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ISSUE NR. 1

ida

THE VOICE OF DECISION SCIENCE ALLIANCE

NAVIGATING COMPLEXITY EMPOWERING DECISIONS

**NEXT GEN LEADERSHIP:
AUTONOMY AND CREATIVITY**

**AI AT THE HELM:
SHAPING ENERGY,
QUANTUM INNOVATION,
AND A GREENER PLANET**

**AI AGENTS:
THE BACKBONE
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**THE GROWTH OF AI
AND ITS IMPLICATIONS**



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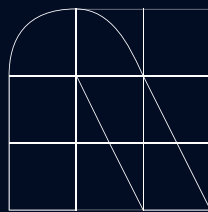
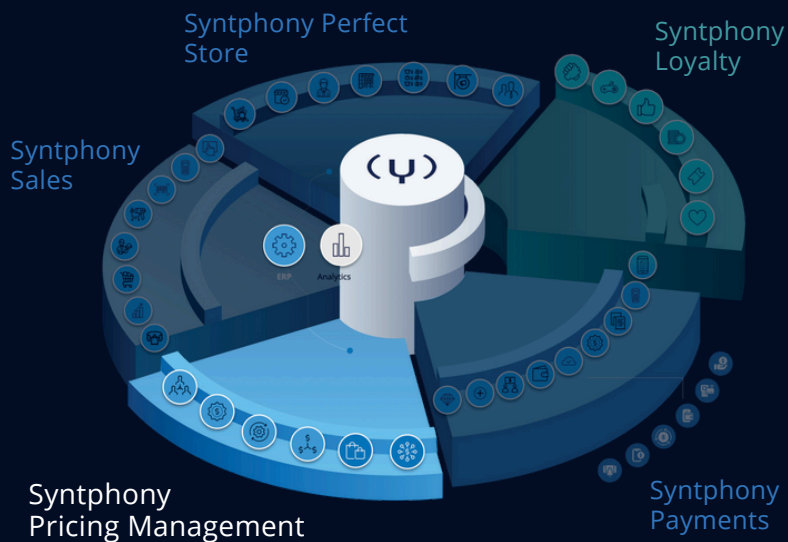
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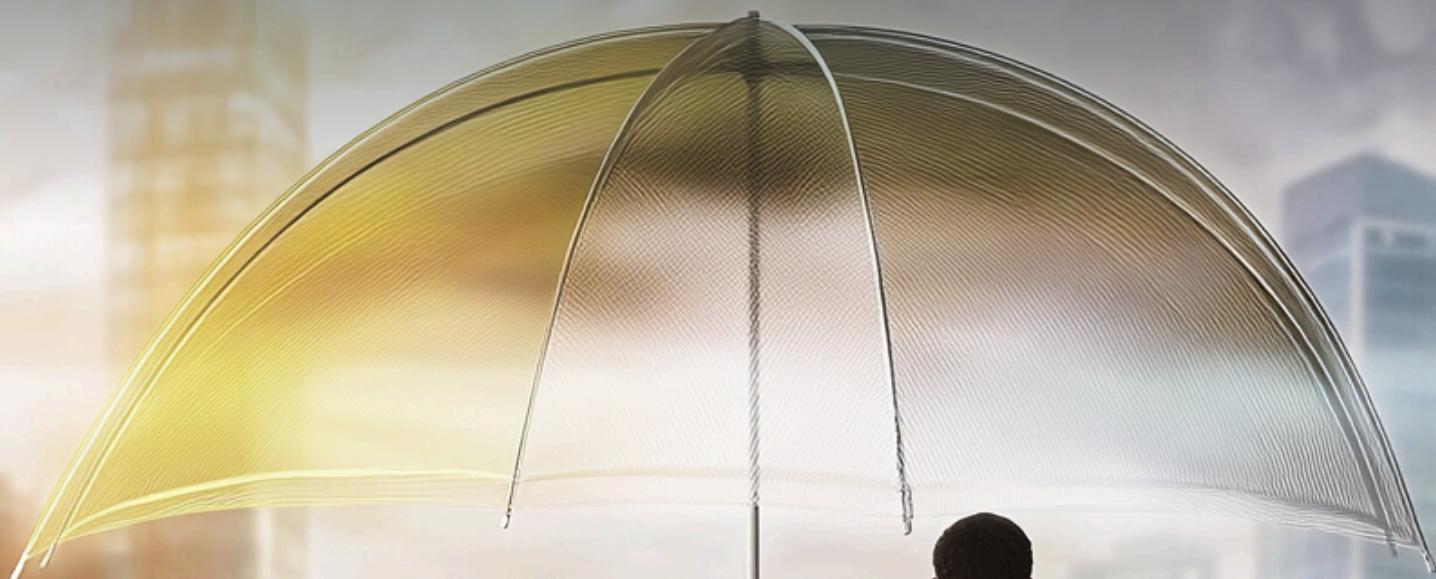
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THE VOICE OF DECISION SCIENCE ALLIANCE

IDA magazine is published by Decision Science Alliance, the global community that empowers organizations and individuals to navigate complex challenges through cutting-edge decision science. By fostering innovation, collaboration, and applied research, the Decision Science Alliance bridges theory and practice to drive impactful solutions across industries and disciplines.



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NAVIGATING THE NEW FRONTIERS OF AUTOMATION AND AUTONOMY

by **Luca Lisci**

Welcome IDA Magazine issue nr.1. As we step into 2025, the convergence of creativity, technology, and autonomy has never been more profound. At this pivotal moment, we stand on the brink of a new era—one that demands both bold vision and critical reflection.

This year will see AI innovations expand from tools of automation to full-fledged AI agents capable of complex, multi-step reasoning. These agents, unlike traditional AI systems, don't just assist—they autonomously act, solve, and decide. From Devin, the AI-powered junior developer, to autonomous video-editing tools, precision and reliability are now more critical than ever. A minor error in any step can disrupt the entire workflow, which is why individuals and companies are increasingly willing to invest in these autonomous systems, some costing upwards of \$500 per month .

Think of it like this: the very nature of labor is changing. AI agents are no longer being compared to software applications but to human employees. Companies are envisioning a future where a single senior developer could manage an army of AI-powered “junior colleagues,” accelerating productivity while reducing operational costs. The implications? Workforces will evolve, organizational structures will adapt, and our understanding of collaboration—between human and machine—will shift irreversibly.

At the same time, AI's role in energy efficiency, healthcare, and even quantum computing is reaching new heights. Real-time AI optimizations are already reducing energy consumption in buildings by double-digit percentages, while companies like Alphabet push the boundaries of hardware with quantum chips capable of surpassing today's supercomputers. Innovations like these are no longer abstract—they're here, now, ready to reshape industries at scale .

But this is where we must pause and reflect. Observing the evolving intersections of art, technology, and strategy, a deeper realization takes hold: the true challenge ahead lies not just in building ever more powerful technologies, but in ensuring they are guided by purpose and responsibility. Technical brilliance alone is no longer enough. As AI and autonomous systems increasingly shape industries, creativity, and even human relationships, the values we embed into their design will determine whether they amplify progress or deepen divides.

This moment calls for careful thought, shared dialogue, and a clear vision for what we choose to create.

AI isn't just transforming businesses. It's redefining the boundaries of what's possible—across sectors, disciplines, and human imagination. Yet, as its capabilities surge, so do the risks of misuse, bias, and over-reliance. If we are to welcome autonomous agents into our workflows, we must also demand transparency, accountability, and fairness in their design.

In this issue of IDA Magazine, we explore:

How AI agents are poised to become the backbone of creative industries.

The rise of “long-thinking” AI models designed for more precise, thoughtful reasoning.

AI-driven innovations in energy, quantum computing, and sustainable technologies.

What it means to lead in a world where autonomy and creativity merge seamlessly.

Alongside these explorations, we bring you exclusive interviews with key voices shaping the future of decision science. This issue hosts insights from members and partners of the Decision Science Alliance, as well as influential personalities from the world of business, technology, and innovation. These are the leaders who are actively bridging AI's potential with real-world impact, offering perspectives that are both grounded and visionary.

The challenge—and opportunity—of 2025 lies in embracing AI not as a replacement but as a partner. A partner in work, in creation, and perhaps, even in thought. It is up to us—entrepreneurs, artists, innovators, and educators—to ensure these systems amplify our humanity, not diminish it.

As we turn the first page of this exciting journey, I invite you to think deeper, push further, and question everything. The future of AI isn't something we'll simply observe—it's something we'll actively shape.

Welcome to the new frontier.



Luca Lisci
Editor-in-Chief
IDA Magazine

A TIDAL WAVE OF TRANSFORMATION: THE AI ERA AND OUR HUMAN RESPONSIBILITY

by **Raffaele Maccioni**

The artificial intelligence wave is upon us—a tsunami of innovation that is as exhilarating as it is disorienting. This transformative force touches every corner of our society, sweeping through small businesses, public organizations, and global corporations alike. But beneath the vast infrastructure of systems and entities lies the beating heart of this revolution: real people. Decision-makers, entrepreneurs, researchers, and professionals are tasked with understanding and wielding these powerful tools responsibly.

Having spent much of my professional life navigating the intricate realms of algorithms and models, I've come to appreciate the enduring value of understanding human nature. Over the summer, I engaged in thought-provoking discussions with colleagues and friends about the juxtaposition of AI's power and human fragility. A recurring question emerged: Can AI evolve to be like us, to become human?

Let me share my perspective. The invention of engines and tractors didn't diminish the worth of humanity; it elevated our productivity while leaving our intrinsic value untouched. Similarly, the assembled atoms forming these tools didn't acquire humanity by association. AI, crafted by human hands, remains an assembly of algorithms and components. While it might simulate emotions or replicate behaviours, humanity remains the protagonist of its narrative, carrying the profound responsibility of directing AI to alleviate suffering, restore our planet, and elevate the quality of research and innovation.

At the Decision Science Alliance (DSA), we recognize this duality. Our technical and managerial expertise provides a solid foundation, but we also embrace the strategic discussions necessary to give context and meaning to our work. This September marked the start of a new chapter for the DSA, launching with IDA Magazine's first full issue after its successful pilot at the International Summer Conference 2024 in Valencia.

Together with the DSA management team, we are committed to making the Alliance a practical and inspiring resource for all members. Whether you are a researcher, entrepreneur, or practitioner, we aim to enhance your decision-making capabilities with cutting-edge models and algorithms. We also invite you to contribute to a bold dream: building an open-source community to develop a discrete stochastic simulation engine, designed to thrive from the cloud to the edge.

This year is one of action and collaboration. Your ideas and contributions are vital to shaping the DSA as a force for positive change. Together, let's ensure that amidst the AI tsunami, humanity remains at the helm—empowered, inspired, and visionary.



Raffaele Maccioni
DSA President



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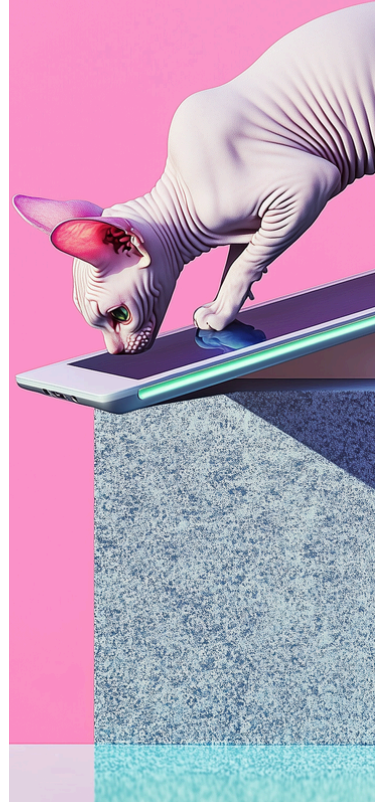
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LEADERSHIP ENGINEERED BY CURIOSITY

In a compelling discussion, **Alessandro Carissimo**—an engineer turned visionary business leader—delves into his journey, offering insights and a forward-looking perspective. From pioneering advancements in semiconductors to spearheading multi-billion-dollar ventures at Siemens, he reflects on the dynamic interplay of technology, leadership, and innovation.

Interview by **Luca Lisci**



Alessandro, thank you for being here today. I'm very happy to explore this conversation together. Before we dive into things, let's give some context to our readers. How would you describe yourself, your work, and this incredible journey so far?

First of all, Luca, grazie for inviting me. Let's say I'm an engineer at heart. What does that mean? I've always wanted to understand how everything works — machines, processes, or businesses — and once I understand, I can't help but try to fix it and make it better.

