IDC ANALYZE THE FUTURE

Future of Industrial Operations: Building an Information-Intensive Environment, Based on the Convergence of IT, OT, and Humans

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Executive Summary

The new manufacturing and future of operations

- The COVID-19 pandemic has proven that organizations must rapidly improve their operational models to achieve higher levels of customer centricity with efficiency, agility, and sustainability.
- Enabling new operational models is central along the journey towards the "Next Normal." The operations of the future require organizations to be able to adapt flexibly to whatever disruptions that arise.
- This requires new ways of working. We've never had so much data, since operational equipment instrumentation has exploded over the past few years. And the convergence of enterprise IT, operational technology, and humans is the crucial element to create a transparent, data-driven organization.

How the organization should change

- Awareness of the business benefits of IT/OT integration is very high.
- But many companies need to focus on bridging the gap between traditional IT and OT environments as new digital solutions (such as machinery condition monitoring, predictive maintenance and digital twins of production processes) require seamless and secure data acquisition, storage, and processing.
- It is extremely important that organizations can turn data into actionable insights, making decisions in the shortest time possible to deliver on customer-centricity better while driving profitability. In this context, the automaton of workflows is essential. So AI- and ML-enhanced solutions are becoming a must as well as skilled data engineers and analysts.
- Because of the rising complexity of digital solutions, the role of vendor ecosystem and third-party solution providers is becoming even more relevant to succeed in the journey towards the "next normal."

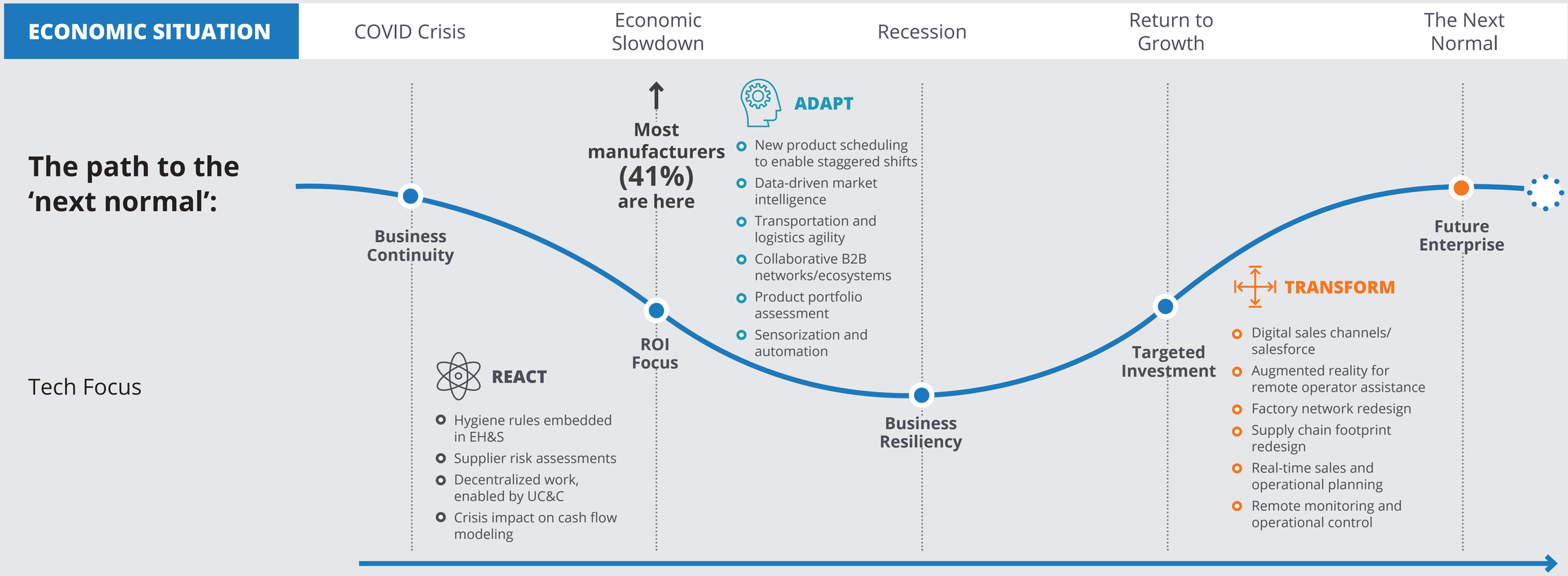
Benefits for the organization

- A revolution in operations entails a revolution in business models, with plenty of benefits for C-suite and customers. LoB leaders (from shop floor operators to machine technicians and plant engineers) will see their jobs transformed.
- The difference in business impact between successful and poor information integration projects can be dramatic.
- The "power of scale" provides value to the organization in terms of faster return on investment (ROI).

