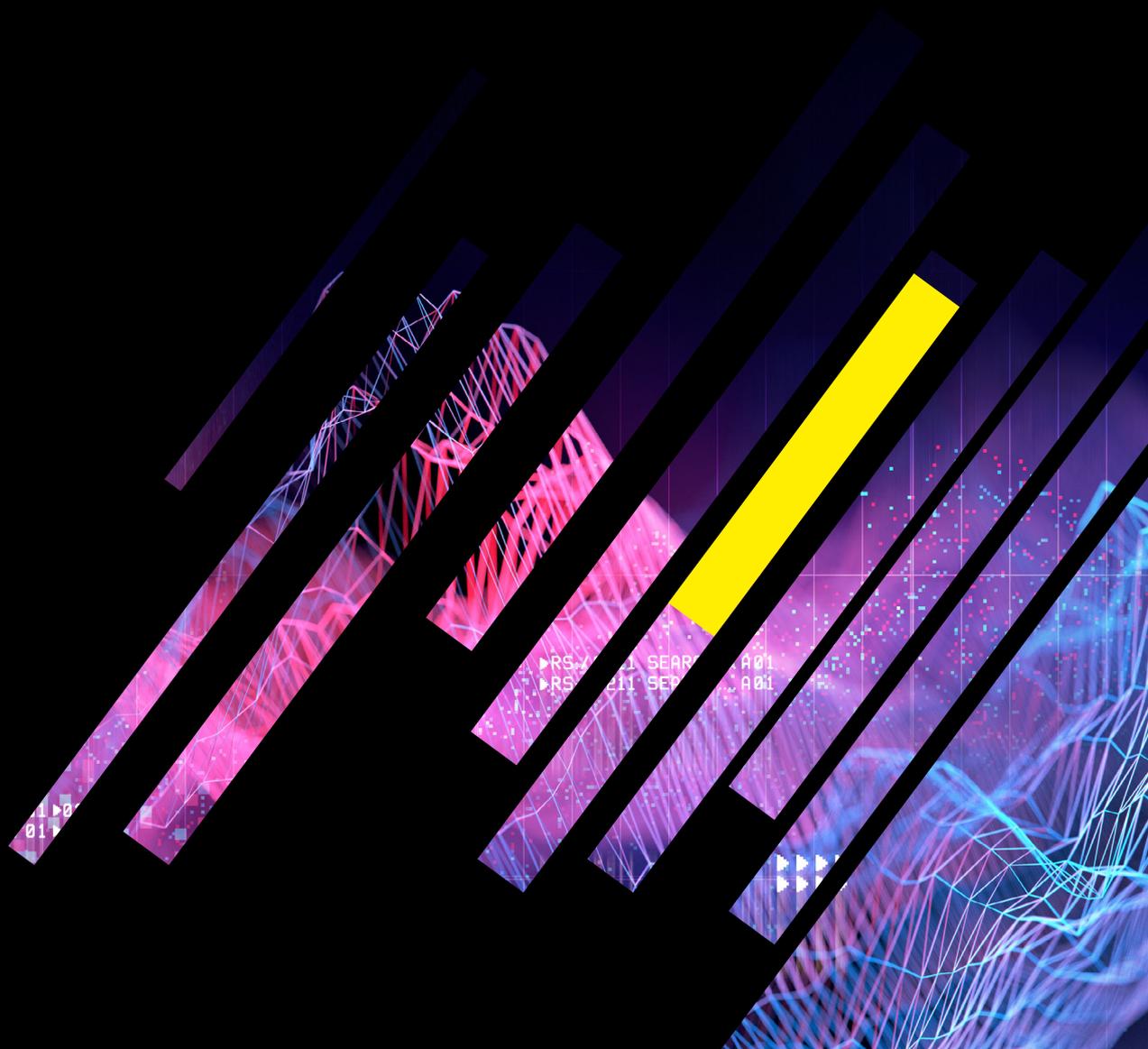


DREES &
SOMMER

INNOVATION SCOUTING

REPORT 2023



This year's Innovation Scouting Report presents technology-based application examples from the construction and real estate sector from along the real estate life cycle which are contributing to the neo-ecology megatrend. In addition, startups from the sector describe their technological solution approaches for this trend.

