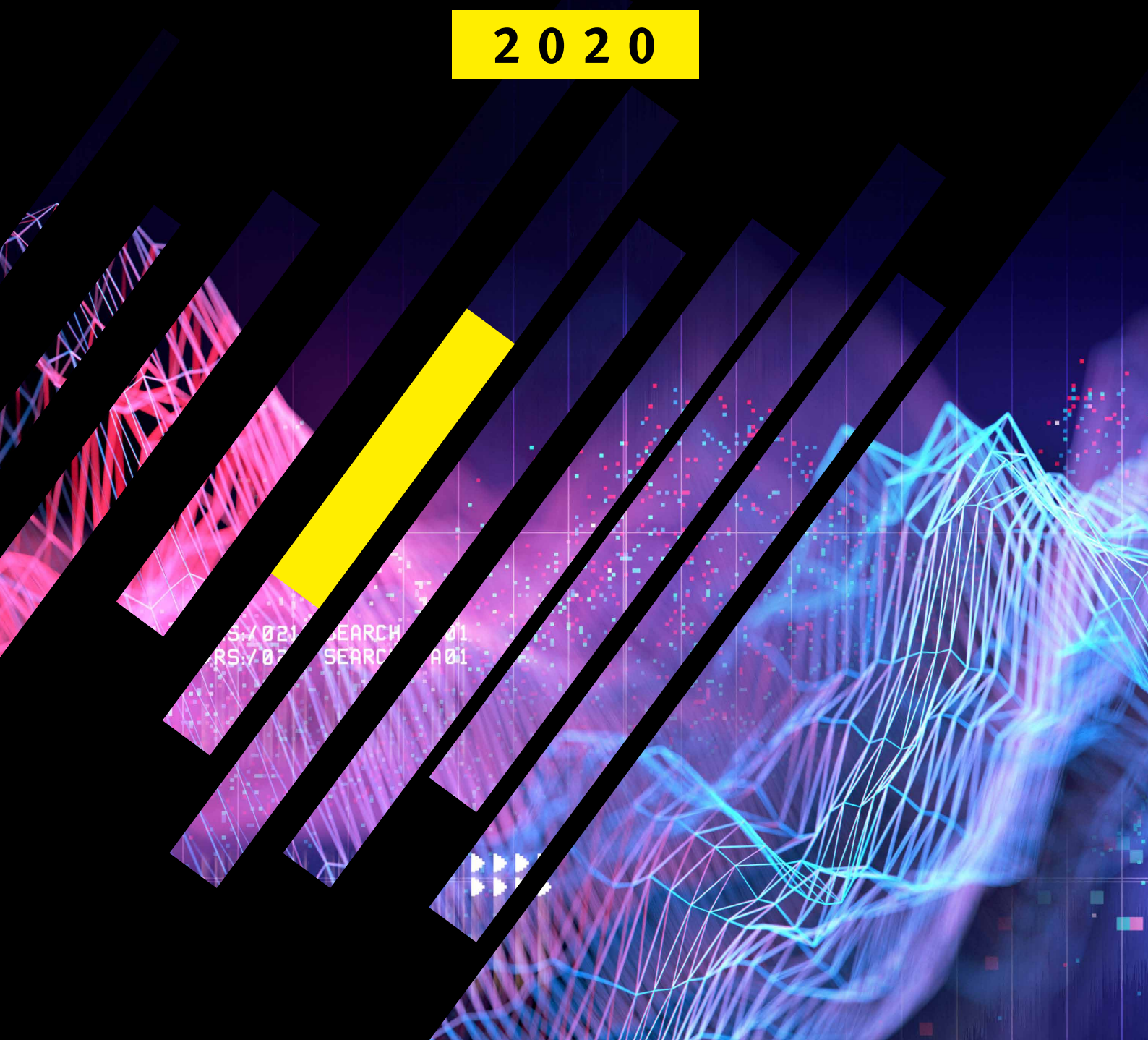# DREES & SOMMER

# INNOVATION SCOUTING REPORT

## 2020

**W**hereas structured trend research is already established in other branches of business, this sort of research is largely absent in the construction and real estate sector. This report deals with the mega-trends and technology trends which dominate our industry today and will do so in the future. In addition, it presents prop-tech and contech companies which are systematically pioneering these technologies.

**T R E N D S** describe current and future developments. Observing and analyzing the relevant trends for the industry, and interpreting them for our own company, lays the foundation for a sustainable innovation strategy. All investment management activities can be derived from this strategy.

**M E G A T R E N D S** are underlying economic, political, social and cultural tendencies which have an effect for a period of up to 50 years. After an analysis of trend activities in different industries, the eleven most widespread megatrends were identified and specifically evaluated in relation to their importance for the construction and real estate sector. The analysis showed that the megatrends of neo-ecology, digital transformation and urbanization are the most influential factors and should be given a high priority in the company's strategic orientation.

