Executive summary of the study

The changing automotive industry

The automotive sector's employment policy implications for the chemical, rubber and plastics processing industries

Results in brief

The global automotive sector is facing a fundamental upheaval triggered by four interlinked megatrends: alternative drives, autonomous driving, shared and diverse mobility as well as connectivity. These have the potential to fundamentally change technologies, production structures and business models in the automotive industry. These changes will affect not only the automotive manufacturers and their approximately 920,000 employees, but also the other 1.7 million people who work in the value chains of the automotive sector in Germany.

The chemical industry as well as the rubber and plastics processing industry – also known as the CRP sectors – are among the most important suppliers to the automotive industry. For them, the megatrends create risks and opportunities. On the one hand, automotive production could decline overall and there could be upheavals in established value chains. On the other hand, the requirements for lightweight construction and longevity of components could increase, as could new demand for innovative materials, for example for alternative drives.

In order to understand the risks and challenges facing the CRP sectors and the transformation processes in the automotive industry, this study examines the employment and value added structure of the CRP sectors and quantifies their interdependencies with the automotive industry.

Key results

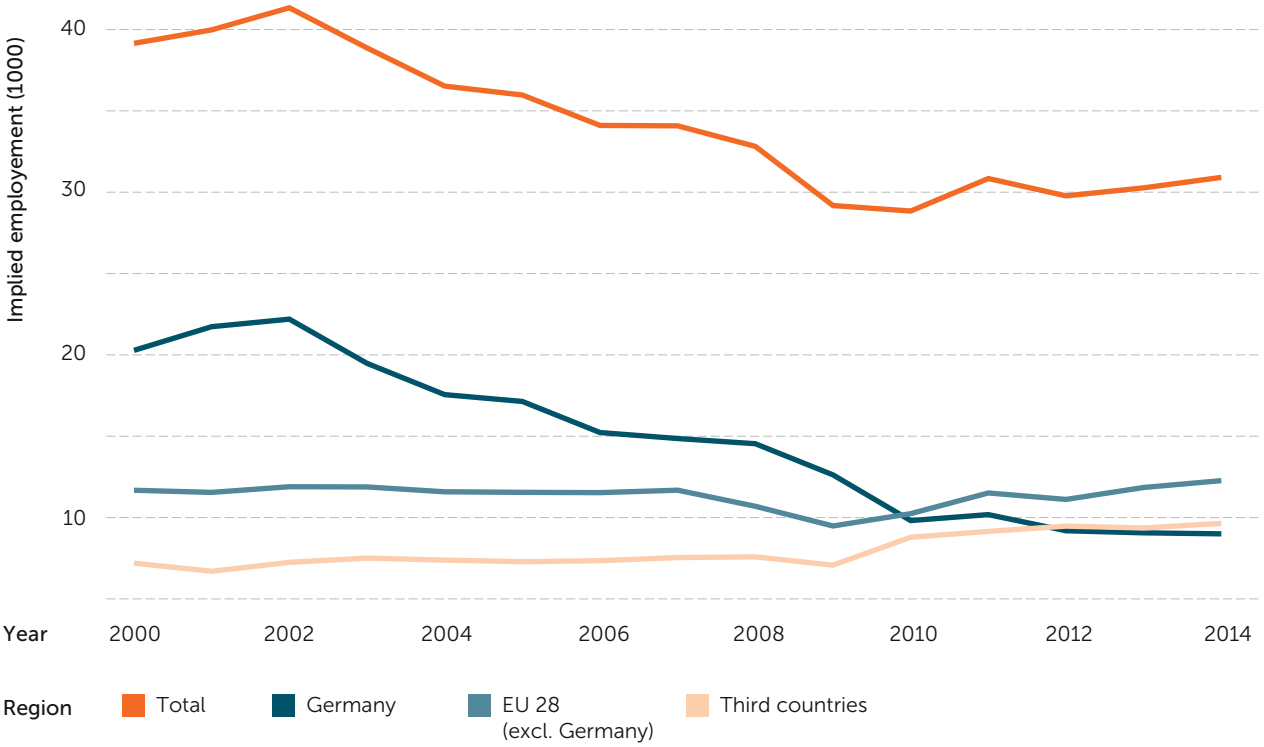
Employment and value added in the CRP industries

- The CRP sectors employed about 726,000 people in Germany in 2017. Of these, 332,200 worked in the chemical industry, 72,600 in the rubber industry and 321,400 in the plastics processing industry. Together, they generated value added of 71.7 billion euros in 2016.

