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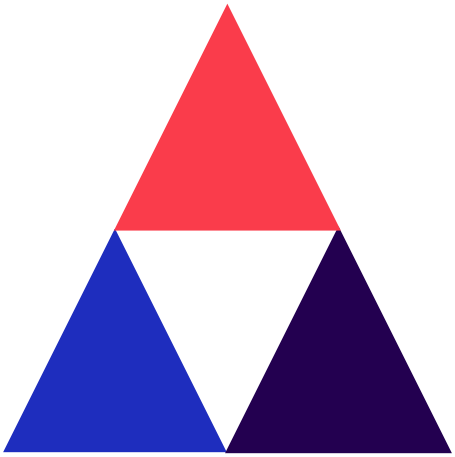
The future of work in the automotive industry: The need to invest in people's capabilities and decent and sustainable work

Issues paper for the Technical Meeting on the Future of Work in the Automotive Industry
(Geneva, 15–19 February 2021)



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Contents

Background

At its 335th Session (March 2019), the Governing Body of the ILO decided to convene a technical meeting on the future of work in the automotive industry and the need to invest in people's capabilities and decent and sustainable work. [1]

At its 337th Session (October–November 2019), the Governing Body in turn decided that the technical meeting should take place in Geneva on 4–8 May 2020. [2] In the context of the ILO Centenary Declaration for the Future of Work, [3] the meeting will discuss future needs for skills and vocational education and training in the automotive industry. With regard to the composition of the meeting, the Governing Body decided to invite all governments, eight Worker representatives and eight Employer representatives, appointed on the basis of nominations made by the respective groups of the Governing Body. Selected official international organizations and international non-governmental organizations were to be invited as observers.

This issues paper has been prepared by the International Labour Office as a basis for discussions at the meeting. Chapter 1 contains a brief overview of the automotive industry today in terms of its structure; vehicle production and sales; and contribution to gross domestic product (GDP), world trade and employment. Chapter 2 sets out the megatrends and drivers of change that will transform the industry in the future, with a focus on technological advances, globalization, demographics and climate change. Chapter 3 describes the challenges and opportunities for decent and sustainable work in terms of employment; skills and lifelong learning; social protection and conditions of work; fundamental principles and rights at work; and social dialogue.

The issues paper addresses the challenges and opportunities that the automotive industry faces in the context of the Centenary Declaration, in which the Conference declared that, in further developing its human-centred approach to the future of work, the ILO must direct its efforts to:

(i) ensuring a just transition to a future of work that contributes to sustainable development in its economic, social and environmental dimensions;

(ii) harnessing the fullest potential of technological progress and productivity growth, including through social dialogue, to achieve decent work and sustainable development, which ensure dignity, self-fulfilment and a just sharing of the benefits for all;

(iii) promoting the acquisition of skills, competencies and qualifications for all workers throughout their working lives as a joint responsibility of governments and social partners in order to:

[1] GB.335/POL/3.

[2] GB.337/POL/2.

[3] ILO, ILO Centenary Declaration for the Future of Work, International Labour Conference, 108th Session (2019).

– address existing and anticipated skills gaps;

– pay particular attention to ensuring that education and training systems are responsive to labour market needs, taking into account the evolution of work; and

– enhance workers' capacity to make use of the opportunities available for decent work. [4]

[4] ILO, Centenary Declaration, para. II.A(i)–(iii).

1. The automotive industry

1. The automobile is one of the most successful manufactured products of the past century. It is perceived as a fast, comfortable, flexible and affordable mode of transport and has become a status symbol or means to reflect identity. [5] Automobiles are and will continue to be critical for the functioning of various industries, sectors, societies and economies worldwide. [6]

2. The automotive industry is a major industrial and economic force in several economies. It originated in Germany and France, came of age in North America in the era of mass production and was further developed in Japan and the Republic of Korea. More recently, China has become a leader in the industry, particularly with regard to the production of electric vehicles (EVs). Vehicle volumes, features, choice, sales and trade and the contribution of the automotive industry to GDP have grown steadily throughout its history. It is so synonymous with twentieth century industrial development and so intertwined with mass production and mass consumption that it has been called the "industry of industries". [7]

3. The automotive industry makes a significant contribution to the global economy and to growth and development worldwide. Its annual turnover is equivalent to the size of the sixth largest economy in the world. [8] The trade in motor vehicles reached US$1.5 trillion in 2018, less than the trade in chemicals and various machinery but more than trade in communication products and in oil, gas and coal. [9] The industry is capital-intensive, drives innovation and generates billions of dollars in investment and millions of jobs and livelihoods.

4. At the same time, the use of automobiles is a major cause of local air pollution, greenhouse gas emissions and road accidents. Combined with the large environmental footprint of the automotive industry and concerns about working conditions in its supply chains, the industry is faced with increasing pressure to reduce its negative externalities and advance decent and sustainable work.

5. Because of its size and impact, the automotive industry is key to achieving the 2030 Agenda for Sustainable Development, in particular to achieving Goal 8 of the Sustainable Development Goal (SDGs), which aims to promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all. If the negative externalities of automotive use and production can be reduced further, the industry can also play a role in achieving the SDGs in other areas, including by contributing to road safety and occupational safety and health (SDG 3); quality education and lifelong learning (SDG 4); innovation, inclusive and sustainable industrialization, and resilient infrastructure (SDG 9); sustainable cities and communities (SDG 11); and responsible consumption and production patterns (SDG 12).

[5] Lauren Redman et al.: "Quality Attributes of Public Transport that Attract Car Users: A Research Review", *Transport Policy* 25 (2013), 119–127.

[6] August Joas et al., "Building the Automotive Industry of 2030", *Automotive Manager* (2019).

[7] Yorgos Papatheodouru and Michelle Harris, "The Automotive Industry: Economic Impact and Location Issues", *Industry Week*, 5 January 2007.

[8] S. Maryam Masoumi et al. "Sustainable Supply Chain Management in the Automotive Industry: A Process-Oriented Review", *Sustainability* 11(14), 2019.

[9] UNCTAD, Key Statistics and Trends in International Trade 2018, 2019, p. 14.

6. The automotive industry has for many years been a leader of research and development (R&D) in manufacturing. It is constantly investing in the development of greener and safer vehicles that are produced with new technologies and materials. With an annual R&D expenditure of more than €50 billion (about US$55 billion), the industry is a frontrunner in innovation and a key driver of knowledge. [10]

7. The automotive industry has also invested in and implemented concrete measures for the development of the skills of its workers all over the world. Training is provided in-house, by industry associations, in collaboration with vocational education and training institutions, and with various government ministries. [11] Given the deep transformation that the sector currently faces, the industry will need to place even more emphasis on attracting, recruiting, training, reskilling and upskilling women and men. It will need to invest in the capabilities of a workforce that will master new technologies and possess the right skill set to drive innovation, productivity and sustainability in the future. [12]

8. At the same time, the automotive industry will need to advance other dimensions of decent and sustainable work in order to promote a just transition to a future of work that contributes to sustainable development in its economic, social and environmental dimensions.

1.1. Definition and structure

9. For the purposes of this issues paper, the ILO defines the automotive industry as classified in the International Standard Industrial Classification of All Economic Activities (ISIC), Revision 4. [13]

10. The automotive industry consists of complex supply chains, which over time have evolved into a global production network (see section 2.2). While only a limited number of countries and companies lead the production of automobiles, the industry's value chain is spread all over the globe and a large number of companies are involved in designing, developing, manufacturing, marketing, selling, repairing and servicing automobiles and automobile components. On average, each vehicle contains more than 20,000 parts, which original equipment manufacturers (OEMs) source from thousands of different suppliers. [14]

[10] Marco Opazo-Basaez et al., "Uncovering Productivity Gains of Digital and Green Servitization: Implications from the Automotive Industry", *Sustainability* 10(5), 2018.

[11] Opeyeolu Timothy Laseinde and Grace Mukondeleli Kanakana, "Interventions to Skills Development in the Automotive Manufacturing Sector of South Africa", in *Skills Development for Sustainable Manufacturing*, ed. Christianah Ijagbemi and Harold Campbell (IntechOpen, 2017).

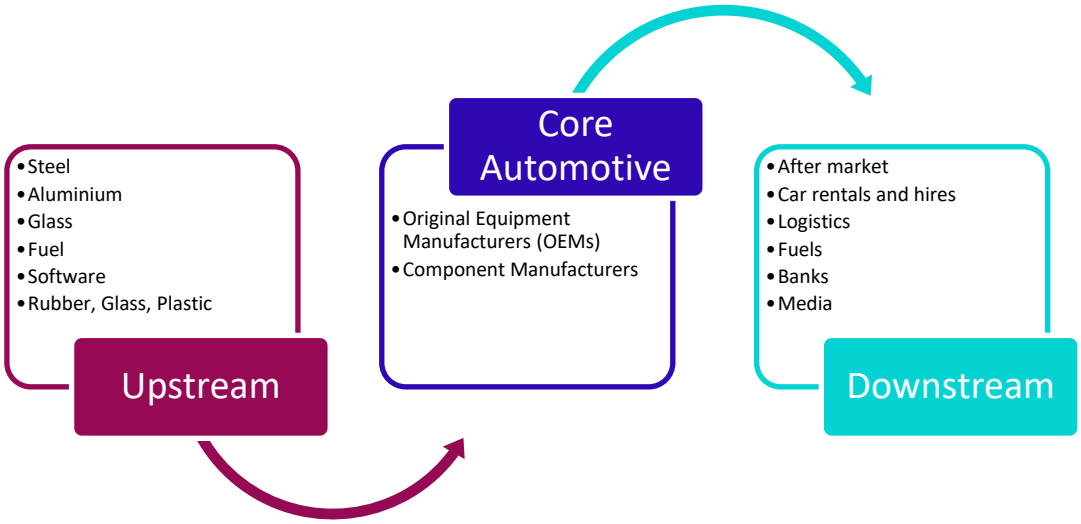
[12] Strategy&, "Automotive Trends 2019: The Auto Industry Must Find a Way to Balance Accelerating Innovation and Financial Survival", n.d.

[13] UN, International Standard Industrial Classification of All Economic Activities (ISIC), Revision 4. ISIC, Rev. 4, classifies the manufacturing of motor vehicles under division 29, "Manufacture of motor vehicles, trailers and semi-trailers", including the manufacturing of parts and accessories for motor vehicles. This issues paper focuses on subdivision 291, "Manufacture of motor vehicles"; subdivision 292, "Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers"; and subdivision 293, "Manufacture of parts and accessories for motor vehicles". It is important to note that some key components, such as batteries, tyres and lighting equipment, are not covered under division 29 but are still under the scope of this issues paper.

[14] Shefali Kapadia, "Moving Parts: How the Automotive Industry is Transforming", *Supply Chain Dive*, 20 February 2018.

11. Figure 1 below presents a simplified version of the automotive supply chain. The focus of this issues paper is primarily on the "core automotive" segment of the supply chain.

Figure 1. The automotive supply chain



Source: Adapted from Market Realist data

12. The automotive industry is dominated by a limited number of multinational enterprises (MNEs). Small and medium-sized enterprises (SMEs) are much more prevalent among the second and third tiers of the industry's supply chains.

13. Lower tier suppliers, who are mostly SMEs, do not typically have access to the human resources, financing, knowledge and competencies to meet basic cost, quality and delivery requirements. They tend to participate in supply chains in an ad hoc and unsustainable manner. [15] However, new technologies, new customer preferences and new market entrants have the potential to reduce the current importance of economies of scale and create opportunities for smaller companies to operate profitably in the future (see section 2.1).

14. The number of large enterprises in the industry is increasing. The number of automobile and automobile parts companies in Fortune's Global 500 increased from 27 to 34 between 2010 and 2019; those 34 companies generated US$2,866 billion in revenue in 2019. [16]

15. Production has increasingly shifted towards emerging economies. In 2010, large enterprises were mostly based in Japan, Germany and the United States of America and there were few China-based companies. In 2019, 7 of the 34 companies in Fortune's Global 500 were Chinese companies, accounting for 17 per cent of the revenues. [17] Several factors, including increased sales and growing mergers and acquisitions in emerging markets, could have led to this geographic shift.

[15] Based on findings of case studies by the ILO SCORE programme Indonesia, the UNIDO Tirisano cluster programme and case studies by UNIDO on the automotive industries of Belarus and Colombia.

[16] Fortune, "Global 500".

[17] Fortune.

16. Mergers and acquisitions have played a key role in shaping the structure and geographic footprint of the industry and have evolved with the industry's needs over time. In the 1990s, mergers and acquisitions in the automotive industry were largely the result of overcapacity. The growth of mergers and acquisitions activity was initially driven by economies of scale and growth, as well as to increase product ranges. Companies then started expanding their operations to emerging markets, especially the BRIC (Brazil, Russian Federation, India and China) countries, in order to establish a global presence and in some cases to reduce production costs. [18]

17. Increasingly, mergers and acquisitions have been focusing on functional collaboration and technology and platform-sharing agreements. According to the Boston Consulting Group (BCG), mergers and acquisitions activity increased drastically in 2018 and the beginning of 2019 but has remained stagnant since then. Recent activity is being driven by the need to find shortcuts to innovation, scale and growth; to expand into new products and services; to sell assets that no longer fit the future strategy of the company; and to cater to the needs of shareholders. [19] Such activity includes not only OEMs but also component manufacturers, suppliers and technology companies. Given the megatrends and drivers discussed in Chapter 2, partnerships with technology companies are becoming increasingly important.

1.2. Global motor vehicle production

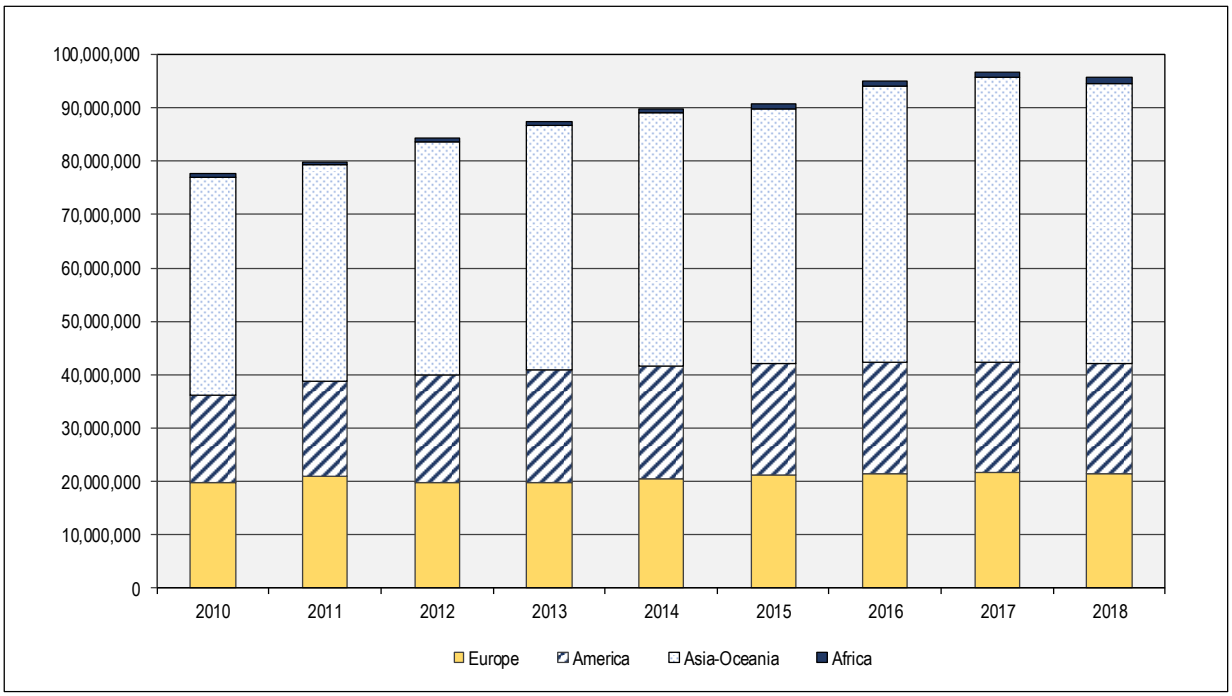
18. Global automotive unit production increased between 2010 and until 2017, when it reached 95.66 million units; between 2017 and 2018, it decreased to 95.05 million units.

19. Motor vehicle production has transitioned from being dominated by only a few countries to being dominated by many. The number of motor vehicles produced in the Asia and the Pacific region has increased substantially over time, while it has been relatively stable in other regions. At the end of 2018, nearly 52 million units were produced in the Asia and the Pacific region, representing about 55 per cent of global motor vehicle production (figure 2).

[18] B. Rajesh Kumar, "Mergers and Acquisitions in the Automobile Sector", in *Mega Mergers and Acquisitions*, ed. B. Rajesh Kumar (Palgrave Macmillan, 2012).

[19] Georg Keienburg et al., "As Tech Transforms Auto, Deals are Booming" (BCG, 2019).

Figure 2. Global motor vehicle production by region, 2010–18 (unit)



Note: America includes North, Central and South America.

Source: International Organization of Motor Vehicle Manufacturers (OICA), correspondents survey.

20. The top five producers of motor vehicles in 2018 were China, the United States, Japan, India and Germany. In line with the regional trends discussed above, production in China and India increased by 26 and 33 per cent, respectively. Growth in the United States and Japan was much lower, at 2 and 1 per cent, respectively. Motor vehicle production in Germany decreased by 10 per cent (table 1).

