

SHAKE IT OR LEAVE IT!

**IT'S TIME FOR
OPERATIONS
LEADERS**



**OPERATIONS.
INSIGHTS**
FALL 2019

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EDITORIAL



DEAR READER,

**WELCOME TO THE SEVENTH EDITION OF
OPERATIONS.INSIGHTS – OUR MAIN
PUBLICATION ON ALL TOPICS AROUND
OPERATIONS MANAGEMENT.**

This edition is all about enabling future growth by customer centric supply chains and operations – from a strategic, organizational and technological perspective. What distinguishes the most successful supply chains from the rest, what can we learn from relevant startups and how will technologies like SAP S/4HANA and 5G transform the industry? These and many more questions will be addressed on the following pages.

We start our series of articles with our study results on what supply chain leaders do differently to contribute to company growth instead of solely focusing on cost efficient operations. For our study “From Inventory to Influencer – The Mover Becomes the Shaker” we surveyed 1,350 executives across multiple industries from companies with USD +1bn sales turnover. Our findings reveal the three key strategies behind what distinguishes a Leader from a Laggard.

Furthermore, our authors discuss how digital innovations can help organizations transform themselves towards a setup that will ensure future growth, reacting to ever-changing market conditions that force organizations to constantly challenge their current setup. Since this discussion is particularly interesting in the light of new market entrants, one of the articles provides an analysis of start-ups challenging traditional supply chain setups.

Leveraging the benefits of automation, artificial intelligence and human-machine interaction continues to be one of the most promising strategies for operations. Our authors show various application areas across different functions such as procurement, production and even human rights management. We enrich these selected articles by an introduction to how the foundations for strategic application of analytics should be set.

In hand with more advanced digital solutions goes the growing number of companies that move towards SAP S/4HANA. Our authors share insights on why strategic considerations must mark the starting point of this journey to make it a success. Lastly, we continue our series of “spotlight on technology”, this time with a closer look at the 5G technology within the Industry 4.0 context.

I hope that you will experience a refreshing and insightful read. As always, our authors and I are looking forward to discussing your feedback and challenges within the supply chain, operations and sustainability domains.

Best regards,

A handwritten signature in black ink, consisting of several overlapping, fluid strokes that form a stylized representation of the name Michael A. Meyer.

Michael A. Meyer

FROM INVENTORY TO INFLUENCER: THE MOVER BECOMES THE SHAKER

An elite few supply chain and operations leaders have gone beyond what they're known for – cost efficiency – to help power company growth. What are they doing right?



Ask a CEO about revenue growth drivers and you will hear a bevy of answers, but few mention “supply chain” or “operations”.

At a few elite companies – just one in five – a different scenario plays out. Their Chief Supply Chain Officers (CSCOs) and Chief Operating Officers (COOs) have moved supply chain and operations beyond cost efficiencies, to a growth enabler. And their CEOs – keepers of the corporate growth agenda amongst other things – couldn’t be happier. Our latest research shows these companies are doing many things well, but a few key strategies from their playbook are game changers. Just three über-smart moves. But those are enough to distinguish them as Leaders, versus Laggards.

OUR DATA

We surveyed 1,350 executives across a range of discrete and process producers with a sales turnover of USD +1bn. The data set comprises of ‘Leaders’ (22 percent) and ‘Laggards’ (78 percent). Leaders are companies who have scaled more than 50 percent of their digital initiatives (proofs of concepts) and earned return on digital investments greater than average industry return on digital capital and return on digital investments. Laggards are companies who have earned a return on digital investments less than the average industry return on digital.

LEADER BUILD, NOT JUST BUY IN

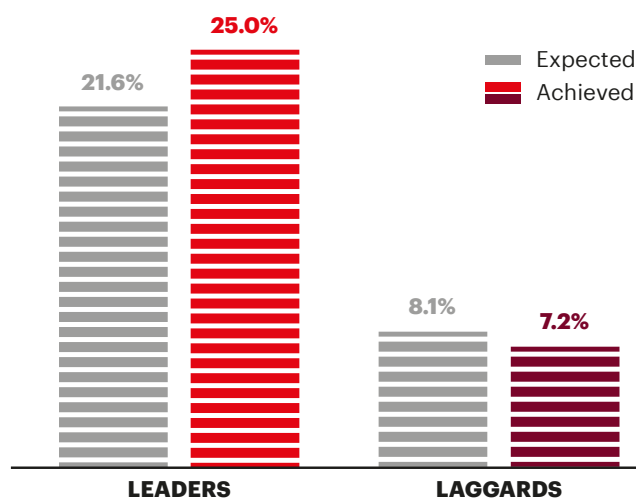
Plenty of supply chain and operations executives buy into the concept of a digital enterprise; fewer help build one.

Our Leaders are rapidly, actively, infusing digital intelligence throughout their supply chain and operating model. And it’s not just digital for digital’s sake. Their investments enable a composite “picture” of high-value customers, so their companies can build hyper-relevant products and services, customized for the individual. They combine smart digital spending with the best of human talent, creating a Human+ Machine hybrid workforce that outperforms either group (humans or technology) on its own.

More precisely, leaders build intelligence in:

- **Scaling rapidly:** This year, as we’ve seen in no other, COOs and CSCOs are building for intelligence. They are scaling digitally enabled supply chain solutions at a rate almost equal to their counterparts in the product design and customer engagement areas. They are even surpassing the sales function, despite its reputation for being a digital pioneer. As a result, supply chain and operations are an enabler, helping to drive greater sustained revenue growth in a way we’ve never seen.
- **Exceeding expected return on investment:** Our Leaders are not only meeting their expected return on investment when scaling digital innovations, they are exceeding it (see Figure 1). This is not digital for digital’s sake, but digital to enable the customer insights that can drive growth. Roughly 80 percent of the 22 percent who are Leaders have invested in big data and analytics, versus 68 percent of the remaining 78 percent who are Laggards. Leaders made not only significantly more return (in excess of 17 percent of Laggards) but exceeded their expectations. The converse was true for Laggards who didn’t meet their own expectations and made less return.

FIGURE 1: RETURN ON DIGITAL INVESTMENTS OVER THE LAST THREE YEARS



- **Investing in talent:** With that investment comes the need for digital talent. As mentioned by a senior supply chain executive we interviewed, a fortune 500 home improvement company has been addressing that issue by new skilling its employees, or bringing in new analytics-driven talent, to derive better insights from supply chain customer data. Its Georgia-Tech-based innovation center provides potential digital engineering talent that can fuel its customer focus.
- **Capabilities, not point solutions:** Leaders begin with the end in mind – growth – which creates a pull mechanism for an integrated digital suite. Rather than one-off technologies, Leaders are investing in technologies in concert – developing capabilities wrapped into platforms versus islands of technological prowess. These capabilities fuel customer relevance in a way conducive to growth.
- **Mastering a hybrid workforce:** Far more supply chain and operations Leaders than Laggards are keen to invest in automation at scale (86 percent for Leaders vs. 72 percent for Laggards). They realize mastering the human / machine balance not only enhances productivity, it frees their workforce from mundane, repetitive jobs. For Leaders, freeing them is not about removing them from the payroll. Instead, they focus on new skilling employees, providing them with skills to work with customer centric digital platforms enabling them to interpret data that enables insights for better decision making (84 percent for Leaders vs. 65 percent for Laggards).
- **Chief Executive Officers (CEOs)** want to build customer centric business models. Almost half (46 percent) of CEOs are focusing on customer centric outcomes like higher growth in services revenues. By contrast, only 39 percent of supply chain and operations executives are focused on the same. By better embedding digital technologies to glean key customer insights, COOs and CSCOs can become as customer centric as their peers.
- **Chief Finance Officers (CFOs)** look to generate better return on investment on digital investments. While supply chain executives are scaling more digital innovation, they are getting lesser returns. For example, companies within Laggards scaling more than 50 percent of their operations and supply chain innovations expected a return of 11.9 percent but received 10.9 percent, falling short. Companies in our Leaders category exceeded their digital investment return on investment expectations, overall, by 3.4 percent.
- **Chief Marketing Officers (CMOs)** know customer desires aren't static – and they want to nail moments that matter, the moments where customers are making key purchasing decisions. CMOs are all about dynamic data-driven customer insights, so it is not surprising that 34 percent are keen to leverage the power of data simulation management platforms. They can use these as tools to drive scalable innovation, but only 25 percent of supply chain leaders are on board with the idea.
- **Chief Information Officers (CIOs)** are building the right platforms to develop customer-relevant products fast. Almost half (45 percent) of CIOs prioritize building digital platforms but just 38 percent of supply chain and operations executives do so. With opensource design and development feeding into innovation speed and strategic ecosystems, COOs and CSCOs who can get on board put themselves at the epicenter of potential new growth.

LEADERS MAKE CUSTOMERS A TEAM SPORT

Customer centricity is an intricate way to describe companies putting customers at the heart of everything they do. At our leading companies, no one function owns the customer. Rather, the C-suite collaborates to “get it right” with high-value customers. No silos allowed.

Our leading COOs and CSCOs are reaching out to their C-suite counterparts. While that may sound simple, it changes everything. They formalize this collaboration with digital platforms that enable different functions to head toward one North Star: customer centricity.

COOs and CSCOs who can keep their fellow C-suite members' bias top of mind can speed the collaboration that leads to customer-fueled growth. Each C-Suite member needs something different from the insights that are generated across supply chains and operations to enable them to become more client centric:

LEADERS PLAY WELL WITH OTHERS AND THE CUSTOMERS WIN

Leaders are all about partnering in an ecosystem. While only 64 percent of Laggards embrace becoming ecosystem orchestrators, almost 78 percent of Leaders do. It follows that Leaders are also embracing open and co-innovation more than other companies (84 percent of Leaders vs. 65 percent of Laggards).

The Laggards in our survey might partner but it's traditionally with suppliers or a few independent experts. Leaders have widened the net, inviting technology partners, universities, innovation

incubators, start-ups – even competitors – to their growth party. They know the strategic diversity built into their ecosystem – managed correctly – can help them get to innovation and growth faster. Leaders are using their digital tools and platforms to dedicate virtual space for co-innovation – inviting their ecosystem to play. Their COOs and CSCOs are linked with everyone from startups to in-house product development teams to drive relevant new offerings to customers as quickly as possible.

IGNITING SUCCESS ACROSS YOUR C-SUITE

While this is a game-changing moment for Chief Operating Officers and Chief Supply Chain Officers, it's also one for their C-Suite counterparts. It offers an opportunity to transform what was previously known as a support function into fuel for growth.

Starting a conversation about the lessons our Leaders offer is a first step for your supply chain and operations executives. They need to start working on the culture and the mindset within the supply chain and operations function by being involved upfront in business conversations, rather than being brought in at the end. Give them a budget for and the freedom to experiment with digital technologies. Push them to drive collaborations with non-traditional players to build a true innovation ecosystem.

If your company is not where the Leaders are yet, closing the gap is within reach. Leaders are using digital with a purpose, collaborating for customer relevance and focusing on getting to the right outcomes to drive growth. In these companies, supply chain and operations Leaders are taking their rightful place next to their C-suite counterparts at the board table, infusing a new intelligence into their operations.



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INTERESTED IN MORE?

This article is a shortened version of Accenture's global study "The Mover becomes the Shaker" (2019). To access the full report, click **HERE** or follow the QR code.



TEAR DOWN THE IVORY TOWERS OF CENTRALIZATION

**How digital innovations facilitate more
decentralized organizational set-ups**



In the past years, we have observed a growing number of companies that are centralizing their operations, even though new digital innovations actually facilitate the opposite – decentral set-ups. By using digital innovations to decentralize organizational set-ups, companies can now combine efficiency with agility needs.

“Digital” and “innovation” are keywords that have both been discussed comprehensively in the past years in the context of new business models, efficiency gains and customer experience. Putting the pieces together, have you ever thought how digital innovations can impact the organizational set-up of companies?

DIGITAL IMPACT ON (DE)CENTRALIZATION

Traditionally, enterprises have tended to centralize their corporate operations, bringing functions like strategy, HR or R&D into a representative headquarter, from which board members and key decision-makers centrally steer the business.¹ In addition, shared service centers and centers of excellence have had a bundling effect – they either bundle transactional activities, such as payroll accounting, in lower labor cost locations or strategic activities in areas with access to key talents.²

Yet, with the digital innovations that can make organizations more decentral, it is good to question if centralized organizational units are still the most appropriate.

Decentral organizations are more agile and dynamic, which is important for getting close to the customer and the market. Furthermore, decentral organizations enable more flexible working environments, which is a benefit for employees and a selling point for recruiters.

Let’s look at three selected innovations that can enable more decentralized organizational set-ups: platforms, the internet of things (IoT) and blockchain. We have defined them in Figure 1.

FIGURE 1: SELECTED DIGITAL INNOVATIONS – OUR UNDERSTANDING³

	PLATFORMS	A platform creates value by facilitating exchanges between two or more interdependent groups, usually consumers and producers. Platforms create large, scalable networks of users and resources that can be accessed on demand and which allow users to interact and transact.
	INTERNET OF THINGS	The internet of things, or IoT, is a system of interrelated computing devices, mechanical and digital machines, objects or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.
	BLOCKCHAIN	A blockchain is a distributed database of all transactions / records that have been executed and shared among the participants. Each transaction is verified by consensus of a majority of the participants in the system. Once entered, information cannot be erased.

DIGITAL INNOVATION #1: PLATFORMS

Today, most consumers are familiar with platforms, e.g. they have shopped on Amazon or booked a room via Airbnb. In the B2B sector, people are also gaining familiarity with platforms, such as OneTwoChem by Evonik, a chemicals industry platform which serves as an additional sales channel and connects different players in the ecosystem. So called multi-sided platforms can reduce the need for bricks-n-mortar infrastructure, as businesses are more and more done online.⁴

Therewith, platforms can fuel different kinds of businesses – enabling startups to grow fast, capture market share as well as support established players to broaden business and extend reach. And in fact, they do: Platforms significantly generate value, as seven out of the ten most valuable companies are based on such a business model.⁵

But platforms also enable operations within a company. They can bring together a vast number of players in different corporate areas, e.g. sales, R&D or learning, to offer and use each other's services. Thus, by expanding the company's ecosystem without a central intermediary, a platform can facilitate a more decentralized organizational set-up.

DIGITAL INNOVATION #2: INTERNET OF THINGS

IoT describes the concept of interconnecting physical objects via the internet and enabling them to communicate with each other. Gartner forecasts that by 2021, 25 billion connected things will be used.⁶

The importance of IoT is especially high in manufacturing industries: 45% of executives regard it as a high or very high priority for their businesses. By applying IoT into processes, companies optimize production, warehousing and asset tracking.⁷ In addition, IoT may also generate revenue by creating new products and services for customers and enabling a better sales data analysis.⁸

IoT can help make producing companies more decentral by connecting their production sites digitally and bringing them together as a virtual factory. This can help companies better manage their over- and under-utilized capacities. In addition, a centralized, proprietary production network at a company can become part of a decentral cross-company production network when it is enabled for IoT. This decentralization of production capacities makes companies more flexible in their production and can lead to efficiencies through better utilization across plants.

DIGITAL INNOVATION #3: BLOCKCHAIN

A third digital innovation facilitating decentral set-ups is blockchain. Smart contracts that are enabled by blockchain allow for automatic processing without the involvement of contracting parties.⁹ With intermediaries eliminated, processing can be more efficient.¹⁰ TradeLens is a digital shipping platform underpinned by blockchain that enables smart contracts. Maersk, the Danish conglomerate, developed the platform with more than 90 participating companies. It uses smart contracts to reduce documentation errors and information barriers in sea freight.¹¹

Blockchains reduce the need for central control units and intermediaries. Highly decentralized organizations based on blockchain are called Decentralized Autonomous Organizations (DAO). A DAO is a fully digital enterprise defined by a set of smart contracts. There is no management in place at all to steer the enterprise. Decisions are made directly by owners who bought shares in the DAO. If the DAO needs to build a product or develop hardware, suppliers must be engaged, since the DAO itself is not able to provide them itself.¹² The organization works without any kind of centralized organizational set-up as it is known in today's business environment. Although it seems to be an offensive example, the construct might be used by at least some businesses in the future and serves as a blueprint for a highly decentralized organization.¹³

SUMMING IT UP

These are three examples of digital innovations that can help make an organization more decentral. However, they are solely a selection of innovations fostering a decentralized set-up of organizations. Others, like extended reality or cloud, have comparable effects but are not as drastic as the three mentioned above. Of course, the decentralization enabled by digital innovations will not eliminate the need for central steering entities, but we believe these innovations should play an important role in the design of operating models of the future, as it offers new opportunities for high performance organizations.

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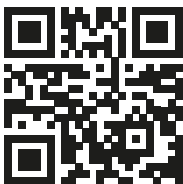
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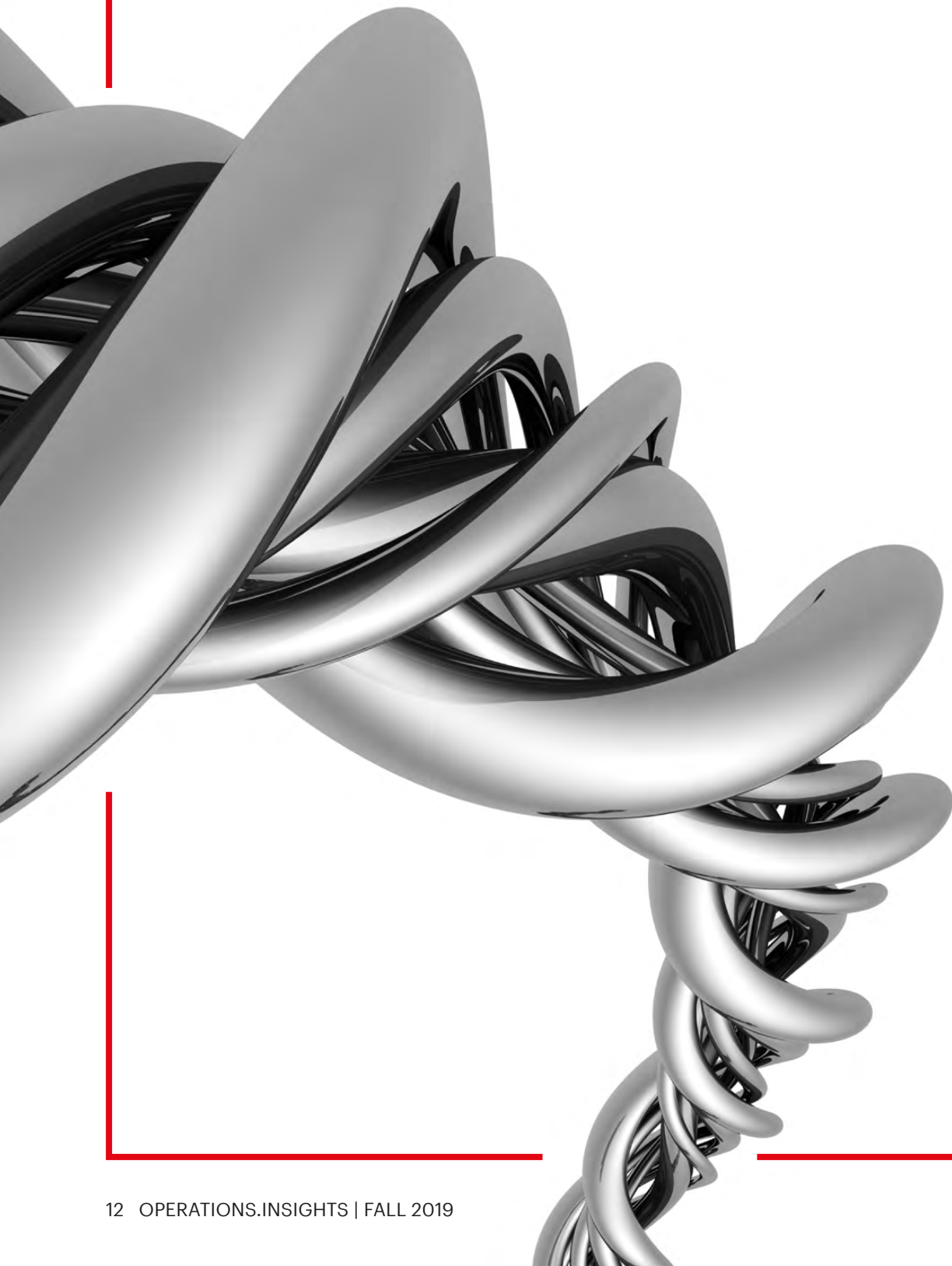
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HEAVY METAL IN THE DIGITAL AGE

**How metal producers can beat the odds and
succeed in transforming themselves**



Digital transformation is a topic of rich and vital discussion in boardrooms around the world. Here are insights on how metal players can transform their full value chain and achieve a successful digital transformation.

