both potential apprentices and employers to navigate, particularly when trying to compare the different apprenticeship offers of different nations. For individuals it is difficult to know what apprenticeships will be recognised between different countries. For international automotive companies it is difficult to manage apprenticeship requirements between different countries</p>	<p>Establish an Apprenticeship comparison tool to try and help both employers and individuals navigate the confusing apprenticeship landscape and compare offers in different countries.</p> <p>A key component of the DRIVES Project is the establishment of an online brokerage tool to source training serving specific new and evolving job roles within the EU automotive sector. It has been agreed that the scope of the Framework will be extended to encompass apprenticeships in order to help comparison of different apprenticeship offers. The tool could be developed to enable simple comparison between different apprenticeships in relation to:</p> <ul style="list-style-type: none"> • EQF level • Job role(s) covered



		<ul style="list-style-type: none"> • Occupation(s) covered • Relevant skills/skills domains • Duration of apprenticeship • Countries apprenticeship is available • Provider type/location
The need to encourage learning from good practice	There are a wide range of examples of good practice within the automotive sector with respect to apprenticeships across Europe. However, there is currently no structured system of disseminating this good practice and no central source of good practice information serving the sector.	<p>Develop a cross EU tool to capture and disseminate apprenticeship good practice within the automotive sector. A range of easily accessible examples of particular relevance to the automotive sector located on one site would provide a valuable resource for employers, providers and others involved in trying to develop and implement apprenticeships to meet the fast changing requirements of the sector.</p> <p>Setting up such a centralised resource clearly has potential links with the DRIVES LinkedIn Group (DAAN) and potential links with the work of the European Alliance for Apprenticeships (EAfA).</p>
The need to improve the image of the sector	It is well documented that the automotive sector suffers from a poor image amongst young people. Innovative solutions are required to address this.	<p>Highlight good practice in terms of work with schools/young people. This could be included in the proposed good practice tool set out above.</p> <p>As an output from DRIVES (a) produce a well-designed document/infographic highlighting the exciting</p>



		<p>opportunities emerging in the automotive sector (b) Develop this in other mediums.</p> <p>Link the above to DRIVES dissemination work programme (WP6)</p> <p>Case study 11 highlights how a national campaign in the UK to encourage more young people to consider a career as a technician links up with World Skills UK to showcase jobs young people may not have considered in order to try and attract young people into the automotive and other industries employing technicians.</p>
<p>The need to encourage greater workforce diversity</p>	<p>There is a clear gender imbalance across the automotive sector as a whole and particularly in relation to certain occupations and more could be done to ensure the industry is an attractive option for all groups. In order to tackle changing future recruitment and skills challenges effectively it will be crucial that steps are taken to ensure the skills of all demographic groups are maximised.</p>	<p>Case study 12 provides an example from Germany of a programme to successfully encourage refugees into the industry.</p>



<p>Challenges faced by SME's</p>	<p>Lack of capacity of many SME's often restricts involvement with apprenticeships. This includes difficulties faced recruiting apprentices as well as providing the learning and development support required.</p> <p>Many SME's also struggle to offer the range of skills required in a work setting, given their particular specialisms</p>	<p>Provide collaborative and shared apprenticeship opportunities. Two particular case studies highlight different ways of trying to address these issues:</p> <p>Case study 13 highlights how a collaborative training agreement between two companies in Italy, one specialising in technical drawings and in innovative mechanical production technologies and the other in electric upsetting and forging benefited both the companies involved and the trainee.</p> <p>Case study 14 highlights a 'Shared Apprenticeship' training model in Wales where a central management organisation holds the responsibility of the apprentices training contract but where apprentices move between different employers who share the responsibility for the Apprentice's true work experience and performance criteria.</p>
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<p>The global nature of the automotive industry versus the local focus of apprenticeships</p>	<p>As automotive supply chains become increasingly globalised in nature, by contrast, apprenticeships tend to be focussed nationally or even more locally, with wide variations in approach, delivery mechanisms, employer involvement and commitment. This poses particular challenges for employers when choosing whether to participate in the apprenticeship systems of those countries they operate in and for the mobility of apprentices seeking employment across national boundaries. Recognition of apprenticeships by different employers is also a problem in some cases.</p>	<p>Encourage development of internationally recognised apprenticeships</p> <p>Encourage adoption of a 'pan-European approach to apprenticeship design</p> <p>Case study 15 provides an example of how one German multinational automotive company has approached this issue by rolling out their own German apprenticeship model to their operations in Mexico.</p>
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7 APPENDICES

7.1 APPENDIX 1

EDUCAM Tripartite Apprenticeship - Practical example of training programme - (additional to school lessons)

First year – Dealerships /retailers

- Accreditations for dealerships/ retailers (mandatory)
- Training for mentorship (mandatory)

First year – Apprentice

- « Welcome to BRAND X » 1 day
- Tailor made first training 1 day
- Welcome to automotive technology (2 days)
- Safety and environment (1 day)
- Safety and attitude (1 day)
- First mechanics maintenance skills (1 day)

Second year – Apprentice

- BRAND X tailor made training sessions (Warranty, SDD...)
- Specific practical training (Service maintenance related)
- Tyre and wheel (blended learning: 1 day classroom training)
- Measuring skills (1 day)
- Airco: working and maintenance (2 days)
- Commonrail: practical training (1 day)
- First level EDUCAM Certificate

7.2 APPENDIX 2

Table A1: Brief explanation of how the terms apprenticeship or apprenticeship are understood in the national contexts of key automotive sector EU countries

Country	Scheme (language of the country)	Scheme (in English)	Brief explanation of how the terms apprenticeship or apprenticeship are understood in the national contexts
Czech Republic			There is no formal apprenticeship programme in the Czech Republic that includes a contract between the apprentice and the employer and there is no shared responsibility between employer and the school related to the training delivered. On this basis Czech Republic was excluded from the CEDEFOP Cross Nation Review. However, there is a VET programme leading to what is termed an 'apprenticeship certificate' and Czech Republic has been included in the analysis of apprenticeship models set out in chapter 4 of this report.
Germany	Berufsausbildung	Dual VET	Apprenticeship is generally understood as vocational education and training at the level of upper secondary education taking place in companies and part-time vocational schools, i.e. training within the 'dual system'. The term apprenticeship (Lehre, Lehrlingsausbildung) is used only for programmes at upper secondary level.
Spain	Formación profesional dual	Dual VET	The training actions and initiatives, combining employment and training, that aim at workers' professional qualification in a regime that alternates work activity in a company and vocational education and training delivered by the education system or labour administrations. Two instruments manage dual VET: <ul style="list-style-type: none"> • the 'apprenticeship contract' is considered a type of dual VET where learners have the status of employees; • a cooperation agreement between the training centre (school) and the company.
France	Contrat d'apprentissage	Apprenticeship contract	An apprentice is defined as a 'young professional' who follows training that draws on an alternation of work-based (in-company) training and school-based training. The concept of apprenticeship is defined by law in the remit of the 'apprenticeship contract' (contrat d'apprentissage) and the 'professionalisation contract' (contrat de professionnalisation) which are the two main apprenticeship schemes in France. These are individual employment contracts.
France	Contrat de professionnalisation	Professionalising contract	



