Capgemini / ALTRAN
Pioneering Intelligent Industry

PIONEERING INTELLIGENT INDUSTRY

POWERED BY DATA

Introduction

The future of industry is Intelligent

At Capgemini we are pioneering what the future of industry will be.

We call it Intelligent Industry.

What's happening? Harnessing the power of data fosters innovation, makes new and differentiated 'smart' products, improves supply chains, creates new customer experiences and delivers new sources of value. Thanks to Intelligent Industry, all companies will see benefits from new and pervasive connectivity, with opportunities to become more efficient and agile, while creating new value-added services, beyond the products they make.

While the way products might look has not changed much, what is going on inside them has significantly – they now have more digital technology internally than ever before. And this in turn creates almost unimaginable amounts of data. The seamless collection, flow and analysis of this, at scale, means that companies can now find insights to improve operational performance, reliability and autonomy, bring innovations to market faster, and deliver intelligent products and associated new services, and customer experiences.

You can think of it as the evolution of Industry 4.0, where industrial companies completely transform across their entire value chain, thanks to taking a data-centric approach. From research & development, to designing a concept, through to engineering and manufacturing it, companies turn data into insight, actions, and a future that radically improves industrial operations, the supply chain, and service and support.

And this will be ushering in a world where machines and computers can sense, communicate with, and learn from their surroundings, offering new potential products and services for companies to develop, intelligent value chains with new ecosystems – and new ways for consumers to manage their health and fitness, to move, eat, talk, shop – to live.

Why now?

Intelligent Industry is accelerating thanks to a combination of three factors:

An abundance of new technologies: which are rewriting the rules of how physical and virtual products are manufactured – and what can be done once they are made. This is possible because of the maturation, accelerating deployment and convergence of technologies such as: artificial intelligence (AI) and machine learning (ML); 5G; Cloud and Edge computing; data analytics and engineering; data security; blockchain; and IoT, amongst others.

New customer expectations: people now want products that are hyper-personalized to their needs, supported with experiences that are memorable. Both have to also be more sustainable, and delivered by companies and brands that can be more trusted thanks to more transparency in how they operate, something that more data can facilitate.

Greater competition for incumbent industrial players: thanks to new technologies and new customer expectations – rivals can emerge from both within their sectors – and well outside them too.

Definition of Intelligent Industry

Defining Intelligent Industry

At its simplest Intelligent Industry means harnessing the power of data to foster innovation, make new and differentiated ‘smart’ products, improve supply chains, create new customer experiences and deliver new sources of value.