Table 1. Production of motor vehicles (unit) in 2018 and 2013 and change in production between 2018 and 2013, selected countries

Country	Units produced in 2013	Units produced in 2018	Change (percentage)
China	22 116 825	27 809 196	26
United States	11 066 432	11 314 705	2
Japan	9 630 181	9 728 528	1
India	3 880 938	5 174 645	33
Germany	5 718 222	5 120 409	-10
Mexico	30 523 95	4 100 525	34
Republic of Korea	4 521 429	4 028 834	-11
Spain	2 163 338	2 819 565	30
France	1 740 000	2 269 600	30
Thailand	2 457 057	2 167 694	-12
Canada	2 379 806	2 020 840	-15
Russian Federation	2 175 311	1 767 674	-19

Country	Units produced in 2013	Units produced in 2018	Change (percentage)
United Kingdom	1 597 872	1 604 328	0
Czech Republic	1 132 931	1 345 041	19
Indonesia	1 206 368	1 343 714	11
Iran, Islamic Republic of	743 680	1 095 526	47
Slovakia	975 000	1 090 000	12
Italy	658 207	1 060 068	61
Poland	583 258	659 646	13
South Africa	545 913	610 854	12
Malaysia	601 407	565 000	-6
Romania	410 997	476 769	16
Argentina	791 007	466 649	-41
Hungary	222 400	430 988	94
Morocco	167 452	402 085	140
Belgium	503 504	308 493	-39
Portugal	154 001	294366	91
Pakistan	142 145	269 700	90
Vietnam	40 920	237 000	479
Uzbekistan	154 760	220 667	43
Slovenia	93 734	209 378	123
Austria	166 428	164 900	-1
Finland	20 603	112 104	444
Colombia	74 900	72 800	-3
Egypt	39 050	69007	77
Serbia	10 905	56 449	418
Belarus	25 600	23 235	-9
Ukraine	50 449	6 623	-87

Source: OICA, correspondents survey.

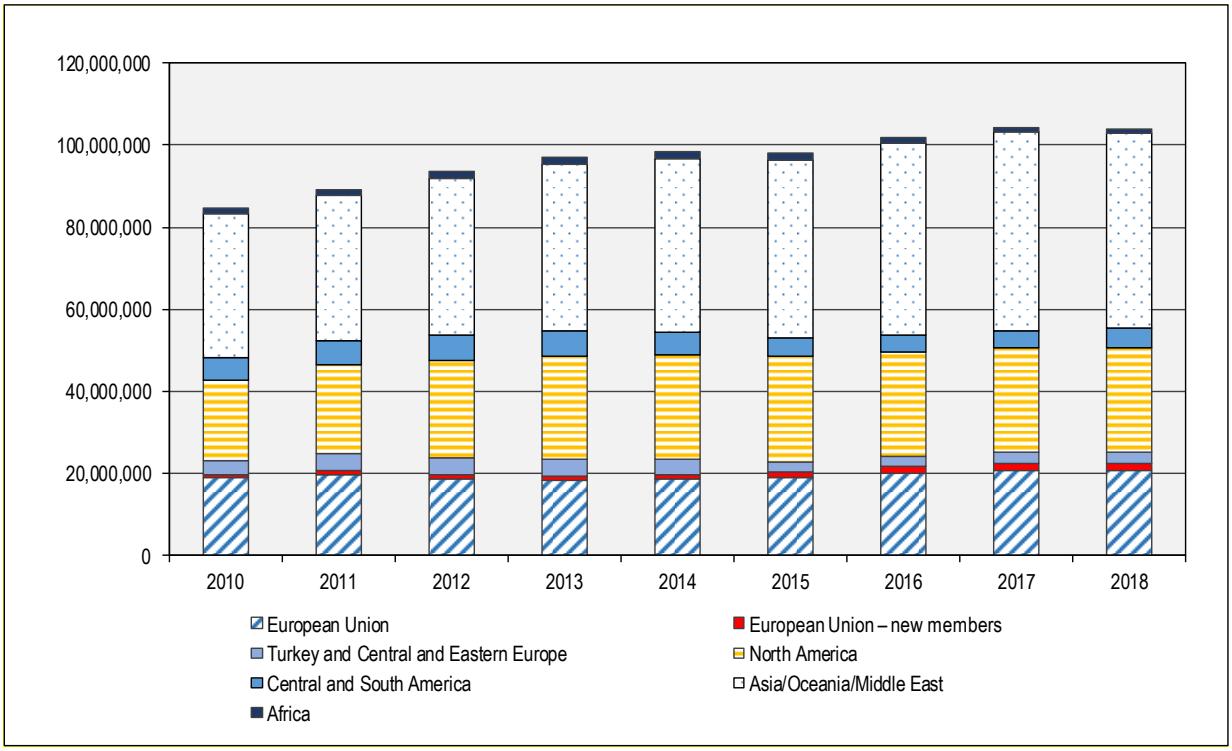
1.3. Global motor vehicle sales

21. Sales of new vehicles (all types, including used vehicles) increased from more than 80 million units in 2010 to more than100 million units in 2018 (figure 3).

22. Sales of motor vehicles in countries of the Asia and the Pacific region and the Arab States increased by 60 per cent, from 25 million units in 2010 to 47 million units in 2018, followed by North America, where sales increased by 30 per cent, from 20 million units in 2010 to 26 million units in 2018. In the European Union (EU), sales increased by 10 per cent, from 19 million units in 2010 to 21 million units in 2018. In other regions, sales decreased

(figure 3). According to data from the Japan Automobile Manufacturers Association, sales increased the most in the BRIC countries. [20]

Figure 3. Registrations or sales of new motor vehicles (all types), by region, 2010–18



Source: OICA, sales statistics.

23. The regional data above is in line with historical patterns that suggest that automobile ownership increases with income per capita. Automobile ownership increases slowly at lower levels of GDP per capita, increases rapidly at middle income levels and then slows down at higher income levels. Following this reasoning, it can be expected that automobile ownership will continue to grow in emerging economies, such as China and other BRIC countries, but will stagnate in Europe and the United States. [21]

24. However, changing consumer preferences, the availability of public transportation, urban layout and policy restrictions can also have an impact on the rate of growth of automobile ownership. [22] The role of such factors can already be seen in China, where the demand for vehicles has recently decreased due to increasing levels of vehicle saturation in cities and the reduction of tax incentives. [23]

[20] JAMA, *The Motor Industry of Japan 2019* (2019).

[21] Huapu Lu et al., "Analysis and Prediction on Vehicle Ownership Based on an Improved Stochastic Gompertz Diffusion Process", *Journal of Advanced Transportation* (2017), 1–8.

[22] Lu et al.

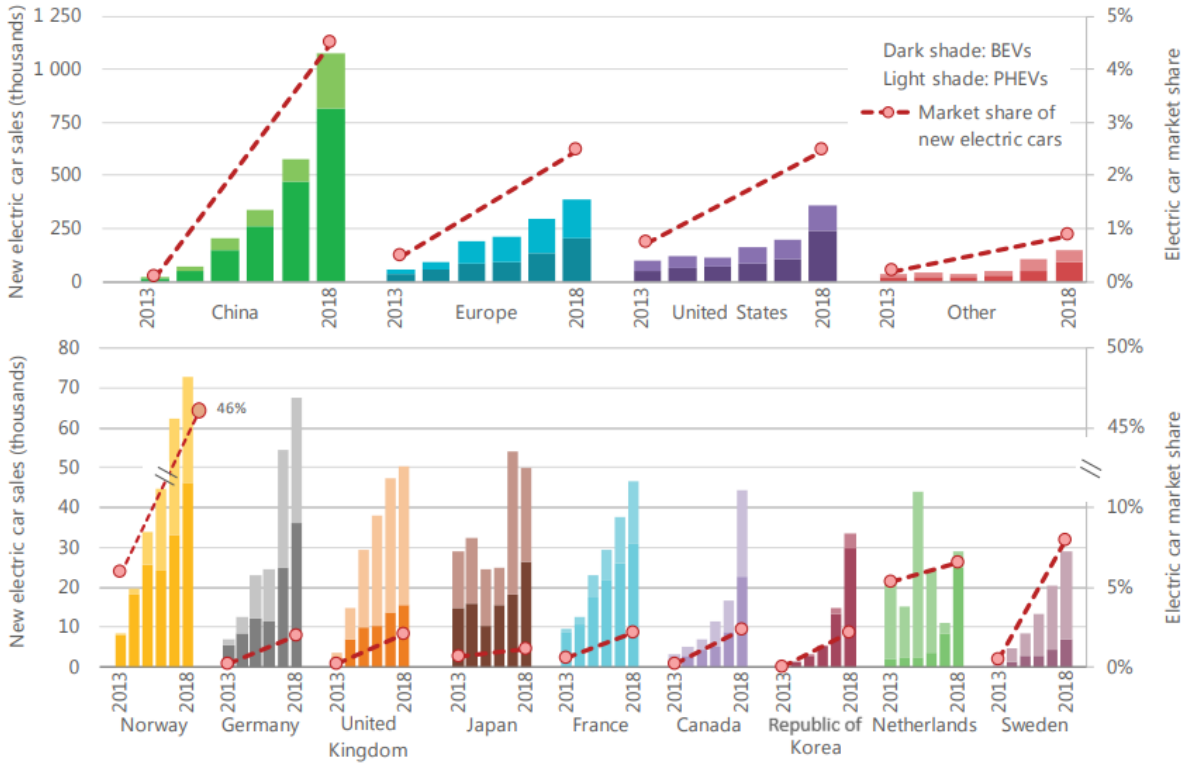
[23] Ben Winck, "The Auto Industry is Shrinking as the World Reaches 'Peak Car' – and It's Dragging Down the Entire Global Economy", *Markets Insider*, 30 October 2019.

25. Although overall automobile production and sales are stagnating, the global EV industry [24] has seen tremendous growth in a short period. Policies such as emission targets, procurement programmes, fiscal incentives to increase the value proposition of EVs and the adoption and further development of EV infrastructure have had a significant influence on the development of this industry. Technological developments in batteries and production systems and capacity have brought about significant cost reductions. In the future, the industry may also benefit from cost reductions resulting from other technologies that could help redesign vehicle manufacturing, making it simpler, innovative and dependent on fewer parts. The private sector's response to these policies and technological developments has been energetic, including OEM commitments on electrification and growth in investment. [25]

26. In 2018, global EV sales exceeded 5.1 million units, an increase of 2 million units over 2017, while in Europe and the United States, sales increased by 385,000 and 361,000 EVs, respectively, over the same period. In 2018, China sold nearly 1.1 million EVs and had 2.3 million units on the road by 2018, making it the world's largest EV market.

27. The next largest markets are Europe and the United States, with 1.2 million EVs and 1.1 million units, respectively, on the road by the end of 2018. Norway is the global leader in terms of EV market share, with EVs accounting for 46 per cent of its new vehicle sales in 2018 (figure 4). [26]

Figure 4. Global EV sales and market share, 2013–18



BEV = Battery electrical vehicle
PHEV = Plug-in hybrid electrical vehicle
Source: IEA, *Global EV Outlook 2019: Scaling Up the Transition to Electric Mobility*, 2019, p. 10.

[24] Including battery and plug-in hybrid electric vehicles.

[25] IEA, *Global EV Outlook 2019: Scaling Up the Transition to Electric Mobility*, 2019.

[26] IEA.

28. The performance of the EV industry varies geographically. China is leading the market, accounting for 51 per cent of global EV sales in 2018. [27] That success can be attributed to the subsidies rolled out in 2010 as incentives for the consumption of new energy vehicles. The United States market also saw significant growth, while the European market saw only moderate growth and the picture varied significantly at the national level.

1.4. Contribution to gross domestic product and world trade

29. The automotive industry is of strategic importance for the national economic growth of many Member States. In developed economies, the GDP share of the automotive industry is relatively high, varying from 10 per cent in the Republic of Korea to 14 per cent in Germany. The automotive industry in South Africa accounted for 7 per cent of the country's GDP in 2017. [28]

30. The automotive industry represents a significant share of international trade. According to the World Trade Organization (WTO), in 2017 motor vehicles and automotive parts accounted for 9 per cent of world merchandise exports and 12 per cent of world exports of manufactured goods.

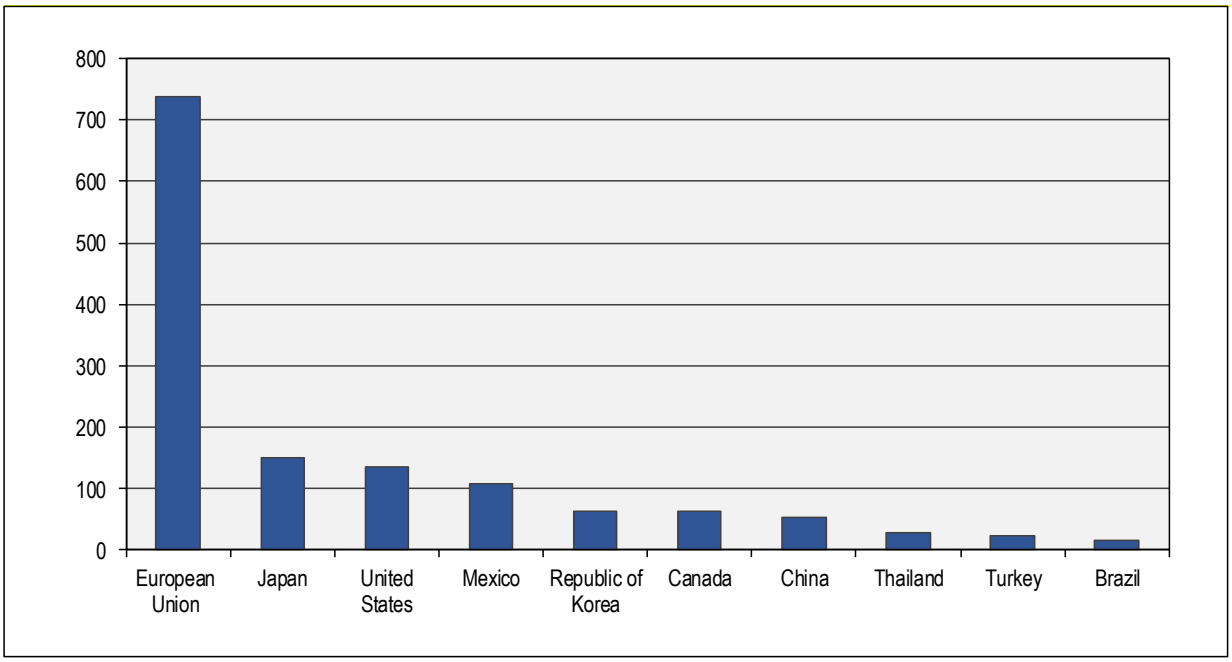
31. The share of the EU in world exports of automotive products increased by 0.5 per cent in 2017 to reach 50.6 per cent. The next largest exporters were Japan, the United States and Mexico. Among the top ten exporters, Brazil recorded the largest increase (32 per cent), followed by Turkey (22 per cent) and Mexico (14 per cent) (figure 5). Collectively, the top ten exporters shared almost 95 per cent of world exports of automotive products in 2017. [29]

[27] Patrick Hertzke et al., "Expanding Electrical Vehicle Adoption Despite Early Growing Pains" (McKinsey & Company, 2019).

[28] Dave Coffey, "Auto Sector Worth its Priority Status," *Sunday Tribune*, 2 December 2018.

[29] WTO, *World Trade Statistical Review 2018*, 2018.

Figure 5. Top ten exporters of motor vehicles and automotive parts, 2017 (US$ billions)



Source: WTO, *World Trade Statistical Review 2018*, 2018.

32. While figure 5 shows that the EU was the top exporter of automotive products, it is important to note that this value includes intra-EU trade. This could account for a large proportion of the exports as the region has a dense and powerful network of suppliers and does not have a large share of "far-distance" supply flows. A similar regional element can be seen in North America and East Asia (see section 2.2). [30]

33. The *Financial Times* reported that the global manufacturing industries were experiencing their sharpest and most geographically widespread downturn in the first half of 2019. One of the reasons for this was trade friction between China and the United States, which hit the automotive industry the hardest. Activity across global automotive producers reached a near-record low in the first half of 2019. [31]

34. The effect of trade restrictions is amplified for the automotive industry because of the widespread use of the "just-in-time" or lean manufacturing system, for which quick access to inputs from suppliers is crucial. To address the increasing risk of trade turbulence, the automotive industry is moving production closer to growth markets, contributing to the process known as reshoring or nearshoring.

