INDUSTRY OVERVIEW

The Automotive Industry in Germany

ISSUE 2016/2017
Germany is recognized worldwide for its outstanding automotive industry and excellence in engineering. From Asia to the Americas, German cars embody highly cherished values of innovation, reliability, safety, and design. Germany is by some distance Europe’s leading production and sales market. The country’s world-class R&D infrastructure, complete industry value chain integration, and highly qualified workforce create an internationally peerless automotive environment. It enables companies to develop cutting-edge technologies which perfectly address tomorrow’s mobility needs. In the future, Germany will continue to strive to provide top-class technological performance through its outstanding infrastructure, prestigious international research facilities and dynamic investment climate. Take a look at our impressive numbers and find out why, more than 125 years after inventing the automobile, Germany remains the world’s automotive innovation hub.

Germany’s automotive industry - located at the market crossroads of Europe
Europe’s Biggest Market
Germany is Europe’s number one automotive market in production and sales terms; accounting for around 30 percent of all passenger cars manufactured and almost 20 percent of all new registrations. Germany also boasts the largest concentration of OEM plants in Europe. There are currently 41 OEM sites located in Germany. German OEM market share in Western Europe was more than 51 percent in 2015. Germany is conveniently located next to Poland, the biggest Eastern European market with passenger car unit sales of 355,000 (eight percent annual increase) in 2015.

Manufacturing Leader
German automobile manufacturers produced over 15 million vehicles in 2015 – equivalent to more than 19 percent of total global production. Twenty-one of the world’s 100 top automotive suppliers are German companies. Germany is the European car production leader: some 5.7 million passenger cars – and 325,200 trucks and buses – were manufactured in German plants in 2015.

Germany’s Largest Industry
The automotive industry is the largest industry sector in Germany. In 2015, the auto sector recorded turnover of EUR 404 billion – around 20 percent of total German industry revenue. The automobile industry is one of the largest employers in Germany, with a workforce of around 792,500 in 2015; an increase of almost two percent compared to the previous year.

Export Success
German passenger car and light commercial vehicle manufacturers recorded foreign market generated revenue of more than EUR 263 billion in 2015 – an eleven percent plus increase on 2014 results. The domestic market generated revenue of EUR 141 billion – an eight percent increase compared to 2014. Around 79 percent of cars produced in Germany in 2015 were ultimately destined for foreign shores. Worldwide, one in five cars that rolls off the production line is made by a German OEM.

R&D Leadership
German OEMs are responsible for around one third of international automotive R&D expenditure, with R&D investments amounting to EUR 19.7 billion in 2014. Germany’s automotive sector is the country’s most innovative industry sector, accounting for 35 percent of total German industry R&D expenditure of around EUR 57 billion in 2014. German automotive companies are responsible for more than 60 percent of R&D growth in Europe. R&D personnel within the German automobile industry reached a level of 100,000.

European Passenger Car Production and Registration 2015
in million

<table>
<thead>
<tr>
<th>Country</th>
<th>Production</th>
<th>Registration</th>
</tr>
</thead>
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<tr>
<td>Germany</td>
<td>5.7</td>
<td>3.2</td>
</tr>
<tr>
<td>Spain</td>
<td>2.2</td>
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</tr>
<tr>
<td>France</td>
<td>1.9</td>
<td>1.6</td>
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<tr>
<td>UK</td>
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<td>1.3</td>
</tr>
<tr>
<td>Czechia</td>
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</tr>
<tr>
<td>Slovakia</td>
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<tr>
<td>Belgium</td>
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<tr>
<td>Poland</td>
<td>0.4</td>
<td>0.7</td>
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<tr>
<td>Italy</td>
<td>1.6</td>
<td>0.4</td>
</tr>
<tr>
<td>Romania</td>
<td>0.3</td>
<td>0.08</td>
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<tr>
<td>Sweden</td>
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<td>0.01</td>
</tr>
<tr>
<td>Slovenia</td>
<td>0.06</td>
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</tr>
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</table>

Source: ACEA 2016
Increasing Worldwide Demand
Global demand for vehicles “Made in Germany” remains strong, with exports accounting for three quarters of all domestic vehicle production (equivalent to almost 4.4 million vehicles and an annual increase of two percent). Germany was the most significant exporter of passenger cars in 2015, ahead of Japan and South Korea.

Most German vehicles are exported to other European countries, with neighbor states accounting for over 50 percent of total export levels. Beyond Europe, the USA is the largest importer of German-made vehicles followed by Asia. German OEMs occupied almost three quarters of the global premium vehicle market, with a similar ratio of premium segment vehicles manufactured for export purposes. Demand for premium vehicles is particularly high in China and the USA. The largest and most exclusive vehicles have a major pull in the Chinese market, so much so that China is the most important market for a number of German vehicle series.

Premium Market Hub
Germany is the world’s premium car production hub thanks to its world-class R&D, labor force, infrastructure, and automotive manufacturing heritage. Of all premium branded vehicles produced globally, more than 70 percent are German OEM-manufactured. Of all vehicles produced globally, almost two thirds of vehicles were produced in Europe (41 percent were made in Germany). Within Europe, more than 80 percent are German OEM-badged vehicles – almost 70 percent of these vehicles are made in Germany. The western European light vehicle production sector is predominantly premium sector focused. As a result, the scale and range of production is expanding significantly. Production of premium segment cars reached a total share of 37 percent of western European light vehicle production and will continue to grow.

