

Artificial Intelligence in NRW

Europe's heart beats digitally, does yours?



In cooperation with:

KiNRW

"The best way to predict the future is to invent it."

– Alan Kay

North Rhine–Westphalia (NRW) is undergoing a transformation, and you can be a part of it. Almost no other European region embodies the shift from industrial tradition to data- and AI-driven value creation more clearly. The region, which was once characterized by coal and steel, is now defined by digital processes, intelligent systems, and data-driven innovation. Artificial intelligence (AI) is not just a technology – it is the key to a new industrial revolution that will shape the future of the economy, science and society.

NRW pursues a clear strategy: to actively shape the future together with you, rather than waiting for it. This involves innovation, investment, and networking between industry, research, and the public. Artificial intelligence creates business opportunities for you, strengthens the economy and

technological independence, and generates jobs for the state.

“ Artificial intelligence can be a real economic game changer for Germany. AI is bigger than anything that has changed our country in recent decades. The future starts now – and NRW is leading the way. We aspire to become the leading digital and quantum region and are moving consistently from coal to AI.

– **Minister-President Hendrik Wüst**

In NRW, you will find a unique melting pot of leading research institutions, international industrial companies, hidden champions, and dynamic startups. NRW offers you a powerful innovation ecosystem for the development and application of AI technologies along the entire value chain.

“ North Rhine–Westphalia has an impressive AI innovation ecosystem – with excellent research, strong industrial partners, and a dynamic startup community. As Europe’s Heartbeat, we bring talent and technology together, making us an attractive location for AI investors from all over the world.

– **Felix Neugart, NRW.Global Business**

The state government is investing specifically in research, infrastructure, and talent, while also strengthening the transfer of knowledge and technology between science and industry. By doing so, NRW is positioning itself as a leading location for secure, responsible, and powerful AI in Europe, offering unique conditions for innovation and investment.

“ In NRW, we implement cutting-edge AI research quickly and effectively. With strong networks, open communication, and the participation of everyone involved in the North Rhine–Westphalian AI ecosystem, we are facilitating the transfer of knowledge and technology that specifically promotes innovation and strengthens the long-term competitiveness of companies.

– **Dr. Christian Temath, KI.NRW**

This brochure provides an overview of NRW as an AI location. It demonstrates how a

robust and ethical AI ecosystem operates and how you can leverage it to create opportunities for your company. North Rhine–Westphalia offers immense potential for the development and application of AI technologies, providing attractive prospects in one of the strongest economic and scientific regions in the heart of Europe.



From industrial state to AI region: NRW is shaping digital transformation

NRW is one of the most dynamic AI locations in Europe. Germany's largest economic region boasts a high concentration of companies, research institutions, and technology-oriented startups that collaborate to transform AI research into marketable applications. The close interlinking of industry and science creates a vibrant environment in which new technologies can be quickly and efficiently integrated into value-added processes, allowing new business models to emerge.

The economic benefits are considerable. A recent study estimated the potential contribution of generative AI alone to the German gross value added at around €330 billion. Companies in NRW are ready to adopt technological innovations into their operational processes at an early stage – one in five already use AI productively. This is due to the state's extensive industrial

expertise, which creates application scenarios for AI in nearly all major industries.

Located in the heart of Europe, NRW offers direct access to international markets and European innovation networks. Its proximity to France, Belgium, and the Netherlands facilitates cross-border cooperation and the scaling of AI applications across Europe – a clear locational advantage for those setting their sights high.

NRW also has excellent infrastructure. The state provides available space for data centers, comprehensive 5G and fiber optic connectivity, and a stable, increasingly climate-neutral energy supply, including direct connections to offshore wind farms. Meanwhile, former industrial sites are being developed into technology and innovation hubs that provide new opportunities for digital value creation.

This expertise has its roots in people: NRW's impressive talent pool. It is one of the regions in Germany with the strongest AI expertise in science and business. It has more academic institutions than Île-de-France or Greater London and offers you more renowned research institutions in a compact region than anywhere else in Europe. Universities, Fraunhofer, Max Planck, and other institutes collaborate closely with industry and startups, while innovation clusters support access to tech transfer and talent.

The **HPC.NRW** competence network provides companies and research institutions with access to 13 high-performance computing centers throughout the state. Private investments further strengthen this infrastructure: Microsoft is investing €3.3 billion in a new data center region –

the largest single investment in German corporate history. Along with the **JUPITER AI Factory**, Europe's fastest supercomputer, a powerful computing ecosystem is being created that will establish standards far beyond NRW.