1.5. Global employment

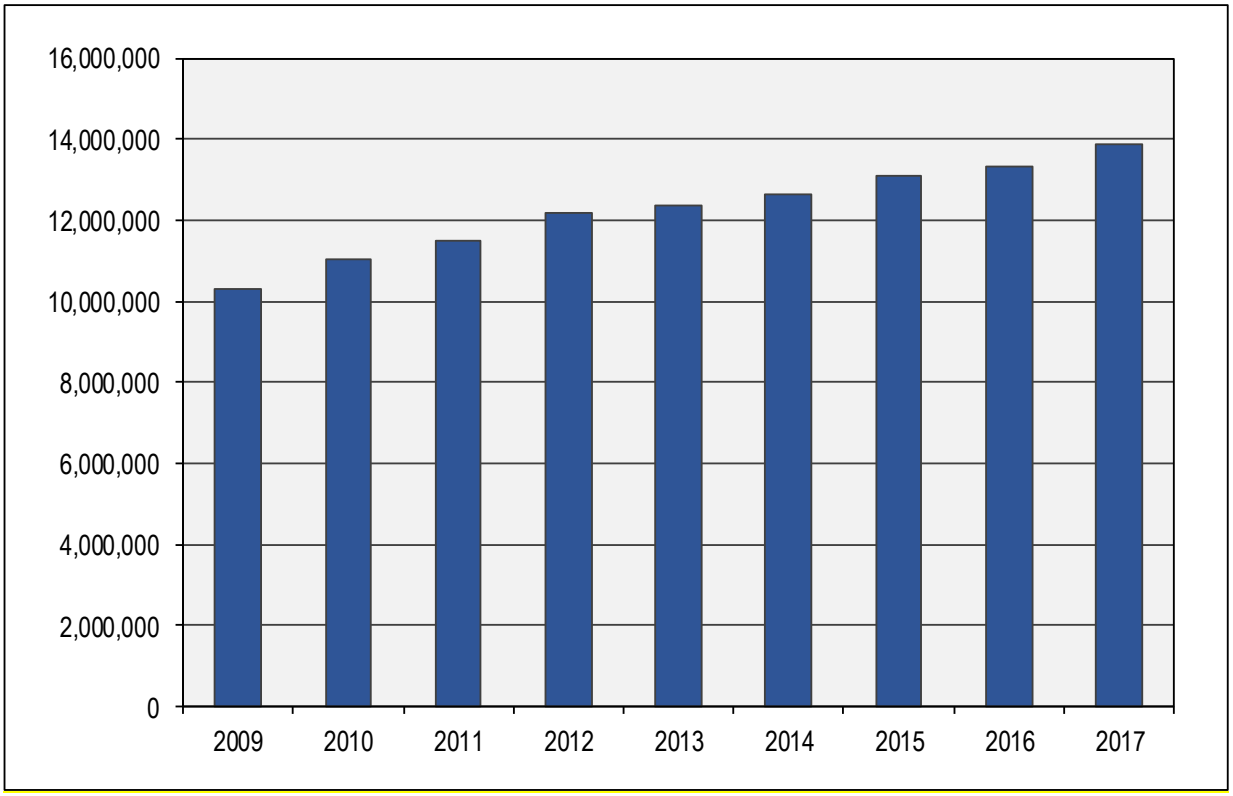
35. The automotive industry contributes significantly to global manufacturing employment. According to the UNIDO Industrial Statistics Database, the number of employees in the "Motor vehicles, trailers, semi-trailers" sector has increased by 35 per cent since the global

[30] Vincent Frigant and Martin Zumpe, "Are Automotive Global Production Networks Becoming More Global? Comparison of Regional and Global Integration Processes Based on Auto Parts Trade Data", *Cahiers du GREThA* (May 2014).

[31] Valentina Romei, "Car Industry Drags Global Manufacturing into Sharp Slowdown", *Financial Times*, 9 September 2019.

financial crisis. In 2017, global employment in the sector was estimated at nearly 14 million workers (figure 6).

Figure 6. Global employment estimate in the "Motor vehicles, trailers, semi-trailers" sector, 2009–17



Source: UNIDO, INDSTAT 2 2019, ISIC Revision 3 database.

36. In some countries, employment in the industry grew substantially between 2009 and 2017. For example, employment in China's automotive industry increased by more than 2 million, representing a 68 per cent increase over that period. By contrast, employment in Australia, Belgium, Brazil, France, Italy, the Russian Federation and South Africa decreased (table 2).

Table 2. Employment in the "Motor vehicles, trailers, semi-trailers" sector, selected countries, 2009 and 2017, and change in employment between 2009 and 2017

Country	Employment in 2009	Employment in 2017	Change (percentage)
China	3 061 400	5 152 245	68
Japan	806 096	1 086 177	35
India	618 560	961 563	55
United States	741 816	884 865	19
Germany	754 286	851 438	13
Mexico	387 760	796 270	105
Brazil	471 019	417 692	-11
Republic of Korea	262 516	328 548	25
Russian Federation	391 439	298 378	-24
France	234 168	220 651	-6
Poland	143 879	190 700	33

Country	Employment in 2009	Employment in 2017	Change (percentage)
Romania	109 144	189 669	74
Turkey	110 660	181 573	64
Czech Republic	134 680	169 548	26
Iran (Islamic Republic of)	146 821	162 684	11
Italy	172 716	161 637	-6
Indonesia	85 362	160 752	88
United Kingdom	154 978	158 489	2
Spain	145 263	157 302	8
Viet Nam	56 461	144 931	157
Canada	95 729	123 671	29
Hungary	63 927	95 080	49
South Africa	119 991	93 572	-22
Malaysia	58 380	91 589	57
Philippines	52 921	88 675	68
Slovakia	48 460	73 666	52
Sweden	63 515	69 489	9
Ukraine	36 461	53 412	46
Belarus	70 670	41 536	-41
Australia	86 000	39 144	-54

Source: UNIDO, INDSTAT 2 2019, ISIC Revision 3 database.

37. Not only does the automotive industry directly employ a large number of manufacturing workers but it also creates additional jobs in other industries in the supply chain. For example, a study in the United States found that for each direct job created in the automotive industry, four additional jobs were created in another sector. [32] Similarly, in the EU, 13.8 million people are employed either directly or indirectly by the automotive sector, of whom only 2.6 million are directly employed in manufacturing motor vehicles. [33]

38. It is not specified whether the UNIDO data cited above (table 2) includes temporary workers. A study commissioned by the ILO on the future of work in the automotive sector found that the adoption of lean manufacturing methods in the automotive industry increased the use of temporary workers as this method required a considerable amount of flexibility. The use of temporary workers is much more prevalent among second-, third- and fourth-tier suppliers, for which capital intensity is low. [34]

[32] CAR, *Contribution of the Automotive Industry to the Economics of All Fifty States of the United States*, 2015.

[33] European Commission, "Automotive Industry", n.d.

[34] Tommaso Pardi: *The Future of Work in the Automotive Sector: The Challenges of Deglobalization*, (ILO, 2017).

39. While data on the share of women employed in the automotive industry is sparse, available data from the ILO shows that female participation in the industry is low. However, there is considerable variation at the national level (table 3).

Table 3. Female employment in the "Motor vehicles, trailers, semi-trailers" sector, selected countries, 2017

Country	Percentage of women employed
France	18
Germany	18
Hungary	32
Italy	19
Philippines	34
Poland	33
Romania	39
Slovakia	34
Sweden	24
Turkey	15
United Kingdom	16
United States	19
Viet Nam	45

Source: ILO, ILOSTAT database.

1.6. The automotive industry at a turning point

40. Throughout its history, the automotive industry has proved remarkably resilient. It has recovered from the most recent global financial and economic crisis and continues to make a significant contribution to GDP, global trade and employment.

41. However, the industry today is at a turning point and faces an increasingly uncertain future:

- The automotive industry is slowing faster than expected. According to the International Monetary Fund's *World Economic Outlook*, the auto sector represented 20 per cent of the GDP slowdown in 2018. Tensions in global trade and the emergence of trade restrictions could cause further harm to the growth of the industry in the near future. [35]

- Rapid technological developments leading to improvements in design and manufacturing, increases in digital driving systems, changing consumer preferences, growing concern about sustainability and climate change and regulatory pressures and measures continue to transform the structures and systems that underpin the automotive industry. An example of such transformation is the rapid rise in the global supply and demand for EVs.

[35] Winck.

42. There is broad recognition that disruption will to a large extent become a permanent feature of the industry in the years to come and that the automotive industry of the future will look markedly different from the automotive industry of today. The future of the automotive industry will to a large degree depend on the capabilities and skills of the women and men that work in the industry.

2. Megatrends and drivers of change

43. The automotive industry has undergone substantial change in recent years, determined to a large degree by several key megatrends and drivers of change. This chapter reviews how technological advances, globalization, demographics and climate change are likely to continue to transform automotive production, creating new challenges and opportunities for the industry. These opportunities and challenges will need to be addressed by governments, employers and workers in order to advance decent and sustainable work and promote a just transition to a future of work that contributes to sustainable development in its economic, social and environmental dimensions.

2.1. Technological advances

44. Automotive industry investments in new technologies are projected to reach US$82 billion in 2020. [36] These are being integrated into already highly advanced manufacturing in order to reduce lead times and increase customization. Furthermore, digitalization is disrupting the entire automotive supply chain, from product design to the sale of automobiles. Technological advances are also enabling manufacturers to offer new products and services, such as EVs and automated vehicles (AVs).

2.1.1. Advanced manufacturing

45. Digitalization is heralding a new era of advanced manufacturing in the automotive industry – elements of which have been described as "Industry 4.0". [37] These technologies include the integration of advanced analytics, artificial intelligence, sensor technologies, the internet of things, cloud computing, blockchain, cyber-physical systems, machine learning, robotics and 3D printing.

46. These new technologies are transforming advanced manufacturing, with smart factories able to rapidly change over production lines and shorten lead times. [38] Digital technologies are interacting with existing technologies, such as welding robots, that have been utilized in vehicle manufacturing for decades. Nevertheless, access to these technologies is not evenly distributed throughout the supply chain. Advanced digital technologies used by OEMs and large parts suppliers often coexist with legacy technologies in many SMEs in lower segments of the supply chain.

47. The automotive industry pioneered the use of robots, including collaborative robots (cobots) that can work alongside humans on the factory floor. Along with other related technologies

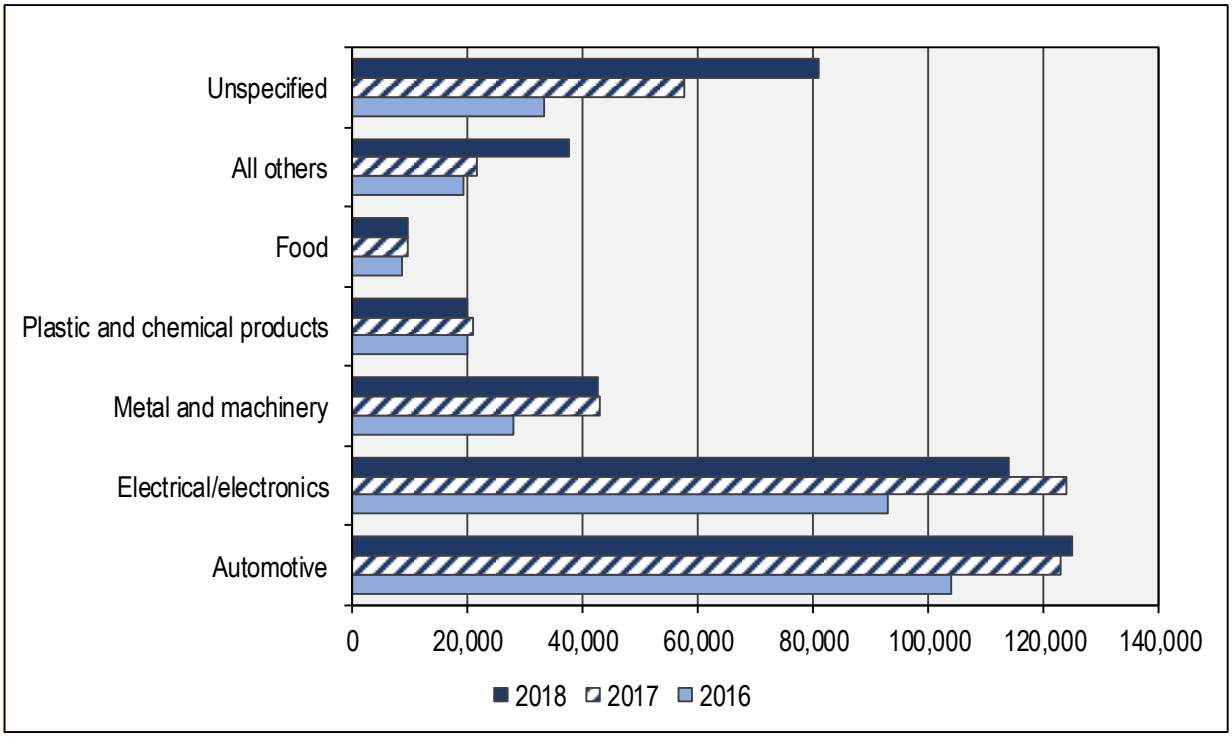
[36] Daniel Newman, "Top 5 Digital Transformation Trends in Automotive for 2019", *Forbes*, 17 January 2019.

[37] IndustriALL Global Union, *The Challenge of Industry 4.0 and the Demand for New Answers*, 2017.

[38] Nitesh Bansal, "This is How a Smart Factory Actually Works" (WEF, 2019).

such as exoskeletons – robotic suits that can reduce the strain of repetitive tasks for workers – advanced robotics are extending automation from welding and painting to tasks across the production process. [39] The sector is today the largest user of robots among manufacturing industries, accounting for 30 per cent of total installations. Annual installations from 2016 to 2018 exceeded those in electrical/electronics, metal and machinery, and plastics and chemical products manufacturing (figure 7).

Figure 7. Annual installations of industrial robots at year end worldwide by industries, 2016–18



Source: IFR, World Robotics 2019 Industrial Robots.

48. The process of 3D printing is an example of an emerging technology with the potential to transform automotive production and further streamline just-in-time production. OEMs and parts suppliers have primarily adopted 3D printing to lower the costs of specialized equipment (such as moulds, jigs and fixtures) and to reduce pre-production model design time. Yet on-demand 3D printing also holds the potential to facilitate the in-house production of parts and could save manufacturers considerable time and resources, reconfiguring the automotive value chain in the process. In 2014, United States-based Local Motors produced the world's first 3D-printed EV, consisting of only 50 individual parts, compared to almost 30,000 in a traditional vehicle. [40]

49. Advanced manufacturing has the potential to transform the industry and enable the management of increasingly fragmented supply chains. The disruption that new technology

[39] Aaron Hand, "The Newest Robotics in Car Manufacturing", *Automation World*, 13 April 2018.

[40] Märtha Rehnberg and Stefano Ponte, "From Smiling to Smirking? 3D Printing, Upgrading and the Restructuring of Global Value Chains", *Global Networks: A Journal of Transnational Affairs* 18, No. 1 (2018), 57–80.

is likely to bring about calls for the adoption of a "human-in-command" approach that ensures that the final decisions affecting work are taken by human beings. [41]

2.1.2. Digitalization in the automotive value chain

50. In addition to the rapid technological advances in core automotive manufacturing, digitalization is set to revolutionize the entire automotive supply chain. [42] Interconnected supply chains improve end-to-end management of the production process and drive down costs and lead times by increasing supply chain transparency through partner system integration and advanced data and analytics, as well as by increasing the efficiency of the process of the value chain from design to manufacture and distribution. [43]

51. Digitalization is further altering the automotive value chain through the predictive maintenance of vehicles. In-vehicle diagnostic systems, smart components and ubiquitous connectivity will alert drivers instantly when there is a problem. Continuous data analysis enables a system of preventive maintenance that reduces critical failures of vehicles, enhances driver safety and lowers the frequency and severity of recalls. Remote diagnostics could generate US$60 billion of additional profits for OEMs, suppliers and telematics service providers. However, dealers and independent service centres stand to lose US$44 billion. [44]

52. Automotive sales are also being transformed by digital technologies, redefining the way that OEMs, consumers and car dealers interact. Not only do consumers have more and more interactive information available to them online but also car showrooms are being transformed into digital marketplaces with virtual reality capabilities. Online retailing increases opportunities for the manufacturer to deal directly with the consumer in selling vehicles or parts. [45] The business model of the automotive industry is therefore evolving rapidly, so that the adoption of AVs and shared mobility solutions could result in even more drastic changes to this model in the future.

53. The digitalization of the automotive value chain offers new opportunities for enterprises, particularly companies that invest in R&D and continue to innovate and technology companies that are able to offer new products and services. Occupations throughout the industry will be shaped by these new technologies and the increasingly rapid growth of data, increasing the demand for highly skilled workers in the fields of science, technology, engineering and mathematics (STEM) who are trained in information and communications technology (ICT) and can respond to new opportunities and the volatility that arise from technological disruption.

[41] Global Commission on the Future of Work, *Work for a Brighter Future* (ILO, 2019).

[42] Randstad, "The Future Success of the Automotive Industry is in its Workforce", n.d.

[43] Randstad; WEF, *Supply Chain Collaboration through Advanced Manufacturing Technologies*, 2019.

[44] Randstad; WEF.

[45] Daniel Newman, "Top 6 Digital Transformation Trends in the Automotive Industry", *Forbes*, 25 July 2017.

2.1.3. New products and materials

54. The demand for new products – in particular EVs and AVs – is further changing the organization of production and work in the automotive industry. The production of these vehicles has in turn increased the demand for new materials.