**N E O - E C O L O G Y** covers factors such as sustainability, pollution control, climate change and the scarcity of resources. Because of its high final energy consumption and the large amount of waste, the construction and real estate sector is under an obligation to act. Merely reducing our ecological footprint is not a long-term solution. The aim should be to leave a positive footprint.

**D I G I T A L T R A N S F O R M A T I O N** can promote a sustainable development by providing a data-driven increase in efficiency.

In shaping the future, consideration is given to social, economic and ecological factors. These three factors are also central to the mega-trend **U R B A N I Z A T I O N** because digital data and processes can help to achieve a qualitative improvement in urban life.

## 70 percent of the world population will live in cities by 2050

Source (in German): Zukunftsinstitut, Urbanisierung: die Stadt von morgen ('Urbanization: The City of Tomorrow'), https://www.zukunftsinstitut.de/artikel/urbanisierung-die-stadt-von-morgen/, (November 25, 2020)

All other megatrends, even those which are not identified as the most relevant trends, are strongly influenced by digital transformation. And forward-looking **T E C H N O L O G Y T R E N D S** also play a decisive role. These trends show the different types of technological progress and possible applications in each industry.

The Innovation Scouting Report 2020 presented here was carried out in cooperation with the University of Applied Sciences and Art (HAWK) in Holzminden, Germany. Special attention was given to the proptech and contech market. To supplement the study, other recognized studies, publications, the technical and market expertise of Drees & Sommer and an analysis of various market participants were taken into account.
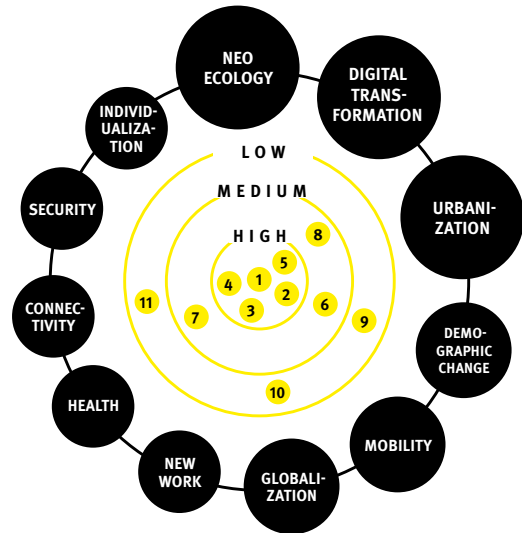


**T E C H N O L O G Y   T R E N D S   A N D   R E L E V A N C E   R A T I N G**

| | | | | | |
|---|---|---|---|---|---|
| 1 | Big Data analytics | 19,6% | 4 | Internet of Things | 11,8% |
| 2 | Artificial intelligence | 14,4% | 5 | Cloud computing | 10,3% |
| 3 | Augmented Reality/Virtual Reality | 13,1% | 6 | Digital twin | 9,1% |
| | | | 7 | Sensor technology | 6,3% |

| | | |
|---|---|---|
| 8 | Blockchain | 4,3% |
| 9 | 3D printing | 4,2% |
| 10 | 5G | 3,8% |
| 11 | Robotics | 3,0% |

The evaluation shows that the greatest potential is seen in the areas of Big Data analytics (19.6 percent) and Artificial Intelligence (14.4 percent). The technology trends Augmented Reality/Virtual Reality (13.1 percent), Internet of Things (11.8 percent) and Cloud Computing (10.3 percent) round off the results for the most relevant trends. Digital twins (9.1 percent), sensor systems (6.3 percent) and Blockchain (4.3 percent) show medium-term potential, but 3D printing, 5G and robotics currently indicate a low relevance because these trends are still in an early phase of maturity.

The different technology trends are closely linked with each other, influence each other and have a common element: **D A T A .**

Studies show that by the year 2025, more than 175 Zettabytes of digital data will be produced. The growing relevance of the data-driven world also has a significant influence on the construction and real estate sector.

The technology trend **I N T E R N E T   O F   T H I N G S   ( I O T )** also stimulates the rapid growth in the production of data. The term IoT refers to the combination of everyday objects with the Internet so that communication between the individual devices becomes possible.

**From 2015 to 2020 the number of networked devices doubled to 30 billion. It is forecast that this number will rise to 75 billion by 2025.**

*Source (in German): SAP, Die Zukunft von IoT 2019 ('The future of IoT 2019'), https://news.sap.com/germany/2019/10/iot-chance-moeglichkeiten/ (November 25, 2020)*

Closely related with this technology trend is the use of **SENSOR SYSTEMS** to record the physical status of buildings. Together, these two technologies form the foundation for smart services in facility management such as smart metering, indoor tracking and real-time monitoring of the condition of a building. Startup companies, like Pinestack, transform smart buildings with a digital infrastructure into data-designed buildings equipped for the future requirements of new office working.