My journey started in high-tech semiconductors, and later I moved into startups. I founded two companies — one failed to get funding, but the second succeeded in Europe. From there, I joined the world of medical diagnostics at Siemens. That's where I led significant R&D integration after Siemens acquired three companies, and I eventually oversaw multi-billion-dollar business units.

I spent my career at the intersection of engineering, innovation, and business leadership, and now here I am in Europe, exploring new opportunities and helping wherever I can.

The way you blend deep technical knowledge with leadership in large organizations is impressive. You talked about leading the integration of three companies at Siemens — a mammoth task. What are the key challenges of driving innovation and change at such a massive scale?

That experience was monumental, Luca. Let me break it into three main challenges.

First, there's the product portfolio harmonization. When three companies come together, each brings its own products and strengths. For example, in blood diagnostics, every system can handle around 100 tests, but they are rarely the same 100 tests. So, the challenge is figuring out which tests to prioritize, which ones to combine, and where to invest millions of dollars in future development.

Then, you have infrastructure and IT integration. Each company comes with its own systems — financial software, inventory management tools, and engineering platforms. Siemens' approach was to let the three companies negotiate and decide which system was the "best," but this took nearly four years. From my perspective, imposing a single standard from the start would have been faster and ultimately more efficient, as opposed to endless debate.

Finally, there's the issue of culture. This is by far the hardest to manage. You can't impose one monolithic "company culture" on thousands of people across different countries and contexts. Instead, you need to focus on creating strong leadership teams while allowing local cultures to thrive. A centralized culture can exist at the leadership level, but every site, every location will have its own unique way of working.

You mentioned Siemens' move into diagnostics and the vision to integrate imaging, blood tests, and patient data. This feels like a glimpse into the future of healthcare. Where does AI fit into this transformation?

AI is central. Healthcare is getting so complex that doctors alone can't process all the information available. Siemens had a vision: combine patient imaging, blood test data, and electronic health records to provide actionable insights for doctors. For example, if a patient has heart disease, diabetes, and COVID-19, AI can analyze thousands of similar cases to suggest the best treatment options based on outcomes.

Another critical area is predictive diagnostics. During COVID-19, we developed an AI-driven algorithm using six blood parameters. It could predict with high accuracy whether a patient would need a ventilator. That insight helped doctors prioritize care.

The same approach applies to diseases like Alzheimer's and diabetes. These conditions require looking at multiple biomarkers in combination, rather than a single clear indicator. AI brings all those data points together to create probabilities and insights that would otherwise take years to analyze manually.

That's extraordinary — using AI to save lives through smarter data analysis. Let's shift gears a bit. You also spoke about laboratory optimization, which sounds both technical and practical. Can you expand on that?

Of course. Let's imagine a mid-sized hospital laboratory that runs hundreds of blood tests daily. Each test takes a different amount of time — some might require 10 minutes, others as long as 40 minutes. To complicate things, each instrument can only run a limited number of tests simultaneously.

The problem gets even more complex because some tests, like those for rare conditions, might only be run once a week, while others, like standard screenings, are run hundreds of times a day. You can't mix certain samples, such as HIV and hepatitis, due to contamination risks.

AI can optimize this entire scenario. It can determine how to prioritize tests, schedule runs efficiently, and ensure that resources are used to their full capacity. Ultimately, this saves time, reduces costs, and improves accuracy.

That ties perfectly to another area you mentioned — tenders and contracts for diagnostic equipment. It's a mix of strategy, finance, and negotiation, isn't it?

Absolutely. Hospitals and governments issue tenders worth millions, requesting hundreds of tests and associated equipment. The challenge is knowing how to price your offer.

Optimizing bids is incredibly complex because there are so many variables. You have the upfront equipment costs, ongoing maintenance fees, consumable pricing, and the cost of service visits. Sometimes, you can offer a competitive price on one test while charging slightly more for another to balance the margin.

AI can transform this process by analyzing historical data, identifying trends, and helping sales teams optimize bids. It's about finding the sweet spot between being competitive and maintaining profitability.

That's a brilliant insight into how AI can impact not only healthcare but business operations. Speaking of impact, you've also mentioned another critical challenge: spotting financial trends in global markets. How do leaders like yourself identify opportunities or risks across regions?

Leaders need real-time visibility into performance. Take Europe, for example. Suppose Germany suddenly shows a spike in diagnostic equipment sales. Is this a sustainable trend or just a one-off event?

AI can analyze regional performance, highlight anomalies, and identify shifts before they become obvious. This allows leaders to act quickly and confidently. It's about cutting through the noise and seeing the bigger picture.

Alessandro, this conversation has been incredibly insightful — we've explored innovation, AI, and leadership through your vast experience. Before we close, is there one key lesson you'd like to share with our readers, especially the younger generation?

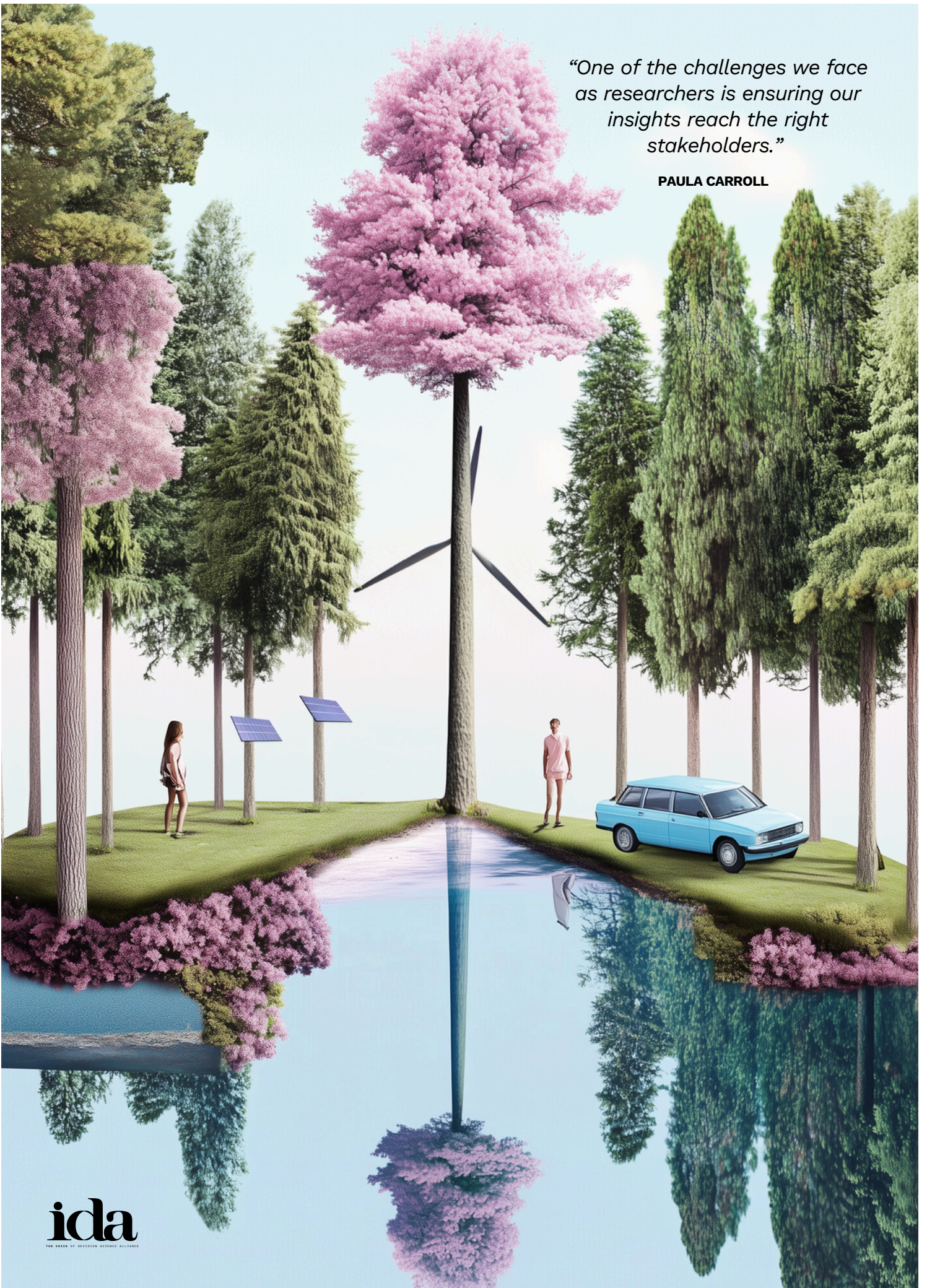
Yes. Stay curious. The world is changing faster than ever, and technology — especially AI — is transforming every industry. Embrace complexity. Learn to analyze data and see the big picture. And most importantly, collaborate. Innovation happens when diverse minds come together.

I couldn't agree more. Thank you, Alessandro, for sharing your story, insights, and vision. It's been a privilege to learn from your experience.

Grazie, Luca. It's been a pleasure to reflect on this journey with you.

*“One of the challenges we face
as researchers is ensuring our
insights reach the right
stakeholders.”*

PAULA CARROLL



SMART GRIDS AND DECISION SCIENCE FOR A SUSTAINABLE ENERGY FUTURE

Presenting her recent research, **Paula Carroll** shares her journey from electrical engineering to operations research, driven by a passion for problem-solving and sustainability. She reflects on the challenges of the clean energy transition, the role of smart grids in stabilizing electricity demand, and the critical importance of interdisciplinary collaboration in shaping a sustainable energy future.

Interview by **Matteo Panero**

Hi Paula, thank you for being here today. To start, it's always fascinating to understand the path that brings experts like you into such specific fields. Could you share a bit about your academic and professional background? Was there a particular moment or experience that sparked your interest in smart grid research?

I began my journey as an electrical engineer here in Ireland, driven by my love for math. At the time, I didn't know much about engineering or even higher education, but I was drawn to the problem-solving aspect of the field. I worked in the utility sector during the 1980s, back when the industry was dominated by a single monopoly. That gave me a deep understanding of electricity networks and their challenges.

After taking a career break to raise my children, I faced difficulties re-entering engineering, so I transitioned into computer science, which eventually led me to operations research. This shift felt natural, as operations research combines mathematical modeling with practical applications—exactly the type of work I enjoy. Over time, my background in electrical engineering reconnected me with challenges in the energy sector, particularly around the clean energy transition.

The need for sustainable solutions has grown increasingly urgent, and it's an area full of both opportunities and complexities. For example, understanding how to meet ambitious sustainability goals while ensuring practical feasibility is a challenge that requires interdisciplinary expertise. That's what keeps me motivated in my research today.

Your background is so rich and diverse—it's clear how much expertise you bring to this field. Speaking of sharing knowledge, you recently attended the International Summer Conference in Valencia. How was your experience there, and what stood out most for you?

The Valencia conference was a fantastic experience. One of my collaborators recommended it, and I was immediately drawn to the event because of its focus on bridging academia and industry. I submitted a paper in collaboration with colleagues from Ireland and across Europe, and I was excited to present our findings to such a diverse audience.

What I found particularly valuable was the opportunity to hear from industry professionals about their perspectives on emerging technologies like AI and large language models. As someone rooted in academia, it was eye-opening to see how these innovations are being interpreted and applied in practice.

Moreover, the conference emphasized interdisciplinarity, bringing together experts from various fields within decision science. That's what made it so enriching—it wasn't just about sharing my own work, but also learning from others and finding potential avenues for collaboration

That blend of academia and industry seems to align perfectly with your own work. Let's talk about the research paper you presented recently. Could you give us an overview of the key issues it addresses?

The paper delves into one of the critical challenges of the clean energy transition: understanding how residential electricity users adopt low-carbon technologies like electric vehicles (EVs), heat pumps, and photovoltaic (PV) panels. These technologies not only influence individual electricity consumption but also have broader implications for grid stability and capacity planning.

To explore this, we utilized data from a trial conducted by the utility regulator in Ireland. The dataset, though a bit dated, provided insights into consumer behavior using smart meters. From this data, we developed reference load profiles, which are essentially baseline patterns of electricity usage. These profiles are crucial for identifying how demand fluctuates and planning necessary upgrades to the low-voltage distribution network.

Our findings highlight the need to prepare for a future where these technologies are widespread. For example, as more households adopt EVs or heat pumps, peak electricity demand will change significantly. Anticipating these shifts is vital to ensuring the grid can handle new pressures without compromising service reliability.

That's fascinating. It seems like understanding these patterns is essential for managing the transition to cleaner energy systems. Specifically, how do smart grids help in making electricity management more reliable and efficient?

Smart grids play a transformative role in modernizing electricity systems. Let me give you an example. When EV owners return home in the evening, they often plug in their cars to charge, coinciding with other peak activities like cooking and heating. This simultaneous demand creates a spike in electricity usage, which can strain the grid significantly.