Emerging markets and the largest economies in the world share a common trait – a demand for metals. But substantial challenges are emerging for today's metal producers, forcing companies to improve performance to remain competitive. Many metals companies need to improve their EBITDA to revenue ratios back above 15 percent up from the 10 percent level where they have been caught since the 2008 financial crisis.¹

While the industry has made continued investments in process optimization to boost performance, it has been rather slow in adopting new technologies, especially when compared to other industries such as banking, media or its key customer industries.

In recent years it has become apparent that also traditional industries can benefit greatly from adopting digital technologies.

Our past project experience has shown that metal producers that harness the potentials of digital transformation could increase their EBITDA margins by up to 13 and more percentage points.²

DIGITAL CAN CHANGE METALS' FULL VALUE CHAIN

Accenture research in cooperation with the World Economic Forum identifies four digital themes that drive digitalization in the metals industry: Automation, robotics and operational hardware; Digitally enabled workforce; Integrated enterprise, platforms and ecosystems; and next-generation analytics and decision support (see Figure 1). It is estimated that tapping the value potentials of digitalization can create approximately USD 130bn for the metals sector, which equals to nearly 1.1 percent of industry revenues and 3.7 percent of industry profits during this period.²

FIGURE 1: TRANSFORMATION IN METALS AND MINING IS DRIVEN BY FOUR DIGITAL THEMES^{3,4}

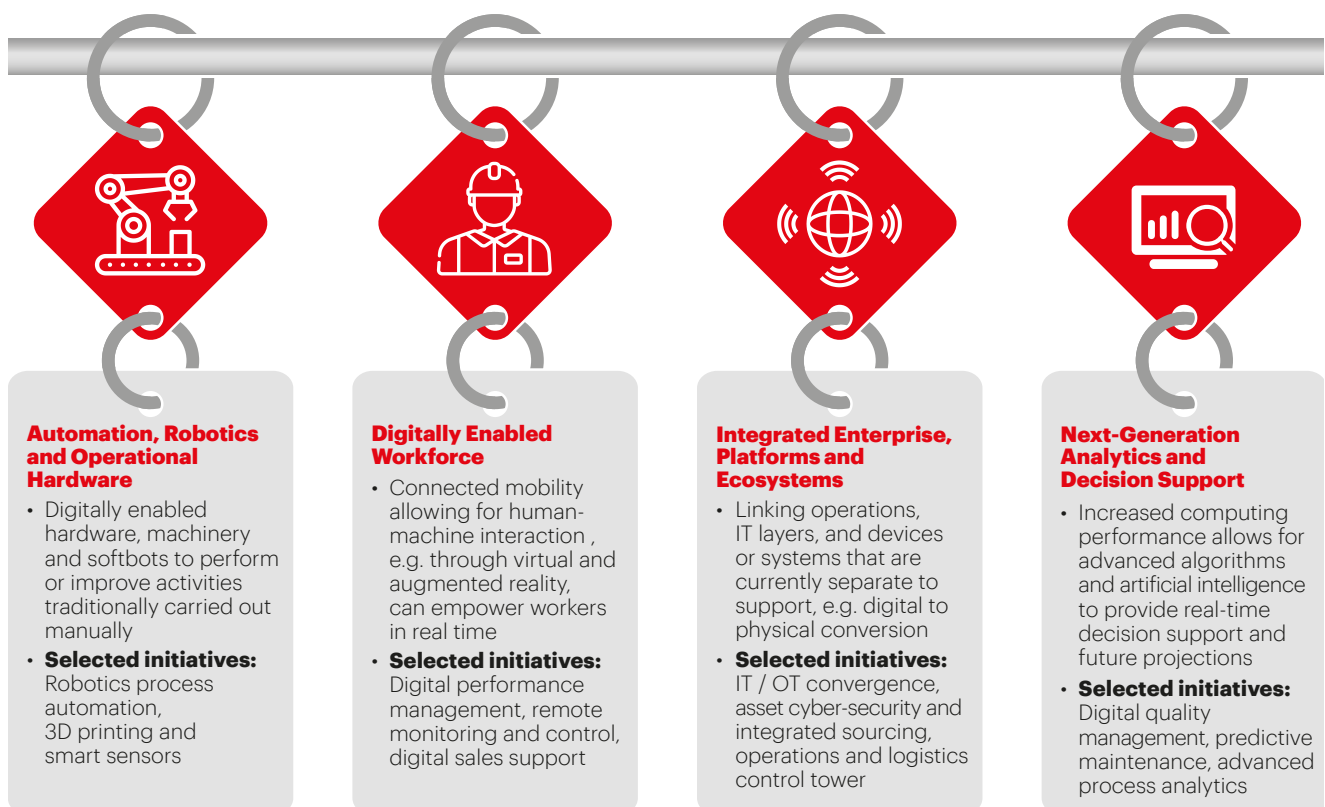
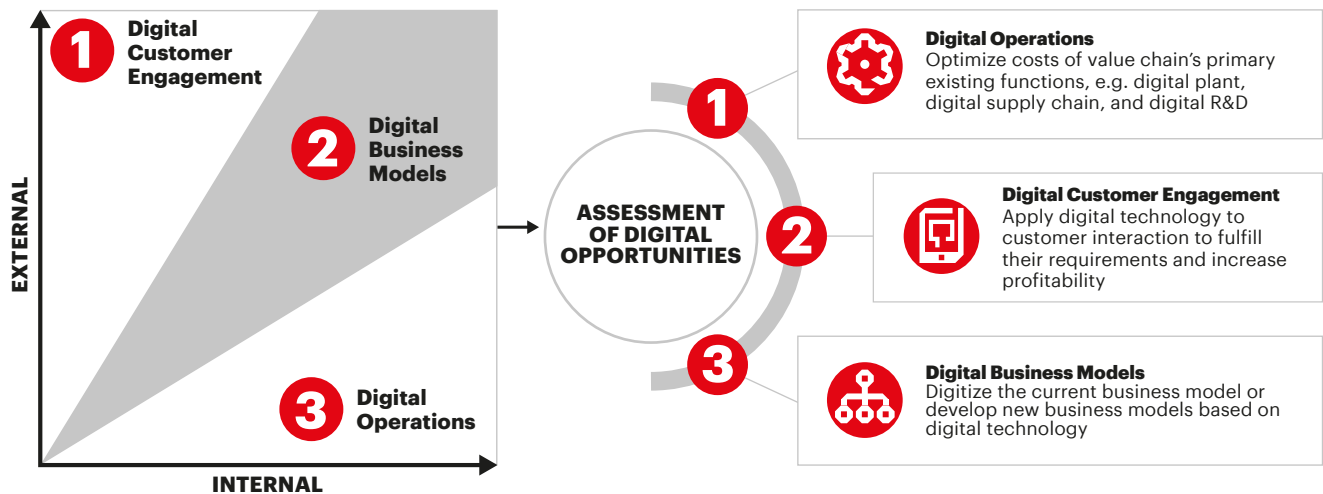


FIGURE 2: DIGITAL INITIATIVES IN THE MARKET CAN BE CLUSTERED INTO THREE DIMENSIONS¹



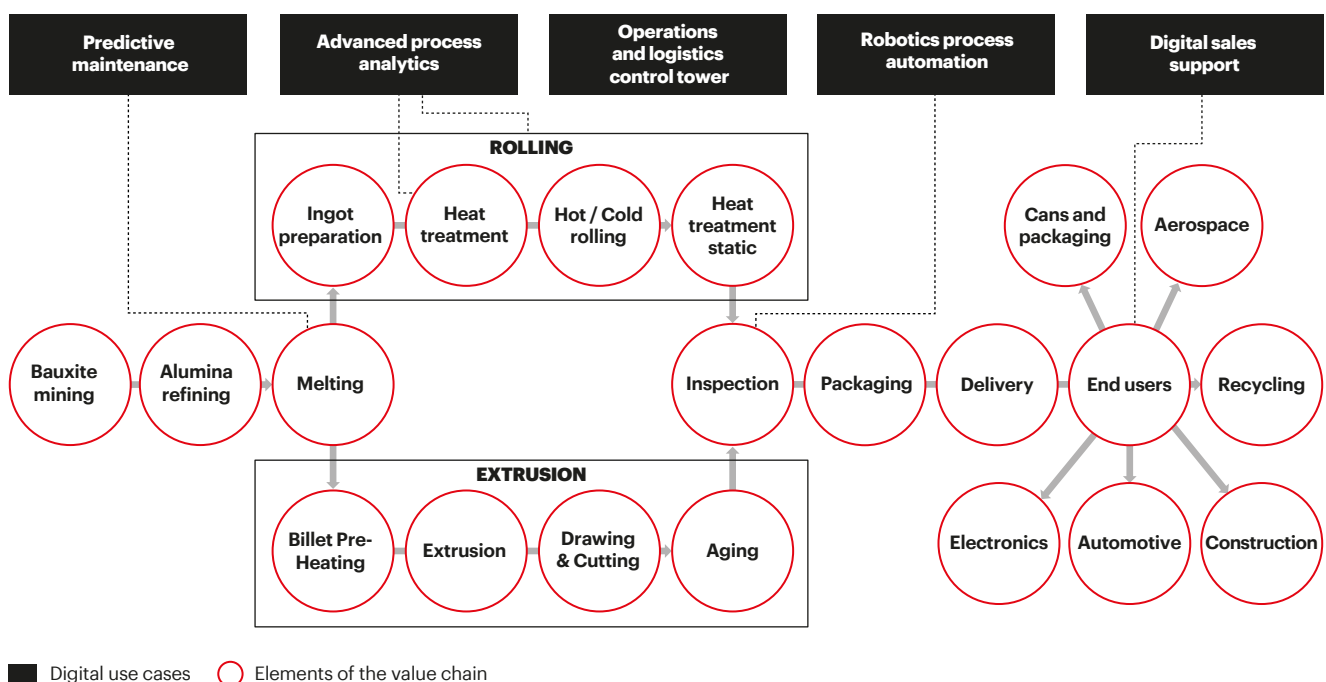
In the market, we find that players are pursuing digital opportunities in particular with regards to: Digital operations optimizing costs of production and internal functions (e.g. HR, Finance, Procurement); digital customer engagement leveraging digital technology to create new or strengthen existing customer interaction points and lately also digital business models to unlock untapped top-line growth (see Figure 2). A recent study issued by the World Economic Forum finds overall productivity increases from digital investments as high as 70 percent for industry leaders. In particular, a combination of the above cited technologies yields a significantly higher return on investment than a siloed application of new technologies.⁵

PUTTING A VALUE ON DIGITAL TRANSFORMATION

At metal companies we see digital use cases deliver the largest value in the following areas along the value chain (see Figure 3):²

Predictive maintenance predicts maintenance needs and improves maintenance cycles. Predictive maintenance assesses machine usage and failure patterns that can increase equipment availability, reduce maintenance costs, spare parts inventory and investments in new equipment. When applied to critical equipment, e.g. furnaces, rotating equipment and in melting, predictive maintenance can give an EBITDA improvement potential of up to 2.5 percentage points.

FIGURE 3: EXEMPLARY ALUMINIUM VALUE CHAIN



Advanced process analytics creates real time transparency on process and equipment parameters. Analytics techniques applied to big data and the use of new sensors can strengthen process control and boost plants' hourly profit by optimizing process parameters used to balance yield, throughput and material costs. For example, yield improvement by 1 to 4 percent and energy operating costs improvement by around 1 percent can boost EBITDA by up to 4 percentage points.

An **Operations and logistics control tower** shares end-to-end supply chain data. End-to-end analysis of trade-offs between order quantities, inventory and logistics costs can improve real time asset performance and cost monitoring across various production sites. Additionally, the control tower will enable enhanced track and trace across all phases of a product's life cycle for raw materials to finished goods. This can improve e.g. logistics costs by 3 to 5 percent and operations and maintenance personnel costs by 3 to 10 percent which can boost EBITDA by up to 3 percentage points.

Robotics process automation reduces manual transactional tasks. Supply chain, HR and finance processes as well as other enterprise functions often involve high volumes of structured data and a flow of 'if/then actions' to process data for later use. The automation or robotization of repetitive tasks can lead to improved employee efficiency and decreased cost from errors. For example, transactional personnel costs improvement by 1 to 4 percent and non-conformance costs improvement by 20 to 25 percent can boost EBITDA by up to 1 percentage point.

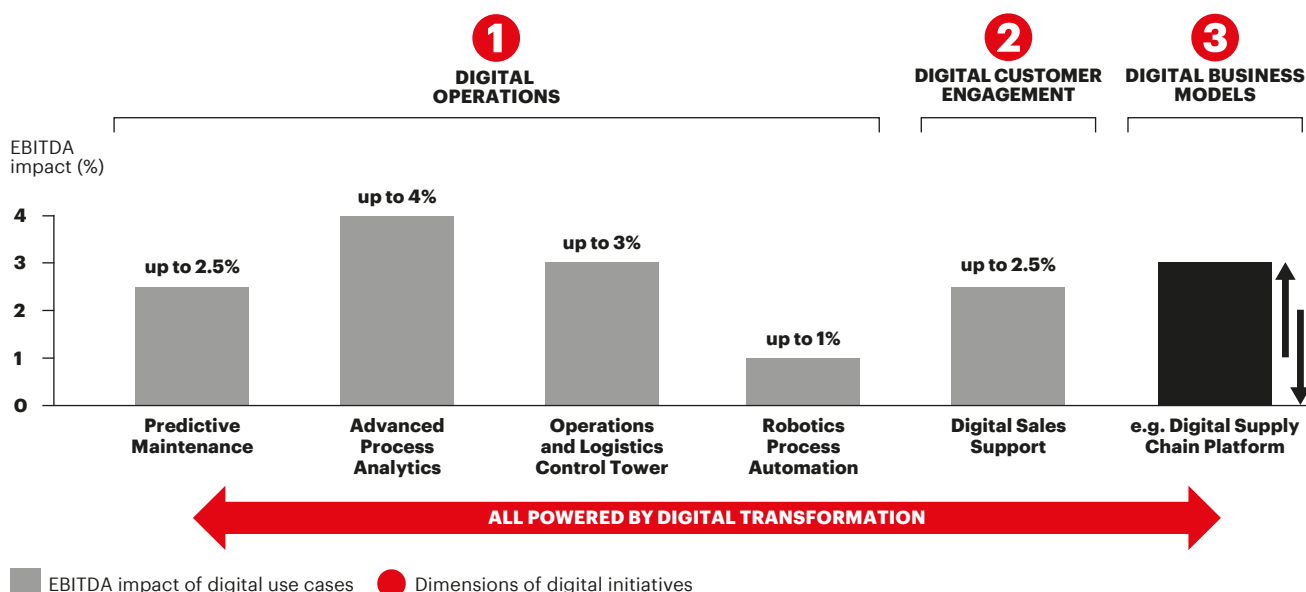
Digital sales support provides a 360-degree view on the customer. Introducing digital tools in sales (e.g. customer interaction platforms, mobility solutions) can improve cross selling opportunities or enable better penetration as well as improve employee efficiency in the sales back-office. Overall, this can achieve a potential uplift of up to 2.5 percentage points in the EBITDA margin.

A number of metals companies are also leveraging digitization to completely re-invent their **business models**. Investing in new business models is the most difficult and least frequently targeted value driver. However, differentiation in digital business models (e.g. digital sales and supply chain platforms) has immense market potential by allowing companies to stay relevant towards existing customers and gaining new ground from their competitors.

Driving a full digital transformation of a metals company is a complex undertaking. We frequently get the question "How do we get after the value rapidly?". To succeed in this, a scalable model for use case deployment needs to be designed. We recommend a staggered approach: First, in the digital initiation phase, going after a limited number of digital lighthouses is recommended; deploying proof-of-concepts at selected plants which will help kick-starting digital initiatives. In a next step, scale-up and roll-out of successful proof-of-concepts across plants and geographies in combination with additional pilots for new opportunities can boost EBITDA by double-digit figures within 4 to 6 years, as recent project experience shows (see Figure 4).

FIGURE 4: DIGITAL VALUE POTENTIAL AT METAL COMPANIES

Digital transformation can increase metals EBITDA margins by up to 13 percentage points within 6 years



Enablers for realizing digital potential

In order to realize and sustain the targeted value potential, key digital enablers have to be in place. Most importantly, successful transformation projects rely on four dimensions: governance & organization, IT foundation, training & upskilling and culture & change.

While all of the above enablers are important to realize a digital transformation, every successful initiative needs to start from a strong, dedicated central program management that designs the digital strategy and drives implementation across the organization.

From there, a **governance and organization** will design the organizational blueprint for the digital governance structure and define resource requirements for program staffing. Setting up a digital governance must be closely aligned with the strategic objectives of the company.

Training and upskilling will support external recruiting of digital talents and distribute awards and budget for the most innovative digital projects within the organization. In addition, a digital academy for upskilling the workforce will be put in place in order to support the training regime.

IT foundation is necessary to enable the IT landscape by leveraging existing data assets and developing an implementation plan across several dimensions (enterprise architecture, analytics capability, data security, etc.). Depending on the scope of digitalization the magnitude of IT adaptations might vary.

