Reimagining the supply chain in the era of Intelligent Automation

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Executive summary

Every business on the planet strives to increase revenue, enhance profitability and delight customers. In the past, organizations mainly focused on achieving customer satisfaction with timely product or service fulfillment. Today, however, most organizations recognize it's no longer enough to compete merely on products and services – instead, it's about managing customer experience throughout the buying journey.

We could go as far as to say this is the era of the experience economy. Most organizations delight their customers by meeting their needs, solving their problems and providing experiences marked by immediacy, vantage and customization.

To my mind, what really matters in this development is the outcome of customers' needs. It's the end result customers are bothered about. For example, B2B network equipment manufacturers are not only focused on meeting their immediate obligations on product delivery, but on sensing the data usage behind the equipment they provide. This might be a key driver for network equipment towers to be installed, or it may be that some infrastructure is gradually replaced by small cell technology. In short, the manufacturer is selling the promise to deliver the outcome. Similarly, in the chemical industry many companies promise an improvement in crop yields as an outcome. Consumer packaged goods (CPG) businesses and retailers are embarking on the same path. They are not only focused on meeting their customers' requirements, but on creating new adjacent needs by predicting their wishes and selling the promise that they will be fulfilled.

So, the next wave of evolution and differentiator will be the "outcome economy." It not only addresses customer end needs by selling a promise of outcome; it also senses and creates wish lists that open new sales opportunities for businesses to improve revenues and profitability, to deliver an notable return on investment and assets, and to achieve a substantial reduction in Total Cost of Ownership (TCO). Many companies such as Amazon are really leveraging their artificial intelligence (AI) tools to enable it, and we have all seen their growth over last few years.
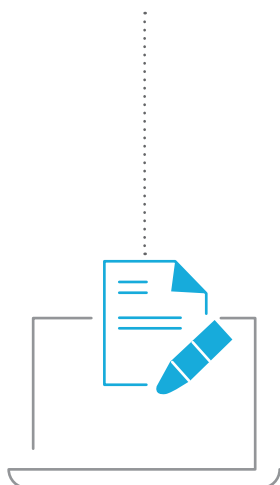
Challenges and opportunities

"Amazon-like" has become an industry standard for customer experience. Look at the convenience of placing orders with one-click checkout, real-time feedback from other buyers, and complete visibility on delivery status. For customers, the service not only meets immediate requirements but creates a need for something of which they may not even have been aware until it was recommended. For Amazon itself, it opens sales avenues and creates a phenomenal growth trajectory. To achieve customer experience at this level you need an entire digital ecosystem in the background to make it happen.
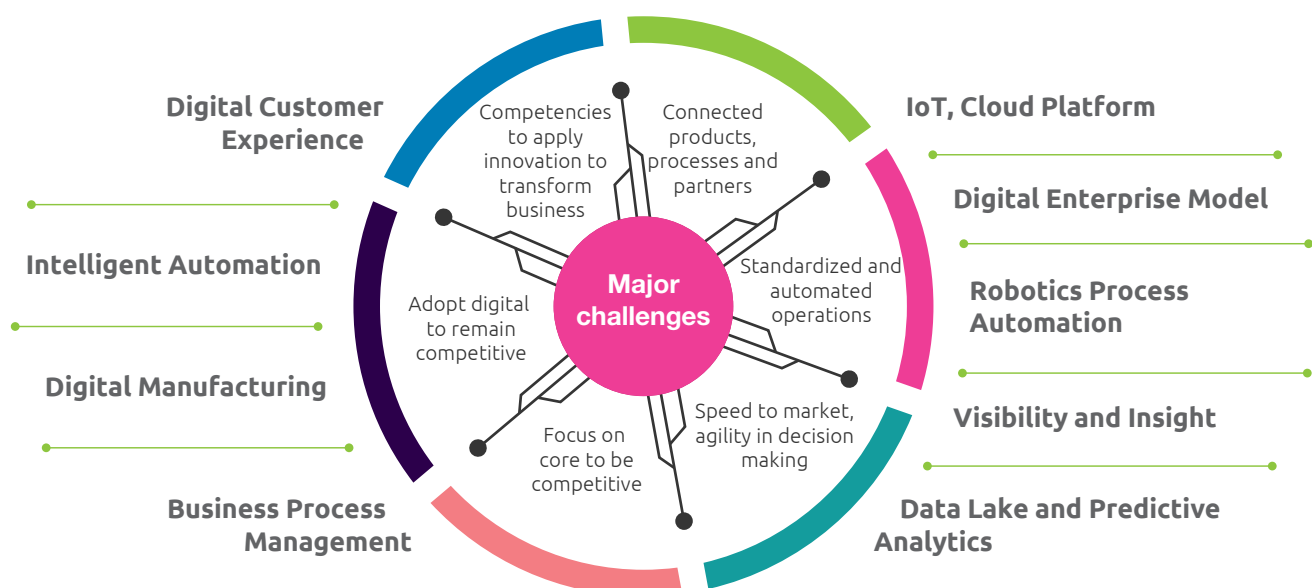
A compelling customer experience has evolved from a nice-to-have to a necessity in many industries. Customer expectations are growing at much faster pace, with individualization and customization, online enabled transparency and easy access to a multitude of options driving increased competition in the business supply chain. In addition, the rapid proliferation of total item variants is adding significantly to costs.
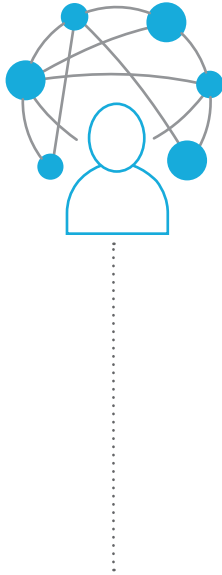
The major challenges are segmented into:
- Interactions with customers and analysis of data touch points.
- Sensing the demand and fluctuations well in advance.
- Agile and decisive actions through real-time insight to respond to evolving needs.
- Collaboration with partners for speed to market.
- Complex processes and technology landscape leading to longer lead times.
- Transparency and visibility across the value chain.