NRW offers you a combination of economic strength, high research density, international networking, and a consistent transformation policy. Benefit from industrial experience, technological openness, and scientific excellence – a mix that makes the state a leading location for secure, responsible, and competitive AI in Europe.



NRW: Germany's No. 1 investment location



Economic heart and international hub in the center of Europe – “Europe’s Heartbeat.”



Economic powerhouse: The highest gross domestic product of all German federal states (one-fifth of Germany’s total GDP).



Leading investment location in Germany with 24,000 foreign companies already managing their German and global business activities from here.



Europe’s densest research network: With its unique concentration of universities and renowned research institutions, NRW offers ideal conditions for innovation and technology transfer.



Germany’s most populous federal state and strategically favorable location with access to a consumer market of more than 46 million people within a 200 km radius of the state capital Düsseldorf.



Ideal ecosystem for founders and investors: NRW offers a strong network of ambitious partners as well as unique sales and procurement opportunities, bringing together innovation drivers and talented people who quickly transform ideas and patents into marketable products.



Excellent transport infrastructure: 6 airports, 120 inland ports, including the world’s largest in Duisburg, and an extensive network of waterways, railways, and roads.



Central and cosmopolitan location: International companies and their employees appreciate the quality of life, tolerance, and open-mindedness found here. This is a decisive factor for teams that want to work and grow globally.

The AI ecosystem in NRW

Become part of one of Europe's leading AI regions

NRW offers you one of the most diverse and application-oriented AI ecosystems in Europe. Companies from industry, energy, healthcare, mobility, and logistics are already implementing AI – not just in the lab, but in the engine room of the economy. This real market penetration makes NRW a driver of AI transformation in Europe.

As a hub for applied AI, NRW allows you to test and develop new technologies in real production environments, logistics processes, and energy networks. The close integration of research, industry, and practice accelerates the path to product-market fit. AI solutions quickly become market-ready and seamlessly integrate into operational processes.

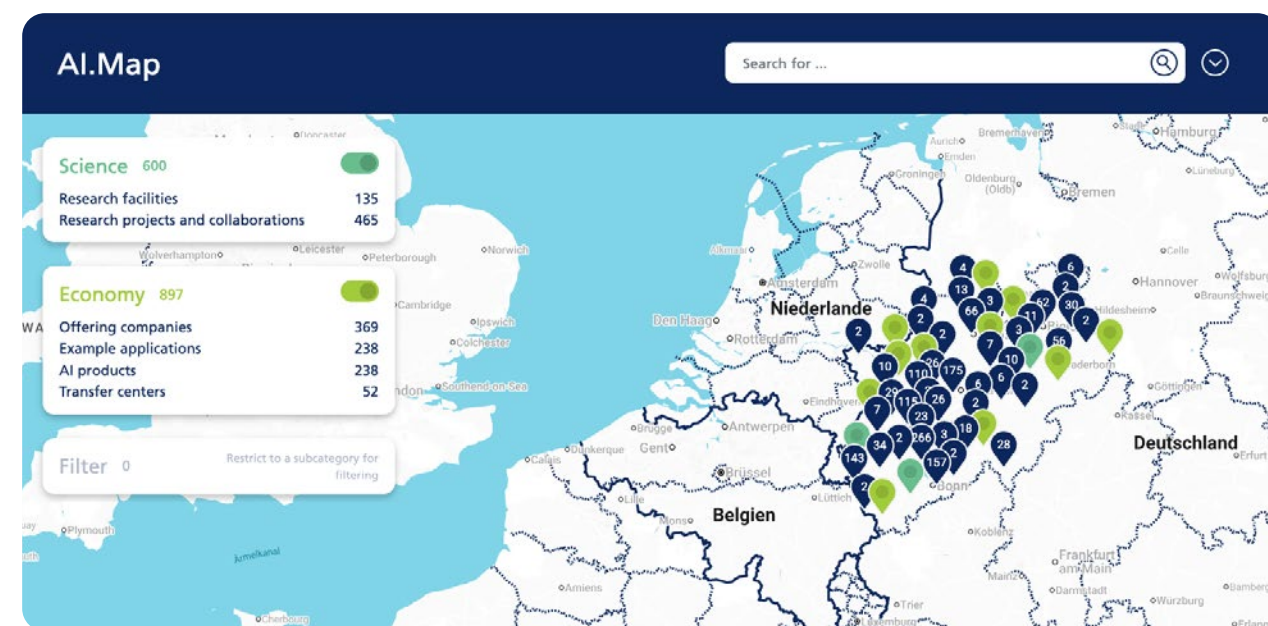
A key advantage stems from the state's industrial character. Many companies have extensive datasets that have grown over time, providing considerable potential for the development and optimization of AI-based applications.