Premium Market Growth
A broad consensus exists among reputable industry analysts that, globally, the premium market segment will grow at a much faster rate than the total passenger car segment in the next decades. Growth within this segment can be mainly attributed to growing international demand for high-value, premium small and compact-sized cars as well as premium SUVs. The German automotive industry is the leading producer of premium cars worldwide and continues to set the benchmark in this segment.

The German market is ideally positioned to meet growing international premium demand: Almost all German and German-based manufacturers have already launched or intend to launch new products meeting premium segment demand. Excellent production standards, sustainable innovation and know-how based on the country’s
automotive manufacturing tradition will further strengthen the leading position of Germany as a leading international automotive manufacturing location.

Worldwide Reputation
German products and the “Made in Germany” label are associated with positive attributes such as quality, reliability, durability, efficiency, and safety. A GTAI study conducted in 15 major world cities finds this to be the case in all regions of the world; be it Asia, Africa, Australia, Europe or the Americas. The study also notes that regional and sectoral differences in terms of importance attached occur in all but one area: the automotive sector.

Rising R&D Budgets
German automotive company investment in research and development remains strong as manufacturers seek to maintain the competitiveness of vehicles “Made in Germany.” In 2014, German automotive companies spent around EUR 19.6 billion on internal research and development projects; more than any other manufacturing sector in Germany. Almost one third of Germany’s total manufacturing industry R&D expenditure is spent by automotive companies, with R&D budgets expected to rise. Germany’s automotive companies employ the largest number of research personnel in the manufacturing sector. With 100,000 researchers (full-time equivalent), automotive companies employ more than one quarter of the total R&D workforce in Germany’s private economy.

Most Innovative Production Location
German cars continue to enjoy a globally positive image and are in high demand across the world. A recent Ernst & Young study of 300 companies active in the European automotive sector (15 percent OEMs and 85 percent suppliers) finds Germany to be the most innovative automotive hub in international comparison. Eighty-one percent of those companies surveyed consider Germany to be the most competitive hub in terms of innovative power (ahead of Japan and South Korea who polled 65 percent and 61 percent respectively).

Assessment of Innovation Power Germany 2013
in percent

“How competitive are the following automotive hubs with respect to innovation power?”

<table>
<thead>
<tr>
<th>Country</th>
<th>Very competitive</th>
<th>Fairly competitive</th>
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<tbody>
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<td>Japan</td>
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</tr>
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<td>France</td>
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<td>28</td>
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<tr>
<td>Russia</td>
<td>7</td>
<td>24</td>
</tr>
</tbody>
</table>

Source: Ernst & Young 2013
MARKET OPPORTUNITIES

Technological Trends

**Sustainable Mobility**
Automotive engineers in Germany are hard at work improving internal combustion engine energy efficiency, developing alternative drive technologies (including electric, hybrid, and fuel cell cars), and adapting lightweight materials and electronics. Carbon emission reduction targets, smart traffic management, and the government’s electric mobility initiative are major drivers for future mobility growth.

According to McKinsey, the overall market value for new vehicles with optimized combustion engines is set to reach between EUR 280 billion and EUR 330 billion by 2020. Impressive developments have already been made in developing smaller, highly charged-up “homogeneous combustion” engines and dual clutch transmissions (DCTs). Demand for alternative drive systems is the result of increased environmental awareness and more rigorous CO2 regulations for new vehicles. Overall market potential for efficient drive systems is valued at between EUR 325 billion and EUR 500 billion through to 2020.

**E-Mobility**
Domestic and international market potential for energy-efficient passenger cars is huge. The global market is expected to grow by 29 percent annually by 2020. Supported by the country’s ambitious e-mobility plans, the automotive sector has set itself the goal of becoming a lead provider and market of electromobility solutions by 2020.

This objective is conceived as the first part of a three-stage process: 1. Market preparation phase to 2014 – R&D and showcase project focus; 2. Market ramp-up phase to 2017 – Energy-efficient vehicle and infrastructure market development focus; 3. Mass market phase to 2020 – Sustainable business model focus.

The country also has ambitious e-mobility plans outside Germany, with German OEMs keen to meet rising export demand for vehicles in the USA and emerging economies. Economic growth, the changing mobility requirements of a young and aspirational population, and the relatively low density of passenger cars are driving demand in the emerging economies. This will allow German-based manufacturers to successfully follow their proven strategy of increased imports and on-site production.

**Connectivity**
The demand for connected cars is set to increase significantly, nowhere more so than in the premium segment. Facilitating a raft of innovative safety, comfort and information services, smart technologies are revolutionizing the driving experience. According to a trend study conducted by McKinsey, the number of smart cars will increase by 30 percent annually over the next years. By 2020, one in five cars will be connected to the internet – 50 percent of these vehicles will belong to the premium segment. Germany’s industry strength in electronic technologies and software solutions is crucial for technological advancement in this sector.