The New Manufacturing and Future of Operations

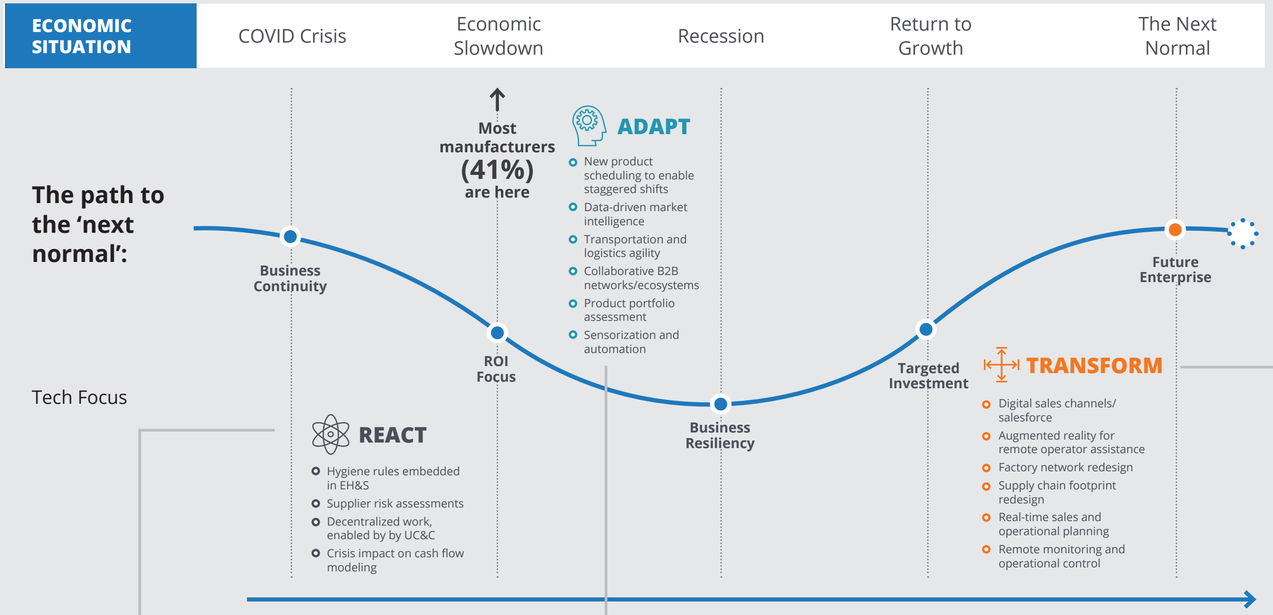
Preparing for the Long Game: The “Next Normal”

The pandemic has accelerated the shift to digital and fundamentally changed the business landscape. As organizations rethink what the future will look like and what it will take to thrive in the new business landscape, innovation is an urgent imperative to overcome disruption, both tactically and strategically, as enterprises with less mature transformations are more challenged to adapt.



Source: IDC, 2020 Note: Data was gathered through conversations with companies and secondary research.

From REACTION mode to TRANSFORMATION of the whole enterprise:



TRANSFORM

- When organizations come out of the recession, they will be operating in a new type of economy — The Next Normal. In the post-COVID economy, expected changes in behavior, consumption, and supply will force companies to adopt digital-led business and operating models that can survive lockdowns, movement restrictions, social distancing, supply disruptions, and more.
- The new business model is established and deployed, based on a direct-to-consumer approach and servitization models, meaning selling digital services on top of the physical products. The development of new business models is supported by business collaboration ecosystems that drive the speed of innovation and reduce the time-to-market.
- Global organizations optimize the factory footprint based on various parameters, such as supply chain risks, local regulations, customer relocations, and digital transformation strategies
- Enablers (on top of the ADAPT phase): new generation ERP, holistic IT architecture, converged IT and OT, supply chain Intelligence tools & control towers, energy management solutions

REACT

- Quick reaction as COVID-19 forced many organizations to adopt digital technologies and change business approaches to maintain business continuity. The main purpose was to ensure business continuity and secure personnel safety. There is no time to be a hero. All actions and measures must be undertaken quickly and monitored almost on real-time basis.
- Enablers: enterprise IT systems such as ERP, PLM, supply chain management tools, communication tools.