NRW's practical approach is complemented by an open culture of innovation. Experience the cosmopolitan mentality for which the region is known – characterized by direct cooperation and uncomplicated networking. This culture makes it easier for you to quickly test new solutions and, together with partners, transform them into viable innovation projects.

The AI.Map from KI.NRW brings together tried-and-tested practical solutions from NRW, showing how AI transfer can be successful – from global technology corporations and software providers to young deep tech startups. This density fosters a robust value chain: AI is not only developed in NRW, but also directly transferred into market-ready products and industrial processes.

AI.Map



Pioneering companies from NRW

The particular strength of NRW as an AI region is evident in the companies that set technological standards here and enjoy international recognition. Six players exemplify the diversity and high performance potential of the location – each in a key future field of artificial intelligence such as generative AI, automation software, industrial applications, or sustainable technologies.

One of the best-known international examples is **DeepL** from Cologne, which is setting global standards with AI-based language processing. DeepL's translation technology is used in more than 200 markets and is considered one of the most accurate solutions available in the field of generative AI. With a valuation of several billion euros, far exceeding unicorn status, DeepL is one of the most valuable AI companies in Europe. The company demonstrates how AI innovations from the region are gaining international visibility and increasing the export potential of AI "Made in NRW."

Cognigy develops AI platforms for automated customer communication and is one of the fastest-growing software companies in Germany. Its solutions are used by global corporations and have raised the international profile of NRW as a location for enterprise-grade AI systems.

The cloud-based, high-performance computing (HPC) platform from **IANUS Simulation**, a deep tech scale-up in Dortmund, facilitates automated simulations that solve highly complex fluid dynamics processes in various industries, including manufacturing, construction, and automotive.

With **Beckhoff Automation**, NRW also has a leading global provider of industrial control technology that integrates AI directly into machine and plant control systems. This combination of hardware, control logic, and AI makes Beckhoff a major player in the industrial application of AI, showcasing its productive use in the core area of German and European industry.



CLAAS, a hidden champion based in Harsewinkel, is a prime example of the agricultural sector's use of AI. This globally active agricultural machinery manufacturer uses AI in smart farming to boost the efficiency, precision, and sustainability of agricultural practices, thereby helping to ensure global food security. CLAAS connects machines, sensor technology, and digital platforms using AI. CLAAS's use of AI demonstrates how it is becoming a key innovation factor in traditional industries.

A further example of the connection between AI, industrial innovation, and sustainability is **Wilo** in Dortmund. The global technology group uses AI to optimize manufacturing processes, energy consumption, and product performance. Wilo SE has received multiple awards for its successful implementation of AI in industrial practice, exemplifying the combination of sustainable technology and economic success.

Science is a growth engine – NRW a leading AI research location

NRW is a center of international, cutting-edge research, and you can particularly benefit from this in the field of AI. In addition to around 70 universities, the state has more than 60 technology and startup centers, as well as over 50 non-university research institutions that accelerate innovation. Every day, thousands of researchers

advance their expertise in software and hardware here. Renowned international research in NRW plays a key role in shaping global technological developments and creates optimal conditions for innovation, technology, and knowledge transfer. It's a productive base for you and has the most vibrant startup scene in Europe.

Room for innovation

NRW is home to one of six national AI competence centers in Germany. The **Lamarr Institute for Machine Learning and Artificial Intelligence** brings together the expertise of distinguished research institutions in the Rhine and Ruhr regions. Its focus is on secure, resource-efficient, and powerful AI. Its goal

is to strengthen European AI sovereignty through excellent research and technology transfer.