Electric vehicles

55. Currently, EVs make up a small fraction (2.2 per cent) of automobiles sold worldwide. However, EV sales have been growing rapidly over the last decade (see figure 4) and projections suggest that the market for EVs will continue to grow in the coming years. Research by the International Energy Agency forecasted that in 2030, EVs will make up 70 per cent of all vehicle sales in China, almost 50 per cent in Europe, 37 per cent in Japan, more than 30 per cent in Canada and the United States, 29 per cent in India and 22 per cent in all other countries combined. [46]

56. Fewer parts are involved in the manufacture of EVs than in internal combustion engine vehicles and more of the manufacturing can therefore be done "in-house". Consequently, EVs pose challenges and opportunities to OEMs and parts manufacturers and the workers and suppliers – often SMEs – that cluster around them. A recent report sanctioned by the Government of Germany estimated that 400,000 jobs were at risk from the shift towards EVs. [47]

57. The demand for new products and services, such as EVs, may also create new challenges for sustainability and adopting a "circular economy" approach in the automotive industry (see section 2.4). A key challenge is how to manage the impacts of e-waste generated by the widespread use of batteries with limited life cycles. [48]

Automated vehicles

58. AVs combine technologies such as sensors, the Global Positioning System, big data and AI to enable a vehicle to see, hear, think and operate like a human driver. They represent a disruptive change – for the industry, for transportation and for workers.

59. Although not yet widespread on the road, AV technology is being tested in advanced economies. Industry forecasts on the use of AVs vary greatly and many predict that it could be decades until fully automated vehicles are commonplace. These forecasts depend on factors such as the level of autonomy of AVs; the legal and commercial obstacles that they may yet face; the economic development of the countries studied; and whether issues such as cybersecurity and road safety of AVs can be thoroughly addressed in order to protect the public. [49]

60. Meanwhile, assisted driving – another feature of AV technology – is becoming increasingly common in new models. Assisted driving is an example of technology that is geared towards

[46] IEA.

[47] Joe Miller, "Germany's Shift to Electric Cars Puts 400,000 Jobs at Risk in Next Decade", *Financial Times*, 13 January 2020.

[48] Kirti Richa et al, "A Future Perspective on Lithium-Ion Battery Waste Flows from Electric Vehicles", *Resources, Conservation and Recycling*, Vol. 83 (2014), 63–76.

[49] Richa et al.

increasing car and road safety; it has increased the pressure on Member States and manufacturers to meet international standards, such as United Nations vehicle safety regulations (see box 1). [50]

Box 1
Road safety concerns drive development of advanced and safer vehicles

Every year, some 1.3 million people lose their lives and up to 50 million people are injured on the world's roads. The United Nations and many other international, regional and national organizations have over the years called for action to tackle the "ubiquitous but invisible" global road safety crisis, which in turn has increased consumer awareness and brought about tighter regulatory requirements for vehicle safety. The automotive industry is continuously making progress towards building safer vehicles that respond to ever-changing consumer needs and regulatory requirements, while improving road safety for consumers and occupational safety and health for commercial motor vehicle drivers. The demand for greater road safety is likely to drive the development of assisted driving and other digital driving technologies in the future.

Source: ILO, *Guidelines on the Promotion of Decent Work and Road Safety in the Transport Sector*, MERTS/2019/9(Rev.) (September 2019); UN, "UN Calls for Action to Tackle 'Ubiquitous but Invisible' Global Road Safety Crisis", *UN News*, 17 November 2019.

61. Nevertheless, AVs provide a new opportunity for OEMs and technology firms to exploit as investors look for solutions to new mobility behaviours in urban areas. In 2019, Uber's self-driving car project received US$1 billion in funding from Toyota Motor, Denso and SoftBank Vision Fund. [51] This is an example of how the structure of the automotive industry of the future will become more heterogeneous, with technology companies providing new products and services such as AVs and increased competition from new entrants. In the future, value added is increasingly likely to be captured by the companies that provide technological solutions within vehicles rather than by those who actually manufacture them.

New materials

62. New materials are shaping the future of the automotive industry and the vehicles it manufactures. These new materials involve advantages such as lightweighting; increased durability and resistance to impact, extreme heat, cold and other weather conditions; and flexibility in terms of the ability to be moulded into complex and elaborate shapes. The use of new materials may change the dynamics of production, further facilitating just-in-time production, such as where bottlenecks may have been created in the sourcing of metal parts.

63. Polymers and composite materials – such as those formed with carbon fibre and biosourced materials – are being used to lightweight vehicles and improve fuel efficiency. [52] Nanomaterials in the automotive industry offer potential advantages, such as further lightweighting, reduction in emissions and vehicle wear, and corrosion resistance and ultraviolet protection. [53] Currently, however, lightweight materials such as aluminium and

[50] Newman, Top 6 Digital Transformation Trends.

[51] Alan Ohnsman, "Uber's Self-Driving Car Unit Gets $1 Billion Shot in the Arm from Toyota, Denso and SoftBank", *Forbes*, 18 April 2019.

[52] Christophe Aufrere, "New Materials are Shaping the Future of the Automotive Industry", *PlasticsleMag* , 30 March 2018.

[53] Meet A. Moradiya, "How Do Nanomaterials Help Push the Boundaries in the Automotive Industry", *AZoNano*, 9 April 2019.

carbon fibre are channelled into higher-end vehicles as they are often significantly more expensive than traditional materials such as steel. [54]

2.2. Globalization

64. During the twentieth century, offshoring and outsourcing fundamentally transformed national automotive industries into global networks of design, production and distribution across global supply chains, coordinated by OEMs and increasingly powerful parts suppliers. This early stage of globalization, driven by trade liberalization and the growth of emerging markets led by the BRIC economies, brought about fundamental changes in where and how automotive products were manufactured.

65. A study commissioned by the ILO [55] has highlighted how the structure of the automotive industry and its supply chains has further evolved in different ways in different automotive regions of production, in a process referred to as "deglobalization". [56] The report describes how:

– The automotive industry in China in the early 2000s evolved into a highly capital-intensive production system established by foreign multinational OEMs in response to increasing demand for motor vehicles in China among its urban elites.

– The Government of India promoted the growth and development of an automotive industry that would guarantee the production of reasonably priced cars (under US$5,000) for the growing middle class and would rely on technology and parts produced by domestic suppliers.

– In Western Europe and the United States, production was relocated to Central and Eastern Europe and Mexico, respectively, where labour costs were lower.

66. While different production systems have emerged in China, India, Western Europe and the United States, the authors also note that competition has increased in each of these markets and that a key driver has been cost reduction. This has in turn lead to deteriorating employment and working conditions, greater job insecurity and increased labour flexibility, with constant or declining wages. [57]

67. Today, there are signs that the global production network of the automotive industry is entering a new era, in which existing production models maintain considerable momentum but are qualified by uncertainty in the geopolitical and trade climates. Although there are many different reasons for this trend, increasing trade restrictions and underlying structural adjustments in the automotive industry are among the contributing factors.

68. This ambiguous environment is particularly challenging for SMEs in developing countries in lower tiers of the supply chain, because they do not have access to the latest technology

[54] Jae-Hee Chang et al., *ASEAN in Transformation: Automotive and Auto Parts – Shifting Gears* (ILO, 2016).

[55] Pardi.

[56] "Deglobalization" here refers to the slowdown or reverse of globalization, whereby production is increasingly done at the regional or local levels.

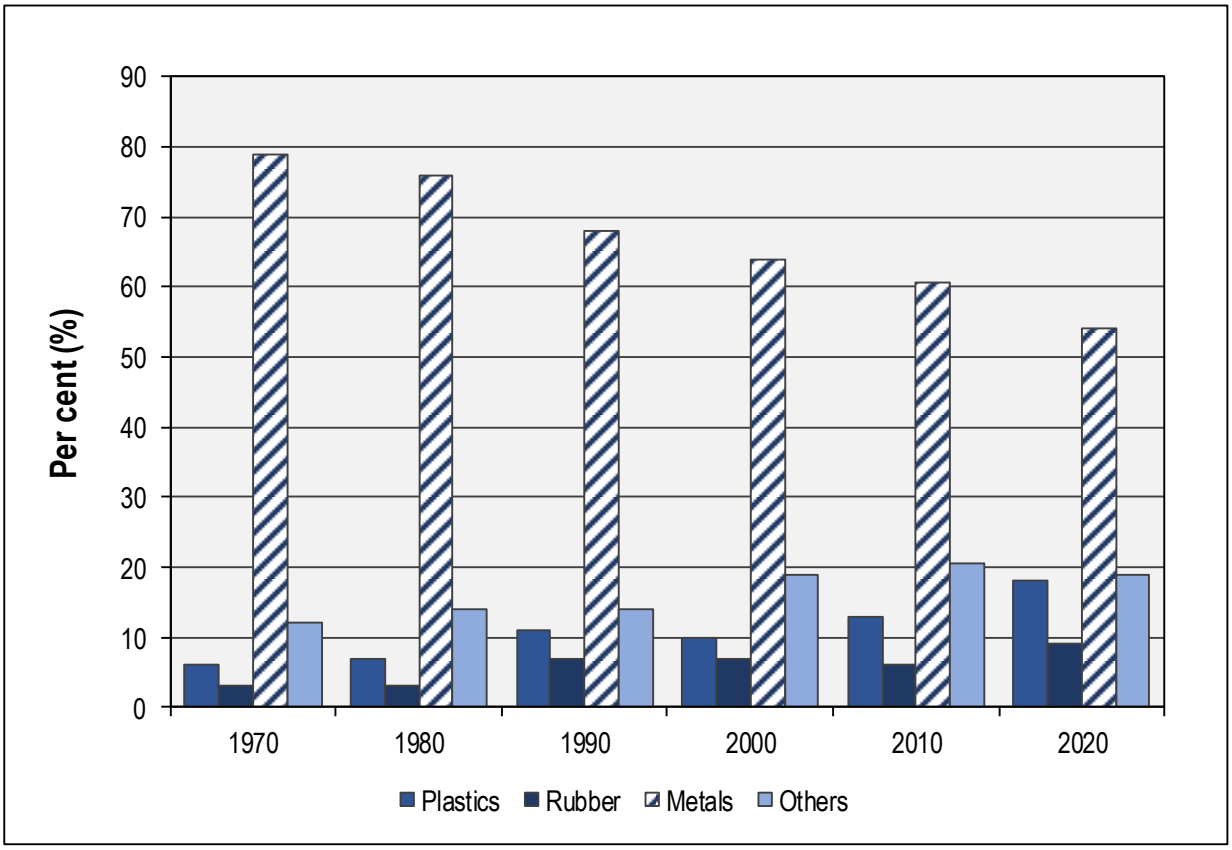
[57] Pardi.

and the means to invest in it. Even when manufacturing has shifted to countries with low labour costs in Asia, Africa and Latin America, high-end design, R&D and product development have largely stayed anchored in OEMs in high-cost and high knowledge-intensive countries. [58] In the future, not only will SMEs that produce parts in the lower tiers of the supply chain have to compete with each other for market shares, but they will also have to compete with increasingly advanced automated production systems in the home countries of OEMs, a trend referred to as nearshoring of production.

69. The above-mentioned digitalization of supply chain management – in which production and delivery cycles are measured in days rather than in weeks – is already forcing OEMs and parts manufacturers to re-examine their existing lean supply chain methodologies in favour of reshoring or nearshoring and other approaches that are more fluid and flexible. Although this will increase cost-efficiency and allow OEMs to respond to the growing demand of consumers for new and customized vehicles, the growing competition and ever-faster placement of orders also risk increasing the downward pressure on SMEs and working conditions.

70. The uncertainties of the new era of globalization are compounded by technological advances and the demand for new materials and inputs for the manufacture of new products and services such as EVs and AVs. Since 1970, the composition of materials used in vehicle production has changed from the use of primarily metals – iron and steel – to plastics and minerals such as copper, cobalt, lithium and nickel (figure 8).

Figure 8. Current and projected change in vehicle composition since 1970



Source: Mekonnen Asmare Fentahun and Mahmut Ahsen Savas, "Materials Used in Automotive Manufacture and Material Selection Using Ashby Charts", *International Journal of Materials Engineering* 8, No. 3 (2018), 40–54.

[58] EPRS, *Reshoring of EU Manufacturing*, 2014.

71. On the one hand, this has created new opportunities for the countries that are endowed with these minerals and the enterprises that turn them into parts and materials used by OEMs. On the other hand, these countries face significant risks associated with the rapidly growing demand for new materials, including environmental degradation, depletion of resources, the impact of volatile mineral prices on the economy and geopolitical tensions. [59]

72. Furthermore, the decrease in demand for traditional materials and parts will likely have a significant effect on many enterprises in the supply chain of the automotive industry. For instance, existing suppliers of iron and steel will experience decreasing demand unless they are able to adapt and develop new lightweight and technologically advanced forms of metals. [60] At the same time, companies that source new minerals and materials from new markets will often be confronted with significant supply chains risks, such as the widespread use of child labour in cobalt mining in some countries. [61]

2.3. Demographics

73. Changing demographics are likely to influence consumption patterns and demand in the automotive industry. Predicting and reacting to shifts in business and consumer demand will provide new opportunities and challenges for the industry and its workers.

74. The United Nations forecasts that the world's population will reach 8.5 billion in 2030 and will exceed 9.7 billion by 2050. More than half of that population growth will be attributed to just nine countries, eight of them developing or emerging economies. [62] Sub-Saharan Africa is projected to have the highest growth rate, with the population of the region doubling by 2050. [63]

75. As the population increases, the size of the global middle class is expected to continue to grow, from about 3.2 billion in 2018 to 5.4 billion by 2030. [64] As noted in Chapter 1, automobile ownership tends to increase with GDP per capita, suggesting there will be growing demand in emerging countries with growing middle classes. However, as also noted in Chapter 1, there are also a number of other factors that could limit demand.

76. Urbanization is set to continue and drive new demand for automobiles in rapidly growing cities. Globally, more than half of the population (55 per cent) now live in urban areas; by 2050, 68 per cent are expected to do so and 90 per cent of that urban population will live in

[59] PwC, *Minerals and Metals Scarcity in Manufacturing: The Ticking Timebomb*, 2011.

[60] American Iron and Steel Institute, "The Value of Steel in the Automotive Industry", n.d.

[61] ILO, *Child Labour in Mining and Global Supply Chains*, 2019.

[62] In descending order of expected population increase, those nine countries are: India, Nigeria, Pakistan, the Democratic Republic of the Congo, Ethiopia, the United Republic of Tanzania, Indonesia, Egypt and the United States.

[63] UN, *World Population Prospects 2019: Highlights*, 2019.

[64] UN, "Amid Rampant Overconsumption, Responsible Food, Clothing Habits Key to Achieving 2030 Agenda, High-Level Political Forum Hears, as Ministerial Segment Begins", 16 July 2018.

Asia and Africa. [65] In 2015, 64 per cent of all travel was made in urban environments. By 2050, the total distance of urban kilometres travelled is expected to triple. [66]

77. Urban city planning is changing, with local authorities imposing more restrictions on road transport and looking for innovative solutions to the challenges of high population density and emissions. Municipalities around the world are increasingly regulating transport in their cities, using instruments such as congestion pricing and restriction to access. Cities such as Oslo have announced their centres to be "car-free" or are targeting a phased transition to car-free status. [67]

78. At the same time, AVs, car-sharing platforms and other mobile-transportation platforms are changing how people travel around cities and the automotive solutions they need. These platforms are based on the concept of "Mobility as a service" or "MaaS" – a term used for a future vision of transport that combines public, private and shared-transportation methods. While new mobility services, car-sharing and ride-hailing platforms and the potential for automated transport are likely to increase demand for AVs and EVs, they are also creating uncertainties for workers.

79. Younger generations increasingly show a preference for car access over car ownership and for soft mobility (for example, non-motorized transport such as pedestrian and bicycle transport) over forms of transport associated with a greater environmental impact. If future generations are able to solve their transportation needs without the use of personal cars, they may delay or abandon purchasing their own vehicles. [68]

80. Data from the United States Federal Reserve shows that the average age of purchasers of new cars increased by more than seven years between 2000 and 2015. [69] However, the analysis suggested that this change was more likely the result of demographic shifts and economic factors than permanent shifts in tastes and preferences for vehicle ownership. A study commissioned by the ILO showed that the purchase of new cars is becoming increasingly less accessible for an average household in France and consumers are increasingly relying on the pre-owned automobile market. [70]

[65] UN, *World Urbanization Prospects: The 2018 Revision*, 2018.

[66] François Van Audenhove et al., *The Future of Urban Mobility 2.0: Imperatives to Shape Extended Mobility Ecosystems of Tomorrow* (Arthur D. Little and UITP, 2014).

[67] Christine Ro, "Car-Free Cities", *BBC Worklife*, 22 July 2019.

[68] Melinda Matyas and Maria Kamargianni, "The Potential of Mobility as a Service Bundles as a Mobility Management Tool", *Transportation* 46, No. 5 (2019), 1951–1968.

[69] Christopher Kurz et al., "The Young and the Carless? The Demographics of New Vehicle Purchases", *FEDS Notes*, 24 June 2016.

[70] Pardi.

