orange™ Business

IT/OT integration and AI adoption accelerates to meet manufacturing challenges

Results from a GlobalData survey conducted on behalf of Orange Business

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Foreword

Across the globe, manufacturers have ambitious plans underway to modernize operations, integrate infrastructure, and unlock the full potential of digital technologies in an operational environment. However, as the journey progresses, many are encountering familiar roadblocks: increasing complexity, a widening skills gap, and growing concerns around cybersecurity.

At the heart of this digital transformation lies the convergence of information technology (IT) and operational technology (OT). This foundational step enhances business resilience and prepares the infrastructure for the introduction of artificial intelligence (AI) in operations. Manufacturers that successfully integrate IT and OT infrastructure are positioning themselves to lead in the AI race, gaining first-mover advantage and the agility to adapt in a world where disruption is the new normal.

This ebook is the result of in-depth research conducted in partnership with analyst GlobalData. Our goal was to uncover the latest market trends, understand the evolving needs of manufacturers, and what barriers lie in the way of success. What we found was clear: the path to resilience, innovation, and competitive edge begins with IT/OT convergence.

We invite you to explore the insights within these pages to understand where the industry is headed, and how to become a leader in the digital era.

Emmanuel Routier
Vice President Smart Industries,
Orange Business

Introduction

Manufacturing faces several challenges in the modern world, including economic disruption, rapidly changing tastes and agile new competitors. New technologies are key to staying ahead of the competition. They allow manufacturers to increase resilience, agility and supply chain flexibility. IT/OT convergence enables these initiatives, underpinning Industry 4.0 and new developments such as generative AI.

To understand how manufacturers are rising to the challenge, we worked with analyst firm GlobalData to survey 500 executives from global manufacturers. A combined 75% of respondents came from Europe, including France (30%), UK (20%) and Germany (10%). The remaining 25% of respondents were split equally among North America and Asia-Pacific enterprises.

To get a holistic view, we spoke to executives from both the IT function (40%) and OT function (40%). The remainder came from functions including senior management, R&D and cybersecurity-focused job roles.

Key findings

1 IT/OT drivers

IT/OT integration is happening widely, with 90% of manufacturers undertaking it to some extent. Operational efficiency and enhanced data insights are the most important drivers, along with management demand for Industry 4.0 strategies.

2 Governance

Collaboration between IT and OT departments is essential, but only 28% of respondents have shared governance and high-level strategy. Some 10% of companies do not even have a clearly-defined strategy of any sort, which can lead to conflict.

3 IT/OT barriers

Organizational issues and resistance to change are proving to be an issue for almost half of companies looking to integrate IT and OT systems. However, integration complexity is the biggest barrier to IT/OT plans, with technical incompatibility between systems creating significant challenges.

4 Technology enablers

The foundational technologies of network, edge computing, cloud and security systems are largely in place, with investment focus moving to digital technologies that address specific use cases. These future plans include digital tools for operators, digital twins and robotics.

5 AI/ML drivers

Manufacturers are targeting AI/ML solutions in IT/OT to improve productivity, supply chain logistics and reduce equipment downtime. However, operationalizing these solutions is proving more challenging, with 62% of projects still at the planning or pilot stage. There is also strong interest in generative AI in OT, with just 11% having no plans to adopt it.

6 AI/ML barriers

Lack of skills is the biggest barrier to progress in AI/ML for OT. To overcome this, many manufacturers are seeking third-party help, particularly for data management and AI best practices. In terms of IT infrastructure, over half of companies believed they already had what was needed in place. However, concerns over security and connectivity persist.

7 Addressing challenges to scale AI

Few organizations have a well-developed AI roadmap, in particular when looking to scale and industrialize projects. We suggest several key actions to address challenges in IT/OT integration, data management, technology, people and security.

1 Operational efficiency remains key driver for IT/OT convergence

Integrating IT and operational technology (OT) systems is essential for manufacturers looking to improve resilience and efficiencies, while enabling enhanced data insights and increased flexibility.

This is reflected in the Orange Business GlobalData survey, which found that operational efficiency was the leading benefit sought by organizations across all sectors when integrating IT and OT systems. In total, 58% of respondents chose operational efficiency as a key driver, along with enhanced data insights (53%) and supporting their industry 4.0 strategy (50%).