Culture and change is required to endorse consistent success stories of workers and executives and to facilitate a group-wide exchange of best practices. This way a communication concept for leadership can generate ongoing content with success stories across all channels.

IT'S TIME FOR DIGITAL REINVENTION

Ten years ago, data was barely discussed as a subject and social media was still for innovators. Today, digital opens a whole new horizon of possibilities. Digital will help the mother of all heavy-asset industries to be ready for the next hundred years by equipping the industry with tools and opportunities to improve productivity, costs and ways of working. So when will you start your digital reinvention?

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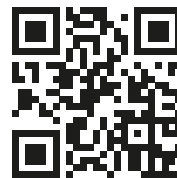
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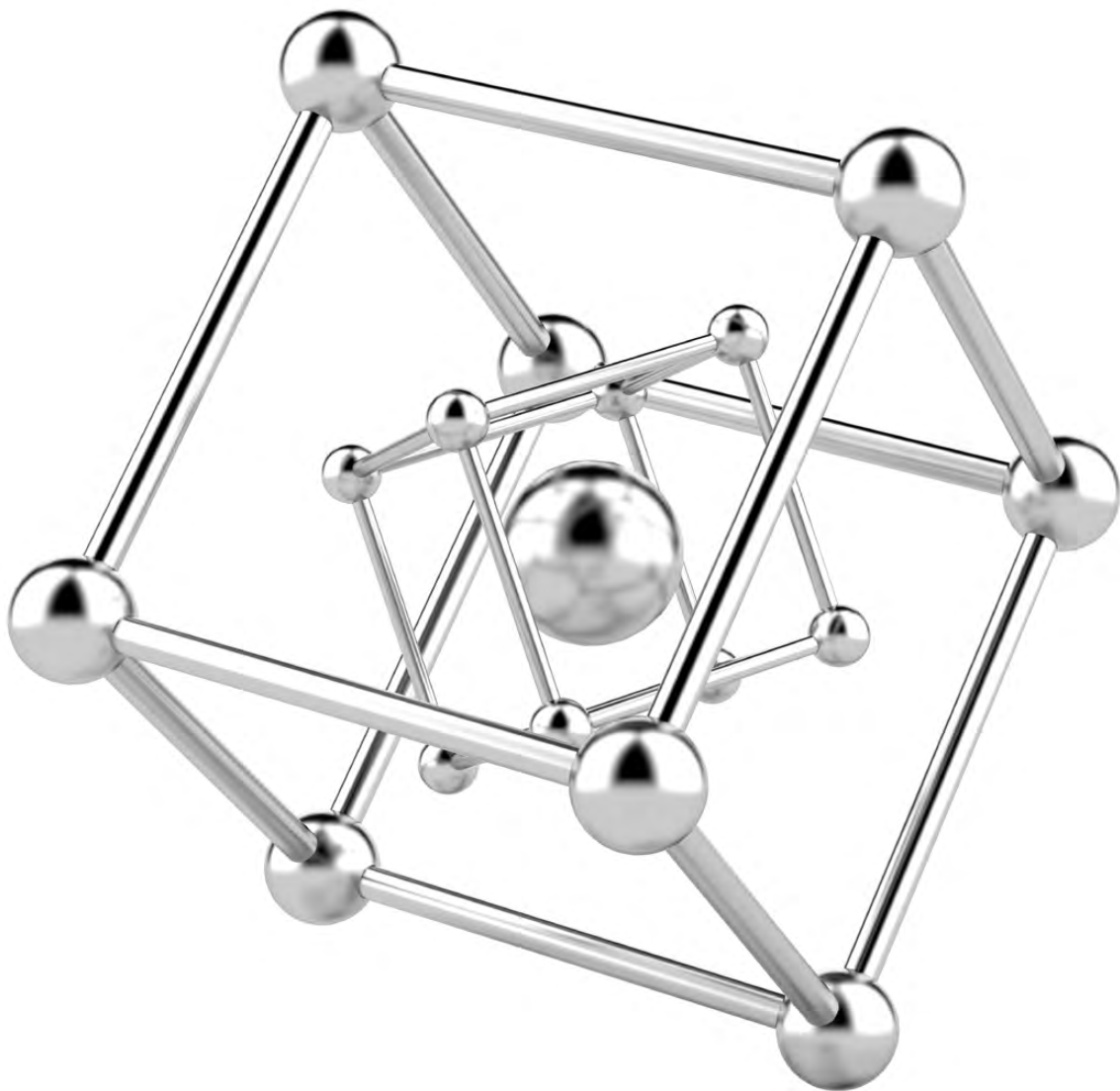
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AGILE SUPPLY CHAIN SEGMENTATION

How a new approach to supply chain segmentation can help companies address complexities



Given fast-changing markets and new customer expectations, well-established approaches – such as SCOR, the supply chain operations reference model, or business process management – can no longer help create transparency and reduce complexity as much as they did in the past.

These methods remain too focused on improving the status quo in supply chains instead of creating space and a vision for something new, such as new customer segments or multiple co-existing business models.

HOW CAN COMPANIES IMPROVE THEIR SUPPLY CHAINS WITH BETTER SEGMENTATION?

To gain an edge, they need to simultaneously combine two segmentation strategies that are often done in a standalone fashion. Companies must segment for the customer, including new and future customers, and they must segment to the product at the same time. For instance, we recommend enriching existing segmentation techniques with segmentation for emerging customer segments, new products, services and experiences related to new products, revenues streams and profitability indicators, for example.

DRIVERS OF SUPPLY CHAIN COMPLEXITY

Supply chains have become exponentially more complex in response to empowered customers with high expectations. Customers want rapid service and fulfillment, and they are demanding more end-to-end order visibility. Similarly, nimble, digitally-native players are tailoring their offerings to individual customer requirements, which means supply chains must serve multiple customer and product combinations and provide different service offerings. Finally, expectations are high for new supply chain capabilities, as customers have new product and service experiences that are made possible by new technologies and analytics. Yet, many supply chains cannot respond appropriately to the changes, and some supply chain setups even block business growth due to legacy structures and “one-size-fits-all” approaches.

FIGURE 1: SUPPLY CHAIN SEGMENTATION APPROACH

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5
Definition of relevant segmentation criteria	Evaluation of customers and products along criteria	Definition of capabilities per customer/product segment	Customer/product segment clustering to supply chain types	Prioritization of initiatives
- Definition of product and customer criteria that trigger different supply chain requirements (e.g. production lead time, margin contribution) - Selection of most relevant product and customer criteria for further analysis	- Review of defined criteria for customer and product groups - Grouping of customer/product combinations with similar characteristics along defined criteria	- Definition of supply chain target capability requirements per customer and product segment - Mapping along SCOR processes plan, source, make, deliver, return, enable	- Clustering of customer groups with similar capabilities into one supply chain type - Agreement on supply chain types for implementation	- Evaluation of current status of supply chain capabilities - Identification of gap between as-is capabilities and to-be capabilities per supply chain type - Definition of initiatives to close gap

QUANTITATIVE ANALYSIS OF UNDERLYING MASTER AND TRANSACTIONAL DATA

HOW TO APPROACH STRATEGIC SUPPLY CHAIN SEGMENTATION

In recent projects, we have developed a pragmatic approach to supply chain segmentation that involves describing products (or services) and customers with individual criteria and then understanding the implications for that segment's supply chain requirements (see Figure 1).

If we take the example of an automotive tier 1 supplier and look at relevant customer segments, traditionally, a customer would have been identified as automotive OEM (based on the nature of the customer's business). Under the new approach, it may now be classified as a lean OEM or as an agile OEM. For the lean customer, a supplier could, for example, pre-build inventory with an expectation that demand will be stable, while for the agile OEM, a supplier may opt to build parts at the end of the lead-time period in order to keep maximum flexibility to respond to changes initiated by the agile OEM.

STEP 1

Consider both product and customer criteria, both backward and forward-looking

Throughout the entire segmentation process, it is important to segment for both the customer and the product simultaneously. To do so, we combine criteria about the customer and product that is based on historical analysis of master and transactional data (i.e. the analysis is backward-looking) with forward-looking criteria for both, such as the market outlook.

In the case of serving a lean OEM, the combined analysis may lead to a decision for a supplier to use a particular production plan.

STEP 2

Get the data you are missing

For step 2, the evaluation of customers and products along criteria, the pragmatic approach might involve analyzing customers and products for volatility and bringing in experts who can provide missing qualitative information about what customers really want. It is common that companies are not able to segment by all points (see Figure 2 for a sampling). If certain criteria cannot be evaluated, companies need to make the effort to do so. This does not mean companies need to segment along each criteria that exists. Instead, they need to select those criteria that distinguish their customers and products in terms of requirements in the supply chain. For example, segmenting for the loyalty of customers is not likely to have implications for the supply chain.

STEP 3

Define the target supply chain capability

In step 3, companies need to define their target supply chain capability. For instance, to serve a lean OEM, a supplier will need statistical methods for planning production. Here it is really about defining the capabilities that you will need, unrestrained by current requirements, and creating a vision. If you believe you will need drones for your products in the future, then capture that requirement in this step. Define the best way to serve your segments in the future, not the next iteration of what is needed. By capturing the vision here, the supply chain can ensure that it has the required amount of transparency and is an integral part of the entire customer experience around a product or service.

STEP 4

Cluster supply chain capabilities by segment requirements

In step 4, the supply chain needs to cluster its offering based on which segments require which capabilities. Using the understanding of what the customers want and what is necessary to deliver the products, companies can create larger clusters that can help simplify the supply chain. With this approach, it is still possible to have different steps in the supply chain configured to meet the specific demands of specific customers. By identifying "macro segments" that can be served with similar supply chain capabilities, companies can reduce costs and increase speed to market.

FIGURE 2: EXEMPLARY SEGMENTATION CRITERIA

CUSTOMER CRITERIA	PRODUCT CRITERIA
Margin	Production volume
Volatility (size, frequency)	Inventory holding time
Sales channel	Production strategy
Add-on services	Production lead time
Size of business	Degree of customization
Share of wallet	Product lifecycle
Customer growth potential	Product complexity
Geographical market	Regulatory requirements
Level of loyalty	Packaging types

STEP 5

Focus on priority initiatives to improve the supply chain and ensure ownership of segmentation

Many companies lose their way working on segmentation projects designed for incremental improvements. We encourage companies to prioritize their activities and prepare the way so that top management is involved in the definition of the segments and takes ownership for them.

Creating new segments is a large-scale change project with implications for multiple functions in a company. As the number of new requirements for customers and products increases, the supply chain must adapt. The first step to adapting is to gain new insights about what is needed and what will be needed in the future so that supply chain capabilities will ensure customer centricity and competitiveness. Top management should be involved to ensure alignment of the segmentation with business strategy, and the core project team involved should have representatives from all functions required for segmentation (e.g. sales, operations and planning).



KEY CONTACT

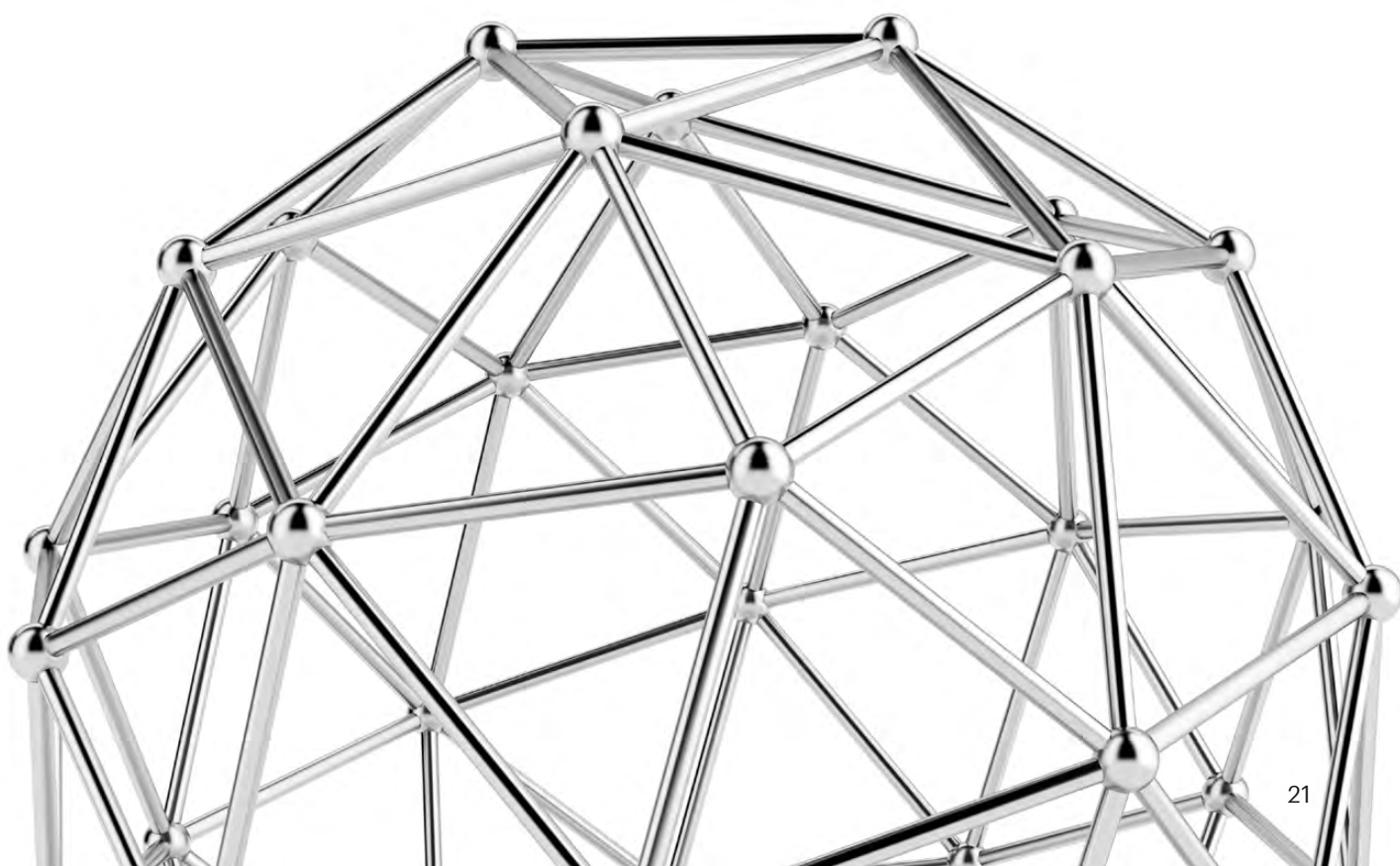
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EVERYTHING DIGITAL BUT NOTHING CONNECTED?

**What startups show us about
the future of supply chains**



When much of a company's supply chain has become digital, but very little of it is connected, the result is rather a digital patchwork but no integrated and digitally-enabled supply chain. Quite often, a clear "digital" vision is missing.

WHEN DIGITAL DOES NOT SCALE – WHERE TO LOOK?

Delivery drones, autonomous vehicles and blockchain for the supply chain – almost every day, we hear about new technologies and new business models. Yet, where to focus? Which of them are applicable to your business and supply chains of the future? In some cases, companies struggle to find the right prioritization and focus for their investments in technology or capabilities.¹ These companies have individual use cases without an integrated supply chain strategy that can combine relevant solutions end to end. This means many of the isolated solutions cannot be scaled across the organization after they have been piloted and developed. To change this, companies need to develop a grand vision for a digitally-enabled and fully integrated supply chain.

One starting point can be a vision with a three to five-year horizon inspired by what startups around the globe are already doing. Some of their solutions – still in the pilot phase today – may form the basis of supply chain paradigms for tomorrow. Accordingly, we have examined more than 3,000 startups – all dealing with different logistics and supply chain problems.

We noted a comprehensive network of solutions, most of them interrelated. They mainly cover supply chain management, supply chain risk management, supply chain optimization, supply chain platforms, warehousing, transport and last mile. The scope shows the abundance of solutions, and it also illustrates one of the important characteristics of supply chains for the future: interconnectedness and integration. It is not any longer about having the best standalone solution. Rather, most startup solutions contribute to each other. We are highlighting some of the most interesting solutions we have encountered in Table 1².

FIVE PATTERNS AMONG STARTUPS IN THE SUPPLY CHAIN

We observe five characteristics among the solutions. They are focused on: **automation**, to take over repetitive tasks; **smart assistants (and co-bots)**, to support human operators with brainpower or physical tasks; **platforms**, to connect different supply chain entities for transparency, instant data exchange and ease; **sharing services** that increase flexibility, improve capacity utilization and provide access to new resources (e.g. from the crowd); or **analytics and artificial intelligence**, which enable process optimization.

BUYING A PAIR OF SNEAKERS – AN EXAMPLE OF THE SUPPLY CHAIN OF THE FUTURE

Let's see what the supply chain of the future will look like by considering an everyday item: sneakers (see Figure 2).

The Order and Deliver Phase

It all starts with the customer: Most likely, they will order their new sneakers online. The order will then trigger a provisioning process. However, much will have changed compared to today. The distribution center which will fulfill the pair of shoes will likely be mostly autonomous, using the latest hardware and software for picking. Other warehouses in the supply chain that have handled the sneakers will be staffed with people wearing smart clothing, or wearables, like gloves and glasses that support them in doing their jobs. In addition, in-warehouse drones, or integrated scanners, will always guarantee full warehouse transparency. For receiving their sneakers, customers can choose from picking them up at a collection point, having them delivered by an autonomous vehicle, like a drone or droid, courier services, or delivery from an "Uber"-like carrier.