2.4. Climate change

81. Climate change will have profound and prolonged effects on all industries. Working conditions will be negatively impacted by climate change, including as a result of the increased exposure of workers to heat stress and air pollution. [71] An ILO study has estimated that the projected increase in global temperatures will render 2 per cent of all work hours too hot to work in by 2030. [72] While climate change is creating uncertainty for the automotive industry, sustainable business models can help firms to insure themselves against the impact of climate change and of social and environmental risks on their supply chains. [73]

82. Both the production and use of cars contribute significantly to greenhouse gas (GHG) emissions and air pollution. A standard internal combustion engine vehicle, for example, emits an estimated 24 tonnes of emissions over its life cycle, about 23 per cent of which occurs in production. [74] The transport sector is the fastest-growing contributor to GHG emissions, accounting for 24 per cent of CO_2 emissions and approximately 14 per cent of total GHG emissions. Road transport – including cars, trucks, buses and two- and three-wheelers – is in turn responsible for about 75 per cent of overall transport emissions. [75]

83. The automotive industry is under immense pressure, both from governments and consumers, to improve the environmental sustainability of the production and use of vehicles. In their efforts to meet the commitments of the 2015 Paris Agreement on climate change, [76] a number of countries have outlined initiatives to reduce net carbon emissions. The EU, for instance, has lowered its target for CO_2 emissions per kilometre from 130 grams in 2015 to 95 grams in 2021. [77] Meanwhile, the Government of the United Kingdom has announced plans to ban the sale of petrol, diesel and hybrid cars by 2035, bringing the target forward from 2040. [78]

84. In response to environmental regulations, the automotive industry has made a number of commitments to address climate change and the emissions crisis, including commitments to lower GHG emissions and produce zero-emissions vehicles. For example, Volkswagen has announced plans to reduce the average emissions of new vehicles by 30 per cent by 2025 and is targeting carbon-neutral status by 2050. Meanwhile, Porsche has committed to ensuring that half its cars are EVs by 2050. [79] Over the period 2008–2018, CO_2 emissions

[71] ILO, *Safety and Health at the Heart of the Future of Work: Building on 100 Years of Experience*, 2019.

[72] ILO, *World Employment and Social Outlook 2018: Greening with Jobs*, 2018.

[73] ILO and IOE: *Changing Business and Opportunities for Employer and Business Organizations*, 2019, 47–48.

[74] LowCVP, *Lifecycle Emissions from Cars*, 2015.

[75] IEA, *CO_2 Emissions from Fuel Combustion: Highlights (2019 Edition)*, 2019.

[76] UN, Paris Agreement on climate change, 2015.

[77] European Commission, "Reducing CO_2 Emissions from Passenger Cars", n.d.

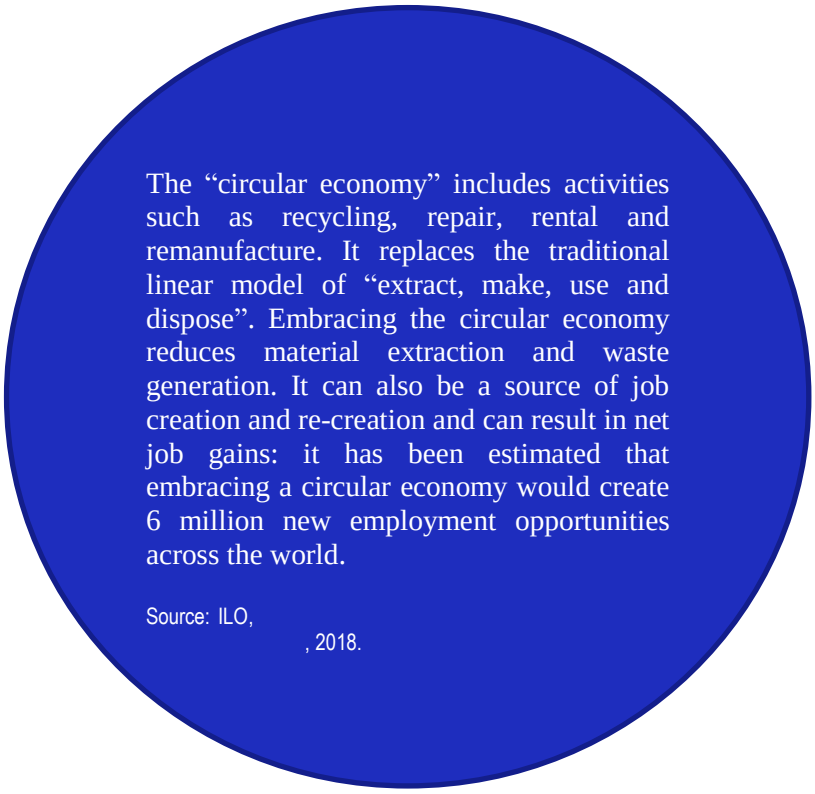
[78] United Kingdom, "PM launches UN Climate Summit in the UK", press release, 4 February 2020.

[79] Madeleine Hillyer, "What the Car Industry has Done to Help Fight Climate Change – and What it Needs to Do Next" (WEF, 2019).

from automotive manufacturing in Europe fell by almost 24 per cent, due to a shift towards lower-carbon and renewable sources of energy. [80]

85. The automotive industry has taken significant steps to increase the reuse of materials and recycling, which are key components of the circular economy (see circle 1). In the EU, 8–9 million tonnes of end-of-life vehicles are generated every year, while Eurostat data indicates that 80 to 100 per cent of the materials obtained from end-of-life vehicles that are collected through regular channels are recovered or recycled. [81] The automotive industry can further contribute to circularity by designing cars for circularity; recycling or remanufacturing components; reducing waste; and prolonging the life cycles of vehicles (figure 9).

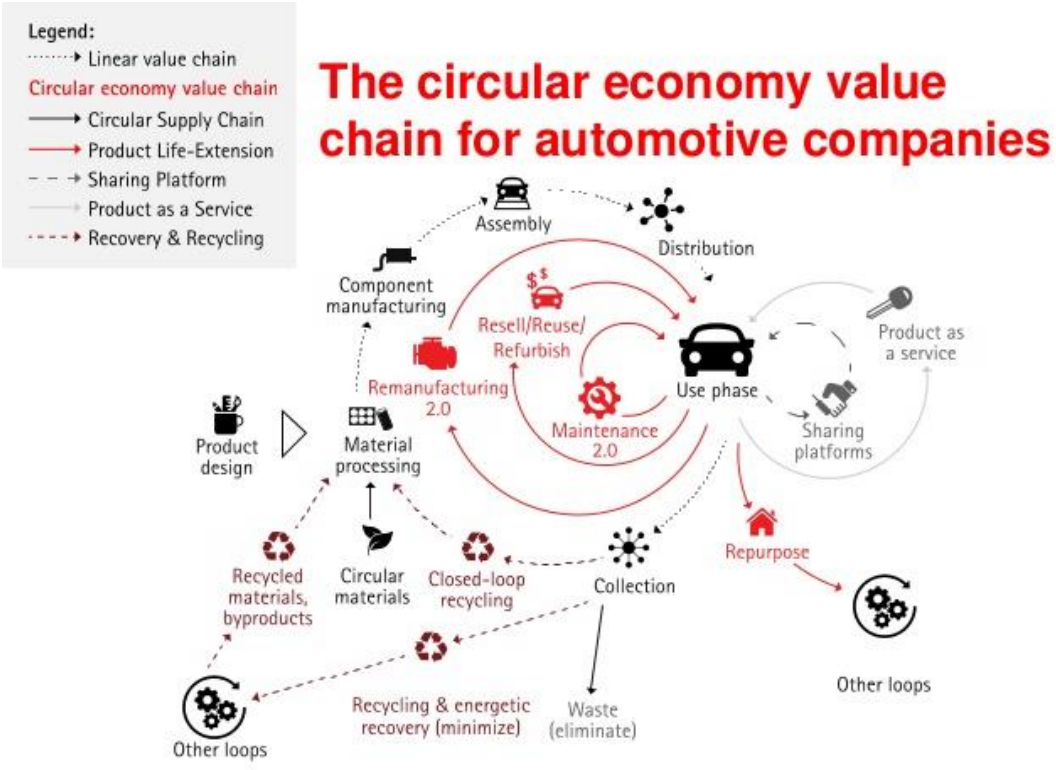
Circle 1. The circular economy



[80] European Automobile Manufacturers’ Association, “Environmental Impact of Car Production Strongly Reduced over Last Decade”, press release, 12 July 2018.

[81] European Parliament, “Circular Economy Package: Four Legislative Proposals on Waste”, *Briefing: EU Legislation in Progress*, January 2016.

Figure 9. The circular economy value chain for automotive companies



Source: Accenture, "Automotive's Latest Model: Redefining Competitiveness through the Circular Economy", slide 5, n.d.

3. Challenges and opportunities for decent and sustainable work

86. This chapter examines how the above-mentioned megatrends and drivers of change are generating opportunities and challenges for decent and sustainable work in the automotive industry, with a focus on the need to invest in people's capabilities.

87. By better understanding the impact that the profound changes in the world of work have on employment, skills development, social protection, social dialogue and rights at work in the automotive industry, the constituents of the ILO may better prepare themselves to manage challenges and seize opportunities to advance decent and sustainable work in the sector.

3.1. Employment

88. The megatrends and drivers identified in Chapter 2 are likely to affect the number and types of jobs in the automotive industry in the future in different ways:

- On the one hand, population growth, an increase in the number of middle-class consumers, urbanization, the increase in customization of automobile production and the growing preference for EVs and greener transport solutions could generate increased global demand for cars and additional opportunities for enterprises of all sizes to expand production and create new jobs.

- On the other hand, the use of ever more advanced manufacturing, robotics, new materials, increased digitalization and AI to optimize the process of production have

the potential to cause significant job losses across the value chain, from mining and oil and gas production to design, manufacturing, marketing, accounting, repair and sales.

89. In addition to the disruption caused by process optimization, the automotive industry is also facing job losses from product innovation: EVs have fewer moving parts and a longer lifespan and require fewer hours to manufacture per vehicle and less maintenance and repair. [82] According to the consultancy AlixPartners, the hours needed to assemble an internal combustion engine amount to 6.2 per vehicle, which increases to 9.2 hours per vehicle for hybrids and decreases to 3.7 hours per EV with an electric motor. [83] In addition, EVs could lead to job losses in fuel production and refinery; retail sale of automotive fuel; and production, maintenance and repair of automobiles. However, EVs will likely also bring jobs gains in electricity generation; manufacture of batteries, electrical parts and machinery; and charging station infrastructure (box 2). [84]

Box 2
Potential impact of green transport and electric vehicles on employment

The ILO has developed several scenarios to estimate the potential economy-wide employment implications of an accelerated shift to greener land transport in the region of the United Nations Economic Commission for Europe (UNECE). One of the scenarios explores the employment implications of introducing a voluntary or mandated target that 50 per cent of vehicles produced across all Member States of the UNECE should be fully electric by 2030.

The result of this modelling, which is based on a macroeconomic multiregional input–output model, is that net employment will increase in the automotive industry and other sectors related to green transport. Net job creation worldwide would be close to 10 million jobs, which is 0.2 per cent greater than the jobs that would be created in a business-as-usual scenario. Some 2.9 million of these jobs would be generated in the UNECE region and some 7 million jobs in other regions.

Source: ILO and UNECE, *Jobs in Green and Healthy Transport: Making the Green Shift*, forthcoming.

3.1.1. Job losses

90. In a much-cited study that generated considerable debate on the threat to employment posed by digitalization, Frey and Osborne estimated that 47 per cent of total employment is at risk of computerization. [85] The authors listed and ranked 702 occupations from the least (‘0’) to most (‘1’) likely to be computerized, including five occupations in the automotive industry: Automotive Glass Installers and Repairers (0.55); Automotive Service Technicians and Mechanics (0.59); Automotive and Watercraft Service Attendants (0.83); Automotive Body and Related Repairers (0.91); and Electrical and Electronics Installers and Repairers, Transportation (0.91). At the centre of the debate is the trend that middle-skilled tasks and occupations, in addition to lower-skilled activities, could increasingly be automated. This

[82] Chester Dawson et al., “Auto Workers Fear EVs Will be Job Killers“, *Automotive News*, 27 September 2019.

[83] AlixPartners, *Global Automotive Outlook 2017*.

[84] ILO and UNECE, *Jobs in Green and Healthy Transport: Making the Green Shift*, forthcoming.

[85] Carl Benedkt Frey and Michael A. Osborne, “The Future of Employment: How Susceptible are Jobs to Computerisation?”, *Technological Forecasting and Social Change* 114 (2017), 254–280.

includes tasks ranging from assembly to painters – "routine" tasks which are already declining in significance within the automotive industry. [86]

91. A 2016 ILO study focused specifically on the impact of four technologies – the electrification of vehicles, advances in lightweight materials, autonomous driving and robotic automation – on enterprises and workers in the automotive and auto parts sector of Member States of the Association of Southeast Asian Nations (ASEAN). The findings indicated that automation and robotics will have the largest impact on the more than 800,000 workers in the industry, particularly on low-skilled workers. Using a methodology similar to Frey and Osborne's, the authors estimated that more than 60 per cent of salaried workers in Indonesia and more than 73 per cent of workers in Thailand face high risk of automation. [87]

3.1.2. Job transformation

92. Other reports concerning the impact of automation on manufacturing jobs take a more conservative view and focus on the likelihood that jobs will be transformed rather than lost. These studies are based on the presumption that, although a task might be automatable, it does not necessarily mean that it will be automated, depending on the economic context, the policy environment and a variety of practicalities and constraints involved:

- McKinsey & Company, for instance, estimated that while only 5 per cent of jobs may be completely automated, 60 per cent of jobs contain at least 30 per cent of tasks that could readily be automated. [88]
- Similarly, the Organisation for Economic Co-operation and Development (OECD) has estimated that 9 per cent of jobs in its member countries are at high risk of automation and while there is a low risk of complete automation, a significant share (50 to 70 per cent) of automatable tasks are threatened. [89]
- A further OECD study in 2018 concluded that 14 per cent of all jobs were likely to be highly automatable and 50 per cent likely to be significantly affected by automation. [90]

93. Analysing the 25 biggest manufacturing economies, BCG found that countries' adoption and use of robotics varied significantly, depending on the mix of industries in the economy; government regulation; the cost, supply and flexibility of labour; and the availability of investment capital (table 4). [91]

[86] Germany, Federal Ministry of Labour and Social Affairs, *White Paper: Work 4.0: Re-Imagining Work*, 2017.

[87] Chang et al.

[88] James Manyika et al., *A Future that Works: Automation, Employment, and Productivity* (McKinsey & Company, 2017).

[89] Melanie Arntz et al., *The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis* (OECD, 2016).

[90] Ljubica Nedelkoska and Glenda Quinitini: *Automation, Skills Use and Training* (OECD, 2018).

[91] Nedelkoska and Quinitini.

Table 4. Four general patterns of robotics adoption among major goods-exporting economies

Adoption categories	Countries
Aggressive	Indonesia, Republic of Korea, Taiwan Province of China, Thailand
Fast	Canada, China, Japan, Russian Federation, United Kingdom, United States
Moderate	Australia, Czechia, Germany, Mexico, Poland
Slow	Austria, Belgium, Brazil, France, India, Italy, Netherlands, Spain, Switzerland

Source: Economist Intelligence Unit; OECD; Fraser Institute; worker-participation.eu; Ius Laboris; L&E Global; Thomson Reuters Practical Law; BCG analysis.

94. Since investments in new task-replacing technologies are generally made where investors believe them to be at least as profitable and to have a similar or lower-risk profile than existing labour-intensive processes, investments in robotics, automation and digitalization depend to a large degree on where a firm is situated in the global supply chain. Leading OEMs and part manufacturers, for instance, are well positioned to make investments in advanced manufacturing and robotics systems. By comparison, supplier firms in the second and third tiers of the automotive supply chain, which tend to be SMEs, are frequently restrained by a lack of access to capital and information about technologies and markets, which in most cases are prerequisites for undertaking large-scale investments in robotics and automation to optimize production.

95. Furthermore, the impact of technological advances on employment is also dependent on the starting point of the industry in the country in question. The automotive industry is already relatively advanced as far as the automation of low-skilled and medium-skilled jobs is concerned, particularly in developed countries. In developing countries, where significant numbers of workers are still employed in areas such as assembly and painting, low-cost and low-skilled jobs might be replaced or at least transformed at a much higher rate through automation in the future. In the above-mentioned report on the risks of automation, the OECD has suggested that low-skilled workers are likely to bear the brunt of these adjustment costs and that their jobs are more likely to be automated than those of more highly qualified workers. [92]

3.1.3. Job creation

96. While automation will displace workers or transform jobs in the automotive industry, technological advances will create new opportunities for enterprises and workers, particularly high-skilled workers – and not only in the production of automobiles. As more and more automotive companies become mobility solution providers, it is highly probable that jobs will be generated in the development and provision of services and products to facilitate future transport solutions.

97. Sustainable enterprises are engines of job creation and play a crucial role in promoting innovation and generating inclusive growth, productive employment and other decent work outcomes. [93] If the automotive industry is to remain at the forefront of innovation and job creation, the tripartite constituents of the ILO must come together to identify and implement concrete measures and solutions to address barriers and create an enabling environment for

[92] Arntz et al.

[93] ILO, *World Employment and Social Outlook: Sustainable Enterprises and Jobs Formal Enterprises and Decent Work*, 2017.

sustainable automotive enterprises, in line with the ILO Conclusions concerning the promotion of sustainable enterprises. [94]

98. While multinational enterprises (box 3) such as OEMs and large part manufacturers account for most of the employment created in the automotive industry, SMEs are strategically important for the creation of decent and sustainable work in the industry, both now and in the future. SMEs can quickly adapt to the megatrends and drivers identified in Chapter 2, particularly in terms of producing new parts and products from new materials, as well as delivering innovative digital services and solutions for existing and new OEMs and part manufacturers, in both established and emerging markets.