Smart grids address this by enabling demand-side management. For instance, users can plug in their EVs, but the charging process might be delayed until off-peak hours, such as late at night. This not only stabilizes the grid but also ensures a more efficient use of resources.

The same concept applies to other technologies, like heat pumps. With the right infrastructure, smart grids can schedule energy consumption based on demand patterns, ensuring that homes remain comfortable while avoiding unnecessary stress on the grid. Essentially, these systems automate decisions that would otherwise be overwhelming for individual users, making energy management seamless and effective.

This transition to smarter systems really does represent a major shift from traditional grids. If we focus on Europe, how do smart grids compare to conventional systems in adapting to changing electricity demands?

Traditional grids were designed with a one-way flow of electricity, from centralized power plants to consumers. In contrast, smart grids support decentralized energy production, where electricity can flow in multiple directions.

Take PV panels, for example. A household with solar panels might generate excess electricity during the day. With a traditional grid, this energy would go unused. But in a smart grid, it can be fed back into the system or stored in batteries for later use. Additionally, smart grids enable services like frequency regulation and demand response, which are essential for maintaining grid stability as renewable energy sources become more prevalent.

This flexibility is a game-changer, especially as we move toward a more sustainable energy future. It empowers communities and individuals to actively participate in energy markets, whether by selling electricity or providing grid services.

Let's talk about the practical applications of your work. How do you see your research influencing energy providers and policymakers?

One of the challenges we face as researchers is ensuring our insights reach the right stakeholders. For example, in Ireland, we have a relatively small network of energy providers and regulators, which makes it easier to connect with decision-makers. However, translating academic findings into actionable policies remains a complex task.

Our work on reference load profiles provides a foundation for designing better pricing strategies and infrastructure upgrades. For example, utility providers can use these profiles to create time-of-use tariffs that incentivize consumers to shift their energy usage to off-peak hours. Similarly, policymakers can rely on our findings to prioritize investments in grid modernization. This is why, for example I joined DSA's Event in Valencia [*Editor's note: The annual Conference of Decision Science Alliance*] to engage with a broader audience, including industry professionals and policymakers. Events like this are crucial for bridging the gap between research and real-world application.

We've discussed a lot of the immediate implications of your work, but I'd love to hear your thoughts on the bigger picture. How can decision science help address global environmental challenges in the coming years?

Decision science has immense potential to drive sustainable change, but it requires collaboration across disciplines and sectors. At its core, decision science provides the tools to model complex systems, optimize solutions, and generate actionable insights.

Looking ahead, I believe the focus should be on community-level initiatives. For example, at University College Dublin, we have a Sustainable Energy Community group that promotes knowledge sharing and collective action. These initiatives can address challenges like energy poverty while building trust in new technologies.

Moreover, decision science must prioritize accessibility. It's not enough to create sophisticated algorithms; we need to ensure they are understandable and usable for the end-users—whether they are policymakers, energy providers, or individual consumers. By connecting insights to tangible benefits, such as cost savings or reduced carbon footprints, we can encourage broader adoption of sustainable practices.

SMART GRIDS AND DECISION SCIENCE FOR A SUSTAINABLE ENERGY FUTURE

interview to **Paula Carrol**



ACTIONABILITY AND THE FUTURE OF AI IN ORGANIZATIONS

In this insightful conversation, **Massimo Mistretta**—a leader at the intersection of AI and organizational transformation—shares his expertise on the growing importance of actionability in AI. Drawing from his experience in both technology and business, Massimo discusses how AI is reshaping industries and the collaborative power between humans and machines. He highlights the importance of open-source technology and offers a forward-thinking perspective on how AI will evolve, especially in the context of startups and large enterprises

Interview by **Raffaele Maccioni**

Massimo, thank you for being here today. Let's talk about artificial intelligence, a topic that is being discussed across all sectors and at every level within organizations. AI is often associated with algorithms that promise to help us, but for these algorithms to truly help, they must be actionable. Your work and your company focus heavily on actionability within organizations. Could you explain why this is so strategic?

Thank you, Raffaele. It's a pleasure to be here and to discuss such a critical topic. Actionability in AI is essential because it's what transforms insights into tangible outcomes. My perspective on this stems from how I see the world—I tend to notice signals everywhere. These signals, when processed or transformed, result in outputs that often become new signals themselves. But for these outputs to have real value, they need to be actionable.

Actionability comes from the ability of either humans or machines to interact effectively with these signals. Many actions can now be fully automated, thanks to advancements in AI. Historically, automation was rule-based, as seen in robotic process automation (RPA). However, today, AI adds cognitive capabilities to these processes, enabling a deeper, more nuanced level of automation.

This creates a collaborative environment where humans and machines work together in a symbiotic relationship. Machines handle repetitive, data-intensive tasks, while humans focus on strategic decision-making and creative problem-solving. This balance is the cornerstone of actionability in modern organizations.

That's an insightful perspective. Shifting gears slightly, I know you are a strong advocate for open-source technology. Why do you believe open source is so important, and what role do you see it playing in the future of AI?

My belief in open source comes from observing its historical success. If we look at the evolution of technology, open-source solutions have consistently outperformed their closed

-source counterparts in certain critical areas. Take, for example, the internet—it runs largely on Apache servers, which are open source. Before this, the space was dominated by closed-source solutions. This success is rooted in collaboration. Open source allows multiple entities, often with diverse goals and approaches, to work together and create something far greater than what could be achieved in isolation. It may appear disorganized on the surface, but the collective effort generates immense power and innovation.

In the context of AI, we're already seeing a significant move toward open source. Many AI tools and frameworks being developed today are open source, making them accessible to a global audience. This trend is accelerating, and I expect it to shape the future of AI development. Regulation will also play a role in this evolution. While I believe there should be oversight, it should focus more on the applications of AI rather than restricting the underlying science, mathematics, or models. Open-source innovation, coupled with thoughtful regulation, will drive progress in a responsible and inclusive manner.

Let's return to actionability. In your experience, are there specific markets or sectors that are more mature and better prepared to adopt these technologies?

That's an excellent question. Compared to previous technological trends, such as social networking or blockchain, AI has scaled much faster and reached a broader audience. This rapid adoption has been driven by advancements in computing power and the increasing availability of AI tools.

What's remarkable is how AI has permeated virtually every industry—small businesses, large corporations, and everything in between. There's no longer a clear divide between "mature" and "immature" markets. Everyone, regardless of scale or sector, is exploring how AI can improve their processes.

However, some industries, such as finance and healthcare, have been quicker to adopt AI due to the immediate and measurable benefits it offers. For instance, AI's ability to process large datasets, detect patterns, and automate decision-making is transforming how these industries operate. That said, the speed and breadth of AI adoption mean that even unexpected sectors are now exploring its potential.

To conclude, I'd like to hear your thoughts on startups versus large enterprises in the AI space. What is the value of a startup compared to a multinational corporation when it comes to delivering solutions?

That's a fascinating comparison. Larger organizations tend to be more structured and resource-rich, which gives them a certain stability. However, this structure also makes them slower to adapt to change. For example, implementing a new AI-driven process in a multinational corporation can take significant time due to the layers of approval and integration required.

Startups, on the other hand, are inherently agile. Their lean structure allows them to respond quickly to market changes and pivot when necessary. This adaptiveness is a double-edged sword—it's a strength in fast-moving markets but can be a challenge in highly regulated or resource-intensive industries.

What makes startups particularly valuable in the AI space is their ability to innovate without being constrained by legacy systems or bureaucratic processes. They can experiment, fail fast, and iterate, which is crucial when dealing with cutting-edge technologies like AI.

In situations where rapid adaptation is essential—such as responding to emerging trends or shifting customer demands—startups often have the upper hand. Their ability to pivot and deliver tailored solutions makes them invaluable players in the AI ecosystem.

“over the next five to ten years, decision science will increasingly leverage AI tools and machine learning algorithms, leading to better-informed decisions.”

CANAN GUNES CORLU



SUPPLY CHAIN UNDER THE CATASTROPHE

In this engaging interview, we have the pleasure of speaking with **Canan Gunes Corlu**, Associate Professor at Boston University's Metropolitan College. With a PhD in operations management from Carnegie Mellon University, Canan has a wealth of expertise in supply chain and operations management. In this conversation, she shares her experiences at the International Summer Conference organized by the Decision Science Alliance, her work on risk mitigation strategies in supply chains during catastrophic events, and her vision for the future of decision science, particularly in the context of Industry 4.0 and digital transformation

Interview by **Matteo Panero**

Hi Canan, thank you for accepting this interview. To start, could you introduce yourself and share a bit about your academic and professional background?

Sure, my name is Canan Gunes Corlu, and I am currently an associate professor in the Administrative Sciences department of Metropolitan College at Boston University. I received my PhD in operations management from the Tepper School of Business at Carnegie Mellon University in 2010. Before joining Boston University in 2012, I was an assistant professor in the Industrial Engineering department at Bilkent University in Turkey. My areas of expertise are operations management and supply chain management, where I've been teaching and conducting research for quite some time now.

Moving on to your paper, which focuses on supply chain risks during catastrophic events, why do you believe it's crucial for companies to start paying more attention to these risks?

Catastrophic events, particularly natural disasters, were once rare, but unfortunately, we are seeing them more frequently. A recent example is Hurricane Helen in Florida, followed by Hurricane Milton just a few weeks later. These events have devastating consequences for companies—they can completely halt supply chain operations, leading to billions of dollars in damage, and in some cases, pushing companies toward bankruptcy. We have unfortunate examples of this from the past. For these reasons, companies need to think about such events and make plans to mitigate the risks associated with them.

What are some early signs that companies should look for to identify potential vulnerabilities in their supply chain?

First, it's essential to map out the supply chain and identify vulnerabilities. Sometimes companies aren't fully aware of the links in their supply chain and how they might be affected by disruptive events. For instance, a company could be located in a stable country but sourcing supplies from a region that is highly vulnerable to natural disasters. Mapping out the supply chain helps highlight these vulnerabilities, and companies can then make plans to address what would happen if a disaster struck in that particular region.

Your paper also discusses the strategy of adding backup stocking locations to manage supply chain risks. What are the benefits of this approach, and how can businesses determine if it's the right choice for them?

The idea is that companies can have two stocking locations: a primary and a secondary one. If the primary location is hit by a disaster—whether man-made or natural—the company could lose part or all of its inventory. In that case, it would not be able to supply the market, which directly impacts both the company's bottom line and its customers.

Having a backup location allows the company to transfer stock from that backup to the primary location, ensuring customer demand is met. This is a risk mitigation strategy that some companies already use.

Could this model also be applied to smaller businesses, or is it more suitable for larger companies?

It's relevant for any company, big or small, that operates a supply chain. The model is applicable regardless of company size.

With the rise of global disruptions, how do you see the strategies discussed in your paper helping companies become more resilient and better prepared for future crises?

One common risk mitigation strategy is holding inventory. Our study helps companies determine when holding inventory at an alternative location is desirable. Having only one location to store inventory is like putting all your eggs in one basket, which we know is not the best approach. Having a second location makes the company more resilient and enables it to continue operations even when a disaster strikes. Using our model, companies can figure out how much inventory they should keep in their primary and secondary locations to mitigate catastrophic risks and improve resilience.

Speaking of the practical impact of your research, what influence do you hope your work will have on the business world?

Risk mitigation is a hot topic in business right now. If companies do not have a secondary location to store their inventory, I hope that our work will convince them to consider it as a strategy and help them decide if they need such a location.

Are there specific industries or sectors that you believe could benefit the most from applying the concepts in your paper?

Any company that holds inventory in its supply chain could benefit, regardless of industry. This work is applicable to companies both big and small. It's not limited to any specific sector.

Have you identified any companies or projects where you see potential collaboration based on your research?

Not a specific one, but I was motivated by some of the news articles I read, where companies lost their inventory because they only had one storage location. Right now, I don't have a particular company in mind, but I believe any company could start using this model.

What type of organizations or industries would you be interested in collaborating with based on your research?

Industries like pharmaceuticals, agriculture, and manufacturing come to mind. These sectors could greatly benefit from the strategies discussed in our paper.

Are you considering any future developments or new research directions based on this work?

Yes, there are several ways to extend this research. Our current model is a basic setup, so there is room to explore more complex scenarios. For instance, in the paper, we consider only two stocking locations, but future research could explore multiple locations with cross-location dependencies. If one location is hit by a disaster, there could be a chance that another nearby location might also be affected. How should companies then store inventory across these locations? Another extension could look at dynamic inventory relocation. Nowadays, we often know when a disaster is coming, even if it's just a few days in advance. Companies might have time to prepare by relocating their inventory dynamically to avoid losses. This is an interesting research question to explore. Lastly, some disasters cause changes in customer demand patterns, which could also be an interesting area for further study.

