

No. 2 -2022

## Data and AI in the Boardroom

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Anyone with a keen  
eye for risk will  
have business

Roland van der Vorst,  
Rabobank

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Moving upwards  
in the chain

Ingrid de Swart, a.s.r.

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Reconsidering your  
ethical compass

Marc Salomon,  
University of Amsterdam

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AI leading  
and doctors  
supporting: reality  
or madness?

Folkert Asselbergs, UMCU

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# The Quest for New Business Models

## Colofon

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Since every green choice makes a difference, we considered the environment in printing this magazine.

# PREFACE

Looking at the world during and post-Covid, it's without doubt we're up against serious changes influencing today's and tomorrow's business models. Covid has given e-commerce a significant boost and forced many businesses to create multichannel environments. Hybrid working and digitization have become a norm rather than an exception in only just a few years.

In its turn, e-commerce has given rise to Industry 4.0. We're seeing the start of a war for customers, for instance in retail. Deliveries are made at lightning speed, in a bid for more customers. This increases the pressure on operational and logistical processes and leads to higher demands on computational capacity and technical innovation. Increasing amounts of data need to be processed more quickly and smarter than ever before. Cloud, data, and AI are becoming indispensable tools.

As more and more decisions are being automated, fair and explainable AI has also come to the fore. Algorithms are to be made in such a way one can explain the choices they make. They must be ethical and fair by design, to avoid the risk of harmful decisions.

Another important development that is taking place, is the growing push towards sustainability. The traditional focus on the bottom line is shifting to a more balanced view. Taking into account customer and employee satisfaction, as well as environmental concerns.

They create excellent reasons to talk with a diverse group of policy makers across various industries about the challenges they're up against. We asked Roland van der Vorst of Rabobank, Ingrid de Swart of a.s.r., Marc Salomon of the University of Amsterdam and Folkert Asselbergs of UMCU to reflect on their quest for new business models in the context of these global issues. Their valuable insights can be found in the second edition of the Data and AI in the Boardroom magazine.

I hope you will enjoy reading these interviews as much as we did having them.

Patrick Hennen

# A NEW BALANCE IN BUSINESS MODELS

Various developments – both technological and social – are putting pressure on companies' revenue models and the organization of different fields of expertise. According to ORTEC's Patrick Hennen, our interlocutors signal that climate change, digitization, and the call for more diversity, inclusion and transparency influence the way we do business, the way we look at data and the way we envision the future of our planet. "And Covid-19 has simply accelerated 'Industry 4.0'."

Nevertheless, anyone with a keen eye for risk and change will still have business, says Hennen. He points to Ronald van der Vorst, who states: "The world is becoming an increasingly risky place. Assessing risk is essentially a bank's core activity, and it is what we excel at." Hennen: "As Head of Innovation at Rabobank Wholesale Rural, Van der Vorst has set himself the goal of capitalizing new revenue models and harnessing our current relationships and strengths to innovate. According to Van der Vorst, the Acorn carbon credit project is a good example of that, and the bank is working hard on getting more money flowing to projects that will help reaching the UN Sustainable Development Goals."



## Industry 4.0

Ingrid de Swart, COO/CTO and member of the board of directors of insurance group a.s.r., recognizes the emphasis from the 'outside world' on sustainability. She endorses it, too: "Our challenge was always to invest the money entrusted to us by clients in the best way possible. But a shift is occurring, and more is expected of our efforts with regard to vitality, long-term employment, self-sufficiency and impact based on the ESG principles. We are expected to adapt our business accordingly, and I think that's right. In fact, I think it's great that we're being asked to do so, as it makes us more appealing in what we do, which in turn lets us connect people to the organization." Looking at the sustainable development goals, Patrick Hennen highlights a trend that has been accelerated by the pandemic: "The 'war for the customer', already going on for years between big retailers like Picnic, Jumbo and Albert Heijn, has entered a new era. In this world things used to revolve around profit, saving costs, and efficiency. Today, it's all about optimizing multiple goals at once. It has become a balancing act between the business bottom line (profit), the contentment of customers and employees (people), and how a company impacts the environment (planet). This balance can vary per company, depending on its own purpose."

# DATA-DRIVEN AND INTUITIVE INNOVATION

## The touch vs the tech?

Digitization has a huge impact on operational and logistic processes, but also on the technological side of things, claims Hennen: "There is going to be ever more data available, real-time and at your fingertips. Data that can give you more insights and from which you can learn. In order to be able to deal with that, you will have to use the cloud, smart algorithms and artificial intelligence." When De Swart joined a.s.r. in 2019, a large part of her job was to initiate the digital transformation. She decided to start it by sitting down with all unit heads to draw up a joint management agenda that transcended the individual agendas of those existing units, innovation and IT: "Let's define lofty goals together and determine what we need to do to accomplish them. It takes some investment, but – in my experience – setting the agenda together is the best way to ensure broad-based support. We are looking to strike the ideal balance between human interaction with real added value, the touch, the tech, and digitized convenience where possible." Hennen notes that Van der Vorst thinks something similar. "Computers are excellent at making connections", says Van der Vorst, "but so are people. Data-driven and intuitive innovation are both important. You should be trying to find a way to make opposites productive, getting one and one to add up to five. I am a big believer in Janusian thinking: the ability to entertain two contrasting ideas, perspectives, or

concepts at the same time. It's the basis for a myriad of technological inventions." At a.s.r., they don't want to apply algorithms until they have very high-quality data, adds De Swart, "and not until we have thought carefully about inclusiveness and exclusivity."

## Fair & explainable AI

In Hennens experience, the explainability of AI becomes more important, the bigger the decision it supports is. "The board of directors will want to understand why a specific decision should follow the advice of the algorithm." Marc Salomon, professor at the University of Amsterdam, affirms this. "It is incumbent on the government, businesses and the public to ensure that algorithmic decision-making stays verifiable and fair. Many companies still have quite some work to do if they are to meet the demand for transparency." This need for transparency is also a sign of the times, Solomon adds, with equality, health and the environment becoming increasingly important. Companies should keep reconsidering their ethical compasses: "Any algorithm that makes decisions, discriminates by definition – making decisions is making choices, and making choices is discrimination. But does it discriminate more than we find ethically acceptable?" An ethical framework is crucial wherever you want to apply data science and artificial intelligence, says Hennen. Folkert Asselbergs, cardiologist at UMC Utrecht, agrees:

"The skeptical attitude to using AI adopted by many patients and colleagues can also be traced back to trust, or a lack thereof, in data. This is one of the reasons why AI isn't widely used in healthcare yet." But that, he claims, is about to change: in ten years' time AI could turn doctors into consultants. "Data scientists are far from having the final say, but AI support will come to play an increasingly important role in healthcare decision-making."

## Democratization of data

Asselbergs believes the most important thing that AI will bring to healthcare is patient empowerment, thanks to the democratization of data. "The experience and knowledge gap between patients and doctors is tremendous, including data knowledge. We speak our jargon and wear a white coat, all of which creates distance. That distance will soon disappear because patients will know exactly what I know." But for AI to take a flight, it is essential that more data become accessible: "Now is the time for action. The government has to facilitate data exchange before the next pandemic presents itself." And, adds Salomon: "Education can play a key role in the success of a digital transformation. This includes academic education, of course, but also secondary vocational education, such as the Dutch MBO. MBO students may not go on to develop their own algorithms, but they would be perfectly capable of using applications that revolve around AI. I would therefore strongly recommend training MBO students in using AI algorithms. If we train and educate people properly, more people will be able to successfully make it through the digital transformation." Hennen: "Awareness of data should be considered a great asset in every layer of an organization. That is the first step. If everybody logs data consistently, the information will become more valuable and more pure."



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## Anyone with a keen eye for risk will have business

Roland van der Vorst has been Head of Innovation at Rabobank Wholesale Rural for two and a half years, putting him in charge of all international business and corporate business in the Netherlands. Van der Vorst is not a stereotypical banker. He prefers operating at the interface of creativity and strategy, a trait that serves him well in his current position. "I have set myself the goal of capitalizing new revenue models and harnessing our current relationships and strengths to innovate. I strive to create things that will benefit us and others alike, playing a positive-sum game rather than a zero-sum one."

*Interview with Roland van der Vorst, head of innovation at Rabobank*

# GENERATING NEW REVENUE STREAMS

***“Using technology opens the door to tremendous accuracy and efficiency gains, as well as enabling us to incorporate different kinds of risks in our models”***

Roland van der Vorst



When Rabobank sounded him out about becoming the new head of innovation, Van der Vorst first wanted to explore whether the position suited him. I talked to a number of people to help me get my bearings, after which a number of things became clear to me. First, Rabobank is urgently looking to change. After all, the banking industry is under significant pressure from various different directions, including low interest rates, regulatory pressure and competition from fintechs. Rabobank's strong focus on food and agriculture was another important factor for me. If you're looking to innovate, having a niche is a major advantage, as it tends to let you take a broader approach to innovation. Our efforts now are related to finance, of course, but they also transcend the financial domain, which is made possible by Rabobank's traditional and inextricable link with the agricultural sector.

**If you're looking to innovate, having a niche is a major advantage, as it tends to let you take a broader approach to innovation.”**

F&A(food and agriculture, ed.) is in the bank's DNA, and we are still one of the key players in that field. Meanwhile, the close ties with the sector are proving to be a great way

to foster innovations and experiments with new revenue models. Rabobank has a pleasant culture: if you want something and you can back it up, I've noticed that you can get a lot done. I work with a diverse team with about twenty nationalities, and with backgrounds from data scientists to derivatives and food specialists.

