BMW GROUP
Corporate Communications

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BMW Opens New Shanghai R&D Center. China R&D Strategy Upgraded for Next-level Digital User Experiences.

++ BMW is taking the digital user experience to the next-level in China with focus on human-machine interaction and hardware-software integration. ++ Designworks Shanghai as local design studio of BMW Group even deeper integrated in R&D centre to bridge the East and the West. ++ From R&D to validation, BMW has built its largest e-mobility R&D footprint outside of Germany in China. ++ In China, for the World: BMW Group Tech Office Asia-Pacific in Shanghai focuses on tech scouting of advanced technologies and innovations. ++

Shanghai. On July 18, 2023, the BMW Group further expanded its R&D footprint in China with the opening of a new R&D Center in Shanghai. China is already home to BMW Group's largest R&D system outside of Germany, with locations in Beijing, Shanghai, Shenyang and Nanjing. Based on the concept of open innovation, all BMW's R&D functions in China have been merged together under one roof for efficient collaboration and high-speed performance. **BMW has now built-up fully-fledged R&D competency and software development capabilities for full-stack ICV development in China, putting the company in the perfect position to further implementing its China strategy.**

Mr. Frank Weber, Member of the Board of Management of BMW AG, Development, said, "**The NEUE KLASSE of BMW will redefine driving pleasure. With our fascinating products and premium mobility experience, the BMW Group moves body, heart and mind empowered by digitalisation.** Our new R&D Center and BMW China R&D upgrade will enable us to achieve a real competence push. Within the last three years, we have tripled our forces in China. Today, more than 3,200 designers and engineers, NEV and software specialists are creating leading-edge innovations in close collaboration with Chinese tech players, start-ups, local partners as well as academia. China is the place to be. Going forward, there will be a lot more China in our worldwide R&D organisation."

A future-oriented R&D strategy and innovation mindset has been central to the

BMW Group's rise to its leadership position in the global automotive industry. The company opened FIZ, its renowned R&D Center in Munich in 1990. Today, the BMW Group R&D network covers 17 countries. China has established the largest R&D and innovation network outside Germany, with facilities and processes as advanced as the headquarters and numerous innovation partnerships.

BMW believes that China is the place to be for future mobility. In April, BMW further upgraded its R&D management in China, bringing all development functions in China under one roof and the leadership of Dr. Robert Kahlenberg. This move not only strengthens the synergy across different R&D functions in China, but will better integrate the China R&D network and its innovation capabilities into BMW Group's worldwide R&D organization. In addition, innovation and future trends will be scouted and assessed earlier in order to better meet the needs of Chinese customers. Within BMW Group's global R&D network, China is the only country outside Germany with full-process R&D capabilities. There are now 3,200 R&D associates in China using their expertise to develop fascinating products for Chinese customers. For instance, in the BMW Operating System 9, 70% of the functions are tailor-made for Chinese customers. What's more, BMW's China R&D team has been deeply involved in the design, development, testing and validation of the locally-produced all-electric BMW i5.

The NEUE KLASSE, BMW's next generation of all-electric models, will write a whole new book in terms of technological development. **BMW's R&D and design teams in China are deeply involved in many key aspects of the development of the NEUE KLASSE models.** A number of China innovations will become highlights of the upcoming NEUE KLASSE models.

By focusing on human-machine interaction and hardware-software integration, BMW is taking the digital user experience to the next-level in China.

Human-machine interaction is a vital part of the user experience. Currently, China is the only market outside Germany that has Skylab, the human-machine interaction design team, and usability lab with all core design functions, covering user experience design, visual design, usability research and the development of human-machine interaction. The facility fully demonstrates BMW's systematic, precise and advanced approach to usability research based on simulation models. The usability research team consists of designers, software

engineers, cognitive psychologists, and more. The specific team conducting usability research during the development of the BMW Operating System 9 included experts with over eight years of experience on average, including some with psychology PhDs. Over a 15-month period, they listened to feedback from hundreds of Chinese customers and customers from other countries and regions.

BMW places a lot of emphasis on the importance of hardware-software integration in car development, with leading-edge software considered essential for a next-level user experience. In China, **BA TechWorks in Nanjing will expand their software team to 500 associates by the end of 2023,** with software development capabilities for full stack development of Intelligent Connected Vehicles. BMW's software development department was established in 2002 and now located in Mountain View (USA), Lisbon and Porto (Portugal), Munich and Ulm (Germany), Tokyo (Japan) and Shanghai, Beijing and Nanjing (China), with over 8,000 software specialists worldwide. The team develops an average of around 100,000 software builds per day and processes around 3,000 builds per hour in parallel.

Designworks Shanghai as local design studio of BMW Group even deeper integrated in R&D centre to bridge the East and the West

In 2023, Designworks started its second decade in China and will further integrate with BMW's world-leading digital development processes based on LED and VR technology, to empower future design through digitalization. The studio space and its technological features greatly improve the effectiveness of the design team, their workflow and global collaboration. More than 25 years ago BMW AG acquired Designworks to serve as the eyes and ears of the BMW Group to the world. Designworks started its operation in Shanghai in 2012 and became a bridge between Western and Chinese aesthetics and a leading force in automotive design. Recently, the design of BMW models worldwide has increasingly reflected the beauty of Chinese culture and modern Chinese values, with a bolder, more striking and more confident flair.