Currently, I have been working on digital twins for supply chains. With recent technological advances, digital twins have become an essential concept for companies toward their path to digitalization. My research with Dr. Bahar Biller (SAS Institute, Inc) and Dr. Stephan Biller (Purdue University) aims to equip companies with the knowledge on the benefits of digital twins and their implementation.

How do you see the future of decision science over the next five to ten years, especially in the context of Industry 4.0 and automation?

That's a great question. I think we're already seeing some of this happening, but over the next five to ten years, decision science will increasingly leverage AI tools and machine learning algorithms, leading to better-informed decisions. I also anticipate growing interest in human-AI collaboration, which was a theme at the conference. We'll likely see decision science open up to disciplines like cognitive science and psychology to better understand and enhance human-AI collaboration.



“Effective leadership in this AI-driven era requires adaptability, a commitment to cross-disciplinary collaboration, and a strong emphasis on ethics and inclusivity”

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THE BOARD OF INDEPENDENT BUSINESS ALLIANCE



NEXT GEN LEADERSHIP: AUTONOMY AND CREATIVITY

The integration of generative and specialized AI is transforming industries by blending autonomy with creativity. This article examines how this synergy fosters innovation, reshapes value chains, and drives new business models across sectors like healthcare, finance, and media. It also highlights the leadership challenges and opportunities in navigating this AI-driven transformation responsibly



The digital era has ushered in a profound convergence of autonomy and creativity, fundamentally transforming industries and redefining leadership paradigms. Central to this transformation is the integration of generative AI with specialized AI, forming a new value chain that fosters unprecedented opportunities for innovation and efficiency. This synergy not only automates tasks but also enhances creative processes, leading to the emergence of novel professions and business models. Generative AI serves as the creative engine, capable of producing content, designs, and ideas, while specialized AI refines and tailors these outputs to meet specific industry requirements. This collaborative framework accelerates innovation, enabling businesses to adapt swiftly to market demands and technological advancements.

The evolution from specialized AI to generative AI marks a significant milestone in technological advancement. Specialized AI systems, designed for specific tasks, have been instrumental in enhancing efficiency and accuracy across various sectors. However, the advent of generative AI has introduced a new dimension by enabling machines to create original content and solutions, thereby augmenting human creativity. This synergy between autonomy and creativity is exemplified in the healthcare industry. For instance, AI-driven diagnostic tools can analyze medical images with remarkable precision, assisting doctors in early disease detection and personalized treatment planning. In the media sector, AI algorithms are employed to generate personalized content recommendations, enhancing user engagement and satisfaction. Educational platforms utilize AI to develop adaptive learning systems that cater to individual student needs, thereby improving learning outcomes.

A tangible example of this human-machine collaboration is observed in the financial industry, where Wall Street banks are increasingly integrating AI into their operations. These AI systems assist in streamlining workflows, generating strategic insights, and enhancing decision-making processes, thereby demonstrating the practical benefits of AI integration in complex business environments.

Traditional value chains, characterized by linear and hierarchical processes, often face limitations in a rapidly evolving digital economy. The integration of generative and specialized AI introduces a dynamic, cyclical value chain that fosters continuous innovation and adaptability. In this new model, generative AI initiates the process through ideation and content creation. Specialized AI then tailors these outputs to specific industry applications, ensuring relevance and precision. Human professionals oversee and refine the process, providing critical judgment and strategic direction. An illustrative case is that of Must Have Ideas, a home shopping company that leveraged AI technology to establish a pioneering TV shopping channel. By utilizing generative AI tools, the company automated 24/7 programming, significantly boosting sales and attracting a loyal customer base. This example underscores how AI integration can redefine business operations and enhance competitiveness.

The convergence of generative and specialized AI has given rise to new professions that bridge the gap between human expertise and machine capabilities. Roles such as AI Integration Designers, Generative Business Strategists, and Autonomous Workflow Architects are becoming increasingly prevalent, reflecting the demand for skills that can effectively harness AI technologies. Business models are also evolving to capitalize on this integration. Platform-based AI ecosystems offer modular tools that businesses can customize to their specific needs. Subscription services provide access to specialized AI modules for various tasks, enabling companies to scale operations efficiently. Hybrid consulting models, combining AI-driven insights with human expertise, offer comprehensive solutions that address complex business challenges. For example, small businesses are utilizing AI to streamline operations and compete with larger firms. Hotels like Zedwell have implemented AI check-in kiosks and virtual concierges, reducing check-in times and staffing needs, thereby enhancing customer service and operational efficiency.

While the integration of AI offers significant benefits, it also presents challenges that must be addressed to ensure ethical and equitable use. Concerns regarding data security, potential biases in AI algorithms, and the digital divide necessitate comprehensive strategies to mitigate risks. Ensuring ethical AI use involves implementing robust governance structures and fostering a culture of transparency and accountability. Addressing issues of accountability in AI-driven decision-making requires clear guidelines and regulatory frameworks. Overcoming the digital divide is essential to ensure that the benefits of AI technologies are accessible to all segments of society, preventing the exacerbation of existing inequalities. A survey revealed that 68% of employees use AI tools at work, and 75% of UK financial firms now utilize AI. However, challenges such as data security concerns and the high cost of unsuccessful implementations highlight the need for careful planning and ethical considerations in AI adoption.

Effective leadership in this AI-driven era requires adaptability, a commitment to cross-disciplinary collaboration, and a strong emphasis on ethics and inclusivity. Leaders must navigate the complexities of integrating AI into business operations while fostering an environment that encourages innovation and ethical responsibility. Case studies of successful AI-driven transformations highlight the importance of strategic vision and proactive adaptation. For instance, companies that have effectively integrated AI into their workflows have achieved significant improvements in efficiency and productivity, setting benchmarks for others to follow. As AI becomes increasingly ingrained in business operations, leaders must focus on scaling its use responsibly. The creation of roles such as Chief AI Officer reflects the recognition of AI's potential impact on business models and the need for dedicated leadership to maximize its benefits.

The seamless merging of autonomy and creativity through the integration of generative and specialized AI is reshaping industries and redefining leadership. By embracing this new value chain, leaders can drive sustainable innovation, create new opportunities, and unlock the full potential of human-machine collaboration. This transformation challenges leaders to act boldly and responsibly, inspiring teams and organizations to adapt to and thrive in this evolving landscape.



“The seamless collaboration between generative, specialized, simulative, analytic, and prescriptive AI is not just a technological advancement—it’s a paradigm shift that redefines how we innovate, work, and lead.”

ida
THE ORDER OF INNOVATION ALLIANCE

AI AT THE HELM: SHAPING ENERGY, QUANTUM INNOVATION, AND A GREENER PLANET

The fusion of AI with advanced technologies such as quantum computing and sustainable systems is reshaping industries and opening doors to unprecedented opportunities. By combining generative, specialized, simulative, analytic, and prescriptive AI, this evolving ecosystem is driving innovation, creating new roles, and fostering more sustainable approaches to global challenges.

The convergence of artificial intelligence (AI) with cutting-edge technologies is reshaping industries and redefining possibilities. Among the most transformative domains are energy, quantum computing, and sustainable technologies, where AI acts as both a catalyst and a collaborator. At the heart of this evolution lies a groundbreaking value chain, where generative AI, specialized AI, and other forms of AI—including operational research simulative AI, analytic AI, and prescriptive AI—work together. This synergy is driving innovation, creating new professions, and reshaping business models. This article explores how these technologies are paving the way for a future where innovation meets sustainability and efficiency.

AI's role in these industries cannot be overstated. Each type of AI contributes uniquely to the value chain. Generative AI, which ideates and creates, works in tandem with specialized AI, which refines and implements these ideas. Simulative AI applies operational research principles to model and predict outcomes under various scenarios. Analytic AI examines vast datasets to uncover insights, while prescriptive AI offers actionable recommendations based on analysis. Together, they form a dynamic ecosystem, enabling rapid advancements in energy efficiency, quantum problem-solving, and sustainable innovation. According to a recent report, 2024 has seen AI deeply integrated into industries such as energy and sustainability, driving unprecedented progress and efficiencies.

In quantum computing, generative AI plays a crucial role in algorithm development, helping to address complex problems with speed and precision. Simulative AI further enhances this by modeling quantum processes, enabling scientists to refine quantum algorithms effectively. Analytic AI and prescriptive AI work alongside these technologies to identify actionable insights and recommend applications for quantum advancements, such as discovering sustainable materials or solving logistical challenges in supply chains. This synergy between AI forms and quantum computing has accelerated innovations in materials science, as noted in a report by The Quantum Insider, which highlighted AI's role in advancing quantum algorithms. Similarly, in sustainable product innovation, AI aids in optimizing designs and manufacturing processes, contributing to the creation of greener technologies.

Specialized AI, the executor in this ecosystem, takes generative AI's ideas and turns them into actionable solutions. Its role in refining outputs is evident in real-world applications such as energy grid optimization. Smarter power grids, powered by specialized and analytic AI, have improved efficiency and reliability, addressing energy demands more sustainably. Prescriptive AI is integral here, offering actionable recommendations to improve grid stability and resilience. Additionally, simulative AI models energy distribution under different scenarios, enabling utilities to anticipate demand spikes and adjust accordingly.

In materials science, the combination of quantum computing and AI has been pivotal in discovering materials that enhance the efficiency of sustainable technologies. Analytic AI processes vast datasets from experiments, identifying patterns and insights that guide research. Meanwhile, prescriptive AI suggests pathways for experimentation, accelerating discovery timelines. In supply chain logistics, specialized AI has revolutionized operations, reducing environmental impact while boosting efficiency. Simulative AI models supply chain networks to identify inefficiencies, while prescriptive AI provides targeted recommendations for improvement, a key trend in green logistics.

This multi-faceted collaboration between different AI types creates a feedback loop that enhances performance. Generative AI ideates, specialized AI implements, simulative AI models potential scenarios, analytic AI derives insights, and prescriptive AI guides decisions. Human oversight ensures that the outputs align with strategic goals. This iterative cycle has become a cornerstone of modern innovation.

This value chain isn't just transforming processes; it's creating entirely new professions. Roles such as Energy Transition Architects, who design AI-driven renewable energy systems, are emerging to meet the demands of this ecosystem. Quantum Integration Specialists bridge the gap between quantum computing outputs and practical applications, while Circular Economy Strategists use AI to optimize sustainable production and recycling processes. Simulative and prescriptive AI are also creating demand for Logistics Optimization Experts and Scenario Modelers, who use these technologies to design adaptive systems that meet dynamic challenges.

Business models are evolving as well. Platform-based ecosystems allow companies to access modular AI tools tailored to specific needs. Quantum-as-a-Service (QaaS) platforms provide advanced problem-solving capabilities, while subscription-based AI modules offer scalability and cost-efficiency. Innovations driven by analytic and prescriptive AI enable businesses to predict trends, make proactive decisions, and customize solutions for diverse markets. These developments highlight how the AI-enabled value chain fosters adaptability and growth in a rapidly changing world.

Despite its promise, this integration comes with challenges. AI technologies, particularly in quantum computing and large-scale applications, are energy-intensive, raising questions about sustainability. Ethical concerns, such as data privacy and equitable access, require comprehensive frameworks to ensure AI's benefits are shared widely. Simulative AI, while powerful, can produce biased models if not adequately calibrated, emphasizing the need for robust governance. IBM's study emphasizes the importance of sustainable IT practices, particularly in AI implementation. Overcoming these challenges demands robust governance and leadership. Leaders in this domain must possess a vision that integrates AI innovations into broader strategic goals, technical literacy to navigate complex systems, and a commitment to ethics and inclusivity. Case studies of companies successfully leveraging AI in workflows demonstrate the potential of strategic leadership to drive efficiency and innovation.

As AI continues to revolutionize energy, quantum computing, and sustainable technologies, its potential to shape the future becomes increasingly evident. The seamless collaboration between generative, specialized, simulative, analytic, and prescriptive AI is not just a technological advancement—it's a paradigm shift that redefines how we innovate, work, and lead. Leaders, professionals, and businesses must embrace this new value chain to unlock AI's full potential, driving progress that is not only innovative but also sustainable.

“As AI systems become more integral to society, balancing these demands will shape the future of the industry. By embracing efficient practices, leveraging renewable energy, and fostering global collaboration, AI can advance responsibly and sustainably, ensuring it serves as a tool for progress rather than a drain on resources.”