TABLE 1: OVERVIEW OF RELEVANT STARTUP SOLUTIONS²

Startup	Area	Description	Sharing	Smart assistants	Automation	Platforms	Analytics
1 Swarm Logistics	Network optimization	Blockchain-driven, autonomous network optimization (route planning, logistics execution, etc.)		●	●	●	
2 Solvoyo	Demand planning	Logistics planning platform, serving all layers from strategic to operational planning				●	●
3 Celect	Inventory planning	Data-driven, cloud-based “customer choice modeling suite” to optimize inventories					●
4 Freightos	Matching platform	International online freight marketplace with freight rate benchmarks				●	
5 Shippo	Matching platform	Multi-carrier web app for marketplaces, warehouses and e-commerce businesses integration				●	
6 Elementum	Matching platform	Cloud-based real-time supply chain platform				●	
7 Haven	Optimization platform	Logistics automation software for commodity producers and their consumers			●	●	
8 Freight Hub	Optimization platform	Digital logistics platform and digital freight forwarder for FbA and E-commerce				●	●
9 Flirtey	Last mile delivery	Drone transportation for last-mile delivery in urban areas		●	●		
10 Robby Technologies	Last mile delivery	Last-mile delivery by robots/ droids driving on sidewalks	●				
11 Rytley	Last mile delivery	Sustainable last-mile delivery by cargo-bikes in urban areas		●	●		●
12 Evertracker	Transport monitoring	AI-driven solution learns from existing processes and allows real-time predictions				●	●
13 Smart Lane	Transport optimization	Cloud-based trip planning software, learning from data mining	●			●	
14 Convoy	Road freight transportation	“Uber for truck-shipping”, matching short-term supply and demand in truck market	●			●	
15 Loadfox	Road freight transportation	Algorithm that “plays Tetris” to fill unprofitable truck-tours to efficient truck routes	●			●	
16 Atheer	Warehousing technology	Wearables (e.g. smart glasses or mobile devices) for picking		●	●		
17 Geek+	Warehousing technology	Full warehouse robot system for picking, sorting and moving			●		
18 Cargometer	Warehousing technology	3D-measurement of goods on a moving forklift, enabling warehouse measurement during operations			●		
19 Swapbox	Last mile delivery	Post-box in neighborhood to avoid missed deliveries	●				
20 windward	Sea freight transportation	Algorithm that detects abnormal ship activities to detect malicious ships		●			●
21 Weft	Sea freight transportation	Container tracking platform enabled by sensors and powered by predictive analytics					●

● Characteristic solution

The Source and Make Stage

But it's not only the last mile that will be different from today. Upstream parts of the supply chain are changing, too. All in all, supply chains will be connected, asset-light and transparent. This means that every party participating in the supply chain to make and deliver the sneakers – from the fabric suppliers and sewing shops in Asia, to the last-mile carrier – will be linked on one cloud-based platform. That platform will cover the entire supply chain and guarantee fast information processing and data transparency. Additionally, sensor and blockchain technology will allow involved parties to monitor and control the supply chain. What does that mean for the customer? Theoretically, they will be able to monitor the journey of their pair of sneakers from their first stitch on. Furthermore, blockchain-based bills-of-lading will help them be certain that the shoes are not fakes. Transparency at this step in the process will primarily benefit the shoe vendor, since it makes it easier for producers to detect deviations in standard processes and take quick countermeasures.

The Planning Stage

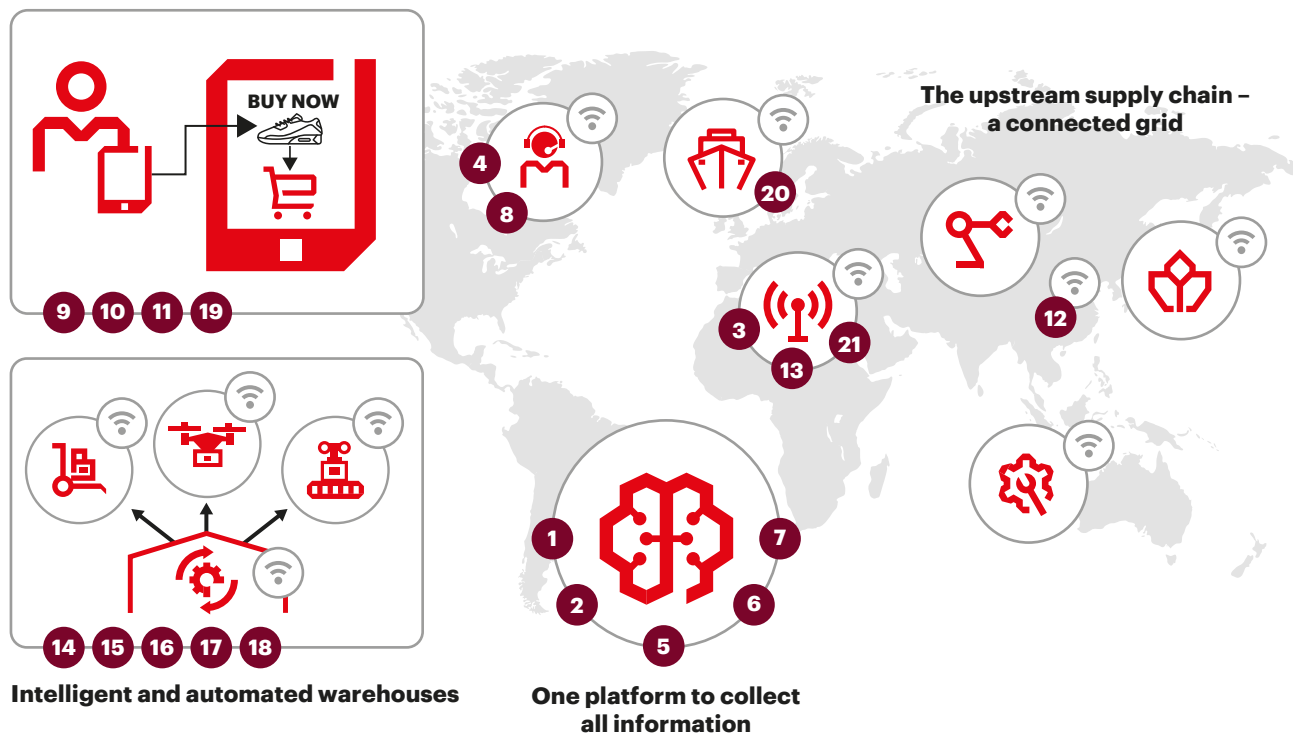
At some point, this additional supply chain control and transparency will also benefit the customer, because it will lead to improved overall service levels. In addition, customers may benefit from lower prices, since the maker of the shoes may pass along savings to them that the company achieved by outsourcing services or specific tasks, like customs and freight management, or savings from optimal shipping modes selected from online marketplaces with full price transparency.

MANDATORY REQUIREMENT: ADAPTIVE ORGANIZATIONS

The startup landscape provides clues about how supply chains are changing – for instance with logistics platforms, intelligent warehouses, the adaptive last mile and manufacturing platforms. We expect supply chains to be connected with intelligent technology that creates seamless interoperability, as well as real-time, end-to-end

FIGURE 1: THE SUPPLY CHAIN OF THE FUTURE

You – the starting point for (last mile) transport



visibility and secure collaboration. Supply chain organizations must accept that traditional operating models are changing and begin now to explore opportunities to create an adaptive organization.

Thus, companies should:

- Take a new approach to talent management. Companies need to establish new talent pools, platforms and development programs. Plus, by automating repetitive and transactional tasks, companies must empower their employees, focusing more on continuous development and strategic improvement.
- Encourage collaboration, building partnerships to serve customers cost-effectively as more supply chain capabilities are expected by customers and partners
- Employ asset-light ecosystems which are comprised of third-party networks that share physical assets
- Offer custom combinations of the supply and value chain to customers, as determined at the time of order

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- Please note that these startups only show an extract of all startups analyzed. Furthermore, the selection is meant to give an overview on existing solutions rather than on highlighting individual solutions. Accenture stands in no commercial relation to any of the companies listed.



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THE PRICE OF LATE PAYMENT

How companies can optimize invoice and payment processes with artificial intelligence



Late payments are costing companies billions. Literally. In 2017, for instance, the cost was estimated at EUR 3.4 bn euros for the European market (excluding the UK), one study showed.¹ Another found that more than half of surveyed companies accepted payment terms that were longer than they were comfortable with.²

By using artificial intelligence (AI) to optimize invoice and payment processes, companies can free up funds for investments in growth and innovation.

Even though longer payment terms or late payments can improve the cash position of the buying-company, the long-term impact can be severe, especially for small and medium-sized enterprises that are at the front end of the supply chain. They need cash to run day-to-day operations to invest in growth and innovation. When they are illiquid, some suppliers may have to take on expensive, short-term loans to meet current obligations.

The risk of losing an important supplier due to these stresses increases when the buying company has late payments or a long payment cycle. Slow or late payment can also impact the buying company’s reputation among existing or potential suppliers.³

DISCOUNTS – CURSE OR BLESSING?

Typically, suppliers use discounts to motivate buying companies to pay earlier. One example is a term like: “Pay me in 14 days instead of 30 days, and I will give you a two percent discount on your purchase order.” With earlier payments, the buyer can reduce the purchase costs while the supplier foregoes a portion of its revenue to ensure liquidity. But what if the buyer is not able to fully make use of the discount because the right processes and authorizations are not set up within the organization? Besides the missed savings in purchase costs, the effective interest rate for late payments can be higher than the cost of capital. In the previous example in which a supplier offered a two percent discount, the effective annual interest rate (*i_{eff}*) would be greater than 36 percent, as the calculation shows (see Figure 1). As a result, the costs associated with discounts can be significant for both companies (see Table 1).

FIGURE 1: CALCULATION OF EFFECTIVE ANNUAL INTEREST RATE (EXAMPLE)

$$i_{eff} = \frac{\% \text{ Discount}}{1 - \% \text{ Discount}} \times \frac{360}{\text{Payment days} - \text{Discount days}} = \frac{2\%}{1 - 2\%} \times \frac{360}{30 - 10} = 36.7\%$$

TABLE 1: DISCOUNT – ADVANTAGES, DISADVANTAGES

	SUPPLIER	BUYER
DISCOUNT UTILIZED	+ Higher liquidity through earlier payment + No risk of unpaid invoices - Lower revenue by 2%	+ Lower purchase costs by 2% - Lower liquidity through earlier payment
DISCOUNT NOT UTILIZED	+ No loss in revenue - Lower liquidity through long payment cycle - Higher risk of unpaid invoices	+ Higher liquidity through long payment cycle - Missed savings of 2% on purchase costs

2% exemplary discount

THE DEVIL IS IN THE PROCURE-TO-PAY CYCLE

The reasons for longer payment terms or late payments may not be linked only to the buying company. Sometimes, longer payment periods can also be a result of inefficiencies within the procure-to-pay cycle of the supplying company.

Typical reasons for these inefficiencies are:

- Complex invoice approval or billing processes
- Large time gap between receiving invoices and products / services
- Time-consuming internal data collection
- Incomplete invoices
- Lack of precautions for payment delays⁴

WIN-WIN WITH AI-BASED INVOICE AND PAYMENT PROCESSES

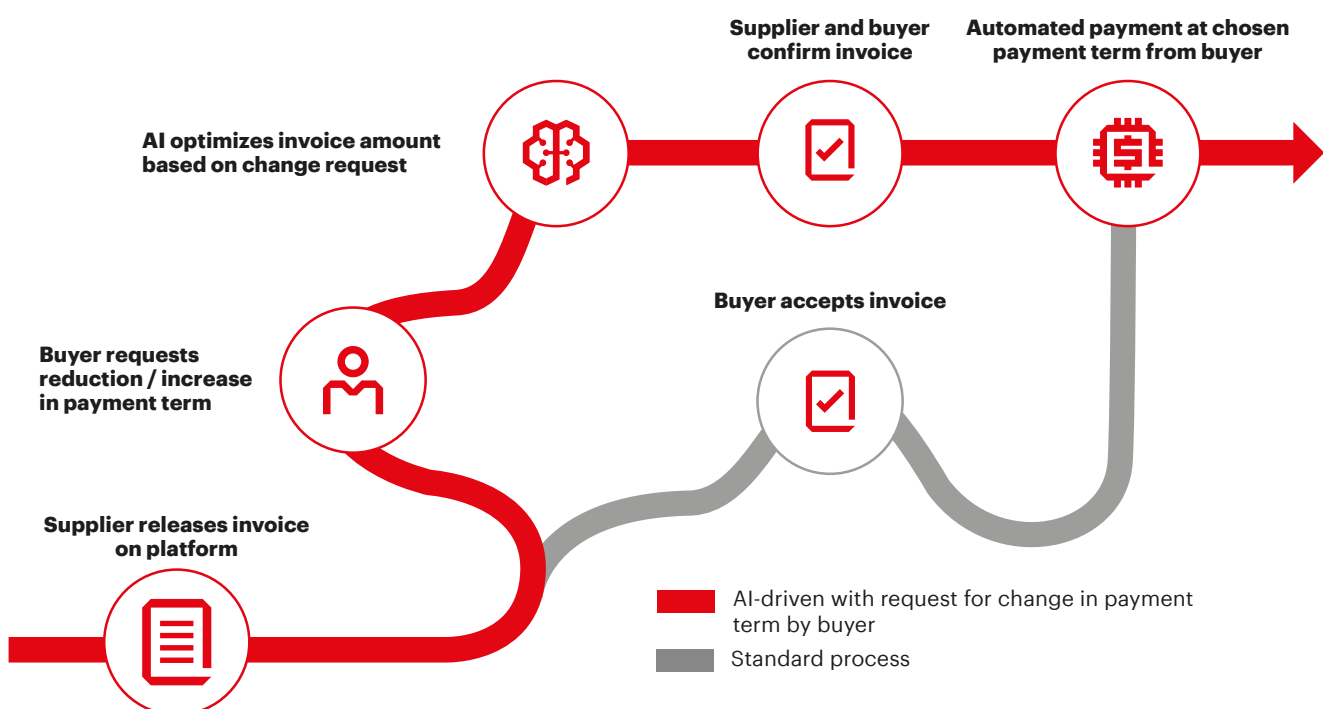
Since the financial strength and the operational capabilities of companies differ, what constitutes “fair” payment terms varies. Companies can define it better by using AI in the invoice and payment process. With AI, for example, the buyer receives the opportunity to propose an alternative payment term to the supplier than the one that was agreed on. If the buyer exercises the option, the system will predict the financing risk to and the future cash position of both the supplier and the buyer. The algorithm uses historical invoice and payment data and metadata that flows through the platform and optimizes the invoice amount according to the proposed payment terms so that neither the supplier nor the buyer are adversely affected.

USE CASE: AI-DRIVEN INVOICE AND PAYMENT PROCESSES

Such an AI-driven invoice and payment process can be initiated by the supplier or the buyer, or both can do it jointly. Or it can be done on an existing procurement platform through an online interface or an end-to-end procurement platform, where invoices are uploaded (see Figure 2).

In both cases, the supplier and buyer obtain real-time information about the procurement and invoice process. As soon as an invoice is provided by the supplier on the platform, the buyer receives a notification by email or text message. The buyer now has the opportunity to accept the invoice or to request a reduction or an increase in the payment term. In case the buyer accepts the invoice, the payment is automatically made at the end of the chosen payment term. If the buyer requests a reduction or an increase in the payment term, the algorithm optimizes the invoice amount with price reductions or price mark-ups to offset any possible disadvantages for the supplier and the buyer. After the new proposal is also accepted by the supplier, the invoice amount is automatically paid by the buyer at the end of the payment term.

FIGURE 2: THE AI-DRIVEN INVOICE AND PAYMENT PROCESS



This results in:



Up to 80% increase in the invoice and payment process by using RPA



Decrease in costs associated with dunning processes and collections



Reduction by 100% in human errors and inconsistencies in invoices through process automation



Increase in staff satisfaction by 43% through reduced manual and repetitive activities in the procure-to-pay process



No charges and costs associated with third party financial institutions

A LOOK INTO THE FUTURE

Existing global economic and political uncertainties are forcing companies to find alternative sources of liquidity. Therefore, late payments and long payment terms will remain a problem in supply chains where companies of unequal financial strength and operational capabilities work together. Therefore, companies should address the potential impact of late payments and longer payment terms in their supply chain to stay competitive and maintain a strong supply chain in the future.

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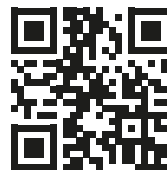
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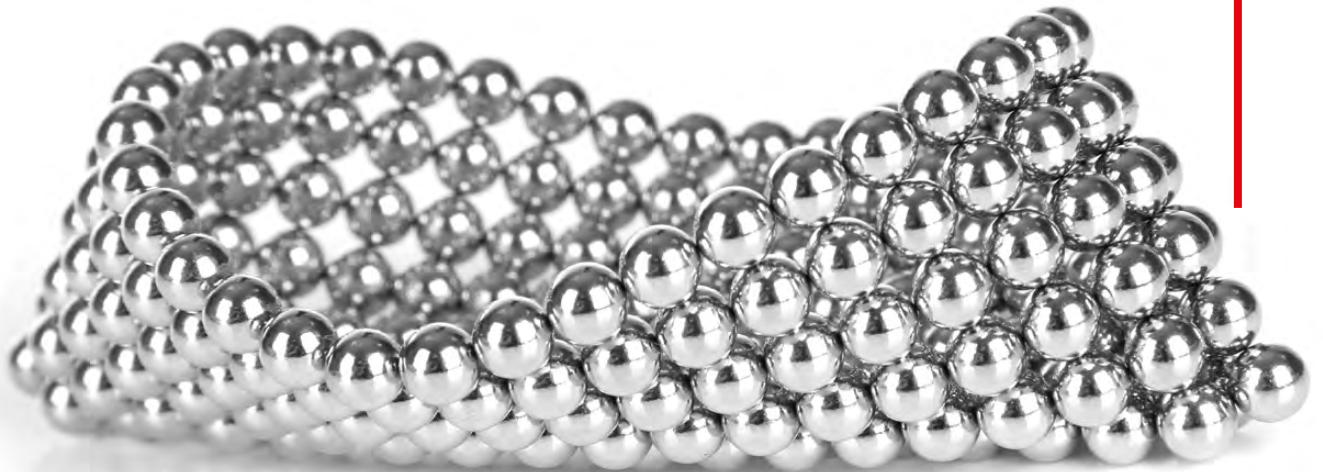
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BLOCKCHAIN'S POTENTIAL IN SOURCING AND PROCUREMENT

**How to disrupt existing contract
management strategies**



Blockchain can help provide close-to-real-time transparency about transactions across the value chain, supporting core procurement processes such as supplier qualification and contract and risk management. It can also help companies manage their supplier ecosystems more effectively while giving impetus for innovation throughout the entire value chain.

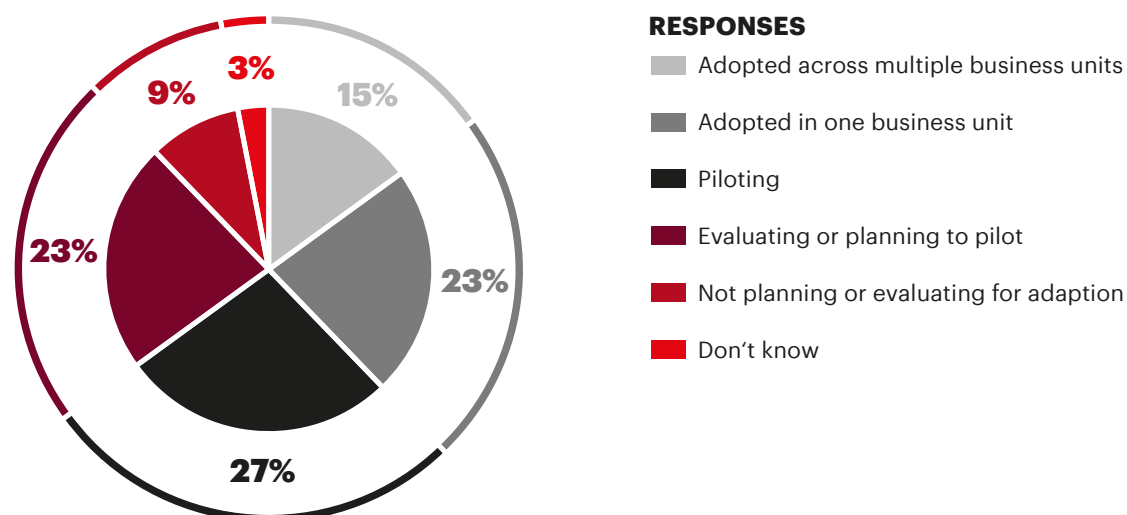
The adoption of blockchain-based solutions is expected to grow exponentially in the coming years: One 2018 report predicts that the blockchain market will grow from USD 1.2bn in 2018 to USD 23.3bn by 2023¹. A 2019 study by Accenture Strategy also showed that 38 percent of companies surveyed had already adopted blockchain-based solutions in one or more business units, while 50 percent were currently running or planning a pilot (see Figure 1).²

Blockchain is a new type of database system that maintains and records data in a way that allows multiple users to securely share access to the same data and information. Information is stored in the form of blocks of transactions on a shared ledger that is maintained by all participants. The distributed ledger is secured via cryptographic mechanisms, and once data is written into a block, it is extremely hard to change it.