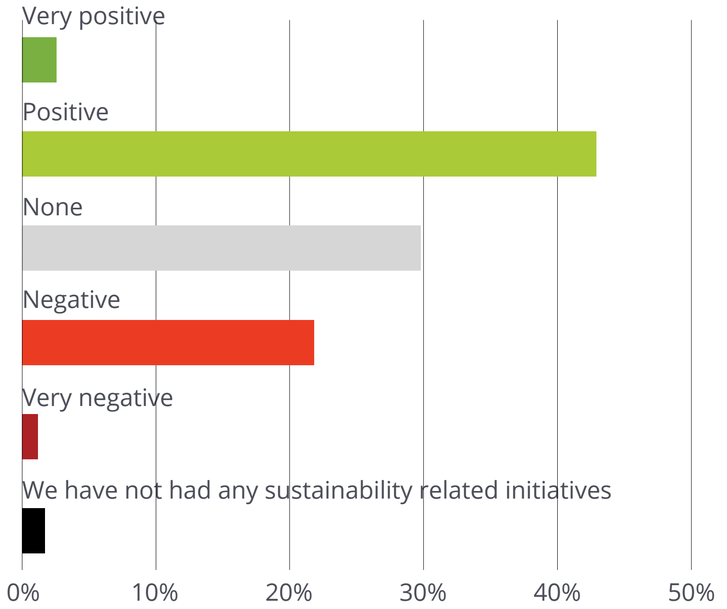
ADAPT

- Quick reaction as COVID-19 forced many organizations to adopt digital technologies on a larger scale and change business approaches to maintain business continuity. The main purpose was to secure revenues, which might be generated not just by the production of the current product portfolio, but also by new innovative services, leveraging data and digital technologies such as IoT, cloud, and AR. Organizations reassess their supply chain network footprint to improve resilience and consider on-shoring some of their key suppliers back to the Europe or the US. Also, digital B2B supplier networks are leveraged on a larger scale and multisourcing strategies are being deployed.
- Enablers: enterprise IT systems, such as ERP, PLM, supply chain Intelligence tools & control towers, quote to order platforms, multicloud architecture.

In the Next Normal, Sustainability is Inseparable From Manufacturing Organizations' Digital Transformation Journey

Importance of sustainable development for manufacturing organizations, building the "green factory"

What do you think the impact of the COVID-19 crisis will be on your sustainable development goals (including climate change, diversity & inclusion, and responsible production) and related activities?



Sustainability strategy comes in line with national/European strategies

A European Green Deal
Striving to be the first climate-neutral continent

GREEN NEW DEAL

Top 3 sustainability expectations that manufacturers have of vendors:

41%
Health & Safety

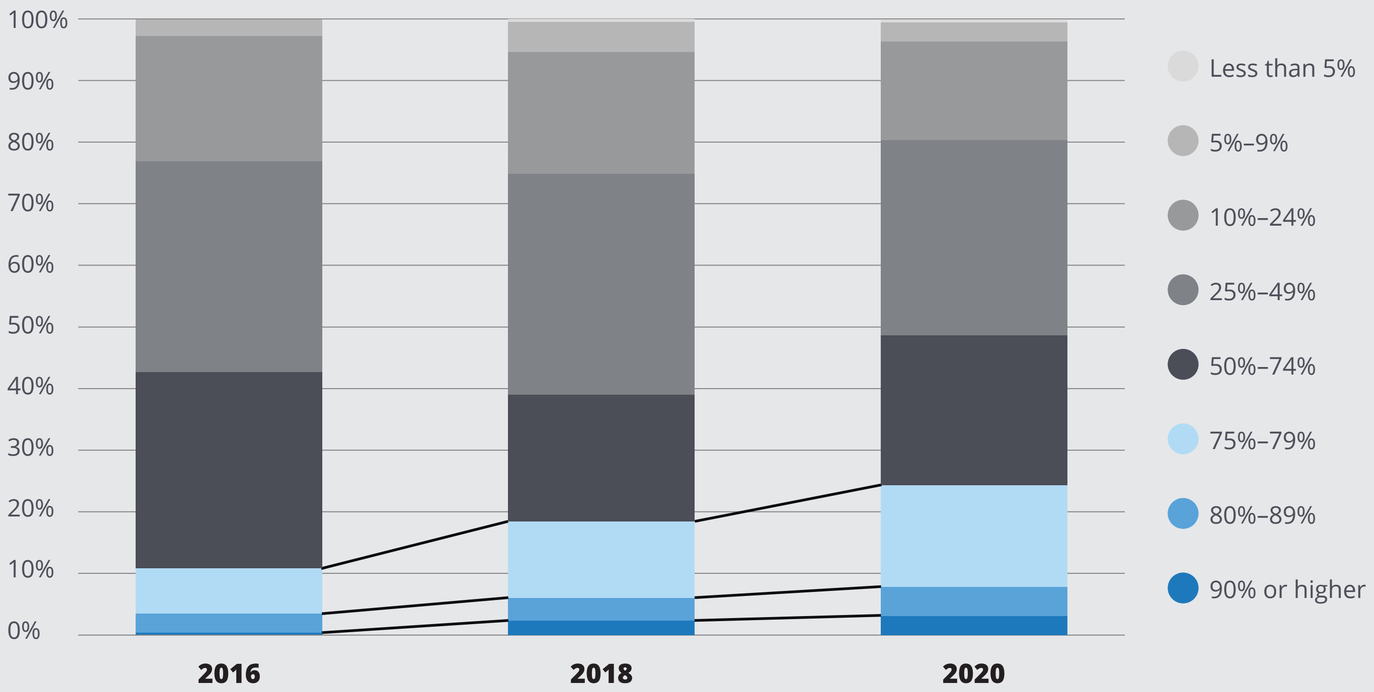
31%
Circular economy business models

24%
Suppliers' code of conduct

Source: IDC European IT Buyer Sentiment Survey — Wave 4, 1-11 May 2020 – Manufacturing Sample, N=143

The New Face of Manufacturing is Being Shaped by Data

Thinking about your production systems, about what percentage of the operational equipment is instrumented (has programmable logic controllers [PLCs], distributed control systems [DCS], sensors, meters, etc.)?



