



Sector information

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Automotive in Munich

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Vehicle construction in Munich – driving forces of digitization

The transition currently sweeping the automotive industry is bringing changes in every area, from products to innovative mobility services. In the European context, a potent cluster of companies make Munich a stand-out location and a driving force in this industry. Development in the sector – especially in the areas of digitization and qualifications – is proceeding at a tremendously dynamic pace.

The knowledge possessed by automotive employees in Munich should continue to command global recognition in the future, and top-quality vehicles designed in the Bavarian capital should continue their success on all key markets: These are the stated aims of both the research activities and strategic focus of Munich's automotive enterprises.

Two genuine **global players in the automotive segment** – the BMW Group and commercial vehicle manufacturer MAN (part of the Volkswagen Group) – are headquartered in Munich, where more than 50,000 people are employed directly in automotive engineering. Yet even they are only one side of a story that also features a singularly broad spectrum of component and assembly suppliers as well as specialist development service providers such as Knorr-Bremse, Osram, iwis Ketten, Webasto, Infineon and ESG. Audi AG too, headquartered in nearby Ingolstadt, enhances the Munich region's standing as an enviable repository of expertise.



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Leading research, development and educational organizations

Innovation, technological progress and the environment are of vital importance in this sector. Ongoing development and the forceful expansion of e-mobility seek to enable zero-emission, energy-efficient driving to play a part in easing the burden on the environment. For this reason, the BMW Group is continuing to invest on a huge scale in R&D activities in the field of e-mobility. At the start of 2019, for example, some 200 BMW Group experts will start work at what will be the newly completed “Battery Cell Competence Center” in Munich.

Other focal aspects of the BMW Group's NUMBER ONE > NEXT strategy include digitization and autonomous driving. The company's R&D activities are bundled extremely efficiently – also in Munich – at the company's major existing innovation hubs FIZ Future, BMW Forschung und Technik GmbH and BMW Car IT.

The innovative strength of the automotive industry in Munich is further reinforced by close links to the vast research potential embodied by the city's universities, including the Munich University of Applied Sciences (MUAS), and an array of non-university institutions. Examples include numerous research projects at the Technical University of Munich (TUM): at the Institute of Automotive Technology (FTM) and the Munich School of Engineering (MSE).

The Bavarian capital boasts an enviable wealth of universities and other research institutions:

14 respected universities

- TUM (Technische Universität München)
- LMU (Ludwig Maximilians Universität)
- Munich University of Applied Sciences
- University of the Federal Armed Forces
- Ten other institutions of higher education



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Non-university research organizations

- The Fraunhofer Society (with its national headquarters and four individual institutes in the Munich region)
- The Max Planck Society (with its national headquarters and twelve individual institutes in the Munich region)
- The Helmholtz Zentrum München (Helmholtz Center Munich, a research organization run jointly by federal government and the Free State of Bavaria and featuring 40 scientific institutes and independent departments). This center focuses on research into health and the environment and is a member of the Helmholtz Association of German Research Centers.
- DLR, the German Aerospace Agency (with eight scientific institutes at its Oberpfaffenhofen campus)

The Munich research establishments and institutions listed below all specialize in automotive engineering and related fields:

Technical University of Munich (TUM)

www.tum.de

The Technical University of Munich has been singled out as one of Germany's elite universities. 40,082 students were enrolled here for the winter semester 2017/2018, and the TUM (including the affiliated hospital) employs 10,103 people. The university's sharp focus on research is reflected in the large number of doctoral degrees attained here (1,032 in the 2015/2016 academic year), as well as the 6,895 scientific publications issued in the same period. The TUM's remarkable research capabilities are likewise mirrored in its ability to attract substantial third-party funding, which totaled EUR 304 million (including for the hospital) in 2016.

The following chairs, faculties and institutes currently conduct research into issues relating to automotive engineering and electromobility:

Science Center for Electromobility

www.wze.mse.tum.de/en

Directors: Professor Hubert Gasteiger, Professor Hans-Georg Herzog and Professor Markus Lienkamp

Designed to coordinate inter-faculty research into electromobility at TUM, this center currently draws on the participation of 40 chairs and departments at the



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faculties of chemistry, electrical engineering, information technology, computer science, mechanical engineering and physics.

Institute for Machine Tools and Industrial Management

www.iwb.tum.de/en

Directors: Professor Michael Zäh and Professor Gunther Reinhart

This organization focuses on research into laser-based manufacturing technologies and production processes.