Although blockchain was originally associated with the bitcoin cryptocurrency system, important applications of blockchain now exist in other areas, such as identity management, supply chain and financial services.

Recently, blockchain has been used within the sourcing and procurement function. We have identified multiple use cases, including for contract management, which we find particularly promising. Blockchain's distributed ledger is the basis for close-to-real-time visibility into the complete lifecycle of any digital "object" and can be a "single source of truth" for a sourcing and procurement organization.

FIGURE 1: ADOPTION OF DISTRIBUTED LEDGERS / BLOCKCHAIN



n=6'672 across 27 countries and 20 industries, with the majority having annual revenues greater than USD 6bn

HOW SOURCING AND PROCUREMENT IS USING BLOCKCHAIN

Before we discuss the potential in contract management, let's look at three further applications for blockchain in sourcing and procurement:

Risk and regulation management

Blockchain can store the entire history of events on a shared ledger, where each new piece of information links back to a block that captures its previous state. Combined with mechanisms ensuring consensus across participants, this makes it extremely difficult to falsify the history of events or transactions and makes any attempts immediately visible. Since it can help prevent counterfeiting and increase trust among users – which has a material and quantifiable impact on business value³ – blockchain is promising for risk and regulation management.

Reconciliation

Since blockchain provides a single source of truth for all users, regardless if they are internal or external, it eliminates the need for reconciling data from different data sources. This allows companies to streamline core procurement processes, from supplier qualification to requisition to pay (see Figure 2).

Automated pay-per-use agreements

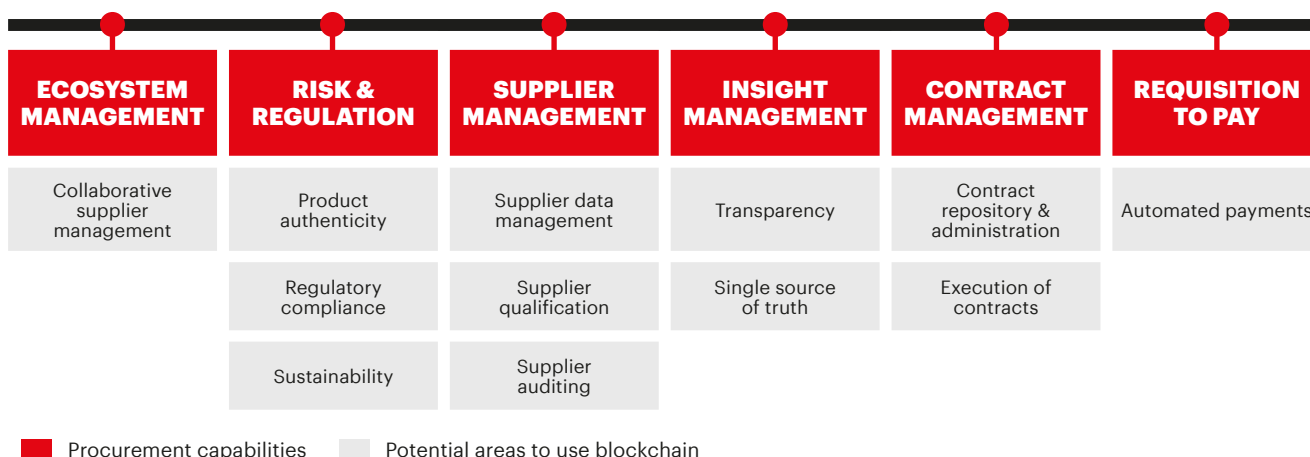
When the internet of things (IoT) is run together with a blockchain-based system, it can enable secure, fast and fully automated payments. Imagine a company with thousands of machines spread out over plants and remote sites. With a blockchain-based system, the company can trigger a script that creates an invoice for the actual times that machines were used. That invoice would be 100 percent accurate and transparent for the customer, because each time the machines were used, that transaction was recorded on a blockchain.

BLOCKCHAIN IN CONTRACT MANAGEMENT

Using blockchain for contract management has high potential since blockchain can directly address and resolve some of the common challenges procurement faces with the contract management process.

Challenge	Blockchain-based solution
Limited intra-company visibility on latest signed contracts, including versions, revisions, expiration / extension dates and payment terms	Key information can be stored on a shared distributed ledger and then seamlessly transferred, updated and built-upon
Involved parties use separate databases without a connection and require significant effort for reconciliation	Agreement on the information stored on the shared ledger eliminates reconciliation needs for both internal and external participants
Changes made to contracts may be tracked in different systems or not at all. This makes it difficult to evaluate what changes were made by users and matters of compliance	Information about contract revisions, extensions, expirations, agreed rates and actual usage can be recorded in a blockchain-based system and easily shared with exactly those parties who are authorized for access. A blockchain-based solution can provide a one-stop shop for creating, updating and using contracts
The current lack of transparency about contracts keeps companies from adapting sourcing strategies and commercial models to actual consumption patterns, which can lead to consistently overpaying for goods and services	Blockchain-based solutions allow companies to drastically reduce costs for audits since they enable close-to-real-time analytics. They also enable savings through "pay for what you actually use" purchasing

FIGURE 2: POTENTIAL AREAS TO USE BLOCKCHAIN ACROSS KEY DIMENSIONS OF THE PROCUREMENT CAPABILITY MAP



It is worthwhile noting that blockchain technology is only one component of such contract management solutions. They also require custom application programming interfaces (APIs), conventional databases, and front-end and administrative applications.

Some companies are developing blockchain-based solutions for contract management, such as Icertis, a traditional contract management services company that is enhancing its offering.⁴ Monax is a startup and pure blockchain company that is developing a platform for contract lifecycle management and smart contracts.⁵ Accenture, as well, has developed Blockchain for Contracts⁶ and is providing a new way to draft and sign contracts easily, efficiently and securely.

WHERE DOES BLOCKCHAIN GO FROM HERE?

While the promise of huge industry transformation with blockchain is still becoming a reality, various companies and consortia are moving fast towards large scale implementations. Since procurement is the entry point for every conversation with suppliers, procurement is responsible for getting to know the technology. It can lead the rest of the organization to blockchain-based solutions and create a lasting competitive advantage with blockchain.

Procurement therefore should:

1. Understand the technology and its potential
2. Join or build a consortium of key players across the industry value chain focused on adopting blockchain
3. Jointly with the consortium, identify the most promising use cases and validate the business benefits with a proof-of-value solution
4. Implement tested solutions at scale to unlock their full value potential

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TAIL SPEND MANAGEMENT 4.0

**Capturing untapped potential with
insight-driven solutions and digitally-infused
buying experiences**



Inefficient tail spend management costs companies millions of dollars each year, although it is probably one of the oldest and least strategic topics considered. New digital tools can help companies unlock sustainable saving potentials of more than 10 percent on tail spend that could not be targeted until now.

Across all categories, thousands of purchases are made each year that are too low in value to be handled by strategic procurement or too infrequent to be covered through structured procurement channels (e.g. catalogs). Usually, this tail spend is managed by setting up a spot buy team, implementing a task force to identify new contract and policy requirements, and rolling out self-service buying channels.¹ But some tail spend still goes unmanaged due to unnecessary free text requisitions that could be covered by catalog or contract call-offs. This phenomenon is usually evenly caused by requisitioners and procurement.

Requisitioners are often faced with non-cascading buying channels and missing information and/or instructions on how to choose the right buying channel. When navigating through self-service portals they often experience non-intuitive and non-user friendly functionalities (e.g. unintelligent search functions). Especially for services identifying the right contract and combination of contract positions is often difficult. Consequently the

“easiest” way to fulfill a need is to bypass preferred suppliers and frame contracts and issue a free text requisition handing over the responsibility for finding the right vendor, contract or position to procurement (spot buy) without ensuring existing options are explored. Actively managing this spend can reduce tail spend by 8 to 10 percent, directly impacting the bottom-line.

Procurement on the other hand is often times confronted with two main challenges. Firstly, spot buy teams often lack resources and insights to conduct necessary compliance checks – e.g. checking available contracts, preferred suppliers and applied conditions. Secondly, category managers and task forces often lack resources and insights to continuously monitor tail spend. Consequently, communication and exchange of insights between category managers and spot buyers may be limited, price negotiations may be inconsistent, and companies may lack price benchmark data (see Figure 1).

FIGURE 1: CHALLENGES IN TAIL SPEND MANAGEMENT

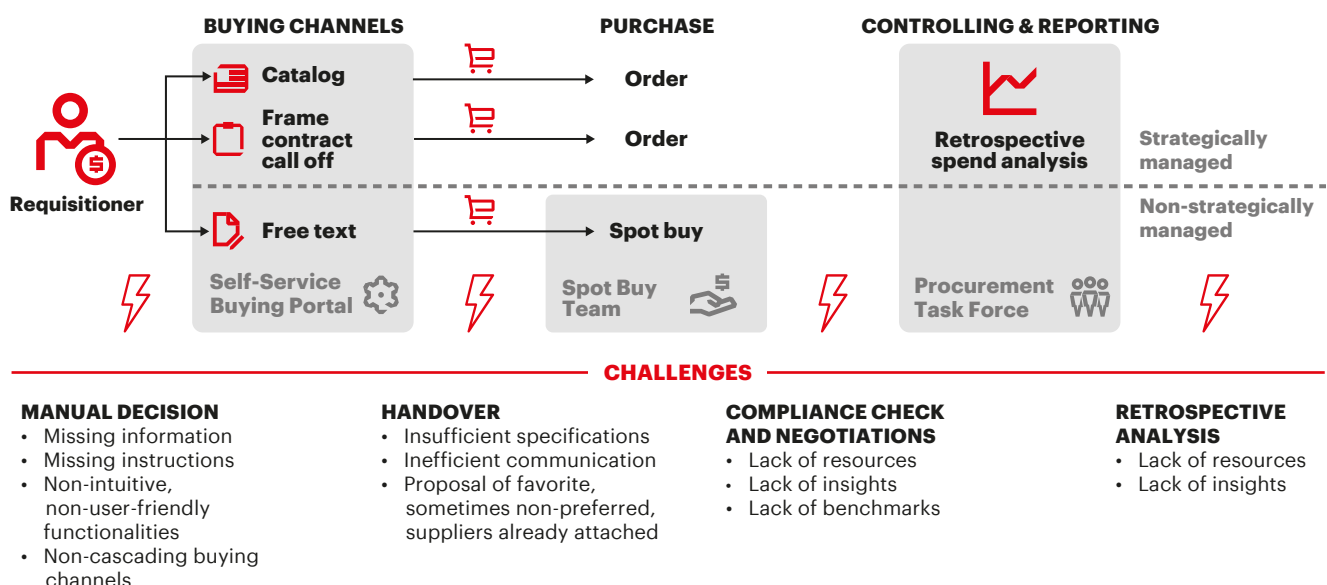
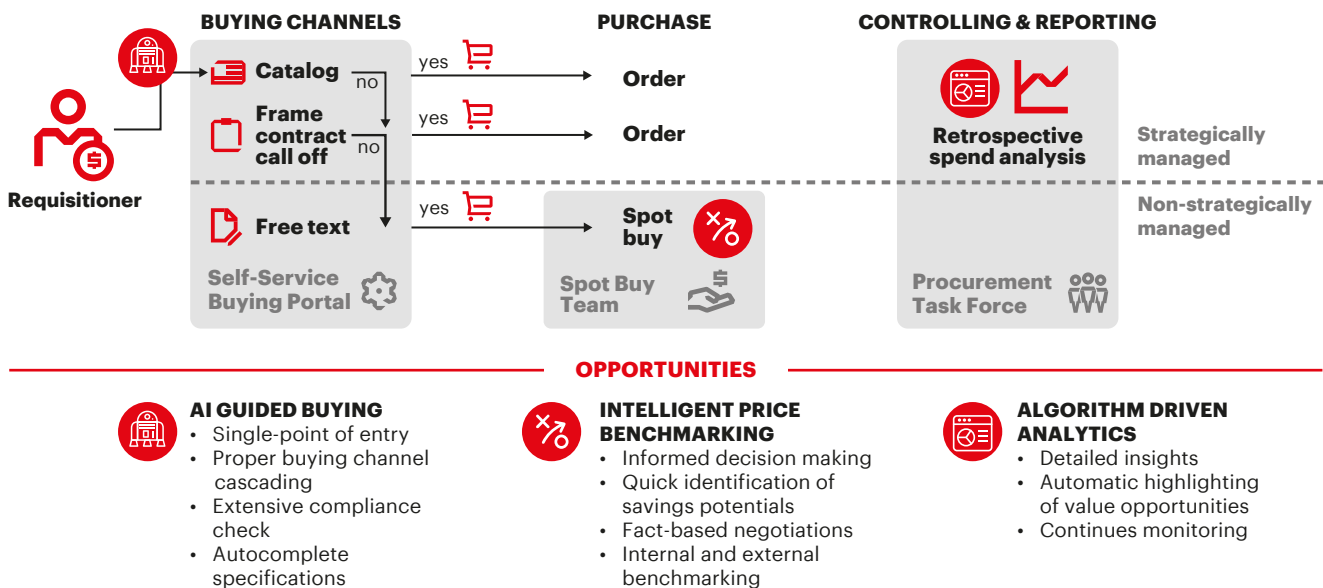


FIGURE 2: IMPROVEMENT OPPORTUNITIES BY DIGITAL TOOLS



TAIL SPEND MANAGEMENT IN THE NEW

To improve tail spend management, companies can enable requisitioners and procurement by implementing various digital tools (see Figure 2) within a tail spend management framework that efficiently guides employees through the purchasing process by providing work instructions, buying channel strategies and guidelines for contract data quality. Digital tools include artificial Intelligence-guided buying, advanced analytics for improved visibility and intelligent price benchmarking.

AI-GUIDED BUYING

The overall objective is to prevent tail spend before occurring by reducing unnecessary free text requisitions and fully utilizing procurement capabilities.

AI-enabled chatbots can serve as a single point of entry for requisitioners and ensure buying guidelines are met and purchases are compliant. Based on the requisitions inputted, a chatbot would recommend preferred catalog items, contract positions and suppliers. If the requisitioner rejects a recommendation, a chatbot can check back to find out the requisitioner's reasons, better understand the requisitioner's needs and make another suggestion. After all self-service buying channels have been explored and no alternatives have been found, the bot can issue a free-text requisition with enriched specifications.

This solution improves the overall sourcing experience for the requisitioner, ensures compliance with strategic procurement strategies at the moment of purchase and thus reduces the number of free-text requisitions.

IMPROVED VISIBILITY OF SAVINGS OPPORTUNITIES

Advanced analytics enable category managers and task forces to continuously instead of retrospectively monitor and analyze tail spend data.

Increasing data availability, new algorithms and visibility capabilities allow a resource-efficient tail spend analysis and automated identification of retrospective, ad hoc and structural value opportunities. These include claims based on historic transactions as payment term or price non-compliance, superior spot buy performance as volume bundling effects, insight-driven negotiation success and coverage via existing contracts and improvements of the tail spend approach by optimizing contract portfolios and rationalizing the supplier base. Overall, advanced analytics equip category managers with relevant insights to identify improvement potentials continuously, better instruct spot buy teams and thus revealing savings potentials in tail spend of approximately 4 to 8 percent.

INTELLIGENT PRICE BENCHMARKING

Intelligent price benchmarking, done with robotic process automation to compare offers and optical character recognition and natural language processing to interpret offers, for instance, helps companies get facts for negotiations, which may result in negotiation successes of 6 to 8 percent on spot buys.¹ First, companies can set alerts to be notified of price changes due to catalog updates, so that managers can consider renegotiation. Second, benchmark data can be used to provide advice about the optimal price during spot buying. This will enable procurement professionals to be more aggressive in price negotiations. Companies will need to set up a database of internal prices that includes data from catalogs, received and accepted offers, price lists and negotiated terms and conditions. In addition, they should also consider external benchmarking platforms to compare prices against.

CONCLUSION

Implementing tail spend management with new technologies can help companies save, by reducing the number of free-text requisitions, automating compliance, simplifying analyses and conducting negotiations with better data at hand.

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DATA IS NOT ENOUGH

How to apply analytics strategically



Applying analytics on an increasing amount of data is expected to generate value. But analytics itself is not the holy grail: It must be linked to business objectives which together lead to value-creating actions for optimized business outcomes.

Leaders need to a) understand top-down business questions to define the required data and b) push the bottom-up integration of data.

The digitalization of products, services and value chains allows industrial companies to gather more data than ever before. Accenture's Technology Vision Survey 2018 shows that most executives want to apply more analytics solutions on their data to harness this information treasure.¹ Despite high efforts and budgets, up to 85% of analytics initiatives fail.²

To make analytics undertakings a success, initiatives must be driven by strategically derived analytic use cases and realize them with the right data in the required quality and on time. Analytic use cases have

to be derived in a direct lineage from business strategy to meet the added value expectations and to identify the required data. To provide the right data in quality and time, a bottom-up integration of data and a data operating model is required (see Figure 1).

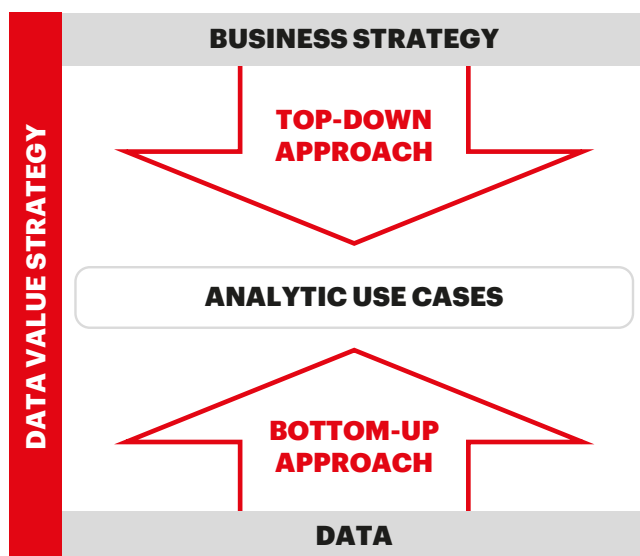
WHY ANALYTICS PROJECTS FAIL

In our recent projects, we experience either use cases that are requested by business but have no strategic purpose defined or lack unambiguous data requirements. While the latter causes initiatives failing to deliver tangible business value, the former are often not even able to deliver any value in the first place.