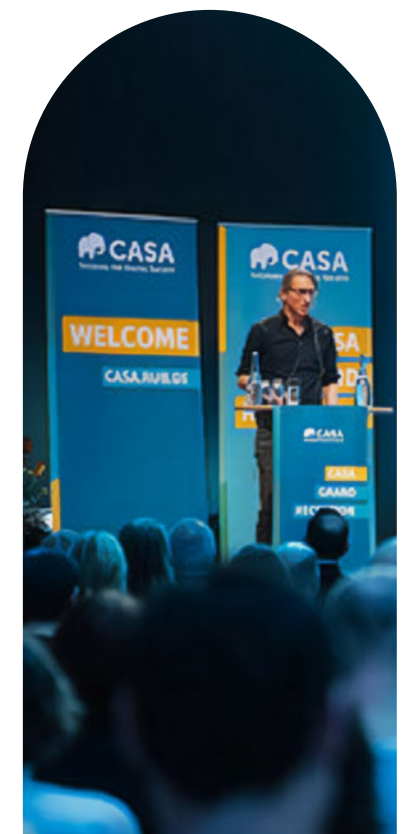
In addition, numerous leading institutions are key in advancing AI development. Here are just a few examples:

The **JUPITER AI Factory, Forschungszentrum Jülich** operates the first European exascale supercomputer, which is also the fastest supercomputer in Europe. This represents a quantum leap for AI applications and the training of large language and scientific models. The research results will be freely available, facilitating the development of new solutions for end users, ranging from improved climate simulations to digital models of human organs.

Initiatives such as the **NeuroSys** future cluster (neuromorphic hardware) and quantum information projects such as **eleQtron** are creating key technologies for the next generation of AI systems. Where conventional computers reach their limits, quantum-based or brain-inspired hardware takes the next step.

Fraunhofer IAIS (Institute for Intelligent Analysis and Information Systems) is one of Europe's leading institutions for applied AI research. The institute specializes in generative AI, intelligent process automation, and AI testing and validation. The institute develops strategies, technologies, and solutions for companies, public authorities, and organizations along the entire value chain.

The Cluster of Excellence **CASA** at Ruhr University Bochum strengthens the resilience of the digital society by researching and developing countermeasures against cyberattacks and AI-driven threats.



AI Flagships

The KI.NRW Flagships are highly innovative, application-oriented projects funded by the NRW state government that operate within the framework of the KI.NRW competence platform. These initiatives bring together companies, SMEs, startups, research institutions, and universities to develop and showcase concrete AI solutions for

real-world problems in various industries, including manufacturing, healthcare, and retail. The goal is to accelerate technology transfer by creating practical applications that quickly gain traction. This will further solidify NRW's position as an AI innovation hub and enable other companies to leverage AI technology.

Flagship projects with particular appeal

The **Cyber Production Management Lab** aims to seamlessly integrate forward-looking technologies such as AI and 5G into medium-sized manufacturing companies.

The **CERTIFIED AI** project is developing testing procedures for AI systems that enable neutral evaluation and provide companies and consumers with information about the guaranteed properties of AI technologies.

Thanks to state-of-the-art technologies such as 5G, AI, and surgical robotics, the **Innovative Secure Medical Campus** has emerged as a pioneer for the medical campus of the future, for example through AI-supported therapeutic decision-making.

Talent hub for AI

In NRW, you have access to one of the largest and most important labor markets in Europe. With around 18 million inhabitants and 9.8 million people in employment, it is larger than that of the Netherlands with around 9.4 million and twice as large as that of Belgium with its 4.8 million employees.

With over 160 AI-related degree programs at universities in places such as Aachen, Dortmund, Bonn, Cologne, Bochum, Wuppertal, and Sankt Augustin, NRW offers one of the most diverse ranges of educational opportunities in Europe. Take advantage of this continuously replenished talent pool to strengthen both research and the economy in the long term. The state's clear strategic focus on trustworthy, resource-efficient, and application-oriented AI research promotes technological

sovereignty and social acceptance, a key factor for sustainable innovation.

Currently, more than 700,000 students are enrolled in one of the approximately 70 universities and universities of applied sciences in the state. Each year, approximately 110,000 students graduate from these institutions in NRW.

To ensure that the next generation is introduced to AI from an early age, NRW is launching the **AI-Skilling.NRW** initiative, which opens up new ways for the approximately 200,000 teachers in the state to use artificial intelligence in the classroom.



Startups are shaping the future of AI – from NRW to the rest of the world

NRW has developed into a leading location for deep tech and industrial AI. Notable examples include **Black Semiconductor** and **GEMESYS**, which are developing neuromorphic and photonic hardware, thereby laying the foundation for the next generation of energy-efficient AI systems. In the field of sustainable

AI, **Recogizer** and **aedifion** are demonstrating how artificial intelligence can be used to optimize energy consumption in real time and reduce CO₂ emissions.

These startups represent the breadth and depth of the AI ecosystem in NRW – from hardware and quantum computing to green tech – and are just a small part of a vibrant AI startup scene, ranging from young deep tech companies to successful scale-ups with international appeal. They demonstrate the state's high startup momentum and strong innovation potential.