Chair of Industrial and Automotive Technologies

www.ftm.mw.tum.de/en

Professor Markus Lienkamp, Dr. Frank Diermeyer

This chair concentrates its R&D activities on electromobility, its components and infrastructure, including vehicle dynamics, driver assistance and smart mobility.

Chair of Internal Combustion Engines

Engine Laboratory

www.lvk.mw.tum.de/en

Professor Georg Wachtmeister

Together with the associated engine laboratory, this chair conducts research into alternative drive systems, CFD simulation, fuel injection, energy & emissions, gas engines and mechanical construction.

Chair of Electric Drive Systems

www.eal.ei.tum.de/en

Professor Ralph Kennel

This chair concerns itself with driver assistance and self-correcting vehicle dynamics systems. Its research group tackles issues such as the application of control equipment, the development of fault-tolerant self-correcting models and status observation modules as well as renewable energy systems.

Chair of Measurement Systems and Sensor Technologies

www.mst.ei.tum.de/en

Professor Alexander W. Koch

Surface analysis, treatment technologies and image processing systems are developed by this chair.



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Chair of Traffic Engineering and Control

www.vt.bv.tum.de/en

Professor Fritz Busch

Local passenger transport and private traffic flows form the focus of this chair's research activities. Projects deal with traffic and environmental data detection, modeling and simulation of traffic systems, determination and control of traffic demand, traffic control, integrated and inter-modal traffic management, intelligent vehicle concepts, quality management in transport as well as effects and potentials of traffic and the environment.

Institute for Machine Elements

www.fzg.mw.tum.de/en

Professor Karsten Stahl

Two areas on which research is focused at this chair are the development of continuously variable transmissions (CVTs) and autonomous hybrid engines for motor vehicles.

Munich University of Applied Sciences

www.hm.edu/en

Munich University of Applied Sciences is one of the largest institutions of its kind in Germany, with roughly 18,000 students enrolled. More than 85 bachelor's and master's courses are currently on offer here. Some 466 professors, 782 staff and around 745 lecturers are on the university's payroll.

Faculty of Mechanical, Automotive and Aircraft Engineering

www.fm.fh-muenchen.d/en

Dean: Professor Andreas Grubner

This faculty offers an array of attractive, forward-looking courses in mechanical engineering, automotive engineering and aircraft systems. Some 2,200 students, more than 60 professors and over 150 lecturers make this the largest faculty at the Munich University of Applied Sciences.

The university's **automotive engineering** course concentrates primarily on road vehicles, motor vehicle assessment expertise and traffic engineering and control.



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University of the Federal Armed Forces

www.unibw.de

The university of the Federal Armed Forces offers seven faculties at university level and three faculties offering courses at the level of applied sciences. Predominant fields and degrees are in Engineering and Electrical Engineering.

Chair of Power Electronics and Drive Systems

www.unibw.de/eit62

Professor Rainer Marquardt

This chair pioneers the drive systems that go into hybrid and electric vehicles.

GSI Gesellschaft für Schweißtechnik International mbH German Welding Institute (SLV Munich)

www.slv-muenchen.de/en

Deputy Director: Professor Michael Dey

The German Welding Institute is devoted to developing and improving processes and equipment in many areas of welding. The corporate and public sectors contract R&D orders to the institute, which also provides consulting and training services and organizes technology transfer events.

Trade shows and events

Automatica

June 16-19, 2020

New Munich Exhibition Center

www.automatica-muenchen.de

Material assembly and handling systems, robots, industrial image processing, positioning systems and propulsion systems for the automotive, medical, electronics and other sectors.

eMove360° Europe 2018

October 16-18, 2018

New Munich Exhibition Center



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www.emove360.com/de/

3. International trade fair for mobility 4.0 -electric-connected-autonomous

Networks and organizations

Cluster Automotive

Bayern Innovativ GmbH, the Free State of Bavaria's development agency for innovation, technology transfer and knowledge transfer

Am Tullnaupark 8

90402 Nürnberg

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www.bayern-innovativ.de/cluster-automotive

Digital Hub Mobility

The Digital Hub Mobility in Munich is part of the nationwide Digital Hub Initiative launched by the Federal Ministry for Economic Affairs and Energy. For the first time, the Digital Mobility Hub brings the capabilities of mobility companies together with those of technology firms. The objective is to further strengthen Munich's already outstanding position as a mobility innovation enter, and to ultimately create sustainable mobility for all in an attractive, liveable city. To achieve this goal, cross-sector mobility solutions are being developed in collaboration with startups and the academic community to meet the mobility needs of customers.

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mobility.unternehmertum.de



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Inzell Initiative

The Inzell Initiative is a cooperative venture between the City of Munich and the BMW Group. It brings together key players from government, industry and the scientific community to implement forward-looking solutions for sustainable mobility in Munich.