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**German Automotive Industry Diversified Strategy**

**CAR-2-X COMMUNICATION**

<table>
<thead>
<tr>
<th>Reduce</th>
<th>Complement</th>
<th>Replace</th>
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</thead>
<tbody>
<tr>
<td>Rolling resistance</td>
<td>Lightweight construction</td>
<td>Drive-train optimization</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Improve motor efficiencies</td>
</tr>
<tr>
<td></td>
<td>Hybrid drive</td>
<td>Flexible fuel vehicles</td>
</tr>
<tr>
<td></td>
<td>Gas</td>
<td>Biofuels (first generation)</td>
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<tr>
<td></td>
<td></td>
<td>Gas-to-liquid</td>
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<tr>
<td></td>
<td>Biomass-to-liquid</td>
<td>Hydrogen</td>
</tr>
<tr>
<td></td>
<td>Fuel cells</td>
<td>Battery-electric drive</td>
</tr>
</tbody>
</table>

Source: VDA 2013
Supply Chain Transformation

The automotive industry is conspicuously changing in terms of its structure, especially in supply chain partnerships. The working relationships between OEMs and suppliers have been transformed by a number of factors including increased model and variety diversity and shorter product life cycles; modularization and assembly strategies; high dynamics by the implementation of new technologies; new e-mobility development activity focus and cost pressures; and high capital intensity levels.

New OEM Business Models
Conventional notions of the role of the traditional OEM within the automotive industry value chain are slowly but surely being consigned to the past. The classic OEM business model – with its dependence on turnover generated from new vehicle sales – is undergoing a major paradigm shift as value creation returns continue to fall. Not only is the modern driver more discerning in his or her auto-purchasing behavior, but heightened buyer expectations have created a market in which there is a car for every consumer. As a result, OEMs have found themselves caught up in a “crowding-out” cycle where ever more and better technological features are required to stay ahead of a congested international market. Moreover, technological advances, historically the sole preserve of the auto manufacturer, are increasingly taking place on the side of the supplier. OEMs are accordingly differentiating themselves in terms of brand reputation and service.

Changing Supplier Role
According to the German Association of the Automotive Industry (VDA), the role of suppliers is noticeably increasing; particularly in the production of drive trains, internal combustion engines (ICEs) and aggregates, bodywork, and exteriors. The VDA also forecasts that a visible extension of supplier activity areas for drive trains, ICEs, electric motors, bodywork, and exteriors will take place through to 2025. According to McKinsey, OEMs will also have to deal with rising production volumes. Building a local supplier base, creating an enhanced supply chain, and bolstering capacities are the result of this development. This is necessary in light of the further development of alternative drives. Suppliers will accordingly become even more important in terms of how much value they add to the product.

Changing Industry Structures: Development of Share of Added Value between OEMs and Suppliers

Increasing Supplier Knowledge
Electronics and software will play a dominant role in vehicle innovation. Approximately 90 percent of automotive innovations in 2015 featured electronics and software, more specifically in active safety and infotainment features. This confirms the notion that supply chain partnerships are becoming increasingly important within the automotive industry value chain. Eighty-four percent of automotive industry CEOs questioned in the PWC 16th Annual Global CEO Survey stress the importance of strengthening their supply chain partnerships as a top priority behind meeting customer and client needs (89 percent of those surveyed).
MARKET OPPORTUNITIES

Value Added in the Value Chain

Automotive Industry Structure
The auto industry in Germany thrives as a result of the diversity of companies active in the sector: large and medium-sized auto manufacturers alike are to be found in Germany, as are system and module suppliers – not to mention numerous small and medium-sized tier 2 and 3 suppliers. In fact, around 85 percent of auto industry suppliers are medium-sized companies. All of these suppliers provide up to 70 percent of value added within the domestic auto sector – ensuring that the German auto industry remains ahead of the competition. Value added is moving to the supplier side, and increasingly also to non-auto industry sectors (e.g. the chemical industry in the field of electric mobility). Not unsurprisingly, international suppliers are increasingly attracted to Germany as a business location. To date, the world’s ten largest non-German auto industry suppliers have successfully established operations in Germany.

Global Suppliers Leader
Germany boasts 21 of the world’s top 100 automotive OEM suppliers. Of these 21 companies, 10 belong to the top 50 automotive suppliers in Europe. Breaking the figures down further still, seven belong to the top 25 global suppliers by

German Automotive OEM and Supplier Density
No other country in Europe can boast a comparable concentration of auto-related R&D, design, supply, manufacturing and assembly facilities. Accordingly, no other country in Europe provides the same market opportunities as those offered by the German auto industry.

Source: GTAI 2015
Automotive suppliers generated around EUR 75 billion of total German automotive industry turnover in 2015 – surpassing the previous 2014 record. Exports account for almost 38 percent of 2015 revenue generated by German suppliers. The German automotive industry recorded a total revenue volume of EUR 404 billion in 2015 – equivalent to a 10 percent increase on 2014 revenue. The domestic market accounted for over EUR 141 billion of this sum, with more than EUR 263 billion turnover generated in foreign markets (equivalent to an eleven percent increase on 2014 revenue). OEM exports account for almost two thirds of total turnover generated. R&D is a crucial factor in maintaining this leading position, as German-based companies strive to stay on top of the trends and developments of a market in transformation. This explains German OEM R&D spending of almost EUR 20 billion in 2014 (almost one third of total global automotive R&D expenditure). Central to the successes enjoyed by German OEMs to date are the skilled teams of workers who support ongoing development and production. The German automotive supplying industry employed a workforce of almost 300,900 in 2015. They also serve Europe’s largest automotive market, where some 5.7 million passenger cars and 325,200 light commercial vehicles were produced in 2015.