THE GROWTH OF AI AND ITS IMPLICATIONS

The landscape of artificial intelligence is undergoing a profound transformation. From the challenges of a "peak data" era to groundbreaking advancements in autonomous reasoning, leaders like Ilya Sutskever and companies like DeepSeek are charting a new course for AI. This pivotal moment balances innovation with the pressing need for sustainability, redefining what's possible in the field while addressing the industry's environmental footprint.

At the NeurIPS conference in Vancouver, Ilya Sutskever, co-founder and former Chief Scientist of OpenAI, shared pivotal insights that are reshaping the trajectory of artificial intelligence. Sutskever emphasized that the era of abundant data for AI training is reaching its end, likening the situation to finite resources such as fossil fuels. This "peak data" era necessitates optimizing existing datasets to fuel further advancements, making efficiency and innovation critical for future AI development. He also predicted a significant leap toward "agentic" AI models, capable of autonomous decision-making and enhanced reasoning. These models will transcend basic pattern recognition, engaging in human-like step-by-step problem-solving. However, this evolution comes with increased unpredictability, as AI systems with reasoning capabilities may deliver surprising outcomes, much like advanced AI in gaming scenarios. Sutskever also drew parallels with biological evolution, suggesting AI might discover new scaling patterns, mirroring the transformative leaps seen in human brain development. Together, these insights highlight a transformative era focused on optimizing data and building more autonomous, reasoning AI systems.

A prime example of this evolution is DeepSeek, a Chinese AI company specializing in scalable, open-source Large Language Models (LLMs). Since its founding in 2023, DeepSeek has made substantial contributions to AI research and development, significantly impacting the field. The company's latest innovation, DeepSeek-V3, is a Mixture-of-Experts (MoE) model with 671 billion parameters, trained on 14.8 trillion tokens over 57 days using 2,048 Nvidia H800 GPUs. Remarkably, this was achieved with an energy consumption of approximately 836,400 kWh, equivalent to the annual electricity usage of 77 average American homes.

Despite its massive scale, the model's training cost of \$5.58 million was highly efficient, outperforming contemporaries like GPT-4o and Llama 3.1 while matching Claude 3.5 Sonnet in capability. DeepSeek's innovations extend beyond scale; its models emphasize efficiency through techniques like Multi-head Latent Attention (MLA) and optimized parameterization. The company's commitment to open-source development fosters global collaboration, enhancing transparency and innovation within the AI community. DeepSeek has also pioneered advancements in vision-language understanding with DeepSeek-VL, which excels in real-world applications by focusing on data diversity and scalability.

However, the rapid development of large AI models raises pressing concerns about energy consumption and environmental impact. Training a single model like GPT-3 consumed 1,287 MWh of electricity, resulting in 502 metric tons of CO₂ emissions. Similarly, GPT-4's training, with its 280 billion parameters, required 1,750 MWh, equivalent to the yearly energy use of 160 American homes. Even BLOOM, a more efficient model, emitted 25 metric tons of CO₂ during training, akin to 80 round-trip flights between London and New York. These figures underline the significant energy demands of AI training. The inference phase, where trained models generate outputs, is equally resource-intensive. For instance, operating ChatGPT 3.5 incurs daily energy costs estimated at \$700,000, reflecting the scale of deployment challenges.

Mitigating these impacts requires a multi-pronged approach. Leveraging energy-efficient hardware such as advanced AI accelerators can significantly reduce energy use during both training and inference. Developing optimized model architectures and algorithms can further decrease computational demands. Transitioning data centers to renewable energy sources is another critical step, alongside aligning global data center operations with green energy initiatives. Companies like DeepSeek are demonstrating how innovation and sustainability can coexist by prioritizing efficiency and scalable methodologies.

The insights shared by Ilya Sutskever and the advancements pioneered by DeepSeek underscore a dual challenge for AI: achieving groundbreaking innovations in autonomy and reasoning while addressing the environmental toll of its growth. As AI systems become more integral to society, balancing these demands will shape the future of the industry. By embracing efficient practices, leveraging renewable energy, and fostering global collaboration, AI can advance responsibly and sustainably, ensuring it serves as a tool for progress rather than a drain on resources. This transformative phase signals an exciting yet critical juncture for artificial intelligence.

AI AGENTS: THE BACKBONE OF CREATIVE INDUSTRIES

Artificial Intelligence is reshaping creative industries by streamlining workflows, automating tasks, and expanding access to professional tools. From media production to music composition, platforms like Synthesia and Runway are driving innovation while raising essential questions about ethics and authenticity. This article delves into AI's transformative impact and the importance of responsible integration.

Artificial Intelligence (AI) agents are rapidly transforming the creative industries, offering tools that streamline workflows, inspire innovation, and expand accessibility. By automating repetitive tasks, enabling complex creative outputs, and democratizing artistic expression, AI is becoming an indispensable partner for artists, designers, and creators across the globe.

In the visual arts and media production, generative AI has revolutionized workflows. Platforms like MidJourney and Gendo are enabling architects at firms such as Zaha Hadid Architects (ZHA) to rapidly produce design options, cutting rendering times by up to 80%. By integrating generative AI tools like Rhino.ai and Maya AI into mid-stage workflows, ZHA has boosted productivity by 50%, enabling architects to focus on creative ideation instead of repetitive tasks. This efficiency not only enhances the creative process but also positions firms to succeed in highly competitive design competitions.

Video editing and special effects have also been transformed by AI. Tools like Runway offer advanced capabilities, allowing creators to remove backgrounds, edit videos, and even generate entirely new footage from text prompts. This enables filmmakers and video producers to prototype scenes or apply sophisticated visual effects in a fraction of the time traditional methods require. Similarly, Kling AI specializes in generating cinema-grade videos from text inputs, complete with advanced 3D mechanisms and physics simulations. This has made Kling AI a valuable asset for industries such as advertising, social media, and entertainment, enabling high-quality video content to be created at scale and with unprecedented efficiency.



AI-driven tools like Synthesia are empowering creators to generate lifelike avatars for video content. By eliminating the need for extensive filming, Synthesia simplifies the production of training videos, advertisements, and social media content. This has allowed creators to scale their output significantly, with some reporting monthly earnings between \$20,000 and \$60,000 through video generation, affiliate product promotion, and personalized content. Such tools are redefining the possibilities for individual creators and small teams, allowing them to compete with larger production houses.

AI-generated personas are also becoming prominent on social media platforms. Meta's initiative to introduce AI-generated profiles for Instagram and Facebook demonstrates the potential for these tools to engage audiences. Each AI persona is equipped with distinct bios and content creation capabilities, designed to drive user interaction. However, this innovation raises important questions about authenticity and the potential for misinformation. Ensuring clear labeling and transparency about AI-generated content is crucial to maintaining user trust and ethical standards.

In the music industry, AI tools are opening new creative possibilities. Suno, an advanced platform for AI-driven music composition, enables musicians to create original soundtracks by blending predefined styles with custom elements. Whether for films, video games, or commercials, Suno democratizes access to professional-grade music composition, allowing creators to produce high-quality tracks tailored to their projects. Similarly, AIVA assists musicians by combining intuitive creativity with AI-powered analysis, creating pieces that expand the boundaries of traditional music composition. These tools empower musicians to explore new creative directions while reducing production costs and timelines.

The accessibility of open-source tools has been a game-changer for the creative community. ComfyUI, an intuitive graphical interface for Stable Diffusion, allows creators to explore and fine-tune workflows by connecting modular nodes for tasks like image generation, inpainting, and post-processing. This flexibility enables artists and designers to experiment with styles, refine outputs, and produce professional-grade content with minimal technical expertise. LangChain further expands possibilities by providing a framework for integrating large language models (LLMs) into complex workflows. Developers can combine tools, APIs, and conversational memory into automated chains, enabling applications such as personalized marketing campaigns, automated design processes, and even data-driven storytelling. These tools are democratizing advanced capabilities, making them accessible to a broad range of creators.

Generative AI tools like Adobe Firefly are also reshaping traditional artistic fields. Designers can explore styles and compositions that might not have been considered otherwise, while copywriters use platforms like Jasper to craft compelling ad copy and slogans tailored to specific audiences. This integration of AI into the creative process ensures that campaigns resonate deeply with their target demographics, driving engagement and conversions. The ability to combine data analysis with creative intuition has become a powerful tool in advertising, ensuring relevance and impact.

AI's ability to analyze vast datasets is transforming decision-making in the creative industries. Fashion designers use AI to predict seasonal trends, aligning their collections with consumer preferences and market demands. Filmmakers rely on AI tools to analyze script performance, audience sentiment, and box office trends, refining their storytelling to maximize appeal. This data-driven approach not only enhances creative outcomes but also reduces the risk associated with large-scale projects.

While the integration of AI into creative industries offers immense potential, it also raises important questions about the authenticity and originality of AI-generated content. The proliferation of AI tools calls for ethical guidelines to ensure responsible usage. Clear labeling of AI-assisted works is essential to maintaining transparency and fostering trust between creators and audiences. These measures will help ensure that AI serves as a tool to augment human creativity rather than overshadowing it.

AI agents are poised to become the backbone of the creative industries, enhancing efficiency, democratizing access to high-quality tools, and fostering innovation. From architecture to media production, advertising to music composition, platforms like Synthesia, Runway, Kling AI, Suno, ComfyUI, and LangChain are revolutionizing the way we create. As we enter this new era of blended technology and artistry, the challenge lies in using AI responsibly to preserve the unique essence of human creativity while pushing the boundaries of what is possible. The fusion of human ingenuity and AI-driven innovation is set to redefine the creative industries, offering opportunities for unprecedented expression and impact.

*“Combining complex technologies
with the insights and expertise of
multicultural teams requires
careful collaboration.”*

MIKIYA TANIZAWA



AI-DRIVEN SOLUTIONS AND PRODUCT DEVELOPMENT IN THE IT AND AI SECTORS

NTT DATA, a global leader in IT and AI, is pioneering solutions that combine advanced mathematical models with machine learning. In this interview, **Mikiya Tanizawa**, Deputy Manager at **NTT DATA**, discusses how the company is driving innovation in areas like pricing optimization and large language models, reshaping industries with AI-powered tools.

Interview by **Matteo Panero**

Dear Mikiya, NTT DATA is a leading Japanese multinational in the IT and AI sectors, serving a diverse global customer base. I'd like to explore with you some of the key elements that characterize NTT DATA's approach to developing products and solutions, particularly those involving advanced mathematical models and machine learning. But before we dive into specifics, could you please introduce yourself?

Thank you. I'm Mikiya Tanizawa, a deputy manager at NTT DATA Group Corporation, where I work closely with multidisciplinary teams across our global organization to deliver innovative technologies to our customers to create co-R&D.

Could you share some examples of model-based AI solutions or products that NOR is currently developing or has already introduced?[MT1]

Certainly. There are numerous areas of focus, each influenced by regional trends. A common global priority is revenue and pricing optimization, which has gained significant attention, as highlighted in Gartner reports. Additionally, large language models (LLMs) have become a pivotal technology, with applications across multiple sectors. At NTT DATA, we're interested in integrating these technologies into other tools like math-optimization solvers. These solvers power everything from supply chain efficiency to pricing strategies, ensuring optimization at scale.

That's intriguing. Can you elaborate on the key elements of your pricing optimization solutions?

Absolutely. Pricing is a strategic lever for retailers—it defines their market position, shapes customer relationships, and influences competitiveness. At the same time, pricing is a highly operational challenge. Retailers must update prices for thousands of products while monitoring competitors and managing dynamic promotions.

To address this, we've developed pricing decision-making technologies that bridge strategic and operational needs. It enables top managers to set high-level strategies while allowing day-to-day operations to implement those strategies consistently. For instance, a retailer might prioritize customer acquisition for specific products while maintaining profitability in others.

Our technology employs predictive optimization, where forecasting is crucial. It's also an "explainable optimization tool," emphasizing transparency. Users often find machine learning and mathematical optimization models opaque, but we ensure the scenarios and proposed solutions are clear and actionable.

Imagine managing thousands of products, each with unique costs, customer behaviors, substitutes, and competing offerings. Add the dynamic nature of pricing in e-commerce, and the complexity becomes clear. Our models help navigate this complexity while ensuring coherence with the retailer's strategy.

It sounds sophisticated. What challenges do retailers face when selecting and adopting these kinds of solutions?

One major challenge is comparing solutions in the market. Many deep-tech aspects—like how forecasts are generated or elasticity is modeled—are not immediately apparent but greatly influence the quality and usability of the solution. Additionally, the rollout time and the learning curve for users to master these tools can vary significantly.

Retailers also face unique internal hurdles, such as varying data quality or organizational cultures. That's why, during our sales process, we engage a consulting team to work closely with customers. We help them define priorities, analyze their data, and ensure the solution aligns with their specific needs and characteristics.

