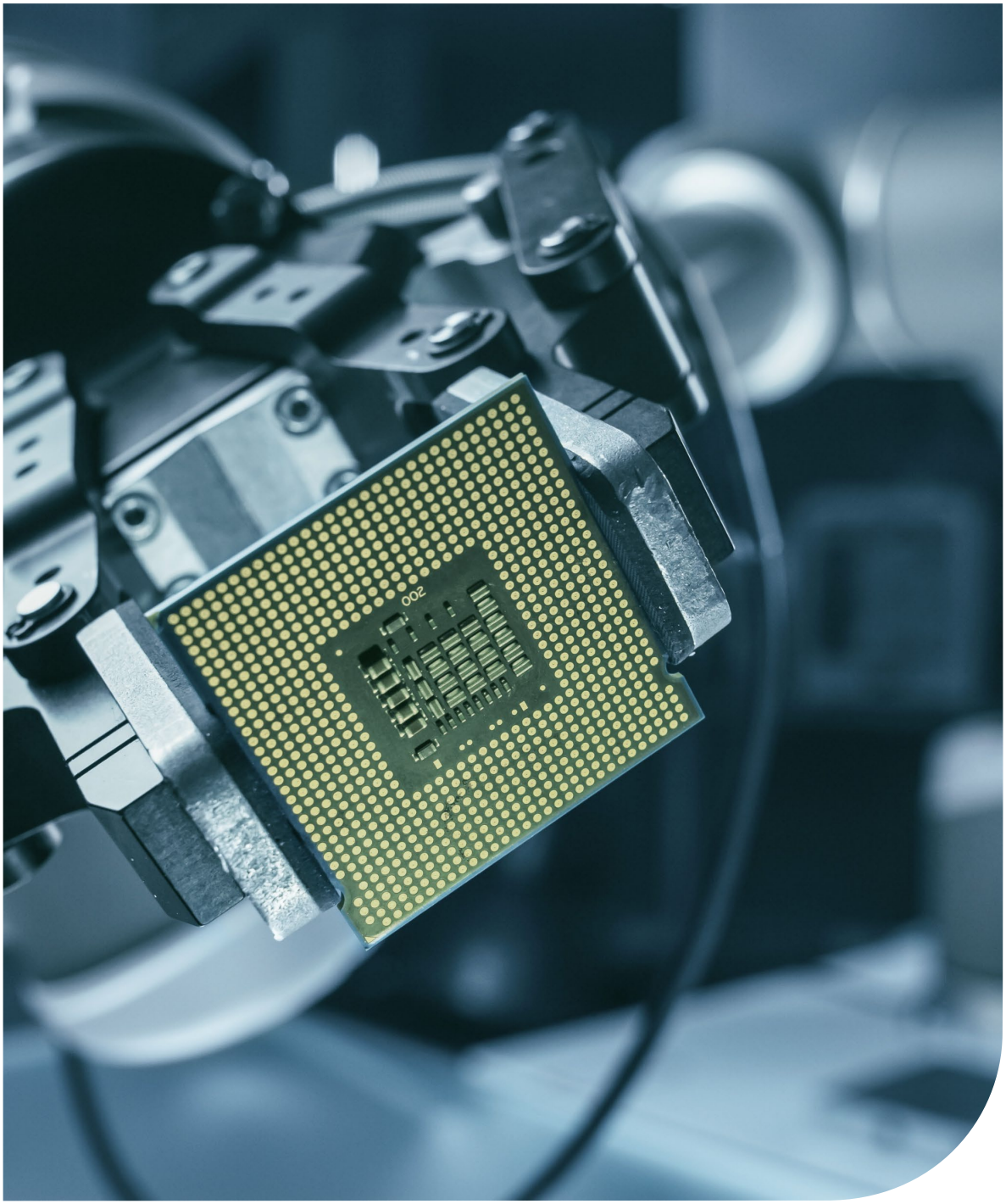


# Digitalization in the Manufacturing Industry

Trend report

# What is the Manufacturing Industry?

From food types to electricals, pharmaceuticals and transport, the manufacturing industry is responsible for transforming raw materials through various processes to create products at any scale.