### OEMs

1. Audi  
2. BMW  
3. Ford  
4. Iveco  
5. MAN  
6. Mercedes  
7. Neoplan  
8. Opel  
9. Porsche  
10. Volkswagen

### Suppliers (only German headquarters)

1. Bosch  
2. Continental  
3. ZF Friedrichshafen  
4. Thyssen Krupp  
5. BASF SE  
6. Mahle  
7. Schaeffler  
8. Benteler Automobiltechnik  
9. Hella KGaA  
10. Brose Fahrzeugtechnik  
11. Draexlmaier  
12. Eberspaecher Holding  
13. Getrag  
14. Leoni  
15. KSPG  
16. Freudenberg  
17. Webasto SE  
18. Infineon  
19. Leopold Kostal  
20. Treleborg Vibacoustic  
21. Kautex Textron
R&D Infrastructure

World’s Leading Auto R&D Nation
No other industry invests as much in R&D – more than EUR 19.6 billion in 2014 alone. As such, the auto industry in Germany accounts for more than one third of the country’s total R&D expenditure. Germany has the highest concentration of all European automotive OEM and tier 0.5 supplier R&D centers. This makes the country the most important automotive development activity location in Europe. Suppliers and service providers located in Germany profit from close client interaction starting from the pre-development stage. They can take advantage of joint research activities with some of the world’s leading automotive technology research institutes and universities.

Increasing R&D Investments
Around 100,000 people were engaged in R&D activity in 2015. As well as making provision for significant internal R&D expenditure, the German automotive sector spends a further EUR 9.4 billion on external R&D – this is equivalent to almost half of the country’s external R&D investments. Despite record R&D expenditure levels, German companies intend to boost their R&D activities further still. According to the Ernst & Young European Automotive Survey, more than 40 percent of German automotive companies want to increase their R&D investments in the future, while 58 percent will maintain current R&D spending levels.

World Innovation Leader
Auto manufacturers and suppliers located in Germany are among the world’s leading patent applicants. Nine out of the country’s top ten patent filing companies are predominately active in the automotive industry – proof positive of the country’s importance within the world’s automotive market and its enormous innovation power.

Germany’s automotive industry remains the country’s leading industry innovator with a significant share of turnover being generated from new product innovations (46 percent in 2014). Almost 70 percent of companies active in the sector introduced new products or processes in 2014. Overall investment in innovation, including internal and external R&D expenditures, is constantly increasing, and is expected to reach EUR 47.4 billion by the end of 2014. Complete industry value chain presence ensures that new and innovative products are made to the highest possible technological standards. The biggest German automotive supplier alone files around 19 patents per working day on average.

R&D Incentives – Germany’s High-Tech Strategy
With R&D considered to be among the most important areas for the development of the German economy, industry and the public sector have made a commitment to spend around three percent of national GDP per year on R&D activities. This amounts to approximately EUR 80 billion R&D spending each year. In addition, an unprecedented campaign to foster the advancement of new technologies has been launched by the German government.

The High-Tech Strategy represents the first national concept to bring key innovation and technology stakeholders together in a common purpose of advancing new technologies. The initiative combines the resources of all government ministries, setting billions of euros aside annually for the development of cutting-edge technologies (R&D projects can also count on generous financial support in the form of R&D grants).
Automotive Industry Clusters
The decentralized nature of the automotive industry has spurred the development of strong R&D business networks. Non-university research institutes, universities and companies work together in numerous federal and regional industry and research clusters to improve or invent new products, solutions, services, and processes. By connecting individual competencies, major R&D clusters in the automotive industry can be identified. These clusters have gained international recognition by integrating industry, science and education in automotive-related areas including mechatronics, microelectronics, mechanical engineering, manufacturing processes, and material sciences. This has helped the industry to secure an internationally leading position in a number of technology fields and secured its status as the international benchmark.

International Research Competences
Industrial R&D activities in Germany benefit from a broad innovation landscape which is home to a diverse array of potential research cooperation partners. Germany also offers research cooperation opportunities with the more than 250 institutes of the four large research organizations: Fraunhofer-Gesellschaft, Max Planck Society, Helmholtz Association, and Leibniz Association. Their more than 70,000 researchers are globally acknowledged experts in applied and basic sciences and economically successful.

The Fraunhofer Institute for Communication Systems ESK, in particular, is developing state-of-the-art vehicle information and communication technologies (ICT). Main competencies lie in the fields of automotive networks, infotainment and driver assistance, and model-driven software.