Typical use cases for operational efficiency include predictive maintenance to reduce downtime, increased automation, quality control, workforce efficiency and energy management. For example, enhanced data insights provided by IT/OT integration can help with supply chain optimization and production planning. Enhanced data insights are also fundamental to moving forward with AI projects. And while cybersecurity is highlighted as a driver, it is fundamentally a prerequisite for the deployment of these Industry 4.0 use cases.

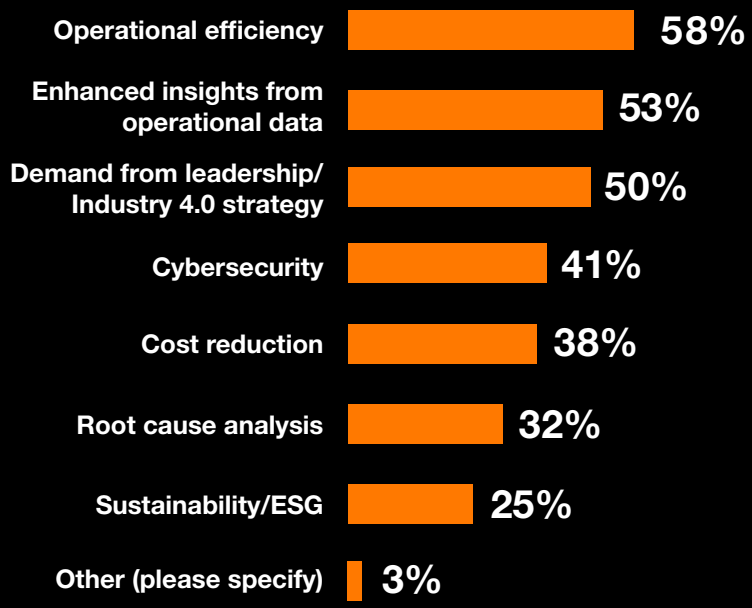
To capture these benefits, our survey shows that IT/OT integration is happening widely across all industries, with nearly 9 out of 10 survey respondents reporting progress. However, it's likely that any full integration reported is limited to some technology areas or sites. Only 3% have undertaken no integration at all.

Predictive maintenance

Reduce downtime through predictive maintenance, which uses sensors, IoT, real-time monitoring and machine learning to predict when a machine is likely to fail. This allows parts to be ordered and maintenance to be carried out in advance of any issues.

What are the primary drivers or reasons for IT/OT integration in your company (choose top 3)?

Sample Base: 500



2 Varied governance approaches to IT/OT integration

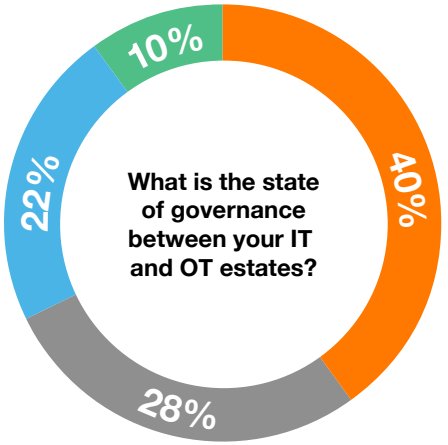
IT/OT integration isn't simply about technology integration; bringing IT and OT environments together is a matter of key governance set up, and significant organizational change. Traditionally, OT has been managed site-by-site, whereas IT has already transitioned to a centrally managed global department.

In our survey, respondents reported a variety of governance strategies. The most common is for IT to make technical decisions except for those dictated by OT solution requirements (40% of respondents). A further 28% of organizations have a shared high-level strategy between IT and OT (with function-specific solutions the responsibility of the respective teams).

Clearly, there are sometimes good reasons why OT is the responsibility of the local factory managers, such as specific local requirements, but a joint strategy for IT/OT convergence is pivotal to success and allows learning to be shared across multiple sites.

"Factories act autonomously, with only some commonality between solutions, depending on the technology" **– Food manufacturing company**

Of those without a shared strategy, 22% of companies have IT and OT operating independently of each other, while the remaining 10% do not have a clearly defined strategy which can lead to conflict.



