

THE
Futuremover

AUTUMN 2023



**Living Space of
the Future**



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More about this issue's contents
in the podcast by Board
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With AI and common sense.
We created these images with
the use of AI tools.

A Tour through the Living Space of the Future



Who isn't familiar with those science fiction films with their outlandish future scenarios – but which no longer seem so far-fetched after a very long time has passed. Smartphones, self-driving cars and helpful robots first appeared on our screens decades ago. People have always been enthusiastic for making the leap into the future, and that doesn't just mean people who are fans of this genre of film. It ultimately comes down to the interest we have in our lives – our lives in the future.

At Globalance, we consistently follow the trends and developments of tomorrow, as only those who look to the future are able to shape it in a positive way. This yearning appears to be especially pronounced today – in a fast-moving era which is full of changes. As a society, we want to know about lots of different things: will we succeed in conserving biodiversity? Will our work in the area of climate protection be enough? Or: in which areas will artificial intelligence make advances?

”

The world will never be as slow as it is today.

We aren't able to provide “watertight” answers to these or any other questions, but we can show you which technologies could have considerable potential in the future, how our lives could change according to the latest knowledge and what it will take to rise to the challenges of our time.

We are therefore pleased to invite you to enter the “living space of the future” together with us.

I hope you enjoy the new issue of Futuremover.

A handwritten signature in black ink, appearing to read 'Reto Ringger'.

Reto Ringger
Founder and CEO

Living Space of the Future

TODAY'S INNOVATIVE SOLUTIONS

The Globalance Futuremovers

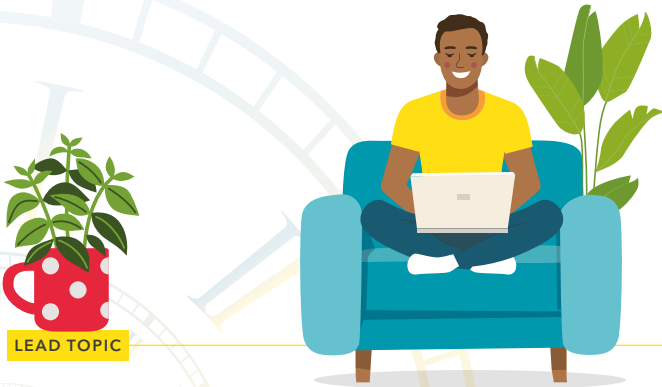


We put our futuremovers on the map for you. A round of introductions to global companies that are successfully responding to megatrends, developing solutions to challenges and replacing outdated business models with their forward-looking concepts. Spin the globe with us – on **page 10**.

GREEN INDUSTRY

The Race for a Sustainable Future

The battle for “green supremacy” hasn’t just begun, it’s in full swing. We are witnessing a genuine race between the economic powers for innovative companies and their future-proof technologies. Find out who’s in the lead and get to know the different strategies that are being pursued on **page 12**.



LEAD TOPIC

Our Living Space in the Year 2033

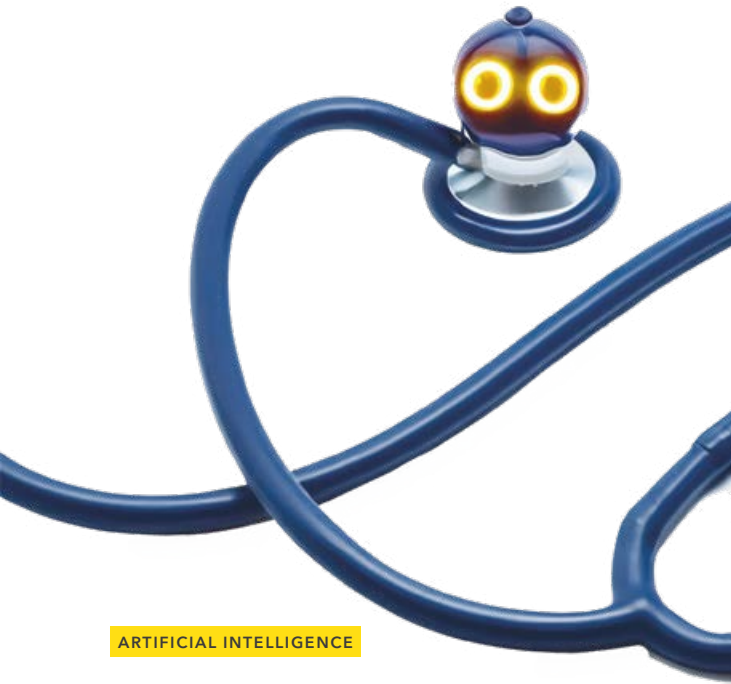
Bruno Messmer, Lieke van der Poel, Sanjay Gupta and Min-Suh In-Tak: four people who are a reflection of our future society. They couldn’t be more different and yet they share one thing in common: through a leap forward to the year 2033, they give us an insight into their everyday lives. How will we be living in ten years’ time? We try to provide some answers on **pages 6–9**.

NUTRITION

Menu Plan 2033 – The Climate-Friendly Food of Tomorrow

Quite a few people have consciously rethought their menu in recent years – and some have already changed it. With an intact food supply system, many things can be influenced positively. Read about how we can achieve this and what contribution the financial institutions can make on **page 14**.





ARTIFICIAL INTELLIGENCE

AI: No Longer the Stuff of the Imagination

If there were a title for the breakthrough of the year, generative artificial intelligence would certainly be the clear winner – and a repeated hot contender in the years to come. After all, in addition to the possibilities of which we are already aware, countless others are waiting in the wings. The potential offered by AI is huge in almost every area. Read about how things are unfolding in the field of medicine and the transfer of knowledge on **page 16**.



START-UPS

The Chair that Assembles Itself

In recent years, 3D printing has made a name for itself – and its big brother is well on its way to doing the same. Although the technology behind 4D printing is still in its infancy, its disruptive potential is quickly becoming clear. Find out the areas in which it is having an impact and how the start-up scene is taking advantage of this trend on **page 22**.

MEGACITIES

The (Dream of) Urban Living Space – How Grey Becomes Green

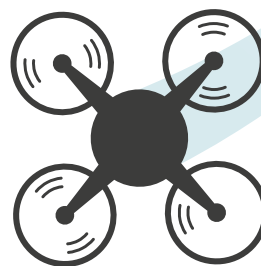
The world's population is growing, which means our large cities are also getting bigger. The great challenge of today and tomorrow is to make urban centres both sustainable and smart – and to adapt them to climate change. On **page 20**, you can find out how we can create more biodiversity in urban areas and read about other innovations for a green transformation.



FACTS & FIGURES

Living Space of the Future

We can write a lot about the living space of the future, present scenarios and make assumptions, but sometimes, nothing is more valid than raw figures. On **page 24**, we therefore present you with our “facts and figures”, to avoid relying wholly on the written word.






It's a very hot summer's day in the year 2033. Bruno looks for a shady spot in his garden, which he eventually finds underneath the cherry tree. "I'm happy that the initiative to 'stop the bees from dying out' has borne fruit," says Bruno, smiling at his pun and looking at the red fruit. He's actually happy about the sunny weather: it's fuel for the solar panels on the farmland – it's great how agrivoltaics has caught on.

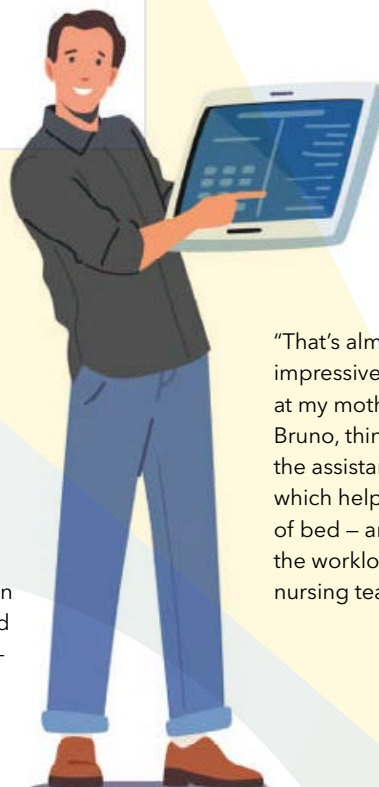
His weakened cardiovascular system could do without the heat, however. Is it down to the stress he's been experiencing at work? Hardly. Bruno hasn't been typing out accounting records manually for a long time. This is an area in which artificial intelligence has made its mark. Bruno now spends his time monitoring processes and checking them for their accuracy – which is also good for his work-life balance.

BRUNO MESSMER

50 years old (*1983)

-  financial accountant
-  nationality: Swiss
-  residing in the Oberland region of Zurich

He's been struggling with high blood pressure for a few days. Before he noticed the classic symptoms, though, the health tracker on his wrist had already stored the data on his vital signs and recorded the abnormalities in his digital patient file. He received his personally recommended immediate measures directly on his smartphone. His customised medication has also been composed by AI, but still needs to be approved by his doctor.