New Product Turnover Share by Industry 2013

<table>
<thead>
<tr>
<th>Industry</th>
<th>New Product Turnover Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive Industry</td>
<td>46</td>
</tr>
<tr>
<td>Electronics Industry</td>
<td>32</td>
</tr>
<tr>
<td>Mechanical Engineering Industry</td>
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<tr>
<td>Textile Industry</td>
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<tr>
<td>Chemical Industry</td>
<td>17</td>
</tr>
<tr>
<td>Glass &amp; Ceramics Industry</td>
<td>17</td>
</tr>
<tr>
<td>Information &amp; Telecommunication Industry</td>
<td>16</td>
</tr>
</tbody>
</table>

Source: ZEW 2016

Automotive Industry R&D Cluster Examples:
Lightweight Construction

Carbon Composites e. V. (CCeV)
Association of companies and research institutions covering the entire value chain of high-performance, fiber-reinforced composites in Germany (headquarters and four centers), Austria and Switzerland. Organizes targeted networking and information exchange with leading CFRP experts from R&D and production; provides access to established R&D and manufacturing services; offers cooperation possibilities at all stages within the entire value chain.

KITe hyLITE
Fraunhofer-Gesellschaft-led cluster that brings together more than 70 partners from industry and R&D focusing on the development of new technologies for hybrid lightweight construction.

Cluster for Lightweight Design (Leichtbau-Cluster, LC) Landshut
Network of companies (40 percent), R&D institutes (30 percent) and service providers (30 percent) to assist and promote cross-industrial cooperation in the field of lightweight design. Key topics within the Cluster for Lightweight Design are materials for lightweight design, design of lightweight structures, and advanced manufacturing technology for lightweight design applications.
MARKET OPPORTUNITIES

European Market Perspective

Growth Markets
The German automotive industry will perform best in the developing world in the years ahead. At home, the sector will consolidate its leading market position, largely as a result of development and growth in the premium market segment. The European share of value added in the premium vehicle segment will be more pronounced than in other regions, where the segment is comparatively small or negligible. China will remain a strong performer in the volume segment, with India also recording a significant increase in demand in the small vehicle segment. The US vehicle market is in upturn mode and one of the most important sales markets for German OEMs. In global comparison, Europe is the most promising automotive investment location in value-added terms.

Competitive and Stable Hub
The PWC 18th Annual Global CEO Survey finds that automotive CEOs are comparatively confident of generating higher revenues in the short- and longer term. Seventy-five percent expect to do so in the next 12 months, and 92 percent in the next three years. Main country sources of expected growth are China, the US and Germany.

A recent Ernst & Young study concludes that German-based automotive hubs record the highest product quality levels – 88 percent of those surveyed consider Germany to be the most competitive hub with the best quality worldwide. Seventy-four percent of respondents also identified Germany as the world’s most product automotive hub.

Manufacturing Location
German companies represent 10 percent of European manufacturing companies and generate 27 percent of total EU turnover in this sector. In fact, the manufacturing sector represents more than one fifth of Germany’s “value added” – one of the highest shares in Europe. Increasingly more international companies are placing their faith in Germany as a vital production site location, and are benefiting from superior productivity rates and the country’s excellent business framework of stable labor costs, excellent production standards, and a highly skilled workforce.

CARS 2020 Action Plan
In order to maintain European automotive industry competitiveness and sustainability, the European Commission set up the CARS 2020 Action Plan in 2012. Consisting of concrete policy initiative proposals, CARS 2020 directly addresses the opportunities opening up in emerging economies. Central to the initiative’s objectives are four areas of activity: 1. The promotion of investment in advanced technologies and innovation for clean vehicles; 2. Improve market conditions; 3. Support industry in accessing the global market; 4. Promote investment in skills and training. Research and innovation activities will be streamlined under the European Green Vehicle Initiative, with European Investment Bank cooperation providing small and medium-sized enterprises with access to credit.
INVESTMENT CLIMATE

Europe’s Most Attractive Automotive Location

Automotive FDI Magnet
According to Ernst & Young’s European Attractiveness Survey 2015, Germany continues to be seen as the most attractive FDI destination in Europe. Ernst & Young’s Standort Deutschland (“Location Germany”) report illustrates that the number of investments made in Germany increased by nine percent in comparison to the previous year. Germany has been able to further exploit its strong industrial base and highly skilled labor force to attract FDI projects; nowhere more so than in the automotive sector where it ranked as the number one destination in Europe with 50 projects. Companies within Germany also assess the current business situation in Germany more positively than in the rest of Europe, with around two thirds of OEMs assessing the business climate as being “good” or “fairly good.”

World Class People
Germany’s world-class education system ensures that the highest standards are always met. Eighty-four percent of the German population have been trained to university entrance level or possess a recognized vocational qualification – above the OECD average of 67 percent. Over 30 percent of German university graduates have a natural sciences or engineering degree background. The mechatronics and automotive engineering disciplines have recorded remarkable growth levels, witnessing a 121 percent leap in student numbers in the past decade alone. The comparatively new mechatronics interdisciplinary program can also boast more than 11,000 students. The auto industry is the most popular career path among engineers, with manufacturers and component suppliers among the preferred employers. The steady flow of mechanical engineers graduating from approximately 100 universities and colleges helps to ensure the continuity of German engineering excellence – a guarantor for the sector’s enduring success.