Source: IDC WW - IT and OT Convergence Survey 2020, Manufacturing, N=346

There has been never so much data available in the manufacturing industry as today as operational equipment instrumentation has increased steadily over the past few years. The success of future operating models is dependent on data management.

Obviously, the percentage of instrumented equipment depends on the appetite for investment in next-generation production assets. Such instrumented assets provide a holistic view of the processes and products utilizing data from PLCs and embedded sensors using edge gateways.

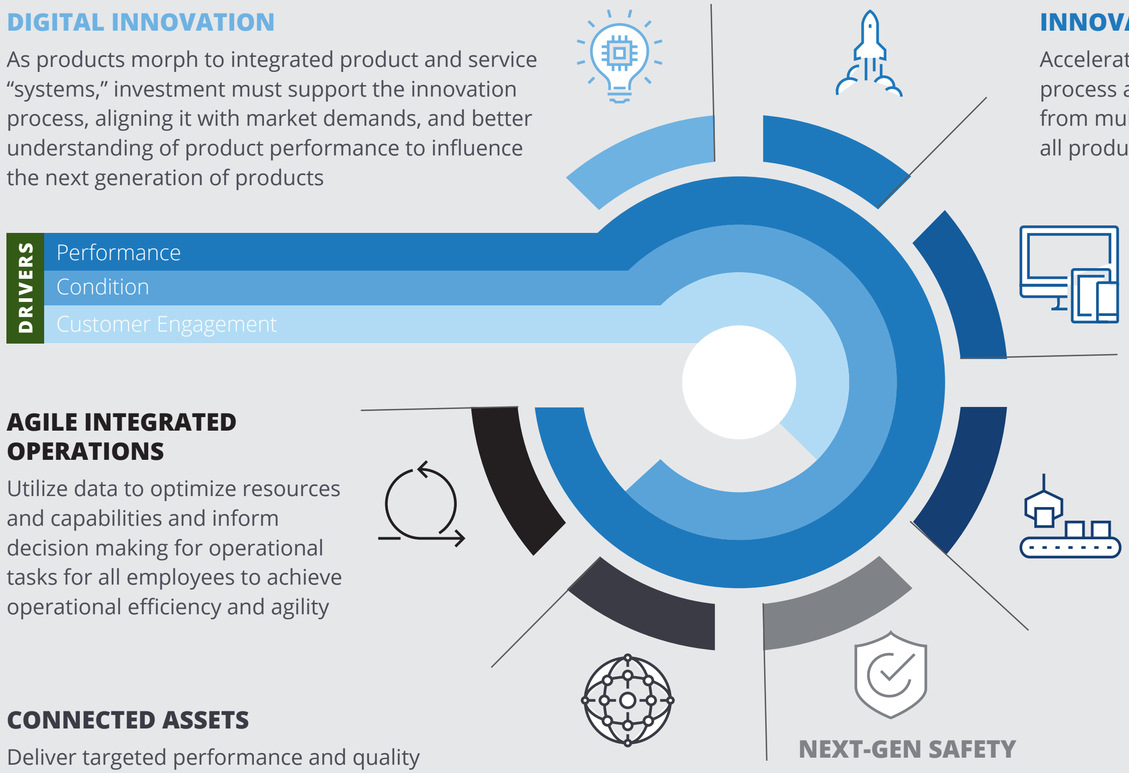
This is very complex to achieve in reality because to improve the share of instrumented production systems, new technical standards must be embedded with technical specifications for each new production asset.

Companies that stick to small pilots and are unable to scale industrial solutions rapidly will be lagging their competitors.

The Success of Future Operating Models Depends on the Right Technology and Data Management Approach

DIGITAL INNOVATION

As products morph to integrated product and service "systems," investment must support the innovation process, aligning it with market demands, and better understanding of product performance to influence the next generation of products



INNOVATION ACCELERATION

Accelerating innovation through a coherent, extended process and innovation platform, sourcing new ideas from multiple sources, and transparently managing all products throughout their life cycle

PRODUCT AS A PLATFORM

Future revenue models that are based on usage and the sale of value-added services, decreasing the emphasis on a one-time sale, to deliver value through an ongoing source of revenue via a platform-centric product

SMART MANUFACTURING

Maximize the yield from existing production capabilities and develop the next generation of connected production capabilities necessary to compete in a digital economy

AGILE INTEGRATED OPERATIONS

Utilize data to optimize resources and capabilities and inform decision making for operational tasks for all employees to achieve operational efficiency and agility

CONNECTED ASSETS

Deliver targeted performance and quality outcomes using an increasingly connected network of assets throughout the value chain

NEXT-GEN SAFETY

Building on safety priorities through automation to eliminate variability in safety processes and minimize risk

Source: IT and OT Integration Survey 2016, n =326

Leader's voice:

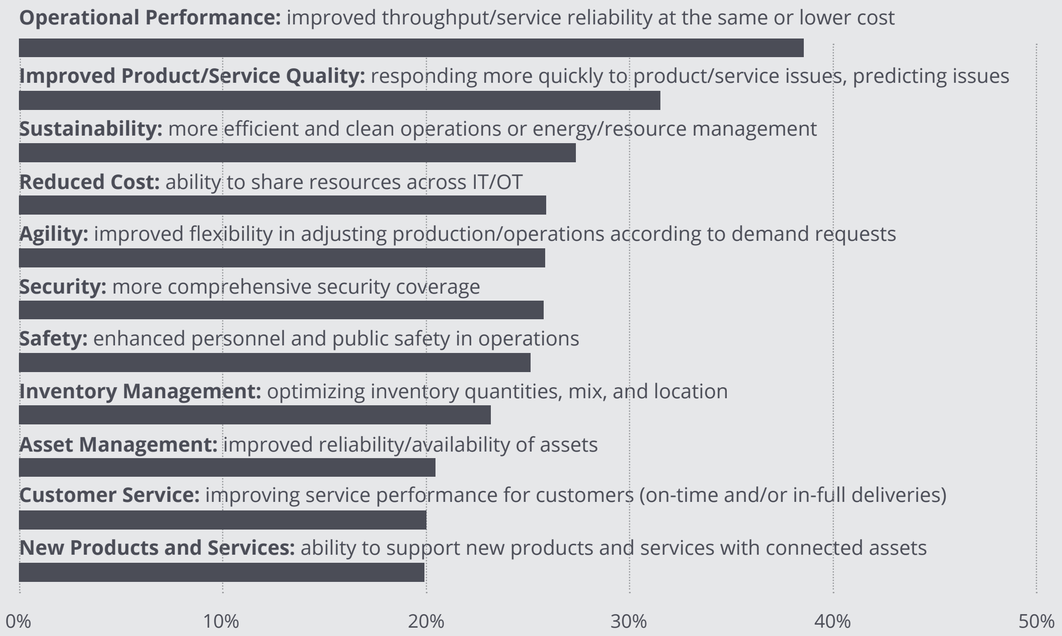
"It's all about data," says a member of the board of management of German Car OEM responsible for production and supply chain management. "We can already see high efficiency gains on the assembly lines."

How the Organization Should Change

What is Driving Factories Towards the Integration of IT and OT?

Organizations are driven to maximize the value of information-intensive processes rather than simply costs. IT/OT integration enables hard and tangible benefits, so investments are driven by an appetite for operational improvement and product innovation. On top of that, survey data also highlights a focus on improving the environmental and social impact of operations.

Select the most relevant options that reflect the motivations for your company to invest in IT/OT integration.



Source: IDC Survey WW – IT and OT Convergence, N = 346

Leader's opinion:

Digital transformation in manufacturing is based on infusing data from smart devices into the execution activities and creating 'information-intensive' processes. This significant change has far-reaching implications in the way people work. From one side, the advancements in automation technology are making the concept of 'lights-out factories' possible. At the same time, people will be considered a valuable part of the modern factory, providing the necessary levels of flexibility and agility to the processes through their decision-making capability.

The availability of data across processes and assets requires new ways of working for field staff:

AUGMENTED WORKER

- Remote assistance
- Record and play
- Localization and navigation
- Document access
- Operational data in real time

"MAINTENANCE+"

- Digital twins of assets
- Data analytics
- Cloud-based solutions
- Subject matter experts and data scientists

ACTIVE ASSISTANCE

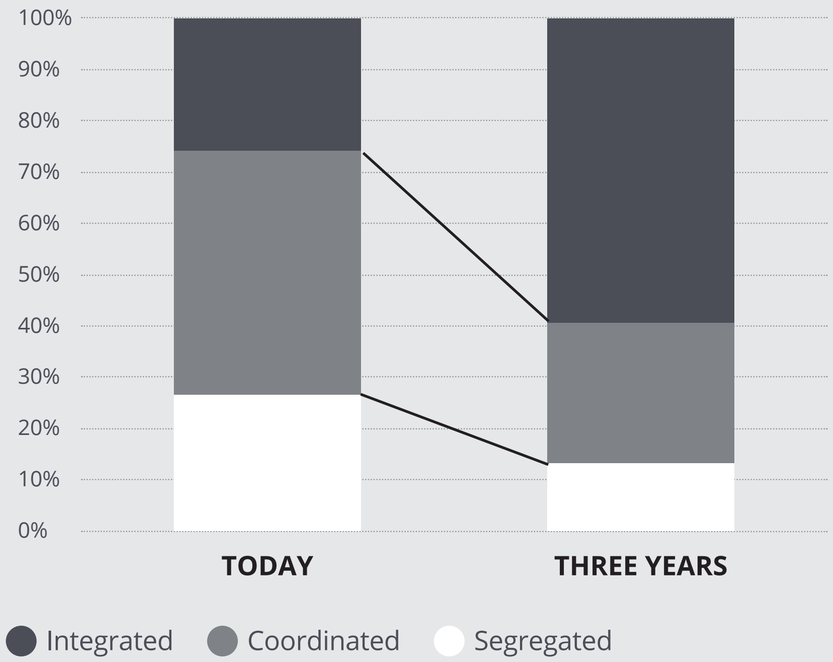
- Remote maintenance and monitoring
- Field support
- Vendor and contractor business models
- Remote/virtual training

OPERATIONAL INTELLIGENCE

- Visualization
- Asset condition
- Communication
- Alarm management
- History • Video/computer vision

Integrated Governance Structures Are on the Rise

Which one of these governance models matches most closely with the structure you have in place in your organization today and in three years?