**How do you organize innovation and how do you involve the business community?**

We have a centralized budget and I get to come up with plans. Some of our projects are still at a very early stage, while other projects are already up and running as real businesses. Some innovations stay squarely in the innovation silo, while we team up with the business community to develop others. It all depends on the nature of the innovation: how close is it to our own activities and can we use the systems we already have in place? At first, I thought we would have to rely heavily on businesses, but I've gradually started to discover that being a bank has tremendous added value. It just requires a lot of our culture and our technical systems.

# RECONCILING CONFLICTING INTERESTS

It is up to Van der Vorst to generate new sources of income for the bank. "My focus is primarily on F&A, because it's the biggest international field there is, and because of our mission to feed the world sustainably. I have set myself the goal of capitalizing new revenue models and harnessing our current relationships and strengths to innovate, which I aim to achieve through cooperative thinking, a philosophy that runs through everything I do as a common thread."

The Acorn carbon credit project is a good example. After Van de Vorst was sent an article on measuring biomass from above, he and his team came up with an idea.

## What does cooperative thinking mean to you?

"It means thinking about interests, rather than about mentality or atmosphere. I may not want the same color wallpaper as my neighbor, but our interests may still be aligned if we both want to install solar panels on our roof. Keeping collective interests in mind fits our current zeitgeist like a glove: creating things that benefit us and others alike, playing a positive-sum game rather than a zero-sum one. Much of what we do at Innovation is based on cooperative thinking."

I have set myself the goal of capitalizing new revenue models and harnessing our current relationships and strengths to innovate.

"Our customers include lots of big farmers in America, Canada and Australia, as well as many smaller farmers in Africa. If we could incentivize small farmers to plant fruit-bearing trees on their land (agroforestry, ed.), their soil would benefit. There are now companies that are willing to pay to have carbon dioxide captured. Because we can measure the biomass of the trees, we can turn them into carbon credits and sell them. 80-90% of the income flows back to the farmer, while we keep the rest. We started a mere 18 months ago, and we already have a 20-strong team working on 8 pilots. What's more, we have two customers, and the first real transaction will, if all goes well, go through very shortly." Van der Horst heralds it as a typical example of how to reconcile conflicting interests - the farmer, the world, the corporate and the bank. That, as far as I'm concerned, should be the compromise 3.0. In the past, the aim would be to come up with something that everything agrees with, whereas in fact you should be trying to find a way to make opposites productive, getting one and one to add up to five." I am a big believer

in Janusian thinking, after Janus, a Roman god who had two faces. It's another word for the ability to entertain two contrasting ideas, perspectives, or concepts at the same time, and it's the basis for myriad technological inventions."

You have to find a way to make opposites productive, getting one and one to add up to five.

Can financing also find its way to those who need it in some other way, e.g. in a way that will help us reach the sustainable development goals?

"There are alternative ways to value existing financial resources, and many of them have already been put into practice. Regulators are coming down hard on us and reminding us that the money we manage for our clients has to meet certain sustainability requirements. We ourselves are hard at work to get more money flowing to initiatives that will help us reach the goals, and innovations that boost traceability, especially of food, are particularly valuable. Where did it come from? Does it meet the requirements? In many cases, companies have taken major strides in this themselves, which enables banks like us to link other forms of financing to the insights provided by traceability. Sustainable finance: offering solutions to companies who meet certain sustainable requirements, as well as their suppliers and their suppliers' suppliers."



# NATURE IN THE ECONOMY

A hundred years ago, we had too little monetary capital and a lot of natural capital, Van der Vorst recalls. Now it's exactly the other way around. This raises an interesting question: can you create a nature-based currency? A carbon credit is basically that: a valuation unit that meets specific requirements, certified by external bodies. We create them. I'm not interested in trading credits, but I am interested in creating them and securing a place for nature in the economy.

There are two different types of currencies: emission credits and capture credits. I'm mainly interested in the latter. Even if we were to stop emitting pollutants altogether, we would still have to remove carbon dioxide from the air. Can we create a credit with real additionality that can be tracked in real time for accurate monitoring? I think you have to exercise caution in how tradeable you make your credits, because I do not support the notion of having carbon credits being resold a hundred times over. By the time they reach their hundredth owner, they'll have lost their link to the physical tree, turning the market for credits into a bubble.

The advantage of blockchain is that you can much better capture the relationship between the physical reality and its digital representation, which makes me hopeful."

A hundred years ago, we had too little monetary capital and a lot of natural capital. Now it's exactly the other way around. This raises an interesting question: can you create a nature-based currency?

The world is becoming an increasingly risky place, and anyone with a keen eye for risk will have business. Assessing risk is essentially a bank's core activity, and what we excel at.

What resources can the bank use to help feed more and more people in a sustainable way?

Over the past two and a half years, I have learned that the food system is enormously complex. In fact, there's no real system to speak of, and Dutch farmers face radically different circumstances than their African counterparts. Our farmers are so efficient, and we have so little space here: a business model like Acorn is simply not compatible with the Netherlands. The situation of large farmers in America is very different, the land they farm is two or three times the size of the province of Utrecht and they take a tremendously data-driven approach. In the US, insight into data is the be-all-end-all. That is one of the reasons why we have acquired a stake in a farm management information system that requests soil data at various different levels. We link these insights to financial data to form a better understanding of what is happening on the land, which can be translated into practices that benefit the farmer and the people alike. We always tailor our approach to the specific country we're working in."



# DEALING WITH RISK DIFFERENTLY

## Dealing with risk differently

On the one hand, says Van der Vorst, banks are under pressure, but on the other hand, the world is becoming an increasingly risky place. "Anyone with a keen eye for risk will have business. Assessing risk is essentially a bank's core activity, and what we excel at. Much of our income is based on our expertise in determining credit risk. The bank used to be decentralized; local Rabobank branches knew exactly who was doing business with whom and how reliable the underlying companies were, giving them access to a lot of knowledge they could use to mitigate risk. Decentralization and digitization require a different approach to risk assessment, and that's why we have technology. We're working on an initiative to use alternative data sources in smallholder farming to determine credit risk, such as satellites. We don't finance

smaller farmers ourselves, but they can struggle to secure funding at times, and when they do get money they pay high interest rates. This is a form of risk assessment that is based on entirely other factors than historical cash flow, and using technology opens the door to tremendous accuracy and efficiency gains, as well as enabling us to incorporate different kinds of risks in our models."

## The centaur model: combining data-driven and intuitive innovation

Van der Vorst agrees that data analytics can drive innovation: "I think data analytics should play a role of greater importance, and - truth be told - that's where we're headed. Dutch companies have certainly taken to data with great gusto, because they have access to uniform datasets. We are fortunate to have advanced infrastructure in the Netherlands. WRR, however, operates in many different countries in very diverse situations: eight million clients is a far cry from 2,000 major clients. The scale is different, the history is different. We have, however, gradually started developing more innovations that produce vast quantities of data, so finding new ways to use those data is a natural response."

Computers are excellent at making connections, but so are people. Data-driven and intuitive innovation are both important.



## Erica D'Acunto, Innovation Lead and Senior Data Scientist at ORTEC

"A few smart brains, a bunch of data, and a good idea can be enough to make your services obsolete in no time. The traditional insurance sector gradually seems to be accepting that fact as well. The big disruptor has yet to appear in the market, but startups like Friendsurance and Lemonade are already nipping at the heels of the legacy players. Their data-based services, such as a peer-to-peer insurance model or an insurance policy on a monthly subscription basis, seem to be better attuned to customers' demands and offer them more freedom of choice. That forces the existing players to take action, and with success: large insurers seem to understand that they will have to invest in data-driven innovation in order to maintain their position."



## Frans van Helden, Managing Director at ORTEC Data Science & Consulting

"Sometimes, decisions based on intuition and experience will do and insisting on using data will amount to nothing more than a waste of time. However, simply ignoring available data and potentially missing an insight you had right at your fingertips is hardly a good approach either."

# DATA-DRIVEN

Is it your ambition to transform your team into a data-driven innovation team?

“Yes and no. Some innovations require a great deal of imagination, and data alone would never have led to a project like Acorn, which sprouted from individuals who connected different factors and parties to create something altogether new. Computers are excellent at making connections, but so are people. Data-driven and intuitive innovation are both important. Look at Garri Kasparov. After he was beaten by Deep Blue (an IBM computer with artificial intelligence (AI), ed.), he discovered that a human chess grandmaster who was supported by an AI would always beat a human grandmaster or AI on their own. Yes, I believe in the centaur model.



## Roland van der Vorst

Roland van der Vorst is head of innovation at Rabobank and professor of industrial design at TU Delft. He also writes a weekly column in Het Financieele Dagblad. Van der Vorst has a bachelor's degree in sociology and master's degrees in business administration and communication studies. He studied for his PhD at Radboud University Nijmegen, and first made a career in advertising and communications. He was head of strategy at FHV/BBDO, chairman of BBDO Netherlands and founder of THEY. Van der Vorst previously lived and worked in Singapore, where he was an entrepreneur and consultant, as well as serving as the director of FreedomLab, where young thinkers from different scientific disciplines write future scenarios.

# Moving upwards in the chain

When Ingrid de Swart joined a.s.r. in December 2019, the main mission she was tasked with was to get more out of the sum of parts. "Organizing ourselves even stronger, based on customers' needs and wishes. Because today's customers don't only need products, but services too. To improve our services, we plan to use data, focus on digitization, and make a.s.r. an even more recognizable brand by giving it for example a clear digital front door. So, my focus needed to be on customers, data, digitization, and innovation, while maintaining all the good things we already had.