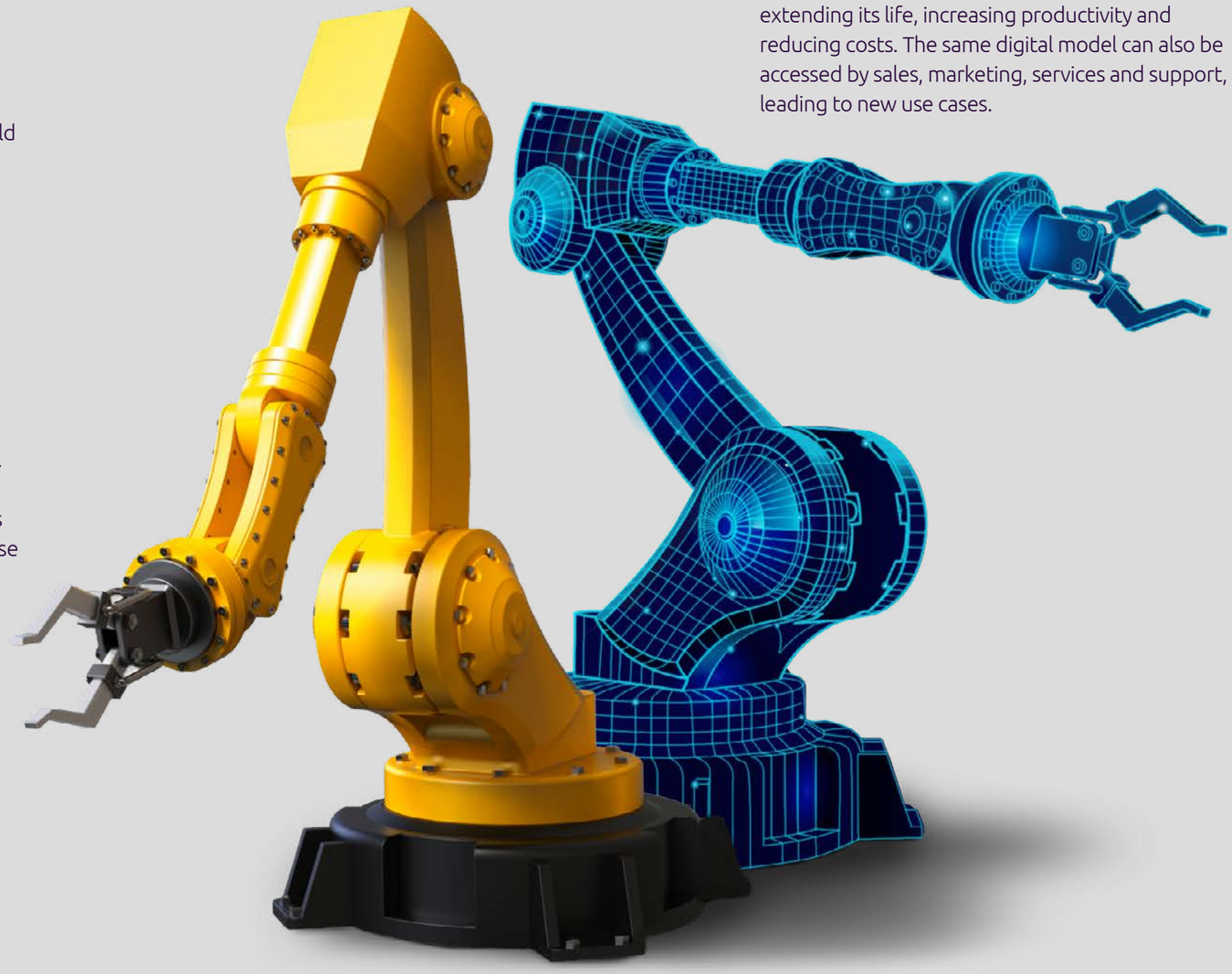
Digital technologies everywhere

By bringing together the physical and digital worlds, any company can now innovate and build intelligent products, operations and services powered by data at scale, by putting digital technology **inside** everything; enabling digital **continuity** throughout a product’s lifecycle; and driving digital **convergence** within wider ecosystems, of services, markets, sectors, even cities.

Digital inside

‘Digital inside’ is making everything associated with industrial processes and production smart. Technologies such as semi-conductors, sensors and software are embedded in products, assets or services, to calculate and generate data. These are matched with platforms that can collect, store and interpret the data generated.

An example of this is a car, now not just a vehicle but an intelligent and connected machine on wheels, thanks to sensors and other technologies that connect them to their surroundings, and wider ecosystems.



Digital continuity

‘Digital continuity’ is when a full or partial virtual model or simulation of a physical object can be created at any time of the object’s lifecycle. This virtual model includes technical or business processes that surround the physical object too.

An example of this is a ‘digital twin’ of a physical object, like a train. Through this model, it is possible to see real-time operations data about its use, and wear and tear. Parts can be replaced earlier, extending its life, increasing productivity and reducing costs. The same digital model can also be accessed by sales, marketing, services and support, leading to new use cases.