To meet today's supply chain challenges, business are embarking on digital transformation. Successful digital transformation comes not from implementing new technologies alone but from transforming the organization to take advantage of the possibilities that new technologies provide. Major digital transformation initiatives are centered on re-imagining the customer experience, operational processes and business operating models.

Moving to the digital age

Digital Customer Experience

Intelligent Automation

Digital Manufacturing

Business Process Management

Major challenges

Competencies to apply innovation to transform business

Connected products, processes and partners

Adopt digital to remain competitive

Standardized and automated operations

Focus on core to be competitive

Speed to market, agility in decision making

IoT, Cloud Platform

Digital Enterprise Model

Robotics Process Automation

Visibility and Insight

Data Lake and Predictive Analytics

The fusion of the physical supply chain and the virtual world into cyber-physical ecosystems will drive transformation across industries and their supply chains. Big Data, advanced analytics, robotics and intelligent automation, cognitive artificial intelligence and the Internet of Things (IoT) are creating additional opportunities along the entire industry value chain.

It's a case of "adapt or perish" – across industries, digitization coupled with transformation of the operating model is changing the rules of the game. Businesses that fail to change will be overtaken by their competition. Manufacturing companies are applying advanced analytics to predict the health of their installed bases and reduce downtime with data gathered from IoT sensors. They are also installing robots to carry out shop floor assembly activities to improve efficiency and reduce costs. CPG businesses are implementing algorithm-driven sensing platforms to predict demand well in advance so as to minimize drop orders and optimize inventories. Customer services functions are heavily deploying cognitive and AI applications to enhance critical customer interactions.

Transforming the supply chain through intelligent automation

The pre-digital economy was designed principally for efficiency, but in the digital economy, agility, scalability, responsiveness and transparency are key. Digital supply chain transformation is built upon four key pillars:
- Connected ecosystem
- Intelligent processes
- Cognitive analytics
- Autonomous fulfillment

This process not only drives optimization of processes and operations – it opens channels to new innovative business models. Here's a little more on those key things it brings to the business:

- **Agility** – redesigning the operating model to make it modular, flexible and boundless to adapt to the evolving market landscape.
- **Scalability** – the capacity to reinforce speed to market from product inception to commercialization.
- **Responsiveness** – the capacity to make quick and informed decisions to respond to the market in real time.
- **Transparency** – empowering employees, customers and partners to interact seamlessly, extending real-time visibility across the value chain

Successful digital transformation comes not from implementing new technologies alone but from transforming the organization to take advantage of the possibilities new technologies provide. This journey has three phases:
- Reimagine – new growth paths, making today's business relevant for tomorrow.
- Reengineer – achieve more with less to deliver better business outcomes.
- Run & refresh – navigate change and orchestrate new, innovative ways of working.

By way of example, here's our own approach here at Capgemini:

How should CXOs themselves approach this challenge? There are endless tools, technologies and applications available, but what matters is selecting not just the best tech but the one that offers the best and most appropriate way of working in prevailing circumstances.

Reimagine	**Reengineer**	**Run and Refresh**
new growth paths, making today's business relevant for tomorrow	Achieve more with less to deliver better business outcomes	Navigate change and orchestrate new, innovative ways of working

	Reimagine	**Reengineer**	**Run and Refresh**
Assets	• Accelerated Solution Environment • Applied Innovation Exchange • Design Thinking	• Digital Enterprise Model • CG IP and Partner tools (Apps Hub) • Supply Chain Transformation office	• Sector and Domain Expertise • Physical and Virtual Delivery Network • Analyst and advisor recognition
Impact	• Agile Operating Model • Digital enterprise and experiences • Organizational alignment	• Benchmarking and transformation plan • Intelligent Automation • Supply Chain Transformation office	• Sector best practices orchestration • Anytime, anywhere services • Proven methodologies and execution

The four key pillars of intelligent automation in the supply chain

Connected ecosystem

Advances in digital technology have changed the buying behavior of customers in both B2B and B2C, giving them access to an array of channels to research, compare and customize the products and services they seek. In turn, this channel proliferation creates unparalleled opportunities for businesses to engage meaningfully with customers and provide differentiated experiences.

To leverage customer interactions and drive revenue growth, companies have invested heavily in omnichannel platforms; but they need to go a stage further, converging views across channels to create a single view of the customer, a single version of the truth, which enables them to respond with a similarly unified experience. This connected ecosystem requires a synchronized operating model in which all the company's functions are aligned to present a single face to the customer, as well as one consistent way of doing business. In B2B markets, companies are providing one single checkout portal to configure the products and services and to order, amend, track and pay in a seamless way. End-to-end integration across the value chain enables real-time visibility, prioritizing and the ability to revise services ordered.