*Interview with Ingrid de Swart, member board of directors a.s.r.*



# BROAD-BASED AGENDA

Let's sit down with all unit heads to draw up a joint management agenda that transcends the individual agendas of those existing units, innovation and IT

Some insurers first run experiments more or less outside their own organization, before implementing them in the organization if they prove successful. What role does innovation play in a.s.r.'s digital strategy?

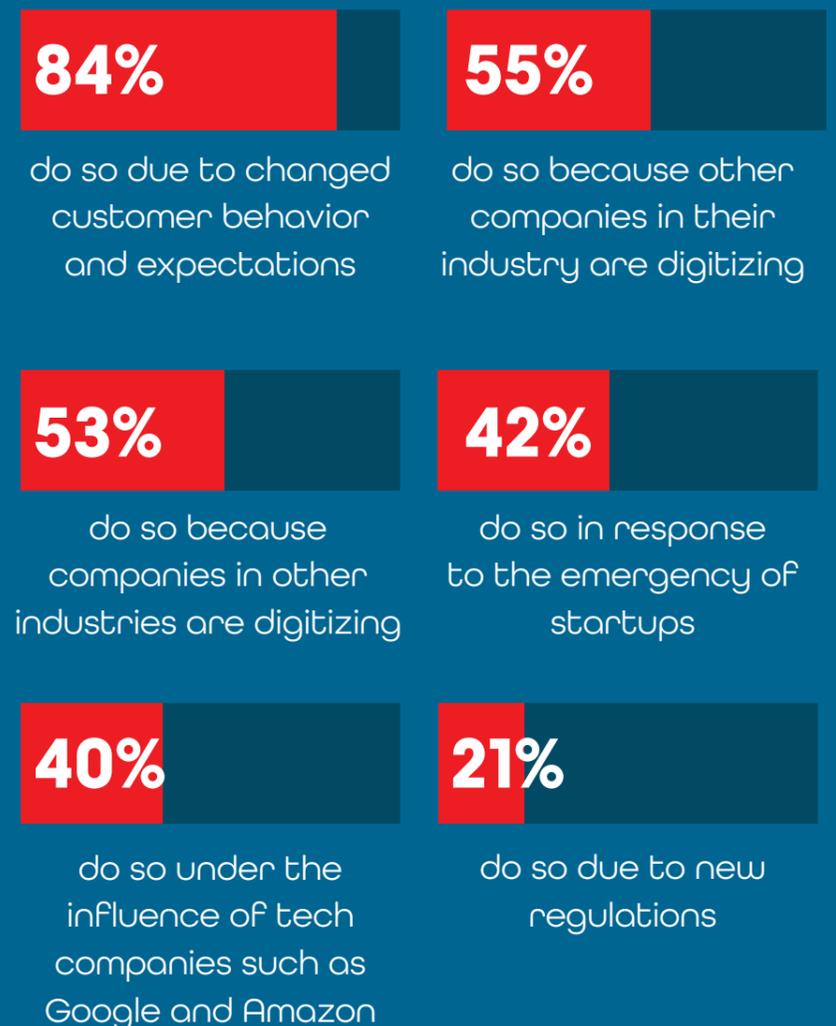
How do you tackle a major change process like digital transformation in practice?

"When I started, a.s.r. still had three IT departments spread across the organization. I decided to merge them because I believe that to really forward the digital movement, you need to have all digital skills and IT in one place. There was some resistance at first, but now everyone has come around and considers it the most important enabler of the movement. Our business units are autonomous when it comes to their insurance records, and you want to keep it that way, because it means they stay agile and accountable. We have, however, merged the layers that determine which application we use to chat with our customers.

"We also had a separate team at Innovation & Digital, which started off as a lab of sorts. It proved to be incredibly useful in an initial phase, because it opens you up to novelties. At more advanced phases, companies will not automatically accept that new, fun ideas also make it to the management agenda of units that have been around for a bit longer, have become more robust and often play a vital role for the operating results. For the past 18 months, we've therefore said: let's sit down with all unit heads to draw up a joint management agenda that transcends the individual agendas of those existing units, innovation and IT. Let's define lofty goals together and decide what we need to do to accomplish them. It takes some investment, but - in my experience - setting the agenda together is the best way to ensure broad-based support."

# WHY DO COMPANIES DIGITIZE?

"Digitization should not be an end in itself, but a means to realize new possibilities and, above all, new business models," says professor Jack van der Veen from Nyenrode Business Universiteit. Research shows that companies digitize for various reasons.



Source: Vlerick Business School; a survey among 52 major Dutch companies

# PREVENTION FOR VITALITY

The insurance company has also developed its very own health app, called 'a.s.r. Vitality'. Quite honestly: I was rather skeptical at first, but I have been positively surprised. People who had installed the app during the lockdowns have been demonstrably more active than the average Dutch person. And more than 45,000 members turn out to actually keep using the app, to get fitter and save up points for rewards, such as Zalando or Bol.com gift cards.

We have to move upwards in the chain and our customers expect us too.

The challenge is to strike a balance between preventing uninsurability and listening to our customers' needs.

One consequence of having more customer data is that more work can be put in prevention. Does encouraging prevention also have implications for a.s.r.'s business model? Are insurers becoming more and more risk managers?

It is true that prevention has become a more important topic for us. We have to move upwards in the chain and our customers expect us too. Customer demand for sustainable damage repairs, for instance, is increasing. The way society views risk management is subject to trends. We started with financial risk: any risk you cannot bear individually, you have to share. Preventing risk or managing risks differently is becoming increasingly important in what we do.

Our challenge was always to invest the money entrusted to us by clients in the best way possible, but a shift is occurring and more is expected of our efforts with regard to vitality, sustainable employment, self-sufficiency and impact based on the ESG principles. We are expected to adapt our business accordingly, and I think that's right. In fact, I think it's even really great that we're being asked to do that, as it makes us more appealing in what we do, which in turn lets us bind people to the organization.



# NO CONGRATULATION WITHOUT CUSTOMER VALIDATION

Under De Swart, a.s.r. set off on its quest for digitization with a common goal. "There were setbacks, of course. At a certain point, it became clear that the product owners did not always know what direction to go when they were faced with choices, which is why we set up several guiding principles. 'Winning starts with beginning' is one of them, but so is 'No congratulation without customer validation'. Sure, you can run through the office high-fiving each other because you made a deadline, but if you then discover that customers have no interest in your latest creation, it will have little added value. We test all our new creations with customers. Our professionals have had to get used to the fact that they are no longer the ones who validate their own work and that customers decide whether it meets their needs. However, it has provided more energy and new insights, such as that you might be able to do the same with much less text and/or fewer actions."

At a certain point, it became clear that the product owners did not always know what direction to go when they were faced with choices, which is why we set up several guiding principles.

Among other things, digitization has given insurers much more and more accurate data on their customers. To what extent do data analytics play a role in customer interactions?

"We want to communicate with customers in a way that suits them best, inspired by the motto 'High tech, high touch'. For many insurance-related matters, customers love the convenience of making arrangements in their own time, just as with banking or submitting meter readings. When it comes to more impactful matters, however, such as a severe car accident or buying a new house, you want to hear a human voice or see the person you're talking to. That's why we're looking to strike the ideal balance between human interaction with real added value, the touch, and digitized convenience where possible, the tech. At a.s.r., we are currently working on 'Ik denk vooruit' ('I think ahead', a new platform that provides our pension customers with an overview of their financial options with a view to the future, ed.). Over the course of this year, more and more data will become available that customers can decide to upload in order to see if they have a pension gap and what they could do about it. Our ambition is not to provide personal financial advice; intermediaries are much better equipped to do that. We do, however, feel a responsibility to make information as accessible as possible. With overview, you gain insight; and you can then decide on your preferred view with your financial advisor, who can see the big picture."



# SOLIDARITY AND CLAIM LEVELS

Artificial intelligence (AI) should be as transparent as possible, as inaccurate or biased algorithms can have unwanted side effects. Customers living in zip codes associated with an unhealthy lifestyle may accidentally be highlighted, for instance. How does a.s.r. deal with this risk?

“This is insurance companies’ core business: insuring risks that people cannot bear individually. We believe that it is important to maintain solidarity among insurance products, without disadvantaging people who are committed to reducing claim levels. The challenge is to strike a balance between preventing uninsurability and listening to our customers’ needs. In terms of AI, a.s.r. is still in the early stages of how we want to deal with algorithms. We don’t want to apply them until we have very high-quality data and have thought carefully about inclusiveness and exclusivity, because we don’t want to inadvertently lock in risk or exclude people.

Currently, data science models are still built primarily for analysis purposes. The current models used by a.s.r. have little direct impact on customers, but do provide additional insight

into the process and how a.s.r. can improve its services. De Swart therefore definitely sees opportunities for AI. “In the long run, AI has added value for a.s.r. as an insurer, but it is important that we can explain which models we use and the insights they yield, which has the added bonus of increasing support in the organization. Our main goal is to be predictable and keep our eyes trained on the long term, focussing on the whole curve rather than on the minutiae, while remaining adaptive. Parking sensors installed on cars, for instance, are a great way to prevent damage. If that effect continues for long enough, we can start compensating customers for reduced claim levels by adjusting their payments. And that’s exactly what we do.”



## Ingrid de Swart

Ingrid de Swart was part of the managing board of Aegon Netherlands from 2017 to 2019 as COO Retail and was responsible for the digitization program, among other things. Prior to that, she worked at Delta Lloyd from 2001 to 2017 in various management and board positions. From 2009 to 2013 she was CEO of ABN AMRO Insurance, before becoming President of the commercial division of Delta Lloyd. From 2014 to 2017, Ingrid de Swart was a member of the Board of Directors of Delta Lloyd, in which role her responsibilities included IT, digitization and innovation.