Trends come in different shapes: microtrends, macro trends, and megatrends. The latter are trends which influence business, politics, society, and culture for up to 50 years. Megatrends of particular relevance for the construction and real estate sector are urbanization, digitization, and neo-ecology. Due to current relevance, this report deals with the neo-ecology megatrend, which is based on the pillars of ecology, economy, and ethics (*source: The Neo-Ecology Megatrend, Zukunftsinstitut*). Aspects such as climate change, health, or sustainable economic activity can be classified under neo-ecology. The construction and real estate sector is responsible for around 37% of global CO₂ emissions (*source: The Mission Construction, Handelsblatt Research Institute*). Society is feeling the effects of CO₂ more and more frequently, for example in the form of extreme weather events like heat waves or other natural catastrophes. This shows how imperative it is for the sector to act in order to shoulder its responsibility.

New green technologies or greentechs can have a significant impact. The high relevance of greentechs is illustrated by the market volume, which is set to increase globally to 9.4 billion euro by 2030 (*source: The future is green – what opportunities are available to German business?, KfW*). Startups from the construction and real estate sector, known as contechs and proptechs, are accelerating and benefiting from this growth. Already today, startups from the DACH region are demonstrating a clear focus on green solutions. 78.2% of the contechs and proptechs offer ESG solutions, which are used especially in project development and real estate management. Due to changed customer requirements, the proptechs are focusing especially on environmental protection solutions (*source: PropTech Germany 2022 Study, blackprint booster, brickalize, Aschaffenburg UAS*).

Investments in contechs and proptechs continued to grow last year. The volume of investments for German startups is 767.3 million euro. This is an increase of 52.7% overall compared with the previous year. The increasing volume of investment in the individual financing rounds is a sign that more and more venture capitalists or strategists are investing in startups (*source: PropTech Report 2022, blackprint booster*).

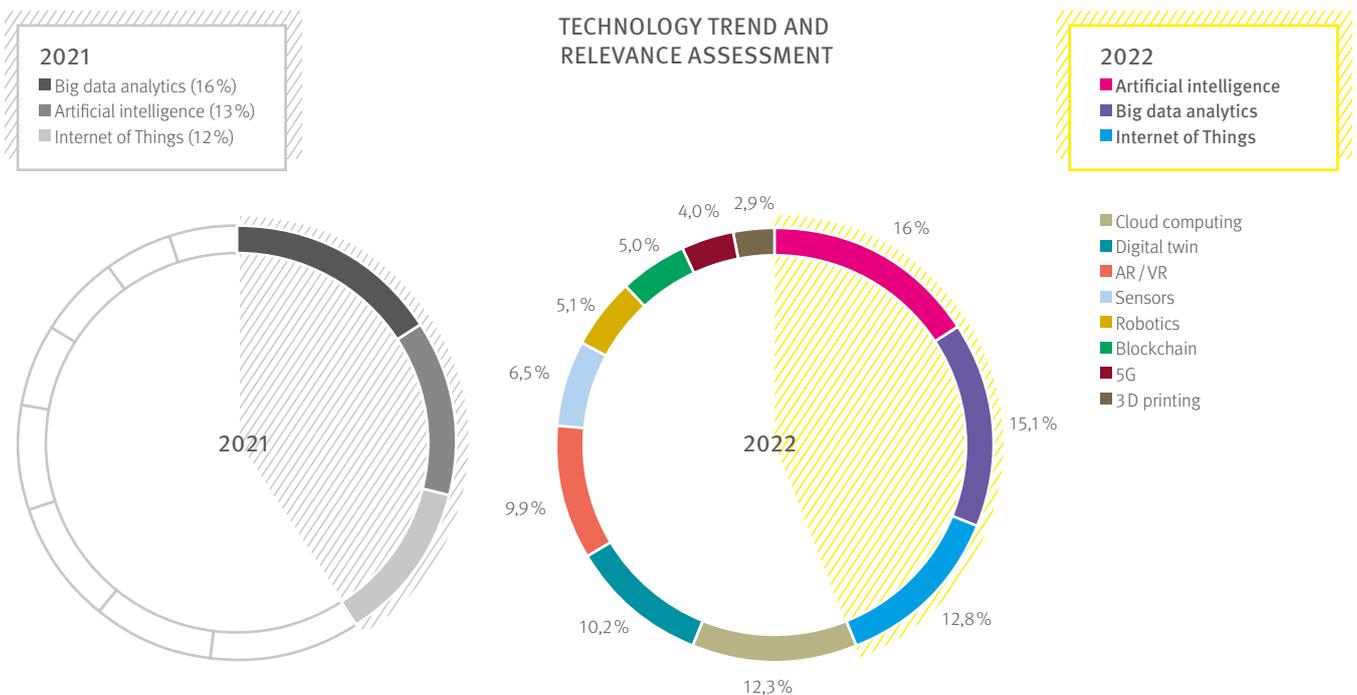
The relevance of the technology trends has shifted slightly compared with the last assessment. The following graphic compares the trend radar for this year with the one from last year's report.

