



# The next industrial revolution

**The New Collar Workforce**
Competing for the talent to deliver

ASPECTS

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SEGRO

# Foreword

Industrial revolutions are often described through the lens of technology. Steam power, electrification, mass production, computing and automation all transformed economies, industries and societies. Yet every industrial revolution has depended on people with the skills and knowledge to turn innovation into something meaningful and beneficial.

Today, Europe stands at the beginning of another period of significant industrial change. Artificial intelligence is moving rapidly into day-to-day operations. Data centres, advanced manufacturing facilities and life science laboratories are expanding. Supply chains are becoming increasingly digital, while established industries continue to evolve.

We believe that the next industrial revolution will depend on three things coming together. These are people, infrastructure and innovation. Considerable attention is rightly given to investment, technology and the places where growth can happen. This report focuses on a critical third factor of whether businesses can access the workforce needed to turn technological potential into economic reality.

Across Europe, demand is growing for workers with a blend of practical, technical and digital skills. These are the people responsible for deploying, operating and maintaining increasingly sophisticated industrial systems. Their contribution will be central to the success of industries ranging from advanced manufacturing, transportation and logistics to life sciences, retail and digital infrastructure.

These questions are important to SEGRO because we work at the intersection of many of these sectors. We see first-hand how the requirements of our customers are changing. Through our Community Investment Plans and wider employment initiatives, we are also committed to helping people access the opportunities that growth creates.

This report, developed in partnership with Randstad Advisory, examines eight European markets, as well as the sectors expected to play an important role in Europe's future economy. It explores the workforce challenges and opportunities that lie ahead, and some of the actions that businesses, educators and policymakers could take to ensure that people are not left behind by technological change.

**The next industrial revolution will be shaped by technology, but it will be enabled by people.**

**PAUL DUNNE**
**MANAGING DIRECTOR, OPERATIONS, DIGITAL AND CUSTOMER, SEGRO**

## Key findings at a glance

The jobs are there. So are the people. The missing ingredient is skills.

Across Europe, businesses are struggling to fill many of the practical and technical roles needed to deploy and operate new technology. Yet the research suggests that much of the potential workforce already exists, among people working in adjacent occupations and a new generation that could enter technical careers.

The challenge is to bridge that gap. Rather than relying on recruitment alone, businesses, educators and policymakers need to give more people the skills and pathways to move into the new collar roles that industry increasingly needs.

Seven findings from our research show where the gaps are greatest, where the potential workforce can be found and what needs to change.



# **Theme 1:** The next industrial revolution is at risk of being held back by people, not technology

## The jobs are there. The people with the right skills are not.

As investment in automation, AI and other technologies accelerates, the skilled workforce needed to deploy, operate and maintain them is struggling to keep up. Without the right practical, technical and digital skills, businesses risk being unable to realise the full potential of their investment.

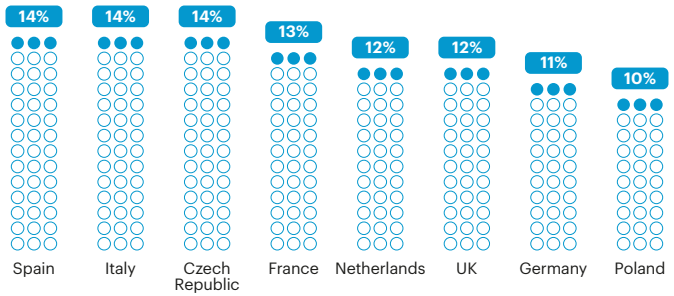
### Hypothesis

Technology deployment is advancing faster than the workforce capability required to operationalise it.

### Evidence

While 58% of employers expect robotics and automation to change their business by 2030, 79% of EU companies cite skilled-staff shortages as an investment barrier. Across the roles analysed, between 21% and 46% of vacancies remain unfilled, compared with the 4% threshold used to indicate a highly competitive labour market. The pressure extends across every sector covered by the research, from automated fulfilment and autonomous vehicle operations to mechatronics, data centre commissioning and advanced therapies. In manufacturing, only between 10% and 14% of the workforce across the eight geographic markets is currently considered ready for new collar roles.

**% of market ready for new collar manufacturing jobs**




### Implication

Technology investment is only as good as the workforce behind it.

Employers should plan for the workforce needed to deploy and operate new technology as part of the investment process. This means developing technician pipelines alongside automation investment, transitioning workers from adjacent roles and assessing whether local labour markets can support long-term operations.

| Industry | Role | Unfilled job rate | x time to fill multiplier |
|---|---|---|---|
| **Retail / e-commerce** | Robotics-assisted & automated fulfilment operators | **45.60%** | 11.4× |
| **Transportation & logistics** | Autonomous vehicle operations & convoy coordinators | **43.30%** | 10.8× |
| **Manufacturing** | Mechatronics & automation technicians | **41.70%** | 10.4× |
| **F&B manufacturing** | Packaging automation & robotic material flow specialists | **41.00%** | 10.3× |
| **Advanced manufacturing** | Advanced robotics & cobot coordinators | **39.00%** | 9.8× |
| **Data centres** | BMS/DCIM controls & commissioning specialists | **38.80%** | 9.7× |
| **Construction** | Prefabrication & industrialised modular assembly specialists | **37.20%** | 9.3× |
| **Traditional retail** | AI stock accuracy & fresh waste coordinators | **36.70%** | 9.2× |
| **Manufacturing** | Predictive maintenance & analytics specialists | **31.30%** | 7.8× |
| **Life sciences** | Bioprocess operations & advanced therapy technicians | **30.10%** | 7.5× |
| **Defence** | Digital twin / smart MRO & AI maintenance specialists | **21.10%** | 5.3× |

*The unfilled-job rate represents the share of vacancies remaining unfilled. A rate above 4% is classified as a highly competitive talent market; 2% to 3% indicates moderate competition, while around 1% indicates lower competitive pressure. The multiplier shows how far each role's unfilled-job rate sits above the 4% high-competition threshold. It does not represent how many additional workers will be required.*

# **Theme 2:** Virtually every sector is competing for the same small pool of talent

## Manufacturing, transportation and logistics, defence, life sciences, data centres, retail and construction increasingly depend on many of the same technical capabilities.

Automation, mechatronics, Industrial IoT, electrical engineering and mechanical engineering recur across the sectors analysed, creating competition between industries that have traditionally recruited from separate labour markets.

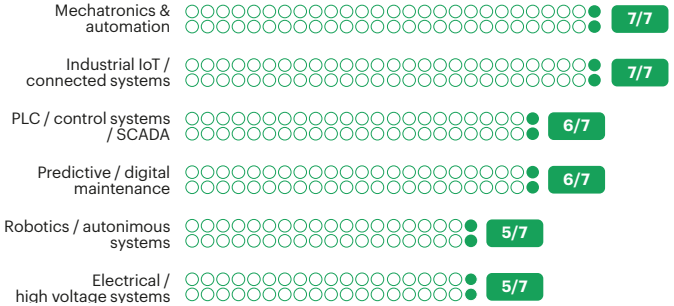
### Hypothesis

Technical talent markets are becoming less defined by industry boundaries.

### Evidence

Two of the roles analysed are sought by all seven sectors, two by six sectors and two by five sectors. Mechatronics, robotics, industrial automation, electrical systems, controls and predictive maintenance recur across industries that have traditionally recruited separately. Employers are therefore increasingly competing beyond their own sector for the same people.

### How many of the seven sectors seek the same role?




### Where the competition is occurring?

| Manufacturing | Retail | Life science | Data centres | Transportation & logistics | Construction | Defence |
|---|---|---|---|---|---|---|
| **Overlap skills:**<br>● Mechatronics<br>● PLC/controls robotics<br>● IIoT<br>● Predictive maintenance | **Overlap skills:**<br>● Robotics<br>● Mechatronics<br>● Industrial automation<br>● WMS/controls<br>● Predictive maintenance | **Overlap skills:**<br>● PLC<br>● Controls<br>● SCADA<br>● HMI<br>● Industrial automation<br>● Predictive maintenance | **Overlap skills:**<br>● Electrical/high voltage<br>● Controls<br>● BMS/SCADA<br>● HVAC<br>● Predictive maintenance | **Overlap skills:**<br>● Robotics<br>● Automation<br>● Mechatronics<br>● BMS<br>● High voltage<br>● Electrical diagnostics | **Overlap skills:**<br>● PLC/controls<br>● ● Electrical systems<br>● IoT<br>● SCADA<br>● Building automation | **Overlap skills:**<br>● PLC<br>● SCADA<br>● Robotics<br>● Predictive maintenance<br>● IIoT<br>● Electrical/ electronic systems |
| **Overlap industries:**<br>● Logistics<br>● Retail<br>● Life sciences<br>● Data centres<br>● Defence<br>● Construction | **Overlap industries:**<br>● Manufacturing<br>● Transportation & logistics | **Overlap industries:**<br>● Manufacturing<br>● F&B<br>● Data centres<br>● Defence | **Overlap industries:**<br>● Manufacturing<br>● Construction<br>● Smart buildings | **Overlap industries:**<br>● Manufacturing<br>● Retail<br>● Automotive<br>● Data centres<br>● Construction | **Overlap industries:**<br>● Data centres<br>● Manufacturing<br>● Smart buildings | **Overlap industries:**<br>● Manufacturing<br>● Aerospace<br>● Data centres<br>● Industrial infrastructure |

### Implication

You can't just solve a skills shortage by taking from your neighbour.