Manufacturing is essential across advanced and developing economies, accounting for approximately 16% of global GDP and 14% of employment.

The manufacturing industry provides a pathway for many countries toward rising incomes and living standards. It is a vital source of innovation and competitiveness, contributing to research and development, exports, and productivity growth. For every $1.00 spent in manufacturing, another $1.81 is added to the economy—the highest multiplier effect of any economic sector.

From being the first industry to utilize automation with the Ford Motor Company in 1913, the manufacturing industry prides itself on being one step ahead of technological advancements.

However, to compete effectively and as demand grows worldwide, manufacturers are searching for methods and technology to transform production systems to reduce costs, time and human presence and improve precision and efficiency.

The manufacturing industry will face new opportunities and challenges following breakthroughs in computing, artificial intelligence, and robotics alongside new digital business models. Therefore, businesses must develop new approaches to build innovative systems that benefit everyone.

# Manufacturing from Past to Present

Five remarkable periods in the recent history of manufacturing.

Beginning in England in 1760, the first significant shift in the manufacturing industry came following the Industrial Revolution, where production changed from handmade to machine-made.

It had a dramatic effect on material costs and production times, as well as demand. As a result, new factories opened swiftly, and workers often experienced horrendous working conditions.

The assembly line became central to production through developments in machinery, allowing companies to increase their output and dramatically reduce production times and costs.

From this point, manufacturers were constantly pursuing new methods to improve the speed and economy of assembly production, resulting in the Unified Assembly Line from Buick Motor Company, capable of producing 1300 cars daily.

To improve production flow and identify and eliminate waste, the Toyota Motor Corporation developed lean manufacturing helping to streamline services and provide savings for products and services throughout the supply chain.

The system eventually began to be adapted globally, with lean manufacturing implemented across various industries, including electronics, aerospace, healthcare, and food manufacturing.

By the 1970s and 1980s, the world entered the Third Industrial Revolution as numerous sectors began to embrace technology and automation to improve productivity.

In addition, the growth of the Internet and the emergence of low-labor cost destinations had a profound impact. As a result, manufacturers could now connect with suppliers and customers globally and reduce labor costs and shipping times.

Today, manufacturing systems are predominantly machine-oriented. However, manufacturers have experimented with robotics since 1926 and have seen steady progress toward more robotic-oriented assembly and manufacturing lines.

Through industrial robots with highly-developed computing abilities, manufacturers can achieve operational freedom and a vision system that supports humans across repetitive and high-precision tasks, improving efficiency and productivity.

# What does technology mean for manufacturing companies today?

As technology and higher levels of automation revolutionize factories and operational processes, the world is primed to move toward a more efficient, seamless, and greener manufacturing industry.

Here we will discuss the trends shaping the sector's future.

**Advancements in technology**:

- 3D printing
- Artificial Intelligence and Internet of Things devises
- Data

**The Digitalization of Manufacturing**:

- Big Data and Advanced Analytics
- Digital workforce
- Digital manufacturing
- Digital warehousing
- Digital supply chain
- Digital customer experience