Box 3
Multinational enterprises in the automotive industry

The ILO Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy (MNE Declaration) is particularly relevant to the automotive industry, which is dominated by a few multinational enterprises (see section 1.1). The MNE Declaration provides clear guidance on how enterprises can contribute through their worldwide operations to the realization of decent work.

The important role of MNEs in skills development and lifelong learning is set out in the ILO Human Resources Development Recommendation, 2004 (No. 195), which states that Members should "call upon multinational enterprises to provide training for all levels of their employees in home and host countries, to meet the needs of the enterprises and contribute to the development of the country" (Paragraph 9(j)).

Many automotive MNEs have adopted explicit human and labour rights policy statements that refer, inter alia, to the Universal Declaration of Human Rights, the ILO Declaration on Fundamental Principles and Rights at Work and the UN Guiding Principles on Business and Human Rights. Car manufacturers have also included human and labour rights criteria in guidelines and codes of conduct for suppliers, which in turn may be required to introduce such guidelines for their own suppliers.

In this regard, the ILO resolution concerning decent work in global supply chains recognizes that governments, business and social partners have complementary but different responsibilities in promoting decent work in global supply chains: Businesses have a responsibility to respect human and labour rights in their supply chains, consistent with the UN Guiding Principles, and to comply with national law wherever they operate. Governments have the duty to implement and enforce national laws, including by strengthening labour administration and labour inspection systems in order to ensure compliance, and to provide access to appropriate and effective remedy and complaints mechanisms.

Source: ILO, *Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy*; ILO, Human Resources Development Recommendation, 2004 (No. 195); Business & Human Rights Resource Centre, "Business & Human Rights Snapshot: Automotive Sector", October 2018; ILO, Resolution concerning Decent Work in Global Supply Chains, International Labour Conference, 105th Session (2016).

99. At the same time, digitalization and other technological advances present a special challenge for some SMEs in the industries. A study of the German manufacturing industry suggested that, while SMEs in Germany are aware of the challenges of digitalization, their readiness and capability to adapt to the challenges of digitalization depends upon their size: the smaller the SME, the more likely it is to suffer rather than benefit from the industry-wide changes brought about by digitalization. [95]

[94] ILO, Conclusions concerning the Promotion of Sustainable Enterprises, International Labour Conference, 96th Session (2007).

[95] Lutz Sommer, "Industrial Revolution – Industry 4.0: Are German Manufacturing SMEs the First Victims of this Revolution?", *Journal of Industrial Engineering and Management* 8, No. 5 (2015), 1512–1532.

100. Well-designed SME policies that are compatible with national circumstances are required to ensure that SMEs increasingly become job creation engines in the automotive industry and a provider of decent and sustainable work. Such SME policies should "align with sound macroeconomic policies, strategies aimed at improving enforcement and compliance, education and skills policies and promotion of social dialogue, freedom of association, collective bargaining and social protection". [96]

101. Governments can take a number of actions to help build an enabling environment for SMEs in the automotive industry, including simplifying overly complex regulations for SMEs; improving SMEs' access to finance through appropriate measures, such as loan guarantees and start-up grants; clustering, networking, linking into technology platforms, and value chain and local economic development to address the lack of scale and scope of SMEs; addressing decent work challenges in the industry; and public investment in infrastructure, education, training and technology. [97]

102. Employers' and workers' organizations can also play an important role in promoting SMEs in the automotive industry by increasing the representation of SMEs and their workers in both types of organizations, improving social dialogue and assisting their members with collective bargaining. The social partners should strengthen services that are beneficial to their members in SMEs and engage with governments to assess and improve the enabling environment. [98]

103. Governments should provide an enabling environment for strong and independent employers' and workers' organizations and for social dialogue on the challenges and opportunities related to a just transition to decent and sustainable work in the automotive industry. In many automotive companies, particularly in Europe, management and workers' representatives have a close collaborative relationship that facilitates the resolution of issues related to job losses, job transformation and job creation, as well as the need to invest in people' capabilities and in decent and sustainable work.

104. Predictions about future job creation in the automotive industry in specific regions and countries do not always make clear what methodologies they are based on and hence their reliability is uncertain. The Adecco Group has predicted that the change in production processes in Europe should lead to the creation of over 2 million jobs, while about 120,000 will become extinct. [99] The Government of Thailand has predicted that the Thai automotive industry will need as many as 700,000 skilled workers by 2022. [100] While these predictions differ significantly, most reports highlight that skills shortages and gaps in the local labour

[96] ILO, Resolution concerning Small and Medium-Sized Enterprises and Decent and Productive Employment Creation, International Labour Conference, 104th Session (2015).

[97] ILO, Resolution concerning Small and Medium-Sized Enterprises and Decent and Productive Employment Creation.

[98] ILO, Resolution concerning Small and Medium-Sized Enterprises and Decent and Productive Employment Creation.

[99] Adecco Group, "Automotive, This is How Employment in the Car Industry is Changing", *Morning Future*, 15 April 2019.

[100] "Labor Ministry Launches Automotive Skills Program", *Asia News Monitor*, 7 March 2017.

market are the most significant barrier to the adoption of new technologies and to job creation in the automotive industry in the future. [101]

3.2. Skills and lifelong learning

105. Skills development and lifelong learning are key to investing in people's capabilities and advancing decent and sustainable work in the automotive industry, as well as to ensuring a just transition to a future of work that contributes to sustainable development.

3.2.1. Future demand for skills

106. Automation and robotization will increase the demand for technical skills, particularly in occupations that require workers to have qualifications in STEM fields. In addition to STEM skills, specific technical skills will be required to deploy, operate and maintain new digital technologies. [102]

107. Two recent in-depth analyses by the ILO of the global demand for ICT specialists highlighted, among other things, that a lack of high-skilled workers would constrain the future economic growth of the ICT sector and other sectors across the economy. [103] In six of the seven countries covered – Canada, China, Germany, India, Indonesia and Thailand – the automotive industry will increasingly compete with other industries to attract and retain workers with STEM backgrounds and with ICT expertise.

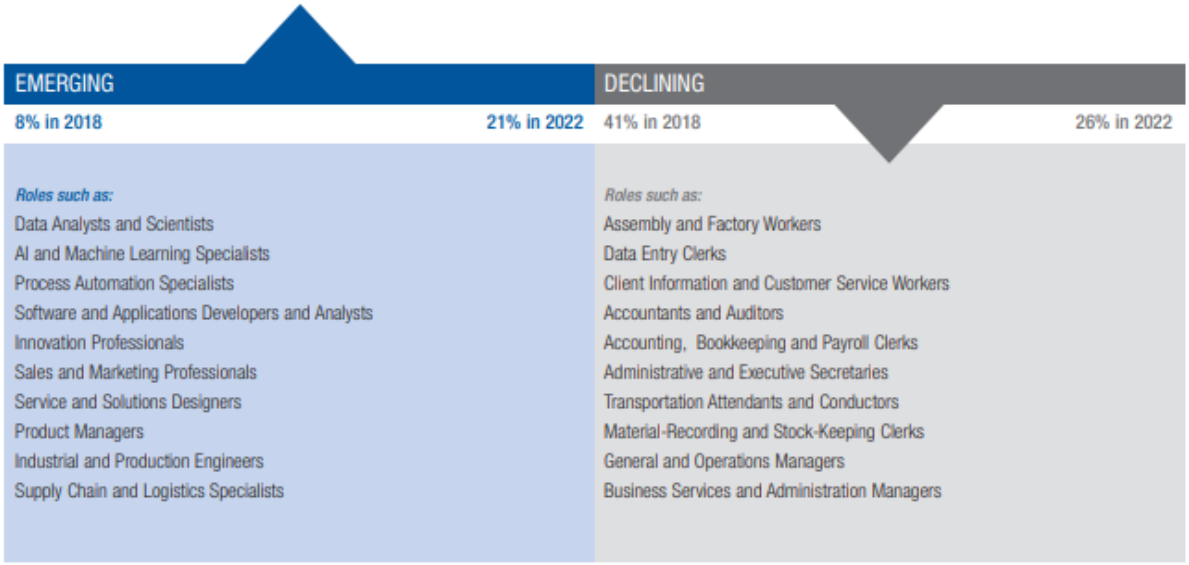
108. According to the World Economic Forum's *Future of Jobs Report 2018*, in the future there will be greater demand in the automotive industry for data analysts and scientists, process automation specialists and industrial and production engineers, among other high-skilled workers. However, there will be less demand for roles such as assembly and factory workers, administrative and executive secretaries and other low-skilled workers (figure 10).

[101] WEF; Chang et al.

[102] ILO, *Skills Policies and Systems for a Future Workforce*, 2018, 1.

[103] ILO, *Skills Shortages and Labour Migration in the Field of Information and Communication Technology in India, Indonesia and Thailand*, 2019; ILO, *Skills Shortages and Labour Migration in the Field of Information and Communication Technology in Canada, China, Germany and Singapore*, forthcoming.

Figure 10. Automotive workforce in 2018 and 2022



Source: WEF, *The Future of Jobs Report 2018*, 2018.

109. This is broadly in line with the findings of the above-mentioned ILO study of how technology is transforming the automotive and auto parts sector in ASEAN countries, which indicated that interviewees were finding it increasingly difficult to recruit electrical and industrial engineers with specialized knowledge of automated process design and robotic programming, analytical experts, customer care experts and workers adept at strategic thinking and troubleshooting. [104] Such shortages of technical and core skills have long been identified as a challenge by employers in the industry. Not only do these skills shortages pose a threat to the competitiveness of the sector, but they also pose a barrier to the employability of its workers.

110. The European Automotive Skills Council (EASC) [105] has produced one of the most thorough examinations of the evolution of the automotive sector's occupations and associated skills in high-income countries. [106] The EASC and its partners have described the key changes to five traditional occupations in the automotive sector, along with the skills requirements for five emerging occupations (table 5).

[104] Chang et al.

[105] EASC is coordinated by representatives of employers and trade unions in the European automotive sector, namely the European Association of Automotive Suppliers, the European Tyre and Rubber Manufacturers' Association and the IndustriALL European Trade Union.

[106] EASC, *Automotive Industry*, 2016.

Table 5. Traditional and emerging occupations

Traditional occupations	Emerging occupations
Maintenance technician	Product engineer
Computer numeric controlled heavy machinery operator/tool and die maker	Process engineer
Paint technician/motor vehicle painter	R&D engineer/technician
Assembly line operative/assembler	3D printing technician
Materials planning analyst	Product design and development technician

Source: EASC, *Automotive Industry*, 2016.

111. For the EASC and its partners in the European automotive industry, a highly skilled workforce, operating under good working conditions and with vocational training opportunities that provide constant upskilling, are of the utmost importance to keep pace with rapid technological developments in the future.

112. In this regard, it should be noted that there is a growing gap in the need for, and availability of, skills across regions and countries. This is in large part due to differences in the level of investment into, and performance of, education and training systems in each country. It is also an indication of the extent to which employers are actively engaged in the development of skills. Along with the uneven adoption of new technologies described above, this gap threatens to reinforce existing inequalities within and between regions. [107] The lack of a highly skilled and trained workforce that is able to operate robotics and manage digital technologies could slow disproportionately the rate of adoption of new technologies in the automotive industry in developing countries.

113. To ensure that workers can continuously adapt to change by improving their skills over the life cycle, the above-mentioned technical skills will need to be complemented by a range of core and foundational skills that are acquired primarily in early childhood and at school. A combination of technical, core and foundational skills will be in high demand in the automotive industry and obtaining such skills will provide workers with sound future employment prospects, as they will be able to move easily between jobs, occupations and sectors. At the same time, the disadvantages that low-skilled workers in some developing countries currently face in the automotive industry will in all probability increase. [108]

3.2.2. The building blocks of skills development and lifelong learning

114. In light of the profound changes in the world of work, it is becoming more important than ever for the tripartite constituents in the automotive industry to work together in better managing skills and skills shortages in order to ensure that employers and workers are best placed to benefit from the opportunities arising from technological advances and other drivers of change:

- Employers will increasingly require workers to be equipped with the appropriate skills to operate new technologies for efficient and sustainable production in order to attract investment and boost productivity. Alongside training new workers, this will mean

[107] IndustriALL Global Union.

[108] Chang et al.

increased investment in work-based learning and in reskilling and upskilling existing workers through lifelong learning.

- For workers, continuing education, training and lifelong learning will become increasingly essential to secure employment in the automotive industry, or to find employment in other sectors if the industry decline in their country.

- For governments, the anticipation of future skills needs is key to putting adequate measures in place to support lifelong learning and invest in people's capabilities and decent and sustainable work. This is best achieved in close collaboration with employers and workers and their respective organizations.

115. The Centenary Declaration calls upon all Members of the ILO to strengthen the capacities of all people to benefit from the opportunities of a changing world of work through effective lifelong learning and quality education for all. [109] Lifelong learning systems are a key part of the Declaration's human-centred approach because such systems help people to find and retain jobs and help enterprises to obtain the skilled workers they need.

116. ILO Recommendation No. 195 states that ILO Members should recognize that education and training are a right for all and, in cooperation with the social partners, work towards ensuring access for all to lifelong learning. [110] It also recommends that Members should, based on social dialogue, formulate, apply and review national human resources development, education, training and lifelong learning policies that are consistent with economic, fiscal and social policies. [111] Human resources development systems should be well thought out and integrated, rather than piecemeal collections of individual policies and programmes. Most importantly, skills development systems should be closely tied to employment policies and programmes and other key policy domains in which skills are key, such as industrial development, regional development and trade.

117. Basic education remains the foundation for future employability and further learning. It lays the foundation for lifelong learning, social mobility and social inclusiveness. Innovative initiatives between schools, universities, private-sector and public-sector training institutes, and employers' and workers' organizations should be encouraged in order to invest resources in skills development to meet the needs and aspirations of present and future employers and workers. [112]

118. The automotive industry has traditionally relied on technical and vocational education and training (TVET) systems to provide workers with the skills required to work in the industry. However, to adjust to changing labour market demands now and in the future, it will be necessary to strengthen the relevance of TVET, such as by broadening qualification profiles and integrating both digital and core skills into the curricula to a much greater extent.

119. Apprenticeships and internships can be instrumental in filling the gaps between the skills acquired during education and the skills needed by the industry, as well as in ensuring the development of high-quality and relevant skills. On-the-job training and work experience can help ensure that young women and men are equipped with the relevant skills and are

[109] ILO, Centenary Declaration, para. III.A(ii).

[110] ILO, Recommendation No. 195, Para. 4(a).

[111] ILO, Recommendation No. 195, Para. 1.

[112] ILO, Recommendation No. 195.

exposed to the use of new technologies. [113] It is important for employers in the automotive industry to become even more actively engaged in the governance, financing and delivery of training, especially in the TVET sector, which has traditionally prepared workers for the majority of occupations in the automotive sector. Institutions such as sectoral skills bodies, including the EASC, provide important opportunities for the industry to better engage with the education and training system, identify and address key skills issues facing the sector, and strengthen school-to-work and work-to-work transitions for the current and future workforce.

120. Dual apprenticeship systems are another tried and tested way of enabling young people to make the transition from the world of education to the automotive industry. They play a key role in ensuring that employers better manage their talent pipeline and enhance youth employability by helping young people to acquire relevant skills, while simultaneously having the opportunity to gain work experience and start the process of building a career. The effective implementation of such systems to meet the future needs of the automotive industry will require continuous effort from governments, employers' associations, trade unions and training providers. [114]

121. The risks of growing polarization and displacement of workers in the automotive industry may further be addressed by bolstering their resilience through reskilling and upskilling opportunities throughout their lifetimes. Currently, access to training remains highly dependent on the type of employment contract, and therefore it is sometimes the case that those who need lifelong training the most are the ones who have the least access to it. Consequently, governments, employers and workers should consider a sustainable approach to provide workers with long-term career training in the automotive industry in the future.

122. Effective lifelong learning systems require good foundational skills for both young women and men, as well as mid-career and older workers. Core skills, such as optimal management of one's own learning, social and interpersonal relations and communication, need to be integrated in all learning methods, ranging from pre-school to training schemes for skills workers. This in turn requires fundamental changes to curriculum and pedagogy in most countries' education and vocational training systems, as well as an investment in the teachers and trainers who deliver education and training. Greater priority needs to be given to both foundational, technical and core skills for employability. There is also a need to examine the link between non-formal learning, qualifications and the programmes offered in different education and training systems. [115]

123. Furthermore, the ageing workforce in the automotive industry in some countries presents an additional challenge for upskilling and reskilling workers. Future-oriented approaches to

[113] ILO, *ILO Toolkit for Quality Apprenticeships, Volume I: Guide for Policy Makers*, 2017.

[114] ILO, *Toolkit for Quality Apprenticeships*. The Governing Body of the ILO decided at its 334th Session (2018) to place on the agenda of the 110th Session of the International Labour Conference (2021) an item related to apprenticeships, which could lead to the adoption of a new international labour standard. This would provide ILO constituents with comprehensive guidance with respect to the design and implementation of apprenticeships, including quality criteria; the governance framework; the roles and responsibilities of governments, employers' and workers' organizations and training providers; the employment status of learners; and the terms and conditions related to their training and employment. See GB.334/INS/2/1 and GB.334/PV.

[115] Lee Rainie and Janna Anderson, "The Future of Jobs and Jobs Training" (Pew Research Center, 3 May 2017).

skills, education and training should account for the rich experience, strengths and weaknesses of older workers in order to best fill the skills shortages in the industry.