Digital convergence

‘Digital convergence’ is when:

1) business systems (such as customer relationship management), and engineering and manufacturing systems (such as Product Lifecyle Management) get closer thanks to IT

2) IT and Operational Technologies (OT), the hardware, software and sensors that make products, machines and plants work, come together

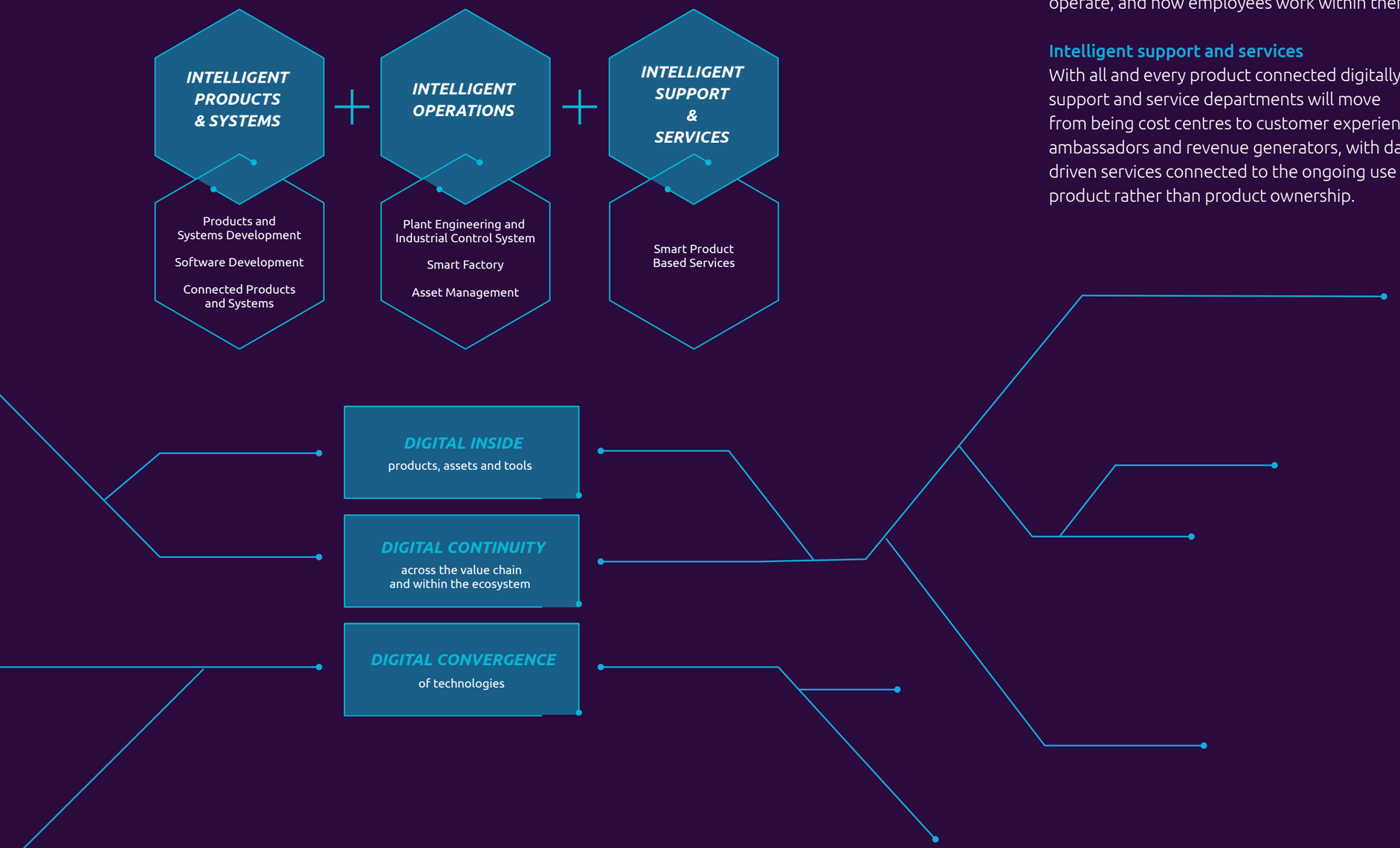
3) closeness between the ‘legacy’ world of devices with limited intelligence and connectivity, and ‘digital world’ technologies increases.