# Reconsidering your ethical compass

Prof. Marc Salomon is a professor at the University of Amsterdam, chairman of the Amsterdam Business School and co-founder of the Analytics Academy. In this interview, he shares his thoughts on Artificial Intelligence (AI) and recent developments in this field: "Algorithmic decision-making is forcing companies to reconsider their ethical compass. This is not a new development. However, society's desire for transparent decision-making has, in recent years, become more pronounced. In my opinion, this is partly due to the popularity of AI, but it's also simply a sign of the times." With society now demanding a greater degree of transparency than ever before, companies find themselves forced to show their hand. Does your algorithm serve only to optimize profits, or does it take social aspects, diversity and the environment into account as well? Transparent algorithms are becoming an increasingly clear indicator of your company's true values."

*Interview with Marc Salomon, professor at the University of Amsterdam*



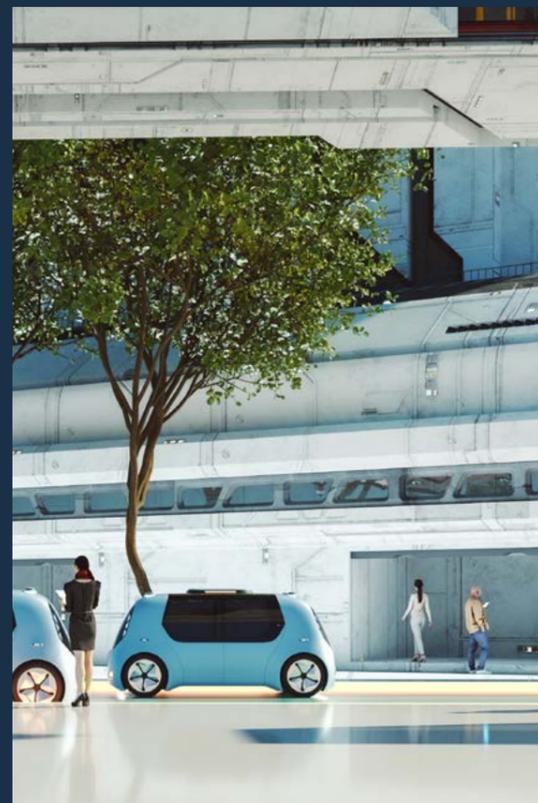
# EXPECTED PROGRESS

Large sums of money are being put into AI in the Netherlands and around the world, through both public and private investment. The government invests mainly in fundamental research, while companies focus more on applied research. These investments will fuel tremendous progress, Salomon expects, though the availability of the right, highly trained people will prove a bottleneck. These shortages can be solved by high-quality education and R&D developing smart technology that allows people without a degree in mathematics or computer science to use AI as well.

## Explainable AI and FAT - fairness, accountability & transparency - are major talking points nowadays, but who is responsible?

It is incumbent on the government, businesses and the public to ensure that algorithmic decision-making stays verifiable and fair, and this system seems to be working. Being unable to explain to the public or the government what your algorithm does, or which steps you have taken to protect people's privacy is increasingly becoming a barrier. However, many companies out there still have quite some work to do if they are to meet this demand for transparency."

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# ETHICAL ISSUES

Salomon explains the dilemmas companies may face in this area: "By what standard do you assess fairness? Any algorithm that makes decisions discriminates by definition - making decisions is making choices and making choices is discrimination: you do this, but not that. But does it discriminate more than we find ethically acceptable? That's the question you need to ask. And you will have to accept that the concept of fairness can be dynamic. The things we found acceptable 10 years ago are by no means the things we find acceptable today. Moreover, ethical standards can change as soon as you cross a border. This is illustrated perfectly by MIT's moral machine, which

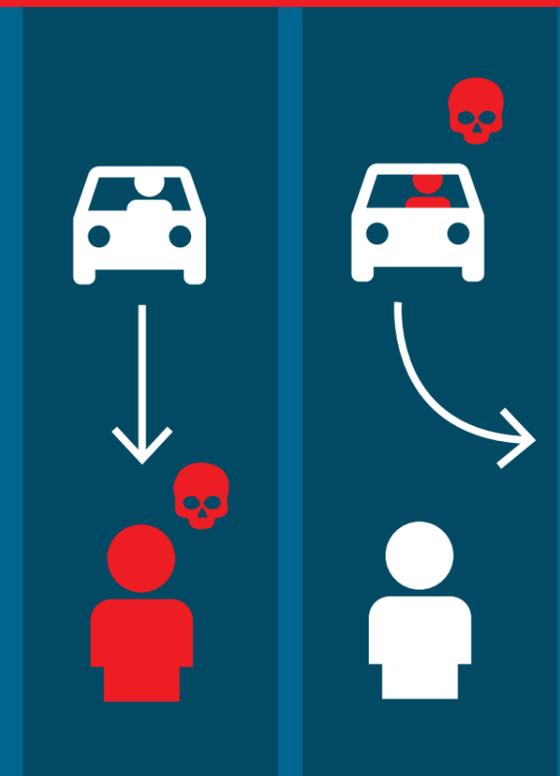
casts you in the role of a programmer coding software for an autonomous car. In this role, you get to decide which priorities the algorithm will set in an emergency. Do you spare the lives of young or old people, black or white people, disabled or healthy people? These preferences and priorities will differ greatly across the world. In some countries, young people are more important than older people, while it is exactly the other way around in others. If you are a multinational company making software for autonomous cars, you have to keep in mind that ethical standards differ all over the world, even though you might not think so at first."

## AN ETHICAL DILEMMA EXERCISE: WHO TO SAVE?

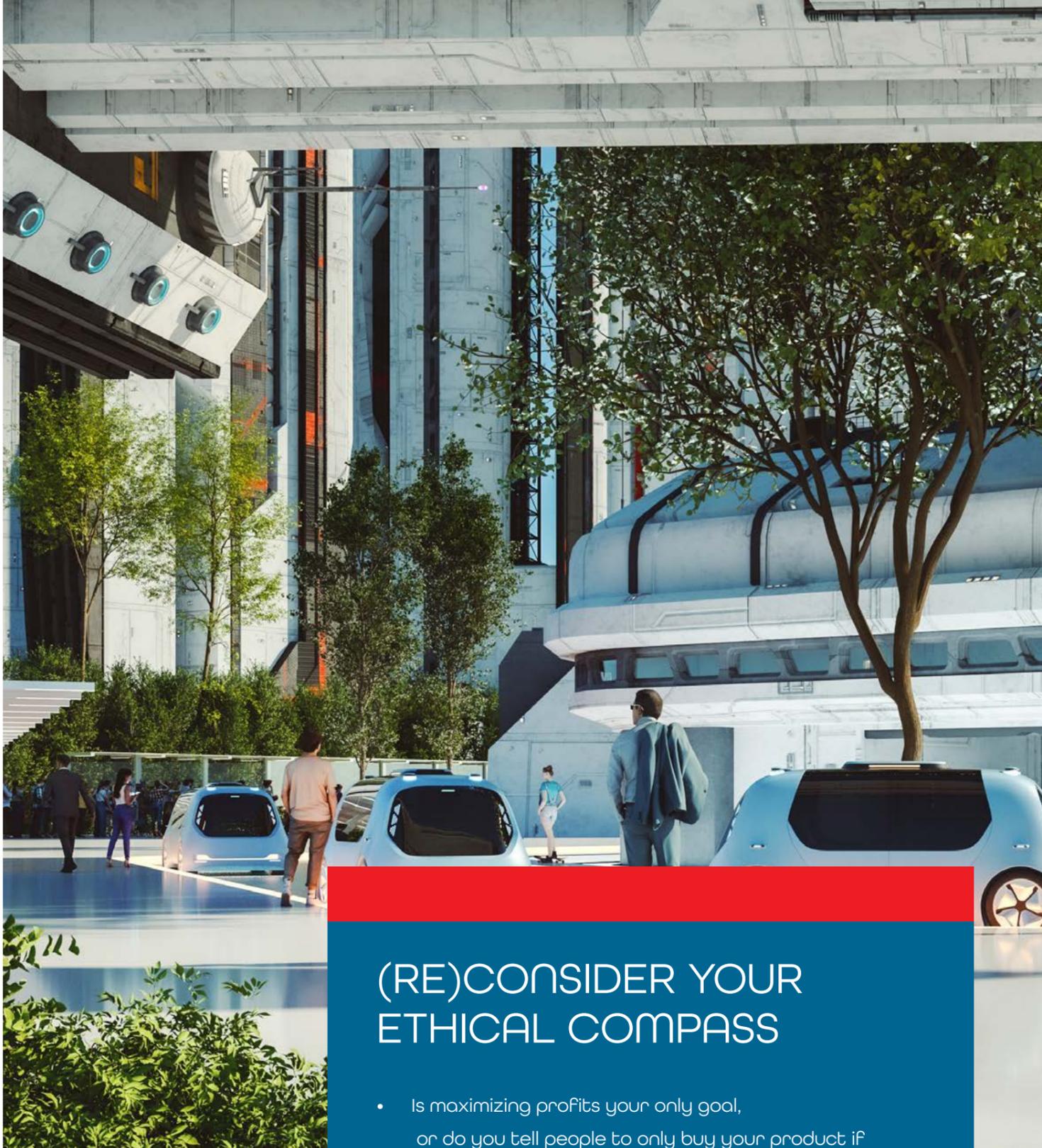
Imagine a self-driving car with sudden brake failure going at full speed towards a man who's crossing the street. He's abiding by the law by crossing on the green signal. By deviating a little, he can be saved, however the woman in the car would crash into a concrete barrier, resulting in her death.

### What should the self-driving car do?

This is a typical ethical dilemma that shows the importance of ethics in the development of technologies.