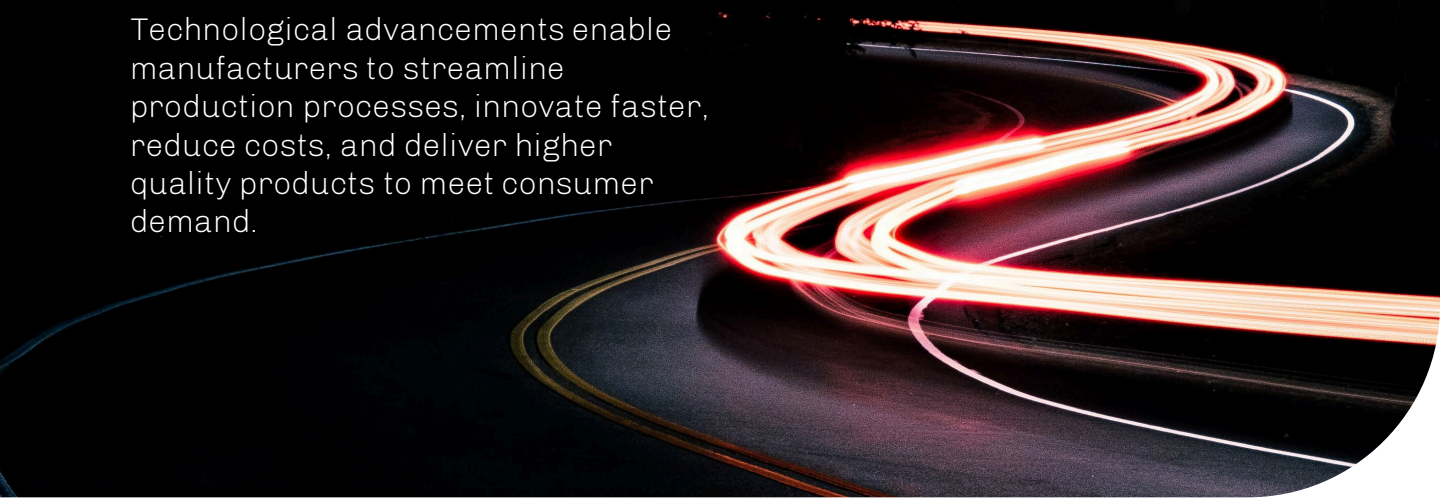
**ESG:**

- Enviromental
- Social
- Governance

# Advancements in Technology

There is no doubting the transformative effect of technology on the manufacturing industry.

Technological advancements enable manufacturers to streamline production processes, innovate faster, reduce costs, and deliver higher quality products to meet consumer demand.



Innovative and digital manufacturing methods, such as additive manufacturing, support businesses in overcoming the limitations of traditional production methods. Additive manufacturing is a production method that uses Digital 3D models to create components.

As 3D printing becomes more affordable, manufacturers can produce high-quality components whilst reducing costs and minimizing error and product failures.

Furthermore, manufacturers can transform quality control processes with automation and remote monitoring through cloud-supported AI and IoT devices.

Implementing intelligent devices across production lines and computerized manufacturing machinery can send and receive notifications about operating conditions.

For manufacturers, access to real-time data enables accurate predictions of when equipment and machinery require maintenance, improving energy efficiency, and reducing downtime and waste.

As a result of these changes, manufacturers must embrace a forward-thinking approach and adopt new capabilities to compete in a tech-dominated marketplace.