The Inzell Initiative is a contribution to meeting the City of Munich's sustainability goals, especially to deal with traffic planning challenges and create quality livable urban space. The basic fundamentals of this approach are elaborated in six current Inzell focus themes – strategic fields of action that address the major challenges of modern mobility in Munich via broad-based, across-the-board measures. The six current Inzell focus themes are: e-mobility, delivery traffic, parking space, autonomous driving, multimodal offers and traffic outside city limits. www.inzellinitiative.de

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Network of Automotive Excellence – NoAE®

The NoAE is a professional, open, cross-company network whose objective is to give the European automotive and component supply industries a sharp competitive edge and a bright future.

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Other networks and organizations

Bayerische Patentallianz GmbH

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E-mail: info@bayerische-patentallianz.de
www.baypat.de

The "Bavarian Patent Alliance", established in January 2007, acts as a patent licensing agency, valuing and marketing the inventions of over 17,000 university-based scientists and engineers in Bavaria. It is the successor organization to the "BayernPatent" project launched in 2001, and ranks as one of the largest and most successful patent and marketing agencies in Germany.

Invest in Bavaria

Director: Dr. Wolfgang Hübschle
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80538 München
Phone: +49 (0)89 2162-2642
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E-mail: info@invest-in-bavaria.de
www.invest-in-bavaria.de

Invest in Bavaria is the relocation agency operated jointly by the Bavarian Ministry for the Economy and Bayern International GmbH. The team assists investors who are looking to move to or expand their business in Bavaria, providing information, helping with the search for suitable premises and putting investors in touch with local authorities, partners and networks.

City of Munich, Department of Labor and Economic Development

Director: Kurt Kapp
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www.business-munich.de

The Department of Labor and Economic Development provides an array of professional services to companies that are based in or considering moving to Munich. Corporate customers are given a single point of contact to walk them through the various administrative requirements. Advice on locations and relocation is another focus. The Economic Development unit also provides support for business startups, information on the availability of premises and a contact service to put firms in touch with the right authorities, chambers of industry and commerce, networks and associations.

Chamber of Commerce and Industry for Munich and Upper Bavaria

Innovation, Environment and Traffic: Dr. Herbert Vogler

Director: Dr. Eberhard Sasse

Balanstraße 55-59

81541 München

Phone: +49 (0)89 5116-0

Mail: info@muenchen.ihk.de

www.muenchen.ihk.de

Representing industrial, trading and service companies in the region, the Chamber of Industry and Commerce is committed to improving conditions for the business community. The chamber sees itself as a parliament that represents the interests of the business community to government and administrative bodies and the public at large. It also provides services (such as consulting) to companies, assumes responsibilities on behalf of the public sector (such as examinations in the context of vocational training) and takes action to promote fair and sustainable business practices.

Munich Network – Netzwerk München e.V.

Chairman: Curt J. Winnen

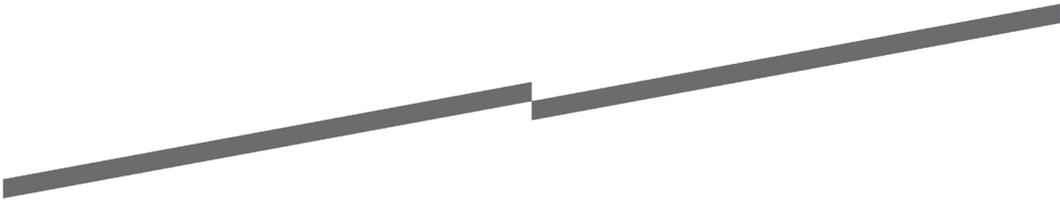
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www.munichnetwork.com



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The Munich Network actively helps technology firms to get started, grow and remain successful in the long run. It brings them into contact with regional drivers of innovation and forges ties with the world's leading high-tech regions.

Key companies

Assystem GmbH

www.assystem-germany.com

Assystem Aerospace Germany GmbH merged with Atena Engineering GmbH in March 2011. Since then, the company and its roughly 600 engineers and technicians have operated under the name Assystem GmbH. Assystem's automotive and mechanical engineering portfolio spans analysis, design and engineering services for components and assemblies. The company operates primarily in Munich and Stuttgart on behalf of Daimler, BMW, Audi and a large number of first- and second-tier suppliers.

Bertrandt Ingenieurbüro GmbH

www.bertrandt.com/en

For over 40 years, the GmbH has been providing development solutions for a global range of the automotive and aerospace industries. In total, the company has approximately 13,000 employees at 53 locations.