Technical talent shortages are increasingly cross-sector rather than industry-specific. Employers should assess workforce availability against total cross-sector demand in a location, rather than considering direct competitors alone. Expanding the shared talent pool through cross-training, vocational pathways and conversion from adjacent occupations will be more sustainable than moving scarce workers between sectors.

# **Theme 3:** The biggest opportunity lies in helping existing workers transition into new collar roles

## Many of the people needed for emerging roles are already working in technical, trade and operational occupations.

Electricians, mechanics, maintenance engineers and warehouse operatives often possess experience that can provide a foundation for further training. Only 9% of today's blue collar workforce in Europe currently has the next generation of industrial skills identified by the research, creating a substantial opportunity to develop new capabilities within the existing workforce.

### Hypothesis

The existing workforce offers the most immediate route to expanding the new collar talent pool.

### Evidence

Many new collar occupations build on skills and experience that already exist within the industrial workforce. The analysis identifies potential pathways across every sector studied, with established transition rates ranging from 2% to 64%. The strongest pathway is from construction and installation roles into prefabricated modular and modern methods of construction coordination, where 64% of the identified workforce has already transitioned. Other significant pathways include mechanics and maintenance technicians moving into autonomous systems, robotics and defence mechatronics roles, at 40%, and electricians moving into hyperscale and high-voltage electrical technician roles, at 35%. Even in more specialist areas, the table identifies relevant foundations within the existing workforce, including maintenance, electrical, quality-control and logistics experience. The opportunity therefore lies in identifying these adjacent capabilities and providing the additional technical training needed for workers to move into emerging roles.

**Many future roles are built from existing knowledge**

| | | |
|---|---|---|
| Electrician + high-voltage / controls | → | Data centre technician |
| Maintenance mechanic + PLC / robotics | → | Mechatronics technician |
| Diesel mechanic + battery / HV diagnostics | → | EV fleet technician |
| Inventory worker + RFID / analytics | → | Inventory-visibility technician |
| Site supervisor + BIM / digital tools | → | Digital site coordinator |
| QC technician + LIMS / PAT | → | Digital-quality technician |

| Industry | Existing blue-collar workforce | | Emerging new collar role | Already transitioned to new collar |
|---|---|---|---|---|
| **Data centres (construction)** | Construction / MEP installer / site coordinator | → | Prefabricated Modular & MMC Coordinator | 64% |
| **Defence** | Vehicle / equipment mechanic / maintenance technician | → | Autonomous Systems, Robotics & Defence Mechatronics Specialist | 40% |
| **Data centres (operation)** | Electrician / power-distribution / electrical-maintenance technician | → | Hyperscale & High-Voltage Electrical Technician | 35% |
| **Construction** | Site supervisor / foreman / construction technician | → | BIM Field Technician & Digital Site Coordinator | 32% |
| **Construction** | Electrician / building-services technician | → | Smart Building Automation & Microgrid Integrator | 32% |
| **Online retail** | Driver / dispatcher / route planner | → | Smart Last-Mile Routing & Fleet Optimiser | 30% |
| **Life sciences** | Maintenance mechanic / industrial electrician / instrumentation technician | → | GMP Automation, Validation & Process-Control Technician | 22% |
| **Manufacturing** | Maintenance mechanic / equipment-maintenance worker | → | Predictive Maintenance & Analytics Specialist | 20% |
| **Transportation & logistics** | Dispatcher / terminal / port operations worker | → | Synchromodal & Multimodal Coordinator | 20% |
| **Transportation & logistics** | Diesel / heavy-vehicle mechanic / auto electrician | → | Electric & Alternative-Fuel Fleet Maintenance Technician | 18% |
| **Life sciences** | QC / sampling / production-quality technician | → | Digital QC, LIMS & PAT Technician | 15% |
| **Online retail** | Maintenance / conveyor technician / industrial electrician | → | Warehouse Automation & Mechatronics Technician | 6% |
| **Manufacturing** | Maintenance mechanic / industrial electrician / machine repair worker | → | Mechatronics & Automation Technician | 2% |

## Where is the transition opportunity to create a new collar workforce?

| Manufacturing | Retail | Life science | Data centres | Transportation & logistics | Construction | Defence |
|---|---|---|---|---|---|---|
| **Existing blue collar workforce:**<br>● Mechanics<br>● Electricians<br>● Maintenance technicians<br>● Operators | **Existing blue collar workforce:**<br>● Warehouse workers<br>● Inventory clerics<br>● Maintenance technicians<br>● Drivers<br>● Dispatchers | **Existing blue collar workforce:**<br>● Maintenance technicians<br>● Industrial<br>● Electricians<br>● Instrumentation and quality technicians | **Existing blue collar workforce:**<br>● Electricians<br>● HVAC<br>● Technicians<br>● Facilities engineers<br>● Controls technicians<br>● MEP/construction workers | **Existing blue collar workforce:**<br>● Diesel<br>● Mechanics<br>● Auto electricians<br>● Fleet technicians<br>● Dispatchers<br>● Terminal workers | **Existing blue collar workforce:**<br>● Electricians, supervisors<br>● Construction technicians<br>● Installers<br>● Trades | **Existing blue collar workforce:**<br>● Vehicle/aircraft mechanics<br>● Electronics technicians<br>● Industrial maintainers<br>● Machinists |
| **Capability to add:**<br>● PLCs<br>● Robotics<br>● Controls<br>● Sensors<br>● Industrial networking<br>● Analytics | **Capability to add:**<br>● WMS/WES<br>● RFID<br>● Automation<br>● Robotics<br>● Data analytics<br>● Route optimisation | **Capability to add:**<br>● PLC/DCS<br>● Automation<br>● LJMS<br>● PAT<br>● Validation<br>● Digital quality systems | **Capability to add:**<br>● Mission-oitical power<br>● Liquid cooling<br>● BMS/OCIM<br>● Redundancy<br>● Commissioning<br>● Modular systems | **Capability to add:**<br>● High voltage<br>● BMS<br>● EV diagnostics<br>● Telematics<br>● Multimodal platforms<br>● Autonomous systems | **Capability to add:**<br>● BIM<br>● Digital coordination<br>● IoT<br>● Building controls,<br>● Automation<br>● Microgrid systems | **Capability to add:**<br>● Robotics<br>● Autonomy<br>● C4ISR<br>● OT security,<br>● AI-enabled maintenance<br>● Advanced manufacturing |



## Implication

### The fastest route to tomorrow's workforce starts with today's workers.

Employers should prioritise targeted, adjacency-based occupational conversion rather than generic reskilling. They should map the capabilities of existing workers against emerging roles, identify the additional training required and create clear progression pathways into those occupations.

# **Theme 4:** Large companies are better equipped to adapt, while small and medium-sized enterprises risk being left behind

Large organisations generally have greater capacity to fund training, establish internal academies and support employees through changing roles.

## Implication

If SMEs can't access the skills, whole supply chains will fail.

Limited access to specialist training and equipment could prevent SMEs from adopting new technologies and create bottlenecks across industrial supply chains. Businesses and policymakers should support shared training infrastructure, regional academies, technology testbeds and mobile training units that give smaller firms access to facilities and instruction they could not provide independently.

Smaller businesses often face the same technology and skills requirements but have fewer resources to develop the necessary workforce capability. Because SMEs form an essential part of industrial supply chains, this gap could constrain the adoption of new technologies across the wider economy.

## Hypothesis

Workforce transformation is becoming increasingly dependent on the size of the organisation.

## Evidence

Small and micro businesses account for 99% of EU enterprises, but large enterprises are much better equipped to invest in technology and workforce development. Almost 73% of large enterprises provide training on emerging technologies, compared with just 17% of small enterprises. Large enterprises are also 3.2 times more likely to use AI and 1.8 times more likely to use IoT. As new collar roles require increasingly specialist equipment, instructors and practical training environments, smaller businesses face a growing disadvantage in developing the capabilities needed to adopt new technologies.

| Indicator | Large enterprises | Small enterprises / SMEs | Gap |
|---|---|---|---|
| **Employees receiving skills training on emerging technologies** | 72.62% | 17.21% | Large firms are 4.2× more likely to provide training |
| **AI adoption** | 55% | 17% | Adoption is 3.2× higher in large firms |
| **IoT adoption** | 48% | 26% | Adoption is 1.8× higher in large firms |





# **Theme 5:** Young people could significantly expand the new collar talent pool

## Meeting future workforce demand will require more young people to enter technical and operational careers.

Many of the occupations identified by the research are suited to apprenticeships, vocational education and industry placements, but employers need to create realistic entry points and clear routes into more specialist roles.