Integrated: Control and execution system investment decisions are made through a shared services organization, a center of excellence, or a corporate function. There is ongoing business as usual collaboration between IT and operational technology. Decision making about investments and priorities for operations is undertaken as a single unit.

Coordinated: Each facility/plant/delivery system makes independent investment decisions about technology for control systems, but execution decisions occur across multiple facilities, plants, or delivery systems through a shared services organization, a center of excellence, or a corporate function. Collaboration between IT and operations teams occurs on a project basis as required.

Segregated: Each facility/plant/delivery system makes independent investment decisions about technology for its operational requirements through control and execution systems.

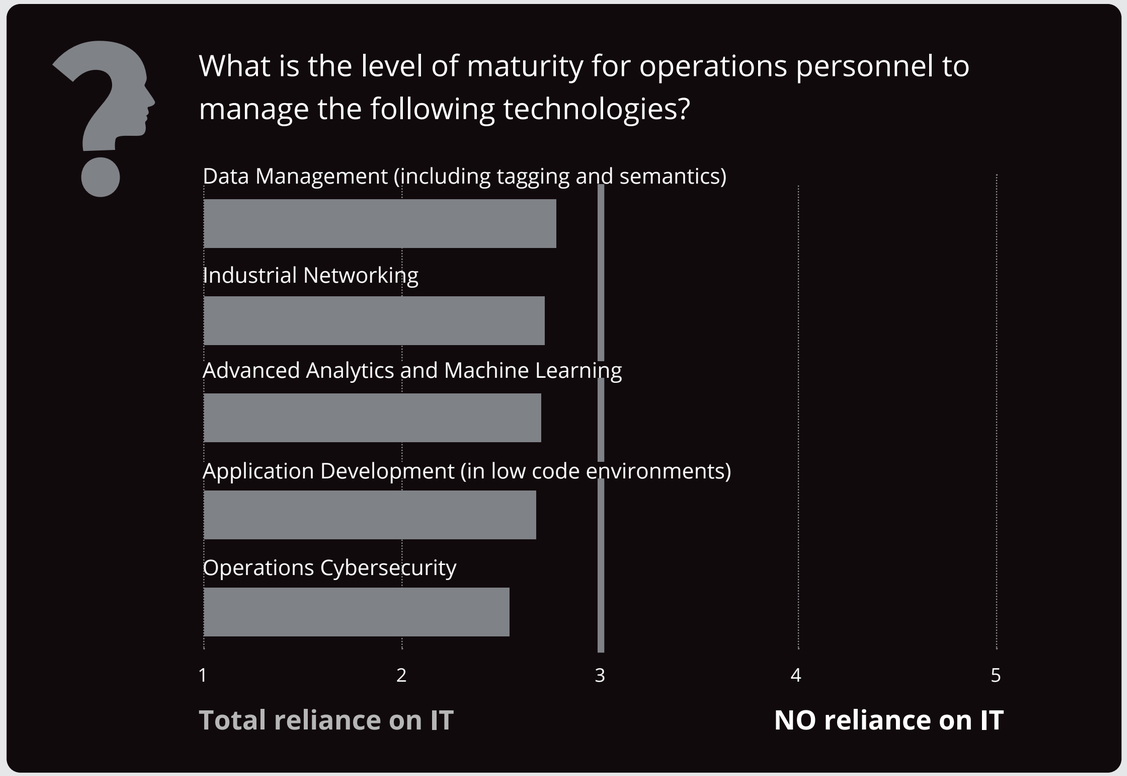
Source: IDC WW - IT and OT Convergence Survey 2020, Manufacturing, N=346