Hungary	Tanulószer- ződésenala pulóduálisszak- képzés	Dual vocational training	Schools and businesses, or so-called other organisations (e.g. hospitals, foundations, associations), jointly contribute to the vocational training of students. The vocational school provides for the vocational theoretical training of youths, while practical training is done by enterprises or other organisations (such as enterprises, entrepreneurs, budgetary bodies, cooperatives, craftsmen, merchants). There are two possible (legal) types of practical training in enterprises. <ul style="list-style-type: none"> • the apprenticeship training contract: training contracts are concluded by the student and an enterprise; the latter undertakes to provide practical training as well as a regular allowance to the student; • cooperation agreement between a VET school and an enterprise to provide practical training for its students. In such a case, however, learners are not contractually linked to the employer, neither do they receive remuneration (they receive remuneration only for the duration of their practice during the school summer holidays).
Italy	Apprendistato per la qualifica e il diploma professionale (Tipo 1)	Apprenticeship for a vocational qualification and diploma (Type 1)	Apprenticeship is an employment contract for an indefinite period aimed at the training and employment of young people.
Italy	Apprendistato professionalizzan- te (Tipo 2)	Occupation- oriented apprenticeship (Type 2)	
Italy	Apprendistato di alta formazione e ricerca (Tipo 3)	Apprenticeship for higher education and research (Type 3)	
Poland	Przygotowanie zawodowe młodocianych	Vocational preparation of young persons	Vocational preparation of young persons may be organised either as: occupational training (nauka zawodu) or training to perform a specific job (przyuczenie do wykonywania określonej pracy). The former lasts between 24 and 36 months and combines practical vocational training at the employers' premises, as well as additional theoretical education. The theoretical education can be accomplished by sending an apprentice to a vocational school or vocational training centre, or by organising theoretical learning by the employer. The latter lasts from three to six months and includes practical vocational training at the employers' premises.



Romania	Ucenicia la locul de munca	Apprenticeship at the workplace	An apprenticeship is vocational training at the workplace that is conducted on the basis of an apprenticeship contract.
Sweden	Gymnasial larlingsutbildning	Apprenticeships in upper secondary	There are two pathways to study a vocational programme at upper secondary school: either as school-based education or as apprenticeship education. The main difference between these two pathways is the proportion of workplace-based learning. For apprenticeship education, more than half of the studies should be provided in workplace-based learning from the moment the apprenticeship starts. Apprenticeship education may start from the first, second or third years of study and may involve a contract and salary.
UK-England	Apprenticeships	Apprenticeships (SASE frameworks (b))	Apprenticeships are full-time paid jobs which incorporate on and off-the-job training. A successful apprentice will receive a nationally recognised qualification on completion of their contract.
UK-Scotland	Modern apprenticeships (c)	Modern apprenticeships (frameworks)	Modern apprenticeships offer people aged 16 and over the opportunity to develop their workplace skills and experience, and gain a qualification while in paid employment.

Source: Apprenticeship Schemes in European countries – A cross-nation Review – CEDEFOP 2018

(a) The decision on which route an apprentice follows is taken by the education and training provider on the basis of his or her readiness to be placed in a company.

(b) In UK-England, there are two sub-schemes running in parallel: i.e. the specification of apprenticeship standards for England (SASE) frameworks and the Trailblazers. The latter will replace the former by 2020. Since 2014 no SASE frameworks have been developed and new apprenticeship standards have been developed by employer groups known as Trailblazers.

(c) Apprenticeships in UK-Scotland are available at four levels: modern apprenticeships at level 2 and level 3; technical apprenticeships at level 4; professional apprenticeships at level 5



Table A2: Model A: Apprenticeship as an education and training system which is aimed at providing people with full competency and capability in an apprenticeable occupation or trade

Description	An education and training system
Purpose	Providing people with full competence and capability in an apprenticeable occupation or trade
Main function	Education and training function
Status of graduate for the labour market	Apprenticeship qualified worker
Governance	Apprenticeship-specific
Qualification	Apprenticeship-specific
Training standards	Apprenticeship-specific
In-company training	Predefined and same for all companies
Set-up	Apprenticeship programme
Schemes	Germany, dual system Poland, vocational preparation of young persons: occupational training (craft sector)

Source: Apprenticeship Schemes in European countries – A cross-nation Review – CEDEFOP 2018

Table A3: Model B: A type of VET delivery within the formal VET system

Description	A type of VET delivery within the formal VET system	
Purpose	Providing a diverse way to deliver VET to achieve formal VET qualifications by bringing people into the labour market	
Main function	Mixed education, training and employment functions	
Status of graduate for the labour market	Vocationally skilled worker	
Governance	Under the umbrella of the overall VET system, apprenticeship-specific governance structures may exist, particularly at operational level	
Qualification	VET qualifications (deliverable in different ways)	
Training standards	Shared with other types of VET delivery	
In-company training	Less regulated and variable (at school-company level)	
Set-up	B2. Full apprenticeship individual pathways (only)	B3. Full and partial apprenticeship individual pathways (a)
Schemes	France, apprenticeship contract France, professionalising contract Romania, apprenticeship at the workplace UK-England, SASE apprenticeships UK-Scotland, modern Apprenticeships	Spain, dual VET with apprenticeship contract Hungary, dual vocational training with apprenticeship training contract Italy, type 1 apprenticeship in upper secondary education Italy, type 3 higher education apprenticeship Sweden, apprenticeships in upper secondary

Source: Apprenticeship Schemes in European countries – A cross-nation Review – CEDEFOP 2018



Table A4: Alternation for Apprenticeship Schemes

Apprenticeship scheme	Form of alternation (how the alternation is organised)
Germany, dual system	Varies: details are specified in the curriculum documents for the different training programmes.
Hungary, dual vocational training with apprenticeship training contract	Varies on a case-by-case basis
Italy, type 1 apprenticeship in upper secondary education (Compulsory school-company alternance)	Varies on a case-by-case basis
Italy, type 3 apprenticeship for higher education (Compulsory school-company alternance)	Varies on a case-by-case basis
Sweden, apprenticeships in upper secondary (Compulsory school-company alternance)	Varies on a case-by-case basis
France, apprenticeship contract	School attendance is not compulsory
France, professionalising contract	School attendance is not compulsory
Romania, apprenticeship at the workplace	School attendance is not compulsory
UK-England, SASE apprenticeships	School attendance is not compulsory
UK-Scotland, modern apprenticeships	School attendance is not compulsory
Spain, dual VET with apprenticeship contract	School attendance is not compulsory