BMW Group

www.bmwgroup.com

BMW has its headquarters in Munich. Its main factory, the BMW museum and the four-cylinder tower that houses the corporate center are all located opposite the Olympic Park. The exhibition pavilion on Lenbachplatz, a local BMW sales company and the BMW Group's research and innovation center FIZ round off the company's presence in Munich. The latter is currently being ramped up into "FIZ future" and will create an additional 5,000 jobs.

Denso Automotive Deutschland GmbH

www.denso-am.eu

Denso is one of the world's leading suppliers of components and systems for heating, air-conditioning, engine cooling, exhaust gas treatment, automotive



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electronics and in-vehicle instruments. DENSO AUTOMOTIVE DEUTSCHLAND GMBH is headquartered in Eching, near Munich.

Edag Engineering GmbH

www.edag.de/en/edag.html

Edag Engineering GmbH works on the development of vehicles, production plants and the optimization of processes. In the field of automotive development, the company operates as one of the largest independent developers of the world's leading automotive brands.

ESG

www.esg.de/en

Elektroniksystem- und Logistik-GmbH a leading system and software house in Germany for development and service processes of software-intensive, complex, technologically advanced and security-critical products. It has a strategic focus on automotive.

F.X. Meiller GmbH & Co. KG

www.meiller.com

This Munich-based, family-owned company manufactures high-tech products for construction logistics, waste disposal applications and interior vehicle fittings.

Hans Widmaier Fernmelde- und Feinwerktechnik

www.widmaier.com

Widmaier is a midsized provider of electronic, electromechanical and acoustic products to leading German car manufacturers.

Hitachi Automotive Systems Europe GmbH

www.hitachi-eu.com

The Japanese high-tech giant has set up its Automotive Research and Development Laboratory in Munich.

Infineon

www.infineon.com

Infineon Technologies is a leading player and pioneer in automotive electronics. The company focuses on automotive applications and standards. The innovative semiconductor products covering the complete control loop



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contribute to a more sustainable mobility in terms of reduced fuel consumption/emissions, improved safety and affordability.

Iwis Ketten, Joh. Winklhofer & Söhne GmbH & Co. KG

www.iwis.com

This traditional company has been a leading producer of high-quality chains and the associated system components for nearly a century.

Knorr-Bremse AG

www.knorr-bremse.com

Knorr-Bremse is a global leading provider of braking systems for railcars and commercial road vehicles. Other important lines of business include on-board systems for railcars and torsional vibration dampers.

Lear Corporation

www.lear.com

The German subsidiary of this, the world's largest manufacturer of car seating systems and automotive interior systems operates a development center in Munich.

Magna Steyr

www.magna.com

Magna Steyr and the network of Magna companies serve as an integrated engineering partner to the automotive and component supply industries, developing components and end-to-end modular solutions for vehicle exteriors and interiors. One of the group's bases is in Munich.

MAN Gruppe

www.truck.man.eu

The MAN Group is one of Europe's leading manufacturers of commercial vehicles, engines and mechanical engineering equipment. The company employs around 48,000 people worldwide and posts annual sales of approximately €16,6 billion. MAN supplies trucks, buses, diesel engines and turbo-machinery, occupying leading market positions in all its business areas.



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P+Z Engineering GmbH

www.arrkeurope.com

With its head office in Munich, the company has been supporting well-known customers for over 50 years in the development of their products. More than 1,000 engineers work in Design, CAE & Simulation, Test & Validation, Electrics & Electronics.

Schleicher Fahrzeugteile GmbH & Co. KG

www.schleicher-fahrzeugteile.de

Schleicher Fahrzeugteile GmbH & Co. KG is a family-owned company that has been operating in Munich for over 70 years. The focus of the company is in the production of camshafts and other vehicle parts.

Volke Consulting Engineers GmbH & Co. Planungs KG

www.volke-muc.de

Volke Consulting Engineers GmbH & Co. Planungs KG with more than 450 employees in Munich, three branches and headquarters in Munich supports companies in the automotive industry in all phases of development. In order to achieve the goals, future-oriented technologies and system applications as well as modern planning management are used.

Webasto AG

www.webasto.de

Webasto is a global leading automotive supplier. Every well-known auto maker uses its high-quality parking heaters, convertible roofs/sunroofs and air-conditioning systems. The company's roof products and heating systems are also used in the auto industry's aftermarket.

This sector information has been carefully researched and diligently compiled. Nevertheless, the City of Munich does not accept any liability or give any guarantee for the validity, accuracy and completeness of the information provided. Please direct any questions, comments or suggestions to:
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