Digitization can break down barriers, so the supply chain can become a completely integrated ecosystem that is fully transparent to all the players involved, from the suppliers of materials and parts to the transporters of those supplies and finished goods, and finally to the customers demanding fulfillment. The digital supply "network" will offer a new degree of resiliency and responsiveness, enabling

first-mover companies to beat the competition in the effort to provide customers with the most efficient and transparent service delivery.

Collaborative cloud-based platforms – now that supply chains have moved in many cases from being linear to something more tangled, in order to improve time-to-market and fulfill customer demands promptly, organizations must collaborate and integrate partners to arrive at a single version of the truth. The operating base has to be a collaborative multi-enterprise model. As organizations grow across geographies and functions, different versions of ERP arise, which then blocks an end-to-end view of the enterprise and creates much more difficult outside boundaries with partners. Collaborative cloud-based platforms, which are non-invasive and sit on top of multiple ERPs with standard connectors, can bring an enterprise, partners and customers under one roof to deliver real-time end-to-end "run" visibility for prompt decision making. These platforms can create customer-oriented networks, from point-of-sale (POS) through to the enterprise, within which manufacturing units and distribution centers can plan for demand by engaging with suppliers for fulfillment. For instance, some CPG companies can allow customers to custom-mix their own drinks at vending machines, disrupting the traditional distribution model while also capturing valuable customer insights for future products.

Connected field services – regardless of whether it's B2C or B2B, customer relationships and experience depend not only on product but also on service, and that's where the aftermarket plays a critical role. Connected field services are key differentiators in providing prompt services and minimizing downtime. Digital platforms today enable real-time connectivity and collaboration between customer service representatives, field technicians, suppliers and logistics providers, delivering manifold improvements in the efficiency and effectiveness of the service value chain. Companies that can put together all these pieces in a connected and fully transparent system will gain a huge advantage by creating tangible value in the areas of customer service, flexibility, efficiency and reduced costs.

Blockchain – as discussed, the supply chain is no longer linear: it's a network ecosystem that can be overly complex and hinder visibility and transparency. Blockchain, though, which is new to the supply chain, will be able to resolve challenges around visibility, transparency, and accountability among partners. Compliance with stringent regulations around product quality, safety and environmental impacts, have created huge obligations for organizations. Blockchain will be able to provide a comprehensive solution by tracking and traceability of goods and services at each step, thereby facilitating trust.

Already complex supply chain pathways are often further hindered in efficiency by redundant systems and processes, reducing accessibility and transparency. Blockchain makes use of an open-permission ledger system to create an ecosystem in which information flows openly. This helps reduce assumed risks while minimizing total costs and driving agility and adaptability.