"That's almost as impressive as things at my mother's," says Bruno, thinking about the assistance robot which helps her get out of bed – and relieves the workload of the nursing team.

Our Living Space in the Year 2033

We all pursue different goals and shape our lives as we so wish – yet we are equally influenced by profound developments and innovative technologies. How are the rapidly growing opportunities changing our lifestyles, though?

We jump into the year 2033 and accompany the daily lives of four different people – and give free rein to our thoughts.




2028 ... 2029 ... 2030 ... 2031 ... 2032 ... 2033

Lieke is standing on the roof terrace of her student dormitory and picking a few carrots from the raised bed for her evening meal. She first heard about urban gardening when she was a teenager, but it has only been practised on a large scale in the Netherlands relatively recently. And this has been especially true since the prices of meat and imported vegetables have skyrocketed. "It's their actual cost, after all," explains Lieke. "At long last, these products are actually being priced according to their origin."

After all, meat has never been an alternative for her. Her mother is a vegetarian, and so is she. It was a statistic from her home country of Germany that had made her suddenly change her mind: the average German citizen eats 46 pigs and almost 1,000 chickens in a lifetime. In Lieke's case, the motivation wasn't just animal welfare, but also environmental protection, as it was increasingly clear that livestock farming accounted for a large share of greenhouse gas emissions – 14.5 per cent globally.

LIEKE VAN DER POEL

24 years old (*2009)

-  student
-  nationality: Dutch
-  residing in Maastricht



2032 ... 2033



And why eat meat, when the alternatives are getting better and better? For a long time, it was only possible for vegan meat substitutes to be produced in a soft consistency, but Lieke and her fellow students now enjoy "steaks" on the grill – including a sufficient protein content, but not a guilty conscience. And while Lieke's weakness for Gouda had prevented her from becoming vegan for a long time, she has now taken that step as well, thanks to precision fermentation. "Fine cheese without the moo," as she calls it.

After spending the last few months in bustling Mexico City – the new mecca for digital nomads – Sanjay found himself drawn to Bali once again. Ever since the new, standardised “New Era of Work” visa, the entry requirements have been much more straightforward. The confusion surrounding tax law is a thing of the past as well. While Sanjay seemed to live in a grey area for a long time, there are now clear rules governing his lifestyle – as well as customised health insurance.

In Mexico, Sanjay mostly worked in co-working spaces; he now sets up his workplace in his apartment. Despite this, there are plenty of opportunities for networking, as more and more homes are explicitly geared towards nomads like him – such as yoga with his friends in the morning and the after-work drinks on the beach.




If you’d have believed the prophecies of a few years ago, there wouldn’t be any need for graphic designers today – doing all the work using artificial intelligence appeared too easy. During a recent discussion with a colleague in his guild, Sanjay had said that was actually wrong, and they both agreed that the AI tools still need to be fed with data by people.

Another topic of conversation: the newly-introduced, universally valid AI watermark for the prevention of deepfakes and to protect still-coveted and genuine “handmade work”. And if Sanjay still has the time after his projects and going surfing, he meets with his family for dancing lessons in the Metaverse to brush up on the basic steps for his sister’s upcoming wedding.

AI tools still need to be fed with data by people.

SANJAY GUPTA

36 years old (*1997)

-  graphic designer and digital nomad
-  nationality: Indian
-  residing anywhere and everywhere





A few cars are driving through Seoul, but they are electric and autonomous.

With the breeze on her face and wearing her navigation glasses, she enjoys looking at the greened building façades. She sees very few newly-built buildings these days, as existing buildings are nearly always redesigned rather than demolished.

Min-Suh spent time in several large cities dominated by bricks, concrete and tarmac during her studies – including her home town. It was then that she first realised that the cities of the future would have to connect with nature. Fortunately, the concrete jungles are increasingly turning into green smart cities. In recent years, what used to be planned on the drawing board has been planned with the use of digital twins. Min-Suh has herself worked with virtual copies of cities and simulated beneficial “What if...?” scenarios together with her colleagues. On the basis of these, it has been possible for important future decisions to be made in the areas of mobility, construction, energy supply and distribution.




Min-Suh has been satisfied with the public transport network in Seoul for a long time: it’s punctual, fast and straightforward. On her last business trip to Europe a few weeks ago, she was equally happy to see the huge progress that had been made there as well. Mobility as a Service has become established and is continuously being refined. A few cars are driving through Seoul in 2033, but they are electric and autonomous. Min-Suh likes to sit in the driverless taxis, but still swears by her e-scooter – which isn’t surprising, as the new cycle paths in the city resemble green motorways.

THE GLOBALANCE VIEW

The future could look like the stories above or something similar – or not. One thing is certain, however: many things will be simpler, more sustainable, more connected and more innovative. Therefore, let us embrace the new possibilities and integrate them into our lives. Whether it’s in the countryside, the megacity or when travelling – we can benefit from these changes and rise successfully to the challenges of our time.

MIN-SUH IN-TAK

41 years old (*1992)

-  architect and urban planner
-  nationality: South Korean
-  residing in Seoul



The Globalance Future-movers

We introduce you to companies that successfully respond to worldwide megatrends and develop solutions for global challenges. These are our future-movers. They use forward-looking concepts to replace outdated business models and achieve a positive footprint at the same time.

This does not constitute a buy recommendation.
Disclaimer on the cover.

TOPICS



HEALTH AND AGE — Companies that develop efficient medical innovations for an ageing and in many places overweight society.



CLIMATE AND ENERGY — Companies that develop innovative products and services surrounding efficiency, storage and distribution in the renewable energy sector.



URBANISATION — Companies which make the large cities of tomorrow liveable and efficient through smart, digital and sustainable innovations.

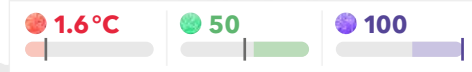


ABCAM PLC – UNITED KINGDOM

Antibodies for the Whole World

HEALTH AND AGE — British company Abcam has been selling antibodies in its online shop since 1998. While online shops were considered a novelty at the time, with this competitive advantage, the company seized the opportunity to grow. Its current customers are life science researchers from more than 130 countries. The Cambridge-based company reports high operating profit margins. Its distribution takes place online only. Its expected growth in revenue and profit is approximately 20 to 30 per cent per year. Abcam, a word created from AntiBodies and CAMbridge, has been listed on the London Stock Exchange since 2020.

GLOBALANCE SCORE



JONES LANG LASALLE – USA

Building Data from All Over the World

URBANISATION — Increasing the efficiency of energy consumption and buildings by collecting and evaluating data from all over the world. US real estate giant Jones Lang Lasalle provides services in the field of infrastructure. The company was originally founded in 1783, and is now at the forefront of the development of new technologies for the creation of sustainable solutions. Jones Lang Lasalle has recently announced that it is set to become even more efficient through the use of its in-house AI, known as "JLL GPT". It is expected to achieve double-digit growth from next year onwards.

GLOBALANCE SCORE





THE RENEWABLE INFRASTRUCTURE GROUP – UNITED KINGDOM

Energy for the Energy Transition

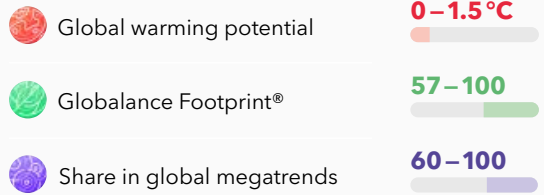
CLIMATE AND ENERGY — With its portfolio, The Renewable Infrastructure Group (TRIG) is able to supply 1.9 million households with electricity from renewable energy sources. The investment company invests in wind, solar and battery storage projects in a total of six countries, including France and Germany. With these investments we are able to prevent some 2.4 million tonnes of CO₂ emissions each year. The primary goal of the investment company, founded in 2013, is to contribute to a climate-neutral future with sustainable returns. The company has an attractive valuation: its dividend yield is roughly 5 per cent.

GLOBALANCE SCORE



GLOBALANCE SCORE

Key areas classified by Globalance:

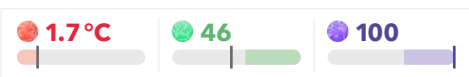


GENMAB – DENMARK

Treatments in the Fight against Cancer

HEALTH AND AGE — Genmab develops antibody products that are primarily used in the treatment of cancer. Inspired by the power of the human immune system to fight disease, this Danish company develops new antibody technologies with the aim of finding a cure for cancer and other diseases. Founded in Copenhagen in 1999, the company has several contracts with leading pharmaceutical companies, including Novartis. Through these licences, revenue growth of 15 to 20 per cent and profit growth of 25 to 30 per cent are forecast.