This last aspect allows data and knowledge from outside of firms in, which in turn makes ecosystems viable. This makes the systems underlying autonomous driving possible: a car able to both process and respond to data from the environment it is moving through in real time.

What can be made now?

Thanks to digital inside, digital continuity and digital convergence, the design and making of intelligent products & systems, intelligent operations, and intelligent support and services is now possible. Capgemini assists clients along the entirety of this value chain.

TRANSFORMING THE VALUE CHAIN



Intelligent products and systems
With products and systems now being smart and connected they can be continuously improved, thanks to real-time feedback. This means greater uptime, reduced costs and improved efficiency.

Intelligent operations
Traditional plants and industrial operations (and more complex systems like transport networks) become smart with new digital technologies, which in turn changes the design of factories, systems and their supply chains, how they operate, and how employees work within them.

Intelligent support and services
With all and every product connected digitally, support and service departments will move from being cost centres to customer experience ambassadors and revenue generators, with data-driven services connected to the ongoing use of a product rather than product ownership.

Our capabilities

As a world leader in technology consulting, IT, engineering and R&D services, Capgemini is uniquely positioned to work with our clients across the whole end-to-end value chain of Intelligent Industry, from the business model, to products, operations and services.

Thanks in part to our integration with Altran, we are the only global provider that has both the sufficient depth of product engineering knowledge and breadth of ability to master data and deploy technology at scale. Which means we help clients innovate and differentiate in this dynamic space.

Our capabilities include:

- **Consulting:** We accelerate the process of turning ideas into prototypes and scalable real-world solutions
- **Domain:** We know key industrial sectors, including aeronautical, manufacturing and energy
- **Engineering:** We think, invent and design the systems clients need, build them at scale and then run them
- **Partnerships:** We work with every type of technology and engineering supplier to achieve the best possible solutions and outcomes
- **Technology:** We understand inside out the key new technologies of Intelligent Industry, and how they can work together.

Through Intelligent Industry we will help you to win, with change to optimize processes, deliver successful products and new business models.

Benefits of Intelligent Industry

Transform your entire value chain

Intelligent Industry unlocks unlimited possibilities for every company in every sector.

DIFFERENTIATED PRODUCTS

- Hyper-personalization and mass customization, enabling unique customer experiences
- Manufacturing on demand, so only what is needed will be made

INNOVATION IN BUSINESS AND REVENUE MODELS

- Continuous data flows make it easier to create and optimize value through a product's useful life
- Innovation of new products, services and associated revenue streams, with monetization of internal and external data
- A shift from transactions to always-on customer relationships via 'as-a-service' business models, turning single manufactured products into platforms at the centre of new service-providing ecosystems

SUSTAINABLE INDUSTRIAL FOOTPRINT

- Better data and application of IT means more productive use of fewer resources, less waste, and a true end-to-end product lifecycle and, ultimately, economy
- Makes the energy production shift towards renewables easier and faster

GREATER AGILITY AND EFFICIENCY

- Smarter factories, high visibility operations, agile plant, and optimized and repeatable processes, make industrial businesses knowledge-driven, continually competitive and highly responsive
- Fully connected supply chains and service management enable faster times to market

ZERO DISTANCE

- Between companies and their customers, improving customer satisfaction
- The ability to see in real time what needs fixing, and how customers are using products, to produce better versions

ACCELERATING THE AUTONOMOUS JOURNEY

- Ensuring driving automation systems are safe to operate, thanks to data-driven architectures, robotics, AI and ML at scale
- Smarter decisions: from activation of accurate, deep and timely data analysis
- Leading to better productivity, predictability and flexibility in operations