### Hypothesis

Young people could become a meaningful source of new collar talent if employers create realistic routes into technical work.

### Evidence

One in five people aged 15 to 24 globally is not in education, employment or training, indicating a substantial potential source of future talent. However, only 22% of the 60 new collar roles analysed provide a direct entry pathway. Most require vocational education, an apprenticeship or relevant workplace experience. The opportunity therefore depends on creating realistic starting points and structured progression into the specialist occupations that are hardest to fill.

### Understanding accessibility across 60 new collar roles

To evaluate entry barriers for young people, the research categorised 60 new collar roles according to the preparation required:

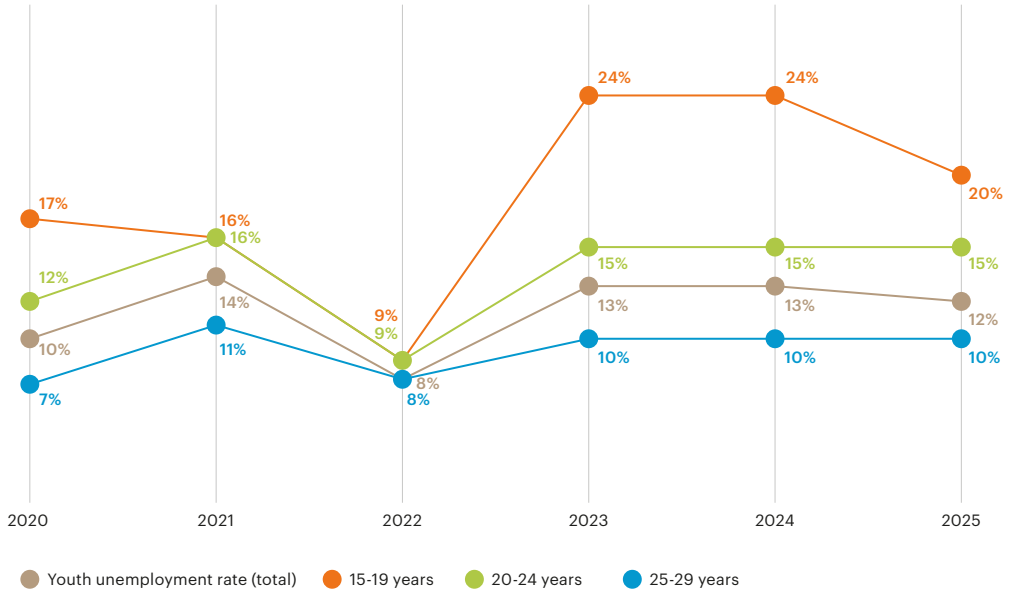
- **Direct entry:** Roles accessible with short, job-specific training
- **Technical pathway:** Roles requiring an apprenticeship, vocational programme or technical certification
- **Experience-led specialist:** Progression roles requiring significant trade experience, regulatory knowledge or responsibility for critical systems

### Implication

The next generation needs a way in.

Employers should distinguish between roles that young people can enter directly and those requiring structured preparation. Entry-level operational roles can provide a first step into technical work, supported by vocational education and apprenticeships that lead towards specialist occupations such as mechatronics, advanced controls and mission-critical commissioning.

### YOY emerging talent unemployment rates by age group




*Youth unemployment remains consistently higher among 15 to 24-year-olds than among those aged 25 to 29 across the markets shown. The gap is particularly pronounced in several countries, indicating that the transition from education into sustained employment remains a significant barrier for younger people. Improving access to entry-level roles, vocational education and apprenticeships could help employers address this challenge while expanding the future technical talent pool.*

The table below identifies the most realistic entry and progression routes across the sectors analysed.

| Industry | Tier 1 - most accessible to early career | Tier 2 - apprenticeship / VET pathway | Tier 3 - difficult / experience-led |
|---|---|---|---|
| **Manufacturing** | | Additive Manufacturing Specialists; Predictive Maintenance & Analytics; Industrial IoT & Connected Facility Technicians | Mechatronics & Automation Technicians, Cobot & Robot Cell Operators |
| **Advanced manufacturing** | — | Advanced CNC & Hybrid Machining Technicians; Smart Factory Data, Quality Automation & Metrology Specialists | Advanced Robotics & Cobot Coordinators; Mechatronics & Cyber-Physical Assembly Technicians; Industrial Controls & Automation Specialists |
| **Automotive manufacturing** | — | EV Battery Manufacturing & Circular Recovery Technicians; Robotic Welding & BIW Operators; AI-Vision Quality Control & Traceability Specialists | Advanced Automation & Robot Programming; Automotive Controls & Mechatronics Technicians |
| **F&B manufacturing** | Digital Process & Fermentation Operators; Automated Sanitation & CIP Technicians | Food Safety & Traceability Digital Analysts; Packaging Automation, Robotic Palletising & Material Flow Technicians | Food Industry Mechatronics & Automation Technicians |
| **Retail** | Smart Inventory & RFID Coordinators; AI-Assisted Store Operations & Support Specialists | Warehouse Robotics & Sorter Technicians; Predictive Analytics & Exception Controllers; Digital Asset Protection & Shrink Analysts | — |
| **Online retail** | Robotics-Assisted & Automated Fulfilment Operators; Inventory Visibility & Data Technicians; Digital Shelf & Product Information Operators | Smart Last-Mile Routing & Fleet Optimisers | Warehouse Automation & Mechatronics Technicians |
| **Traditional retail** | Smart Inventory & RFID Coordinators; Digital Shelf/ESL & Price-Integrity Operators; AI Stock Monitoring & Fresh Waste Coordinators; AI-Assisted Store Operations Data Coordinators | Digital Shrink & Asset Protection Analysts | — |
| **Life sciences** | — | Digital QC, LIMS & PAT Technicians | Digital Twin & Simulation Specialists; Predictive Maintenance & Data Analytics; Bioprocess Operations & Advanced Therapy; GMP Automation, Validation & Process-Control Technicians |
| **Transportation & logistics** | Automated Fulfilment & AMR Warehousing | Electric & Alternative-Fuel Fleet Maintenance; Telematics-Enabled Fleet Analytics; Synchromodal & Multimodal Coordinators | Autonomous Vehicle & Convoy Operations |
| **Construction** | Prefabrication & Industrialised Modular Assembly Specialists | Construction Robotics & Automated Layout Technicians; Drone/Laser Scanning & Reality-Capture Technicians; BIM Field Technicians & Digital Site Coordinators | Smart Building Automation & Microgrid Integrators |
| **Data centres** | — | Prefabricated Modular & MMC Coordinators | Hyperscale & High-Voltage Electrical Technicians; Advanced Thermal Management & Liquid-Cooling Specialists; BMS/DCIM Controls & Commissioning Specialists; White-Space Mechanical & Systems Technicians |
| **Defence** | — | — | Autonomous Systems, Robotics & Defence Mechatronics Specialists; C4ISR/Radar & Combat Systems Technicians; Cyber-Physical Security & OT Maintenance; Digital Twin/Smart MRO & AI Maintenance; Additive Manufacturing & Materials Technologists |

# **Theme 6:** Many of the hardest to fill jobs are practical, operational and site based

## Demand is growing for people who can apply digital and engineering skills inside factories, warehouses, laboratories, data centres and construction sites.

The highest-pressure roles identified include automated fulfilment operators, autonomous vehicle operations coordinators, mechatronics technicians, robotics coordinators, controls and commissioning specialists, and industrialised modular assembly specialists. These jobs connect technological innovation with the physical environments in which businesses operate. Unlike more location-flexible digital occupations, like coding, software engineering and cyber security, these roles must be performed close to the machinery, systems and physical environments they support.

### Hypothesis

Physical presence is becoming a distinct source of talent scarcity in the new collar workforce.

### Evidence

Across the six sector comparisons analysed, around 40% of vacancies for site-dependent roles remain unfilled, compared with around 13% for more location-flexible roles. The practical roles tied to factories, warehouses, laboratories and other physical assets are therefore around three times harder to fill on average. This pattern is found across multiple sectors, from manufacturing and online retail to transportation and logistics, and life sciences, although the size of the gap varies by occupation.

The table compares a site-dependent role in each sector with a more digitally mediated or location-flexible role. The percentages show the proportion of advertised vacancies that remain unfilled, with a higher figure indicating greater difficulty recruiting.

### Implication

If people have to come to work, make it somewhere they want to be.

