



## German automotive industry

The German automotive industry is an important sector both in terms of its economic impact and as a source of employment. The industry's supply chains stretch across many European and non-European countries, contributing to employment and economic development especially in Central and Eastern Europe. The sector faces numerous drivers of change, including pressure to be competitive and adopt the latest technologies. One key issue is the necessity to shift to zero emissions vehicles as part of the transition to climate neutrality.

### Overview

The automotive industry is the largest industrial sector in Germany. In 2017, it generated almost EUR 500 billion of turnover (representing 27 per cent of national manufacturing turnover) and employed 866,000 people (representing 12 per cent of national manufacturing employment).<sup>72</sup>

However, developments such as lower export demand for German cars (due to competition from elsewhere), technological change and regulation of emissions are challenging the resilience of the sector.<sup>73</sup> In 2019, car production in Germany reached a 22-year low of 4.7 million cars, leading German car manufacturers to announce that tens of thousands of jobs are at risk. More recently, the coronavirus outbreak has added further uncertainty in the European automotive sector, with many carmakers including Volkswagen, Daimler, Fiat Chrysler Automobiles (FCA) and Renault shutting down factories as part of the measures to fight the virus.<sup>74</sup>

Worldwide, the automotive sector is preparing to phase out vehicles powered by internal combustion engines (ICE) and to switch to the production of electric vehicles. Many countries and cities, in Europe and elsewhere, have already adopted specific time schedules for the ban of ICE vehicles, and the topic is being discussed at the European level.<sup>75,76</sup> In recent years, European regulations on emissions from vehicles have been tightened, with a view of encouraging European carmakers to increase efforts into research, development and production of electric vehicles and hybrids, so they are better positioned to maintain market share. At the same time other connected innovation trends including the potential shift to autonomous vehicles and digital technologies changing travel patterns are disrupting the industry.

### Interactions with megatrends

The German automotive industry is already highly automated. Germany is the fifth-largest market for robots in the world, with almost 27,000 industrial robots installed in 2018, most of them in the automotive sector.<sup>77</sup> Although robots do not seem to have directly displaced existing workers in Germany, they appear to have led to increased income inequality by increasing the earnings of high-skill workers and decreasing the earnings of low and medium-skill workers, particularly in machine-operating occupations.

Germany is the biggest car exporter in the world, accounting for 20 per cent of global car exports.<sup>78</sup> However, the German automotive manufacturing sector is highly vulnerable to the new production processes associated with the transition to electric vehicle production as well as growing competition from countries such as China. In particular, China is positioning itself as the global leader in the production of electric vehicles.

### Implications for jobs and skills

Research suggests that the switch to electric vehicles will entail significant changes in the industry's labour market. Electric vehicles contain fewer parts than traditional ICEs and are faster to manufacture, resulting in lower demand for component parts (as many will become obsolete) and less work for assembly workers.<sup>79,80,81</sup>

Predictions regarding future employment impacts range dramatically depending on the specific assumptions made. One study indicates that German GDP could be 0.5 per cent higher compared to the baseline in 2030 because of investment in electric vehicles, with a potential net employment creation of approximately 145,000 jobs, primarily in construction, electricity, hydrogen, services and manufacturing.<sup>79</sup> However, regions where the automotive sector, including the production of components, constitutes a significant share of total employment, might be negatively affected.

Positive net figures conceal significant likely job losses in the sector, where estimates range from the loss of 400,000<sup>82</sup> jobs by 2030 to more moderate losses of approximately 75,000 to 100,000 jobs, primarily in engine and gearbox manufacturing.<sup>83,84,79</sup> There is already evidence of supply chain restructuring in Europe, with German manufacturers of components such as Bosch, Mahle and Schaeffler making redundancies because of lower employment needs connected to electric vehicle manufacturing.

Despite these challenges, establishing domestic supply chains to produce electric vehicles will be fundamental to avoid further job losses stemming from a loss of international competitiveness: employment losses would be massive if the production of electric vehicles was to be completely seized by foreign competitors such as China, resulting in the potential end of the car manufacturing industry in Germany.

One key need to minimise job losses and the impact of change is active reskilling of workers where possible. Several pan-European projects<sup>85</sup> aim at understanding the future skills needs of the automotive sector and developing appropriate training for upskilling and reskilling with the involvement of the industry.<sup>86</sup> New skills required will include the ability to set up, operate and maintain automated systems. Machine tool operators (eg mechanics) will need to complete a formal vocational training programme focused on working with electrical and electronic systems.<sup>79</sup> There is also the need for more transversal skills such as social and intellectual skills (required to evaluate and organise information and data), with a focus on adaptability.<sup>87</sup>



### Automotive manufacturing Germany

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