Source: Apprenticeship Schemes in European countries – A cross-nation Review – CEDEFOP 2018



Table A5: Duration of apprenticeship programmes/individual apprenticeship pathways and minimum in-company training

Apprenticeship scheme	Typical duration the apprenticeship programmes	Minimum share of time spent in in-company training
Group A		
Germany, dual system	Three or 3.5 years depending on the occupation. Duration is specified for each occupation in the respective training ordinance	Minimum 70% (exact % depends on the single apprenticeship programme)
Poland, vocational preparation of young persons: occupational training (craft sector)	Three years	Depends on the agreement with the employer and on the school curriculum. The minimum number of hours of practical education at basic schools is 60.6%
Apprenticeship scheme	Duration of the individual pathway	Minimum volume of in-company training as per regulation
Group B2: School attendance is not compulsory		
France, apprenticeship contract	Minimum and maximum (one to three years depending on the final qualification and may be extended to four years for disabled people). It may also vary between six months and one year	Minimum 400 hours per year for upper secondary level, minimum 750 hours per year at higher level. Further details about alternation and time spent at the Centre de formation d'apprentis (CFAs) and enterprise are determined by the individual CFA.
France, professionalising contract	Minimum and maximum (six to 12 months, some cases up to 12-24 months)	75-85% of the contract duration. Between 15 and 25% of the total contract duration is dedicated to evaluation, accompanying and training measures carried out by a training centre.
Romania, apprenticeship at the workplace	Minimum one year and maximum three years depending on qualification level	No minimum share is compulsory
UK-England, apprenticeships (SASE frameworks)	One to three years (depends on the qualification level)	Apprentices in their first year must spend at least 280 hours in 'guided learning'; 100 hours or 30% (whichever is greater) of all guided learning must be delivered off-the-job.
UK-Scotland, modern apprenticeships (frameworks)	No timescale for completing an apprenticeship and they typically take from around six months to three years to complete	No minimum share is compulsory



Table A6: Duration of individual apprenticeship pathways and volume of in-company training: B3 schemes

Apprenticeship scheme	Typical duration of the corresponding VET programme	Duration of the contract	Minimum volume of in-company training as per regulation
Schemes with compulsory alternation between school and company training			
Hungary, dual vocational training with apprenticeship training contract	Three years	Varies	No minimum share is compulsory, but in practice 40-80%
Italy, type 1 apprenticeship in upper secondary	Three-four years	Minimum six months and maximum four years depending on the qualification	Minimum 40% of the duration of the contract (ranging from 40% of six months to 40% of four years)
Italy, type 3 apprenticeship for higher education	Six months to five years	Minimum and maximum (minimum six months and maximum one to five years depending on the qualification)	Minimum 40% of the duration of the contract (ranging from 40% of six months to 40% of five years)
Sweden, apprenticeships in upper secondary	Three years	Upper secondary apprenticeship education can start the first, second or the third year of the VET programme	From the moment the apprenticeship education starts, half of the education should comprise workplace-based learning
Schemes where alternation between school and company training is not compulsory (all learning may take place at the company)			
Spain, dual VET with apprenticeship contract	Two years	Varies	Minimum 33%

Source: Apprenticeship Schemes in European countries – A cross-nation Review – CEDEFOP 2018



Table A7: Overview of responsibility for the learning in the company: group A schemes

Scheme	Accreditation of company (a)	Requirements on employers as per regulation	Who assesses suitability of companies to train (accreditation and/or monitoring)?	Are there any sanctions (b)?
Germany, dual VET	N/A	Mentor, learning support, learning environment, training plan	Chambers: register contracts, monitor employer compliance, organise final examination, provide advice and support to companies	Y
Poland, vocational preparation of young persons: occupational training (craft sector)	N	Training plan, equipment, tutors, learning support	Supervision over the course of vocational training of young persons employed by craftsmen is exercised by the Crafts Chamber or authorised craft guilds. They control it, check the documentation, observe the process and get feedback from the learners	Y

Source: Apprenticeship Schemes in European countries – A cross-nation Review – CEDEFOP 2018



Table A8: Responsibility for learning in the company: group B schemes

Scheme	Accreditation of company before recruiting	Requirements on employers as per regulation	Who assesses suitability of companies to train (Accreditation and/or monitoring)?	Are there any sanctions?
Hungary, dual vocational training with apprenticeship training contract	Y	Trainer, learning environment, equipment provision of practical training as per VET framework curriculum	Chambers	Y/N (close monitoring)
Italy, type 1 apprenticeship in upper secondary education	N	N/A	Education and training provider	Y, fines
Italy, type 3 apprenticeship for higher education		Tutor, equipment, learning environment, training plan	Education and training provider	Y, fines
Sweden, apprenticeships in upper secondary	N	Tutor, training plan, facilities, equipment	Schools – Swedish School inspectorate supervises and assesses the quality of vocational education programmes. Inspection increasingly also covers learning at the workplace	N
Schemes where school attendance is not compulsory				
Spain, dual VET with apprenticeship contract	According to the Labour Code, the Company can provide training if it has adequate facilities and staff	Tutor and training support, facilities	N/A	N
France, apprenticeship contract	Not clear	Learning environment, learning support	CFA (centre de formation d'apprentis) (f)	Y
France, professionalising contract	N	Tutor, training plan, learning support, learning environment	OPCA verifies monitor contract compliance and bears the costs of the contract and of training	N
Romania, apprenticeship at the workplace	N	Apprentices coordinator, access to theoretical and practical training	Enforcement of the obligations of the employer is under the control of the employment regional (county) agencies through labour inspectors	Y



UK-England, apprenticeships (SASE frameworks)	N	Tutor, learning environment, learning support, develop a training plan	It is the education and training provider's responsibility to ensure that quality standards are met. This includes challenging or not engaging with employers who are unwilling or unable to contribute to a high quality apprenticeship	N
UK-Scotland, modern apprenticeships (frameworks)	N	N (training providers are under contract to the enterprise networks to agree provision of appropriate training throughout the apprenticeship, to assess competences, to develop individual learning plans with the employee and employer, and to administer the modern apprenticeship through contact with the local enterprise company and by keeping the central modern apprenticeship management database updated)	In cases where modern apprenticeship training is entirely work-based, the training provider usually has an assessor-only role and visits the apprentice at the place of work to assess competence. Training companies are responsible for work-based training and therefore have an important role in ensuring apprentices successfully complete apprenticeships. Monitoring the quality of work-based training is more complicated than classroom based training due to the large number of employers involved – over 10 000 in 2012/13. Most of these employed just one apprentice	N