- IT makes all technical decisions, except ones dictated by OT solution needs
- Shared high-level strategy between IT and OT – but function-specific solutions managed by the respective teams
- IT and OT are separate – Technology strategy and decisions beyond shared assets are made with minimal consultation
- In Transition – Responsibilities for strategy and solution decisions are not well defined – IT and OT are occasionally in conflict

Sample Base: 500

3 Organizational and technical barriers to IT/OT integration

As highlighted in the previous section, organizational issues can be a significant barrier to deeper IT/OT collaboration, and this, along with site resistance to change, has been identified as such by 46% of respondents in the survey. A lack of executive buy-in was identified by 17% of respondents, with 29% citing budget constraints.

However, the biggest barrier to deeper IT/OT integration highlighted in the survey was integration complexity, with over half of respondents saying it was an issue. Part of the challenge is technical incompatibility between systems, which was also noted by 42% of respondents. Many OT systems use legacy technology, which are not designed to be digitally integrated and will often require some retrofitting.

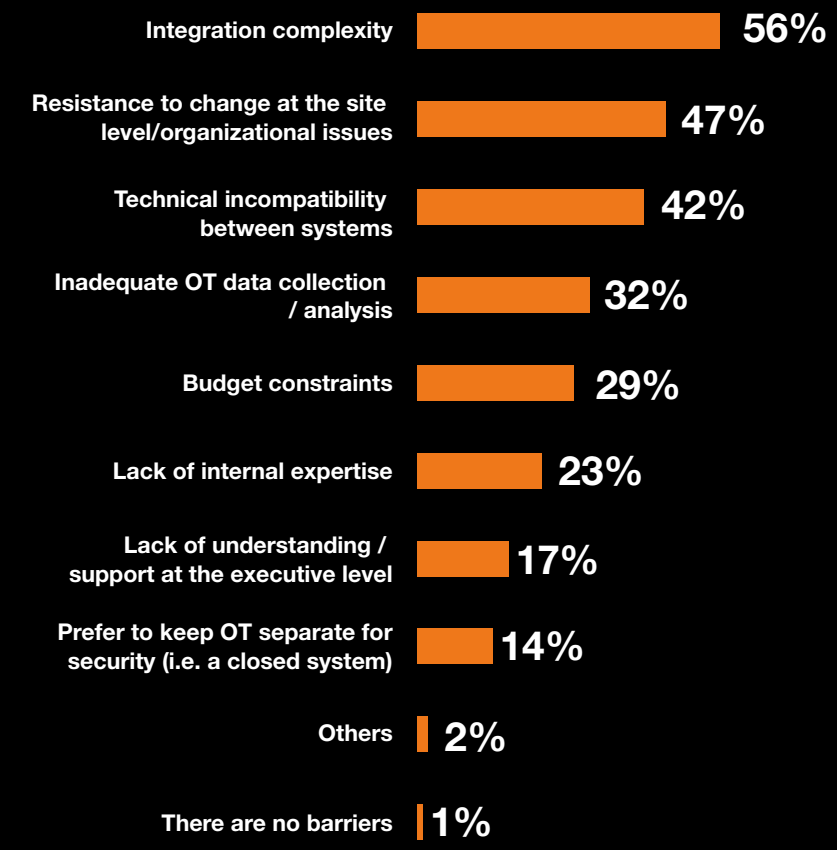
"We need to modernize IT and share data, but operations consist of both old and new machines."
– Automotive company

Factories are very focused on a production-first mentality and would be concerned about the downtime that integration work could create. OT staff are also wary about opening their business-critical systems to potential cyberbreaches. In fact, 14% of respondents said they were keeping OT systems separate for security purposes – the so-called "air-gap".

Clearly, some manufacturers are concerned about the lack of skills (23%) to undertake these projects in terms of technology and change management, and they would benefit from external help.

What are the main barriers to achieving IT/OT integration in your company?

Sample Base: 500



4 Foundational technology enablers for IT/OT integration in place

Successful IT/OT integration relies on a variety of technology enablers. To get some idea into the technology landscape now and in the future, our survey asked manufacturers which technologies they were using or planning to adopt in their OT environment.