You mentioned that NTT DATA also has a math-optimization solver and is developing an LLM-based solution. Could you elaborate on these?

Certainly. Our solver, Nuorium Optimizer, is a key component of our pricing and revenue optimization tools. It's a robust engine developed by NTT DATA Mathematical Systems Inc., which has a lot of data scientists and engineers. Nuorium Optimizer delivers the computational power behind our optimization models. Utilizing the solver, by controlling order and production volumes, we were able to maximize profits while reducing food waste in Japan. In addition, we are integrating the solver into Syntphony Pricing Management, which is developed by NTT DATA Italia and has several commercial performances.

Regarding LLMs, NTT DATA launched Tsuzumi through the Microsoft Azure AI Models-as-a-Service (MaaS) offering, which is a Large Language Model (LLM) with robust capabilities in Japanese and English. We're actively developing applications that enhance user experiences. For example, within our pricing solutions, we've proposed a great solution such that LLMs can act as intelligent assistants, helping users configure optimization parameters or quickly extract data insights. This adds a layer of usability and efficiency to our tools.

NTT DATA operates on a global scale, merging technologies and expertise from diverse teams. How has that experience been for you?

It's both challenging and incredibly rewarding. Combining complex technologies with the insights and expertise of multicultural teams requires careful collaboration. But when it all comes together in a successful solution, the sense of achievement is unparalleled. In one word, it's exciting.

A NEW ERA OF RISK A NEW ERA OF INNOVATION

Our industry is experiencing change unlike any before. This creates opportunity to embrace new technologies, innovative risk transfer solutions and minimize disruption. Guy Carpenter can show you how. Visit us at www.guycarp.com



THE ROLE OF PARAMETRIC SOLUTIONS IN RISK MANAGEMENT

In this interview, we have the pleasure of speaking with **Roberto Guidotti**, Vice President in Risk Management at **Guy Carpenter**.

With a strong engineering background, Roberto leads the development of innovative parametric solutions for risk management. Throughout the conversation, we will explore how these solutions are transforming the insurance landscape by reducing basis risk and improving payout efficiency. We will also delve into the crucial role decision-makers play and the tangible impact parametric solutions have had on numerous clients.

Interview by **Raffaele Maccioni**

Roberto, thank you for being here today. Let's start with a bit of context. Could you explain your role at Guy Carpenter and how your professional background prepared you for it?

Thank you, Raffaele, for the invitation. It's truly a pleasure to be here today. At Guy Carpenter, I serve as Vice President in Risk Management. My work focuses on developing parametric solutions alongside my team, with the goal of providing innovative and efficient risk management tools to our clients.

My academic and professional journey has played a significant role in shaping my expertise in this field. I have a background in civil engineering, which provided me with a strong foundation for understanding risks at specific locations. During my studies, I explored the entire chain of risk assessment—starting with hazard identification, followed by fragility analysis, and finally, evaluating the potential damage to an asset.

This combination of technical knowledge and practical application forms the backbone of my role at Guy Carpenter. Here, we work on connecting hazard exposure to economic outcomes, ensuring that our parametric solutions are not only robust but also highly relevant to the risks our clients face.

That's fascinating. Parametric solutions seem to be an innovative way to manage risk. Could you summarize their main advantages and how analytical solutions contribute to their effectiveness?

Absolutely. Parametric solutions are indeed innovative, particularly because they address a key challenge in traditional insurance models—what we call “basis risk.” This is the potential discrepancy between the financial payout provided by the parametric solution and the actual losses incurred by the insured party.

Let me explain. Parametric solutions are designed to trigger payouts when an event occurs that meets predefined parameters, such as a specific wind speed, magnitude of an earthquake, or rainfall level. While this simplifies the claims process and speeds up payouts, it doesn't always

s perfectly align with the actual damage sustained by the insured.

Our job is to minimize this basis risk as much as possible. This is where analytical solutions play a crucial role. At Guy Carpenter, we collaborate with universities and other institutions to implement optimization algorithms that refine our models. These algorithms help us adjust the parameters to ensure that payouts are more closely aligned with the real-world losses clients experience.

By enhancing the precision of our parametric solutions, we not only reduce financial discrepancies but also build trust and confidence in these products.

You mentioned optimization algorithms and minimizing basis risk. Could you elaborate on how these algorithms are applied in practice?

Certainly. The implementation of optimization algorithms is at the heart of our work. Essentially, these algorithms allow us to analyze historical data, understand hazard probabilities, and model potential loss scenarios.

For example, let's consider a portfolio exposed to hurricanes. Using historical weather data and damage reports, we can simulate various scenarios to identify the parameters that should trigger payouts. This includes determining the threshold wind speed or rainfall level that correlates most closely with actual losses.

By refining these parameters, we minimize the gap between the losses incurred and the compensation provided. This is what we refer to as reducing basis risk. It's a dynamic process that requires constant evaluation and adjustment, but the result is a solution that's both efficient and reliable.

Collaboration is also key here. Working with universities and research institutions allows us to stay at the forefront of analytical advancements, ensuring that our models incorporate the latest methodologies and data sources.

It's impressive how much technology and data analysis are involved in these solutions. That said, with so much automation, where do decision-makers fit into the process? What role do they still play?

That's an important question, Raffaele, because the human element remains critical despite the advancements in automation. Let me break it down into two key areas where decision-makers play a central role.

The first is recognizing the need for risk transfer. In risk management, there are several strategies available—investing in risk reduction, retaining the risk, or transferring it via insurance. Deciding to transfer risk through a parametric solution is a strategic choice that requires careful evaluation of the organization's vulnerabilities and goals.

The second area involves defining the scope of coverage. Decision-makers must determine which risks or events to insure against and what level of protection is required. For example, they might decide to focus on high-frequency, low-impact events or low-frequency, high-impact disasters. While analytics provide insights and recommendations, it's ultimately up to the decision-maker to align these with the organization's overall strategy.

Automation supports these decisions by providing data-driven insights, but the judgment and foresight of decision-makers remain irreplaceable.

That's a great perspective. Could you share an example where parametric solutions made a tangible difference for a client?

Absolutely. One example that comes to mind involves a client with significant exposure to hurricanes. In this case, traditional insurance models often resulted in delays due to the time required for damage assessments and claim processing.

With a parametric solution, we defined clear triggers based on measurable criteria, such as wind speed and storm location. This allowed payouts to be made almost immediately after a qualifying event, giving the client access to funds when they needed them most.

This not only minimized financial disruptions but also enabled the client to resume operations more quickly. It's a powerful demonstration of how parametric solutions can provide both financial security and operational resilience.

Looking ahead, what do you see as the biggest challenges and opportunities for parametric solutions in risk management?

The opportunities are immense, particularly as more industries recognize the value of parametric solutions. These products can be adapted to a wide range of risks, from natural disasters to supply chain disruptions, making them highly versatile.

However, there are challenges as well. One major hurdle is education—helping stakeholders understand how parametric solutions work and why they are beneficial. Many organizations are still accustomed to traditional insurance models, so there’s a learning curve involved.

Another challenge is data availability. Parametric solutions rely heavily on accurate and timely data to define triggers and calculate payouts. Ensuring access to reliable data sources will be critical for the continued success of these solutions.

Despite these challenges, I’m optimistic about the future. With ongoing advancements in analytics and technology, I believe parametric solutions will become an essential component of modern risk management.



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baobab soluciones is a high-tech company specializing in AI-powered optimizing applications, enhancing efficiency, and achieving cost savings. baobab soluciones have implemented solutions for companies listed on the IBEX 35 and global FORTUNE, transforming processes and leveraging data to deliver significant business value.

THE ROLE OF REINSURANCE IN ADDRESSING CLIMATE RISKS AND DRIVING INNOVATION

In this interview, **Guillermo Franco**, an expert in both academia and reinsurance, discusses how the sector is adapting to climate change and driving innovation. He shares insights on the role of technology in improving risk management, the importance of bridging academia and industry, and how platforms like the Decision Science Alliance (DSA) can accelerate the adoption of new solutions

Interview by **Raffaele Maccioni**

Guillermo, thank you so much for being here today and for the inspiring speech you gave earlier. Let's start with a big question. Over the past decades, we've seen how industrialization and globalization have fueled economic growth but also contributed to pollution and climate change. These changes are now creating disasters that affect families, industries, and entire communities. From what you said earlier, it seems that reinsurance can play a key role in reversing this trend, especially by supporting decarbonization through financial tools. Is that right? Can you help us understand how this works?

Thank you, Raffaele. It's a pleasure to be here. You're absolutely right—there's a strong connection between reinsurance and climate change. At its core, reinsurance is about transferring risk, which means we're deeply affected by the changes in risks that climate change brings.

But beyond just managing risk, reinsurance can actively support decarbonization. For example, we can invest in clean energy projects and sustainable businesses that aim to lower carbon emissions. Another critical role we can play is incentivizing the development of nature-based solutions, such as forests or wetlands. These not only act as carbon sinks but also reduce risks like flooding.

In essence, reinsurance isn't just about reacting to disasters—it's also about helping create a more sustainable future by aligning financial tools with environmental goals.

That's such an important perspective. Let's talk about the tools that make this possible. How do you think technology is changing the way reinsurance works, especially when it comes to addressing challenges like climate change?

Technology is essential because the scale of today's challenges requires solutions we've never had before. For example, we need more responsive policies that can cover a broader range of risks and impacts.

Emerging technologies like Earth observation systems, artificial intelligence (AI), and machine learning are making a huge difference. They allow us to process massive amounts of data quickly and accurately. For instance, satellite imagery combined with AI can help us monitor disaster-prone areas in real time, which improves our risk models and enables faster responses.

These advancements mean we can design better insurance products that transfer risks more efficiently, ultimately providing more comprehensive coverage for people and businesses. Technology isn't just helping us keep up—it's giving us the tools to stay ahead.

You've worked in both the US and Europe, so you've seen how reinsurance operates in different contexts. Do you notice any differences in how these regions use technology or approach innovation in the industry?

Yes, there are some notable differences. The reinsurance industry is global, so there's a lot of collaboration between companies in Europe, the US, and even Asia. But the pace of innovation can vary depending on the specific challenges each region faces.

In the US, for example, there's an urgent need for new products because of the sheer variety and intensity of risks—hurricanes, wildfires, earthquakes, severe storms, you name it. This urgency drives faster innovation, with companies focusing on creating solutions that address these immediate threats.

In Europe, while there's also innovation, it doesn't seem to be happening as quickly, possibly because the region faces different kinds of risks. However, I think this dynamic will evolve as Europe grapples more directly with its own climate-related challenges.

Switching gears a little, let's talk about your role. You work both as a researcher in academia and as a practitioner in a large organization. I imagine it's not always easy to bring academic innovation into a big company with its established processes. How do you manage that balance?

That's a great question, and you're absolutely right—it's challenging. Large organizations often have long-standing processes that have worked well for years, so introducing change can be difficult.

To make it work, we start small. We focus on manageable projects or collaborations that demonstrate immediate value. For example, when we work with academic groups, we ensure the research has a practical application we can use internally, whether it's improving a process or creating a new data set.

It's also about building trust. When I can show my colleagues that a new approach makes our work easier or more effective, it becomes easier to integrate innovation into the company. In a way, it feels like running a startup within a multinational—you need to be agile and persuasive while staying aligned with the larger organization's goals.

That's an interesting perspective. Speaking of bridging different worlds, let's talk about the Decision Science Alliance (DSA). As a nonprofit, DSA aims to connect academia and industry, helping organizations adopt new technologies and methodologies more effectively. How do you see its role in supporting companies like yours?

First of all, let me congratulate you on building the Decision Science Alliance. It's an incredibly valuable platform. Many conferences either lean too heavily toward academia or focus solely on industry. DSA strikes a perfect balance, fostering collaboration and cross-pollination of ideas between the two worlds.

The idea of creating an open simulation platform, which you mentioned earlier, is particularly exciting. It would give companies like ours a way to see how different techniques are applied in practice, providing inspiration and guidance for adopting these approaches.

By showcasing real-world applications and encouraging dialogue between researchers and practitioners, DSA can accelerate the adoption of innovative solutions. I believe your work will have a significant impact on how we approach decision science and technology integration.

THE ROLE OF REINSURANCE IN ADDRESSING CLIMATE RISKS AND DRIVING INNOVATION

interview to **Guillermo Franco**

OPTIMIZATION AND COLLABORATION BETWEEN RESEARCH AND INDUSTRY



In this interview, we sit down with **Álvaro García Sánchez**, founder of **baobab soluciones**, to discuss the intersection of academia and industry, and how optimization techniques are making a significant impact on renewable energy. Álvaro's journey from industrial engineering to leading innovative projects in wind energy optimization exemplifies the importance of bridging the gap between research and real-world applications. We explore his insights on collaboration, optimization, and the future of decision science..