Benefits of Intelligent Industry

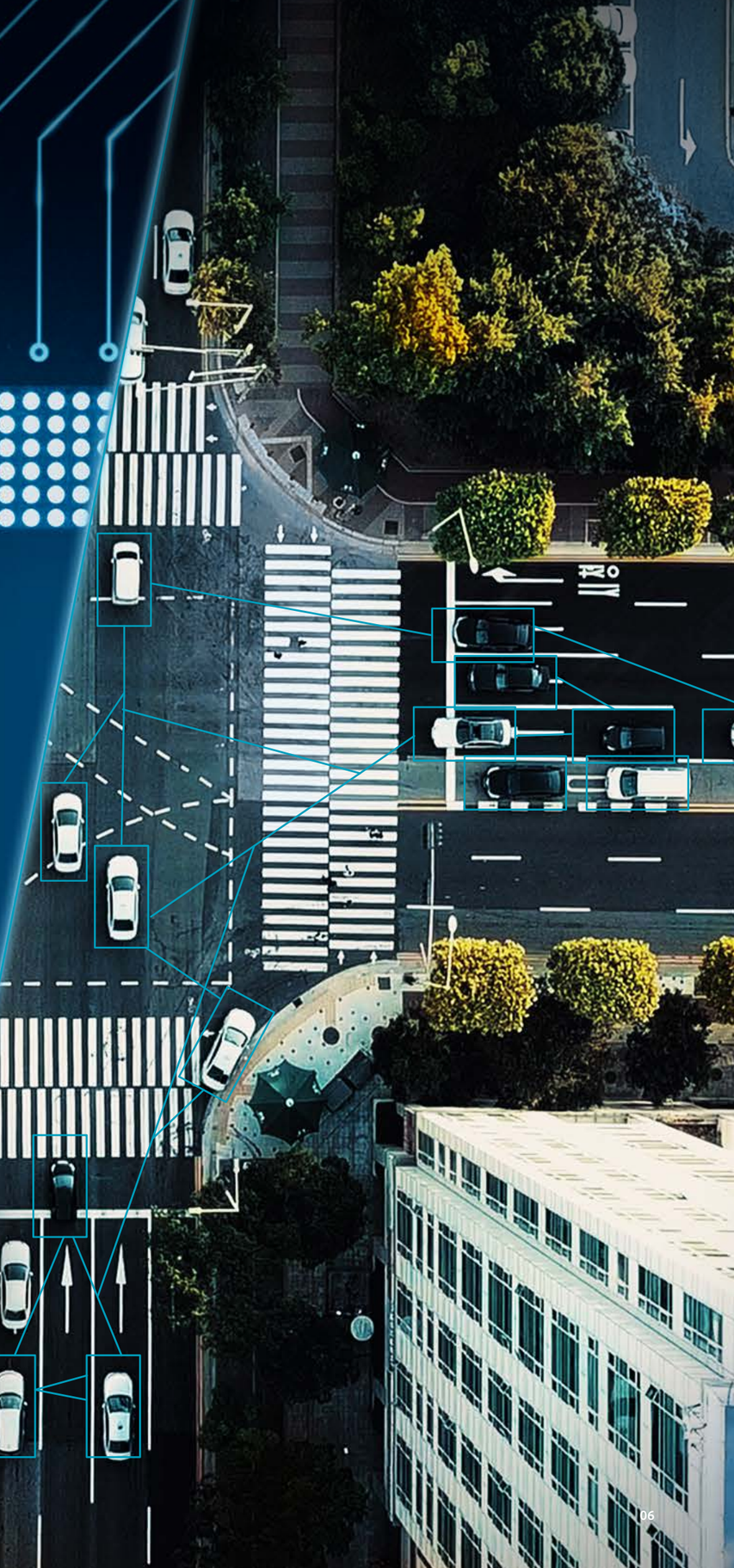
What's possible now?

Thanks to technology like IoT sensors, cheap storage capability, higher computing power, and better connectivity, the ability to harness data is challenging every industry's structure, and especially traditional original equipment manufacturers (OEMs) and operators. The way that factories work is changing, becoming smarter with the application of analytic intelligence.

Meanwhile, new industry entrants are disrupting old business models, developing new insights and monetization methods. To win in this world means creating a model of manufacturing with self-learning at its core, using the data gathered as the foundation of new value chains.