Technologies with the current highest adoption rate in OT environments include local/managed industrial networks (74%), public cloud (68%), LAN/Wi-Fi as IT extension (64%), and integrated OT security (60%).

These network and cloud deployments are prerequisites for sharing and processing data from OT environments with the wider organization. In addition, local computing services via edge computing and private clouds are in place in almost 84% of respondents, which are vital to support AI activity in OT. The focus on security is vital given the increased vulnerabilities of connected systems.

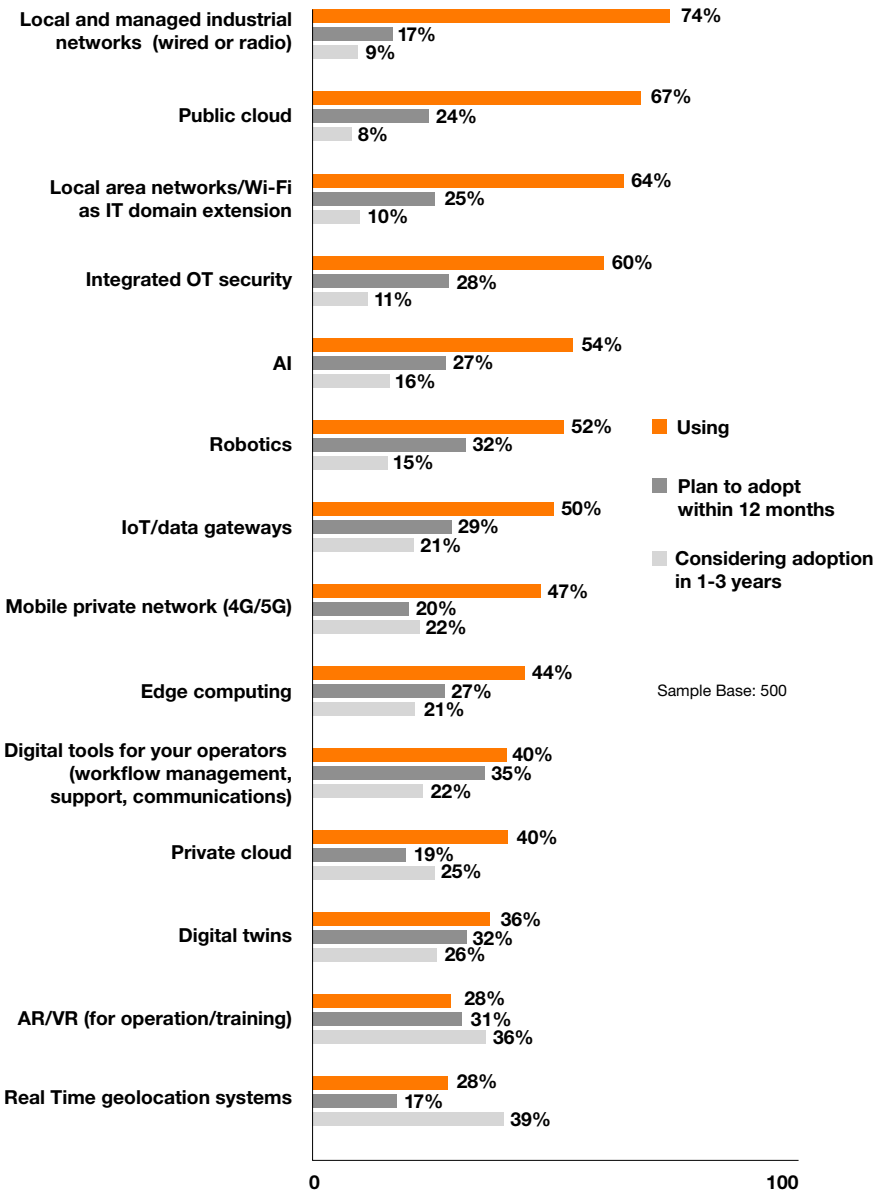
Over the next 12 months, manufacturers are looking to adopt digital tools for operators (35%), digital twins (32%), robotics (32%), and AR/VR for operation/training (31%). In the long term (1-3 years), other technologies are being planned, including real-time geolocation systems (39%) and private cloud (25%).