High Productivity
Measured in unit labor costs, Germany experienced a major increase in productivity the past decade. In marked contrast to other European countries which have experienced an overall increase in unit labor costs, Germany’s unit labor costs decreased by a yearly average of 0.26 percent for the period 2004 to 2013. This made the economy more competitive – particularly manufacturing.

Dual Education System
Germany provides direct access to a highly qualified and flexible labor pool. The country’s dual education system – unique in combining the benefits of classroom-based and on-the-job training over a period of two to three years – is specifically geared to meet industry needs. In close cooperation with industry and the government, the German Chambers of Industry and Commerce (IHKs) and the German Confederation of Skilled Crafts (ZDH) ensure that exacting standards are adhered to, guaranteeing the quality of training provided across Germany.

FDI Projects in the Automotive Sector 2014 in percent

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<tbody>
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<tr>
<td>USA</td>
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<td>Japan</td>
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<tr>
<td>India</td>
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<td>France</td>
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<table>
<thead>
<tr>
<th>By destination country</th>
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<tbody>
<tr>
<td>Germany</td>
<td>50</td>
<td></td>
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<td>UK</td>
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<td>Czechia</td>
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<td>Russia</td>
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<tr>
<td>Poland</td>
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</table>

Source: Ernst & Young 2014
First Choice Business Location

Reliable Logistics Infrastructure
Germany’s infrastructure excellence is confirmed by a number of recent studies including the Swiss IMD’s World Competitiveness Yearbook and various investor surveys conducted by institutions including the World Economic Forum (WEF) and Ernst & Young. The 2016 Logistics Performance Index of the World Bank ranked Germany first worldwide for its logistic proficiency; singling out Germany’s quality of trade and transport infrastructure. Accumulated in this score for Germany are high marks for the quality of roads and air transport, excellent railroads and port infrastructure as well as information infrastructure.

Stable Economy
Germany is widely considered to be the economic stabilizing force in Europe – particularly within the Eurozone. Between 2010 and 2015, EU-28 real GDP grew at around one percent. During the same period, the German economy grew at a rate of around two percent, with Germany’s real GDP growth rate higher than that of France and Italy. The German government expects an upswing of 1.7 percent in 2016.

Sound and Secure Legal Framework
According to the WEF, Germany is one of the world’s best locations in terms of planning and operating security. Germany is also one of the world’s leading nations in terms of intellectual property protection and protection from organized crime. German regulatory authorities are highly professional in their operations. The German legal system also counts as one of the world’s most efficient and independent. Social, economic, and political stability provides a solid base for corporate investment projects. Contractual agreements are secure and intellectual property is strictly protected in Germany.

Competitive Tax System
Germany offers a competitive tax system providing attractive tax rates for companies. In recent years, the German government has implemented root and branch reforms of the tax system to make the country a more attractive business location. The German tax system allows for differing tax rates in German municipalities. On average, corporate companies face an overall tax burden of less than 30 percent. Significantly lower tax rates are available in certain German municipalities – up to eight percentage points less. The overall tax burden can therefore be as low as 22.83 percent. This makes Germany’s corporate tax system one of the most competitive tax systems among the major industrialized countries.

Quality of Infrastructure 2016

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Germany</td>
</tr>
<tr>
<td>2</td>
<td>Luxembourg</td>
</tr>
<tr>
<td>3</td>
<td>Sweden</td>
</tr>
<tr>
<td>4</td>
<td>Netherlands</td>
</tr>
<tr>
<td>5</td>
<td>Singapore</td>
</tr>
<tr>
<td>6</td>
<td>Belgium</td>
</tr>
<tr>
<td>7</td>
<td>Austria</td>
</tr>
<tr>
<td>8</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>9</td>
<td>Hong Kong</td>
</tr>
<tr>
<td>10</td>
<td>United States</td>
</tr>
</tbody>
</table>

Financing & Incentives in Germany

In Germany, investment projects can receive financial assistance through a number of different instruments. Besides private sources, these instruments may come from different public incentives programs with the possibility of program combination available to all companies – regardless of country of provenance. They fit the needs of diverse economic activities at different stages of the investment process.

**Investment Project Financing by Private Equity**
Technologically innovative start-ups in particular have to rely solely on financing through equity such as venture capital (VC). In Germany, appropriate VC partners can be found through the Bundesverband Deutscher Kapitalbeteiligungsgesellschaften e.V. (BVK – “German Private Equity and Venture Capital Association”). Special conferences and events like the Deutsches Eigenkapitalforum (“German Equity Forum”) provide another opportunity for young enterprises to come into direct contact with potential VC partners. Public institutions such as development banks (publicly owned and organized banks which exist at the national and state level) and public VC companies may also offer partnership programs at this development stage.

**Investment Project Financing by Bank Loans**
Debt financing is a central financing resource and the classic supplement to equity financing in Germany. It is available to companies with a continuous cash flow. Loans can be provided to finance long-term investments, working capital and operational costs (R&D, personnel) and for bridging temporary financial gaps. Besides offers from commercial banks, investors can access publicly subsidized loan programs in Germany. These programs usually offer loans at attractive interest rates in combination with repayment-free start-up years, particularly for small and medium-sized companies. These loans are provided by the state-owned KfW Group and also by regional development banks.