3.2.3. Gender equality at the heart of skills development

124. While there is a growing recognition in the automotive industry that women are a source of underutilized talent, available data suggests that female participation in the automotive industry is low. There are three times as many men than women employed in the sector in EU Member States. [116] Although women constitute 47 per cent of the total labour force in the United States, they represent only about 27 per cent of the workforce in its automotive industry. [117]

125. The results of a study conducted in 2018 by Automotive News and Deloitte indicate that a number of underlying issues act as a barrier to women joining the auto industry (figure 11).

Figure 11. Survey results on barriers to women joining the auto industry

Source: Michelle Lytle et al., "Shifting Diversity into High Gear: Helping to Close the Auto Industry's Talent Gap" (Deloitte, 30 May 2019).

126. There are even fewer women in leadership positions in the industry. Between 2014 and 2018, the number of women executives in the top 20 motor vehicles and parts companies in the Fortune Global 500 increased by only two women. Women make up less than 8 per cent of all executives in the top 20 automotive companies, half of which had no women on their executive teams in 2018. [118] The lack of progress can in part be explained by a reluctance to recognize the expertise and experience that women in leadership positions can bring to the industry as it navigates an uncertain future: only 38 per cent of leaders in the automotive

[116] EASC.

[117] United States Bureau of Labor Statistics, "Women in the Labor Force: A Databook", December 2018.

[118] 20-first, *20-First's 2018 Global Gender Balance Scorecard: Automotive Top 20 – Men Still Hogging the Wheel* (April 2018).

industry agree that they do not yet have sufficient diversity of thought and experience of their leadership teams. [119]

127. As things currently stand, the low labour market participation of women in the automotive industry is not likely to improve in the future. Research and data from a joint ILO and LinkedIn initiative have shown that women jobseekers are less likely than men to possess the digital skills that are in high demand in the automotive industry. [120] While the demand for high-skilled workers with STEM backgrounds and with digital skills will offer opportunities for both women and men in the future, there are almost twice as many young men than women enrolled in STEM-related fields of study. [121] This is in large part due to traditional societal norms and gender stereotypes that prevent women from pursuing studies in these fields. However, studies also indicate that women in STEM professions face more frequent discrimination and sexual harassment than men and often find gender discrimination an impediment to career success. [122]

128. The time has come for the automotive industry to define and implement an industry-wide transformative gender agenda and monitor progress against it. This agenda should include:

- enhancing equal employment opportunities in the industry by adopting measures to improve women's access to education, skills training and work–life balance, and by providing workplace-level redress mechanisms and policies, including incentives for the provision of childcare and parental leave;
- ensuring equal opportunities, equal participation and equal treatment, including equal remuneration for women and men for work of equal value;
- immediately and effectively addressing all forms of violence and harassment against women and men in the industry, in line with the ILO Violence and Harassment Convention, 2019 (No. 190), and its accompanying Recommendation (No. 206).

3.2.4. Coordinated policies and action for lifelong learning

129. As mentioned above, the ability of both women and men to take advantage of the opportunities presented in the future world of work will be contingent upon effective lifelong learning systems. Governments should consider taking the lead in designing modern lifelong learning systems in the automotive industry, in close consultation with workers and employers – the key actors and beneficiaries of such systems. [123]

130. Given the speed of technological advances and the uncertainty around the level of change, lifelong learning systems must be flexible and prepare the workforce to continue learning over the life cycle. They will need to be closely aligned with the labour market in order to

[119] EY, "Think Governments Are Achieving Gender Diversity in the Workforce? Think Again. How Five Disconnects Are Holding Back Gender Parity", 2017.

[120] ILO, *A Quantum Leap for Gender Equality: For a Better Future of Work for All*, 2019.

[121] UNESCO, *Cracking The Code: Girls' and Women's Education in Science, Technology, Engineering and Mathematics (STEM)*, 2017.

[122] Cary Funk and Kim Parker, "Women and Men in STEM Often at Odds Over Workplace Equity" (Pew Research Center, 9 January 2018).

[123] Funk and Parker.

better forecast future skills demands – including those required by emerging occupations – and to match them with current skills development and training opportunities.

131. To be effective, lifelong learning systems should be able to draw on a host of complementary and coherent labour market policy measures (box 4), including social protection and unemployment protection, as well as fiscal, trade, investment, enterprises development and sectoral policies. Such policies should be underpinned by concerted government action at the national, sectoral and local level, with the full involvement of workers, employers, education and training institutes and other key actors in the automotive industry.

Box 4
Policy considerations for lifelong learning

- Members should use social dialogue to formulate, apply and review national human resources development, education, training and lifelong learning policies which are consistent with economic, fiscal and social policies.
- The social partners have particularly important responsibilities in supporting and facilitating lifelong learning, including through collective bargaining agreements.
- As part of the lifelong learning agenda, governments should provide employment placement services, guidance and appropriate active labour market measures, such as training programmes targeting older workers. In addition, where possible, these programmes should be supported by legislation to counter age discrimination and facilitate workforce participation.
- Members should develop national qualifications frameworks to facilitate lifelong learning.
- Members should promote equal opportunities for women and men in education, training and lifelong learning.
- Members should recognize workers' rights to free time for training through paid study leave.
- A holistic approach includes the development of core skills, as well as raising awareness of workers' rights and entrepreneurship, as the building blocks for lifelong learning and the capacity to adapt to change.

Source: ILO, *Lifelong Learning: Concepts, Issues and Actions*, 2019.

132. Supporting life and work transitions and facilitating a just transition to a more sustainable auto industry will require more effective unemployment protection, coupled with employment services, skills development and other labour market policies, in order to enable workers to reskill and upskill and – if necessary – transition to another job. [124] The general discussion of skills and lifelong learning to be held at the 109th Session of the International Labour Conference (25 May–5 June 2020) is expected to provide new recommendations and policy options for developing the skills needed in the future.

3.2.5. Investing in lifelong learning

133. Governments have an indispensable role in financing basic education and ensuring equitable access to training opportunities and lifelong learning (box 5).

[124] ILO, *Guidelines for a Just Transition Towards Environmentally Sustainable Economies and Societies for All*, 2015; ILO, *World Employment and Social Outlook 2018*; ILO, *Report for the Recurrent Discussion on Social Protection (Social Security)*, International Labour Conference, 109th Session (2020), forthcoming.

Box 5
Equitable access to learning

Ensuring equitable access to learning requires a life-cycle perspective. Girls and boys and disadvantaged groups, such as persons with disabilities and minorities, should be given equal access to pre-school and early childhood education, just as women, men and other gender identities should have equal access to adult learning. Programme entry requirements that demand formal qualifications should not act as a barrier to learning, while the use of diverse learning methods, courses and settings that cater to multiple learning needs is equally important.

In addition, both financial and non-financial incentives can influence engagement and encourage participation. Incentives should be used to encourage individuals to maintain their employability and for employers to encourage and support their workers to learn, both on and off the job. Incentives and funds should be allocated according to life-cycle needs and deployed effectively.

Source: UNESCO, *Ensuring the Right to Equitable and Inclusive Quality Education*, 2018.

134. At a time when the employment relationship and contractual relations are evolving and diversifying and job tenures are shorter, individuals may need additional support to be able to engage in learning. Public funding can support and incentivize access to learning opportunities through such means as voucher financing models, entitlements, skills guarantees, individual learning accounts, subsidies, grants, credits and tax breaks. However, the scarcity of public resources, especially in developing countries, calls for a diversification of funding sources and continued support through development cooperation. Mechanisms that require employers to contribute to workforce training, such as sectoral levies or national tax breaks, are possible channels for engaging the private sector in training provision and participation. [125] Industry training funds that generate resources for employers to use on training are another common strategy for increasing employers' investment in skills.

135. Lifelong learning thus requires a strong and continued commitment from the automotive industry. Given the clear benefit for enterprises, it may be useful to perceive learning expenditures as an investment rather than a cost. The vast majority of the largest OEMs and part manufacturers have training programmes in place, including along their supply chains, but it is not always possible for SMEs to invest in the same way in the skills that they need for the future.

136. ILO Recommendation No. 195 provides that "the realization of lifelong learning should be based on the explicit commitment: by governments by investing and creating the conditions to enhance education and training at all levels; by enterprises in training their employees; and by individuals in developing their competencies and careers". [126]

137. While concerted action by the tripartite constituents is and should be the foundation for investing in the skills required by the automotive industry in the future, the challenge is of such magnitude and historical importance that action is needed by all actors and industry stakeholders. In recent years, there has been an increase in innovative partnerships, tools, and regional, national and local initiatives to monitor skills needs and address skills shortages, gaps and mismatches. Such initiatives should complement rather than replace the key role of Member States in financing education and training systems; they can pave the way for new and effective ways to invest in lifelong learning now and in the future.

[125] ILO, *Guidelines for a Just Transition Towards Environmentally Sustainable Economies and Societies for All*; ILO, *World Employment and Social Outlook 2018*; ILO, *Report for the Recurrent Discussion on Social Protection (Social Security)*.

[126] ILO, Recommendation No. 195, Para. 4(b).

3.3. Social protection and conditions of work

138. Together with the realization of gender equality in opportunities and treatment and effective lifelong learning and quality education for all, universal access to comprehensive and sustainable social protection is critical to strengthening people's capacity to benefit from the opportunities of a changing world of work. Social protection includes benefits for children and families, maternity, unemployment, employment injury, sickness, old age, disability and survivors, as well as health protection. [127]

139. The Centenary Declaration calls upon all Members of the International Labour Organization to strengthen the institutions of work to ensure adequate protection of all workers. [128] This is particularly important at a time when technological advances and digitalization are likely to not only reduce the cost and increase the speed at which parts manufacturers and suppliers are able to deliver new and innovative products and services, but also increase the cut-throat competition that in some segments of the increasingly fragmented automotive supply chain is putting pressure on wages, hours and working conditions.

3.3.1. Social protection

140. Social protection is a human right as well as a productive factor that can help workers and employers navigate life and work transitions and enable people, industry and economies to prosper. [129] Faced with a historically high degree of uncertainty and disruption, social protection floors have become more important than ever for the automotive industry, because they provide workers with freedom from fear and insecurity. Social protection furthermore contributes to economic growth by strengthening people's capacities to benefit from the changing world of work by enhancing productivity and supporting household income and thus domestic consumption and aggregate demand. [130]

141. The Centenary Declaration calls upon the ILO to develop and enhance social protection systems that are adequate, sustainable and adapted to developments in the world of work. [131] Governments need to guarantee universal social protection for all, from birth to old age, through social protection floors, thereby providing a basic level of protection to all, complemented by contributory social insurance schemes that provide higher levels of protection.

142. This is particularly important for the automotive industry since digitalization, other technological advances and globalization have led to growing diversification in working arrangements in the sector, including a growth of gig economy workers. Some categories of workers – part-time workers, temporary and temporary agency workers, self-employed workers and those with unclear employment relationships, and more specifically workers on

[127] ILO, *World Social Protection Report, 2017–19: Universal Social Protection to Achieve the Sustainable Development Goals*, 2017.

[128] ILO, Centenary Declaration, para. III.B.

[129] GB.294/ESP/4; ILO, *World Social Protection Report 2017–19: Universal Social Protection to Achieve the Sustainable Development Goals*.

[130] ILO, *Report for the Recurrent Discussion on Social Protection (Social Security)*.

[131] ILO, Centenary Declaration, para. II.A(xv).

digital platforms [132] – are often not covered or are only partially covered by social protection systems. New and emerging forms of work made possible by digitalization may not provide the same level of social protection as existing forms of work.

143. As highlighted by the ILO Global Commission on the Future of Work, social protection systems will need to evolve with the rapidly changing world of work in order to deliver adequate and comprehensive protection for all workers in line with international labour standards, irrespective of contractual status and enterprise size. Social protection systems should be enhanced to ensure that adequate and comprehensive coverage will be extended to workers in all types of employment. In light of the increasing number of automotive workers who are susceptible to move between wage employment and self-employment, between different enterprises and sectors of the economy or between countries, social security systems should be strengthened to ensure that rights and entitlements are accessible and portable. [133]

144. Confronted with more frequent life and work transitions, workers in the automotive industry will need a holistic package of social protection benefits, as well as skills and employment measures, such as job matching, training and reskilling, career counselling and entrepreneurship support. Such an integrated approach will require the development of bridges between employment and social protection policies, as well as coordinated delivery mechanisms. Enterprise-level bipartite dialogue, as well as sectoral and national-level tripartite dialogue, have proven useful to find balanced and sustainable solutions to these challenges.

145. The forthcoming recurrent discussion on the strategic objective of social protection (social security), under the follow-up to the ILO Declaration on Social Justice for a Fair Globalization to be held at the 109th Session of the International Labour Conference, is expected to provide new recommendations and policy options for achieving universal social protection.

3.3.2. Changes in work organization

146. Digitalization and automation have facilitated the proliferation of new and emerging forms of employment, including work on digital platforms, and in some countries have led to the proliferation of on-call employment or other forms of temporary and part-time employment, as well as dependent self-employment and temporary agency work, frequently referred to as non-standard forms of employment. [134]

147. Workers and their organizations in the automotive industry have for a number of years expressed concern over the growing use of outsourcing and contract labour, as well as other new and emerging forms of employment. Following the global financial crisis, there were reports of particularly high increases in the use of temporary labour in BRIC countries and Mexico. [135]

[132] Christina Behrendt and Quynh Anh Nguyen, *Innovative Approaches for Ensuring Universal Social Protection for the Future of Work* (ILO, 2018).

[133] Global Commission on the Future of Work.

[134] GB.323/POL/3.

[135] Ulrich Jürgens and Martin Krzywdzinski, *New Worlds of Work: Varieties of Work in Car Factories in the BRIC Countries*, 2016; Cirila Quintero Ramírez and Paolo Marinaro, "The Remaking of the

148. One of the key findings of an ILO study on non-standard employment around the world is that workers in non-standard employment are less likely to receive on-the-job training, while firms that use more non-standard employment tend to underinvest in training and in productivity-enhancing technologies and innovation. The study also highlights that over-reliance on non-standard employment can lead to a gradual erosion of firm-specific skills, limiting the ability to respond to changing market demand. Hence, while there may be some short-term cost and flexibility gains from using non-standard employment, in the long run these may be outweighed by productivity losses. [136]

149. The digitalization process involves both greater machine-to-machine and machine-to-human communication and includes the mass collection of big data. Automotive companies are using technology to prevent conflicts of interest, insider trading, public sharing of sensitive information or other potential risks that could harm the company's reputation. While there are obvious efficiency benefits to the manufacturer and the consumer, digitalization also results in changes for workers. Worker productivity, for example, is likely to be more closely monitored and analysed. This has given rise to the concern that digitalized production may encroach upon the privacy of workers with invasive surveillance practices.

150. The Centenary Declaration calls for policies and measures that ensure appropriate privacy and personal data protection and respond to the challenges and opportunities in the world of work relating to the digital transformation of work. [137] To address these challenges and opportunities, Member States and their social partners will need to review and improve their laws and practices to ensure that production is carried out in accordance with a worker's expectation of privacy and personal autonomy.

3.3.3. Working-time arrangements

151. Everyday work and life have already undergone profound changes in the twenty-first century due to the emergence of new ICT applications and globalization. ICT applications allow workers to connect with network servers and colleagues anytime, anywhere, while a globalized world often demands that workers be available outside traditional working hours. [138] At the same time, the changing structure of family life has meant that many workers are demanding more flexible working arrangements.

Mexican Labor Movement in the Automotive Industry", *Journal of Labor and Society* 22, No. 1 (2019).

[136] ILO, *Non-Standard Employment Around the World: Understanding Challenges, Shaping Prospects*, 2016, xxiv.

[137] ILO, Centenary Declaration, para. III.C(v).