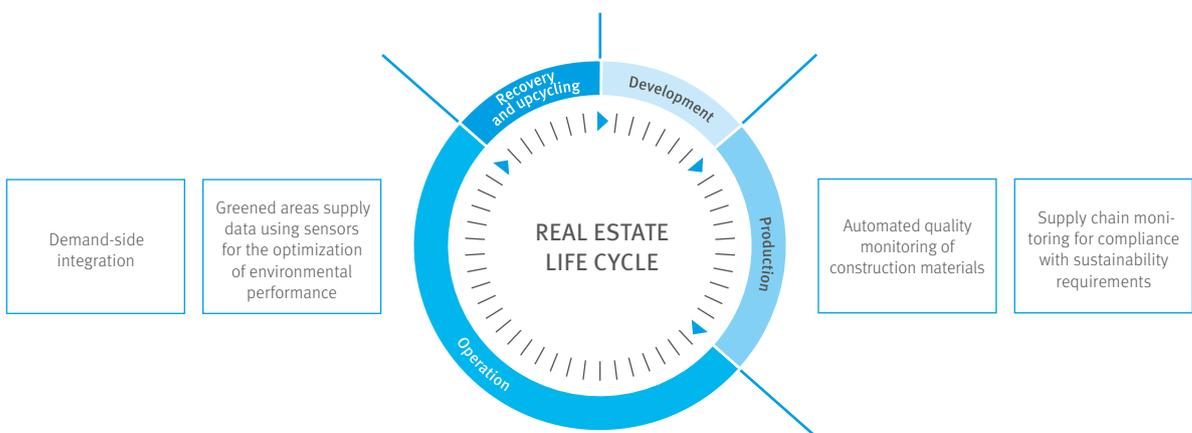
The data used to determine the relevance was from 2022 and 2023 for the most part. In addition, experts from the construction and real estate sector were surveyed on the current use of technologies.

The increasing relevance of **artificial intelligence (AI)** is clearly recognizable. It is taking over from **data analytics** as the top trend. **The Internet of Things (IoT)** is among the top three technology trends once again this year.

The use of AI is increasingly developing into a key factor in business success. Intelligently controlled machines and processes are a key driver in most sectors. AI is of great importance in the construction and real estate sector too, for smart buildings or automated construction sites. The widespread use of building information modeling applications is causing a rise in the digital twin technology trend. Cloud computing has also increased in relevance, benefiting from the rise in software-as-a-service applications, also connected with ESG platforms.

This report presents application reports based on the three most important technology trends of AI, big data analytics, and IoT, which are having a positive influence on the neo-ecology megatrend. In addition, it presents concrete solution approaches offered by startups. These not only relate to the technology trends as well as neo-ecology, but also overlap with other technologies and are linked to the real estate life cycle.



USE CASES –
INTERNET OF THINGS

The term IoT refers to the combination of various technologies. It uses sensors, data transmission technologies, data processing methods, and a user interface for acquiring, sharing, and processing data.

The technology connects and networks physical as well as virtual objects via the Internet. For that reason, it is predominantly used from the creation process of a building onwards. In the production phase, sensors connected via the Internet make it possible to monitor construction materials. This helps with compliance with quality class requirements. IoT offers additional added value in the tracking of sustainable material supply chains.