Europe is expected to need 4.7 million technician openings by 2035, including many roles tied to physical assets and operating environments. Employers will need to develop technical capability close to where facilities are located by drawing on local workers, adjacent occupations, commuting populations and vocational training providers. As competition for site-based talent increases, the quality, accessibility and attractiveness of workplaces will also become more important in attracting and retaining skilled workers. Access to site-based talent is therefore becoming an important location consideration alongside land, power, connectivity and infrastructure.

| Industry | Site-dependent role | Vacancies remaining unfilled | More digitally mediated / location-flexible comparator | Vacancies remaining unfilled |
|---|---|---|---|---|
| **Manufacturing** | Mechatronics & Automation Technicians | 41.7% | Smart Factory Data, Quality Automation & Metrology Specialists | 6.0% |
| **Advanced manufacturing** | Advanced Robotics & Cobot Coordinators | 39.0% | Smart Factory Data, Quality Automation & Metrology Specialists | 6.0% |
| **F&B manufacturing** | Packaging Automation, Robotic Palletising & Material Flow Specialists | 41.0% | Food Safety & Traceability Digital Analysts | 7.0% |
| **Online retail** | Robotics-Assisted & Automated Fulfilment Operators | 45.6% | Digital Shelf & Product Information Operators | 16.7% |
| **Transportation & logistics** | Autonomous Vehicle & Convoy Operations | 43.3% | Telematics-Enabled Fleet Analytics Specialists | 23.4% |
| **Life sciences** | Bioprocess Operations & Advanced Therapy Technicians | 30.1% | Digital Twin & Simulation Specialists | 20.9% |



# **Theme 7:** The next industrial revolution will thrive where talent, logistics infrastructure and innovation come together

## Industrial growth is most likely to succeed in locations that can turn investment into productive capacity by combining workforce depth with logistics infrastructure and innovation.

The combined analysis identifies European clusters where these conditions already overlap, while highlighting the importance of connecting surrounding communities to the opportunities created.

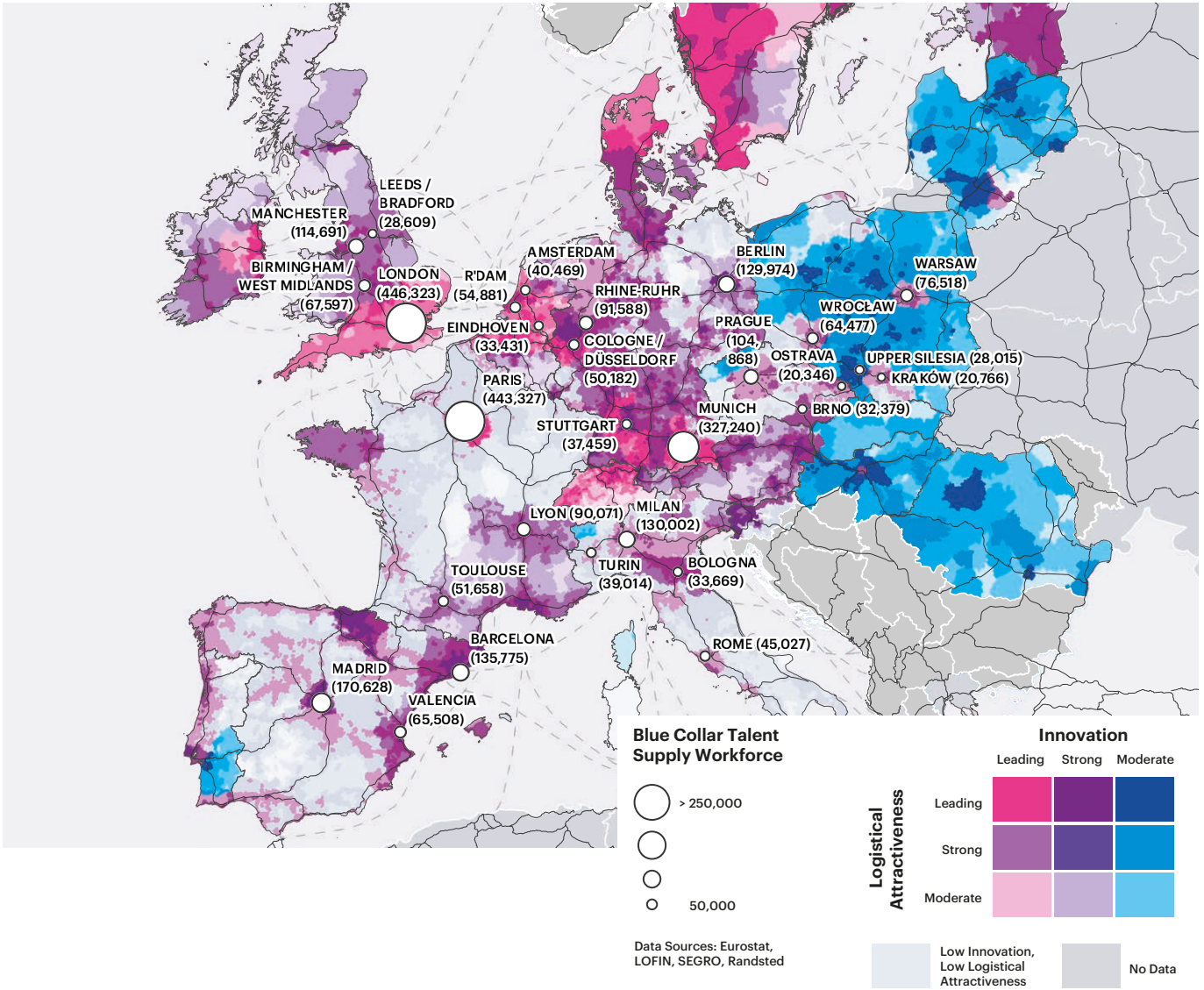
### Hypothesis

Industrial growth will increasingly favour locations that combine the right workforce, logistics infrastructure and innovation base.

### Evidence

Randstad's workforce analysis, combined with SEGRO's assessment of logistics attractiveness and regional innovation, identifies several European clusters where these strengths overlap. These include Munich and Southern Germany, Paris and Île-de-France, London and the South East UK, Rhine-Ruhr, the Dutch industrial and logistics corridor, Northern Italy and Prague. Each cluster has a different mix of workforce, logistics infrastructure and innovation capability, demonstrating why industrial readiness should be assessed locally rather than through national averages alone.

**Where talent, infrastructure and innovation converge**



The table highlights the workforce base underpinning several of the clusters identified by the combined analysis.

| Industrial ecosystem | Evidence of workforce depth | Why it matters |
|---|---|---|
| **Munich / Southern Germany** | 148.3K manufacturing, 131.2K retail and 13.2K life-sciences workers | Deep industrial and engineering base creates blue-collar populations for automation, mechatronics, advanced manufacturing and life sciences |
| **Paris / Île-de-France** | 106.9K manufacturing, 162.8K retail, 107.9K construction, 55.6K defence and 10.2K life sciences | One of the broadest cross-sector technical and operational labour ecosystems |
| **London / South-East UK** | 384.6K retail, 56.3K construction plus a major Thames Gateway logistics pool | Large workforce catchment spanning logistics, fulfilment, construction and specialised technical sectors |
| **Rhine-Ruhr / Western Germany** | Major manufacturing and logistics concentrations across Cologne-Düsseldorf and the wider Rhine-Ruhr corridor | Industrial production and logistics networks create substantial cross-sector technical demand and mobility |
| **Eindhoven–Rotterdam–Amsterdam** | 27.7K manufacturing in Eindhoven, 38.6K around Rotterdam-The Hague, alongside major logistics pools | Smaller labour market but highly specialised around advanced manufacturing, logistics and digital infrastructure |
| **Milan / Northern Italy** | 61.7K manufacturing, 46.0K retail and 6.1K life-sciences | Broad industrial blue-collar base supporting manufacturing, life sciences and infrastructure transition |
| **Prague / Central Europe** | 44.6K manufacturing, 35.9K retail and a highly concentrated defence workforce | Strong industrial base creates conversion potential if innovation and training ecosystems continue to deepen |



## Implication

### Without skills, innovation remains an idea and logistics has nothing to move.

Businesses and policymakers should assess industrial readiness at cluster level and identify the specific constraint holding each location back. EIB modelling suggests that targeted investment in local infrastructure and skills could increase regional GDP by up to 2.5% by 2040, reinforcing the value of aligning workforce, infrastructure and innovation investment around local economic strengths.

# Recommendations for providing the skills to help enable the next industrial revolution

## 1.

### Plan occupational transitions, not just training programmes

Many of the people needed for emerging new collar roles are already working in technical, operational and trade-based occupations. Employers and policymakers should identify the specific pathways through which these workers can move into emerging roles, recognising the skills they already possess and focusing training on the capabilities they need to add.

This requires workforce planning to move beyond broad commitments to reskilling. Employers should map adjacent occupations, define the additional technical requirements for each transition and create recognised pathways that allow people to develop new capabilities while remaining in employment.

## 2.

### Define new collar careers and create clearer routes into them

New collar occupations are emerging across the economy, but many remain poorly defined or understood outside their industries. Employers, educators and policymakers should work together to describe these careers consistently, improve awareness of the opportunities they offer and make their entry and progression routes easier to understand.