As can be seen, the greatest demand for new adoption is for digital technologies to address specific use cases rather than foundational, horizontal solutions that are already largely in place.

“Cables are preferred for connectivity as they give a physical connection and buildings have obstacles that can interfere with Wi-Fi”

Automotive company

Which of these technologies are you using or planning to adopt in your OT environment?



AR/VR for operations & training

Augmented reality (AR) and virtual reality (VR) can transform training and operations in manufacturing by supporting employees with immersive applications. Using digital headsets, AR can overlay instructions on how to fix a machine for the employee, increasing safety and providing real-time feedback. And VR can create realistic simulations on how to carry our training on complex or hazardous machinery before tackling it in real life.

5 Manufacturers targeting a variety of use cases and business benefits from AI in IT/OT

As shown in the previous sections, interest in artificial intelligence and machine learning is already well established in manufacturing.

According to our survey, AI/ML solutions for OT have near universal interest with all but 3% using, piloting, or planning to implement. In over 90% of companies, C-Suite and top management consider AI/ML integration in the OT environment as essential (23%), very important (37%) or important (32%).

We also asked manufacturers what benefits they were looking for when implementing AI in converged IT/OT environments. The most cited were improved productivity (40%), product quality (34%), greater efficiency (26%), improved supply chain logistics (24%) and reduced equipment downtime (24%).

Manufacturers are using a variety of AI use cases to achieve these business benefits, notably predictive maintenance (53%) and condition-based monitoring (51%). The most common use cases being planned (1-5 years) are overall employee effectiveness (65%), shipping documentation (62%), demand forecasting (61%), and information access (59%).

However, it's worth noting that only 34% of respondents said that they had already extensively deployed AI/ML solutions. The majority of respondents (62%) were only at the pilot, proof-of-concept and planning stage, which indicates that operationalizing these solutions is proving more challenging.

Computer vision for quality control

Using cameras and AI, computer vision can help monitor and improve product quality by inspecting products and detecting any faults. This could be ensuring products are assembled correctly, whether there are any defects, or how far they deviate from the standard. Rapid processing from edge computing is required to deliver the performance required.

“We are using AI for integrity simulations to predict vulnerabilities and reduce risks. This includes real-time ‘what if’ analyses for physical assets.”

Energy company

What do you see as the greatest benefits of implementing AI in OT?

Sample Base: 500

GenAI interest on the rise

Our survey also specifically looked at the planned adoption of Generative AI in OT environments. There are several use cases where GenAI could be useful, such as giving staff on the factory floor easy access to information about the machines they are working on via large language models and knowledge bases.

Results show that there is strong interest in its potential; most enterprises were either currently using (37%) or testing/POC stage (18%) GenAI in their OT environment. Early projects are likely to be desk work related applications, such as document processing. Future projects around Gen AI in industrial operations still face challenges, such as machinery noise affecting voice recognition. However, just 11% had no plans to adopt GenAI.

“GenAI is used in document processing for freight being transported by sea, air or land. This includes translation and standardization of output format.”

Logistics company

6 Skills and concerns over accuracy are top barriers to AI adoption in IT/OT

As highlighted earlier in the survey, manufacturers' interest in AI is not always matched by the progress in deployment, so we also asked manufacturers what barriers are holding back broader AI adoption in OT.

The biggest barriers were lack of AI skills (31%), concerns over the accuracy of the results (26%), insufficient data quality or availability (24%), the ability to monitor real-time data (23%), and concerns over cybersecurity (21%). However, as can be seen in the chart, there is a very wide range of barriers, from corporate issues to technology.

Regarding IT infrastructure to support AI in OT, the largest number of respondents (52%) said they partially had it, compared to 33% who said it was fully in place, and 14% who didn't. For those that didn't, the most common concerns were security (69%), cloud connectivity (51%), and legacy equipment (47%).

To help overcome these barriers, manufacturers are also looking for third-party help. The top areas sought for support are improving data management (46%), followed by AI best practices (42%), AI roadmap (37%), understanding the regulatory environment (36%), and identifying use cases (32%).

"Security is always a concern when it comes to AI – you need to trust the data and know where it came from"

Chemical company

What are the top challenges that are holding back broader AI adoption in your OT environment?