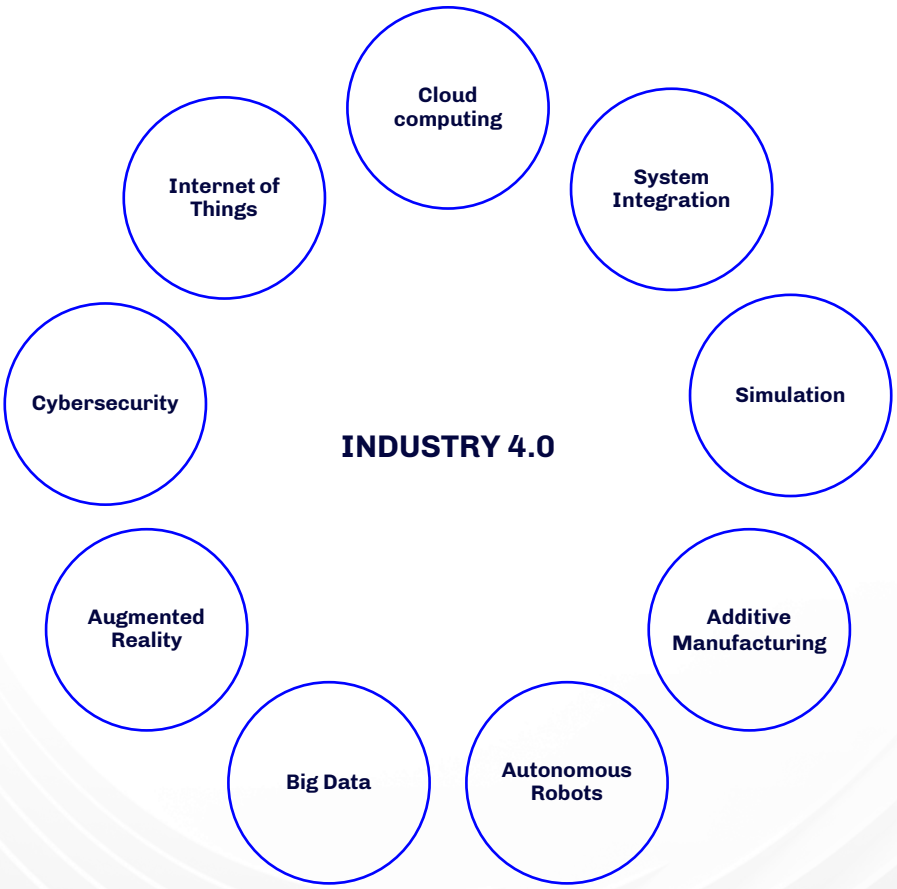
# The Digitalization of Manufacturing

Industry 4.0 represents a unique stage in the organization and control of the manufacturing value chain.

It aims to revolutionize how companies manufacture, improve, and distribute products, integrate new technology, and enhance cyber-physical systems.

Integrating traditional manufacturing, industrial factories, and innovative technology across supply chains embodies Industry 4.0. Digital control through cloud computing and IoT technologies enables information sharing to streamline operations and blur the line between actual and virtual warehouses.

Moreover, as automation grows across production processes, it allows manufacturers to detect errors better, optimize through data, and create dark factories capable of working around the clock.



# Big Data and Advanced Analytics

Big Data will help reimagine the manufacturing sector's operations and functions.

The insight acquired through data will ensure businesses can improve their decision-making across the manufacturing value chain, from procurement to material handling, production processes, packaging, and logistics.

Intelligent devices and machine-learning equipment will help to pave the way for a self-diagnostic and predictive maintenance approach.

Analyzing data collected from sensors on the factory floor will provide real-time visibility of assets. Thus, enabling predictive maintenance that minimizes equipment downtime and reduces capital expenditure.

Furthermore, closer collaboration across the supply chain is possible through improved connectivity, shared data, and better analytics.

Collecting and sharing data between departments will make it easier for businesses to achieve targets.

Through automation and other technological advancements, there is the potential for growth across all elements of the manufacturing value chain. Across digital manufacturing, warehouses, supply chains, and customer experience, the possibilities are endless.

## Digital workforce

As robotics and automation technologies develop, the capabilities of machines to fulfill both manual and cognitive tasks without human intervention grows.

For the manufacturing industry seeking to deliver faster and more precise processes, improve product quality, and reduce labor costs, the rise of dark factories will allow them to capitalize on technological advancements.

A dark factory is a fully automated industrial production site. Automated machines carry out the entire production process, from entering raw materials to delivering finished products. Without any direct human operation, dark manufacturing allows for a 24-hour production process running 365 days a year

Many factories globally have adopted industrial automation. However, despite technological growth, human involvement is still necessary within the manufacturing industry across inspection, quality assurance, and shop floors.

Operating a modern production system requires the co-existence of machines and humans.

As technology improves, industrial leadership must help empower the workforce, make work more accessible and inclusive, and support the upskilling and training of the workforce.

## Digital manufacturing

Across the manufacturing production chain, digital tools are helping improve its processes' effectiveness and deliver tailored solutions to its customers.

Manufacturers are acquiring a better insight into issues such as inventory levels, delivery statuses, and demand cycles through automated cloud-based solutions. Therefore, supporting manufacturers to make informed decisions and deal with irregularities in both supply and demand.

Moreover, on the factory floor, the addition of sensors to manufacturing equipment enables manufacturers to predict maintenance intelligently, reducing downtime, and lost revenue.

Whereas for customers, whilst the first industrial revolution developed the techniques necessary for mass production, Industry 4.0 seeks to offer mass customization.

Today, smart factories can produce customized goods that meet individual needs more cost-effectively. In addition, advanced simulation software applications, new materials, and technologies such as 3-D printing allow manufacturers to create specialized items for customers.

## Digital warehousing

Manufacturing organizations must invest in their warehousing and distribution facilities to cope with the growing demand from e-commerce platforms and meet consumer expectations.