Interview by **Matteo Panero**

Hi Alvaro, thank you for accepting this interview. To start, could you briefly tell us about your academic and professional journey, and how your interest in renewable energy research developed?

Sure, I am an industrial engineer and I earned my master's degree and PhD from the Technical University of Madrid. My career has always been focused on solving combinatorial problems, especially in the fields of production and research. In 2011, I founded Baobab Solutions, a company that allows me to combine my passions for research, teaching, and collaboration with companies. It was from this that my interest in wind energy optimization was born, a field with enormous potential for collaboration between academia and industry.

At Baobab, we also work on projects for corporate clients, addressing real problems that allow us to apply our research. Additionally, we participate in funded projects, which not only improve our technological capabilities but also allow us to share our solutions with the scientific community. This combined approach of research and practical application is at the core of our work.

n your latest study, you focused on optimizing turbine placement in wind farms. Why is this such a crucial factor for maximizing energy production?

The arrangement of turbines has a significant impact on the efficiency of a wind farm. If turbines are too close together, they interfere with each other, reducing the amount of wind available for each. Conversely, placing them in areas with more wind ensures greater production. The challenge is to find the right balance between these variables, as an optimal arrangement can significantly increase long-term revenues without incurring additional operational costs.

The interesting part is that, once a wind farm is built, operational costs generally remain stable. Therefore, optimizing turbine placement means obtaining more energy over the life of the farm without further investment. It's a strategy that increases profitability without raising costs. Thanks to this approach, companies can reinvest the generated profits into new projects or improvements, making energy more accessible overall.

It's fascinating how optimization can increase production without additional costs. In practice, how does this process work, and how much can it impact the results?

Exactly, this is the crux of the issue. When we optimize turbine placement, we can make the most of the available wind for decades, without additional operational costs. By simply improving placement, a wind farm can produce up to 10% more energy, which represents a significant increase in revenue for the company. It's a strategy that generates immense long-term value.

In comparing different optimization methods, you found that random biased optimization is particularly effective. How does this approach differ from traditional techniques like integer programming or particle swarm optimization (PSO)?

Integer programming works well for small problems, but it becomes ineffective at larger scales. Random biased optimization, on the other hand, is a method that allows us to explore many more combinations of solutions in a smarter and more flexible way. We don't limit ourselves to selecting the best solution in a single step; instead, we create a variety of possible solutions, exploring them in a guided manner.

This technique, when combined with PSO, allows us to achieve even better results. We have discovered that by combining these two techniques, we can improve the efficiency of a wind farm by 10% compared to traditional solutions already in use in the industry.

This 10% improvement in energy production is significant. Can it also be applied to other industries?

Yes, absolutely. This approach is applicable to many other industries, such as logistics and manufacturing. In these sectors, similar problems are faced, where there are many variables to consider, and the optimal choice is not always obvious. Combinatorial optimization is a very powerful technique that can be used to solve complex problems in sectors like healthcare, resource management, and logistics. Ultimately, any industry facing complex decision-making with many options could benefit from these techniques.

You mentioned the relationship between research and companies. How has the attitude of companies toward using optimization techniques changed over time?

When we started Baobab, it was very challenging to convey what we did to companies, especially when we talked about "operations research." It was an abstract concept for many, and there was skepticism about whether we could find better solutions than those developed by business experts over decades. Often, we heard comments like, "I've worked in this factory for 20 years; how can an algorithm do better than me?" This kind of distrust was common.

Now, thanks to machine learning and artificial intelligence, companies are much more open. The concept of "machines that learn" is easier to understand, and people are accustomed to seeing practical applications of these technologies, such as sales forecasting models or image classification. As a result, it is easier for us to explain how optimization can improve their processes and provide tangible results.

Today, companies trust the mathematics and models we propose much more; the challenge is no longer to convince them of the validity of the technology but to demonstrate that the investment is worth the benefits gained. The focus has shifted to proving the economic return because trust in technology is now established.

Looking to the future, do you see new areas of research or emerging applications?

Certainly, there are several promising lines of research. Historically, machine learning and operations research have been two separate worlds, but now there is a growing integration between these approaches. For example, techniques like reinforcement learning are showing tremendous potential for further improving business decisions.

In the future, I see the possibility of combining these tools to tackle even more complex problems. The idea is not only to use machine learning for predictive data but to integrate it directly into operational decision-making processes to generate optimal solutions in real time. It's a rapidly growing research field that could provide extraordinary solutions for sectors like energy, logistics, and manufacturing.

Finally, how do you see the future of decision science and what can its greatest contributions be?

Alvaro García: Decision science has enormous potential in fostering collaboration between academia and industry. This will enable us to tackle problems in a more realistic and efficient way, as well as to open new avenues for addressing complex issues such as demographics and natural disasters. I am convinced that the DSA will play a central role in this evolution, facilitating collaborations and promoting innovation on a global scale.

Thank you very much, Alvaro, for your time and availability. We look forward to having you with us again at the next ISC conference.

Thank you, Matteo! I will do my best to be there; I definitely don't want to miss it!



Math Biology® is an innovative, science-driven Italian startup in the health technology sector. By integrating biology, physics, engineering, and mathematical modeling, we have developed the Health Deep Screening Technology—a groundbreaking, AI-based, zero-invasive screening solution for deep metabolism assessment. The strength of Health Deep Screening Technology lies in its capacity to leverage the direct relationship between metabolic processes and illnesses, symptoms, and psycho-physical states, supporting prevention, early diagnosis, and Personalized Medicine.

FUTURE OF AI IN CLINICAL DECISION SUPPORT

In this interview, we have the privilege of speaking with **Elvira Plenzich** and **Roberto Tufano**, both AI specialists at Math Biology, who are at the forefront of developing innovative solutions for clinical decision support. Their work centers around the application of AI and mathematical modeling to optimize healthcare diagnostics and treatment. We explore their backgrounds, the integration of advanced technology into clinical workflows, and how their research, alongside Math Biology's DMA technology, is poised to reshape the future of medical diagnostics.

Interview by **Matteo Panetro**

Elvira, Roberto, thank you for joining me today. To start, could you tell us about your academic and professional paths and how you both began collaborating with Math Biology?

Elvira Plenzich: Thank you, Matteo. Roberto and I share a remarkably similar background. I completed both my undergraduate and graduate studies in Mathematics at the University of Salerno. During my master's program, I had the opportunity to intern with a company, and it was during this period that I first connected with Raffaele Maccioni, thanks to Professor Raffaele Cerulli (Director of the Department of Mathematics, University of Salerno). Even though it was a virtual interaction due to the pandemic, it opened the door to future collaborations.

That experience eventually led to discussions with my professor Raffaele Cerulli and Raffaele Maccioni, which guided me toward pursuing an Industrial PhD with Math Biology. This was also when I was introduced to Math Biology, whose mission and innovative projects really resonated with my interests in data science and healthcare.

Roberto Tufano: Elvira captured it well. My journey was similar—I also studied Mathematics at the University of Salerno, but my focus during the internship was more programming-oriented, particularly advancing my knowledge in Python. Conversations with Raffaele and learning about Math Biology's work inspired me to focus on applying mathematical modeling to biological systems. It was an exciting opportunity to combine my passion for healthcare with a practical, research-driven approach.

Math Biology stood out because it bridges advanced technology with a deep commitment to creating impactful solutions in diagnostics. Joining their team has allowed us to explore how decision science can transform healthcare.

Let's delve into your paper. It addresses challenges related to managing clinical data to support medical decisions. Could you explain how your service-oriented architecture tackles these issues?

Roberto Tufano: Absolutely. One of the biggest challenges clinicians face today is managing the sheer volume of data generated in healthcare settings. These data are often heterogeneous, coming from multiple sources such as medical records, imaging systems, and wearable devices. This can overwhelm clinicians, leading to inefficiencies and potential burnout.

Our architecture integrates artificial intelligence to streamline data processing and provide actionable insights. By adopting a modular service-oriented structure, we allow clinicians to break down large problems into manageable components. Each module is designed to address specific tasks, ensuring the system remains flexible and adaptable to varying needs. To achieve interoperability, we use the FHIR (Fast Healthcare Interoperability Resources) standard, which ensures seamless data integration across different healthcare systems. This makes it easier for clinicians to access and share patient information efficiently.

Elvira Plenzich: The value of this approach is its ability to reduce repetitive tasks. For instance, when a patient's medical history is shared between providers, it minimizes the need for manual transcription or redundant tests. This not only improves efficiency but also enhances the overall patient experience.

For Math Biology, this approach aligns with our commitment to harnessing technology like DMA to create solutions that are both practical and transformative.

Your work incorporates the "human in the loop" approach. How do you balance human involvement with advanced automation in your system?

Elvira Plenzich: The human-in-the-loop methodology is central to our philosophy. While automation can handle repetitive tasks and generate preliminary analyses, the clinician remains at the core of the decision-making process. For example, AI might suggest diagnostic pathways or treatment plans based on patient data, but it's the clinician who validates and implements these recommendations.

This approach also allows clinicians to provide feedback that improves the AI over time, ensuring the system evolves alongside their needs.

Roberto Tufano: Absolutely. We want clinicians to view the system as an ally rather than an obstacle. By designing intuitive interfaces that integrate seamlessly with clinical workflows, we aim to minimize disruption while maximizing value.

Building trust is another critical factor. Transparency is key, which is why we use explainable AI models. When clinicians understand how the AI arrives at its recommendations, they're more likely to trust and adopt the system. This reflects Math Biology's broader goal of ensuring that technology empowers, rather than replaces, human expertise.

Math Biology's DMA technology is central to innovation in diagnostics. How do you see it transforming clinical diagnostics?

Roberto Tufano: DMA technology is revolutionary because it's non-invasive and highly adaptable. In traditional diagnostics, clinicians often rely on invasive procedures or complex imaging techniques, which can be costly, time-consuming, and stressful for patients. DMA provides an alternative that prioritizes early detection while reducing unnecessary interventions.

Elvira Plenzich: Building on Roberto's point, DMA technology is particularly impactful for conditions where early diagnosis is critical, such as cancer or cardiovascular diseases. By providing detailed metabolic insights, DMA helps clinicians identify risks earlier and tailor treatments more effectively.

At Math Biology, we view this as a step toward precision medicine. While there are challenges in scaling and integrating the technology, the potential benefits for patients and clinicians are enormous.

Looking ahead, what future developments or projects are you considering based on your current research?

Elvira Plenzich: One major project is PREVEDO, a collaboration between Math Biology and the University of Salerno. This initiative involves clinical trials combining DMA technology with traditional diagnostics. It's a critical step in validating our architecture in real-world settings and demonstrating its effectiveness.

Roberto Tufano: PREVEDO is just the beginning. The modular nature of our system means it could expand beyond medicine into areas like nutrition and sports science. While our immediate focus is on healthcare, the versatility of the architecture opens up opportunities in other fields where data-driven decisions are essential.

At Math Biology, our broader vision is to create tools that are not only innovative but also deeply integrated into everyday practices. We're excited to see how our work evolves in the coming years.

OPTIT

optimal solutions



Optit is a leading Italian provider of advanced decision support systems solutions, empowering industries to manage complexity and transform data into actual value. Leveraging over a decade of expertise in mathematical modeling, data science, and artificial intelligence, Optit offers innovative tools to support strategic, tactical, and operational decision-making processes. Optit's tailored solutions enable businesses to reduce costs, enhance efficiency, and contribute to a sustainable green transition. Whether it's creating digital twins of energy systems or generating optimized operational plans, Optit's cutting-edge technologies drive measurable results for clients worldwide.

DECISION SCIENCE AND ITS IMPACT ON ENERGY, LOGISTICS AND BEYOND

In today's landscape, where AI and data-driven solutions are becoming ubiquitous, choosing the right technology can be challenging. In this interview, we speak with **Matteo Pozzi**, CEO of **Optit**, a company specializing in applying advanced mathematical models to optimize business processes, particularly in energy, logistics, and the circular economy. Matteo shares his insights on how decision science can create tangible value for businesses and the importance of blending technology with practical expertise

Interview by **Raffaele Maccioni**

Matteo, thank you for being here with us today. We often hear companies and startups claiming to offer artificial intelligence or analytical solutions. However, this wide range of offerings can sometimes overwhelm adopters, making it challenging to identify the most suitable solutions. Optit has deep roots in applying mathematical models to solve business problems. Based on your experience, what would you say to help adopters navigate this complex landscape and make informed decisions?