Sample Base: 500

Data quality in AI

Data quality is a key success factor in all AI applications, with 24% of companies highlighting it as a barrier. In manufacturing, having low-quality data, such as noisy, missing or corrupted sensor data can cause machine learning models to make incorrect predictions. For example, in predictive maintenance operations, poor quality data could lead the model to predict machine failure, when in fact it is operating normally. These concerns over accuracy were shared by 26% of respondents.

7 Integration help needed: addressing challenges to scale AI

Few organizations have a well-developed AI roadmap, in particular when looking to scale and industrialize projects. The technology is changing quickly and new use cases are coming to market regularly.

Making plans during these dynamic times can be challenging, and help from partners is needed with key actions to address multiple challenges and achieve business benefits. These include:

- Developing IT/OT integration strategies to achieve improved productivity and efficiency of AI
- Prioritizing zero-trust, integrated OT security and compliance to reduce the risks of AI in OT implementation
- Developing robust data management strategies to ensure responsible use of AI and to scale deployment of AI-driven workloads
- Training and education across integration, data management, and AI skills
- Change management and communicating the ROI and value of AI to overcome resistance and to foster adoption
- Complying with a rapidly changing regulatory environment

Addressing the challenges around infrastructure, IT/OT integration, and broader AI adoption

Challenge	Key drivers	Key actions	Expected benefits
IT/OT integration	▪ Tech upgrades to support AI in OT	▪ Develop integration strategies ▪ Invest in training ▪ Standardize protocols	▪ Improved productivity, efficiency
Data management	▪ Improve data collection ▪ Data quality	▪ Modernize data management ▪ Invest in storage ▪ Provide education	▪ Ability to monitor in real time ▪ Improved insights ▪ Confidence in accuracy
Infrastructure / technology	▪ Increase compute / data processing ▪ Enhance network capacity ▪ Inadequate infrastructure	▪ Modernize systems ▪ Allocate budget ▪ Focus on compute and network	▪ Greater efficiency ▪ Reduced equipment downtime
Organizational / people	▪ Reduce skill gaps	▪ Implement change management ▪ Invest in training ▪ Communicate value	▪ Agile workforce ▪ Improved worker safety ▪ Sustainability
Security & compliance	▪ Strengthen cybersecurity/privacy	▪ Prioritize integrated OT security ▪ Ensure compliance	▪ Reduced risks

Why Orange Business

Orange Business can help you overcome these barriers to IT/OT integration and AI/ML adoption, including meeting governance, data quality, integration and IT infrastructure for OT requirements.

We have a unique skill set as a global integrator, communications operator and service provider along with genuine experience of the industrial world.

This includes providing state-of-the-art Industry 4.0 solutions to increase agility, scalability, and resilience, while increasing productivity and opening opportunities to explore new connected products and digital business models.

Our individual approach is designed to make your business outcomes a reality. Our consultants have extensive industry experience and vertical expertise supported by best-in-class partner ecosystems.

Our consultants can answer your transformation challenges at every stage of the data journey using a secure, scalable, flexible approach. With our business approach, methodology, and skills, we will work closely with you to outline business goals, organize efficient and secure data sharing, and accelerate innovation.

- **More than 26,000 customers in the industry sector and 33% of our key international customers are manufacturers**
- **A consultancy-led approach to transforming data and creating value for the business**
- **Our network, compute and cybersecurity services have been adapted for OT. This includes suitability for harsh environments, support for industrial protocols, modular services and increased resilience**
- **Partner-agnostic with 3,900 digital and data experts and 2,400 cloud and data center experts**
- **Cybersecurity expertise tailored to the specific environment and challenges of industry, with expertise from 3,000 cybersecurity experts at Orange Cyberdefense**
- **Networks and IT infrastructure designed for connectivity and data storage & compute that meet your production requirements, including LoRA, 4G, 5G, Mobile Private Networks, industrial LAN and edge computing**

To find out how Orange Business can help you set up and maintain the necessary secure infrastructures to enable IT/OT convergence click here

Our consultants can help you build a data-driven factory ready for Industry 4.0. Details are available here

We can bring Real Wisdom to your (AI) initiatives, including preparing your infrastructure for new applications and supporting the operational excellence of your operations. Find out more

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