The resulting large and unstructured data volumes (known as Big Data) can be harnessed by the appropriate processing and evaluation. This is where the technology trend **BIG DATA ANALYTICS** comes into play. This trend involves the procurement or collection of data, optimization, evaluation and analysis of information. The transformation of large volumes of data into useful and high quality smart data is made possible by pattern recognition. The information which is gained can be used to optimize processes.

The increasing speed, size and diversity of the collected data also make **ARTIFICIAL INTELLIGENCE (AI)** more important. The greater the volume of data that must be processed, the more important it becomes to use artificial intelligence to increase the efficiency of data processing. Computer-assisted pattern/rule recognition enables AI to simulate and even optimize human problem-solving behaviors.

The quality of the conclusions drawn by an AI system is enhanced by an increase in the data quality and data quantity. The sector is currently inhibited by the challenge of overcoming the boundaries between individual companies to make an exchange of data throughout the industry possible. Open and decentralized sharing of data would create new prospects for data-based decision-making.

**PINESTACK**
Foundation:        2018 in Bamberg, Germany
Short description:  Pinestack is a software developer with a focus on real estate economics. We produce digital modules within an integration-based smart building operating system. Smart office applications and building automation functions make a property into a smart building

**21ST REAL ESTATE**
Foundation:        2016 in Berlin, Germany
Short description:  Using Artificial Intelligence, they generate smart data to  perform area, portfolio and project analyses

Recording and combining the data from every phase in the life cycle of a building makes it possible to create a digital real-time copy of a physical object. This **DIGITAL TWIN** serves as a 'single source of truth'. In the construction and real estate sector this trend is widespread in the form of building information modeling (BIM). BIM offers an integrated approach to facilitate cooperation between all parties and trades involved in construction, from planning to the actual building work, and thus makes optimum project coordination possible.

**As early as 2015 the German government presented a three-phase plan to introduce BIM. Initially it was to be used for infrastructure projects, but it can also be extended to other areas.**

*Source (in German): German Ministry of Transport and Digital Infrastructure (digital planning and construction) https://www.bmvi.de/SharedDocs/DE/Artikel/DG/digitales-bauen.html, November 25, 2020*

The increasing volume of the data that is generated and processed also requires a sufficiently large data storage capacity. **CLOUD COMPUTING** suppliers meet the necessary requirements for storage space, computing power and application software as a service via a network or the Internet without any limitation as to location. Outsourcing the data storage to the cloud leads to lower costs and greater flexibility in the planning, which is why many companies use this technology. According to Germany's digital association BITKOM, a growth of over 30 percent in the use of cloud computing must be expected over the next few years. There are challenges in relation to compliance with the German and European data protection regulations which, are not necessarily observed by large cloud computing enterprises situated outside the EU. Therefore, the European Union has started the project GAIA-X with the aim of creating data sovereignty throughout Europe and a transparent, trustworthy data infrastructure.

An additional perspective in relation to data security, which aims to create trust and transparency, is offered by **BLOCKCHAIN** technology, which is also referred to as distributed ledger technology (DLT). In this technology, data are stored redundantly and decentrally with different network participants (or nodes). An alteration / falsification of the data is almost impossible because it would need to be accepted by all of the nodes. The most common applications of this technology are found in transaction management. Blockchain also has great potential in the LegalTech segment in the form of smart contracts. A further use is in creating an unambiguous and unchangeable digital identity. This is the approach which is adopted by the startup company OLI Systems, for example, to ensure system-specific identification of the source of electricity and accurate calculation of the accounts for power consumption. It is also possible to implement an efficient control of charging processes for electromobility. This solution provides greater transparency, uses the existing infrastructure efficiently and fulfills the obligation to prove the use of electricity from sustainable sources. Even though the technology has great potential, Blockchain still has few sector-specific applications in practice and is yet to prove its value.

Communication and collaboration in every phase of the life cycle is of crucial importance for optimized project coordination. **AUGMENTED REALITY (AR) AND VIRTUAL REALITY (VR)** appeal to different senses, so a deeper understanding of a property can be developed. AR is a computer-assisted extension of the real world, but VR creates a computer-generated world which is separate from the real environment. A mixture of the two technologies is referred to as mixed reality (MR). These technologies support the planning and construction process and simplify project coordination. The Berlin startup company WeAre makes remote collaboration possible, for example by providing a 3D building plan in a virtual conference room. Other use cases for the technology include virtual viewing, which is particularly used in purchase and sale transactions so that potential vendors and buyers can experience the building remotely.