- The structure of the three economic sectors differs considerably. While the chemicals sector is made up of a mixture of both small- and medium-sized enterprises (SMEs) and large companies, each respectively employing about half of the workforce, the plastics processing industry is dominated by SMEs. Differences can also be found in the level of qualification of the employees. In the chemical industry, 13.9 per cent of the employees work in highly qualified expert jobs, while only 6.8 per cent do so in plastics processing. The rubber processing industry lies between these extremes. Moreover, the chemical industry is more research-intensive than the production of rubber and plastic goods.

- The chemical industry and the manufacture of rubber and plastic products create jobs and added value in other economic sectors through their demand for intermediate products. In 2014, there were 4.5 additional employees in upstream stages of the value chain for every employee in the chemical industry – this corresponds to an employment multiplier of 5.5.

Employment in the chemical industry within the automotive sector's value chains between 2000 and 2014



Source: Own calculations based on the WIOD

In the rubber and plastics processing industries, this figure was lower at 3.0 and 1.9 respectively (employment multipliers of 4.0 and 2.9). For every euro of value added generated in the CRP sectors, about two more were created in upstream stages of the value chain.

- By way of comparison: For the automotive industry (for 2014), the study shows an employment multiplier of 6.0 (5.0 in 2000). So for every job in the automotive industry, there are five more in other industries. An employment multiplier of 6.0 is very high compared with other manufacturing sectors. Only the chemical industry shows a similarly high value of 5.5.

Interdependencies between CRP industries and the automotive industry

- The study shows a close link between the chemical industry, the rubber and plastics processing industries and the automotive sector, both at home and abroad. 127,100 employees in the German CRP sectors (2014) worked exclusively for the automotive industry (not only the German one). Around 30,900 of them were employed in the chemical industry, 26,600 in the rubber industry and 69,600 in the plastics processing industry. This corresponds to ten per cent of the total employment in the chemical industry, about one third of employment in the rubber processing industry and about 20 per cent of employment in the plastics processing industry. These jobs are created by the production of advance services that are directly or indirectly integrated into automotive production in Germany or internationally.

Geographical shift and temporal development

- There was a marked geographical shift during the period under review (2000-2014). The CRP industries are becoming increasingly internationalised. In 2014, for example, 29.1 per cent of all employees in the chemical industry working in the value chains of the automotive sector produced intermediate products for the German automotive industry. In 2000 it was 51.8 per cent. In contrast, in 2014 39.7 per cent of the employees in the chemical industry worked in the value chains of the European automotive industry; this was only 29.8 per cent in 2000. 31.2 per cent were active in the global value chains (2000: 18.4 per cent). These increases are mainly due to the increasing importance of automotive production in central Europe (Czech Republic, Poland, Slovakia) and China. The added value of the chemical industry is therefore particularly globalised in comparison with the other CRP sectors.

- By contrast, the rubber and plastics processing industry is much more closely linked to the domestic and European automotive industries. More than half of the employees in these sectors who work for the automotive industry do so for the German sector and one third for the European sector. Here, too, the

automotive industry is becoming increasingly important in central Europe. These figures indicate that the chemical industry tends to provide special products for automotive manufacturers worldwide, while the rubber and plastics sectors are more closely integrated into the production networks in Europe. These results underline that the interdependencies between the CRP sectors and the automotive industry should be considered from a European perspective.

- German automotive production has therefore become less important for the chemical industry in Germany. With some exceptions, this also applies to the rubber industry. European and non-European automotive production has gained in importance in both sectors. There are many indications that the German chemical and rubber industries have increasingly abandoned labour-intensive activities or relocated them abroad since 2000. In the plastics sector, on the other hand, the dependency on the automotive industry has increased since 2000. The value added triggered by global automotive production in the three sectors remained largely constant for the chemical industry during the period under review, while it rose in the other two sectors.