Source: MIT's Moral Machine



## (RE)CONSIDER YOUR ETHICAL COMPASS

- Is maximizing profits your only goal, or do you tell people to only buy your product if they really need it?
- Does your algorithm serve only to optimize profits, or does it take social aspects, diversity, and the environment into account as well?

### How do companies go about creating fair, accountable & transparent AI?

“Realizing that these issues exist is the first step. Next, you have to constantly scrutinize and evaluate your ethical compass. Is maximizing profits your only goal, or do you tell people to only buy your product if they really need it, like Patagonia does? You have to think about your ethics carefully, because transparency is taking over. As I mentioned before, I think this is due in part to the enormous growth of AI, which is often described as a ‘black box’ that you feed data into without truly knowing what happens and what the output of the algorithm means. Governments and the general public are justifiably scared of such a technology, which is why transparency has now become a major issue. Simultaneously, this need for transparency is also a sign of the times, with equality, health and the environment becoming increasingly important.”

Any algorithm that makes decisions discriminates by definition - making decisions is making choices and making choices is discrimination.

## CAN ALL ALGORITHMS BE FAIR?

Despite all our efforts, algorithms will never be perfectly fair, predicts Rogier Emmen, Data Scientist at ORTEC. “They just don’t exist, just as you will never find a perfectly fair person. There is no holy grail for fairness, and what we perceive as ‘fair’ could also change over time. “Fortunately, we are quickly becoming better at creating fair algorithms, rather than just focusing on accuracy. Public interest in the fairness of these algorithms is gradually increasing, thanks to pressure from lawmakers and regulators, the media, and society. Facebook, for instance, has started evaluating its own algorithm. People want transparency and equal opportunities: they want to understand how these algorithms are treating them and whether that is fair. That’s only reasonable, really.”



Rogier Emmen,  
Data Scientist at ORTEC

# DIGITAL TRANSITION

The digital transformation is still in full swing at many organizations. Larger companies in particular have appeared to struggle to navigate the required changes with all their staff. "Many companies do try to take their people on board throughout the digital transformation", Salomon begins, "but some people simply lack the background or interest to familiarize themselves with such a technically complicated subject. Education, however, can play a key role in the success of a digital transformation. This includes academic education, of course, but also secondary vocational education, such as the Dutch MBO. MBO students may not go on to develop their own algorithms, but they would be perfectly capable of using applications that revolve around AI. I would therefore strongly recommend training MBO students in using AI algorithms. If we train and educate people properly, more people will be able to successfully make it through the digital transformation. Fortunately, things are already moving in the right direction. At the University of Amsterdam, we are seeing a vast increase in interest in business analytics, econometrics and artificial intelligence, with student numbers being considerably higher than they were, say, five years ago."

## How can education help businesses make the transition as smooth as possible?

"At the Analytics Academy, we spent a lot of time during the Big Data for Managers program teaching people about the issues at hand and the people you need to navigate them. By doing so, we hoped to create ambassadors

MBO students may not go on to develop their own algorithms, but they would be perfectly capable of using applications that revolve around AI. I would therefore strongly recommend training MBO students in using AI algorithms.

who would disseminate these ideas in their own organizations. Our teaching is strongly project-driven: feel free to bring your own project, and we'll brainstorm how you can leverage AI in your business. And it has worked. For example, we helped the Port Authority Rotterdam and DPG Media, among others, deploy AI within a few weeks. We are currently in the process of developing a training course on the ethical and privacy issues this article addresses. for members of supervisory boards, upper management and anyone else interested in these issues. We will continue to develop innovative courses and programs, as meeting market demands is key for us. Besides, our lecturers are much more interested in doing something new than rehashing old topics that they have already been over 1000 times."



Building AI applications on American and Chinese infrastructure may push all high-level jobs to China and the USA, causing Europe to lose a lot of talent

## Knowledge and Infrastructure

### How has the pandemic impacted education over the past 18 months?

"We were able to experience what does and does not work with regard to online teaching. Remote learning works just fine for cramming the basics, but tutorials in which you try to build or create something together should definitely not be online. I also learned that we should not position the Analytics Academy as an online teaching tool. Rather, we really excel at transferring high-quality knowledge to students face-to-face."

### Finally, a geopolitical point: in Europe, we build AI applications primarily on American and Chinese infrastructure. You think that's unwise?

"Unwise? It's stupid! Microsoft is a U.S. company, which means the U.S. government can request them to disclose all the data they have. We simply cannot stay in control over our own privacy, and one only needs to think back to WWII to remember how wrong this can go. Besides, this development may, at some point, push all high-level jobs to China and the USA, causing us to lose a lot of talent. This should be avoided at all costs. We have to build our own European alternatives for the Cloud and for AI algorithms. However, I am saddened to see that despite projects like GAIA X, Europe has nothing to offer. I am hopeful, though, that more people will realize that we are not headed in the right direction and that this realization will prompt them to build their own infrastructure."



### **Marc Salomon**

Professor Marc Salomon holds several positions, including Professor of Decision Sciences at the University of Amsterdam and Chairman of the Amsterdam Business School. Prior to joining the University of Amsterdam, Salomon was COO at law and notary firm Stibbe (2004-2013), COO and Director of Research at strategy consultant McKinsey & Company (1998-2004) and Director of the Center for Applied Mathematics at Rabobank (1996-1998). From 1996 to 2005, he also served as Professor of Operations Research at Tilburg University. Salomon studied Econometrics at VU University Amsterdam and received his PhD in Business Administration/Operational Research at Erasmus University Rotterdam.



## In ten years, AI leading and doctors supporting: reality or madness?

Folkert Asselbergs is a cardiologist at UMC Utrecht and is involved in several data collection and data analysis projects in the field of personalized medicine. In the near future, Artificial Intelligence (AI) will play a much bigger role in healthcare, including in hospitals. Asselbergs says: "At the moment, AI still plays a supporting role, but I think that ten years from now, AI will be in the lead and doctors will primarily support."

*Interview with Prof. Dr. Folkert Asselbergs, cardiologist and Professor Precision Medicine in Cardiovascular Disease at UMC Utrecht and University College London*

# THE HUMAN TOUCH

The past 18 months showed that healthcare planning is essential, especially in times of crisis. But data are not always readily available. Has the General Data Protection Regulation inhibited progress in data exchange?

Covid is the prime example of why healthcare needs to modernize, but red tape has started slowing development to the speed of molasses." Folkert Asselbergs does not hide his impatience. "AI is not widely used in healthcare yet, as many people do not yet see its added value. Part of the reason is that the Netherlands is very restrictive in using and sharing data for research. Making data available for research will be a game changer: it will allow for faster development of new and better algorithms and will boost innovation. Plenty of ideas are out there, the technology is ready, but the progress is not as fast as I would like to see it. I would like to urge the Minister of Health to amend legislation and regulations more quickly: now is the time for action. The government has to facilitate data exchange before the next pandemic presents itself."

AI now still plays a supporting role, but I think that ten years from now, AI will be in the lead and doctors will primarily support

Asselbergs often finds himself debating colleagues who are less convinced of the value of AI. "For single sources of data, such as ultrasounds, MRIs and CT scans, AI is already advanced, and developments are forging ahead at blistering pace. Integrating different data sources - particularly the unstructured text found in electronic health records - will take longer. AI now still plays a supporting role, but I sincerely think that ten years from now, AI will be in the lead and doctors will primarily support. We will still be the ones to talk to patients and make decisions about the suggestions put forward by AI, but I envision people coming into a car wash of sorts with imaging, biomarkers and wearable data, giving them a top five of the most likely diagnoses. These are then mapped to existing scientific knowledge about what the therapy of choice should be for these types of patients. It would almost turn doctors into consultants."

IN TEN YEARS' TIME, AI WILL BE IN THE LEAD AND DOCTORS WILL SUPPORT.  
WHAT DO YOU THINK:

## REALITY OR MADNESS?

Definitely a reality! **66%**

No, that's madness **34%**

Source: ORTEC's LinkedIn poll - 2021



# CAPILLARIES OF SOCIETY

Will patients accept this change? Or will they be wary of having an algorithm determine what is best for their health?

"Discussions often revolve around 'the human touch', but who is to say that AI isn't better at that, too? You can take my word for it, there are some boorish doctors out there, and all the complaints we get revolve around communication. You could really wonder whether people are truly more empathic than computers." The skeptical attitude to using AI adopted by many patients and colleagues can also be traced back to trust, or a lack thereof, in data, Asselbergs notes. "The feeling of: is it correct? A particularly telling example was a study that used deep learning on chest x-rays in the emergency ward. When they finally looked at the decisive feature of the prediction model, it turned out that the device used to take the images was the best predictor, because the Siemens device was used for bedridden patients and the Philips device for people who could still walk around. These are important pitfalls to consider, hence the call for explainable AI: you want to know what's under the hood."



Data from people in underprivileged social groups are rarely captured by algorithms, even though they're the groups the algorithms are used for most. That will be the most difficult challenge: getting to the capillaries of society. We are now considering the idea of a form of donor registration for data. If we don't change the data inclusion, inclusiveness will be unachievable.

Once the trust is there, we might be off to the races, especially when it comes to personal medicine: I think that patients will soon have their own Amazon or Microsoft or ORTEC platform that automatically retrieves all your information, if you give it permission, which you could then enrich yourself by adding DNA, biomarkers or a scan. That's where algorithms are headed, but where are the risks? You share your results with a doctor to ask them their opinion, and even this doctor will, likely, have been chosen by AI." With all these new technological possibilities, Asselbergs does foresee problems with regard to the different groups in society: "Data from people in underprivileged social groups are rarely captured by algorithms, even though they're the groups the algorithms are used for most. That will be the most difficult challenge: getting to the capillaries of society. We are now considering the idea of a form of donor registration for data. If we don't change the data inclusion, inclusiveness will be unachievable."