Source: Apprenticeship Schemes in European countries – A cross-nation Review – CEDEFOP 2018

Table A9: Group A apprenticeship schemes: education levels and eligibility by age

Apprenticeship scheme	Eligibility age
Germany, dual system	15+
Poland, vocational preparation of young persons: occupational training (craft sector)	16-18

Table A10: Group B apprenticeship schemes: education levels and eligibility by age

	Education level (formal certificates or qualifications)	Second chance	Eligibility age
Spain, dual VET with apprenticeship contract	Lower, upper and higher levels	N/A	16-25
France, apprenticeship contract	Upper secondary and higher programmes		15-25
France, professionalising contract	CVET all qualification levels	X	16-25 who want to complete their initial training 26+ unemployed registered at PES beneficiaries of specific state aids
Hungary, dual vocational training with apprenticeship training contract	Upper secondary and adult education (for the second qualification)		15+
Italy, type 1 apprenticeship in upper secondary education	Upper and post-secondary		15-25
Italy, type 3 apprenticeship for higher education (e)	Higher programmes		18-29
Romania, apprenticeship at the workplace	CVET (qualifications at levels 2, 3 and 4 on the national/ European qualifications frameworks)	X	16-25 (adults outside of the formal education and training system, unemployed, no qualification for which they train)
Sweden, apprenticeships in upper secondary	Upper secondary, adult education	Alternative pathway in formal VET (not the main route)	
UK-England, apprenticeships (SASE frameworks)	Upper and post-secondary intermediate, higher, advanced, graduate	Alternative pathway in formal VET (not the main route)	16+ Generally schemes are targeted to 16-24 (funding reflects this) however, apprenticeships are available for older age groups and the unemployed
UK-Scotland, modern apprenticeships (frameworks)	Upper secondary	Alternative pathway in formal VET (not the main route)	16+ Funding has been prioritised, however, for 16-17 year olds under a UK-wide government training guarantee, and the funding available to those 25 and over is currently limited

Source: Apprenticeship Schemes in European countries – A cross-nation Review – CEDEFOP 2018

7.3 APPENDIX 3

Table A11: Number of Apprenticeship starts in England of direct relevance to the automotive sector¹⁸⁸

Name of Apprenticeship	Number of apprenticeship starts 17-18	Number of apprenticeship starts -2018 to Q3
Accident Repair Technician	70	60
Autocare Technician	30	270
Automation and Controls Engineering Technician	-	-
Automotive Glazing Technician	10	30
Bus and Coach Engineering Technician	290	230
Composite Engineering	30	-
Composites Technician	20	20
Electrical / Electronic Technical Support Engineer (Degree)	60	90
Embedded Electronic Systems Design and Development Engineer (Degree)	100	70
Other Engineering Related Apprenticeships	11,160	7,760
Engineering Fitter	-	100
Engineering Operative	-	110
Engineering Technician	3,080	3,910
Engineering Manufacturing Technician	-	-
General Welder (Arc Processes)	110	160
Heavy Vehicle Service and Maintenance Technician	590	630
Heritage Engineering Technician	-	40
Improvement Leader	-	-
Improvement Practitioner	100	330
Improvement Specialist	-	10
Improvement Technician	150	290
Manufacturing Engineer (Degree)	110	270
Metal Casting, Foundry & Patternmaking Technician	-	10
Metal Fabricator	-	20
Metrology Technician	20	20
Motor Vehicle Service and Maintenance Technician (Light Vehicle)	2,510	2,890
Non-Destructive Testing (NDT) Operator	20	10
Non-Destructive Testing Engineer (Degree)	10	20
Non-Destructive Testing Engineering Technician	50	30
Product Design and Development Engineer (Degree)	100	230
Propulsion Technician	-	10
Systems Engineering (Degree)	30	30
Vehicle Body and Paint Operations	1,260	1,000
Vehicle Fitting	270	70
Vehicle Maintenance and Repair	5,940	3,830
Vehicle Parts Operations	570	430
Vehicle Sales	20	50

¹⁸⁸ Source: <https://www.gov.uk/government/statistical-data-sets/fe-data-library-apprenticeships#apprenticeship-and-traineeships-current-data>

Table A12: Number of Apprenticeship starts in Germany of direct relevance to the automotive sector¹⁸⁹

Name of Apprenticeship	Number of apprenticeship starts 17-18
Car body and vehicle construction mechanic	1608
Agricultural and construction machinery mechatronics technician	2745
Two-wheel mechatronics technician	930
Metal former (m/f)	9
Automobile salesman/woman	5454
Electronics technician for automation technology	2175
Electronics technician for industrial engineering	7044
Electronics technician for building and infrastructure systems	99
Electronics technician for devices and systems	2199
Electronics technician for information and systems technology	123
Industrial mechanic	12966
Mechatronics technician	8577
Process Technologist Metal (f/m)	555
Tool mechanic (f/m)	3114
Machining mechanic (f/m)	20

¹⁸⁹ Source: Bundesinstitut für Berufsbildung (BIBB), 'Datenreport zum Berufsbildungsbericht 2019', 2019.

Table A13: Number of Apprenticeship starts in Portugal of direct relevance to the automotive sector¹⁹⁰

Name of Apprenticeship	Number of apprenticeship starts 17-18	Number of apprenticeship starts -2018 to Q3	Number of apprenticeship starts -2019 to 2020
EFA - Professional Certification of Motorcycle Mechanics	18	18	18
EFJ - Automotive Mechatronics - Type 7	---	---	35
EFA - Professional Certification of Automotive Mechatronics	55	53	38
Body Repair and Painting Technician - Level 4	19	---	51
Automotive Mechatronics Technician - Level 4	74	90	56
CET - Automotive Mechatronics, Process Planning and Control	---	15	---
Fast Service Mechanic - ACTIVE LIFE	---	18	---
EFA - Automotive Mechatronics - S3 Type A	---	19	---
EFA - Professional Body Repair and Painting Certification	37	36	---
Automotive Technology - Professional Senior Technicians (CTeSP)	33	41	45
Industrial Maintenance - Senior Professional Technicians (CTeSP)	29	40	46

Source: CEPRA – Centro de Formação Profissional da Reparação Automóvel;
<https://www.cepra.pt/portal/>