Governments across Europe are already investing in technical education, vocational training and apprenticeships. The priority should be to connect these programmes more clearly to emerging occupations and real employer demand. This means distinguishing between roles that offer direct entry, those requiring structured technical preparation and specialist occupations that depend on workplace experience, while showing how people can progress from one level to the next.

## 3.

### Plan for shared capabilities across sectors and locations

Workforce planning is often organised by sector, even though manufacturing, logistics, construction, data centres, life sciences, defence and retail increasingly compete for many of the same capabilities. Employers and policymakers should identify shared occupational demand across the local economy and coordinate provision accordingly.

This planning should be undertaken around industrial clusters and realistic travel-to-work areas. It should combine workforce demand with infrastructure, innovation and planned investment, giving businesses a clearer view of whether the locations in which they invest can provide the site-based technical workforce they will require.

## 4.

### Open up workforce infrastructure to industrial supply chains

SMEs often require the same emerging capabilities as larger organisations but cannot independently fund specialist equipment, instructors or training environments. Workforce programmes should therefore be designed around industrial supply chains, not individual employers.

Larger businesses, training providers and public bodies should explore how specialist facilities, employer academies, technology testbeds and training capacity can be shared with smaller suppliers and neighbouring businesses. Provision should be flexible enough for SMEs to participate without removing employees from their operations for extended periods.

# **Sector summary –** Advanced manufacturing



## Advanced manufacturing is progressing fastest in digital quality, while robotics capability remains constrained

Factories are producing more information than ever before. The research suggests workforce development has been concentrated around data, monitoring and quality functions, while some of the roles that connect machines, software and production systems remain in much shorter supply.

### Why this matters

Many advanced manufacturers have spent years investing in automation, sensors and connected production systems. Those technologies only create value when organisations have enough people who understand how to optimise them.

### What the research tells us

**Data and quality functions are leading the transition.**

The estimated transition rate is highest in smart factory data, quality automation and metrology roles, at 49%. Advanced CNC and hybrid machining stands at 29%, while mechatronics and cyber-physical assembly reaches 30%. This suggests that progress is strongest where digital tools can be integrated into established production and quality functions.

**Robotics remains the clearest capability gap**

The estimated transition rate into advanced robotics and cobot coordination roles is only 3%, despite growing demand for automation, PLC programming, robotic welding and cell optimisation. These roles require deeper technical development than basic equipment operation because workers must be able to diagnose, reconfigure and improve automated systems.

**The workforce already contains much of the raw material**

Maintenance engineers, technicians and machine operators often possess strong foundations for more advanced technical roles. Retraining these workers may prove more effective than relying entirely on external recruitment.

### What this means

Advanced manufacturers should distinguish between roles that can be developed through shorter conversion programmes and those requiring sustained work-based technical training. Existing production and quality workers provide a strong foundation, but mechatronics, controls and advanced robotics will require deeper pathways combining theory, equipment-specific experience and practical assessment.

The estimated transition rate is highest in smart factory data, quality automation and metrology roles

49%

Advanced CNC and hybrid machining stands

29%

# **Sector summary –** Automotive manufacturing

## Electrification is changing far more jobs than vehicle assembly

Much of the public conversation focuses on batteries and electric vehicles. The research points towards a broader workforce transition affecting maintenance, diagnostics, quality control, automation, power systems and production engineering.

### Why this matters

Vehicle manufacturers are reconfiguring production around new technologies while competing for many of the same technical skills sought by manufacturers, utilities and digital infrastructure businesses.

### What the research tells us

**The strongest transition is in controls and mechatronics**

The research identifies an estimated transition rate of 35% into automotive controls and mechatronics roles, compared with 18% for advanced automation and robot programming, 13% for AI vision quality control and traceability, 6% for battery manufacturing and circular recovery, and 5% for robotic welding and body-in-white. The pattern suggests that the immediate workforce challenge extends beyond battery production into the controls, maintenance and automated systems that support modern vehicle manufacturing.

**Electrification and automation require different pathways**

Battery and powertrain workers need capabilities in high-voltage safety, battery processes, e-drives and traceability. Maintenance mechanics and electricians require a deeper route covering PLCs, industrial controls, networks, robot diagnostics and predictive maintenance. The research indicates that high and low-voltage capability features in 99% of the relevant battery-role job postings analysed, while projected skills growth is particularly strong in robotic welding, automation and industrial networking.

**Quality and production are becoming more closely connected**

Digital inspection systems, robotics and data-driven manufacturing are reducing the distinction between production engineering and quality functions.

### What this means

Automotive workforce strategies should treat electrification and factory automation as connected but distinct transitions. Building a larger battery workforce alone will not address shortages in controls, mechatronics, robotics, high-voltage maintenance and digital quality. Employers should map existing assembly, maintenance, electrical and quality roles into the relevant pathways rather than direct them through a single generic EV programme.

Research identifies an estimated transition rate of

**35%**

into automotive controls and mechatronics roles

Research indicates that high and low-voltage capability features in

**99%**

of the relevant battery-role job postings analysed



# **Sector summary –** Food & Beverage manufacturing

Transition into digital food safety and traceability occupations has reached

25%

Food-industry mechatronics and automation roles have an estimated transition rate of

16%

## Traceability and compliance are driving workforce change as much as automation

Food manufacturing is often associated with automated production lines. Some of the strongest workforce transitions identified by the research are taking place in food safety, traceability and quality management.

### Why this matters

Increasing regulatory requirements, supply chain transparency and customer expectations are changing the skills needed across production environments.

### What the research tells us

**Quality functions are evolving rapidly**

Transition into digital food safety and traceability occupations has reached 25%, compared with only 4% in automated packaging and material flow roles. This suggests workforce transition is currently more advanced in compliance, quality assurance and product traceability than in packaging automation and material flow.



**Shared technical skills must be combined with food-sector expertise**

Food-industry mechatronics and automation roles have an estimated transition rate of 16%. These occupations require capabilities in PLCs, sensors, industrial networking and automated equipment, but also knowledge of hygienic design, refrigeration, clean-in-place systems and food-safety requirements. The technical foundations may be transferable from other industries, but workers still need preparation for the operating and regulatory conditions of food production.

**Production knowledge remains highly valuable**

Many experienced operators and maintenance teams already possess sector-specific expertise that can provide a strong foundation for more advanced technical roles.

### What this means

Food manufacturers should develop separate but connected pathways for process operations, digital quality, packaging automation, maintenance and automated sanitation. Training should combine common automation foundations with the food-specific requirements of hygiene, traceability, cleaning, refrigeration and regulatory compliance. Shared provision will be particularly important for smaller manufacturers that cannot reproduce these environments independently.

# **Sector summary –** Transportation & Logistics

Across the sector as a whole, the research estimates that approximately

**6%**

of the identified workforce has moved into new collar roles

## Transportation & Logistics is becoming a major competitor for technical talent

The sector is investing heavily in fleet decarbonisation, warehouse automation, fulfilment technology and digitally enabled transport networks. As a result, it increasingly requires many of the same skills as manufacturing, data centres and energy infrastructure.

### Why this matters

For many years workforce discussions focused on driver shortages. The research suggests technical capability may become just as important.

### What the research tells us

**Several workforce transitions are developing at different speeds**

Across the sector as a whole, the research estimates that approximately 6% of the identified workforce has moved into new collar roles. The estimated transition rate reaches 20% for synchromodal and multimodal coordination and 18% for electric and alternative-fuel fleet maintenance, but remains at 4% for telematics-enabled fleet analytics, 3% for automated fulfilment and AMR warehousing, and 1% for autonomous vehicle and convoy operations.