Thank you very much, Raffaele, for inviting me. It's a pleasure to share our perspective. Let me start by introducing Optit and its origins. Our journey began in 2007 with a clear vision: bringing mathematical models from operations research into the business world. From the start, we focused not only on the scientific value of what we do but also on all the enablers necessary to make decision science applicable to real-world business processes.

There are two critical elements I believe every provider must address, regardless of the specific solution they offer. The first is that the model itself, while crucial, is not enough to deliver value on its own. At Optit, we address this challenge through two key organizational choices.

The first is our Software Factory, which is dedicated to building platforms, applications, and solutions that embed our models. The user ultimately interacts with an interface, and this interface must speak directly to the processes they manage daily. Importantly, it needs to be user-friendly for individuals who may not have expertise in artificial intelligence or operations research. Decision-makers using these tools should focus on their jobs, not on mastering complex algorithms.

The second element involves bridging the organizational and human gap. This means translating real-world processes into mathematical terms and analyzing data in ways that allow advanced techniques like machine learning to be applied effectively. Ultimately, the person remains at the center of the decision-making process, supported by technology that simplifies and enhances their work.

This is why, alongside our technical experts, we have consultants who focus entirely on understanding the client's needs and translating them into actionable solutions. Consultants are not tasked with coding or developing the models themselves; instead, they act as the crucial bridge between the technology and the people who will use it.

That's an interesting point about the importance of consultants. From your perspective, what makes consultants so essential in projects like these?

Consultants play a critical role because they help bridge the knowledge gap between technical solutions and the practical realities of the client's organization. As someone with a background in management consulting, I know firsthand the value of entering a project with a willingness to learn.

When we approach a new project, we're not necessarily experts in the client's industry or specific challenges. However, by working closely with their internal teams, we capture their expertise and translate it into mathematical models and actionable tools. This requires both technical skills and the ability to communicate effectively, ensuring that the client's knowledge is fully reflected in the final solution.

For example, one of our most significant projects started with optimizing cogeneration plants in district energy systems. Today, we're helping a major utility in New York manage the transition toward decarbonizing the city's energy infrastructure. Achieving this required not only advanced artificial intelligence tools but also a deep understanding of the client's operational needs.

Energy is clearly a key area for Optit. Would you say it's one of the primary sectors where you're focused right now?

Absolutely. The energy sector has become a major focus for us, and for good reason. It's undergoing a massive transformation, driven by the urgent need to decarbonize and shift toward sustainable energy systems.

We're particularly active at the intersection of heating and electricity, as heating alone accounts for about half of the energy we use every day. By optimizing energy systems, we aim to contribute to building a better, more sustainable world.

That said, energy is not the only area where we work. We also have strong expertise in logistics and supply chain optimization, as well as in circular economy projects, particularly in waste collection and management. These areas all share a common thread: the ability to use decision science to drive meaningful change and efficiency.

You mentioned earlier the importance of translating client needs into actionable tools. Do you think process know-how is essential for developing these solutions?

Absolutely. Process know-how is fundamental. Consultants must immerse themselves in the client's environment to understand the details of their processes—details that even the end user might not fully articulate at the outset.

This involves what I call a "mimic exercise," where we learn the intricacies of the client's operations and translate them into solutions that are both effective and user-friendly. It's not just about building the best mathematical model; it's about ensuring that the model integrates seamlessly into the client's processes and generates real value.

For example, in our energy projects, we don't just optimize systems in isolation. We work collaboratively with the client to understand their specific challenges, from regulatory constraints to operational priorities. This level of engagement is what sets effective solutions apart from generic ones.

You've achieved so much in areas like energy and logistics. Looking ahead, what are your plans for future initiatives?

Energy will remain a major focus for us, as it's at the heart of one of the most significant societal transformations of our time. Decarbonization is not just a technical challenge—it's a societal one, requiring collaboration across industries and governments.

We're also committed to expanding our work in logistics, supply chains, and the circular economy. These areas offer incredible opportunities to apply decision science to real-world problems, creating solutions that are both sustainable and efficient.

Lastly, we're always open to exploring "exotic" projects—those that push the boundaries of what decision science can achieve. For us, it's about staying curious and innovative, no matter the challenge.

Matteo, thank you for sharing your insights and experiences. It's inspiring to see how Optit is using decision science to drive meaningful change across industries.

Thank you, Raffaele. It's been a pleasure to discuss these topics. I'm proud of what we've accomplished at Optit, and I'm excited about what the future holds as we continue to innovate and grow.

Elvira Plenzich: Building on Roberto's point, DMA technology is particularly impactful for conditions where early diagnosis is critical, such as cancer or cardiovascular diseases. By providing detailed metabolic insights, DMA helps clinicians identify risks earlier and tailor treatments more effectively.

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At Math Biology, our broader vision is to create tools that are not only innovative but also deeply integrated into everyday practices. We're excited to see how our work evolves in the coming years.

automate group



Automate Group brings together five leading Italian companies in the field of industrial automation, all united by the shared mission of developing integrated and innovative solutions for the digitalization of industrial operations. The company focuses on designing and implementing comprehensive digital transformation paths for industrial processes, adopting a unified approach to technological challenges through multidisciplinary expertise. By continuously investing in innovation, Automate Group stays at the forefront of emerging trends, addressing both the immediate and future needs of its clients. With profound expertise and experience, Automate serves as a single point of contact, guiding clients throughout their entire digital transformation journey.

LEVERAGING DATA FOR STRATEGIC DECISIONS: INNOVATIONS IN THE INDUSTRIAL SECTOR

In this interview, we speak with **Nicola Bisi** and **Claudio Malchiodi**, co-founders of **Latitudo**, a company specializing in data analytics and automation. They discuss their backgrounds and the role Latitudo plays within the Automate group, particularly in integrating data, AI, and business intelligence to optimize industrial processes. Their innovative work is driving transformation across various sectors, helping businesses enhance decision-making and improve operational efficiency.

Interview by **Matteo Panero**

Hello Nicola and Claudio, it's a pleasure to have you here for this interview. Let's begin by introducing your professional backgrounds, career paths, and your roles at Latitudo.

Nicola Bisi: I am a Data Warehouse Architect with over 20 years of experience in managing complex projects and developing advanced technological solutions. Currently, I serve as Project Manager at LATITUDO s.r.l., a company I co-founded. My passion and expertise in Data Warehousing and web applications are reflected in my extensive experience in designing and implementing solutions that optimize data management and enhance business performance.

Claudio Malchiodi: I am a co-founder of LATITUDO s.r.l. and oversee all development projects related to Data Warehousing and Data Analytics. My role involves aligning the company with market expectations within my area of expertise while striving to anticipate business trends. I have developed projects and integrations involving Microsoft SQL Server, Business Process Management platforms, and interactions with SAP. For clients, I have created various dashboards for data analysis, ranging from cost analysis in telecommunications to asset management, leveraging the capabilities of Microsoft SQL Server and, in recent years, Microsoft Power BI and Microsoft Fabric.

Latitudo recently joined the Automate Group, which specializes in automation for the industrial, manufacturing, intra-logistics, and automatic handling systems sectors. How does Latitudo position itself within the Automate world and, more generally, in relation to systems involving robots, automated production lines, and automated handling systems?

Nicola Bisi: The central aspect of Latitudo's positioning within the Automate Group lies in its ability to integrate, manage, and transform data available to companies into actionable information that supports strategic management decisions.

This perspective comes from over 20 years of experience in implementing data analytics solutions used by company managers, from financial controllers to sales directors and operations managers. The key point is Latitudo's focus: it concentrates on data and business processes not directly related to production. This focus positions Latitudo as one of the pivotal elements within the Automate Group for the coming years, where IT, OT, and AI competencies will converge into a unified sphere.

Latitudo provides solutions related to Decision Science for its clients. As a company, are you already adopting these techniques internally to optimize your decision-making processes, or do you plan to do so in the future?

Claudio Malchiodi: We use these technologies for some of our clients. Internally, we employ them for predictive purposes, leveraging tools that integrate some of these functionalities, such as for budget forecasting or project timeline estimation. We have been active users and explorers of these technologies for several years.

Based on your experience, how has the perception of data centrality for decision-making evolved in small and medium enterprises (SMEs) compared to larger companies?

Nicola Bisi: While the centrality of data is an important topic for all companies, regardless of size, one of the key developments in recent years has been the emergence of technological tools that enable the implementation of Data Analytics systems with timelines and costs that are manageable even for SMEs. This is a cornerstone for data analysis in companies, as it allows SMEs to access advanced tools. Until a few years ago, creating Data Analytics systems involved costs that did not align with the typical budgets of SMEs. However, a critical aspect remains: in small and medium enterprises, the importance of data collection and management is still not fully understood.

Claudio Malchiodi: In large companies, on the other hand, we often see that despite having greater resources, they do not fully exploit the available technologies for data management. Here too, a cultural shift is necessary, especially to ensure that data is used strategically in every business process.

Which SME sectors are showing the greatest awareness and interest in data?

Claudio Malchiodi: Observing market trends, we can see that the SME sectors showing the greatest awareness and interest in data are primarily those that have traditionally used it, such as retail and finance. They are now followed by important sectors like healthcare and agrifood. These companies have understood the importance of leveraging data to optimize processes, improve operational efficiency, and make strategic decisions based on concrete information.

Latitudo specializes in Microsoft technologies. Which Microsoft solutions do you find particularly effective in helping SMEs integrate data into their decision-making processes?

Nicola Bisi: It's crucial for SMEs to have an entry point into the world of data analytics that is not overly costly. The cost of the technological solution, particularly licensing, and implementation costs are two fundamental factors. In recent years, the introduction of Power BI in our projects has allowed us to address client objections related to the cost of technology licenses. Another key aspect is the adoption of cloud technologies, which offer advanced capabilities at reasonable costs. One of the solutions we frequently propose to our clients is Microsoft Fabric, which enables the implementation of comprehensive business intelligence systems designed for the integration of artificial intelligence and machine learning tools.

Have you developed any success stories where tools like Azure or Power BI have significantly improved SMEs' decision-making processes?

Claudio Malchiodi: We now have numerous examples of such cases, as they are quite common. Transitioning from a spreadsheet containing tens of thousands of rows to a visually intuitive graphical interface automatically simplifies the decision-making process. In many companies, Excel remains the cornerstone of information distribution. However, centralizing data management and using certified systems with validated and easily accessible data greatly enhances the reliability and clarity of information.

Do you think partnerships with platforms like DSA could amplify the impact of these technologies?

Nicola Bisi: Partnerships with organizations like the Decision Science Alliance (DSA) can undoubtedly amplify the impact of data analytics and artificial intelligence technologies. Collaborating with specialized organizations like the DSA provides access to advanced expertise, resources, and best practices that can accelerate the adoption and implementation of innovative solutions. Such partnerships can also facilitate knowledge sharing and the adoption of advanced methodological approaches, improving the effectiveness of the implemented technologies.

In the context of the manufacturing sector, what are the main challenges SMEs face in creating a seamless link between commercial and production areas? How can data contribute to streamlining the entire process, from supply chain planning to distribution?

Claudio Malchiodi: In an increasingly complex industrial environment, it is essential to standardize tools for data collection, management, and processing. Companies need to undergo a digital transformation that allows them to easily connect the needs of the commercial and administrative areas with those of production. Data and process digitalization are the key concepts that enable companies to merge these areas efficiently, improving overall management.

Many believe that artificial intelligence is a tool reserved for large companies. How do you encourage SMEs to overcome this misconception and see AI as an accessible tool? What unique advantages can SMEs gain by implementing advanced methodological approaches to data analysis and usage?

Nicola Bisi: SMEs need to be encouraged through training and by explaining that these technologies, which might seem like science fiction, are now available to all companies. New technologies have democratized access to artificial intelligence and data analytics, lowering economic and technical barriers for SMEs.

Thank you for sharing your experience and insights with us. Your responses provide a clear and inspiring perspective on how Latitudo is contributing to transforming the landscape of data analytics and automation. They highlight the importance of an integrated approach and data centrality, showing how SMEs can grow and improve their competitiveness by adopting advanced technologies. We look forward to seeing you at ISC 2025!

Nicola Bisi and Claudio Malchiodi: Thank you! We are excited to share our expertise and contribute to the dialogue on the evolution of decision science!

LEVERAGING DATA FOR STRATEGIC DECISIONS: INNOVATIONS IN THE INDUSTRIAL SECTOR



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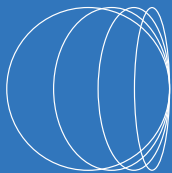
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