What developments can we expect in the shorter term? And to what extent does the Medical Device Regulation still raise practical issues for these types of AI applications?

The big med-tech behemoths are coming and will focus mainly on prevention. They will steer clear from the curative side of things at first, because it is considerably more complex, due in part to the Medical Device Regulation. Besides, there is simply not as much money to be made there. We will all have to discover how developments in hospitals unfold together. The platform economy is already upon us: whoever has the platforms with the biggest user base, wins. You don't necessarily need to have the better product: scale is what matters. It's a shame, to be honest, because it does slow down innovation."

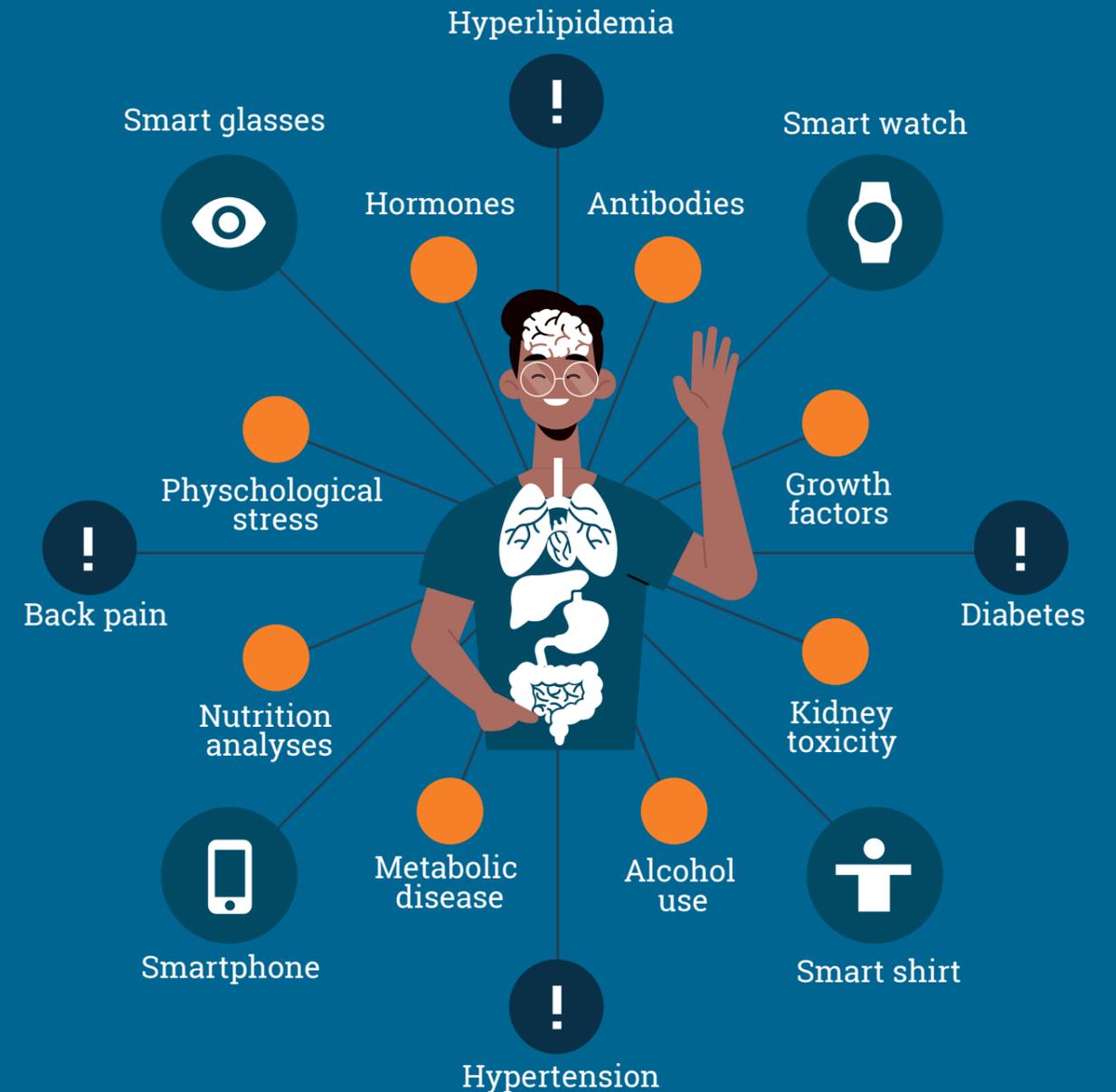
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# THE WHOLE PATIENT



University College London, where Asselbergs is a part-time professor of Precision Medicine, employs data managers for each of its divisions. Data scientists are mostly involved in the research side of healthcare, but Asselbergs can hardly imagine not having a data scientist in his department in ten years' time: "Someone who, when we discuss patients during the morning handover, can chart the optimal course based on the data. Data scientists are far from having the final say, but AI support will come to play an increasingly important role in healthcare decision-making." He believes the most important thing AI will

bring to healthcare is patient empowerment, thanks to the democratization of data. "The experience and knowledge gap between patients and doctors is enormous, including data knowledge. We speak our jargon and wear a white coat, all of which creates distance. That distance will soon disappear because patients will know exactly what I know. The USA is miles ahead of the Netherlands in terms of general knowledge of anatomy and which doctor to see. In the Netherlands, people tend to think: you have a degree, you decide."



If there's one sector that can benefit from the increasing availability of more data and better AI, it's healthcare. Wearables and smartphones generate more and more medical data than can be used for preventative measures and treatment plans. Databases containing information on large numbers of patients can be used for personalized medicine. That changes the role and business model of healthcare providers. Instead of treating existing medical issues, they will increasingly use data and AI to prevent problems, or treat them in earlier stages.

Have medical schools incorporated these new insights about AI in their programs?

"Most have not. That's why the DataClinics program is working on a Data Science basics curriculum for healthcare professionals. We need to prepare healthcare professionals for the future. Specialisms are still very traditional and organ-centered, but that will change, and the question is whether specialisms as we know them will be around for much longer. I think technical medicine is the profession of the future: it'll prove to be essential. Doctors will still need to do their rounds and listen to patients, but they will have to become communication experts or consultants, reasoning more from the perspective of the human being they are treating rather than their organs. You could consider incorporating an internist into the surgery department, for instance, to help optimally treat patients with multimorbidity. At the same time, that internist will be able to harness U-Prevent to tackle prevention issues, so that the GPs no longer have to. Now that the patient is in hospital anyway, why not give them a quick check-up and treat their high blood pressure while they're here? Hospitals can still be very siloed at times. With our new strategy, we get to see a much clearer picture of patients even before they come in for surgery. We treat the whole patient: while you're here to get a new hip, we'll treat your cholesterol at the same time. It's an approach that makes a lot more sense.



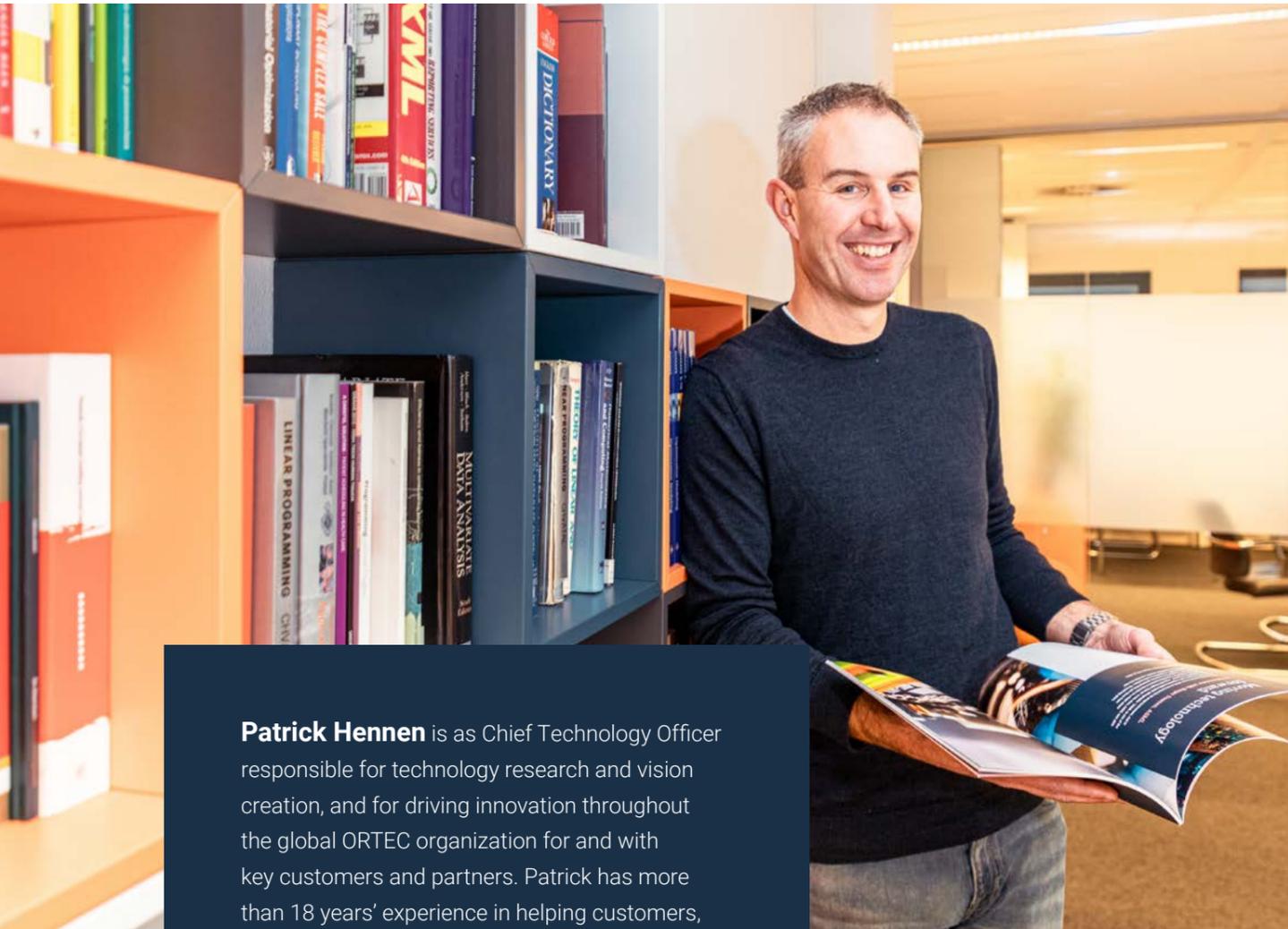
AI now still plays a supporting role, but I think that ten years from now, AI will be in the lead and doctors will primarily support