- In comparing the CRP sectors with the German automotive industry, the study shows that gross value added and employment in the German automotive industry have increased considerably more since 2000 than in the three sectors examined in Germany. The automotive industry is creating and securing jobs in the supply industries – increasingly abroad and especially in the EU. In Germany, the number of jobs generated directly by the German automotive industry has stagnated or fallen.

Percentage proportions of implied employment provided by the respective automotive sectors in selected countries within the CRP sectors in Germany

	Chemical		Rubber		Plastics	
	2000	2014	2000	2014	2000	2014
China	0.7 %	8.0 %	0.2 %	4.2 %	0.3 %	4.8 %
Germany	51.8 %	29.1 %	73.0 %	53.0 %	69.2 %	50.4 %
France	7.7 %	5.4 %	4.0 %	3.4 %	4.7 %	3.6 %
UK	3.7 %	5.8 %	2.0 %	2.8 %	2.3 %	3.0 %
Japan	3.5 %	3.2 %	0.7 %	1.1 %	1.0 %	1.3 %
Poland	1.1 %	3.3 %	0.8 %	2.2 %	0.9 %	2.3 %
Slovakia	0.4 %	2.9 %	0.5 %	2.7 %	0.5 %	2.7 %
Spain	4.4 %	4.1 %	3.0 %	3.4 %	3.3 %	3.6 %
Czech Republic	2.1 %	6.1 %	2.6 %	7.6 %	2.7 %	7.5 %
USA	8.0 %	7.7 %	2.3 %	3.0 %	3.0 %	3.4 %
EU 28 (excl. Germany)	29.8 %	39.7 %	20.3 %	32.6 %	22.7 %	33.6 %
Third countries	18.4 %	31.2 %	6.6 %	14.5 %	8.1 %	16.1 %

The table shows the proportion of jobs provided by the respective automotive sectors in selective counties within CRP sectors in Germany that are located as a whole in the value chains of the automotive sector. In 2014, for example, 69,600 people worked in the plastics processing industry for the automotive sector. Of these, 50.4 per cent or 35,100 worked for the German automotive sector and 7.5 per cent or 5,200 for the Czech automotive sector.

Source: Own calculations based on the WIOD

Conclusion

- The sectors investigated are closely interdependent and are being increasingly integrated into European and international value chains. This means that global automotive production is creating jobs and added value in the German CRP sectors; at the same time, the value chains of German automotive manufacturers are becoming increasingly international.

- The chemical industry, in particular, is highly internationalised. The plastics processing industry is much more national in character, but its value added and employment are very much dependent on the automotive industry.

- Many companies in these industries are facing major challenges with regard to the upcoming transformations as well as changes in global value chains and global markets around the automotive industry. In this context – and given that these sectors have considerable economic significance but are differently well prepared for the transformation – it makes sense from an industrial policy perspective to formulate appropriate strategies for the respective sectors.

- In particular, targeted support for SMEs, the development of further training programmes for employees and the creation of incentives for research and development would especially help SMEs and their employees to utilise the potential for innovative technologies and business models.

About the method

- Methodologically, the employment and value added multipliers are calculated on the basis of national and international input and output tables. These multipliers make it possible to determine how many employees and what value added the sector in question generates in other sectors with which it is linked in its value chain.

- Secondly, the method identifies the interdependencies between the chemical, rubber and plastics processing industries on the one hand and the automotive industry on the other using bisectoral employment and value added multipliers. This makes it possible to determine the extent to which the employment and value added in the CRP sectors are dependent on the automotive industry. Here the study takes into account the Europeanisation and internationalisation of German industry.

- This is the first time that the quantitative interdependence of these three sectors with the automotive industry has been determined, specifically: how much employment and added value is generated by the automotive industry in the chemical, rubber and plastics processing industries.

· • • You can find the complete version of the study on our website at www.arbeit-umwelt.de • • ·

Published
October 2019

Produced on behalf of the
IG BCE Foundation for Labour and the Environment
Inselstraße 6, 10179 Berlin,
Königsworther Platz 6, 30167 Hannover

Conducted by the
Fraunhofer Institute for Microstructures of Materials and Systems IMWS
in Halle (Saale)