GLOBALANCE SCORE

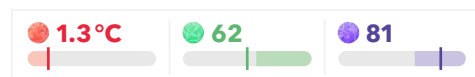


SEKISUI HOUSE – JAPAN

Climate-Friendly Homes

URBANISATION — Japanese company Sekisui House became famous in the 1970s with a residential house made from prefabricated room modules. This saved both money and materials as it resulted in less construction waste. Today, Sekisui House continues to set new standards in the area of compact, intelligent and climate-friendly construction. Since 2009, the company has been making "zero energy houses" which are equipped with solar cells and batteries and therefore emit up to 80 per cent less CO₂. A dividend yield of 4 per cent is possible thanks to the company's free cash flow and solid balance sheet.

GLOBALANCE SCORE



Discover Globalance World and learn more about the Globalance methodology.



The Race for a Sustainable Future

THE EU IS EXPECTING TO SEE INVESTMENTS WITH A VALUE OF SEVERAL TRILLION DOLLARS in climate-neutral industries over the years to come. In the race for green companies, however, China is ahead, and the US is attracting businesses with generous subsidies. Can the EU still take the lead?

Swiss solar cells manufacturer Meyer Burger is seeking its fortune in the USA. The land of unlimited opportunities is offering the company higher subsidies in the form of loans and tax cuts than the EU. Meyer Burger plans to build an additional plant in Colorado, qualifying for tax credits of up to USD 1.4 billion over the years to come.

These subsidies have been made available through the recent Inflation Reduction Act (IRA), which intends to reduce greenhouse gas emissions in the USA by 40 per cent by 2030 in com-

parison with 2005. The IRA creates incentives for the green industry, i.e. for companies that invest in renewable energies. Those benefiting include manufacturers of solar, wind, battery and electric vehicle components.

Can the EU Keep up with the US?

The considerable investments that the Biden administration has enacted are a thorn in the side of the EU. The EU is responding with its Green Deal Industrial Plan, so that "Europe's climate-neutral industry is able to compete", as explained on the website of the European Commission. The programme provides over EUR 660 billion in EU funding by 2050, with the goal of generating approximately EUR 4 trillion of new, private investment in climate-neutral businesses.

The plan consists of four measures:

- 1 reducing bureaucracy
- 2 faster access to funding opportunities
- 3 training of new professionals
- 4 more open trading relations

There's a big "but" regarding the trading relations, though. Knowing that other industrialised countries are also fighting to attract green companies with subsidies worth billions, the EU wants to "prevent undesirable side effects in the competition for its own net-zero industry", according to a report by the EU Commission. It therefore wants to



Illustration: Bigmouse108/iStock



EUROPEAN UNION

A competitive and the first climate-neutral continent by 2050: such is the ambitious goal of the European Green Deal. With investments of over EUR 660 billion by the EU member states, this goal should also be achieved.

UNITED STATES

The USA is aiming to reduce its greenhouse gas emissions by 40 percent by 2030 in comparison with 2005. To this end, the government is making nearly USD 400 billion available by 2030 under the Inflation Reduction Act.



Europe wants to become the first climate-neutral continent.

use the “protective instruments” at its disposal so as to secure the single market.

The need for protectionist measures of this kind is illustrated with the example of solar cell manufacturer Meyer Burger. The company recently suffered major losses in revenue because the EU market has been flooded with cheap solar products from China.

China Is in the Lead – But for How Much Longer?

In recent years, China has taken the lead in the battle for “green supremacy”. The country is now a powerful competitor to the US and the EU in the environmental technology industry. China has supported its green industry with subsidies which – in terms of gross domestic product – were twice as high as those in the EU for a long time. According to the EU Commission this has distorted the market, and means that the production of many green technologies is currently dominated by China. It is therefore unsurprising that the EU has set itself this ambitious goal of catching up with China and the USA at the economic, geopolitical and environmental levels, and, in its own words, of becoming the first climate-neutral continent.



CHINA

China has been investing in the green industry for a long time and wants to maintain its leading position in the future: the People’s Republic therefore intends to invest over USD 280 billion in clean technologies by 2025.

The Living Spaces of Tomorrow

With its Green Deal, the EU is creating the foundations for the future in order to develop green infrastructure and thereby both conserve existing habitats and create new ones. Although the EU has also talked about protectionist measures, especially towards China, its long-term goal is to create a global Green Deal. After all, if the EU succeeds in implementing its Green Deal and establishing it as a model for a social consensus, responding successfully to the global environmental crisis while achieving economic success at the same time, this could also influence other governments. This will create a positive outlook for the way in which we will live tomorrow.

THE GLOBALANCE VIEW

From an investor’s perspective, decarbonising our economy and society is one of the greatest investment opportunities per se. The four areas of energy efficiency, renewable energy sources, energy storage and distribution, and decarbonisation, in the form of CO₂ capture, for example, are particularly promising. Companies that successfully position themselves in these niches with innovative products and services can expect annual growth rates of 15 to 30%, which makes them attractive investments in the long term. At the same time, investors should make sure they do not have any CO₂-intensive investments in their portfolios. These will come under increasing pressure in terms of the net zero targets.



This article might be interesting for someone you know?

SHARE THIS ARTICLE NOW!

Menu Plan 2033 – The Climate- Friendly Food of Tomorrow

FINANCIAL INSTITUTIONS ARE IMPORTANT STAKEHOLDERS for getting our food systems back on track and preventing damage to our environment and economy. A roadmap for a more sustainable future.



Our food plays a key role in the fight against global warming and the conservation of habitats. According to the non-profit start-up EAT, it would be possible to feed ten billion people by 2050 without surpassing the limits of our planet. To achieve this, we would have to eat in a healthier way, i.e. consume less meat and adapt our use of resources. Of course, the problem is more complex than this, and all the stakeholders in the area of food production need to take action, not just consumers.

Financial institutions have considerable influence over the transformation of our food systems. They play an important role in providing significant financial resources for supporting the necessary transformation and achieving the global goals in the areas of climate change and conservation. The “Planet Tracker” think tank has identified several measures for achieving a significant impact in the area of food production and consumption by 2030, with financial institutions at the heart of the measures.

Less Methane, More Alternative Proteins

A key measure for the transformation of our food systems is to be found in the area of methane emissions from livestock. When methane is released into the atmosphere, it increases the greenhouse effect and contributes to global warming 80 times more quickly than CO₂. Consumers are already able to achieve short-term successes by eating less meat.

Investors can make a positive contribution by investing in companies that are committed to reducing their methane emissions and which take measures to prevent methane gas in their production processes. Investing in plant-based meat substitutes as well as proteins from other sources, such as insects, algae, fungi, worms and lab-grown animal proteins (also known as “clean meat”) can also help to prevent methane emissions.

One third of all food produced is never consumed.



Fighting Food Waste and Loss

However, it would be even more effective to ensure that so much food doesn't have to be produced in the first place. After all, a lot of food ends up being thrown away. Another measure therefore aims to ensure that less food is wasted and/or lost. Food loss is when food is lost during its production and along the supply chain – before it has even reached the retailers. According to an estimate by the Food and Agriculture Organisation of the United Nations, approximately one third of the food produced worldwide isn't ever consumed. Food waste, in contrast, is caused by retailers and consumers.

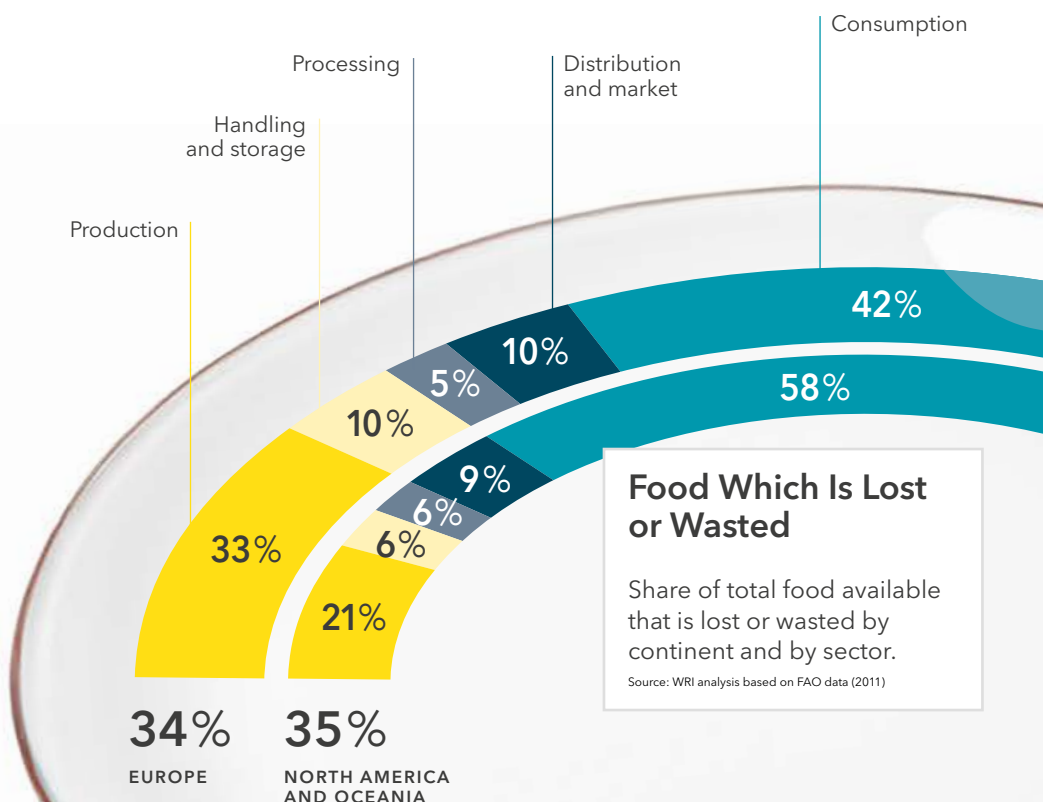
The hunger for investments to fight food waste and food loss is considerable: in the US alone, private investment in this area increased by 30 per cent to 4.8 billion dollars in 2021. The investment opportunities range from AI technologies in agriculture in order to detect and combat pest infestations at an early stage, for example, through to the recycling of production waste and the production of biogas from food waste.