The Internet of Things (IoT) – the digital supply chain is where the physical meets the virtual. We see this in particular in IoT and in the sensors, servers, data lakes, analytics engines, insight and visualization tools that inhabit this world. This environment creates meaningful data but in vast quantities, analysis of which necessitates cognitive computing. We'll be turning to this area shortly.
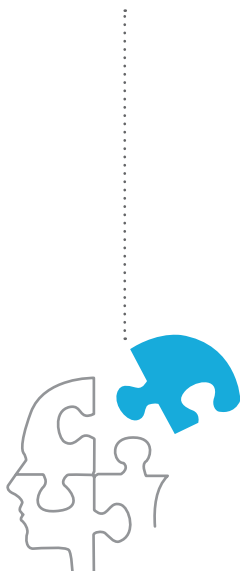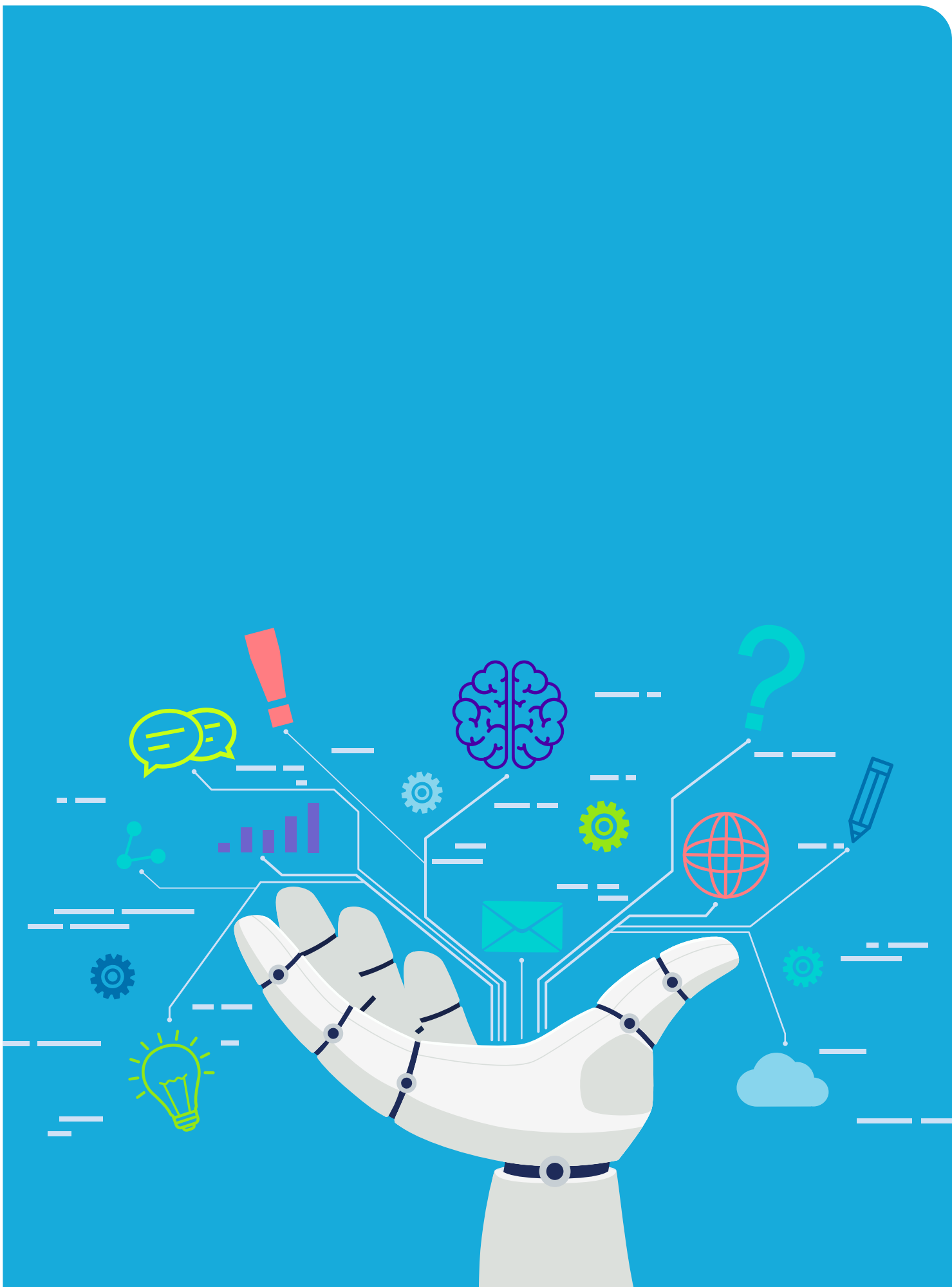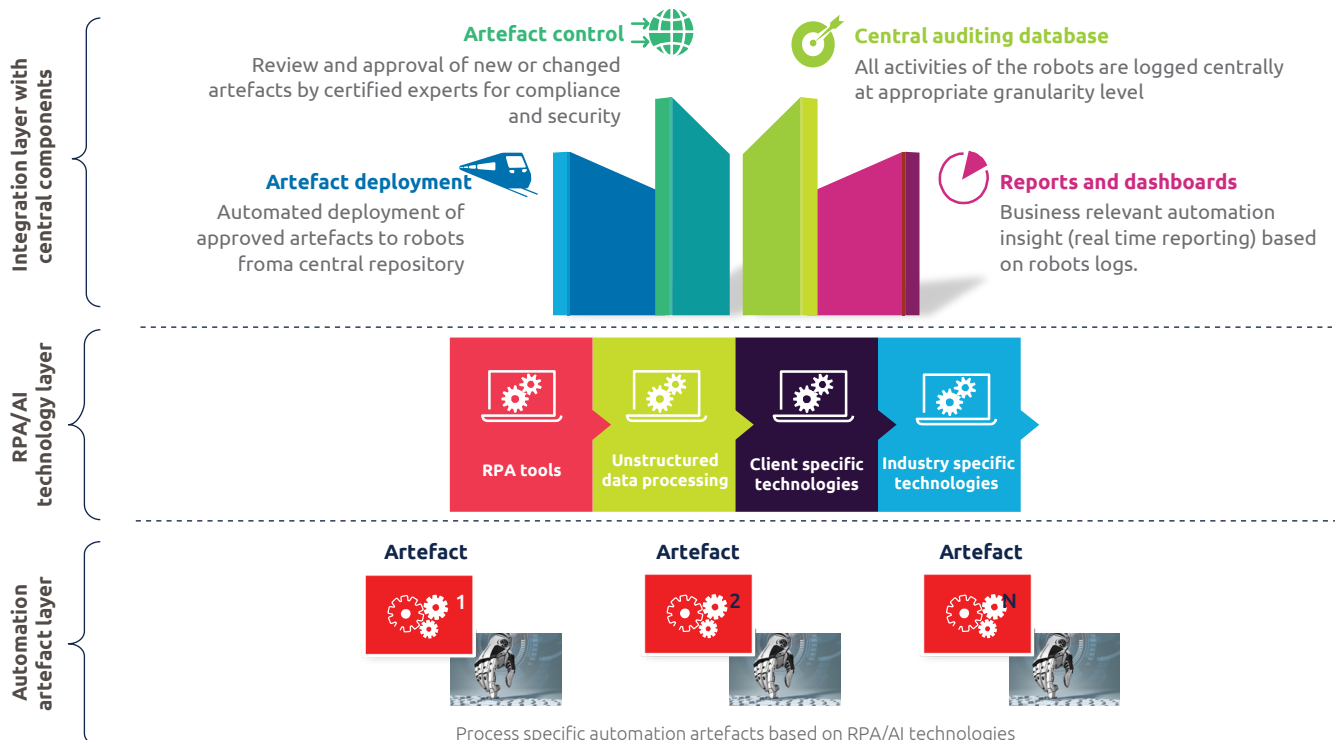
Intelligent processes

In the last few decades we have seen an evolution in automation from task automation to the automation of data center operations to process level automation. Organizations are striving to do more with less to lower costs by improving efficiency, effectiveness, accuracy and minimizing resource deployment across their supply chain processes.