¹⁹⁰ Only apprenticeships where number of starts are known have been included

Table A14: Automotive related apprenticeships in England by level and typical duration

Name of Apprenticeship	UK Level	Status	Date approved for delivery	Typical duration
Accident Repair Technician	3	Approved	6 June 2017	24 months
Auto care Technician	2	Approved	24 May 2018	30 months
Automation and Controls Engineering Technician	4	Approved	3 July 2019	48 months
Automotive Glazing Technician	3	Approved	28 June 2018	36 months
Bus and Coach Engineering Technician	3	Approved	7 September 2016	36 months
Composite Engineering			This Apprenticeship will be closed from 2020	
Composites Technician	3	Approved	16 February 2017	36 months
Electrical / Electronic Technical Support Engineer (Degree)	6	Approved	12 November 2014	60 months
Embedded Electronic Systems Design and Development Engineer (Degree)	6	Approved	10 June 2016	36 months
Other Engineering Related Apprenticeships	2 and 3			
Engineering Fitter	3	Approved	20 November 2018	42 months
Engineering Operative	2	Approved	24 September 2018	12 months
Engineering Technician	3	Approved	31 March 2017	42 months
Engineering Manufacturing Technician	4	Approved	5 November 2019	42 months
General Welder (Arc Processes)	2	Approved	27 April 2016	18 months
Heavy Vehicle Service and Maintenance Technician	3	Approved	7 September 2016	36 months
Heritage Engineering Technician	3	Approved	23 August 2018	42 months
Improvement Leader	6	Approved	29 January 2019	18 months
Improvement Practitioner	4	Approved	27 February 2018	14 months
Improvement Specialist	5	Approved	8 November 2018	14 months
Improvement Technician	3	Approved	27 February 2018	14 months
Manufacturing Engineer (Degree)	6	Approved	12 November 2016	60 months
Metal Casting, Foundry & Patternmaking Technician	3	Approved	11 October 2018	27 months
Metal Fabricator	3	Approved	18 January 2019	42 months
Metrology Technician	3	Approved	17 August 2017	36 months
Motor Vehicle Service and Maintenance Technician (Light Vehicle)	3	Approved	22 Oct 2015	36 months



Non-Destructive Testing (NDT) Operator	2	Approved	22 August 2016	18 months
Non-Destructive Testing Engineer (Degree)	6	Approved	20 November 2017	48 months
Non-Destructive Testing Engineering Technician	3	Approved	1 December 2015	36 months
Product Design and Development Engineer (Degree)	6	Approved	12 November 2014	60 months
Propulsion Technician	4	Approved	5 September 2018	42 months
Systems Engineering (Degree)	7	Approved	11 September 2015	48 months
Vehicle Body and Paint Operations	2 and 3			
Vehicle Fitting	2 and 3			
Vehicle Maintenance and Repair	2 and 3			
Vehicle Parts Operations	2 and 3			
Vehicle Sales	2 and 3			

Source: <https://www.instituteforapprenticeships.org/apprenticeship-standards/>

Table A15¹⁹¹: Automotive related apprenticeships in Germany by level and typical duration

Name of Apprenticeship	EQF Level	Status	Date approved for delivery	Typical duration
Car body and vehicle construction mechanic	2-3	Approved	2014	42 months
Agricultural and construction machinery mechatronics technician	3	Approved	2014	42 months
Two-wheel mechatronics technician	2-3	Approved	2014	42 months
Metal former (m/f)	0	Approved	2016	36 months
Automobile salesman/woman	3-4	Approved	2017	36 months
Plant mechanic	3	Approved	2018	42 months
Electronics technician for automation technology	3	Approved	2018	42 months
Electronics technician for industrial engineering	3	Approved	2018	42 months
Electronics technician for building and infrastructure systems	3	Approved	2018	42 months
Electronics technician for devices and systems	3	Approved	2018	42 months
Electronics technician for information and systems technology	3-4	Approved	2018	42 months
Industrial mechanic	3	Approved	2018	42 months
Mechatronics technician	3	Approved	2018	42 months
Process Technologist Metal (f/m)	3	Approved	2018	42 months
Tool mechanic (f/m)	3	Approved	2018	42 months
Machining mechanic (f/m)	3	Approved	2018	42 months

¹⁹¹ Bundesinstitut für Berufsbildung (BIBB), 'Datenreport zum Berufsbildungsbericht 2019', 2019.



Table A16: Automotive related apprenticeships in Portugal by level and typical duration

Name of Apprenticeship	EQF Level	Typical duration
EFA - Professional Certification of Motorcycle Mechanics	2	1060 hours
EFJ - Automotive Mechatronics - Type 7	4	1625 hours
EFA - Professional Certification of Automotive Mechatronics	4	1550 hours
Body Repair and Painting Technician - Level 4	4	3753 hours
Automotive Mechatronics Technician - Level 4	4	3753 hours
CET - Automotive Mechatronics, Process Planning and Control	5	1400 hours
Fast Service Mechanic - ACTIVE LIFE	2	500 hours
EFA - Automotive Mechatronics - S3 Type A	4	2120 hours
EFA - Professional Body Repair and Painting Certification	4	1475 hours
Automotive Technology - Professional Senior Technicians (CTeSP)	5	24 months
Industrial Maintenance - Senior Professional Technicians (CTeSP)	5	24 months

Source: CEPRA – Centro de Formação Profissional da Reparação Automóvel; <https://www.cepra.pt/portal/>

Table A17: Automotive related apprenticeships in England by sector coverage and main focus

Name of Apprenticeship	Sector(s)	Overview:
Accident Repair Technician	Automotive	Mending damaged vehicles using a range of metalworking and finishing techniques.
Auto care Technician	Automotive	Carrying out a range of services and repairs to cars, car derived vans and light goods vehicles
Automation and Controls Engineering Technician	Automotive, Food & Drink, Oil & Gas, Pharmaceutical, Construction	Installing and maintaining hardware and software for automation systems.
Automotive Glazing Technician	Automotive	Repairing and replacing windscreens on vehicles
Bus and Coach Engineering Technician	Automotive	Carrying out a range of engineering work on buses and coaches for bus and coach operators.
Composite Engineering	Aerospace, Automotive, Marine and Renewables industries and are becoming increasingly important in the Oil & Gas, Construction and Rail sectors.	Working with a range of different composite materials, using a variety of resins, fibres and other core materials (This Apprenticeship will be closed from 2020)
Composites Technician	Aerospace, Automotive, Marine and Renewables industries and are becoming increasingly important in the Oil & Gas, Construction and Rail sectors.	Combining lighter and stronger alternatives to metals for use in manufacturing.
Electrical / Electronic Technical Support Engineer (Degree)	Automotive	Supporting the manufacturing of new products by bringing the product to life and resolving manufacturing problems.
Embedded Electronic Systems Design and Development Engineer (Degree)	Aerospace, Automotive, Automation and Instrumentation, Robotics, Telecommunications, Information and Computer Technology, Defence, Energy (including renewables), Transport and Consumer Electronics	Designing and developing electronic circuits, devices and systems for a range of industries.
Other Engineering Related Apprenticeships	Engineering industries	
Engineering Fitter	Manufacturing and process sectors	Producing complex high value, low volume components or assemblies
Engineering Operative	Manufacturing and Engineering sectors	Carrying out a range of engineering operations
Engineering Technician	Aerospace, Aviation, Automotive, Maritime Defence and wider Advanced	Designing, building, servicing and repairing a range of engineering products and services.