Innovation networks are drivers of international excellence

The location's particular strength lies in its close integration of research, industry, and startup support. Incubators, accelerators, and technology centers create optimal conditions for the development of marketable AI solutions, providing direct access to pilot customers and real-world laboratories.

As a statewide umbrella organization, the **KI.NRW** competence platform plays a central role in connecting stakeholders, accelerating technology transfer, and positioning NRW in European networks.

The **European Digital Innovation Hubs** (EDIH Rhineland, EDIH South Westphalia, and EDIH Dortmund) complement it by offering small and medium-sized enterprises access to AI test environments, consulting services, and computing capacities.

- **EDIH Dortmund:** Companies from logistics, manufacturing, and trade
- **EDIH Rhineland:** Sustainable integration of digital innovations into operational and administrative processes
- **EDIH South Westphalia:** Human-centered digitalization and human-machine interactions

In addition, four other regional innovation hubs, the **digital hubs**, provide practical development spaces. These hubs serve as low-threshold entry points for individuals interested in starting a business. They also function as important regional hubs for digital innovation, connecting startups with local companies.

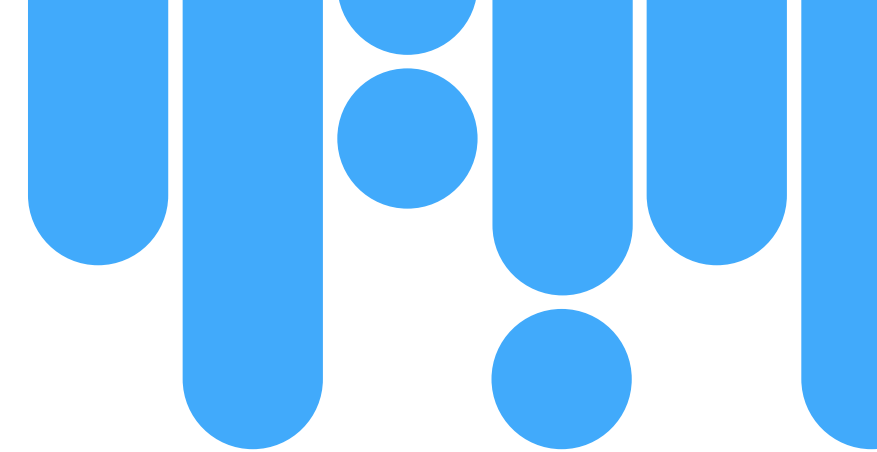
The German government has designated initiatives such as **BRYCK** in the Ruhr region and the **Gateway Factory** in Cologne, Aachen, and Düsseldorf as Startup Factories. These initiatives are among the most important innovation platforms in Germany.

Digital hubs

- digitalHUB Aachen
- Digital Hub Bonn
- digihub Düsseldorf / Rhineland
- Digital Hub münsterLAND

In addition, the **AI Village** in Hürth is creating a physical location for AI and robotics applications, bringing together companies, research, and further education.

Specialized institutions, such as the AI service center **WestAI, ZaKI.D** in Duisburg, and the **it's OWL** technology cluster, primarily support medium-sized companies in the adoption of AI solutions.



Conclusion

“People who are serious about software should make their own hardware.” – Alan Kay

NRW takes a holistic approach to artificial intelligence – and offers you the full spectrum. Not only are AI applications developed here, but also the necessary hardware for quantum computing and quantum machine learning, as well as neuromorphic chips.

This is made possible by something you will only find in NRW: close, uncomplicated cooperation between research, industry, and startups. Many of the most successful AI startups are spin-offs from universities or are born from collaboration with leading industrial companies and institutes. The result: Technologies move from the laboratory to practical application exceptionally quickly here.

At the same time, NRW is home to large industrial companies that have long used AI productively in fields such as mechanical engineering, energy, health, logistics, and agricultural technology. This provides startups and investors with direct access to real data, clear use cases, living labs, and pilot customers. AI is not only developed here, but also immediately tested, validated, and scaled.

Become part of an ecosystem combining strong research expertise, industrial demand, and entrepreneurial dynamism with a talented pool of professionals. Be where innovation not only emerges, but also has an impact. Welcome to a region that not only thinks about AI, but also puts it into practice.