Yet, there remains room for improvement within warehousing from an automatization perspective.

Whereas in traditional warehousing, inventory control and operator task organization are manual processes, a digital warehouse can help increase the speed and accuracy of various tasks, make it possible to control stock in real-time, and shorten delivery periods.

Moreover, creating internal and external datasets simulates and predicts real-world situations and provides real-time insight into warehouse operations' status and condition, helping to boost efficiency by 20% to 25% in some estimations.

Improving business intelligence around a company's warehousing through higher data quality can support operational optimization, such as inventory management and ordering systems. Furthermore, it can design storage mechanisms that minimize retrieval time and cost.

The digital management of goods improves the safety and speed in storage and order picking tasks. Therefore, as more businesses face growing challenges, digital warehousing is, for many, the necessary solution.

## Digital supply chain

Manufacturing operations are dependent upon a transparent, efficient supply chain. However, supply chain disruptions continue to challenge the industry, with 28% of industry professionals experiencing stock shortages during the Covid-19 crisis, leading to delays with customer orders.

In some cases, this has resulted in businesses seeking to bring manufacturing operations back from offshore locations. According to the US Reshoring Initiative, manufacturers created 338,000 manufacturing jobs in the US between 2010 and 2016.

However, the activity has prompted fears that reshoring production may lead to a less-open global economy and hinder economic activity as efficiency decreases and labor costs rise.

Therefore, digital technology is pivotal in helping manufacturers build a more resilient supply chain.

Manufacturers are safeguarding their supply chains through autonomous planning with AI and machine-learning algorithms, supplemented by internal and external data regarding suppliers, customers, weather forecasters, demographic sources, and broader economic indicators. The data accumulated regarding the supply chain can support manufacturers in many ways.

For example, if an assembly line is experiencing a disruption, deliveries can be rerouted or delayed to reduce wasted time or cost. Additionally, by studying weather, transportation partner and retailer data, companies can use predictive shipping to send finished goods and better schedule deliveries to meet consumer demand.

## Digital customer experience

The manufacturing industry has historically been slow in prioritizing customer experience improvements or adopting new customer experience channels and engagement tools. However, they are quickly waking up to its benefits.

As the presence of digitalization across the manufacturing value chain grows, manufacturers are connecting the ability to offer customers attractive customization options and reduce the time to create, receive, schedule and process customer orders to ensure happy, returning customers.

The integration of elements that support improving customer experience is increasing across standard manufacturing processes.

The influx of innovative digital technologies, such as 3-D visualization and Virtual Reality (VR), provide customers with an immersive experience where complicated, configurable items come to life.

Moreover, as consumer demands continue to grow, manufacturers must meet and surpass their expectations or risk losing customers to competitors who can.

The challenge for manufacturers is maintaining a positive customer experience throughout their products' lifecycles.

For example, delivering proactive customer support services such as chatbots can ensure customers feel connected. A survey found that 64% believe 24-hour service is the best feature of a chatbot, empowering customers by being ready to answer queries no matter the time.

In addition, manufacturers can now produce a real-time, comprehensive data stream of consumer input. The data can deliver updates on the product's health, usage, and whether they are satisfying customer expectations.

With this unrivalled insight, manufacturers possess the key to improving the delivery of their services and, most importantly, customer experiences.

# ESG

The pressure on organizations to prove they are helping to address vital environmental, societal, and governance issues has rapidly intensified.

The manufacturing industry must embrace more environmentally and ethically-sound approaches to remain competitive. Consequently, ESG frameworks are gaining traction across organizations today.

An ESG framework assesses the impact of a company's sustainable and ethical practices on its financial performance and operations.

No longer solely focused on delivering value for shareholders, ESG is redefining priorities for companies, urging them to seek goals that are not financial or competitive. Including providing consumer value, investing in employees, dealing fairly and ethically with suppliers, and supporting communities in which they operate.

Since 2020, 57% of CFOs have emphasized ESG initiatives, with 23% saying they're more important than ever. ESG is ushering in a new framework for evaluating businesses' sustainability efforts and elevating sustainability in manufacturing.