Often managers look at their data or tools for inspiration. Instead, they need to start with business priorities first which define the business outcomes and using analytics as a way to get there. Without identification of the required data by top-down business questions first, analytics may waste time and mislead decision-makers (see Figure 2a).

Data management then has to enable analytics with the bottom-up integration of required data. The data may have to come from different data internal silos (e.g. ERP product data, IoT big data, CRM customer data) or external. If a company lacks this enabling provision of the right data in quality and time, analytic use cases will not gain any benefit due to unmet data demand but instead, waste the time of data scientists (see Figure 2b).

FIGURE 1: ANALYTIC USE CASES AS A RESULT OF BUSINESS STRATEGY AND DATA OPERATING MODEL



THE CRITICAL ROLE OF C-LEVEL SPONSORSHIP

A strong C-level mandate is required to align data-driven value creation across the enterprise. The sponsor has to oversee both top-down and bottom-up analytic approach. This requires a combination of business acumen with deep data governance and architecture knowledge in one dedicated role. In big organizations, a dedicated data governance function is key to solve conflicts of interest: It owns data governance and critical data in the communal interest of multiple departments, e.g. enriched customer data.

FIGURE 2A: USE CASES WITHOUT PROPER TOP-DOWN APPROACH

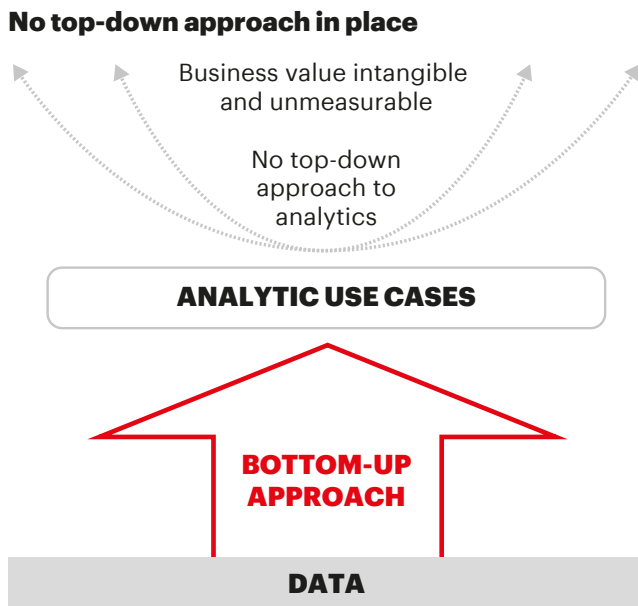
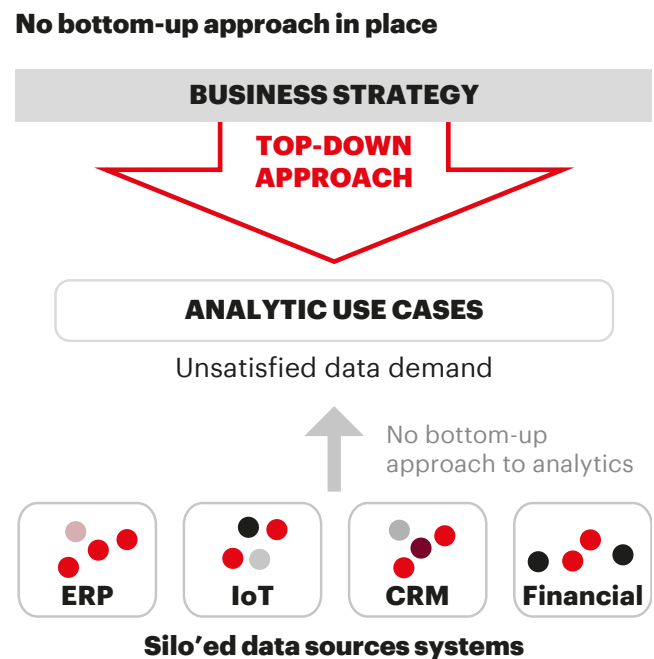


FIGURE 2B: USE CASES WITHOUT PROPER BOTTOM-UP APPROACH



TOP-DOWN CLARIFIES: IDENTIFY THE RIGHT DATA FOR ANALYTICS

Starting with your business strategy – the power of purpose

An analytic use case starts with its purpose: Why do you want to apply analytics? This strategic intent has to be derived from business strategy (see Figure 3), e.g. growth in a geographical area or market leadership in on-time delivery.

Setting business objectives

The strategic purpose has to be broken down into objectives that cover the most important aspects. This breakdown turns abstract strategic goals into tangible business language and even implies milestones to reach it, e.g. detailed insight on customers in a certain area (with the most important customer KPIs as milestones) and enhancement of the sales approach (in distinct phases).

Business problems for analytics to solve

With actionable objectives in place, hurdles and questions on how to reach them arise. The failure of many data initiatives is due to a lack of understanding of the business problems and the driving forces behind analytics.³ Business problems can be e.g. the scatter of essential customer information or late awareness of supply chain bottlenecks or forecasting on a specific topic.

Defining what data or analytics are required

Which data assets and analytic insights are required to solve those business problems? The failure of many analytic initiatives is rooted in starting use case formulation with what data is available.

Instead, the demand for data should be derived from business problems. E.g., the demand could be each customer's activity from lead discovery to aftersales care in a comprehensive visualization, unveiling cross-selling opportunities.

The analytics use case

Following the top-down approach, analytic use cases are well defined and derived from business needs with actionable objectives and the definition of required data and analytics capabilities. Each use case itself must be broken down into objectives itself. After setting milestones and defining tasks or user stories, experts from both top-down approach (domain experts) and bottom-up enablement (tech and data experts) must be included. Each of the use case's objectives creates a demand for visualization, frontends, tools, data, infrastructure, etc.

FIGURE 3: THE TOP-DOWN APPROACH

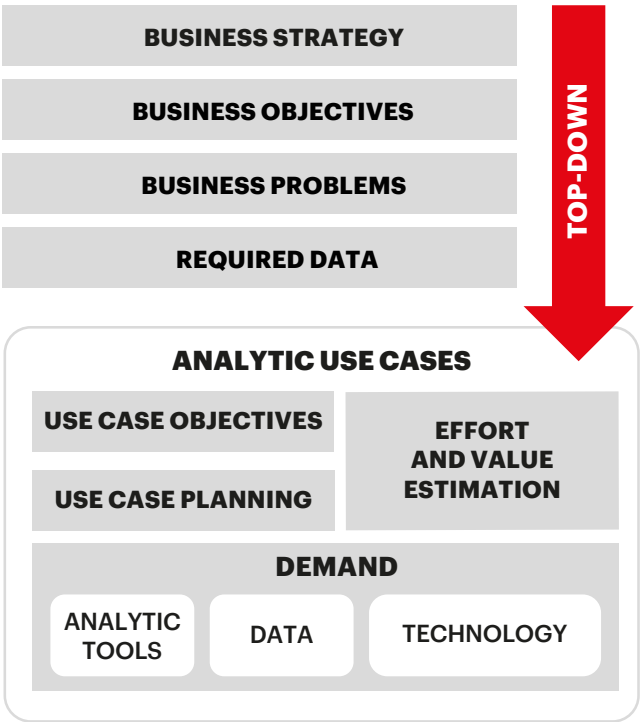
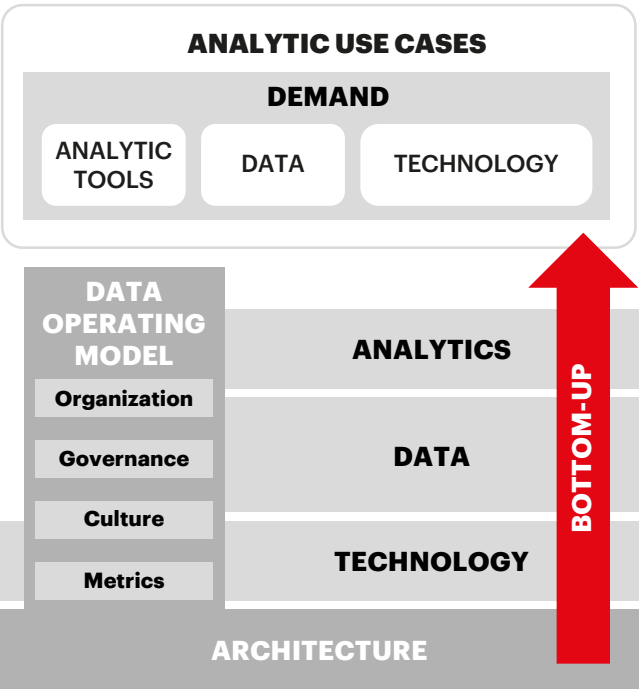


FIGURE 4: THE BOTTOM-UP APPROACH



BOTTOM-UP ENABLES: PROVIDING THE RIGHT DATA FOR ANALYTICS

An architectural fundament

The bottom-up approach's objective is to fulfill the analytic use cases' demand with the right data in quality and time (see Figure 4).

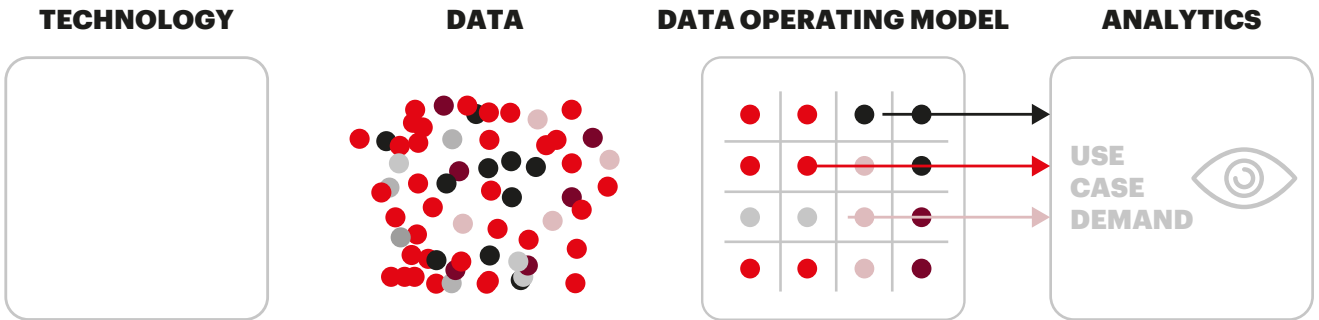
Therefore, data must be organized on top of an enterprise architecture and technology layer. The architecture enables the integration of different data source systems and the collaboration between systems on technology (infrastructure and networking), data and application level (e.g. analytics).

Bringing the bottom-up approach to life:

The data operating model

The data operating model is the key facilitator of the data value strategy to the bottom-up approach. It orchestrates the data-related parts of technology and most importantly the company's data and analytic tools in use (see Figure 5). Along with the right architecture, it operationalizes data in the dimensions of organization, governance, culture and domain metrics.

FIGURE 5: DIFFERENTIATION OF PILLARS ORCHESTRATED BY THE DATA OPERATING MODEL



Organization

Choosing the right organizational model depends on the company. After having planned and implemented several data operating models at companies with revenues from EUR 10bn to 50bn p.a., we can recommend a hybrid data and analytics function for companies as large as this. Anyway, only a detailed business case calculation will reveal the return of this overhead. For smaller companies, other rationales may apply.

Data governance

Apart from lowering the analytic initiatives failure rate, data governance leads to improved data quality.⁴ Knowledge workers spend up to 30 percent of their time in data curation, scrap, rework and failure recovery caused by defective information processes.⁵ And this has not turned for the better in the past 20 years. Besides mitigating those data usage inefficiencies, data governance reduces the risk of legal fines, lowers cybersecurity incidents, lets data scientists discover new data assets and enhances possibilities of external data collaboration.

Two concepts are critical for these goals: data ownership and data stewardship. Data ownership means that any data asset in the company has a dedicated owner, who is accountable for its quality, availability, usage, security, and privacy. Data stewardship refers to a network of data professionals throughout the organization governing and organizing data in their respective domains.

Metrics

To measure and enhance the success of the bottom-up approach, the data consumer feedback is important, e.g. questionnaire to the cross-functional teams who work on analytic use cases. Their qualitative opinion or even better quantitative rating on data provision speed and data quality is a key metric.

Culture

The most sophisticated operating model will fail if the human factor is left out of the equation. To utilize the interconnectedness of the operating model and to avoid redundant work, a sharing mindset should be the vision. The shared resources of the data governance function encourage the exchange and reuse of good practices. Additionally, an open data community should comfort your employees to share scalable solutions and ideas across departments and data domains.

WRAP-UP

Bringing together the business and functional units for the top-down derivation of use cases with the enabling analytic capabilities in your company is a challenging task but showed great returns in past projects. Especially data governance holds great value levers despite its regulatory reception.

Leaders of data-driven enterprises

- define a data value strategy and recognize the value potential of data governance with a dedicated function for data management / governance,
- bring together business strategy (top-down) and data management (bottom-up) by empowering cross-functional analytic initiatives, and
- operationalize initiatives' efforts in a company-wide data operating model.

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HUMAN RIGHTS RISKS

How advanced analytics can improve due diligence in the supply chain



In the past, we have seen that publicly reported human rights violations can have a substantial negative impact on companies because they impact trust. Such incidences can harm companies' competitive positions and put revenues and EBIT at risk.

MANAGING HUMAN RIGHTS RISKS IS CRUCIAL FOR FUTURE-PROOFING BUSINESSES

To measure the effect of trust on financial performance, Accenture Strategy developed the Competitive Agility Index¹. An analysis using the index showed that 54 percent of the 7,000 companies considered suffered a trust-damaging incident during the study period of 2.5 years. The index quantified their loss in turnover at USD 180bn.

Human rights include, among others, the right to live, freedom from slavery and torture, workers' rights and the right to immovable property. Companies may hence face human rights risk in different ways – by being associated with forced or child labor, torture and ill-treatment, involuntary resettlement or detrimental impacts on communities.

Poor monitoring may have been a contributing factor to well-publicized examples of human rights violations. In 2018, for instance, reports said Foxconn was overusing agency workers in their Chinese factories, who have fewer rights than regular workers.² Another recent example with damaging impacts on a company's reputational and operational standing is the Brumadinho dam collapse in Brazil in January, 2019, in which more than 250 people died. Much of the steel used by car manufacturers come from such Brazilian mines. Spilled mud and toxic sludge destroyed communities and their land, and it displaced hundreds. Yet in 2018, the dam was certified to be safe. Vale SA, the company operating the dam, saw its share price drop significantly.³ Vale SA and safety certifier TÜV SÜD have been accused of severe negligence⁴, damaging stakeholder trust and their reputation.

As this indicates, we see three reasons for managing human rights in supply chains, including production and service delivery.

First, it is good business practice to treat all people with dignity and equality and to demonstrate ethical leadership. Second, through effective risk identification and assessment, companies can protect stakeholder trust and their reputation. They can measure, manage and report human rights risks to estimate their value-at-risk and to remain competitive. Third, better monitoring can help companies comply with the United Nation's Guiding Principles on Business and Human Rights. It can also help meet guidelines at the national level, for instance those in Germany in the National Action Plan on Business and Human Rights. The plan says companies should integrate measures to ensure human rights are not being violated into their business and supply chain activities, and they should set up a clear human rights due diligence process.

SUPPLY CHAIN RISKS ARE NOT UNDER CONTROL

Most companies, especially large companies, incorporate human rights principles into their codes of conduct or awareness programs, in order to demonstrate high public commitment and responsible corporate engagement.

Despite these efforts, global businesses are increasingly threatened by human rights risks in supply chains and on production sites. Risks can be country-, location-, or business counterparty-specific, and they can be difficult to observe. Violations may be the result of a lack of transparency and enforcement mechanisms with contractors. Operations in remote or politically unstable locations may also make it harder to enforce human rights standards.

Often, it's difficult for companies to get the information they need to monitor risk, and it may be biased. Tools that incorporate specific and diverse data sets to monitor the risks can help companies avoid costly mistakes.

SOLUTION: A HUMAN RIGHTS DUE DILIGENCE TOOL

Companies need a data-driven due diligence process for human rights for the supply chain to identify, prevent, mitigate and account for potential human rights violations. This requires tools for ad-hoc decision making, reporting and communications about human-rights related activities.

This calls for an IT-based solution that is integrated into existing value chain monitoring systems.

For a data-driven, human rights risk due-diligence process, companies need a tool allowing them to:

- Model comprehensive human rights risk indices for specific locations or business partners
- Draw on up-to-date data and news sources to monitor human rights incidences worldwide
- Visualize human rights risk situations on interactive dashboard maps, graphs and timelines
- Zoom into specific risk assessments through customized user views

Accenture Strategy conceptualized and co-created such a Human Rights Due Diligence Tool (HRDDT) with a German multinational conglomerate so it could identify and assess risks in its foreign sourcing, production and investment activities. To do so, we

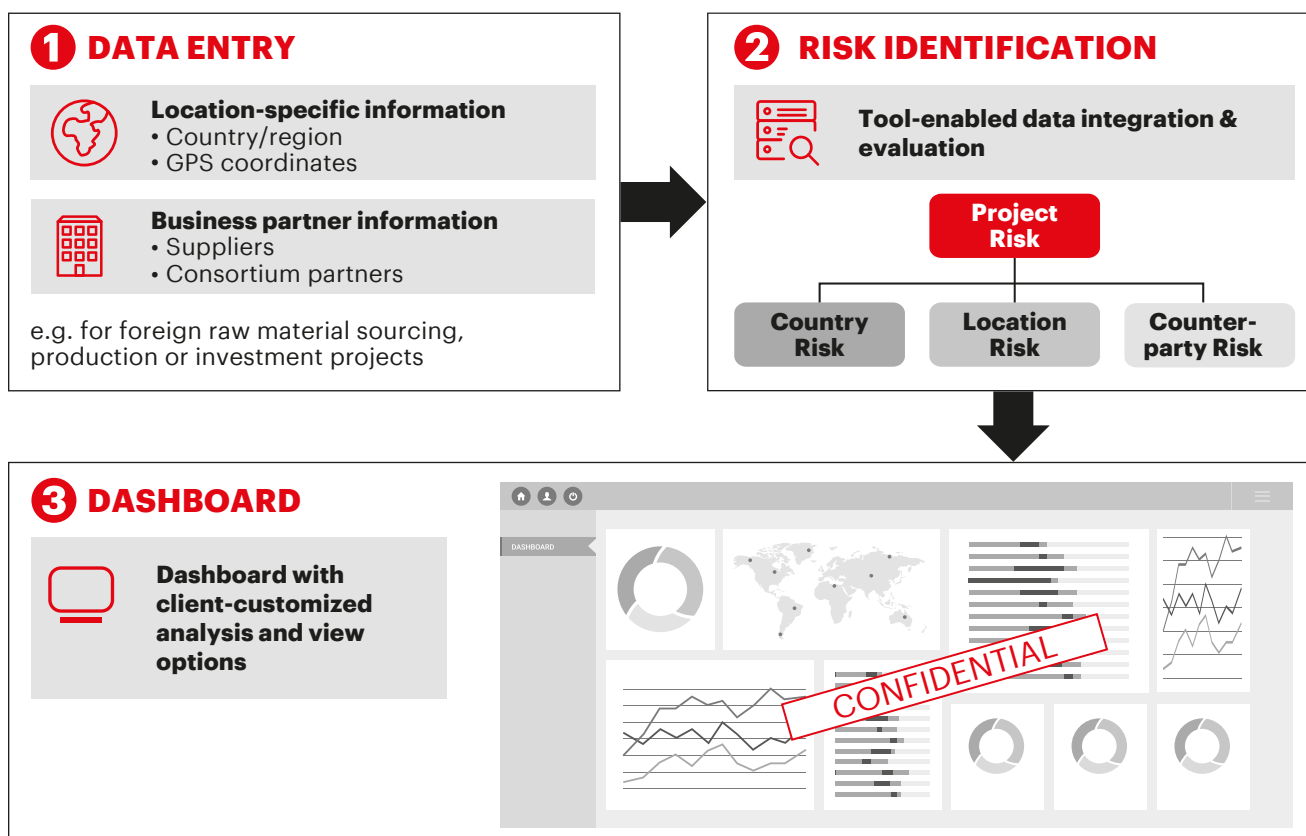
incorporated relevant data, including quantitative data, from external databases and news sources. The HRDDT models the data and visualizes the country-, site- and counterparty-specific risk in an interactive dashboard view (see Figure 1).