**Electrification is the most immediate technical transition**

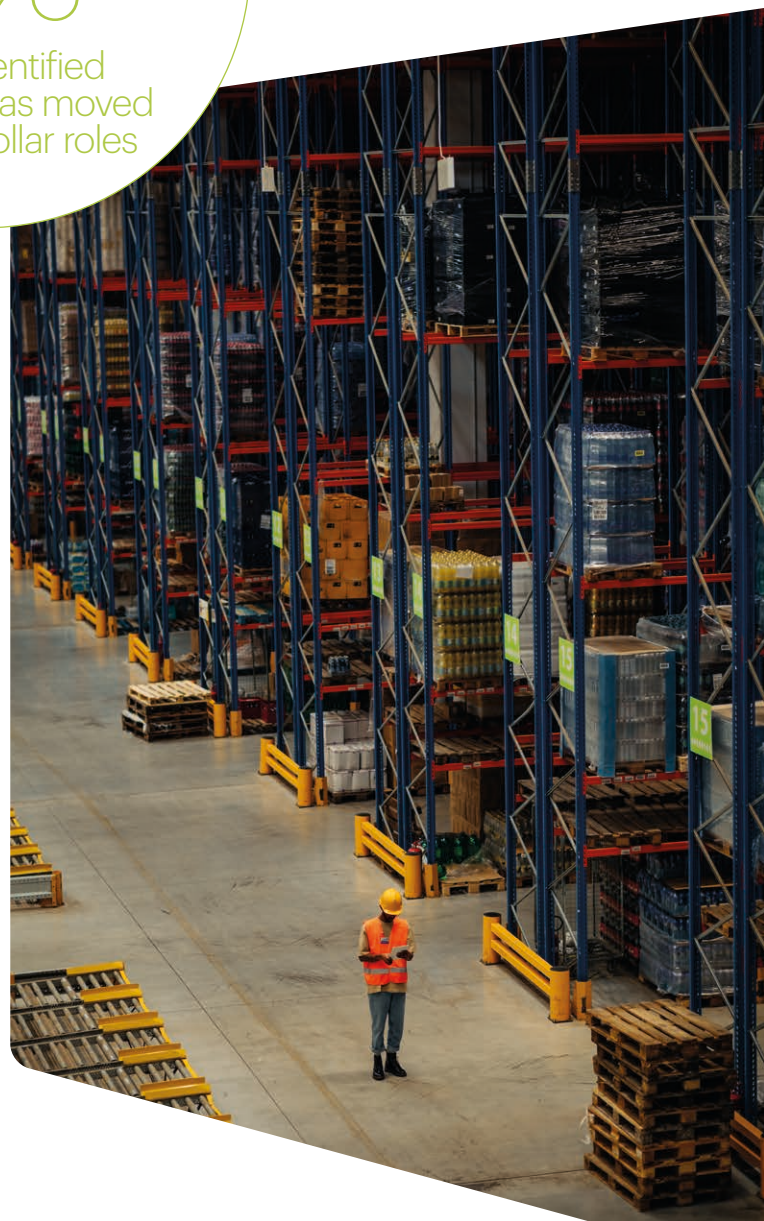
Diesel, battery-electric, hybrid, hydrogen and other alternative-fuel vehicles are likely to coexist for a considerable period. Fleet-maintenance workers will therefore need to support multiple powertrains while developing capabilities in high-voltage safety, battery diagnostics, charging systems, thermal management and connected-vehicle technologies.

**Existing workers represent a major opportunity**

Mechanics, dispatchers and warehouse operatives possess knowledge that can support movement into higher-skilled technical occupations.

### What this means

Transportation and logistics businesses should create distinct pathways for fleet electrification, warehouse automation, telematics and multimodal coordination rather than rely on a broad future-logistics curriculum. Existing mechanics, drivers, dispatchers and warehouse workers bring relevant operational knowledge, but each pathway requires different additional capabilities. Shared regional provision could help smaller operators access equipment and training they cannot provide independently.



# Sector summary – Retail

## Retail is evolving into two very different workforce models

The research highlights a widening divide between online retail and traditional retail. Both are changing, but they are changing in different ways.

### Why this matters

Many retail businesses operate physical stores, fulfilment operations and digital channels simultaneously. Their future workforce may need increasingly different capabilities across those environments.

### What the research tells us

**Transition is more advanced in online retail**

The estimated transition rate into the new collar occupations analysed is approximately 12% in online retail, compared with around 3% in traditional retail. This reflects greater movement into fulfilment automation, inventory visibility and last-mile coordination, while many store-based digital roles remain at an earlier stage.

**Fulfilment operations are becoming more technical**

Automation, inventory visibility, routing optimisation and warehouse technology are increasing demand for more digitally enabled operational roles.

**Store-based retail is changing too**

Digital pricing, inventory management, replenishment and waste reduction technologies are reshaping many frontline responsibilities.

### What this means

Retailers should not treat store technology and automated fulfilment as a single workforce transition. They require different technical pathways, but common foundations in inventory data, digital decision-making and operational problem-solving could allow employees to move between them. This would help retailers develop existing frontline workers rather than compete entirely through external recruitment.



The estimated transition rate into the new collar occupations analysed is approximately

**12%**

in online retail...

... compared with around

**3%**

in traditional retail

# **Sector summary –** Defence

## Defence faces a workforce challenge that cannot be solved through recruitment alone

European governments are committing to significant increases in defence spending, yet many of the capabilities required by the sector are also in demand elsewhere in the economy. Security requirements add another layer of complexity.

### Why this matters

Defence employers are competing for engineers, technicians, systems specialists and automation expertise at the same time as advanced manufacturing, aerospace and digital infrastructure businesses.

### What the research tells us

**The identified capability pool is unusually constrained**

The supply-and-demand analysis estimates that approximately 6% of the identified defence workforce has transitioned into new collar roles across the markets assessed. Germany has 0.86 identified workers per advertised vacancy and the Czech Republic 0.37. These figures indicate a constrained capability pool, although the people identified may already be employed and should not be interpreted as immediately available candidates. Security-clearance requirements and restrictions around sensitive technologies create additional barriers to cross-industry and cross-border recruitment.

**Adjacent industries provide a foundation, but defence requires an additional layer of qualification**

The estimated transition rate from relevant mechanical and maintenance backgrounds into autonomous systems, robotics and defence mechatronics roles is 40%. For electronics and communications workers moving into C4ISR, radar and combat-systems roles, it is 30%. These pathways demonstrate the relevance of capabilities found in aerospace, automotive, electronics and advanced manufacturing, but workers may also require security clearance, defence standards, export-control knowledge and platform-specific preparation.

### What this means

Defence employers should create structured pathways from adjacent industries while maintaining the security and regulatory standards required by the sector. Earlier visibility of career opportunities, recognised foundation training and preparation for clearance requirements could reduce barriers for technicians moving from aerospace, automotive, electronics and advanced manufacturing.

The supply-and-demand analysis estimates that approximately

**6%**

of the identified defence workforce has transitioned into new collar roles



# **Sector summary –** Life Sciences

Germany has an estimated

12,084

new collar life sciences workers and...

11,903

...advertised vacancies, producing a ratio of approximately one identified worker for each vacancy

## Scientific expertise increasingly needs to be combined with digital capability

Life sciences organisations are becoming more automated, connected and data-enabled. The workforce implications extend well beyond laboratory science.

### Why this matters

Manufacturing, quality assurance, validation and operational functions are all becoming increasingly dependent on digital systems.

### What the research tells us

**Digital manufacturing roles are developing unevenly**

Across the selected occupational pathways, the research identifies an average transition rate of approximately 13%. The strongest pathway is into GMP automation, validation and process control roles, at 22%, followed by digital QC, LIMS and PAT roles at 15%. Transition into digital twin and simulation roles stands at 12%, predictive maintenance and data analytics at 11%, and bioprocess operations and advanced therapies at 7%.

**Automation and regulation must be developed together**

Future technicians need to combine PLC, SCADA and process-control capability with validation, data integrity, electronic batch records, deviation management and GMP requirements. Training these areas separately risks leaving employers searching for candidates who already possess a combination of engineering, digital and regulatory experience that existing pathways rarely produce.

**The identified capability pool remains narrow in several markets**

Germany has an estimated 12,084 new collar life sciences workers and 11,903 advertised vacancies, producing a ratio of approximately one identified worker for each vacancy. The UK has a stronger modelled ratio, but the wider analysis points to a constrained specialist workforce. These figures indicate labour market pressure rather than the immediate availability of candidates, as many of the people identified may already be employed.

### What this means

Life sciences employers and training providers should integrate automation, digital quality and regulatory learning within the same pathways. Shared practical environments could allow technicians to develop digital and engineering capability while learning to maintain validated production, data integrity and regulatory compliance.



# **Sector summary –** Construction



## Construction is combining traditional site expertise with digital and industrialised delivery

Technologies such as BIM, modular construction, digital surveying and smart building systems are changing how projects are delivered and managed.

### Why this matters

Digital tools and industrialised construction methods still depend on people who understand sequencing, tolerances, safety, materials and constructability. The opportunity lies in adding digital and technical capabilities to established site and trade expertise.

### What the research tells us

**Digital coordination is one of the most developed pathways**

BIM field technician and digital site coordinator roles have an estimated transition rate of 32%, as do smart building automation and microgrid integration roles. Reality capture and construction robotics pathways remain at earlier stages, at 9% and 8% respectively, suggesting that digital coordination is developing faster than more specialised automation roles.

**Industrialised construction is creating new pathways from established trades**

The estimated transition rate into prefabrication and industrialised modular assembly roles is 13%. Carpenters, steel fixers, electricians, installers and other trades retain valuable practical knowledge, but need additional capabilities in digital work instructions, production planning, quality control, logistics coordination and design for manufacture and assembly.

**Smaller contractors face a particular access challenge**

Many digital construction roles require access to specialist software, equipment, live projects and practical assessment. Smaller contractors and specialist suppliers may struggle to provide these independently, even though they form an essential part of project delivery.

### What this means

Construction businesses should use live projects to develop digital capability, embedding training and assessment into project delivery. Clearer occupational pathways are needed for BIM field technicians, reality-capture technicians, modular assembly specialists and smart building integrators, particularly for workers employed by smaller contractors and specialist suppliers.