Robotic Process Automation (RPA) – most organizations across CPG, high tech manufacturing, healthcare and the chemical industry are embarking on RPA for process automation, particularly in areas that are high-volume, repetitive and rule-based, such as orders and claim processing, invoice creation, and reports and dashboards. RPA software bots can monitor inventory, generate notifications and reorder products when levels go below a set threshold. It frees up time and resources to work on high-value exception-based requirements. RPA is quite effective in lowering service costs by improving productivity by 40–60%, although results can vary in relation to the nature of the processes involved and their maturity levels.

Processes gain in complexity as a result of multiple handshakes, a proliferation of intermediate steps, and fragmentation across regions and markets. Automating processes without first addressing this issue would mean not only perpetuating waste but automating it too. It's imperative that processes are first transformed to become lean, standardized and harmonized. Reading from "E" to "R," the methodology below illustrates a useful approach:
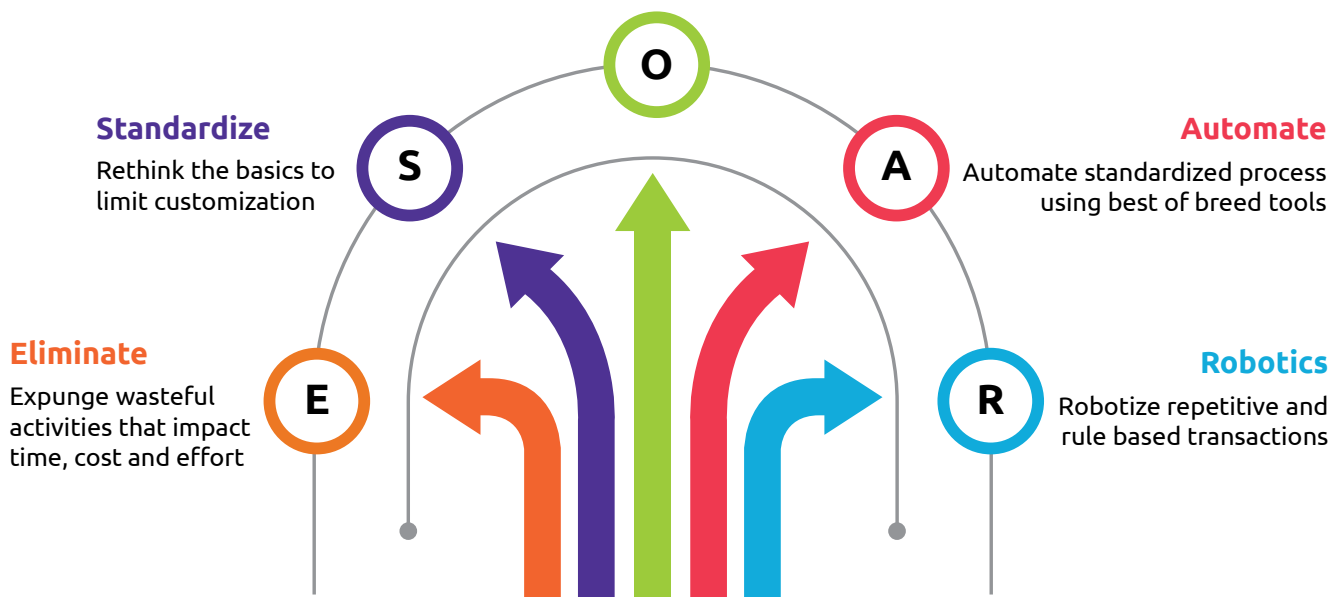
Self-learning algorithm-based demand sensing – organizations are frequently surprised by volatility in demand, with fast-changing customer requirements, changing minds and an abundance of alternatives. As forecast errors have cascading impacts on planning, inventories and fulfillment, it is critical to sense true

Integration layer with central components

Artefact control
Review and approval of new or changed artefacts by certified experts for compliance and security

Central auditing database
All activities of the robots are logged centrally at appropriate granularity level

Artefact deployment
Automated deployment of approved artefacts to robots froma central repository

Reports and dashboards
Business relevant automation insight (real time reporting) based on robots logs.

RPA/AI technology layer

RPA tools

Unstructured data processing

Client specific technologies

Industry specific technologies

Automation artefact layer

Artefact 1

Artefact 2

Artefact N

Process specific automation artefacts based on RPA/AI technologies

demand – which is often quite different from the forecast calculated by analyzing historical information using quantitative and qualitative methods.

Organizations have to start deploying self-learning algorithm-based demand sensing using real-time demand signals. It synthesises multiple data sources such as points-of-sale (POS), social media interactions, economic indicators and weather conditions, and analyses masses of data to deliver insights. Demand sensing

Standardize
Rethink the basics to limit customization

O

S

A

Automate
Automate standardized process using best of breed tools

Eliminate
Expunge wasteful activities that impact time, cost and effort

E

R

Robotics
Robotize repetitive and rule based transactions

provides a step-change in forecasting added value and in reducing extreme error.