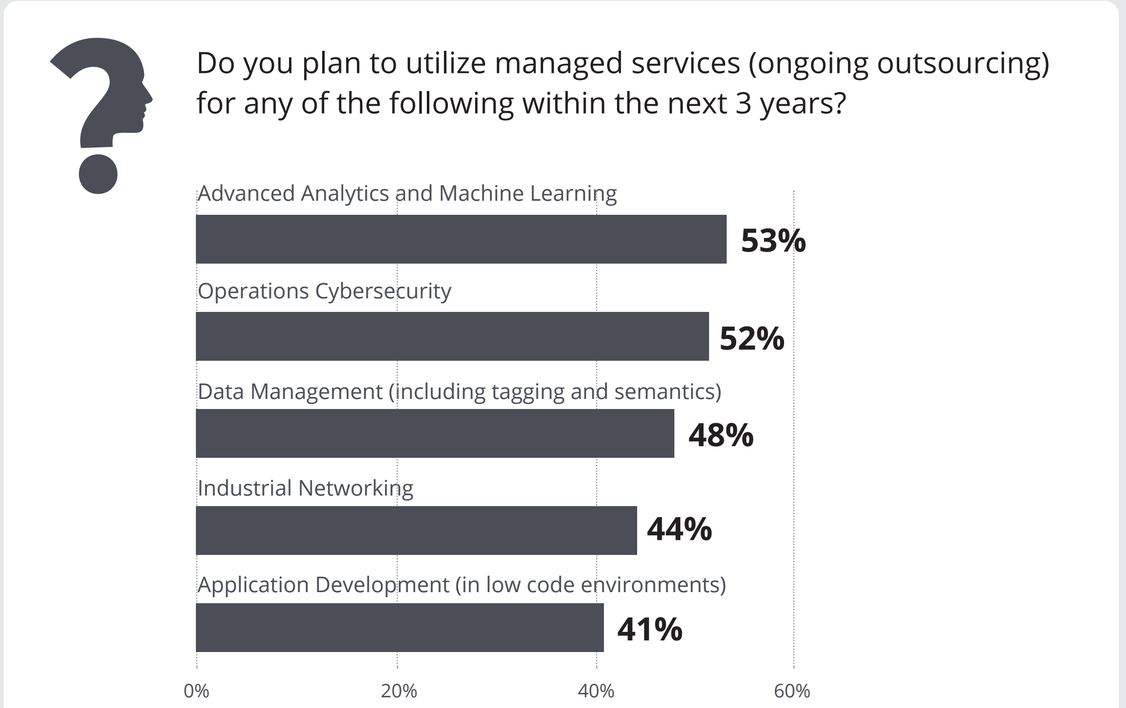
The Need for External Help

Despite the importance of IT/OT integration and operational improvement, companies struggle to have their operations personally focused enough on IT matters. They lack the capability to handle this issue internally.

Therefore, third-party solution providers can support companies in their journey, particularly when it comes to analytics, data management and cybersecurity.

OT personnel is still heavily reliant on IT....





Source: IDC WW - IT and OT Convergence Survey 2020, Manufacturing, N=346

Benefits for the Organization

A Top–down View of the Main Benefits for C-suite

King of Operational Performance

COO

- Consistent visibility of asset and operations performance
- Transformation of the organization to market-driven production and operations — verification of capability, capacity, and ability to meet demand
- Higher strategic role: from “king of execution” to “innovation enabler”
- Reduction of performance risks caused by demand-side and supply-side
- Meeting sustainability goals and reducing environmental risks

Oversees Operational Technology Deployment

CTO

- Higher deployment scalability and reduced cost by sharing technology resources
- More comprehensive security coverage of operational systems and assets
- Better control of production assets, such as production lines and machinery, as well as detailed and real-time view on business outcomes with subscription-based or pay-by-usage models for machinery and plants

CEO

- Better evaluate the performance against financial targets (EBIT, share price, etc.)
- Raising the company profile and appeal to investors
- Visibility of key operational and strategic KPIs
- Holistic view of the company’s performance in real time
- Operational/environmental risks reduction; Full compliance with environmental, social and company policies

Head of Information Systems

CIO

- Higher productivity and effectiveness in deploying technology
- Change agent: delivering IT best practices to the shop floor
- Merging of data streams for IT and OT and higher efficiency in handling requests
- Bridging silos in a real, effective and relevant way, beyond simple office reorganizations

Ensures Financial Stability and Governance

CFO

- Better transparency, control, and confidence of financial KPIs, linked to operational processes
- Automated, up-to-date, one-click reports and compliance execution
- Improved risk management in terms of economic/ financial threats

Enhanced safety of personnel and security of assets, processes, and products

Focus on the Impact on Key LoB Activity
Shop Floor Operators

Key Job Transformation Enablers:

Remote Overall Equipment Effectiveness (OEE) visibility, real-time, contextual work instructions, digital EH&S, collaboration and communication, AR-enabled training and support, augmented operations, simplified tasks with smart tools

Key Technologies Contributing to Job Transformation:

Data integration/data lakes, AI and analytics, IoT and edge, AR/VR

How do you expect operational data (TB/Day) to grow over the next 12 months?

15.7% Increase

The impact of technology integration on select business KPIs

If IT/OT is not fully integrated (standalone solutions)		*Benefits achieved when IT/OT is fully integrated*
46.4% Decrease	***Throughput or Productivity***	*8.4% Increase*
24.5% Increase	***Scrap, Defects, or Laboratory Failures***	*13.7% Decrease*
45.3% Decrease	***Inventory Turnover***	*9.4% Increase*

Source: IDC WW - IT and OT Convergence Survey 2020, Manufacturing, N=346

Focus on the Impact on Key LoB Activity
Machine Technicians

Key Job Transformation Enablers:

Service-centric instructions, "over the shoulder" assistance, real-time condition monitoring and diagnostics, smart tools, intelligent spare parts and tools provisioning

Key Technologies Contributing to Job Transformation:

Remote diagnostics, cloud, IoT and edge, AR/VR

What do you estimate the average cost of unscheduled asset downtime to be for your organization in economic value per hour (labor, lost throughput, increased service cost)?