Great Opportunity – Great Impact

The Planet Tracker report identifies further measures in the field of regenerative agricultural systems, such as the prevention of deforestation for the creation of agricultural space and in the area of more transparent supply chains. Financial institutions play an important role in all these measures, as they can provide significant funding for the transformation. If they decline to take on this task, they risk both damaging their reputation and lost profits. After all, as estimated by Race to Zero, a UN initiative, companies that are at the heart of the food supply industry could lose up to 26 per cent of their value because of climate change. And this figure certainly isn't irrelevant for the industry: the 40 largest food companies in the world have a combined value of 2.2 trillion US dollars and employ nearly 8 million people. And yet the opportunities for these companies are considerable: they are increasingly able to benefit from a shift in consumer demand towards more sustainable products, while protecting their reputation

In the USA, private investment in food waste and loss increased by 30 per cent.

at the same time. Companies that take clear and decisive action therefore have the best chance of benefiting from the transformation of food systems, while companies which fail to act could potentially suffer a significant loss in value – up to 15 per cent for the agricultural industry and roughly 4.5 per cent for the restaurant and food supply industry.



THE GLOBALANCE VIEW

Anyone who wants to invest and develop assets over the long term cannot avoid the issues surrounding global nutrition: it is important to recognise the intricacies of the interactions between climate, nature and agriculture on the one hand, and access to affordable, healthy food on the other. Globalance has defined the criteria that companies must fulfil to be classified as future-proof. Technological advances are causing surprising company names to adapt the world of agriculture to the conservation of resources with the use of digital tools.



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To do so, scan the QR code.





AI: No Longer the Stuff of the Imagination

GENERATIVE ARTIFICIAL INTELLIGENCE HAS SPREAD IN A VERY SHORT TIME. Suddenly, countless activities are no longer in human hands alone – as digitally generated results are too fast, too cheap and too good. But what other potential remains to be exploited in addition to the shaping of text and images, research work and administrative tasks?

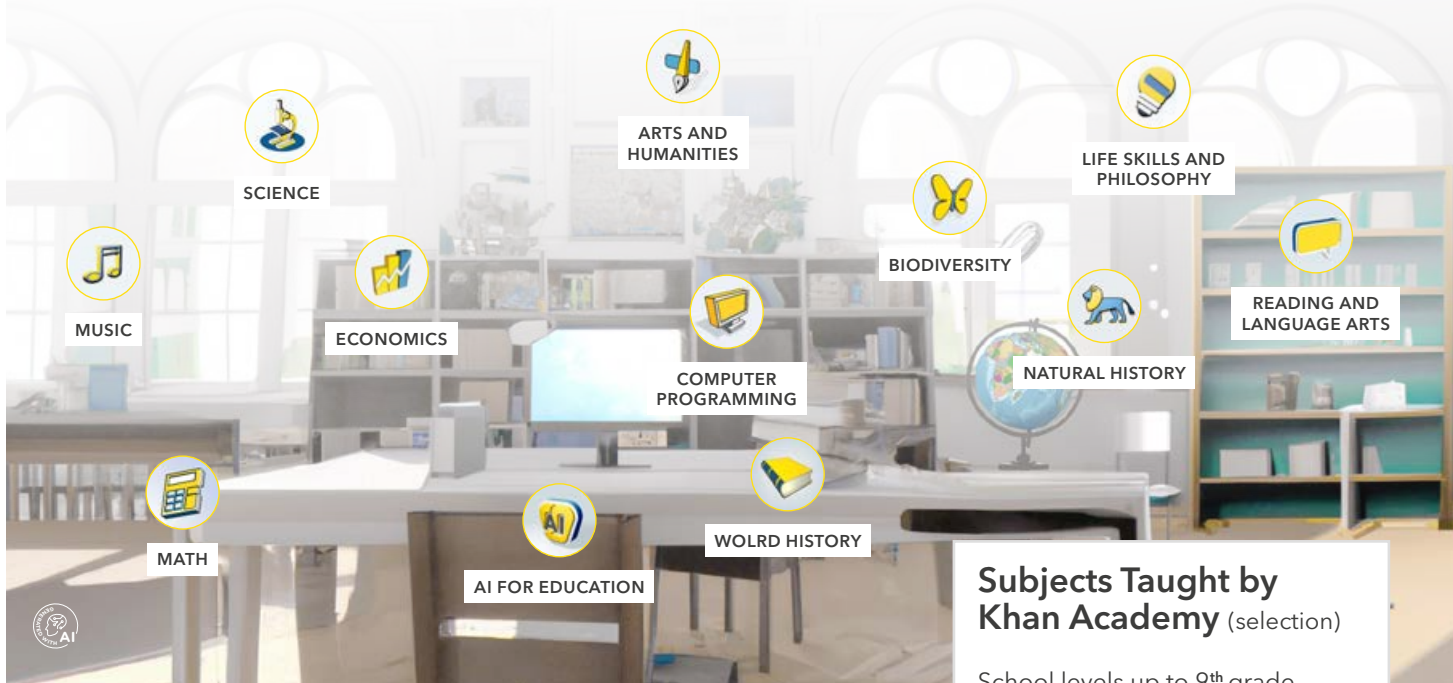
Ever since Google DeepMind's AI application AlphaFold – a rapid and accurate predictor of protein folding – artificial intelligence has demonstrated its huge potential in the field of life science, and shown how rapidly it can contribute to solving previous puzzles.

We can't just benefit from artificial intelligence in the world of research, though; it can also make a difference in everyday medical practice.

Artificial Intelligence – a Boon for Early Detection?

More than a few people are worried about the breakthrough of AI – could it pose a threat to us? One thing is clear: a set of regulations needs to be formulated. If we succeed here, however, AI will be able to help us in a variety of different areas – such as the early detection of breast cancer. Artificial intelligence algorithms are already beating

the previous standard procedures – like the statistical-clinical risk model of the Breast Cancer Surveillance Consortium (BCSC). In the mammography imaging procedure, AI detects even the very smallest abnormalities, and the more images a self-learning algorithm has in front of its lens, the better it gets. According to Vignesh Arasu, Research Scientist and Radiologist at the health-care company Kaiser Permanente, recent



AI is able to extract thousands of additional mammography characteristics.

advances in AI deep learning will provide us with the ability to extract hundreds to thousands of additional mammography characteristics.

In the future, an individual's risk score could also be calculated within a matter of seconds, which would improve the possibilities for an individualised form of care. Vignesh Arasu sees this as a very good tool for offering personalised precision medicine.

Google Is Getting Involved (Again)

Google – for a long time the driving force behind AI – has recently had to contend with OpenAI and Microsoft in the public sphere. Therefore, the company has recently announced a plethora of innovations. Based on its "Large Language Model" (LLM) Bard, it is now testing its medical counterpart, Med-PaLM 2. Healthcare is a trillion-dollar

industry which generates many terabytes of data every year. Thanks to advanced AI and machine learning, tools such as Med-PaLM 2 are able to harness this treasure trove of knowledge for the greater good. The program has been trained with complex medical knowledge, and is now being supplemented with skills so that it is able to view, classify and evaluate individual information such as X-rays and symptoms on an holistic basis. In this way, patients will one day get improved results in a straightforward way.

And that's good news for Bruno Messmer who features in the article "Our Living Space in the Year 2033" and therefore has a good chance of receiving his customised treatment plan from a chat-bot in the year 2033.

The Private Digital Lesson

AI in the classroom is seen as a big problem in many places – it could actually revolutionise traditional teaching, though. In his studies in the 1980s, psychologist and educationalist Benjamin Bloom demonstrated that 90 per cent of pupils achieved their learning goals in individual lessons, while only 20 per cent did in group lessons. Private lessons are expensive – but not AI-based tutoring programmes.