BIM field technician and digital site coordinator roles have an estimated transition rate of

**32%**

as do smart building automation and microgrid integration roles

The estimated transition rate into prefabrication and industrialised modular assembly roles is

**13%**

# **Sector summary –** Data Centres

## Mission-critical power and cooling are becoming the key workforce constraints

The sector depends heavily on electricians, commissioning specialists, controls engineers, HVAC technicians and operational experts. Many of these occupations are also highly sought after by manufacturing, energy and construction businesses.

### Why this matters

As AI and cloud infrastructure expand and facilities become more complex, data centres need people who understand the operational consequences of failure across critical power, cooling and controls systems. Workforce capability is therefore becoming a strategic consideration alongside power, connectivity and location.

### What the research tells us

**The strongest workforce foundations sit in adjacent industries**

Construction, industrial engineering, building services, facilities management and manufacturing all contain workers with relevant technical foundations. However, these workers still need preparation for the redundancy, reliability, commissioning and operational risk requirements of mission-critical environments.

**AI infrastructure is increasing demand for cooling and controls capability**

The skills analysis projects particularly strong growth in data centre cooling, alongside continuing demand for cooling towers, CRAC and CRAH systems, thermal management and building controls. As rack densities increase, HVAC and mechanical workers will require additional expertise in liquid cooling, coolant distribution units, leak detection, water chemistry and environmental monitoring. Facilities will also need to maintain conventional air-cooled environments during the transition.

**Construction and operation require connected but distinct pathways**

The highest estimated transition rate is into prefabricated modular and MMC coordination roles, at 64%, drawing primarily on construction, installation and site coordination experience. High-voltage electrical roles stand at 35% and white space mechanical and systems roles at 30%, while advanced thermal management and BMS/DCIM controls and commissioning both stand at 23%. These pathways draw on related foundations, but the requirements of construction, commissioning and long-term operation are not interchangeable.

### What this means

Data centre workforce planning should distinguish between construction, commissioning and long-term operation while creating recognised bridges between them. Developers, contractors, operators and equipment vendors should collaborate on mission-critical pathways covering power, cooling, controls, modular systems and integrated commissioning. Training should build on established electrical and mechanical expertise while preparing workers for the redundancy, reliability and operational-risk requirements of data centre environments.

The highest estimated transition rate is into prefabricated modular and MMC coordination roles, at

64%

High-voltage electrical roles stand at

35%

White space mechanical and systems roles stand at

30%



# **Market summary –** Czech Republic




## The Czech Republic has a strong industrial workforce, but specialist capability is concentrated in a small number of regional centres

The Czech Republic has an identified manufacturing workforce of around 194,000 people, underpinned by established automotive and engineering industries. Prague accounts for 23% of this workforce and has particularly high concentrations of retail and defence capability, while Brno and Ostrava provide important secondary industrial pools. This creates a strong foundation for workforce conversion, but access to emerging technical capabilities will vary significantly by location.

### Why this matters

Industrial concentration creates strong ecosystems around manufacturers, suppliers, universities and training providers. It also intensifies competition for skilled workers in those same locations.

### What the research tells us

**Prague is carrying a disproportionate share of workforce demand and capability**

Prague accounts for 23% of the country's manufacturing workforce, 59% of its retail workforce and approximately 60% of identified defence workforce activity. Brno and Ostrava are important secondary hubs but operate at a much smaller scale.

**Manufacturing remains the country's defining economic strength**

The Czech Republic has an identified manufacturing workforce of around 194,000 people and one of Europe's strongest automotive and engineering traditions. Manufacturing is projected to account for approximately 25% of employment by 2035, reinforcing the importance of converting the existing industrial workforce into new collar roles.

**The existing industrial workforce creates a significant conversion opportunity**

The Czech Republic has a strong base of manufacturing, automotive, engineering and technical workers who could move into automation, mechatronics and digitally enabled production roles. The latest research identifies the need to add AI, data, Industrial IoT and cybersecurity capability to this established practical and technical foundation.

### What this means

The Czech Republic should build occupational transition pathways around its established industrial strengths. Shared training infrastructure linked to employers in Prague, Brno, Ostrava and other industrial locations could help existing workers acquire automation, mechatronics, data and connected-systems capabilities, while giving smaller businesses access to training and equipment they may struggle to provide independently.

The Czech Republic has an identified manufacturing workforce of

**194,000**

Prague accounts for

**23%**

of this workforce and has particularly high concentrations of retail and defence capability

# Market summary – France

## France's industrial ambitions are increasing pressure on an already constrained technical workforce

France has around 3.1 identified new collar workers for each advertised vacancy in the analysis, indicating significant pressure on the relevant capability pool. This increases the risk that growth in defence, life sciences, manufacturing, construction and transportation and logistics intensifies competition for the same technicians, engineers and operational specialists.

Industrial capability is also concentrated geographically. Paris accounts for 19% of the national manufacturing workforce, 30% of retail, 35% of defence and 32% of transportation and logistics. Lyon and Toulouse provide important additional concentrations across manufacturing, aerospace, logistics and life sciences.

France also has one of the larger future workforce populations among the markets covered, reinforcing the importance of connecting technical education and vocational pathways to clearly defined new collar careers and real employer demand.

### Why this matters

Many of the sectors prioritised through France 2030 are competing for the same group of technicians, engineers and operational specialists.

### What the research tells us

**France faces significant pressure on new collar talent availability**

France records around 3.1 identified workers for every new collar vacancy, compared with 2.2 in Germany and 4.6 in the Netherlands.

As demand grows, recruitment pressure is likely to increase across multiple sectors simultaneously.

**Industrial capability is concentrated in a relatively small number of regions**

Paris contains 19% of the country's manufacturing workforce, 30% of its retail workforce, 35% of its defence workforce and 32% of its transportation and logistics workforce. Lyon and Toulouse feature prominently across manufacturing, aerospace, logistics and life sciences.

**The greatest demand sits in intermediate technical occupations**

The research highlights persistent shortages in mechanical engineering, electrical engineering and production engineering. These are the roles responsible for deploying, operating and maintaining increasingly sophisticated industrial systems.

### What this means

France's industrial ambitions depend on expanding the number of technicians able to work across automation, engineering and digital production. Workforce planning should connect the level of investment under France 2030 with clearly defined occupational pathways and aggregate demand across sectors. Building these pathways around Lyon, Toulouse and other regional industrial centres could also help distribute skilled employment and investment more widely.




France records around **3.1** identified workers for every new collar vacancy, compared with 2.2 in Germany and 4.6 in the Netherlands

Paris accounts for **19%** of the country's manufacturing workforce, 30% of its retail workforce, 35% of its defence workforce and 32% of its transportation and logistics workforce

# Market summary – Germany

## Germany's industrial lead now depends on converting one of Europe's largest traditional workforces into digitally enabled roles

Germany has almost 750,000 manufacturing workers and 163,000 new collar manufacturing workers. Its 449 industrial robots per 10,000 employees demonstrate the sophistication of its industrial base, while also increasing demand for technicians who can programme, maintain and improve those systems.

Germany's future entrant population is proportionately smaller than in several of the other markets, adding importance to retraining its experienced industrial workforce.

### Why this matters

Germany is not building industrial capability from scratch. The challenge is transforming one of Europe's largest industrial workforces for increasingly digital and automated environments.

### What the research tells us

**Germany remains Europe's industrial heavyweight**

The country has almost 750,000 manufacturing workers, more than 163,000 identified new collar manufacturing workers and a robot density of 449 industrial robots per 10,000 employees, the highest figure in the study.

**Regional clusters remain a major source of national competitiveness**

Munich accounts for around 20% of Germany's manufacturing workforce. Hamburg, Rhine-Ruhr and Frankfurt-Rhine Main are major transportation and logistics hubs, while Munich also hosts Germany's largest life sciences talent pool.

**Demand is rising across several strategic sectors simultaneously**

Manufacturing, defence, logistics and life sciences are increasingly competing for similar technical skills, creating pressure even within Germany's large labour market.

### What this means

Germany's next industrial advantage will depend on converting the depth of its established workforce into stronger automation, controls, mechatronics and digital-production capability. Occupational transition pathways should build on the experience of existing manufacturing and maintenance workers, while shared training infrastructure must remain accessible to the Mittelstand. Planning should also reflect simultaneous demand from manufacturing, defence, logistics, life sciences and data centres within Germany's major industrial regions.




Germany has almost

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...and

163,000

new collar manufacturing workers

# Market summary – Italy

## Italy's industrial transition will depend on whether its SMEs and existing workforce can adopt emerging capabilities

Italy's manufacturing transition rate of around 16% and construction rate of 18.6% show that workforce transformation is under way. Much of the country's industrial strength, however, sits within specialist SMEs and industrial districts around Milan, Bologna, Turin and other regional centres. Smaller employers generally have less capacity to fund specialist equipment and training, making shared provision particularly relevant.

Italy also has a proportionately smaller future entrant population than several other markets examined. This increases the importance of retaining younger workers, defining clearer technical career routes and helping experienced employees move into emerging occupations.