The use of real-time signals in demand prediction is a game changer because it creates forecasts in sync with current market conditions instead of relying on historical shipments and well-meaning but often biased input from sales and marketing. As a result, short-term forecast error is typically cut by around 30–40% compared to traditional demand planning.

One of the advantages of automated algorithms is that they are free of human bias and have no concept of gaming the system.

Cognitive analytics

Data is the principal driver behind the smart connected supply chain. Assimilation and analysis of both structured and unstructured data across diverse sources can provide critical insights and information.

Every activity in the supply chain network is generating a tsunami of data, mainly across stakeholders and partners external to the organization. All this information from connected products and services has the potential to drive operational excellence and new operating models. But the key challenge lies in the nature of that information. 80% of the data generated is unstructured. It's sometimes known as "dark data" – examples are images and videos that can't be analyzed by conventional IT methods because they can't understand natural language or recognize objects or patterns in images.

Data is a treasure trove, but organizations that fall behind in deploying cognitive analytics are obliged to survive on the interpretation of just 20% of their data, which will not able to provide sufficient insight into current market trends and fast-evolving customer buying behaviors. As a result they will not able to transform their operating model, reducing their ability to compete.
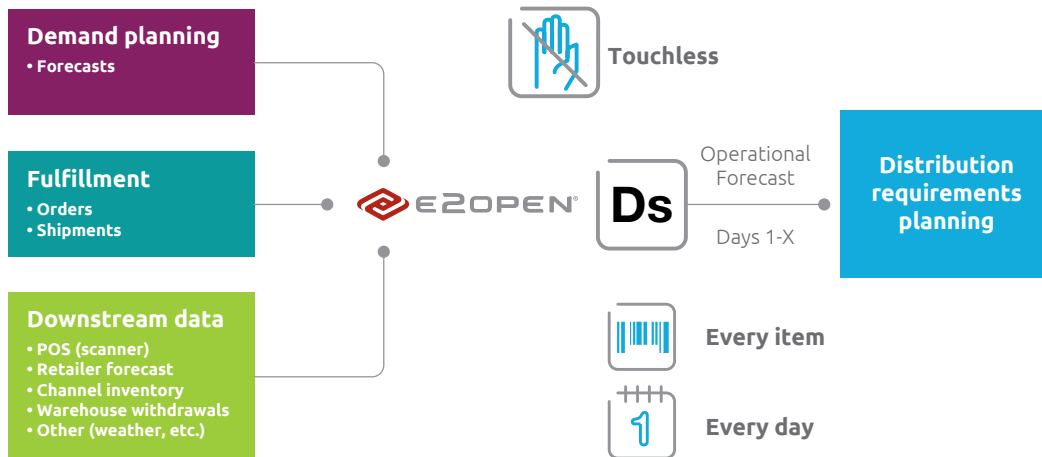

To thrive in today's digital world, the key differentiator is predictability. Organizations need to:
- Predict demand well in advance to plan inventory and fulfillment.
- Predict the health of an installed base and avoid downtime.
- Sense consumer choices to bring new products quickly to market.
- Obtain real-time data and insight to make prompt and informed decisions to delight customers.

Predictive analysis is a game-changer. Cognitive computing with its ability to analyze more variables is able to make predictions with greater forecast accuracy. Cognitive technology allows computers to interpret deeper reasoning behind data correlations and use advanced algorithms to interpret text in order to derive insights and sentiment from unstructured data. Better predictions can help eliminate things like the dreaded bullwhip effect.

Retail POS data can contain a wealth of insights into consumer preferences and demand. Data is generated through diverse channels including OTC (over the counter), web browsing, e-commerce and product evaluation through social media platforms such as Facebook. Cognitive computing enables organizations to analyze data patterns, and find correlations promptly to predict consumer demand and personalize services. Manufacturing companies are installing sensors in their installed base to enable tracking and traceability, to assess the health of assets, and also, through cognitive analysis, to predict potential failure and carry out preventive maintenance, which in its turn improves return on investment (ROI). Logistics providers have started making use of smart containers embedded with GPS tracking and sensors which generate location data in controlled conditions so as to trace movement and protect products. This is also improving container utilization and availability leading to better return on assets (ROA).

Organizations have to deploy a comprehensive approach to cognitive analytics covering data collection, aggregation and analysis to handle the barrage of data with variety, velocity and volume, to convert into insight at speed, to scale and visualize for fact-based decision-making and to solve persistent problems.
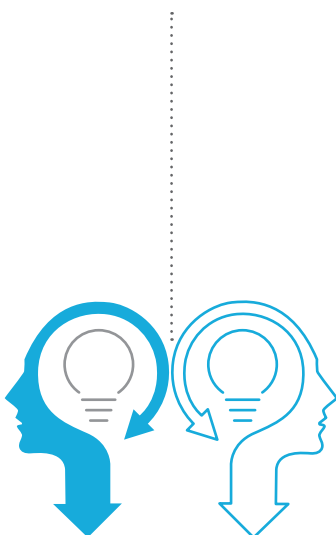
Companies need to transform their supply chains by investing in these cognitive technologies, using talented data scientists to create a customer-centric operating model that extends from new product design right through to fulfillment.