The tool generates risk indices that are based on context-specific sub-indicators and the likelihood of their risk. Nearly 100 sub-indicators cover:

- Labor, community and fundamental rights
- Political risks
- Legal security and rights of indigenous communities
- Labor and community rights violations by counterparts
- Business conduct and environmental impacts of counterparties

The HRDDT indicates an overall risk level and shows the risk factors and possible actions for mitigation, such as exclusion of controversial project suppliers. By using the tool before and during projects, companies can minimize the risk of engaging in business activities that may be linked to human rights violations.

FIGURE 1: KEY COMPONENTS OF THE HUMAN RIGHTS DUE DILIGENCE TOOL (HRDDT)



Benefits include:

- Ability to make better decisions through detailed risk assessments
- Transparency of human rights risks for the company at a global level, and by function, such as project management, investor relations, sustainability, compliance, supply chain, communication, and health and safety
- Ability to determine a company's exposure – e.g. its "value at risk"
- Having a basis for "go" and "no go" decisions about investments or collaboration and for suitable mitigation measures

Finally, we appreciate our client's decision to share its effort and encourage companies active in international supply chains and with foreign production activities to think of Big Data enabled human rights risk identification solutions for risk identification and management.

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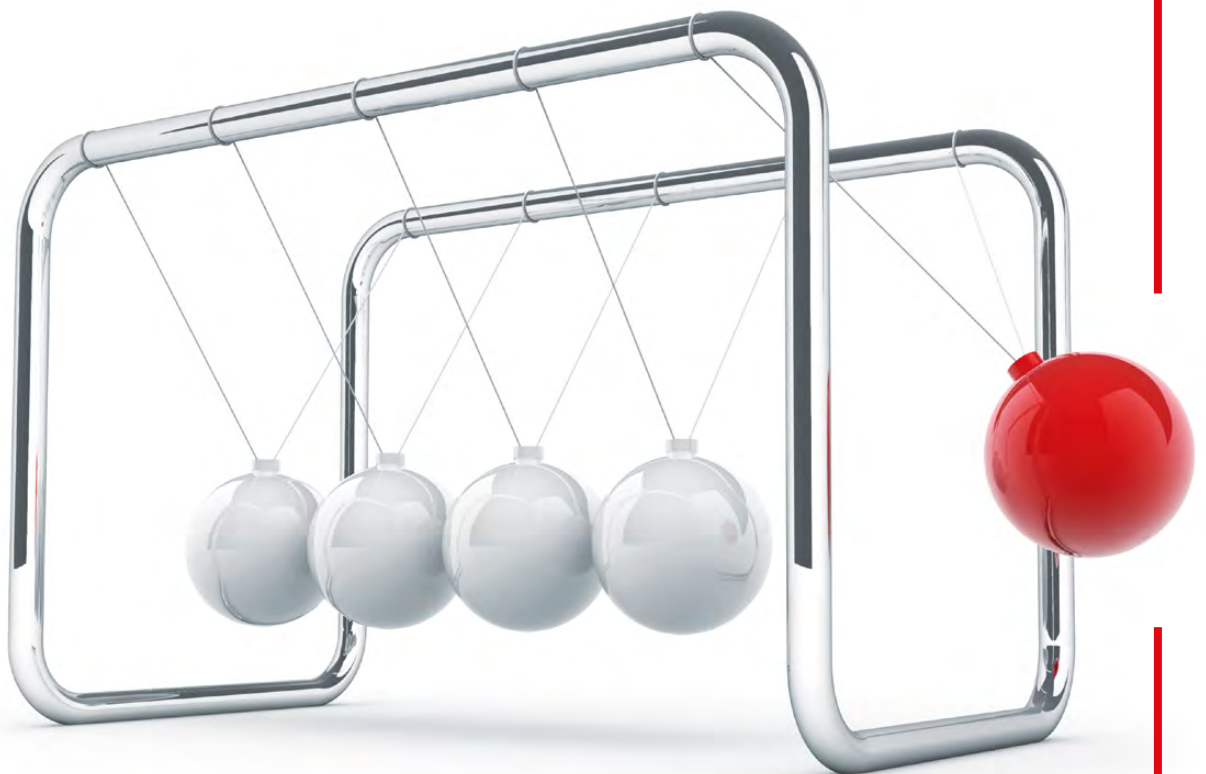
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INDUSTRY X.0: PRODUCTION ANALYTICS AT WORK

**How data science can increase
capacity in chemical plants
without more CAPEX**



Data science and advanced analytics can give production companies the opportunity to unlock hidden capacity that a traditional engineering approach cannot. This can be enough to avoid investment into new equipment lines – and therefore be a game changer for the asset- and CAPEX-heavy chemical industry.

Data science and big data analytics have become far more sophisticated in recent years – most visibly in their use for mining social media and deriving insights from customers. In production, however, their application has been rather limited, aside from some pilots e.g. in predictive maintenance. This is a lost opportunity, since much of production equipment, especially in chemical plants, has been equipped for many years with at least some sensors that produce data. Today's advanced analytics and state-of-the-art data science techniques can make use of such data and unearth further capacity gains by finding optimum operating conditions, de-bottlenecking equipment networks, identifying the root causes of failures, and predicting process quality in real-time.

DATA DRIVING AND GUIDING IMPROVEMENT

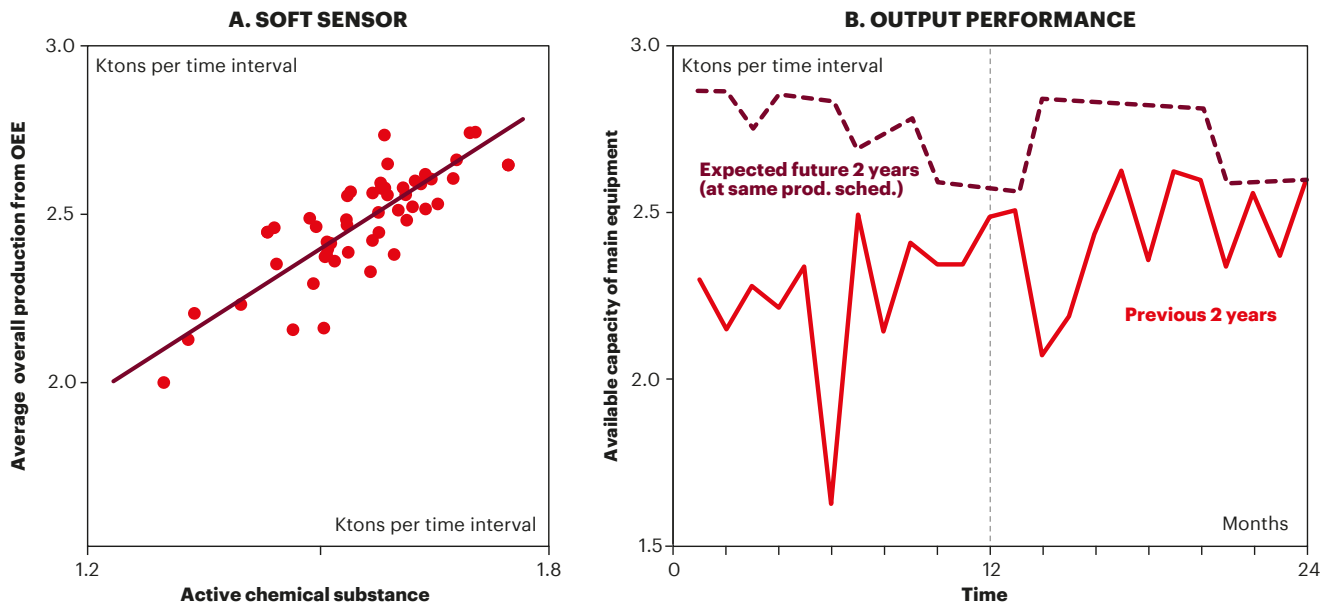
Allowing the data to drive and guide improvement activities is a paradigm change, compared to the classical approach of using engineering experience and standard sensors and feedback-control loops that are already installed. The classical approach is to make use of chemical process engineering, as well as operations and manufacturing excellence techniques, to squeeze out improvements in production, e.g. regarding yield (including first pass rate), throughput, quality, energy and capacity utilization. In most production lines, however, companies cannot gain much more production capacity with these activities alone. Most often the equipment was built many years ago for lower levels of production that cannot meet current market demands. Applying data science, however, can result in further production capacity and efficiency improvements.¹

USING “SOFT SENSORS” TO GENERATE MEANINGFUL DATA AND INSIGHTS

In chemical production, companies can use software to emulate a missing sensor or missing direct link between a physical in-process variable and an output-related variable (“soft sensor”) and thus access “critical” data. For a data-driven approach to work properly and generate meaningful insights, it is crucial to have data from critical process steps and parameters. Most often, creating such links is a challenge, since many physical in-line parameters like temperatures, weights, flow rates, pressures, etc. have already been measured at several locations in the production line, but a link is missing to the quantity and activity of the active chemical substance in the output of the process step. A soft sensor can fill this important gap often found in production lines.

For example, we developed a soft sensor for the concentration of a desired metal oxide (active chemical substance) in an outgoing suspension flow by measuring the average overall production volumes and correlating them with lab analysis results in a calibration curve (see Figure 1A). The trendline allows us to determine the amount of active substance on the basis of flow rates from the furnace and from the alkaline solution, and alternatively from the overall output weight. These values were integrated into Manufacturing Execution System (MES) dashboards for easy access.

FIGURE 1: SOFT SENSOR CALIBRATION CURVE (A) AND OUTPUT PERFORMANCE IMPROVEMENT POTENTIAL (B)



By applying analytics to the resulting data on the active substance, it became clear that the output could be improved by a) increasing the alkaline solution and gas flow, b) optimizing cleaning and turnaround times and frequencies, and c) selecting the best piece of equipment in the network of parallel reactors that the material flow is fed into. For c), we built a mathematical solver and network simulation tool for finding best line-balancing combined with optimized corresponding job scheduling. In total, we estimated the client could achieve a 10 to 20 percent increase in overall output (see Figure 1B).

IDENTIFYING GOOD PERFORMANCE EARLY ON WITH ANALYTICS AND SET POINTS

Advanced analytics can also be used to identify early in the production process if something is sub-optimal and what parameter to watch for. In the example just discussed, big data analytics based on several years of data from multiple parallel lines revealed a large variance of the output over time (see Figure 2A), even though all incoming flows were kept constant. We created a multi-dimensional correlation analysis to find out what causes these variations and identify how to keep production at maximum. We tested all physical production parameters that might have influenced production, including raw material dependency and some non-physical parameters, e.g. operator / shift changes (see extract in Figure 2B). We saw that only few specific operating set points actually define if the overall production run will be of either good or bad performance, as is likely the case for many

production systems. Our analysis allowed us to create a decision tree that tracks the parameters and shows the path to the highest active chemical output. This result was also incorporated into the MES.

MODELLING AND PREDICTIVE ANALYTICS

Once we know the critical path parameters, real-time and predictive analytics can be used to monitor operations and identify if production is still on track. If it is not, the system can estimate what output is expected with the current deviations from the optimum parameters.

By incorporating the multi-dimensional parameters (as a time series) and their dependencies into a model that represents the physics inside the equipment, we can determine how and where to intervene – i.e. we can simulate “what-if” scenarios. These simulations are based on real-time data and make use of sophisticated analytics² and thus clearly outperform black-box simulations with many estimations that were used in the past.

We applied this analysis to another process step as well: distillation. In this case, we modeled its degradation and determined the ideal number of cleaning cycles by using an optimization algorithm incorporated into a what-if simulation. We recognized patterns related to sudden clogging in the distillation column and were able to de-bottleneck this production step, resulting in overall operating costs decline by 8 percent.

FIGURE 2: OUTPUT LEVELS OVER TIME (A) AND PRODUCTION PARAMETER – OUTPUT DEPENDENCY ANALYSIS (NORMALIZED SCALE) (B)

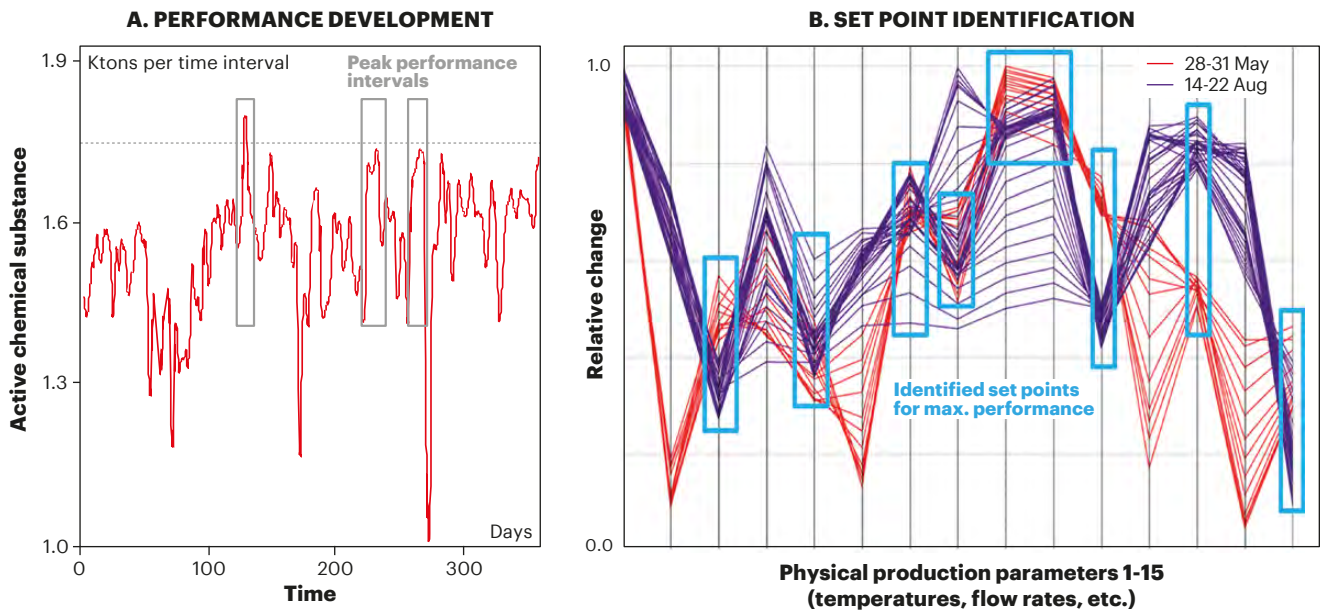


Figure 2B shows the variance of different production batches in 15 selected physical variables like temperature, flow, etc. If high variance is found, then this identifies a critical production parameter. If all lines fall together, this indicates no significant process influence and renders it negligible for further analysis.

KEY TAKEAWAY

The above-mentioned advanced analytics use cases in chemicals production are just a few examples of the immediate, tangible outcomes data-driven decision-making can create for a company. Before investing into further physical assets to increase production capacities, it is worthwhile thinking about identifying and extracting any hidden capacity by using the one other asset the producers already have – their data.

NOTES

- ¹ The examples are derived from Accenture project experience, e.g. from a 10-week Accenture project executed on one product line at a European production site of a large chemicals company.
- ² We used a Support Vector Regressor with RBF kernel to create the best model in this case.



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GAIN, NOT PAIN IN S/4HANA MIGRATION

**Think beyond technology
to enable a holistic and successful
business transformation**



For many companies, a migration to S/4HANA is just another complicated and costly IT project. It can be far more than that: a chance for a business transformation building on the new functionalities and the digital core. However, the only way to reap these benefits is with a strong business perspective for the project upfront.

TYPICAL CHALLENGES IN S/4HANA MIGRATION

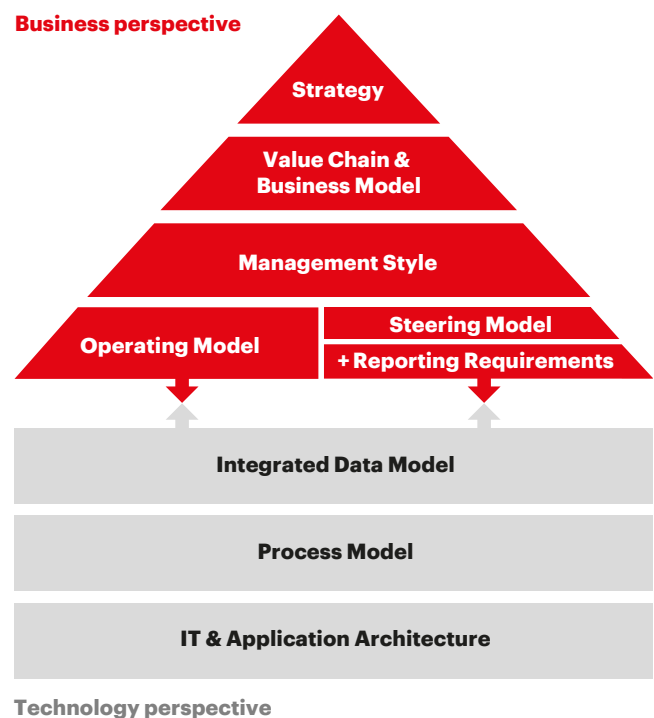
Today, emerging digital technologies are re-shaping businesses and ecosystems and are fundamentally changing the way organizations operate. A digital transformation powered by S/4HANA can help companies become more agile, enable new business models and put data to use as an asset.