Khan Academy is already convincing people as a free-of-charge personal tutor – and could also be used by teachers as a kind of assistant. The "Khanmigo" program offers valuable methodology by not only highlighting

maths errors for example, but by asking the learner how they arrived at their incorrect result. In this way, it is possible for misunderstandings and comprehension errors to be eliminated. "Khanmigo" also responds cleverly in cases of complete cluelessness, providing hints instead of simply offering solutions.

In this way, AI, often thought to pose a threat to school teaching, could in fact become the after-school tutor of tomorrow.

RESPONSIBLE AI INVESTING – THE GLOBALANCE CRITERIA

A company undertakes to...

- + explicitly support global guiding principles;
- + make sufficient investments in ongoing security checks, so-called "AI alignment" (ensuring "human values" in AI systems);
- + ensure the transparency of all internal AI developments (timetable; record of safety issues; evidence of understanding of how it works);
- + have critical issues reviewed by independent experts.



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How Google Is Using AI to Empower Others

“We Have a Responsibility for the Technologies We Create.”

Interest in artificial intelligence is extremely high, but there is also scepticism and sometimes fear. What’s your view on this?

We should remember AI didn’t emerge last year – it has served us reliably for quite some time. Every time you use Google Search or Google Maps, for example, you are benefiting from AI. As a fast-moving technology, AI comes with complexities and risks that evolve over time. At Google, we want to address these risks. We are committed to setting the standard for the beneficial and responsible development and use of AI.

Is there a generally accepted definition of artificial intelligence?

I like John McCarthy’s somewhat circular definition: “The science and engineering of making intelligent machines.” But what do we consider intelligence? There are two main approaches: we can either focus on the ability to learn, or we can focus on the ability to perform tasks that only humans had been capable of in the past, such as driving cars, writing code or telling jokes. Both answers are exciting.

Which areas of life will be most influenced by AI?

I share the view that AI will become as foundational as electricity. Its impact cannot be nar-

rowed down. Personally, I am most excited about ways for AI to do good, both on an individual level as well as globally, helping address problems like climate change. Exciting projects already exist as part of the AI for the Global Goals initiative. Two examples are the use of AI to develop flood forecasts or an early warning system for the right time to spray pesticides.

What responsibility does Google bear in regards to AI?

We have a responsibility for the technologies we create. While governments set the boundaries, companies are ultimately on the frontline and have a critical role to play. We control how we develop and release AI. To this end, we launched our company-wide AI Principles in 2018. Every new product and customer engagement is reviewed through their lens.

AI has great potential, but also great potential for conflict. How can it be part of the solution rather than part of the problem?

We believe it’s critical to embrace the tension between boldness and responsibility. The only way to be truly bold in the long term is to be responsible from the start. We also know this isn’t a problem a single company can solve. Building AI responsibly must be a collective societal effort.

“We believe it’s critical to embrace the tension between boldness and responsibility.”



“We are working on standards for responsible use of AI.”

Are there already examples of AI supporting ground-breaking research?

AlphaFold from Google DeepMind is one such project. By accurately predicting 3D models of protein structures and sharing them freely, it is accelerating research in nearly every field in biology, including the development of drugs and the fights against antibiotic resistance and malaria. Through Google Cloud Vertex AI, we also allow other organisations the use of AI for their own needs. One such example is the American Cancer Society’s use of Vertex AI to identify novel patterns in digital pathology images.

What of future generations and their education? What advice regarding AI would you give today’s leaders in education?

AI should be a key part of the curriculum at all levels. It is critical that we give the next generation the knowledge and tools to become even more responsible users and developers of AI. AI is also a great tool to augment education itself. AI can personalise an existing curriculum by providing individual answers, generating quizzes and even images or videos. We should think of it as an advanced assistant, not a classroom disruptor.

Can AI also benefit people with physical limitations related to age or disability?

As a person with a disability who has worked on accessible products, I can confidently say: yes! I am a huge believer in the potential of AI to help people with disabilities. Voice-activated products for example are life changing for many people. One of my favourite projects is Euphonia – an AI model trained for speech recognition of people with impaired speech. Combined with Google Assistant, the system can repeat the user’s command, allowing them to use their voice to control their devices and to communicate more easily. In general, Google believes AI has the potential to improve the health of billions of people. There are many projects where we’re already making advances. Google’s ARDA tool, which screens more than 500 patients a day for diabetic retinopathy, the leading cause of blindness, is one example.

What innovations can we expect from Google in the coming years?

I am very excited about our efforts to allow others to innovate with AI. Google Cloud’s Vertex AI democratises the technology, allowing not just data scientists but a much larger range of users to take advantage of AI. By giving businesses and organisations access to the latest and greatest AI technology, we empower them to innovate at a scale and with a diversity we couldn’t accomplish by ourselves. It is this partnership that excites me the most. Better together.

Given the immense amount of power necessary for AI development, how realistic is Google’s goal of being climate-neutral by 2030?

While data centres now power more applications for more people than ever before, gains in efficiency have seen the share of global electricity consumption remain constant at about 1% since 2010. Google’s data centres are designed, built and operated to maximise the efficient use of resources. We are striving to ensure each data centre accelerates the transition to renewable energy and low or zero-carbon solutions.

Read the in-depth interview and more about the development of AI.



YARIV ADAN

Sr. Director, Product Management,
Google Cloud AI

Yariv has been leading product teams at Google since 2007. In his current role, Yariv is the Sr. Director of Product for Conversational AI in Google Cloud. Before that, he was one of the founders of the Google Assistant and Google Lens, the lead PM for privacy and security, built and led the Emerging Markets product team, and worked on YouTube monetisation. Before joining Google, Yariv spent 10 years as an engineering manager in various Israeli start-ups and companies.

The (Dream of) Urban Living Space – How Grey Becomes Green



THERE CAN BE LITTLE DOUBT THAT THE TREND TOWARDS URBANISATION IS CONTINUING – and that the same can be said of the effects of climate change. There is therefore no alternative but to take further action: our towns and cities must become more sustainable. But how can we create more biodiversity in urban areas, how can we generate electricity, and where can we store water?

The sight of greened façades on houses is no longer anything new. Vertical vegetation appears to be growing all over the world. In the heart of our large built-up cities, such developments are probably the most symbolic examples of the green transformation. Yet, biodiversity in urban areas can also be smaller in scale – and no less effective.

Five Trees for Biodiversity

Unsealed soil and interconnected spaces of greenery and water contribute to a functioning ecological infrastructure. This has also been recognised by the Swiss Confederation, which is developing reference provisions for greater biodiversity and a better quality landscape. It is also a goal that Japanese construction company Sekisui House has been supporting for several years with its “Gohon no ki” project (the “five trees” initiative). To counteract the loss of flora and fauna and conserve biodiversity, Sekisui House plants five native trees for each of its customers – three for birds and two for butterflies. In this way, more than 17 million trees have already been planted which are ideally suited

to the local climate and provide a home for animal species. With its “Gohon no ki” concept, the company has promoted urban greening throughout Japan. In cooperation with several universities, Sekisui House has developed a quantitative assessment for its networking-based greening. The results are certainly impressive: the number of native tree species has increased tenfold in the three largest metropolitan regions of Japan. The number of bird species moving into residential areas

has doubled – and the number of butterfly species has increased fivefold. We are familiar with green in height, we are now familiar with green in width as well.

Step-by-Step to Power Generation with a Difference

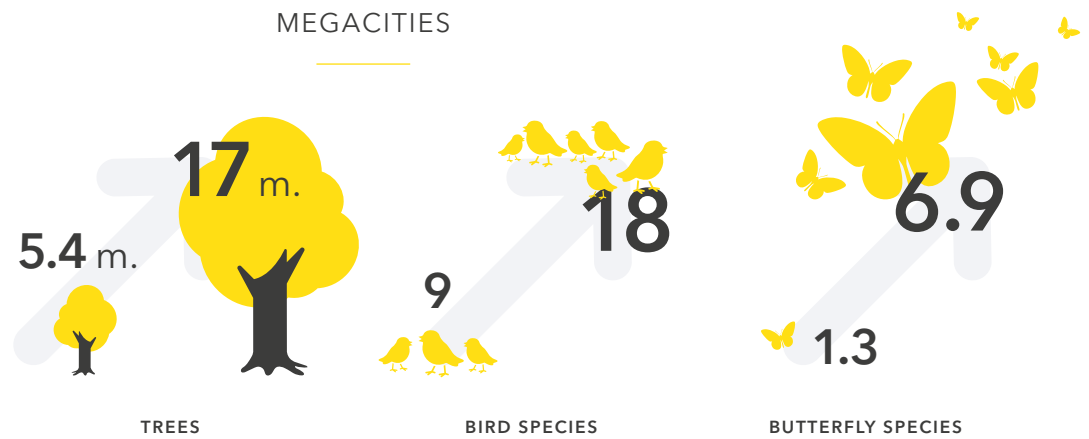
The greater the population, the greater the demand for electricity: it's logical. How can we manage the energy supply in our ever-growing megacities, though? If environmental scientist Vaclav Smil has



Grown Biodiversity

Since 2001, the “Gohon no ki” concept in Japan has successfully increased the number of trees by millions and its biodiversity.