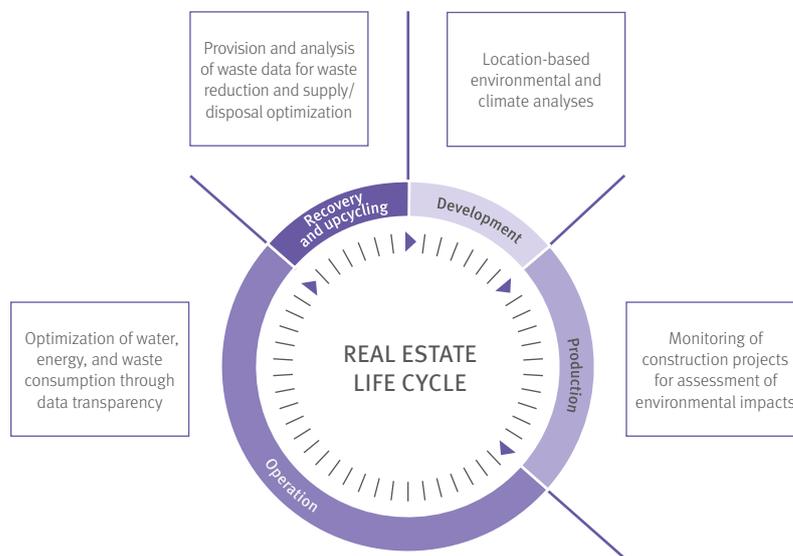
There are increased application possibilities for IoT in the operational phase in particular. Data can be acquired using sensors and, following analysis, used for tasks like plant control. Sensors measure the air quality and pollutant load in real time, and provide this data for the purpose of remote management through data transmission technologies. Building users or automated ventilation systems are notified if ventilation is required to improve the air quality. [See Introduction to startup 1 #IOT \(Green City Solutions\)](#) Another field of application of IoT is demand-side integration. Here, the optimized machine utilization is tied to a specific time. This can be coupled to an electricity price or to the availability of renewable energies.

#IOT STARTUP 1 GREEN CITY SOLU- TIONS

The starting point for Green City Solutions is the idea of combining nature with digital technology. The resulting product is biotech air filters based on living moss. Green City Solutions was founded by horticulturist Peter Sanger, media information scientist Zhengliang Wu and others while at university. The company now has its own moss farm and 30 employees.

Green City Solutions leverages the natural ability of living moss to filter fine dust and cool the ambient air. The interaction of sensors, intelligent ventilation, watering, and software increases the natural capacity of the moss and makes it measurable and controllable. The IoT guarantees the vitality of the moss and transforms the moss filters into an easy-to-maintain, long-lasting system. The acquired environmental and product performance data on the air quality or quantity of purified air can be visualized in real time and is suitable as a relevant measure for achieving standards as well as sustainability and ESG targets.

The company's vision is to mitigate the real consequences of climate change in the urban space, to filter greenhouse gases and fine dust, and in this way to help design the best possible city of the future. The biotech filters can be used as freestanding street furniture for creating targeted fresh air zones or on facades as large-scale fresh air sources.

USE CASES –
BIG DATA ANALYTICS

The big data analytics technology trend describes the storage and processing of large quantities of unstructured data. Data is the most important starting point in a digitized and connected world. The application examples around big data analytics are strongly correlated with the IoT and AI application examples.

As early as the planning phase, big data analytics can be used to select environmentally friendly construction materials based on data. In addition, the use of big data analytics enables the development of a sustainable strategy based on an analysis of emissions data. In this way it can help with the decarbonization of a building as well as with the planning, simulation, and implementation of a climate strategy.

During building operation, a variety of data is collected using IoT and sensors as the starting point for big data analytics. The aggregated data provides transparency about water, energy, and waste consumption. A data analysis can be used, for example, to achieve more efficient consumption control. This increases the energy efficiency and thus helps to lower CO₂ emissions. [Startup 2 #Big data analytics \(aedifion\)](#). Particularly for green lease analytics, transparency about consumption is critical to ensure the controlling of sustainability clauses in lease agreements. With these agreements, owners and users undertake to protect the environment.