	Manufacturing and Engineering Sectors	
Engineering Manufacturing Technician	Automotive, Aerospace/Airworthiness, Chemical Processing, Land Systems, Marine, Maritime Defence, Materials Manufacturers and their respective supply chains.	Providing specialist technical support for engineers
General Welder (Arc Processes)	Used extensively and in almost every sector of industry	Working with metals to create high-strength welds in 2 welding positions, using at least 1 arc welding process.
Heavy Vehicle Service and Maintenance Technician	Automotive	Inspecting and repairing a range of heavy vehicles (HVs) and trailers for dealerships, independent garages and franchise and large fleet operators.
Heritage Engineering Technician	Heritage sectors include veteran, vintage and classic; agricultural engineering, aviation, bus and coach, commercial vehicle, marine, military vehicle, motor cycle, motor vehicle and steam, working in organisations as diverse as Global Manufacturers, Museums and small operators to small voluntary groups and individual owners	Preservation, restoration, re-manufacture, service and repair of historic UK and International engineering achievements
Improvement Leader	Wide range of sectors	Developing improvement strategies and providing leadership in improvement for a business
Improvement Practitioner	Sectors include automotive, banking, engineering, food products, IT property, retail, telecoms	Identify and lead the delivery of change across organisational functions and processes
Improvement Specialist	Commonly found in all industry sectors and functions including Automotive, Pharmaceutical, Telecommunication, Retail, Finance, Food, Drink, Travel and Leisure	Leading the deployment of improvement strategies
Improvement Technician	Across all industry sectors and functions including automotive, banking, engineering, food products, IT, property, retail, telecoms	Responsible for delivery and coaching of improvement activity within an area of responsibility
Manufacturing Engineer (Degree)	Primarily Automotive	Helping take products from design to manufacture,

		ensuring that they are launched on time, at cost and to the right quality.
Metal Casting, Foundry & Patternmaking Technician	The industry underpins and is a vital supplier to other industries including automotive, aerospace, rail, power and renewable energy, medical, pumps & valves, defence, petrochemical and marine.	Casting is the process from which solid metal shapes (castings) are produced by filling voids in moulds with liquid metal.
Metal Fabricator	Work includes manufacturing bridges, oil rigs, ships, petro-chemical installations, cranes, platforms, aircraft, automotive and machinery parts, sheet metal enclosures, equipment supports, and anything that can be fabricated out of metal	Manufacturing anything that can be fabricated out of metal
Metrology Technician	Advanced manufacturing, aerospace, automotive, construction, energy, environment, pharma and healthcare and space	Identifying measurement needs and planning and performing measurement tasks using tools, equipment, instrumentation and software programs
Motor Vehicle Service and Maintenance Technician (Light Vehicle)	Automotive	Servicing and repairing light vehicles such as cars and vans, working on all the systems found in the vehicle.
Non-Destructive Testing (NDT) Operator	Transferable across all engineering sectors	Inspecting components, materials, welds and other items within manufacturing processes.
Non-Destructive Testing Engineer (Degree)	All industry sectors	Testing materials used in machinery and structures to find faults like corrosion, cracks, flaws and other imperfections
Non-Destructive Testing Engineering Technician	specific industries, such as aerospace, motorsport , power generation and distribution, manufacturing, railways, oil & gas (on- and offshore), marine and construction	Using specialist methods to detect cracks and other imperfections in manufactured components, including those that have been in service for a period of time.
Product Design and Development Engineer (Degree)	Automotive and some other sectors	Using engineering techniques to bring new products to life or redesign existing products.
Propulsion Technician	Automotive	Testing or building function to support the development of propulsion systems
Systems Engineering (Degree)	Sectors include transport (e.g. rail, aviation, automotive, maritime), defence	Solving some of the most complex engineering challenges by organising all the information needed to understand



	& security, telecommunications, health, manufacturing, construction, and infrastructure	the whole problem, exploring it and finding the most appropriate solution.
Vehicle Body and Paint Operations	Automotive	Assessing and repairing damage, restoring body and paintwork, and carrying out automotive glazing and windscreen repair
Vehicle Fitting	Automotive	The Vehicle Fitting apprenticeship deals with fast-fit operations in the motor vehicle industry. Motor vehicle fitters, or fast-fit technicians, repair and replace tyres, batteries, exhausts and other vehicle parts, while the customer waits.
Vehicle Maintenance and Repair	Automotive	Vehicle maintenance and repair apprenticeships deals with the repair and maintenance of all types of vehicles, from mopeds to lorries.
Vehicle Parts Operations	Automotive	The Vehicle Parts Operations apprenticeship covers the sale of motor parts for all kinds of vehicles. Vehicle parts operatives (or parts advisers) order, sell and manage stock control on a wide range of parts and accessories for all kinds of vehicles – from cars and motorcycles, to lorries, buses and coaches
Vehicle Sales	Automotive	The Vehicle sales apprenticeship prepares you for the many activities that go on in a car sales showroom. It takes a lot to sell a car: extensive knowledge of vehicles, the ability to read a customer, negotiation skills, and the self-confidence to pull it all off and secure the deal.