Mean (in USD) 113,099

The impact of technology integration on select business KPIs

If IT/OT is not fully integrated (standalone solutions)

Benefits achieved when IT/OT is fully integrated

37.3% Increase	***Unscheduled Asset Downtime or Outages***	*13.1% Decrease*
33.6 Decrease	***Speed of Changeovers***	*11.9% Increase*
39.9% Increase	***Reportable Environment, Health, & Safety Incidents***	*11.8% Decrease*

Source: IDC WW - IT and OT Convergence Survey 2020, Manufacturing, N=346

Focus on the Impact on Key LoB Activity
Plant Engineers

Key Job Transformation Enablers:

Digitally-enabled commissioning, remote plant monitoring and security, plant/process performance simulation, and flexible machine tools

Key Technologies Contributing to Job Transformation:

Remote diagnostics, cloud, IoT and edge, AR/VR, 5G / Wifi6 capable networks, digital twins/digital thread, integrated data platform

Which of the following best describes your organization's approach to IT/OT integration?

Manual integration: 13.4%
Batch integration: 25.3%
Mixed approach: 40.1%
Real-time integration: 21.2%

The impact of technology integration on select business KPIs

If IT/OT is not fully integrated (standalone solutions)		*Benefits achieved when IT/OT is fully integrated*
37.7% Increase	***OT Security Incidents***	***12.3% Decrease***
44.8% Increase	***Labor Costs***	***10.5% Decrease***
33.3% Increase	***Energy Cost per Unit***	***9.1% Decrease***

Source: IDC WW - IT and OT Convergence Survey 2020, Manufacturing, N=346

Case Study
Schneider Electric

Increase energy and process efficiencies while boosting agility and asset performance

Company Overview

Company name: Schneider Electric

Core business: Focused on the digital transformation of energy management and automated processes, providing integrated solutions for homes, buildings, datacenters, infrastructure, and industries. It wanted to ensure its 50-year-old manufacturing plant in Le Vaudreuil, France, would be price competitive for the next 50 years through deployment of digital tools.

Technology Requirements

Working with Orange Business Services, it is trialing the use of a 5G network to support:

- Augmented reality applied to maintenance technician activities
- The implementation of a telepresence robot for remote visits

Solution

Schneider Electric has embraced a co-innovation project with OBS that aims to leverage 5G to simplify factory IT operations, improve support to manufacturing, and accelerate factory digitization at its Le Vaudreuil factory. 5G technology provides low latency, high throughput, and secure indoor coverage to trial a range of use cases along various aspects.

These include:

- Enhancing the operational efficiency of field maintenance technicians through content delivery and seamless assistance from remote experts
- Enabling Schneider customers to remotely tour the factory with a telepresence robot

Expected Business Benefits

- **Facilitated maintenance** thanks to the increase in connected objects and lower latency
- Fewer repetitive tasks for operators, **more interesting tasks**, and better promotion opportunities
- Ability to view **production information** in **real time on mobile devices** when away from machines
- **25%** increase in operator efficiency, **30%** decrease in the cost of maintenance, and energy savings of **>30%***

*These are overall benefits from the smart factory program at Le Vaudreuil that have been reported in several WEF manufacturing "lighthouse" reports (source: World Economic Forum, Fourth Industrial Revolution: Beacons of Technology and Innovation in Manufacturing, January 2019).

Orange Business Services believes 5G-enabled solutions will enable a significant transformation of business models for all companies in all sectors of activity.

Essential Guidance

Think BIG — start small — scale fast

Include the Industrial IoT framework in your digital transformation strategy. This means thinking big for the future, as you should always have industrial scalability in mind. Some companies deploy solutions suitable only for pilots, but later fail to scale.

Invest in digital asset automation via operational edge and IIoT

Set up digital asset automation via an operational edge and IIoT so the data can flow seamlessly between the edge and enterprise IT systems. There must be a security concern, addressing both IT and OT areas. Many companies are afraid to move forward in their integration due to cybersecurity concerns, but solving the security barrier can boost all digital programs.

Rethink ecosystems and partner relationships to enable technology and information integration for process execution and innovation

You don’t have to rely on internal experience and capabilities alone. Build internal and external collaboration ecosystems and third-party partner relationships. Use combined IT/OT teams to select and fund edge projects, as these are almost 50% more likely to move their edge pilots into full production.

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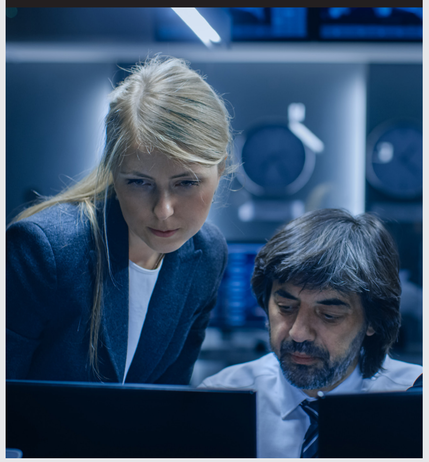
Cloud experts

2.1k

Cyberdefense experts



12m+

Connected objects managed by Orange

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