Take for example autonomous driving. It is only possible because various digital technologies, such as sensors, can be put in cars to drive them, collect data about other cars and what's happening on the streets they're driving through, and how the cars respond. Because those sensors can send data in real-time over mobile edge networks, computing decisions have to be made close to the car, so there also needs to be enough processing power in proximity to it. Consider that a single test run of a self-driving car generates petabytes of data, so there is a need for platforms to store and analyse the data for insights – at scale. And even then, real world test runs won't be sufficient to generate all the verification and validation needed to prove that self-driving cars are safe. So, there must be simulation and modelling done too, generating even more data. Autonomous driving is only possible thanks to the complex interplay of physical engineering and digital technologies that is at the core of Intelligent Industry.

Or consider the impact of AI in the research and development (R&D) process for life sciences. Thanks to AI and data analytics implemented at scale, all scientific literature, not just what human researchers can read, is available to be interrogated. Meaning that, rather than working on assumptions, the complexity of the real world can be reflected, in hypotheses and testing of new products. This will lead to not just faster time to market and reduced costs, but unexpected innovations, too.



Client success story 1

Pioneering Intelligent Products and Systems

Taking an Intelligent Industry approach meant that our client, a medical devices manufacturer, could revitalize their R&D, reducing time-to-market for end-to-end, integrated development of their next generation of connected products, as well as lowering costs, and strengthening delivery processes. We have worked with them to also develop: a product reliability prediction model, backed with performance data analytics; an upgradable connectivity solution that can be assembled on devices; and a new services model.