NRW.Global Business – Economic Development Agency

The state-owned economic development agency NRW.Global Business is the partner for all companies when it comes to investment projects and settlements in NRW, the development of growth markets, and networking with international business partners. NRW.Global Business conducts international location marketing for Germany's No. 1 investment location, NRW,

and attracts foreign direct investment worldwide. The experts at NRW.Global Business support investors in tax and legal matters and provide detailed information about the economic structure and industry clusters. They analyze investment projects, identify suitable locations, and accompany an investment project from the first step to successful establishment and beyond.

Benefit from the network

With its international offices, the company is represented in future markets around the globe. In addition to branches in Japan and the USA, NRW.Global Business has representative offices in China, the United Kingdom, India, Israel, Poland, and Turkey. In cooperation with the head office in Düsseldorf, the international offices support companies with investment projects in NRW.

KI.NRW

The KI.NRW competence platform is developing North Rhine-Westphalia into a leading location for applied artificial intelligence (AI) while establishing the state within national and international networks. As the state's central umbrella organization for AI, KI.NRW unites cutting-edge research, innovation, and entrepreneurship. The goal is to raise the profile of players in the AI

ecosystem, connect them, and accelerate the transfer of AI from research to the economy. To this end, the competence platform supports companies of all sizes and maturity levels in their journey into the world of AI. KI.NRW addresses the diverse needs of the economy through specialized events, consultation hours, workshops, and publications. KI.NRW always puts people at the center of AI design. Funded by the NRW Ministry of Economic Affairs, Industry, Climate Action and Energy and Ministry of Culture and Science, KI.NRW is managed by the Fraunhofer Institute for Intelligent Analysis and Information Systems IAIS in Sankt Augustin, one of Europe's leading research institutes in the fields of artificial intelligence and machine learning.



NRW.Global Business worldwide

From Chicago to London, from Tel Aviv to Tokyo: With our international offices, we are represented in important growth markets around the globe. Our experts in your region look forward to hearing from you.

International offices

NRW.Global Business Japan / Tokyo (NRW Japan K.K.)
Dr. Carolina Kawakubo
Phone: +81 3 52102300
Email: contact@nrwglobalbusiness.co.jp

NRW.Global Business (NORTH AMERICA) LLC / Chicago
Michael Kordus
Phone: +49 211 13000 122
Email: kordus@nrwglobalbusiness.com

NRW.Global Business (NORTH AMERICA) LLC / South East
Daniel Dueren
Phone: +1 229 4606104
Email: daniel@nrwglobalbusiness-usa.com

NRW.Global Business (NORTH AMERICA) LLC / West Coast
Jörg Rose
Phone: +1 424 2626221
Email: joerg@nrwglobalbusiness-usa.com

NRW.Global Business China / Beijing
Xingliang Feng
Phone: +81 10 65907066
Email: beijing@nrwglobalbusiness.cn

NRW.Global Business China / Guangzhou
Jie Liang
Phone: +86 20 32215613
Email: guangzhou@nrwglobalbusiness.cn

NRW.Global Business China / Nanjing
Xiadong Wang
Phone: +86 25 52270000
Email: nanjing@nrwglobalbusiness.cn

NRW.Global Business India / Bangalore
Ambika Banotra
Phone: +91 91102 15076
Email: ambika.banotra@nrwglobalbusiness.co.in

NRW.Global Business Israel / Tel Aviv
Gabriele Tabach
Phone: +972 3 6806800
Email: gabriele@nrwglobalbusiness.co.il

NRW.Global Business Poland / Warsaw
Oliver Burrak
Phone: +48 572 703062
Email: burrak@nrwglobalbusiness.pl

NRW.Global Business Türkiye / Istanbul
Akin Okumuş
Phone: +90 212 2491848
Email: info@nrwglobalbusiness.com.tr

NRW.Global Business United Kingdom / London
David Schneider
Phone: +44 7551284735
Email: d.schneider@nrwglobalbusiness.uk

Headquarters

NRW.Global Business GmbH
Trade and Investment Agency
of the German State of
North Rhine-Westphalia (NRW)
Felix Neugart, CEO
Völklinger Straße 4
40219 Düsseldorf, Germany
+49 211 13000-0
nrw@nrwglobalbusiness.com
www.nrwglobalbusiness.com

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NRW.Global Business GmbH
Trade & Investment Agency
of the German State of
North Rhine-Westphalia (NRW)
Völklinger Straße 4
40219 Düsseldorf, Germany
+49 211 13000-0
nrw@nrwglobalbusiness.com
www.nrwglobalbusiness.com

Responsible (acc. to press law)
Annette Peis, Head of Division
Marketing | Communication | Information
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