Source: World Economic Forum (WEF)



his way, “decentralisation” will be the magic word. Instead of generating energy from large, centralised power stations, electricity should instead be generated locally and on a smaller scale. Photovoltaic systems etc. are, of course, suitable options. To shape the future in a positive way, however, more unconventional thinking is also welcome. One such example is kinetic tiles made from hard-wearing rubber.

We are familiar with green in height, we are now familiar with green in width as well.

This innovation from English company Pavegen generates electricity whenever people walk on tiles. Where the tiles are laid out, as is the case at several British railway stations and London Heathrow Airport, electricity is generated through the pressure exerted whenever somebody steps on an electromagnetic coil. So far, enough electricity has been generated to operate info screens and mobile phone charging stations.

At present, this technology is still quite expensive – one square metre of the tiles costs an average of EUR 5,000. At 8 watts, the energy generation per person and tile also leaves something to be desired, which is why these devices only make sense at heavily-frequented locations.

Pavegen is rising to this challenge, however, and setting up a research laboratory to manufacture the tiles in a more sustainable, low-cost and energy-efficient way.

Benefiting from “Sponge Intelligence”?

For a long time, rainwater was considered to be waste water. Many towns and cities were therefore built to allow rainwater to drain away as quickly as possible. This is about to change, though. A development that has been implemented in Copenhagen is also to become a reality in Berlin – the changeover to a sponge city. The rationale: the German capital should be able to store rainwater like a sponge, so that it is able to cope with both very heavy rain and droughts in the future. The precipitation should no longer simply disappear through the sewage system, but be collected locally and on site.

This approach is becoming more and more widespread in new neighbourhoods. A housing estate with 5,000 sponge-style homes, for example, is currently being built on the site of the former Tegel airport. In this respect, the construction of Europe’s largest cistern by 2025 is certainly a coup.

Existing urban spaces are mostly still sealed with concrete – in Germany alone, this currently accounts for 44 per cent of urbanised areas. In addition to a targeted unsealing, the Berlin landscape architect who dreamt up the name “sponge city”, Carlo Becker, recommends the “piggyback principle”: if roads are dismantled during construction work, why not take the opportunity to redesign the gutters and recesses for superior infiltration at the same time?

If 25–30 per cent of the city can be disconnected from the sewage system, the dream of the sponge can come true, and help Berlin stay cooler in hot weather, droughts and thunderstorms.

If Min-Suh In-Tak, the architect and urban planner referred to in the article “Our Living Space in the Year 2033”, is to enthuse about our ever greener smart cities in ten years’ time, there can be no doubt that developments such as these – as well as an exceptional pioneering spirit – will be necessary.



This article might be interesting for someone you know?

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THE GLOBALANCE VIEW

Urbanisation is, in a sense, a super megatrend: no other topic is at the interface of more megatrend issues than urbanisation. This is where the challenges of climate and energy, new mobility, digitisation, scarcity of resources and urban consumerism meet in a very confined space. The investment opportunities are correspondingly diverse, ranging from urban infrastructure, energy-efficient real estate and urban mobility to security concepts and vertical farming. The geographical dimension of this topic is also interesting from the investor’s perspective. The 10 largest megacities are currently to be found in Japan, India, China, Bangladesh, Brazil, Mexico and Egypt.

The Chair that Assembles Itself

The technology behind 4D printing is still in its infancy. Despite this, its disruptive potential is quickly becoming clear – from furniture which assembles itself to medical implants that grow with the body.

Whether it's a mobile phone cover, a pair of glasses or a dental implant: our world is now shaped by 3D printing. It is even possible for houses to be built in a climate-friendly way and in a completely individual design using specialist 3D concrete printing. But that's not all. Universities and individual start-ups are already working on the further development of 3D printing – 4D printing, where another dimension is added: time. In this area, fabrics can be manufactured which change with time, either continuously or instantly – "at the touch of a button". With the use of 4D printing, for example, the volume of an item can be reduced several times over by printing it in a folded format.

At its location of use, the item then unfolds on its own to assume its actual size. Imagine a bouncy castle for children that takes up little space when folded for transport but gets very large when inflated. With 4D printing, this principle also works for other applications as well as constructions that require hard materials, for example.

And all of this is possible without any external help, as is the case with the air in the bouncy castle. This is of particular interest for transport. If large-volume objects or constructions can be transported in a space-saving way, it isn't just economical, it is also of interest from an environmental perspective.



Another interesting field of application is medicine. Implants can be printed individually for a patient and "programmed" to grow with them. Alternatively, medicine reservoirs can be implanted which activate whenever the patient is running a high temperature. At the moment, research on these versatile substances is largely being conducted at universities such as MIT, Harvard and ETH Zurich, but some start-ups are also working on the technology of the future.



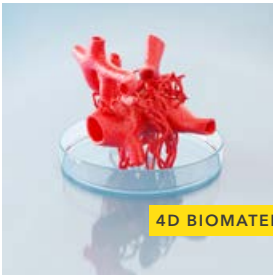
4D printing is the further development of 3D printing to which another dimension – time – is added. Fabrics that have been printed four-dimensionally are able to change as required.



The market for 4D printing is expected to reach a value of USD 3.72 billion by 2030.



According to designer Skylar Tibbits, it could be possible for 4D-printed water hoses to transport water using a wave motion instead of a pump.



4D BIOMATERIALS – UK

Faster Healing after an Operation

With the technology developed by English start-up firm 4D Biomaterials, wounds are able to heal faster and better following an operation. The individual framework implants are printed in a printer. They are then pressed and applied to the required location in the patient’s body. The implant unfolds by itself due to the body temperature and closes the wound. After a certain time, the implant dissolves. The company emerged in early 2020 as a spin-off from the universities of Birmingham and Warwick, and now supplies its products to manufacturers of medical devices and healthcare facilities in the UK, the EU and the USA.

Ultra-Fast Production

Carbon, Inc. is able to make products up to 100 times more quickly than established methods using digital technology and light. This is possible with its Digital Light Synthesis (DLS) technology; the company has also raised considerable capital for the further development of DLS. This process uses ultraviolet light to harden liquid plastic resin at specific locations, allowing solid structures to be created in a very short time. Another difference to conventional 3D printing is the possibility to “programme” the material. The chemical compounds can be changed after the printing with the use of heat. The heat triggers a chemical reaction which causes the materials to adapt and strengthen and become exceptionally strong.



CARBON, INC. – CANADA



CONTRIVE DATUM INSIGHTS – USA

Materials of the Future

The commercial use of 4D printing isn’t yet widespread. The research is still in its infancy, although it is making steady progress. It is also expected that increasing numbers of start-up firms will address the materials of the future and develop new products. According to market research by Contrive Datum Insights, the market potential in this area is set to increase considerably in the years to come. While the 4D printing market only had a value of approximately USD 238 million in 2022, it is expected to grow to USD 3.7 billion by 2030. The developments in this area are exciting, also because there are so many areas of application which 4D printing is able to revolutionise – whether the textile industry, consumer goods, architecture, waste management, agriculture or aviation.



The US military is investing almost one million US dollars in the development of 4D printing.



North America is the fastest growing market for 4D printing.