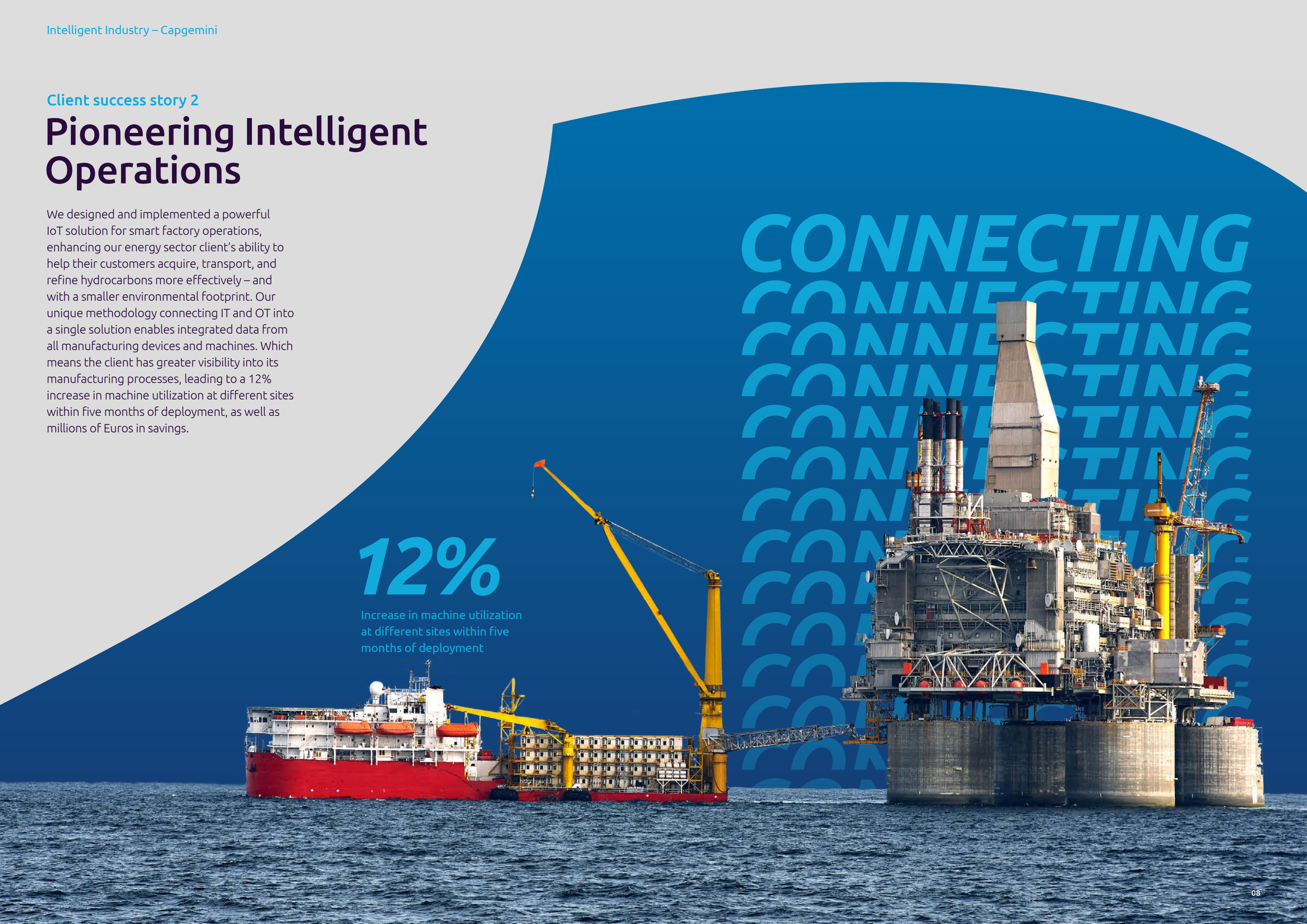
Client success story 2

Pioneering Intelligent Operations

We designed and implemented a powerful IoT solution for smart factory operations, enhancing our energy sector client's ability to help their customers acquire, transport, and refine hydrocarbons more effectively – and with a smaller environmental footprint. Our unique methodology connecting IT and OT into a single solution enables integrated data from all manufacturing devices and machines. Which means the client has greater visibility into its manufacturing processes, leading to a 12% increase in machine utilization at different sites within five months of deployment, as well as millions of Euros in savings.

12%

Increase in machine utilization at different sites within five months of deployment



Client success story 3

Pioneering Intelligent Support and Services

We helped our client, a world-leading energy and utility company, develop a smarter and safer way of maintaining its assets. Our platform allows our client to improve safety equipment inspection monitoring at its nuclear plants. Our platform enables industrialization and innovation, providing organizations with the ability to automatically collect, analyze and act on data from connected devices, sensors, machines and people.

Why work with Capgemini?

Pioneering Intelligent Industry for every industry

Capgemini is the world leader in pioneering Intelligent Industry, delivering digital transformation for the largest industrial and technology players. With the integration of Altran, the world leader in engineering and R&D services, we now have full capabilities in both industrial and digital technologies – so we can design, develop and deliver tomorrow's products and services.

What sets us apart is the combination of technology implementation at global scale, deep product engineering abilities, and extensive domain and industry knowledge – knowing the specifics of our clients' business, activities and processes.

For every sector we work in, we can identify relevant new technologies and the best way to adopt and combine them. We have the ability to think and invent with our clients, design the systems they need, build and then run them. We can find new revenue streams and cost efficiencies for our clients, transform their business models and improve experiences for their end-customers.

It is by bringing these aspects of knowledge and global expertise together that we will accelerate the three big changes – digital inside, digital continuity, and digital convergence – which will drive this intelligent industrial revolution.

The future of industry is intelligent. The future of industry is here. And it's working now.

PIONEERING INTELLIGENT INDUSTRY POWERED BY DATA

Capgemini is pioneering Intelligent Industry. Along with Altran, the world leader in engineering and R&D services, we are driving the extension and evolution of ‘Industry 4.0’ across all sectors of the economy.

Along the industrial value chain from design, research & development, engineering, manufacturing, operations, supply chain and support, we are harnessing the power of data to foster innovation, move new and differentiated smart products from concept to industrialization, improve supply chains, create new customer experiences and deliver new sources of value.

Across sectors including automotive, telecommunications, life sciences and consumer products, we help our clients anticipate, transform and react to these developments, so they keep their competitive edge, and take advantage of what is possible when everything is intelligent, and powered by data.

Visit us:
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