The construction sector consumes enormous amounts of materials. Solutions based on the concept of the circular economy are therefore needed in the fight against resource scarcity. To enable a circular economy, solutions which provide information about the material quality, origin, and position are important in the recovery phase.

#BIG DATA ANALYTICS STARTUP 2 AEDIFION

aedifion was founded as a spin-off of RWTH Aachen. The company has grown from four people in 2017 to over 50 team members now at our headquarters in Cologne. Since 2017, we have continuously expanded our software offering among other things and can now model the complete process of operation optimization from data collection, to AI-based analysis, to autonomous operation optimization. By doing so, we help our target group to operate buildings more sustainably and to achieve ESG targets more quickly.

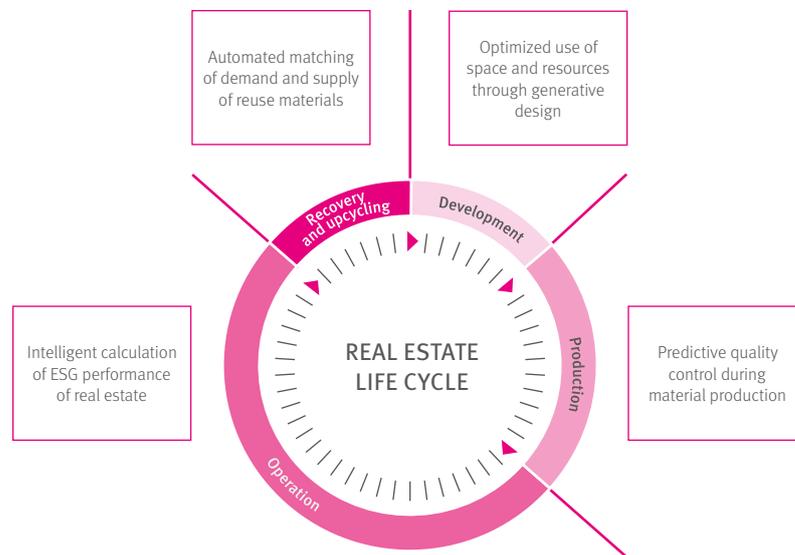
Big data and its analysis is the basis of our cloud platform:

In order to optimize operation in the long term, we start by ensuring a comprehensive database using plug-and-play and produce a set of operating data. This is organized into digital twins and analyzed using artificial intelligence. In this way, operating inefficiencies and errors can be uncovered. With our AI-based autonomous control, we can apply a predictive and self-learning approach to building control.

99% of existing buildings are not operated efficiently. This means a lot of unnecessary energy is consumed and thus also CO₂ is produced. Before expensive remedial measures are undertaken, it is important to optimize operation. A saving of up to 40% in energy consumption can be achieved in this way, which takes the ESG strategy of many owners into account.

ARTIFICIAL INTELLIGENCE

USE CASES – ARTIFICIAL INTELLIGENCE



AI organizes and analyzes data which forms the basis for automated processes. The technology is able to transfer human thinking and learning to computers, so they can learn, plan and self-correct using data.

The use of AI offers many opportunities to make a positive impact by contributing to sustainable and environmentally friendly planning and production. Using generative design, plans can be optimized in order to reduce the use of space and resources, for example. Furthermore, AI provides assistance with quality assurance by optimizing supply chains and in this way identifying problematic materials and waste materials early on. In addition, it enables predictive quality control during material production. [See Introduction to startup 3 #AI \(alcemy\)](#)

#AI STARTUP 3 ALCEMY

alcemy is a Berlin-based proptech startup founded in 2018. It currently has 34 employees working on implementing a new type of cement and concrete production, which is less expensive, with less CO₂, and consistently high quality. The AI-assisted software is used in cement plants and ready-mix concrete plants, for example at Dyckerhoff, Spenner, and Märker.

alcemy's technology enables more uniform, simple, and cost-effective production of sustainable cements and concretes by applying predictive control to the production quality using AI. This sets the course for a progressive reduction in the CO₂ footprint and significantly simplifies the handling of even the most complex mixtures. As a general rule, the more sustainable a concrete, the more challenging its production and the more quality monitoring is needed. This is precisely where alcemy comes in, with the company considering itself an enabler for this new generation of sustainable cements and concretes.