## Environment

A company's use of energy, its impact on pollution and natural resource conservation, and energy efficiency from shopfloors to headquarters are under much scrutiny.

Manufacturers are under significant pressure to develop more ecologically friendly industrial processes and make more sustainable investments. It has certainly become a priority, with reportsa record $120 billion was invested sustainably in 2021.

Additionally, an example of a company moving toward more sustainable processes comes from the Danish multinational brewer, Carlsberg.

They have invested in technology that allows them to run a brewery that eliminates water waste. Thus, Carlsberg can reuse 90% of processed wastewater and reduce energy consumption by 10%.

## Governance

Businesses must comply with stringent ESG-related targets, from carbon emissions to delivering gender-equal pay. In addition, it emphasizes ethics, openness, and transparency within decision-making across an organization.

An inability of companies to comply with ESG initiatives may result in significant regulatory penalties. For example, the failure to satisfy sustainability targets may result in severe fines for manufacturers.

## Social

For businesses, factors such as their industry relationships, support of gender and diversity equality, health, and safety, their impact on local communities and protection of workers' rights are vital to compliance with the ESG framework, as well as retaining and growing their customer base.

Many workers, particularly millennials and Gen Z professionals, seek employers with strong ESG track records. Furthermore, younger customers are nearly twice as likely to consider ESG issues when purchasing.

Manufacturing companies that fail to act may struggle to attract the talent they need to thrive in the future and the revenue to innovate.

Therefore, to create better workplaces, ensure worker safety, and provide clarity on their environmental impact, manufacturers must embrace new technologies to acquire the visibility and data necessary to build and manage their ESG programs.

For example, for a long time, factories have not been renowned for the best working conditions. Yet, with robotics and automation technology facilitating the move toward dark factories, innovative factory capabilities allow machines to take over much of the hard work.

Recent events have awakened companies to commitment to ESG matters more than ever.

Repositioning environmental, social, and governance priorities from risk to opportunity is the first step to generating meaningful progress, creating lasting growth for all stakeholders, and building a more sustainable society.

From which manufacturers will play a vital role in the transformation.

# The 7N Way: The flexible IT consultancy

A global network of extraordinary IT people – delivering on clients' objectives and beyond

## Sector expertise drives the digital transformation

In recent years, macro events have increased the pace of innovation, development cycles, and competition, while creating an ever-changing risk landscape. Armed with knowledge of these trends and their implications on the business, our agents and consultants can help mitigate risk and identify opportunities in our clients' business cycle.

Over decades, 7N has been part of several waves of digitalization. Today, our consultants work across industries and geographical borders to deliver the projects that define the new digital realities.

We offer clients a highly specialized portfolio of IT services and solutions delivered by the top 3% of IT professionals. Our expertise spans across many industries providing digital transformation across all phases of the IT project life cycle.

By engaging early with 7N, our clients already benefit from our expertise when defining project scope and strategic needs, and they always gain flexibility to adapt and accommodate changing demands while retaining control and maintaining ownership of IT development in-house.

## How we deliver high-performance IT

Delivering with high efficiency shouldn't lead to higher workload. We build efficient teams, where expertise and experience accelerate more than headcount and capacity. In doing so, we helm form small, highly efficient teams, staffed to maximize client impact.

## A tailored recruitment process refined over 30 years

We have a sophisticated our best-of-breed approach to identifying and quality-assuring top 3% IT professionals. Our model is designed to identify personal capacities, professional skills, and drive to deliver to our clients. For all clients, we have dedicated recruitment teams with extensive local knowledge and global reach for candidate sourcing. We tailor our recruitment process to each client's technical and cultural needs.

# Connect with our advisors

Schedule a meeting and hear more about how we can help you assess your possibilities and overcome your challenges.

GET IN TOUCH


7N Group is an elite IT consultancy agency with more than 20 years of market experience in serving all aspects of critical IT projects both within the public and private sector.

We have dedicated ourselves to finding the right match between our consultants and the companies we serve – we believe that is how the best results are created. At 7N, we have built a professional community of extraordinary people. A community dedicated to achieving professional and personal development. A place where the best gets to play with the best.

www.7N.com | info@7N.com