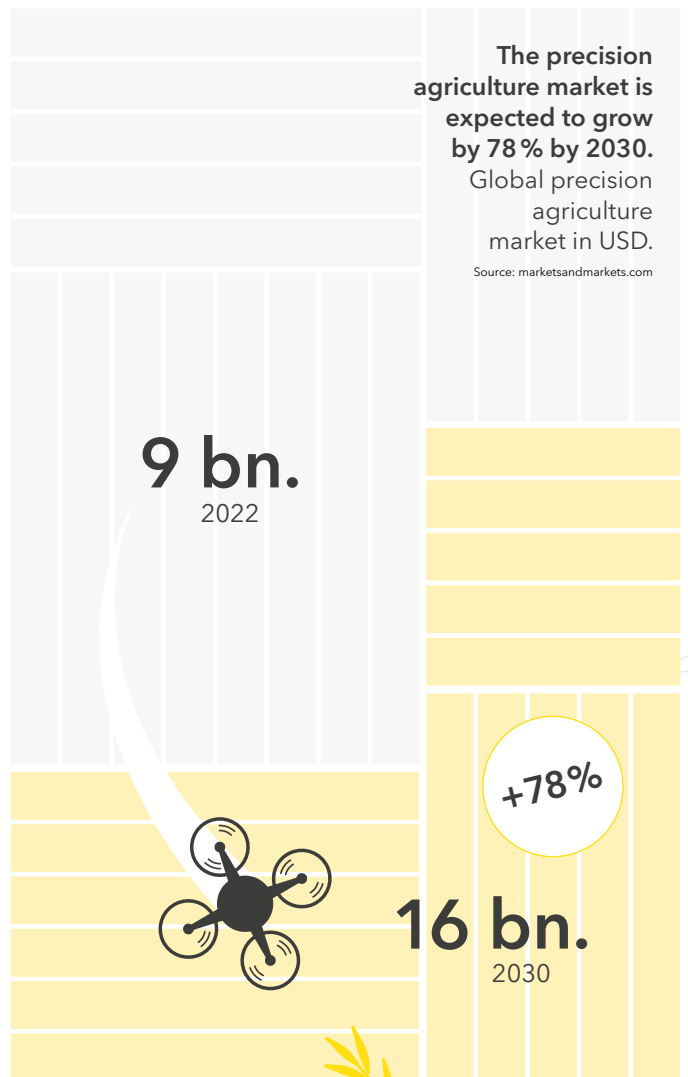
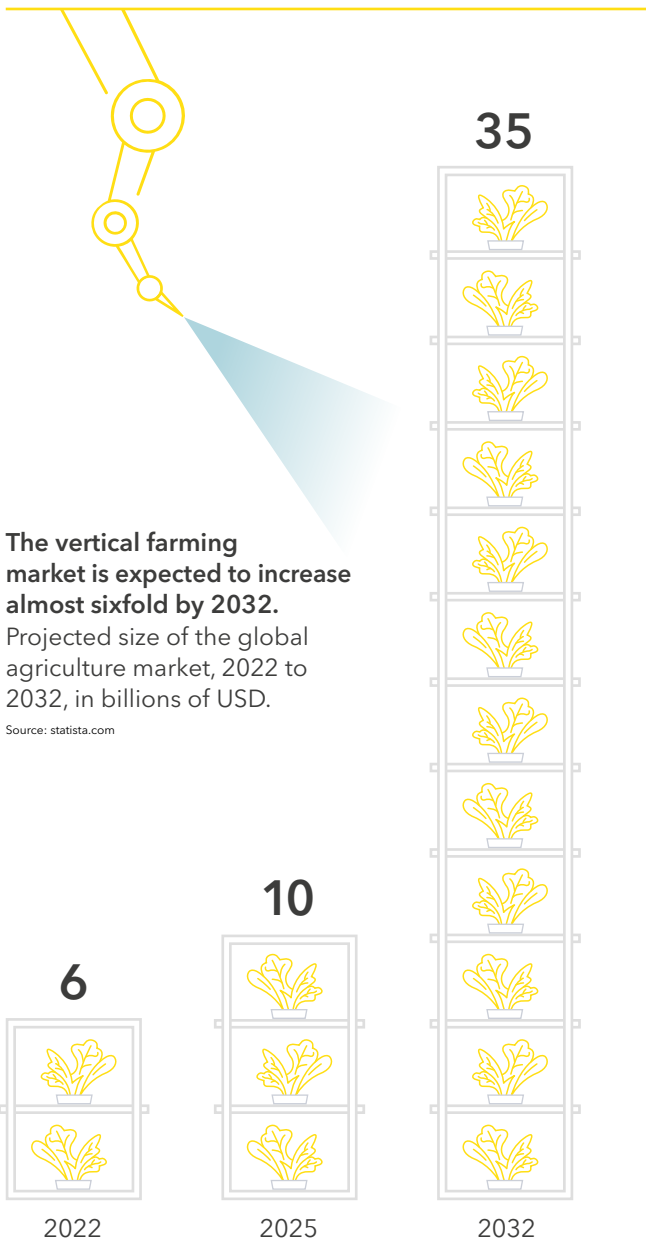


Car manufacturer BMW is tinkering with a 4D printed car which changes shape according to its speed.

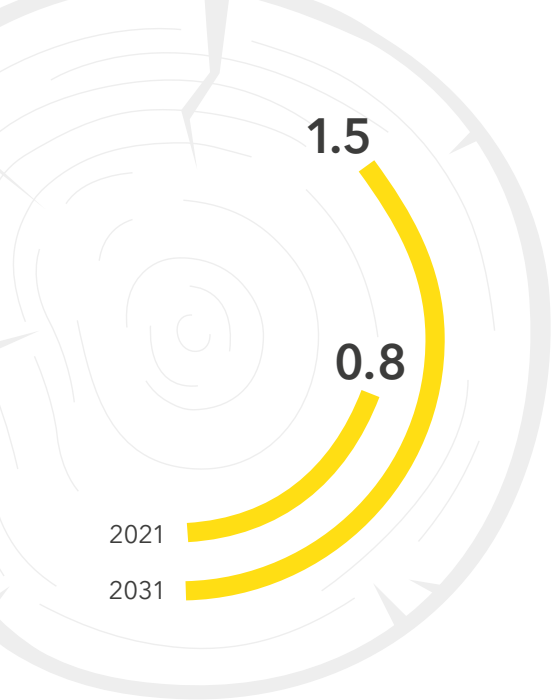
This does not constitute a buy recommendation. Disclaimer on the cover.

Living Space of the Future

WE CAN WRITE A LOT ABOUT THE LIVING SPACE OF THE FUTURE, present scenarios and make assumptions – but sometimes, nothing is more valid than raw figures. We therefore present you with facts and figures on this topic to avoid relying wholly on the written word.



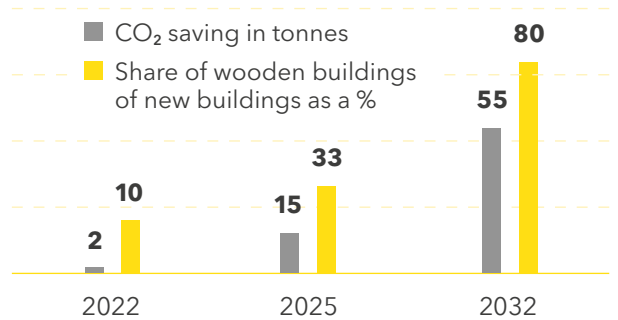
FACTS & FIGURES



As a construction material, wood can contribute to making real estate more sustainable.
The share of wooden buildings is expected to increase eightfold by 2032.

By 2031, the construction timber market is expected to almost double in size.
Global construction timber market in billions of USD.

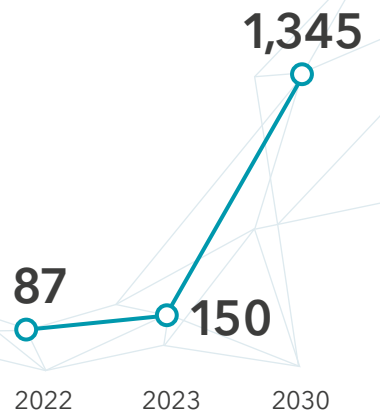
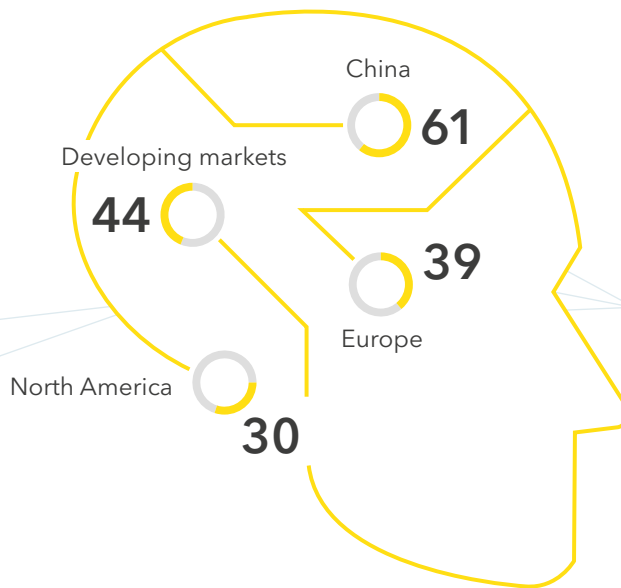
Source: alliedmarketresearch.com



Source: Amiri et al. 2020: Cities as carbon sinks – classification of wooden buildings

Companies are using AI to make their business activities more sustainable.
Companies using AI to become more sustainable, in percent.