BMW has long led the way in advanced digital R&D, building excellent user experiences for global customers. The **BMW Group Driving Simulation Center** located in Munich covers an area of some 11,400 square metres, and is equipped with 14 simulators with the capacity of 100 simulations per day. Tests include innovative entertainment technologies, user interfaces and operating concepts,

multi-mode interaction between users and the vehicle, chassis tuning, driver assistance functions and even fully-automated driving scenarios. These tests greatly speed up the development and significantly reduce the environmental impact during the R&D processes.

From R&D to validation, BMW has built its largest e-mobility R&D footprint outside of Germany in China

The BMW Group established its **first battery center outside of Germany with full battery capabilities** in China in 2017. The BMW Shenyang R&D Center has been focusing on electrification technology development, product localization, calibration, and validation for over 10 years. **The recently expanded Shenyang R&D Centre Phase II** has further strengthened BMW's full process development and validation capabilities for locally-produced new energy vehicles. The facility includes 19 new laboratories, 17 of which are dedicated to testing new energy vehicles.

China is also home to BMW's **largest testing and validation footprint** outside of Germany. The Shenyang R&D Centre has a global-leading **EMC laboratory**. In the anti-interference test, the general standard in the industry requires 30 V/m, while the electric field intensity in BMW EMC lab could reach 100V/m on average and up to 140 V/m in extreme test conditions. BMW also owns a professional **NVH laboratory** in Shenyang, including an acoustic hub Dyno laboratory and outdoor test track, which can run strict tests of noise outside and inside the cabin. The **High-Voltage Battery (HVB) testing lab** can simulate extreme conditions to ensure the high-performance and safety of high-voltage batteries in all conditions. The high-voltage battery of the all-new BMW i3 underwent 155 hardware tests and 994 software function tests during the development process.

All BMW vehicles will undergo **rigorous vehicle testing** prior to launch, at geographical locations from 71 degrees north to 25 degrees south latitude, and temperatures from -40 degrees to 46 degrees. The extreme testing ensures all new models will provide excellent performance for customers whatever the weather and road condition. In addition, all models launched in China will undergo **vehicle endurance testing** in the special environments of high altitude, high humidity, high temperature and extreme cold in China. The test contents include the powertrain system, the battery, the motor, the control units, and the dynamic

performance.

Thanks to the fully-fledged BEV R&D and testing capabilities in China, the BMW Group has already launched locally-produced BEVs including the BMW i3, BMW iX1 and BMW iX3, as well as imported BEVs including the BMW i4, BMW i7 and BMW iX. Meanwhile, the locally produced BMW i5, will be unveiled this year.

In China, for the World: BMW Group Tech Office Asia-Pacific in Shanghai focuses on tech scouting of advanced technologies and innovations

BMW Group is a strong believer in innovation through collaboration, and is constantly scouting for global innovators in new technologies and future mobility trends. In 2013, **BMW Group Tech Office** was established in Shanghai. It focuses on the future mobility pillars of Electric, Digital and Circular. BMW collaborates with innovative companies and even offers platforms for innovative start-ups to enter the automotive market with the help of BMW. BMW Tech Office covers different tech fields like generative AI, AR/VR, sustainability and digital solutions. 2023 marks the 10th anniversary of the Tech office, and the center has been upgraded to the BMW Group Tech Office Asia Pacific, based in China but feeding back innovations for the world.

BMW is also expanding its circle of joint innovation partners. As well as cooperating with tech giants such as Tencent, Alibaba, China Unicom, Navinfo and Huawei, BMW also engages with China's future tech innovators and top universities such as Tongji University and Tsinghua University. Recently, **BMW signed a Memorandum of Understanding with China Automotive Technology & Research Center (CATARC)** for cooperation in the areas of intelligent connected vehicles, new energy vehicles, sustainability, vehicle safety, and more. The two parties have agreed to conduct exchanges and discussions on policy and regulation, promote the standardization in the framework of an ICV ecosystem, and advance ICV and NEV development in China together.

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The BMW Group

With its four brands BMW, MINI, Rolls-Royce and BMW Motorrad, the BMW Group is the world's leading premium manufacturer of automobiles and motorcycles and also provides premium financial and mobility services. The BMW Group production network comprises over 30 production sites worldwide; the company has a global sales network in more than 140 countries.

In 2022, the BMW Group sold nearly 2.4 million passenger vehicles and more than 202,000 motorcycles worldwide. The profit before tax in the financial year 2022 was € 23.5 billion on revenues amounting to € 142.6 billion. As of 31 December 2022, the BMW Group had a workforce of 149,475 employees.

The success of the BMW Group has always been based on long-term thinking and responsible action. The company set the course for the future at an early stage and consistently makes sustainability and efficient resource management central to its strategic direction, from the supply chain through production to the end of the use phase of all products.

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