However, many organizations are struggling with how to start the migration. Uncertainty centers around questions such as: What does digital mean in the context of our business? What parts of S/4HANA can enable that? Where is the business value, and what is our journey? Such questions will only become more urgent as SAP ends its support for the previous ECC suite in 2025. And these questions need to be answered long before deciding on approach or deployment options, or architecture.¹ In other words: Companies need a business strategy, including a value-realization methodology, change management and a roadmap.

Still many companies regard an S/4HANA migration as just another IT initiative or IT system upgrade that is driven by the IT department. For this reason, they may lack such a strategy. Moving to S/4HANA includes fundamental and far-reaching changes and will have a business impact that should not be underestimated. Significant value can be derived along the journey by redesigning business processes to make them simpler, redesigning business decision-making to make it more insight-driven, and redesigning business models to make them more connected to business networks. When these redesigns are executed, our experience shows that companies can turn their migration into a competitive advantage.

The key to a successful transformation is to connect both the technology and business perspectives and use them as guiding principles (see Figure 1). This should be addressed well before the start of an implementation to make sure the investment (which can be well into three digit million Euros) is used wisely. The value generation will already begin during this planning phase, e.g. as a company prepares to redesign its processes.

FIGURE 1: BOTH THE BUSINESS AND TECHNOLOGY PERSPECTIVES NEED TO BE ADAPTED FOR SUCCESSFUL TRANSFORMATION



DEFINING THE “NEW VALUE” FROM S/4HANA

On the technology side, it is worth highlighting the different architecture S/4HANA uses: Compared to its predecessor a reduced but more efficient (lean) ERP core is used, and it is supplemented by modular service platforms and a data integration layer (see Figure 2). The simplified core handles standard process adoption, while market-leading software-/platform-as-a-service (SaaS/PaaS) is used for widely used common applications (e.g. Ariba, SuccessFactors), and further differentiated business applications can be built around this. Each company must determine how much it can adopt the SAP standard(s) and how many costly and harder to maintain customizations it really needs.

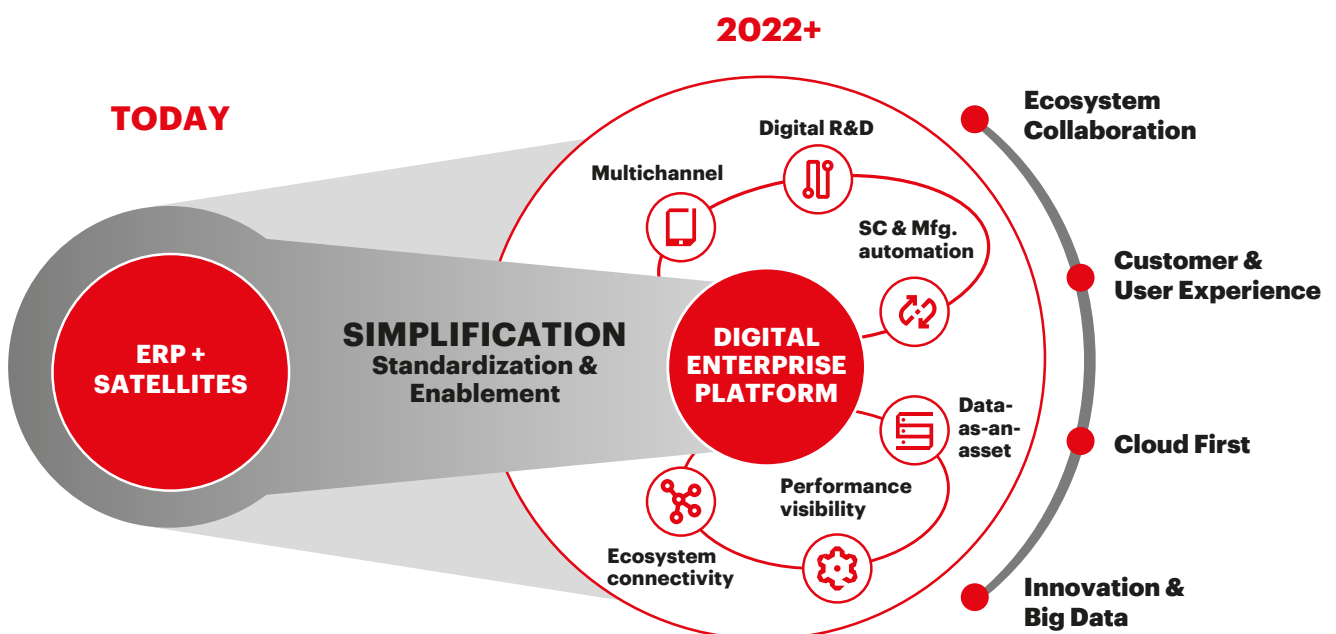
This new “digital core”, into which all data streams can be consolidated, allows all kinds of intelligent and predictive tools to be run. This includes real-time and accurate demand forecasting or predictive maintenance. Because of the digital core, the system can be seen as an enabler for new digital business models (within ERP).

Benefits also translate down to day-to-day activities, as illustrated by the example of a customer service manager who previously ran into trouble when delivery commitments could not be met since those estimates were made on last month's data.² Now the same manager has real-time visibility of all stock, inventory and the production process in one system and can make and keep commitments to customers.

Even last-minute changes by customers do not result in losses, as the manager can interactively reschedule production, and supply orders and the schedules and material planning of the respective departments get updated automatically. This compares to the current way of updating things in overnight batch runs or even not at all. All entries were done via SAP's Fiori app, which is much easier to use than the previous SAP user interface.³

Similarly, other features like a new general ledger in accounting, a simplified data model (universal journal), and a new, combined finance and controlling module allow staff to avoid painful reconciliations at period-close and to do the closing faster. In fact, we observed significant acceleration of end-of-month or end-of-quarter processes – on average five days faster.⁴ Procurement, production and supply chain all benefit from accessible real-time data in S/4HANA and insights derived from it. The accessibility is created by cloud services and the digital core, while the data quality is significantly improved by the central master data governance in S/4HANA. For real-time analysis, advanced analytics and machine learning algorithms are used, and also artificial intelligence and natural language processing can be used in certain applications. It also includes a higher degree of process automation, which can make a significant difference in operations.

FIGURE 2: LEAN IT ARCHITECTURE WITH SMALL DIGITAL CORE AND MODULES AROUND TO ADDRESS BUSINESS CHALLENGES



STARTING A TRANSFORMATION TO S/4HANA WITH A BUSINESS STRATEGY

To achieve such benefits, companies need to develop and execute a transformation roadmap. It is critical to start the migration journey by exploring and defining the company's digital strategy, current business models, and its potentially new business⁵ and operating model opportunities.⁶ The focus should be on how value can be realized within the company and towards the customer (value map), and how opportunities align alongside. This leads to the next step of defining a target state for focus capabilities needed to deliver such value. A gap analysis will reveal what needs to be done and what impact on business and IT the transformation will have. The key is the next step of stating the value proposition and developing the business case for the migration to S/4HANA, i.e. evaluating costs / effort and strategic benefits per opportunity area. Only after companies have gained clarity on what parts or application / process changes will yield a positive business case they can develop a transformation and change management roadmap. Finally, companies need stakeholder engagement, and they need to define their value-tracking methodology and governance.

A migration to S/4HANA is rather a full business transformation than a tech rollout. It requires a clear business strategy to make use of the full potential and the opportunity to address current business challenges. And the whole rollout should not be delayed until the previous ECC suite is no longer supported in 2025, because value can be accumulated immediately. We have observed that most major companies have already executed a S/4HANA migration, but mid-sized and smaller companies across industries are far behind. It's time to act now!

NOTES

¹ Approach options are "all-new" greenfield or "build-on" brownfield; deployment options are on-premise, in the cloud or hybrid versions.

² Source: Accenture project experience

³ User-centricity created through Fiori apps has in some cases shown an increase in transactional/process efficiency by 50% while reducing errors by 30% (source: Customer Success Stories, SAP S/4HANA, Oct. 2018, and Accenture project experience).

⁴ Source: Accenture project experience and a study by SAP 2017, Digital Transformation to Run Simple

⁵ For example: rethinking services that impact loyalty and sales, geo-targeting, segmented marketing and device-agnostic customer engagement

⁶ Including process harmonization, adding new skills and adding new capabilities



KEY CONTACT

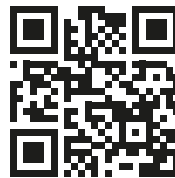
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SPOTLIGHT ON TECHNOLOGY

FAST, FASTER, 5G

How 5G will make Industry 4.0 reality

5G will enable the next productivity jump in the journey to Industry 4.0 and the Industrial Internet of Things (IIoT). To benefit from the boost, companies need to proactively integrate 5G into their strategies and develop a 5G operating model.

“5G is a groundbreaking technology with the potential to revolutionize industrial production.”

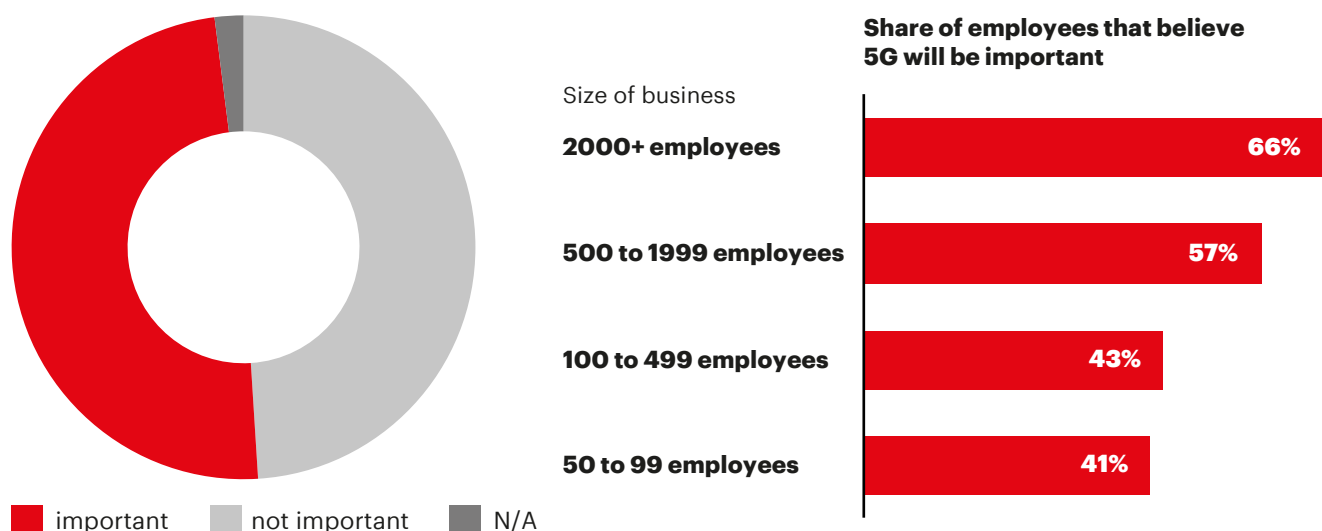
Dr. Johann Wieland, President & CEO BMW Brilliance Automotive Ltd., 2019¹

Currently, leaders across manufacturing industries are considering how to get the most out of the Industry 4.0 and IIoT solutions in their production networks. For now, the available technology limits productivity increases from Industry 4.0 solutions. Existing transmission standards such as 4G, Wi-Fi or ZigBee are not able to provide the necessary low latency or connect enough devices to make optimal use of Industry 4.0 and IIoT solutions. Many companies look at 5G for an answer (see Figure 1).

5G, expected to be market ready in 2021, will smooth out these bottlenecks by enabling high bandwidth (min. 20 GB per second) and extremely low latency (<1 ms) wireless data transmission.² Additionally, 5G infrastructure enables the connection of a million devices per square kilometer. This means that companies can scale their Industry 4.0 and IIoT solutions easily and in a cost-effective manner.³

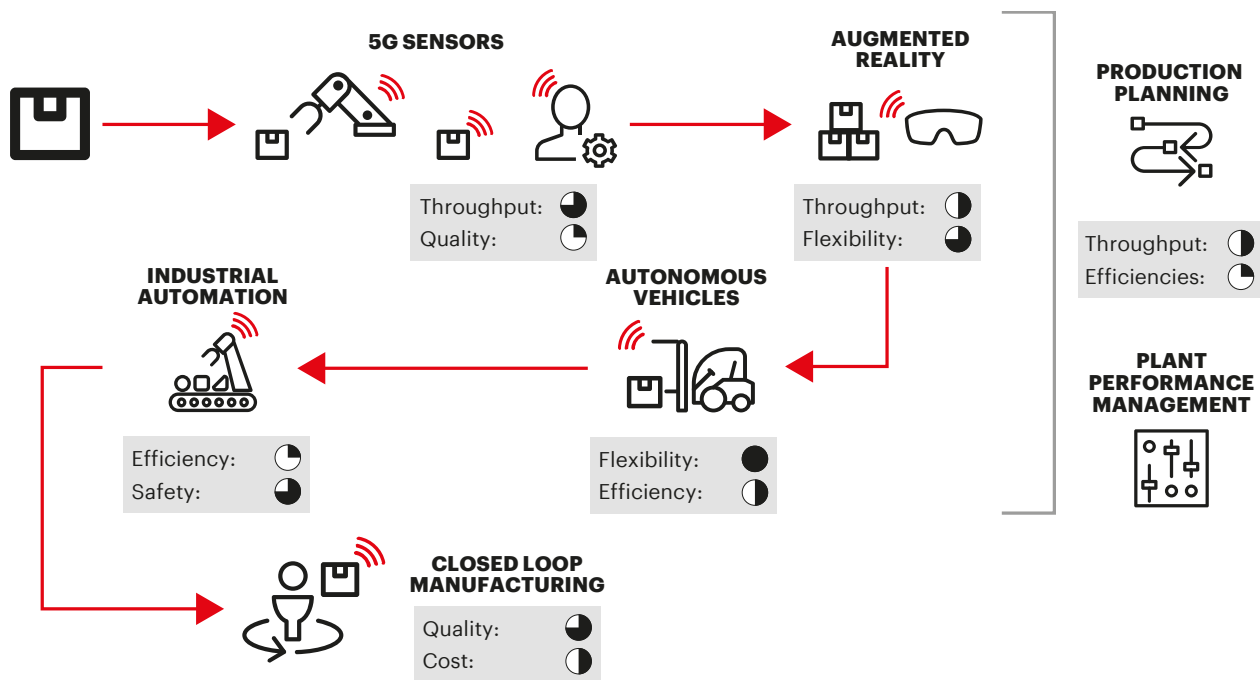
Thus, 5G is much more suitable than its lower-performing predecessors for handling the large quantities of data that result from the interconnectedness of millions of devices within a production facility. 5G will also have a big impact on environmental sustainability: 5G puts lower energy demands on mobile end devices than 4G, and this means the battery life of mobile devices will increase from a few weeks to up to 10 years.⁴

FIGURE 1: TWO THIRDS OF LARGE COMPANIES COUNT ON 5G³



Source: BITCOM research

FIGURE 2: HOW 5G CAN BE USED IN THE PRODUCTION PROCESS



Accenture estimate on 5G savings potentials: ○ Low beneficial Impact ● High beneficial Impact

THE OPERATIONAL BENEFIT OF 5G

5G will improve operational efficiency by enabling innovative manufacturing solutions (see Figure 2).

Gathering Data

- **5G sensors** – Since 5G sensors have especially low energy consumption (e.g. battery lifetime can be up to 10 years), their use across large plants (e.g. chemical plants) will provide rich information over a long period of time. This lays the foundation for new maintenance strategies, quality improvements, and improved traceability, all of which will reduce idle times and costs.
- **Augmented Reality** – Increased data transmission volumes at high-speed will enable broadcasting of live information from across large areas of a plant (e.g. aerospace plants or maintenance halls) to people wearing Augmented Reality (AR) devices. This will provide maintenance or assembly workers with critical, complex information (e.g. complex digital twin overlays or live support from a third party) which will improve their efficiency and flexibility.

Intelligence at the edge

- **Autonomous Vehicles** – 5G's low latency and high reliability enables edge communication and coordination for robots and automated guided vehicles. 5G also makes it possible to have peer-to-peer or backend-facilitated communication, which increases the efficiency and flexibility of collaborating devices such as robots and

autonomous vehicles. This enables more flexible systems for intralogistics (e.g. delivery of spare parts for machine maintenance) or one-piece flow dynamics for production lines (as showcased by e.g. KUKA AG and Bosch Rexroth).⁵

- **Industrial Automation** – 5G will make remote operations easier by enabling real-time remote control of machines as well as drones, compared to legacy technologies with lower transmission rates. This will enable new forms of intralogistics or machine operation (e.g. remote control of multiple robots from a control center), leading to lower mean time between repair (MTBR), less time spent on non-value-adding tasks and improved plant safety.

Connecting the supply chain

- **Production planning** – Low-energy sensors make tracking of goods along the supply chain more cost-effective. This will lead to more supply chain information, which will enable companies to plan their production based on actual movement data, thereby reducing unnecessary changeovers and waiting times in the manufacturing process.
- **Closed loop manufacturing** – 5G will enable connected goods/closed loop manufacturing by allowing high quantity data to be transmitted from individual products back to the factory. This enables plants to improve their production mid-term through analysis of failures in the field.

CHALLENGES OF 5G – HOW TO PROCEED?

When determining the required technological foundation for 5G, companies need to decide if they want to build their own network or choose a pre-designed solution provided by a mobile network operator (MNO). Some manufacturers are designing their own closed 5G networks that are tailored to their individual needs, for instance for security and device management.

The design and implementation of customized 5G solutions will be challenging since manufacturers cannot count on the support of MNOs that seek to avoid the substitution of their services. However, flagship projects such as the 5G go-live at BMW Brilliance Automotive (BBA) production sites in China earlier this year show that successful 5G-cooperations between OEMs and MNOs are possible.¹

Since 5G technology is maturing, additional security risks need to be mitigated: 5G enables the transmission of much more data from many more devices than in the past, which makes these networks easier to attack because there are far more entry points. In addition, cyber-attacks will be much faster than in the past, and security systems will need to be able to respond quicker.

RECOMMENDATIONS

1. Rethink your Industry 4.0 strategy

Most Industry 4.0 and Industrial IoT strategies were designed with limited data transfer technologies in mind. Companies need to rethink their use cases and technology foundations for 5G and ensure that their strategy takes into account the integration of this new infrastructure in the long term.

2. Incorporate 5G technology as infrastructure in future plants and production lines

Even though 5G isn't expected to debut until 2021, planning for plants, as well as Industry 4.0 and IIoT infrastructure and equipment, needs to reflect the impact and planned integration of 5G technology. Automotive suppliers are already integrating 5G sensors into the planning of their future plants and can therefore act as a point of reference for other companies.

3. Define an individual 5G operating model

Since 5G is an emerging technology, it requires a company-specific operating model to integrate it successfully into the corporate infrastructure and realize the expected productivity boost. Manufacturers need to define a strategy for how to operate the 5G infrastructure (make or buy), train personnel in new skills and design the implementation roadmap based on a company-wide impact analysis.

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