Source: <https://www.instituteforapprenticeships.org/apprenticeship-standards/>

Table A18¹⁹²: Automotive related apprenticeships in Germany by sector coverage and main focus

Name of Apprenticeship	Sector(s)	Overview:
Car body and vehicle construction mechanic	Automotive	Specialising in car body maintenance technology maintain and repair car bodies, vehicle superstructures, chassis and chassis, maintain and adjust vehicle systems and auxiliary equipment such as brake and lighting systems, air conditioning and safety systems.
Agricultural and construction machinery mechatronics technician	Automotive	Maintain vehicles, machines and systems used in agriculture, forestry and on construction sites. They diagnose faults and malfunctions in mechanical, hydraulic, electrical and electronic systems, determine the causes of faults and rectify defects by repairing or replacing the relevant parts. They dismantle or assemble components and assemblies, process workpieces manually and mechanically and also carry out welding work. In addition, they carry out exhaust emission tests and establish vehicle electrical power connections. They install systems (e.g. milking systems), put them into operation, test them and instruct the operators. They also equip agricultural and construction vehicles or machines with accessories and auxiliary equipment.
Two-wheel mechatronics technician	Automotive	Maintain and repair motorised and non-motorised two-wheelers, manufacture them, adapt them and modify them according to customer requirements. They are also active in sales.
Metal former (m/f)	mixed	Design and manufacture art and utility objects from metal.
Automobile salesman/woman	automotive	Carry out commercial tasks at the interface between the trade and workshop, above all in the procurement, distribution and sale of motor vehicles as well as parts and accessories. You will be responsible for bookkeeping, cost accounting and calculation as well as administrative and organisational tasks, e.g. in personnel management. In addition, they observe developments on the market and take the information gained in this way into account when planning and carrying out marketing campaigns. Automotive clerks organize customer service and accept maintenance and repair orders. In sales, they advise private and business customers on financial services products, prepare offers and conclude financing, purchase, leasing or insurance contracts.
Plant mechanic	mixed	Manufacture plants and piping systems for the chemical, mineral oil and food industries or for supply companies. They cut sheets, edge them, lengthen pipes, bend pipe sections and sheets and produce individual components, e.g. with the aid of CNC machines. If necessary, they assemble the components in the plant to form assemblies and arrange transport to the construction site or to the customer's plant. They assemble individual components and assemblies on site. They connect pipelines, install valves and seals, connect boilers or pressure vessels and hand over the finished systems to the customer. Their tasks also include plant maintenance, repair and, if necessary, the expansion or conversion of existing plants.
Electronics technician for automation	mixed	Plan and install, for example, computer-controlled production machines, machine tools, traffic

¹⁹² <https://berufenet.arbeitsagentur.de/berufenet/faces/index?path=null/sucheAZ&let=A>

technology		control systems or building technology systems. They analyse the functional relationships and ensure that sensors, electronic controls and control devices control and regulate the electrical, pneumatic and hydraulic drives according to the respective operating requirements. To do this, they configure software, bus systems, networks and device components. They program and test the systems, put them into operation and instruct the users in their operation. If faults occur, the electronics engineers search for the causes and remedy them. They advise customers about technical possibilities, service offers and costs. During maintenance work, they check the electrical protective measures and safety devices.
Electronics technician for industrial engineering	mixed	Install electrical components and systems in the fields of electrical energy supply, industrial plants or building system and automation technology. They design plant modifications and extensions, install cable routing systems and power cables, set up machines and drive systems and install switchgear. They also program, configure and test systems and safety equipment. They also monitor the systems, maintain them regularly, carry out regular tests and repair them in the event of a malfunction. They also organise the assembly of systems and monitor the work of service providers and other trades. When the systems are handed over, electronic technicians for operating technology instruct the future users in their operation.
Electronics technician for building and infrastructure systems	mixed	Plan and install ventilation, heating, electricity and security systems in residential and industrial facilities, schools, hospitals and other buildings, and ensure their smooth functioning. They integrate and configure technical building systems and control equipment, hand over the systems and instruct users in their operation. They also monitor the systems with the aid of control systems, check the equipment and compliance with safety regulations, make fault diagnoses and repair the technical equipment themselves or arrange for it to be repaired. They advise clients, calculate costs, award contracts and accept services from third parties.
Electronics technician for devices and systems	mixed	Adapt assemblies, produce printed circuit boards, assemble components and manufacture electronic devices and systems for various purposes. They install and configure programs or operating systems, check components, develop device documentation or create layouts. In addition, they take care of the procurement of components and equipment and support technicians or engineers in the implementation of orders. They plan production processes, set up production and testing machines and assist in quality assurance. They also prepare system documentation and production documents. They are also responsible for maintenance and repair. In customer service and in the repair of devices, electronic technicians limit the sources of error for devices and systems and replace defective parts. In addition, they advise customers and instruct users in the handling of the devices.
Electronics technician for information and	mixed	Are involved in the development of automation systems, information and communication systems,

systems technology		control elements, signal and safety systems or radio systems and work on their implementation and installation. They assemble hardware components and electronic components, install information technology equipment, configure operating systems and networks and set up user interfaces and user dialogs. They also adapt standardized software solutions, program software components and interfaces, integrate hardware and software components, and perform system tests. In the event of system malfunctions, they provide support and eliminate malfunctions, e.g. through software adaptations or the replacement of defective components.
Industrial mechanic	mixed	Organise and control production processes and ensure that machines and production plants are ready for operation. They build machines or entire production plants, install and network them and put them into operation. If their focus is on production engineering, they set up machines, rebuild them and control production processes. Their tasks also include the maintenance and repair of operating equipment and technical systems. To do this, they select test equipment, determine the causes of faults and replace defective components or wear parts, for example, check bearings and tighten screws. If necessary, they also manufacture spare parts themselves using CNC machines. In addition, they hand over technical systems and products to customers and instruct them how to operate them.
Construction mechanic (f/m)	mixed	Manufacture e.g. elevators, factory or airport handling halls, ship hulls and superstructures or pedestrian bridges. They use flame cutters, lasers or CNC machines to cut steel girders to length and cut profiles and sheet metal to millimetre accuracy. They bend or edge sheet metal, drill holes, assemble the components, align them and join them by welding, screwing or riveting. If necessary, they install drives and control devices and install claddings. They assemble smaller objects such as vehicle superstructures in the workshop, larger structures such as halls or bridges on site. They are also responsible for the maintenance and repair of metal structures, tools and production machines.
Mechatronics technician	mixed	Build complex mechatronic systems from mechanical, electrical and electronic assemblies and components, e.g. robots for industrial production. They test the individual components and assemble them into systems and plants. They put the finished systems into operation, program them or install associated software. They follow circuit diagrams and design drawings and carefully check the systems before handing them over to their customers. They also maintain and repair mechatronic systems.
Process Technologist Metal (f/m)	mixed	Working with metal produce steel and non-ferrous metals or convert steel, ferrous or non-ferrous materials into beams, sheet metal, wire or profiles.
Tool mechanic (f/m)	mixed	Manufacture punching tools, casting and injection moulds or devices for industrial series production and mechanical engineering, as well as precision mechanical and surgical instruments. For the production they usually use CNC-controlled machine tools, which they also program themselves. With the help of turning, milling, grinding and drilling machines, they manufacture the

		individual parts of the often complex tools. They adhere exactly to the dimensions specified in the technical drawings. They assemble individual parts into finished tools and install them in the production machines, e.g. in punching machines. They carry out test runs and check the finished products. The maintenance and repair of tools and machines is also part of their job.
Machining mechanic (f/m)	mixed	Manufacture components, e.g. for machines, engines or turbines. They usually work with CNC lathes, milling machines and grinding machines. They enter the production parameters into the machines or retrieve programs from the machine memory and modify them if necessary. Then they select the tools, clamp the metal blanks, align them and start the machines. They monitor the machining processes, remove the finished workpieces, and check whether dimensions and surface quality meet the specifications. In the event of malfunctions, they search for the cause according to defined test procedures and eliminate the problem. Their tasks also include regular inspection and maintenance of the machines.