### Folkert Asselbergs

Professor Folkert W. Asselbergs has been working at UMC Utrecht as a cardiologist since 2010. He specializes in diagnosing hereditary cardiomyopathy and heart failure. Since 2013, he has also held a part-time position at the Institute of Cardiovascular Science and Institute of Health Informatics, University College London as Professor of Precision Medicine. Asselbergs has been head of Circulatory health at UMC Utrecht for two years and chair of the Data Infrastructure pillar of the Dutch CardioVascular Alliance. In addition, he researches how genetic information and other data can be (re)used to individualize diagnostics, risk prediction and treatment of cardiovascular diseases.

# Thinkers in Digital Transformation



**Patrick Hennen** is as Chief Technology Officer responsible for technology research and vision creation, and for driving innovation throughout the global ORTEC organization for and with key customers and partners. Patrick has more than 18 years' experience in helping customers, like Shell and KLM, to make better decisions combining his passion for mathematics and technology.

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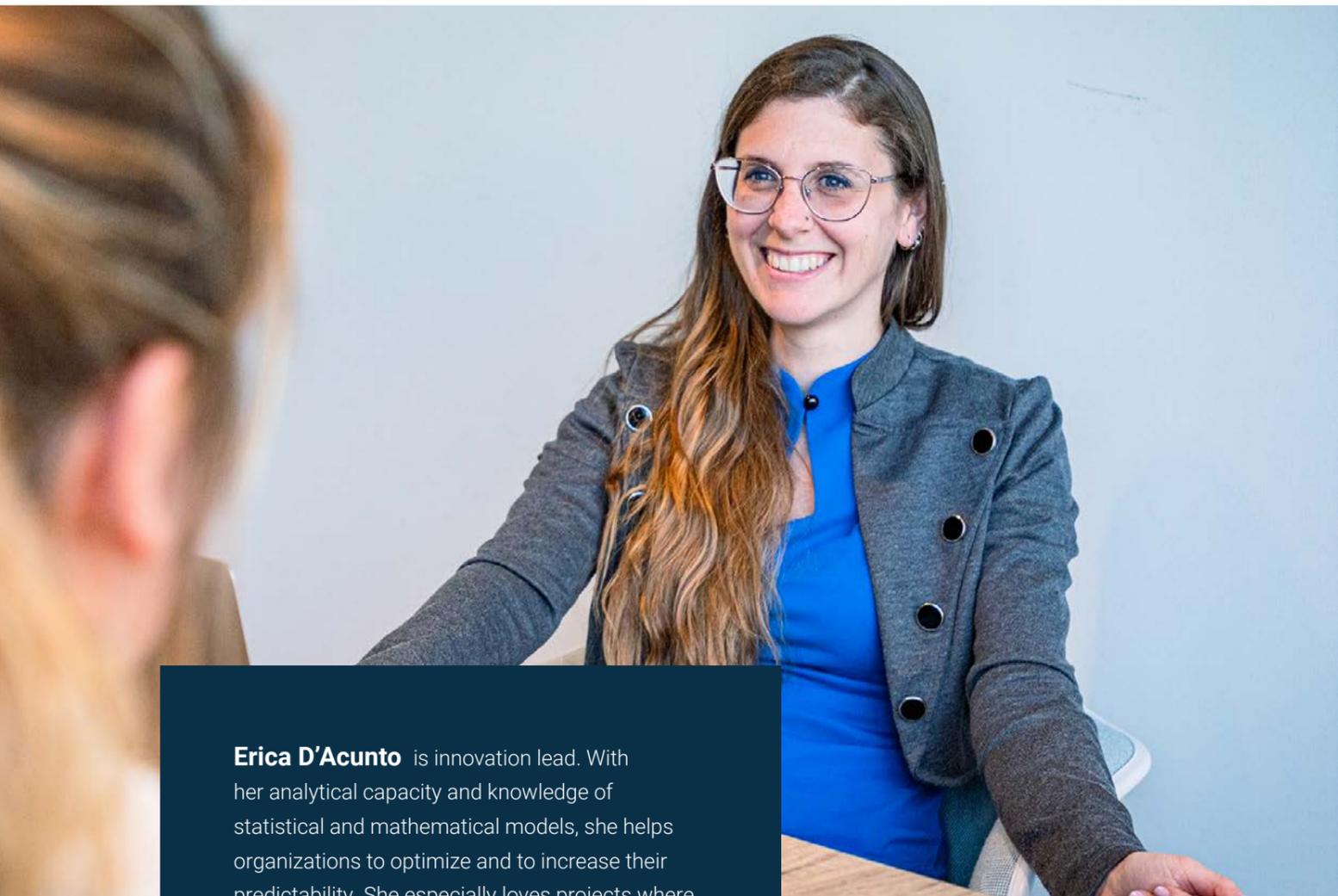
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**Rianne Langenberg** is Managing Consultant and Business Strategist, specialized in digital strategy, change management and process design. Rianne has supported a variety of organizations, like Achmea, in shaping and accelerating their digital transformation, aiming to not just improve but to renew.