Companies are embarking on digital transformation to achieve the next level of operational excellence, leveraging emerging technologies such as advanced robotics, advanced analytics, artificial intelligence and machine learning. To create sustainable value they are adapting to new business models such as smart factories, smart products, smart supply chains and connected field services.
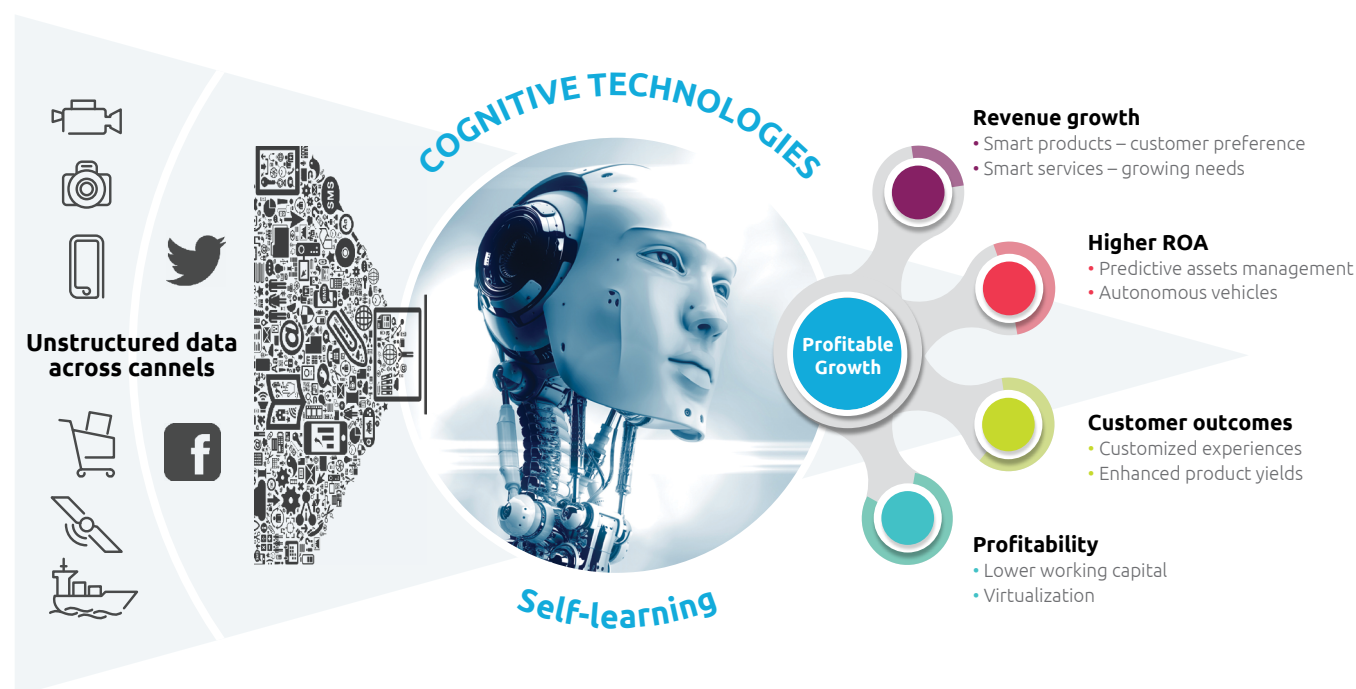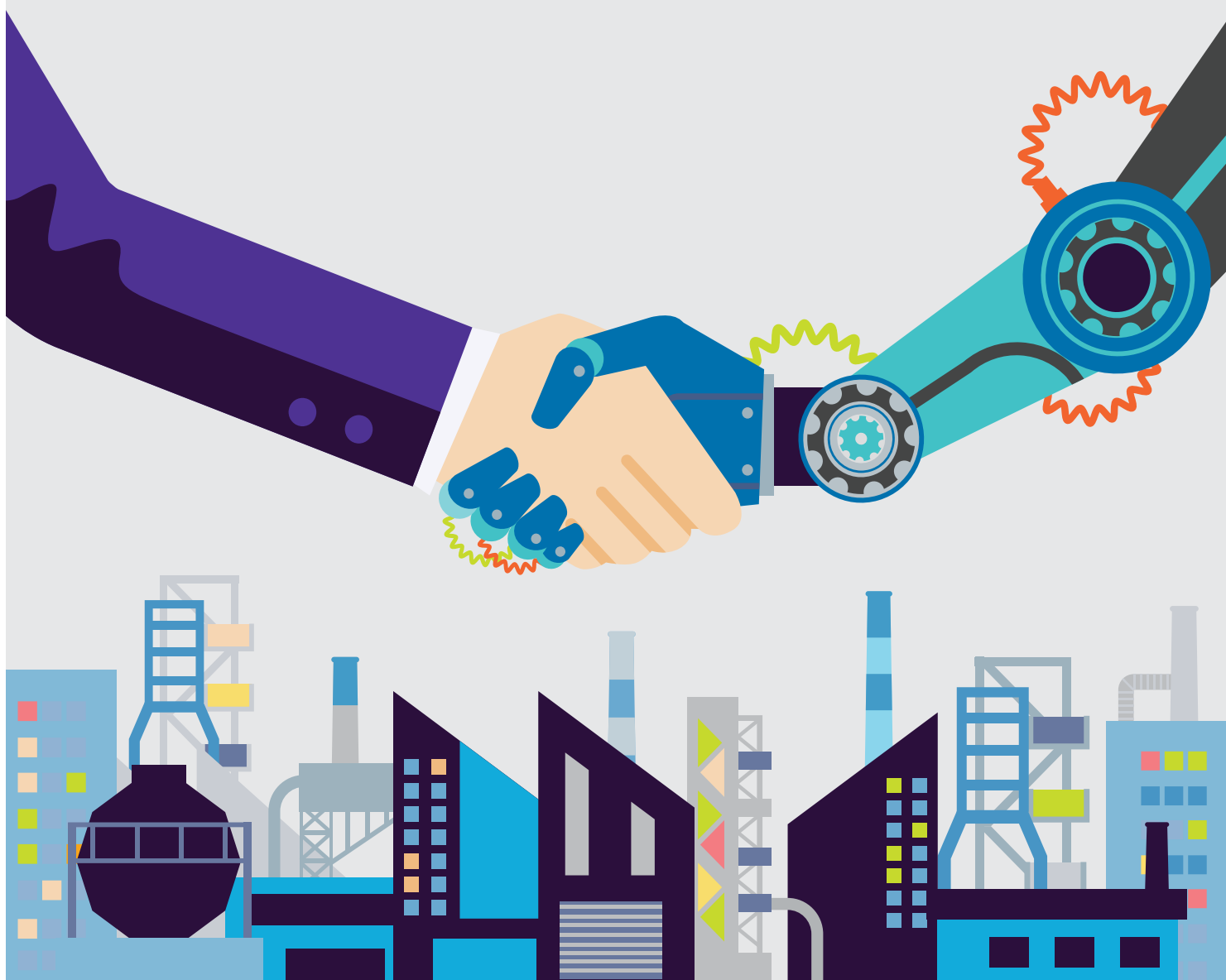
Autonomous fulfillment