Table A19: Further information on automotive related apprenticeships in England

Name of Apprenticeship	Source of further information
Accident Repair Technician	https://www.instituteforapprenticeships.org/apprenticeship-standards/accident-repair-technician/
Auto care Technician	https://www.instituteforapprenticeships.org/apprenticeship-standards/autocare-technician/
Automation and Controls Engineering Technician	https://www.instituteforapprenticeships.org/apprenticeship-standards/automation-controls-engineering-technician/
Automotive Glazing Technician	https://www.instituteforapprenticeships.org/apprenticeship-standards/automotive-glazing-technician/
Bus and Coach Engineering Technician	https://www.instituteforapprenticeships.org/apprenticeship-standards/bus-and-coach-engineering-technician/
Composite Engineering	
Composites Technician	https://www.instituteforapprenticeships.org/apprenticeship-standards/composites-technician/
Electrical / Electronic Technical Support Engineer (Degree)	https://www.instituteforapprenticeships.org/apprenticeship-standards/electrical-electronic-technical-support-engineer-degree/
Embedded Electronic Systems Design and Development Engineer (Degree)	https://www.instituteforapprenticeships.org/apprenticeship-standards/embedded-electronic-systems-design-and-development-engineer-degree/
Engineering Fitter	https://www.instituteforapprenticeships.org/apprenticeship-standards/engineering-fitter/
Engineering Operative	https://www.instituteforapprenticeships.org/apprenticeship-standards/engineering-operative/
Engineering Technician	https://www.instituteforapprenticeships.org/apprenticeship-standards/engineering-technician/
Engineering Manufacturing Technician	https://www.instituteforapprenticeships.org/apprenticeship-standards/engineering-manufacturing-technician/
General Welder (Arc Processes)	https://www.instituteforapprenticeships.org/apprenticeship-standards/general-welder-arc-processes/

Heavy Vehicle Service and Maintenance Technician	https://www.instituteforapprenticeships.org/apprenticeship-standards/heavy-vehicle-service-and-maintenance-technician/
Heritage Engineering Technician	https://www.instituteforapprenticeships.org/apprenticeship-standards/heritage-engineering-technician/
Improvement Leader	https://www.instituteforapprenticeships.org/apprenticeship-standards/improvement-leader/
Improvement Practitioner	https://www.instituteforapprenticeships.org/apprenticeship-standards/improvement-practitioner/
Improvement Specialist	https://www.instituteforapprenticeships.org/apprenticeship-standards/improvement-specialist/
Improvement Technician	https://www.instituteforapprenticeships.org/apprenticeship-standards/improvement-technician/
Manufacturing Engineer (Degree)	https://www.instituteforapprenticeships.org/apprenticeship-standards/manufacturing-engineer-degree/
Metal Casting, Foundry & Patternmaking Technician	https://www.instituteforapprenticeships.org/apprenticeship-standards/metal-casting-foundry-patternmaking-technician/
Metal Fabricator	https://www.instituteforapprenticeships.org/apprenticeship-standards/metal-fabricator/
Metrology Technician	https://www.instituteforapprenticeships.org/apprenticeship-standards/metrology-technician/
Motor Vehicle Service and Maintenance Technician (Light Vehicle)	https://www.instituteforapprenticeships.org/apprenticeship-standards/motor-vehicle-service-and-maintenance-technician-light-vehicle/
Non-Destructive Testing (NDT) Operator	https://www.instituteforapprenticeships.org/apprenticeship-standards/non-destructive-testing-ndt-operator/
Non-Destructive Testing Engineer (Degree)	https://www.instituteforapprenticeships.org/apprenticeship-standards/non-destructive-testing-engineer-degree/
Non-Destructive Testing Engineering Technician	https://www.instituteforapprenticeships.org/apprenticeship-standards/non-destructive-testing-engineering-technician/
Product Design and Development Engineer (Degree)	https://www.instituteforapprenticeships.org/apprenticeship-standards/product-design-and-development-engineer-degree/
Propulsion Technician	https://www.instituteforapprenticeships.org/apprenticeship-standards/propulsion-technician/
Systems Engineering (Degree)	https://www.instituteforapprenticeships.org/apprenticeship-standards/systems-engineer-degree/

Table A20: Further information on automotive related apprenticeships in Germany

Name of Apprenticeship	Source of further information
Car body and vehicle construction mechanic	https://berufenet.arbeitsagentur.de/berufenet/bkb/124530.pdf
Agricultural and construction machinery mechatronics technician	http://portal.berufe-universum.de/pdfs/124412.pdf
Two-wheel mechatronics technician	http://portal.berufe-universum.de/pdfs/124408.pdf
Metal former (m/f)	http://portal.berufe-universum.de/pdfs/15192.pdf
Automobile salesman/woman	http://portal.berufe-universum.de/pdfs/6622.pdf
Electronics technician for automation technology	http://portal.berufe-universum.de/pdfs/15640.pdf
Electronics technician for industrial engineering	http://portal.berufe-universum.de/pdfs/15623.pdf
Electronics technician for building and infrastructure systems	http://portal.berufe-universum.de/pdfs/15621.pdf
Electronics technician for devices and systems	http://portal.berufe-universum.de/pdfs/15632.pdf
Electronics technician for information and systems technology	http://portal.berufe-universum.de/pdfs/122382.pdf
Industrial mechanic	http://portal.berufe-universum.de/pdfs/29055.pdf
Construction mechanic (m/f)	http://portal.berufe-universum.de/pdfs/29049.pdf
Mechatronics technician	http://portal.berufe-universum.de/pdfs/2868.pdf
Process Technologist Metal/ Process Technologist Metal	http://portal.berufe-universum.de/pdfs/130917.pdf
Tool mechanic (m/f)	http://portal.berufe-universum.de/pdfs/29051.pdf
Machining mechanic (m/f)	http://portal.berufe-universum.de/pdfs/29053.pdf