**Investment and R&D Incentives**
When it comes to setting up production and service facilities, investors can count on a number of different public funding programs. These programs complement investment project financing. Most important are cash incentives provided in the form of non-repayable grants applicable to co-finance investment-related expenditures such as new buildings, equipment and machinery. R&D project funding is made available through a number of different incentives programs targeted at reducing the operating costs of R&D projects. Programs operate at the regional, national, and European level and are wholly independent from investment incentives. At the national level, all R&D project funding has been concentrated in the High-Tech-Strategy to push the development of cutting-edge technologies. Substantial annual funding budgets are available for diverse R&D projects.

**Labor-related Incentives**
After the location-based investment has been initiated or realized, companies can receive further subsidies for building up a workforce or the implementation of R&D projects. Labor-related incentives play a significant role in reducing the operational costs incurred by new businesses. The range of programs offered can be classified into three main groups: programs focusing on recruitment support, training support, and wage subsidies respectively.

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**Incentives in Germany**

<table>
<thead>
<tr>
<th>Funding purposes</th>
<th>Investments</th>
<th>Working Capital</th>
<th>Research &amp; Development</th>
<th>Specific Purposes</th>
<th>Personnel</th>
</tr>
</thead>
</table>

**Financing supported by any of the following public funding instruments (combinations of instruments usually possible)**

<table>
<thead>
<tr>
<th>Public funding instruments</th>
<th>Grants</th>
<th>Loans</th>
<th>Guarantees</th>
<th>Equity Capital</th>
<th>Mezzanine Capital</th>
</tr>
</thead>
</table>

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SUCCESS STORY

Best Practice Example: Hangsheng Electronics Corporation

“When HSASE entered Germany for the first time trying to set up business, we didn’t have any idea how to do it - until we met the experts from Germany Trade & Invest. Since then, we have been receiving professional advice and practical support in almost every aspect, from laws and regulations, office location settlement to recruitment questions. This help is crucial for foreign companies in Germany. If I have any questions now I feel relieved because I know they will support me.”

Michael Bao, Managing Director, Hangsheng Technology GmbH, Berlin (part of Shenzhen Hangsheng Electronics Corporation, China)

Company Information
Hangsheng Automotive Electronics Corporation is a leading provider of electronics products to the automotive industry. Founded in 1993 and based in Shenzhen, the company develops and produces a broad array of automotive electronics products ranging from in-car entertainment systems, navigation systems, and body ECU products to smart traffic and theft prevention systems.

Particularly strong in the domestic Chinese market with 90 percent market coverage and 30 percent market share (the company counts 19 of the country’s top 20 manufacturers as clients), Hangsheng Automotive Electronics has successfully established itself as a force in international markets – including North America, South Asia, the Middle East, and Russia. The company is now on the Tier 1 supplier list of six of the world’s top ten car manufacturers and continues to expand its global export business rapidly.

Project Information
As part of the company’s rapid export roll-out strategy on the way to achieving its objective of becoming a billion dollar operation, Hangsheng Electronics has expanded its global footprint beyond China in recent years, establishing international operations in the USA, Japan, Russia, and Germany. The company was looking for a suitable research and development location for its European activities.

Germany Trade & Invest Support
After initial contact was established in January 2013, preliminary discussions (which formed the basis for further investment project support) between Hangsheng Automotive Electronics and GTA I took place. GTA I was able to provide the Chinese company with comprehensive consultancy services pertaining to company law in Germany, tax and legal considerations, as well as personnel and recruitment issues. Follow-up meetings were arranged to provide information specific to the German automotive sector.

Project Start
On successful conclusion of these activities, Hangsheng Automotive Electronics indicated a desire to establish a research and development facility in Berlin. The German R&D offshoot (Hangsheng Technology GmbH, Berlin) was founded in May 2013. The successful acquisition of Hangsheng Electronics is not a one-off. An increased number of Chinese automotive technology providers have invested in Germany in recent years, with Chinese automotive industry suppliers making significant investment in research and development operations in Germany.

Automotive Electronics
Project Milestones

<table>
<thead>
<tr>
<th>Company</th>
<th>Hangsheng Automotive Electronics Ltd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country of Origin</td>
<td>China</td>
</tr>
<tr>
<td>Industry</td>
<td>Automotive Electronics/Connected Car &amp; Infotainment</td>
</tr>
<tr>
<td>Company Objective</td>
<td>Establishment of a European R&amp;D Center</td>
</tr>
<tr>
<td>GTA I Support</td>
<td>- Company formation information</td>
</tr>
<tr>
<td></td>
<td>- Site preselection, site visit organization</td>
</tr>
<tr>
<td></td>
<td>- Final site decision support</td>
</tr>
<tr>
<td>Initial Contact</td>
<td>January 2013</td>
</tr>
<tr>
<td>Company Formed</td>
<td>May 2013, GmbH formation in Berlin</td>
</tr>
</tbody>
</table>
Germany Trade & Invest Helps You

Germany Trade & Invest’s teams of industry experts will assist you in setting up your operations in Germany. We support your project management activities from the earliest stages of your expansion strategy.