The future of the supply chain will be self-orchestrated. Radio-frequency identification
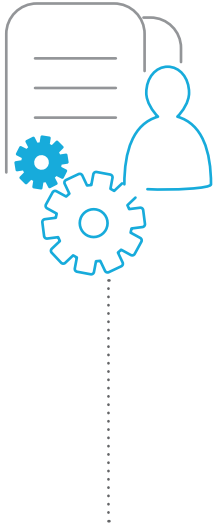
(RFID) and GPS are not new in this context, but artificial intelligence will change things significantly. For example, Amazon has already deployed thousands of robots at its fulfillment warehouses for pick-pack-ship activities, and Amazon drones are in pilot runs for last-mile deliveries to customers. Self-driven trucks are already being tested in different parts of world, and many logistics providers are planning to include them in their transportation fleets.

The last mile is the most complex part of supply chain, and here we're seeing autonomous deliveries are poised to make the process more efficient, effective, safe and eco-friendly. Containers leveraging IoT and GPS-combined technology have significantly improved container utilization and lead-times.

Autonomous trucks and vehicles are trending a new age of mobility. In coming years, they will change the game for logistics and in both B2B and B2C markets.

Unstructured data across cannels

COGNITIVE TECHNOLOGIES

Self-learning

Profitable Growth

Revenue growth
• Smart products – customer preference
• Smart services – growing needs

Higher ROA
• Predictive assets management
• Autonomous vehicles

Customer outcomes
• Customized experiences
• Enhanced product yields

Profitability
• Lower working capital
• Virtualization

While autonomous vehicles will improve efficiency, they will also improve safety by minimizing crashes and accidents due to human errors and fatigue. These vehicles are navigated using embedded radar systems, cameras and sensors emitting vast data, which is processed and analyzed by an AI-powered system.

Capgemini's intelligent supply chain

At Capgemini's Business Services, we orchestrate services and transform our clients' supply chains, leveraging intelligent automation to create a fully integrated-sector specific solution powered by technology, talent, process transformation and visualization. Our Digital Supply Chain is a broad, deep and comprehensive service that brings together business process management – from "plan to deliver" – with best-in-class cloud-based solutions such as analytics and insights, benchmarking and maturity assessments, digital transformation and change management.

This includes an end-to-end collaborative platform for real-time visibility across all supply chain functions for enhanced efficiency and effectiveness, algorithm-based demand sensing to improve forecast accuracy and optimize working capital, RPA to improve order management process efficiency, and cognitive analytics to gather data into one place, deliver insights at the point of action and generate differentiated business value.

In conclusion – the importance of strategy

Intelligent automation makes it possible to create an ecosystem for holistic automation to drive value for business. Since there is so much noise about automation and digitization, companies tend to deploy technologies randomly. This can generate point benefits but will not deliver enterprise-wide added value.

Scan here to learn more about Capgemini's Digital Supply Chain service
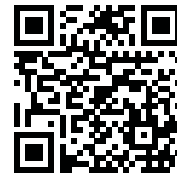
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Capgemini is a global leader in consulting, digital transformation, technology and engineering services. The Group is at the forefront of innovation to address the entire breadth of clients' opportunities in the evolving world of cloud, digital and platforms. Building on its strong 50-year+ heritage and deep industry-specific expertise, Capgemini enables organizations to realize their business ambitions through an array of services from strategy to operations. Capgemini is driven by the conviction that the business value of technology comes from and through people. Today, it is a multicultural company of 270,000 team members in almost 50 countries. With Altran, the Group reported 2019 combined revenues of €17billion.

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