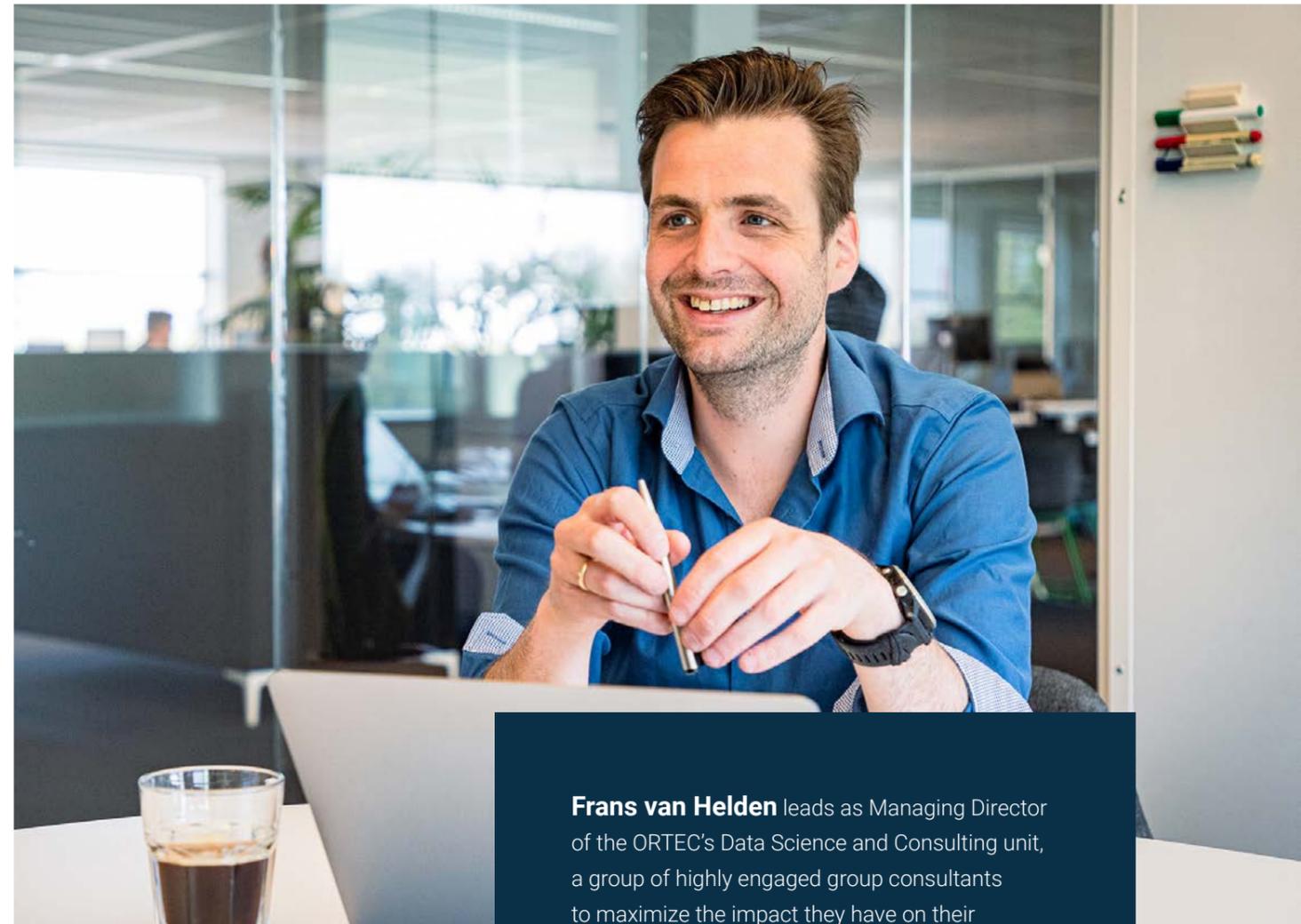
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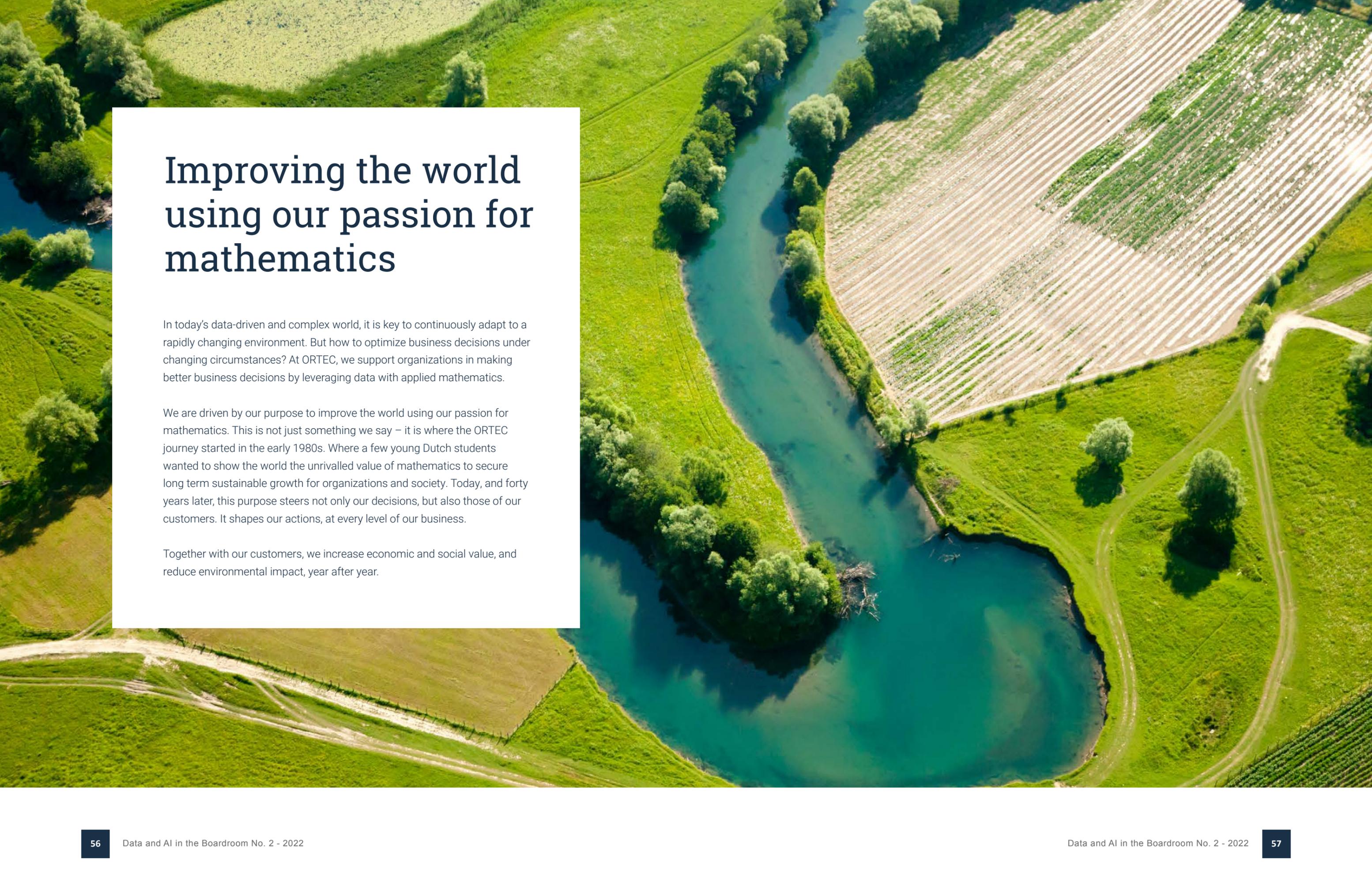
**Erica D'Acunto** is innovation lead. With her analytical capacity and knowledge of statistical and mathematical models, she helps organizations to optimize and to increase their predictability. She especially loves projects where technology and business come together. Her vast experience and her critical mindset make Erica perfectly capable of looking beyond the hype, spotting innovative developments, and approaching a challenge from multiple angles.

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**Frans van Helden** leads as Managing Director of the ORTEC's Data Science and Consulting unit, a group of highly engaged group consultants to maximize the impact they have on their customers. Frans advises Dutch and international multinationals, like ASML and Huntsman, based on a thorough knowledge of algorithmic optimization, analytics and applications in various business areas and businesses.

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# Improving the world using our passion for mathematics

In today's data-driven and complex world, it is key to continuously adapt to a rapidly changing environment. But how to optimize business decisions under changing circumstances? At ORTEC, we support organizations in making better business decisions by leveraging data with applied mathematics.

We are driven by our purpose to improve the world using our passion for mathematics. This is not just something we say – it is where the ORTEC journey started in the early 1980s. Where a few young Dutch students wanted to show the world the unrivalled value of mathematics to secure long term sustainable growth for organizations and society. Today, and forty years later, this purpose steers not only our decisions, but also those of our customers. It shapes our actions, at every level of our business.

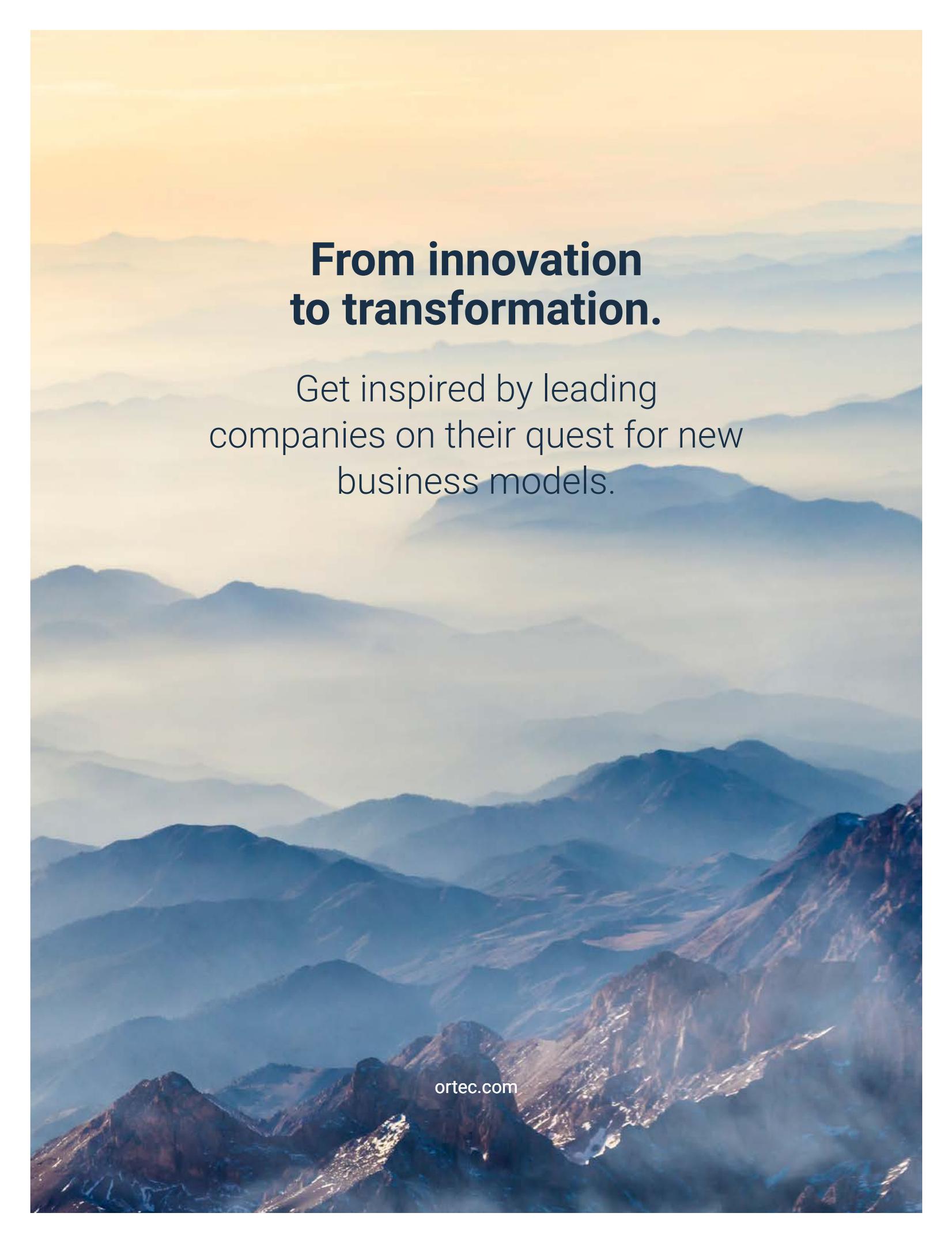
Together with our customers, we increase economic and social value, and reduce environmental impact, year after year.

Data and AI in the Boardroom is an ORTEC magazine to support senior executives to cope with the challenges, opportunities and risks of data and artificial intelligence, enhancing decision-making to secure long-term, sustainable growth in today's fast-changing world.

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