We provide you with all of the industry information you need – covering everything from key markets and related supply and application sectors to the R&D landscape. Foreign companies profit from our rich experience in identifying the business locations which best meet their specific investment criteria. We help turn your requirements into concrete investment site proposals; providing consulting services to ensure you make the right location decision. We coordinate site visits, meetings with potential partners, universities, and other institutes active in the industry.

Our team of consultants is at hand to provide you with the relevant background information on Germany’s tax and legal system, industry regulations, and the domestic labor market. Germany Trade & Invest’s experts help you create the appropriate financial package for your investment and put you in contact with suitable financial partners. Our incentives specialists provide you with detailed information about available incentives, support you with the application process, and arrange contacts with local economic development corporations.

All of our investor-related services are treated with the utmost confidentiality and provided free of charge.

Our support services for your investment project

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Evaluation</th>
<th>Decision &amp; Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business opportunity analysis and market research</td>
<td>Market entry strategy support</td>
<td>Project partner identification and contact</td>
</tr>
<tr>
<td>Project partner identification and contact</td>
<td>Joint project management with regional development agency</td>
<td>Coordination and support of negotiations with local authorities</td>
</tr>
<tr>
<td>Identification of project-specific location factors</td>
<td>Cost factor analysis</td>
<td>Site preselection</td>
</tr>
<tr>
<td>Site preselection</td>
<td>Site visit organization</td>
<td>Final site decision support</td>
</tr>
<tr>
<td>Support services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identification of relevant tax and legal issues</td>
<td>Project-related financing and incentives consultancy</td>
<td>Organization of meetings with legal advisors and financial partners</td>
</tr>
<tr>
<td>Administrative affairs support</td>
<td>Accompanying incentives application and establishment formalities</td>
<td></td>
</tr>
</tbody>
</table>
Our Expertise Network

Germany Trade & Invest (GTAI) provides direct access to all of the relevant actors in the German economy. As the hub for a far-reaching network at both home and abroad, GTAI maintains close relations with a number of partners important to international investors setting up business in Germany. These include all federal government ministries and the leading associations of the German economy including the Federation of the German Industry (BDI) and the Association of the German Chambers of Industry and Commerce (DIHK).

As well as this, GTAI also maintains close ties to important trade and industry associations including the Verband der Automobilindustrie (VDA – “German Association of the Automotive Industry”). Our working partnership with the VDA allows prospective investors to benefit from the association’s detailed market analyses and industry structure insights. Together with Germany Trade & Invest’s business support services, companies who locate to Germany can do so knowing that the VDA is promoting the interests of the automotive industry both domestically and internationally.

The German Association of the Automotive Industry (VDA) nationally and internationally promotes the interests of the entire German automotive industry in all fields of the motor transport sector, for example in international trade and economic, transport and environmental policy, technical legislation, standardizing and quality assurance. To an equal extent, VDA promotes services in standardization, research and quality. It organizes the world’s largest trade fair for mobility, the IAA (International Motor Show), as well as other congresses and it regularly publishes on all automotive topics.

The members of the association are companies that operate a plant in the Federal Republic of Germany for the industrial production of motor vehicles and their engines, trailers, special bodies and containers as well as vehicle parts and accessories.

The VDA consists of about 600 member companies, who have come together to research and produce clean and safe automobility for the future. In the country that is known for its successful invention of both automobiles and trucks, the VDA represents the automotive manufactures and supply companies to ensure the continued competitive utilization of their experience and skills. The cooperation between manufactures and suppliers in the VDA is unique in the world of motoring.

Since 1946, the VDA has lobbied nationally and internationally for the creation of the best possible automobility. Our goals are safety, quality and sustainability at the highest technical level. As the representative of the key industry in the German economy, the VDA is responsible for more than 750 thousand jobs in Germany and leads a lively dialogue with the industry, the public, politicians, and customers.

The IAA (International Motor Show) is held every year. In even-numbered years it is the turn of the IAA Commercial Vehicles Show. The IAA Passenger Cars Show is held in odd-numbered years.

The office of the association is situated in Berlin. The VDA also has an office in Brussels as well as a location of the VDA China (QMC) in Beijing.

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Stefan Di Bitonto is the senior manager for automotive technologies in Germany Trade & Invest’s Mechanical & Electronics Technologies team. An acknowledged industry expert, Stefan has successfully accompanied numerous investment projects from North America, Asia and Europe.

Rico Trost is responsible for the automotive industry in Germany Trade & Invest’s Mechanical & Electronics team. An International Business master’s graduate, the experienced strategic management and consulting specialist worked for the SCHOTT international technology group in Germany and the US prior to joining GTAI’s Investment division.

For questions on how to establish your business in Germany please contact Stefan Di Bitonto (stefan.dibitonto@gtai.com) or Rico Trost (rico.trost@gtai.com).

For more information about the automotive industry in Germany, please visit our website: www.gtai.com/automotive

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About Us
Germany Trade & Invest (GTAI) is the economic development agency of the Federal Republic of Germany. The company helps create and secure extra employment opportunities, strengthening Germany as a business location. With more than 50 offices in Germany and abroad and its network of partners throughout the world, GTAI supports German companies setting up in foreign markets, promotes Germany as a business location and assists foreign companies setting up in Germany. All investment services and related publications are free of charge.

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