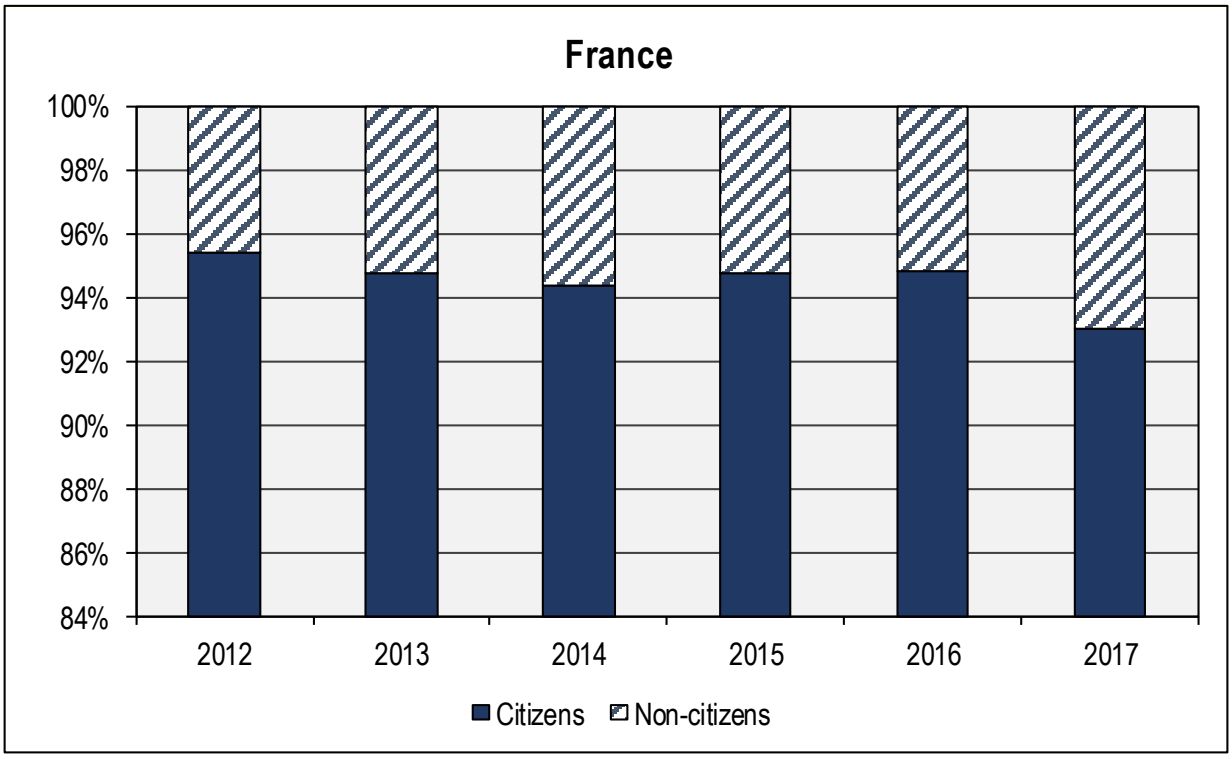
[138] Eurofound and ILO, *Working Anytime, Anywhere: The Effects on the World of Work*, 2017.

152. Telework and other flexible work arrangements in the automotive industry can allow workers to find a better balance between their working lives and other commitments, while promoting the inclusion in the labour market of older workers, workers with family responsibilities, people with disabilities and other groups vulnerable to exclusion and discrimination. However, the uncoupling of work from traditional working spaces also allows work to encroach upon spaces previously reserved for personal life. This erosion of the borders between work and leisure can intensify work- and time-related stress. [139] As these changes affect both employers and workers directly, arrangements have often been concluded in collective agreements, after extensive consultations between the social partners.

3.3.4. Migrant workers

153. From the time of the introduction of the mass production of automobiles in the United States at the beginning of the twentieth century, the automotive industry has attracted large numbers of migrant workers. Today, migrant workers continue to constitute an important share of the workforce of the automotive industry in many countries. Between 2012 and 2017, the number of migrant workers relative to all workers in the automotive industry has increased from about 5 per cent to about 7 per cent in France and from 8 per cent to 10 per cent in the United States (figures 12 and 13).

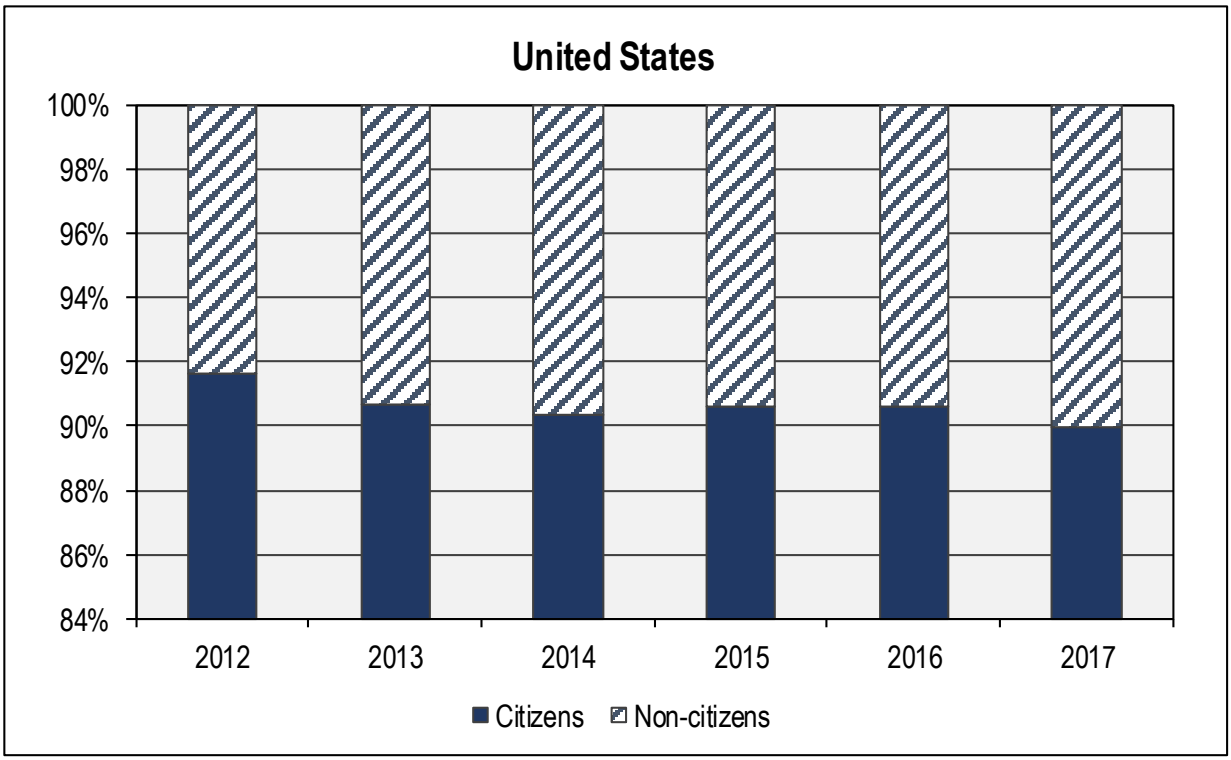
Figure 12. Proportion of non-citizens in the manufacturing of motor vehicles, trailers and semi-trailers, France (2012–17)



Source: ILO, ILOSTAT database.

[139] Eurofound and ILO, *Working Anytime, Anywhere: The Effects on the World of Work*, 3.

Figure 13. Proportion of non-citizens in the manufacturing of motor vehicles, trailers and semi-trailers, United States (2012–17)



Source: ILO, ILOSTAT database.

154. The industry has traditionally attracted low-skilled assembly workers or workers with technical skills needed for more specialized tasks. However, the need for high-skilled and STEM-educated migrant workers is likely to drive the demand for migrant labour in the automotive industry in the future. While recruiting migrant labour can be beneficial to companies, it can also result in the permanent loss of highly qualified nationals in origin countries. At the other end of the skills spectrum, where migrant workers are recruited into low-skilled jobs this can often lead to concerns about the conditions under which migrant workers work. [140]

155. Migration is becoming increasingly complex and migration policies have continued to evolve, including by placing a greater reliance on more temporary labour migration programmes as opposed to permanent immigration. The ILO has detected a worldwide "mushrooming" of temporary foreign worker schemes that typically impose more stringent and less favourable conditions of admission and stay on less-skilled workers, relative to better-skilled workers, and feature strong return control mechanisms, often regardless of actual labour market needs. With these trends likely to continue in the future, the extent to which migrants' skills are recognized and linked to meaningful employment becomes an important issue. There is an increasing emphasis on the validation and recognition of skills and the expansion of bilateral and regional mutual recognition arrangements. [141]

[140] ILO, *The Future of Labour Supply: Demographics, Migration, Unpaid Work*, 2016.

[141] ILO, *The Future of Labour Supply*.

3.3.5. Occupational safety and health

156. The Centenary Declaration states that "[s]afe and healthy working conditions are fundamental to decent work". [142]

157. While the automotive industry has seen significant improvements during the course of its history, it remains hazardous. In the United States, for instance, 6.3 out of every 100 full-time workers employed in motor vehicle manufacturing in 2018 suffered some kind of non-fatal occupational accident or illness, according to data from the United States Bureau of Labor and Statistics. [143] The incident rate for this industry was much higher than that reported by other hazardous sectors, such as mining or basic chemical manufacturing, which had rates of 2.3 and 1.3 per 100 workers, respectively.

158. The sector's high accident rate is associated with several different variables since workers in the automotive industry are exposed to many different risk factors, including ergonomic conditions; being hit by or trapped between objects, slips, trips and falls; exposure to noise, vibrations, fire and other hazardous conditions; and hazardous substances.

159. One of the most pronounced benefits of technological advances in the automotive industry and the increasing use of digitalization is that, in the future, more and more hazardous tasks can be carried out by robots and controlled remotely. This provides an important opportunity to improve the work environment and worker safety in automotive manufacturing. At the same time, technological advances, the increasing use of new materials, the growing complexity of production systems and the new risks associated with climate change, air pollution and heat stress may bring about new hazards and exacerbate emerging occupational safety and health (OSH) risks, including physical and psychosocial risks.

160. Anticipating these risks and the potential impact on both women and men is a crucial first step to effectively manage them and strengthen the preventive safety and health culture in the automotive industry. OSH is high on the agenda of both employers and workers in the automotive industry, and OSH-specific committees comprising representatives of employers and workers have been created and have been operational at the enterprise level for decades. However, it is increasingly clear that more needs to be done to improve safety and health in the industry and its supply chains. Continued investments in promoting prevention and in safety and health management systems are not only crucial for saving lives and eliminating occupational injuries and diseases. They are also key to improving productivity and attracting high-skilled workers to work in the industry in the future.

161. In light of the profound changes in automotive production and the use of new technologies and materials, there is a growing need to update OSH training and mainstream OSH into the core of general education for everyone before they enter the world of work, continuing throughout their working lives. Integrating OSH into general education and vocational training programmes can help build safer and healthier future generations of workers. Promoting lifelong learning on OSH can help workers and employers learn about, and adapt to, emerging as well as persistent OSH risks, thus improving safety and health throughout the work–life continuum. [144]

[142] ILO, Centenary Declaration, para. II.D.

[143] United States Bureau of Labor Statistics, "Incidence Rates of Nonfatal Occupational Injuries and Illnesses by Industry and Case Types, 2018", n.d.

[144] ILO, *Safety and Health at the Heart of the Future of Work*.

3.4. Fundamental principles and rights at work

162. States have the duty to ensure that the fundamental principles and rights at work and ratified ILO Conventions protect and are applied to all workers, including in the automotive industry.

163. Freedom of association ensures that workers and employers in the industries can organize to efficiently negotiate work relations. Governments have a key role in creating a stable political and civil climate, as well as legal and institutional frameworks that enable autonomous employers' and workers' organizations to operate freely, without fear of reprisal.

164. Combined with effective freedom of association practices, sound collective bargaining practices ensure that employers and workers have a voice in negotiations and that the outcome will be fair and equitable. Collective bargaining allows both sides to negotiate a fair employment relationship for all workers and prevents costly labour disputes. [145]

165. Freedom of association and collective bargaining are enabling rights that are important to the attainment of all ILO strategic objectives. These enabling rights have allowed strong and independent workers' and employers' organizations to contribute to the growth and development of the automotive industry.

166. In many automotive-producing countries, the industry is generally characterized by high unionization rates and strong and representative employers' and workers' organizations. Nevertheless, the profound transformation of the auto industry is likely to test the strength and resilience of employers' and workers' organizations in the future:

- With the advent of new production systems and new suppliers in new markets offering new products and services, employers' organizations need to adapt their services to changing needs and to reinforce their capacity to service an increasingly diverse set of business interests.

- Similarly, trade unions need to adopt innovative organizing techniques to connect with workers outside traditional workplaces and to organize new groups of workers in the industry, including high-skilled ICT workers who remain largely unorganized in many countries. [146]

167. Forced and child labour are not prevalent in core automotive production, which is the focus of this issues paper. However, there have been several reports of the widespread use of forced and child labour in the extraction of mica, cobalt, gold and other minerals and metals used by the industry.

168. The automotive industry is not immune to the discrimination that millions of people in the world of work suffer from. Discrimination stifles opportunities, wastes human talent and accentuates social tensions and inequalities. Therefore, measures to prevent and eliminate all forms of discrimination are critical to investing in people's capabilities and advancing decent and sustainable work in the automotive industry.

[145] ILO, "International Labour Standards on Collective Bargaining", n.d.

[146] Jelle Visser, *Trade Unions in the Balance: ILO ACTRAV Working Paper* (ILO, 2019).

3.5. Social dialogue

169. In the past few decades, social dialogue has played a key role in profoundly transforming the automotive industry by addressing the governance gaps that have surfaced as a result of accelerating globalization, shifting employment patterns, economic crisis, ongoing financial pressures and increased insecurity. Social dialogue and collective agreements have been instrumental in identifying and implementing the solutions that have helped the automotive industry to manage and recover from the global financial and economic crisis. [147]

170. Social dialogue remains vital to meeting the challenges and opportunities faced by the automotive industry today and in the future. From job losses to job transformation and from new and emerging forms of employment to changing requirements in OSH, social dialogue can help the industry to find solutions and facilitate the promotion of decent and sustainable work. Social dialogue is particularly critical in ensuring that investments in people's capabilities, skills development and lifelong learning systems will allow employers and workers to seize new opportunities in the future.

171. ILO Recommendation No. 195 stresses that social dialogue should be the basis of formulating, applying and reviewing national human resources development, education, training and lifelong learning policies. It specifically recommends providing support to the social partners to enable them to participate in social dialogue on training, as well as strengthening social dialogue and collective bargaining on training at international, national, regional, local, and sectoral and enterprise levels as a basic principle for systems development, programme relevance, quality and cost-effectiveness. [148]

172. The ILO has over the years gathered evidence and examples of the ways in which social partners – employers' and workers' organizations – can engage in formulating, applying and reviewing national human resources development, education, training and lifelong learning policies. This includes defining a national strategy for education and training and lifelong learning; establishing a guiding framework for training policies; improving access for all to enhance employability and facilitate social inclusion; the identification of trends in the competencies needed by individuals, enterprises, the economy and society as a whole; promoting a transparent mechanism for the assessment, certification and recognition of skills; and promoting the diversity of training arrangements to meet the different needs of individuals and enterprises and ensure high-quality standards. [149]

173. In this regard, it should be noted that social dialogue, including collective bargaining, takes diverse forms and takes place at different levels, depending on the contexts and traditions of each country. In many emerging economies, social dialogue tends to reflect the automotive industry's development, the aim being a balanced distribution of increasing gains among all the actors involved. In developed countries, by contrast, trade unions and employers seek mostly to address complex market and technological challenges, preserve business competitiveness and ensure better employment and working conditions.

174. As a result of globalization and the increasing geographical dispersion of production, social dialogue may become more and more difficult to organize. Social dialogue across national borders can help to address mismatches between the scope of activities of global actors (such as MNEs) that are increasingly transnational and trade unions and other social actors that

[147] Eurofound, *Social Dialogue and Recession in the Automotive Sector: A Global Perspective*, 2011.

[148] ILO, Recommendation No. 195, Paras 1, 5(f) and 5(i).

[149] ILO, *Workers' Organizations Engaging in Skills Development*, 2019.

remain largely embedded at the national level. [150] The role of governments in providing enabling legal and regulatory environments for dialogue between the social partners will become increasingly important.

175. Good examples of cross-border social dialogue initiatives in the industry include the European works councils (EWCs) and global works councils (GWCs). In EWCs and GWCs, workers are represented and consulted by management on decisions that can affect their working conditions. One of the first GWCs grew out of an EWC, when the management of Volkswagen AG and the members of the company's EWC, as well as employee representatives from Volkswagen AG sites in South Africa, America and Asia, signed an agreement in 1998 to create an international social dialogue body for issues related to the company. In 2000, the EWC at Renault S.A. became a GWC when the observer status already granted to Slovenia and Turkey was extended to employee representatives from Argentina, Brazil and Romania and later to representatives from other countries as well. [151]

176. A further important tool to promote cross-border social dialogue is the use of international framework agreements (IFAs), otherwise known as global framework agreements (GFAs). IFAs are concluded voluntarily between MNEs and global union federations and consist of general principles, elements of collective bargaining and dispute prevention and resolution. IndustriALL Global Union has entered into GFAs with 11 different automotive companies: BMW Group, Robert Bosch GmbH, Daimler AG, Ford Motor Company, Leoni Group, MAN SE, PSA Group, Renault S.A., Rheinmetall AG, Volkswagen AG and ZF Friedrichshafen AG. These GFAs refer to the ILO Fundamental Principles and Rights at Work as well as other ILO Conventions and Recommendations.

177. The GFAs with Ford Motor Company, PSA Group and Renault S.A. are the only agreements that have specific provisions concerning skills development and measures to address the negative impact of job transformation. With the rapid adoption of new technologies in the industry in the coming years, it will be essential to review and update all existing and future GFAs to include measures to address the impact of the profound changes that digitalization and automation will bring about, as well as how skills and lifelong learning can be promoted.

178. As stated in the Centenary Declaration, "[s]ocial dialogue, including collective bargaining and tripartite cooperation, provides an essential foundation of all ILO action and contributes to successful policy and decision-making in its member States". [152] In light of the considerable challenges and opportunities facing the automotive industry in the future and because of the industry's significant contribution to society and economic growth, social dialogue is key to shaping a future that works for all, not only in the automotive sector but in other economic and social sectors as well.

[150] Konstantinos Papadakis (ed.), *Shaping Global Industrial Relations: The Impact of International Framework Agreements* (ILO, 2011).

[151] Eurofound, "Global Works Council", 21 February 2019.

[152] ILO, Centenary Declaration, para. II.B.