> **Of the 41 sectors covered in the study, the Technical University of Munich identified seven business sectors which offered a particularly high potential for AR/VR, including real estate.**

*Source: Hutzschenreuter, Thomas; Burger-Ringer, Christian: Impact of Virtual, Mixed, and Augmented Reality on Industries, Technical University of Munich, 2018, https://mediatum.u.b.tum.de/doc/1454069/1454069.pdf*

The technology trends **ROBOTICS** and **3D PRINTING** showed especially great potential in manufacturing industry. Industrial robots can react to changes in the environment with the aid of AI, sensor systems and the new mobile phone standard **5 G.** This means that construction errors can be avoided, the quality can be increased and the speed of development can be accelerated. The same effects can also be observed for the technology trend 3D printing. This process can be used to produce a three-dimensional object by applying different layers of material. Innovative printing materials and processing methods have created new possibilities. However, these technology trends are still in an early phase of their maturity. For robotics and 3D printing, the future challenges include the need to deal with the lack of the infrastructure on building sites. With the increasing relevance of modular construction, it is expected that these two technologies will also see a positive development trend.

**OLI SYSTEMS**
Foundation:      2016 in Stuttgart, Germany
Short description:    Offers unchanging and efficient documentation of the flow of electricity and user-centered battery charging management in existing buildings by using Blockchain technology

**WEARE**
Foundation:      2017 in Berlin, Germany
Short description:    Offers a virtual conference room and collaboration tools to make shared working possible even over long distances.

In conclusion, it must be recognized that all of the technologies presented in this report are driven by data. To unlock the real added value of the data for the user, the data must be collected, stored, processed and evaluated. Data-driven technologies and business models can only truly be scaled when the current silo mentality is overcome. If data can be shared throughout the industry in the form of a decentralized data pool and collated over the full life cycle of a building, this will create new synergies.
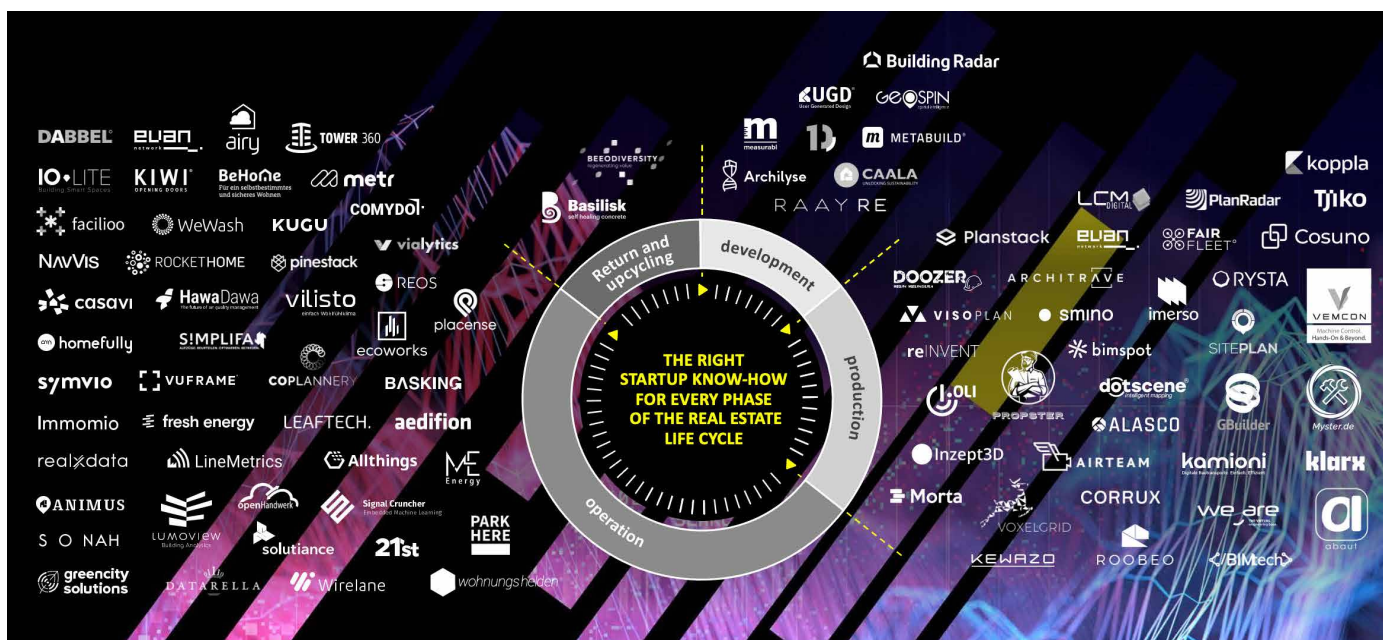
# DREES & SOMMER: YOUR INNOVATIVE PARTNER FOR CONSULTING, PLANNING, CONSTRUCTION AND OPERATION

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 port-folios, 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"*.

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 sub-jected to digital transformation and new business models are being efficiently and systematically developed and brought to the market.

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