The AI is able to analyze relevant information about a building's energy consumption. This means it can identify sustainability potential during the operating phase. This potential application helps when calculating the ESG performance of a building. Using smart building applications, the improvement suggestions identified by the AI can be automatically implemented.

Demolishing a building for recovery produces material waste. AI supports the recycling of materials by analyzing the waste and identifying which parts of it can be recycled for other construction projects. Special platforms act as interfaces between various construction projects for this. [See Introduction to startup 4 #AI \(Mineral Minds\)](#)

#AI STARTUP 4 MINERAL MINDS

Mineral Minds is a Stuttgart-based tech startup founded in 2019. Its vision is to bring together the German construction, supply, and waste disposal industry in an independent, market-neutral network, and in this way make a significant contribution toward a 21st century closed circular economy.

With the help of the Mineral Minds network and the software application Stoffstrom as a Service, companies can network their construction, supply and waste disposal projects and in this way connect internal as well as external material flows to over 30,000 collection and delivery points all over Germany.

Using the intelligent Mineral Minds matching algorithm, the best solution economically and ecologically can be found for a specific project and material. It includes both the regionality of the options as well as the type of collection or delivery point. In this way, temporary measures in particular in which materials are specified or handed over for recycling are flexibly integrated.

The German construction, supply and waste disposal sector is facing the challenge of structural transformation, with recycling materials and completing circles in the sense of the circular economy continuing to grow in importance. Mineral Minds helps to optimize material flows and in this way to save CO₂, time, and money.

In order to reduce the ecological footprint in the long term, it is necessary to keep expanding the technological possibilities. The construction and real estate sector needs to go a step further, however, and build and operate buildings as well as infrastructure in a climate positive way and according to the Cradle to Cradle® design principle. The 10 future theses for the construction and real estate sector 2033 describes how the sector can leverage technologies and adopt pro-recycling behaviors in the future. [Futuretheses \(dreso.com\)](https://www.futuretheses.com)

A clear demarcation as well as prioritization of trends will not be possible in the long term. The current development shows that trends will evolve at an enormous pace in the coming years. Companies need to focus on defined corporate development. In order to achieve this, it is important to keep an eye on trends which combine to have short-term, medium-term, and long-term consequences at both company and sector level.

Startups develop disruptive business models based on new technologies which support sustainable construction and operation, and are thus drivers of digitization. Digitization has the potential to change sectors fundamentally. There, it is recommended that companies engage with future theses early on. For a sustainable change, networks, collaborations, and exchange between startups and companies are essential. Especially since sustainability and digitization are two very important topics in the construction and real estate sector. Each directly benefits the other, and offers many opportunities for innovation and growth.

Our scouting team identifies and evaluates high-potential startups worldwide. The goal is to connect startups working in specific areas and at specific levels with Drees & Sommer as well as our customers and partners for the purpose of exchange and further collaboration. Startup scouting takes place on request and responds to concrete market needs.

2023 STARTUP LANDSCAPE

Selection of startups from the Drees & Sommer network

THE RIGHT STARTUP KNOW-HOW FOR EVERY PHASE OF THE REAL ESTATE LIFE CYCLE

THE DREES & SOMMER INNOVATION CENTER: INNOVATIONS FOR SUSTAINABLE CHANGE

Innovations are part of the Drees & Sommer DNA. The Innovation Center has set itself the task of promoting digital change in the real estate industry. The process of digital transformation in the market is changing the interests and needs of clients more quickly than ever before. Therefore, our goal is to increase the innovation speed of Drees & Sommer. Existing business areas are being subjected to digital transformation and new business models are being efficiently and systematically developed and brought to the market.

As the leading European consulting, planning and project management enterprise, Drees & Sommer has worked with private and public clients from construction bodies to investors on all types of real estate and infrastructure projects – both analog and digital – for 50 years. With its pioneering and future-shaping consulting, the company offers solutions for successful buildings, high-return portfolios, powerful infrastructure and livable cities. 4,000 employees in interdisciplinary teams based at 46 locations worldwide support clients across a wide spectrum of sectors. All the services provided by the partner-run company take into consideration both economic and ecological concerns. Drees & Sommer calls this holistic approach “the blue way”.

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