Source: mckinsey.com

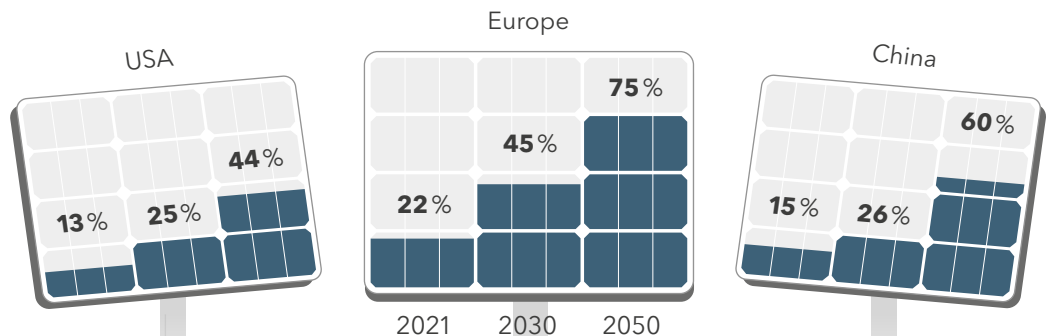


The AI market is forecast to grow rapidly.
Global AI market in billions of USD.

Source: marketsandmarkets.com

In the world of politics, the race for subsidies for the renewable energy mix is in full swing.
Share of renewable sources of energy in the energy mix.

Sources: ScienceDirect, EIA, IEA, EEA, ETIP Wind, Energy Partnership, Our World in Data, Goldman Sachs





Lene Petersen

Climate protection expert,
WWF Switzerland

... when investing

What has been your best investment so far?

A long-term sustainability fund that I have invested in for my daughters – twice over.

What is important for you when investing?

That my money only goes into truly sustainable investments, and that I'm not helping to fund anything harmful to the environment or the climate in a hidden or coincidental way.

What would you change if you were to become queen of the financial markets?

I would integrate sustainability systematically and comprehensively as a central principle, ensuring that all funding is redirected towards sustainable activities and therefore contributes to the achievement of global goals.

Act now!
Lene Petersen

... personally

Are you optimistic or pessimistic about the future?

I am somewhere between realistic and optimistic. That's where we have to be if we want to work on ensuring a bright future with motivation and dedication.

How do you recharge your batteries when your personal power level is low?

In the great outdoors together with my family, climbing and hiking.

What I still want to learn:

To play the cello.

... as a sustainability expert

What has been your biggest lesson learned so far?

That it's always also about people and how they feel. That we need to be aware of and take other perspectives and perceptions into account if we want to achieve anything outside our own "bubble".

How important will sustainability be in the future?

A key point here is that sustainability is indispensable for our future – for everyone: individuals, companies, investors, countries. Our progress with sustainability will determine our future way of life.

If I were to start a new business, it would ...

... adapt solutions that already exist at the global level to local contexts.

ARTIFICIAL INTELLIGENCE

Outside the Comfort Zone

The topic of artificial intelligence and its effects is omnipresent. Its possible consequences are complex and far-reaching, and even the inventors and developers of AI technologies don't have a clear idea of its potential impact either. A Pandora's box has been opened, and it is necessary for the worlds of business and politics as well as society to come to terms with the new technology. Almost every sector will be affected. Even the equity markets, and with them the financial services industry, are likely to undergo major changes sooner rather than later. As remarked by LinkedIn's co-founder Reid Hoffman: "The future will be sooner and stranger than you think".

We're already feeling it today: ChatGPT etc. are set to make fundamental changes to our lives. While there are huge opportunities, the potential risks are also taking on unknown dimensions. How should AI be regulated? Will AI and the developers behind it follow the rules? What impact will AI have on our society? How can we protect ourselves against its misuse? All are questions to which there is a lack of answers. Historian and best-selling author Yuval Harari believes that the exponential development of AI and the speed at which it is occurring are among the greatest challenges to mankind. Homo sapiens have been very adaptable for hundreds of thousands of years, yet the pace of the changes presented by this technology poses a very big challenge, the likes of which we haven't seen before.

Globalance Learns AI

The opportunities are considerable, but the risks must also be closely monitored. This can only be achieved by getting to grips with the new technology and its various applications. As a bank that looks to the future, we want to address the opportunities and risks that this new technology presents to our company on a proactive basis. We are open-minded and interested in finding out where we can use this technology in our strategy or our operational processes. We are embarking on this journey with a wary eye and a moral compass. We are currently assessing the use of our "own" generative AI, and are testing and training an in-house ChatGPT.

In this respect, we are testing a variety of possible applications in the fields of research, investment strategies, marketing, customer interactions, process optimisation, and more. We are working with an innovative Swiss business start-up, and want to draw the possible conclusions by the end of the year. We are only processing data sources with which we are familiar, so that we are able to trace the origins of the information at all times. In another AI project, we developed an AI-based avatar with Globana which enabled us to gain some initial experiences in this field.

AI Investments in Portfolios

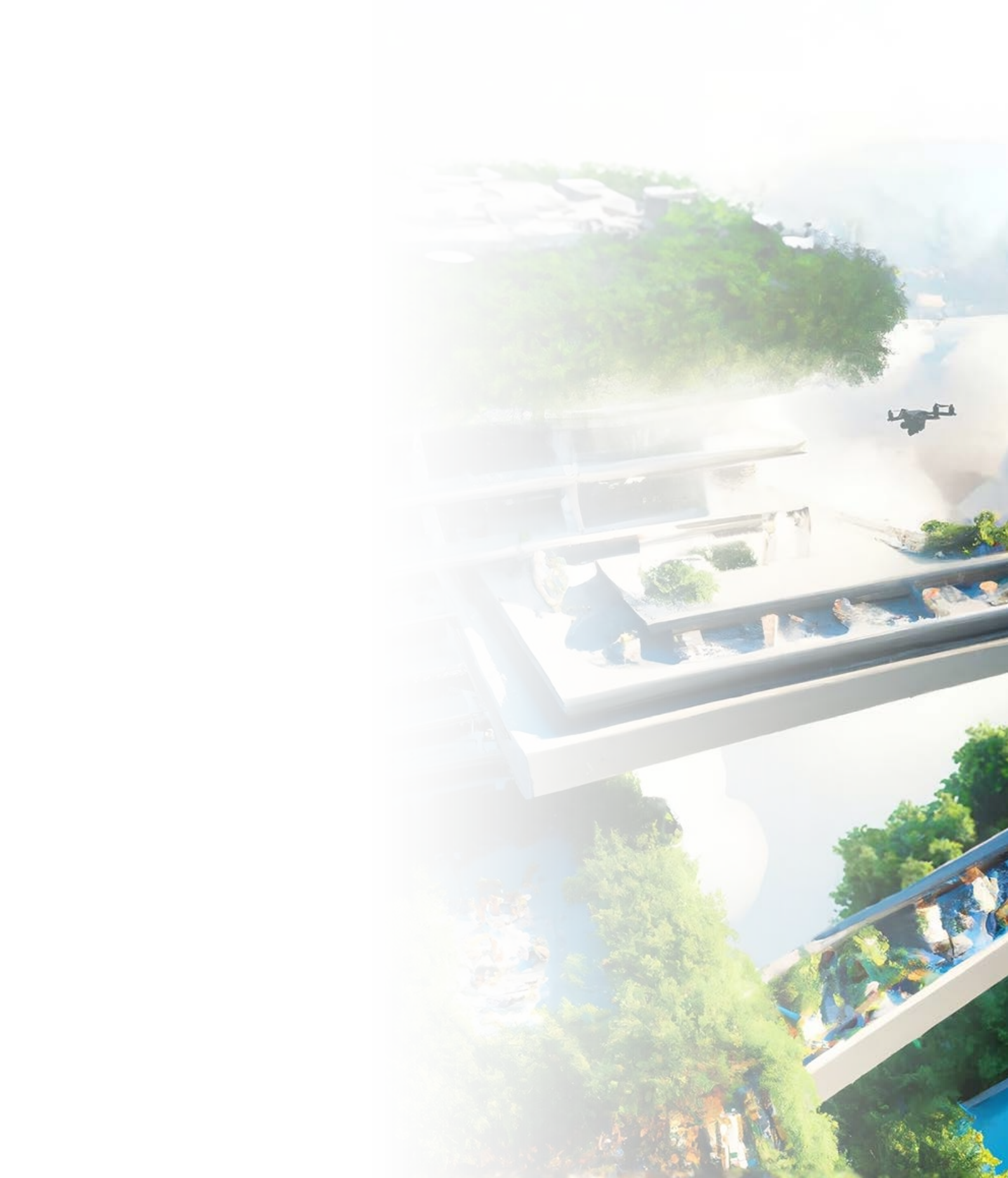
The call for regulations and, from some, a pause in developments, are getting louder and louder – including in tech and research circles. We also recognise sensitive areas, such as personal privacy and the quality of information, to which we are devoting special attention to remain true to our investment philosophy. We are therefore developing definitive criteria for responsible AI investing (see page 17). After all, we have considerable expectations regarding the use of AI systems. In particular, we welcome the potential of AI in areas of application such as ecosystem monitoring, supply chains, logistics, de-carbonisation, the circular economy and the efficiency of resources.

Once a sub-topic of digitisation, AI has now become a megatrend in its own right which is affecting all asset classes and industries – and should therefore find its way into portfolios.

Learn more about AI with Globana:



globalance.com/en/globana



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