### Why this matters

Many future workforce programmes naturally focus on large employers. Italy's economy relies heavily on smaller specialist businesses that are equally important to industrial competitiveness.

### What the research tells us

**Manufacturing remains highly concentrated in the north**

Milan accounts for 17% of Italy's manufacturing workforce, supported by major industrial concentrations in Bologna and Turin. Many of the country's strongest industrial capabilities remain concentrated within these regions.

**Workforce transformation is underway**

Manufacturing transition rates have reached around 16%, while construction stands at 18.6%, suggesting parts of the economy are adapting relatively well to changing technical requirements.

**Industrial specialisms provide a basis for targeted occupational pathways**

Automotive, precision engineering, construction, food manufacturing, transportation and logistics, and life sciences all provide relevant foundations for new collar workforce development. The priority is to define the specific transitions available within each industrial district rather than apply one generic training model across the country.

### What this means

Italy should organise workforce development around its industrial districts and supply chains. Shared academies and practical training facilities linked to regional specialisms could help SMEs adopt new technology, support occupational transitions for experienced workers and give younger people greater visibility of the technical careers available locally.




Italy's transition rate to new collar roles is

18.6%

in construction...

...and

16%

in manufacturing

# **Market summary –** The Netherlands

## The Netherlands combines a strong talent ratio with highly connected technology and logistics clusters

The Netherlands has approximately 4.6 identified new collar workers per vacancy, the strongest ratio in the study, alongside a robot density of 293 per 10,000 manufacturing workers. Rotterdam-The Hague, Amsterdam-Schiphol and Eindhoven combine logistics activity, advanced manufacturing, digital infrastructure and innovation capability.

This gives employers greater workforce flexibility than in several of the other markets analysed. However, the same regional strengths attract businesses from multiple sectors seeking engineers, controls specialists, maintenance workers and automation technicians.

### Why this matters

The report repeatedly identifies the importance of talent, logistics infrastructure and innovation occurring in the same locations. The Netherlands scores strongly across all three dimensions.

### What the research tells us

**The Netherlands records the strongest talent ratio in the study**

The country has around 4.6 identified workers for every new collar vacancy, significantly above most other markets analysed.

**Technology and logistics ecosystems are closely connected**

Rotterdam-The Hague, Amsterdam Schiphol and Eindhoven appear repeatedly as centres of logistics activity, advanced manufacturing and technology capability.

**High technology adoption does not remove workforce risk**

The Netherlands has 293 industrial robots per 10,000 manufacturing workers and high levels of digital adoption. The research nevertheless identifies a limited domestic technical workforce and competition for automation technicians across advanced manufacturing, logistics, semiconductors and data centre infrastructure.

### What this means

The Dutch opportunity lies in strengthening the connection between technology clusters, logistics corridors, employers and the education system. Workforce planning should assess shared occupational demand across sectors, while modular and work-based pathways help existing workers move into emerging roles. This will be important to prevent successful clusters becoming constrained by the competition their own attractiveness creates.




The Netherlands has approximately

**4.6**

identified new collar workers per vacancy

There are

**293**

industrial robots per 10,000 manufacturing workers and high levels of digital adoption

# **Market summary –** Poland

## Poland's industrial and logistics strength is increasing demand for new collar capability

Poland has strong manufacturing and logistics clusters around Wrocław, Upper Silesia, Poznań and Warsaw, giving the country an important position within European industrial supply chains. However, the combined analysis identifies only around 3.3 new collar workers per advertised vacancy, indicating significant pressure as employers seek automation, engineering and digital capability.

SEGRO's combined workforce, logistics and innovation mapping also suggests that Poland's industrial and logistics strength is not yet matched by the same concentration of innovation activity found in parts of Western Europe. Closer links between employers, universities, applied research and workforce development could help Poland capture more value from its industrial base.

### Why this matters

Many of the ingredients associated with industrial growth are already in place. Poland has a large manufacturing workforce, growing logistics corridors and a strong position within European supply chains. Future competitiveness will increasingly be influenced by workforce capability, productivity and innovation.

### What the research tells us

**New collar capability is not keeping pace with advertised demand**

Poland records around 3.3 identified new collar workers per advertised vacancy in the combined analysis. Retail is particularly constrained, with a national ratio of approximately 0.1 identified workers per vacancy.

These figures represent pressure on the modelled capability pool, not the number of active candidates available for each position.

**Industrial growth is concentrated in a number of powerful regional clusters**

Wrocław, Upper Silesia, Poznań and Warsaw feature prominently across manufacturing, logistics and retail workforce data. These locations have become increasingly important hubs for industrial and supply chain activity.

**There is an opportunity to connect industrial strength with applied innovation**

SEGRO's combined analysis shows strong industrial and logistics activity but a less developed overlap with innovation density than in several Western European clusters. Stronger connections between employers, technical education, universities and applied research could help convert Poland's production and logistics base into wider capability in automation, engineering and process improvement.

### What this means

Poland's next industrial chapter should focus on developing the people needed to operate, maintain and improve increasingly sophisticated industrial systems. Occupational conversion pathways linked to Wrocław, Upper Silesia, Poznań and Warsaw could build on the existing manufacturing and logistics workforce, while closer employer-education partnerships and shared facilities would improve access for SMEs.




Poland records around

**3.3**

new collar workers per advertised vacancy

Retail is particularly constrained, with a national ratio of approximately

**0.1**

identified workers per advertised vacancy

# Market summary – Spain

## Spain's strongest industrial opportunities are concentrated around Madrid and Barcelona

Madrid and Barcelona contain significant shares of Spain's workforce across several strategic sectors. Madrid accounts for 43% of the identified defence workforce and 22% of retail, while Barcelona contains 24% of manufacturing and hosts the country's largest life sciences workforce cluster.

These concentrations create powerful ecosystems around established employers, infrastructure and training providers. They also reinforce the importance of developing workforce pathways linked to the distinct industrial strengths of other regions, rather than relying on national skills programmes alone.

### Why this matters

Many of the occupations associated with the next industrial revolution are clustered around the same regions attracting investment in advanced industry and infrastructure.

### What the research tells us

**Madrid and Barcelona dominate several strategic sectors**

Madrid contains 22% of Spain's retail workforce and 43% of its defence workforce, while Barcelona accounts for 24% of manufacturing employment and hosts the country's largest life sciences cluster.

**The transition is progressing at different speeds across sectors**

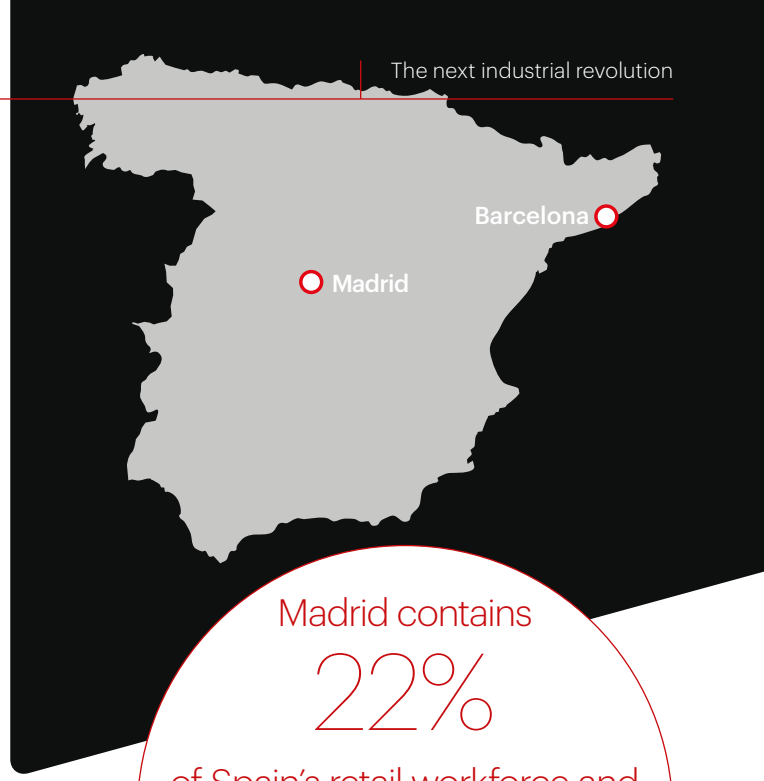
Spain's manufacturing new collar transition rate is approximately 14%, while life sciences stands at just over 8%. Construction is further advanced at 16.9%, supported by growing use of BIM, digital coordination, industrialised construction and smart-building systems.

**Technical workforce demand extends beyond Spain's two largest cities**

Automation, robotics, digital maintenance, logistics technology, construction and smart infrastructure are creating technical workforce requirements across several Spanish regions. The opportunity is to connect training and occupational pathways to the actual sector strengths and planned investments within each local economy.

### What this means

Spain should build on the scale of Madrid and Barcelona while developing occupation-specific pathways around the strengths of other industrial regions. Training connected to automotive manufacturing, construction, energy, logistics and digitally enabled infrastructure could broaden participation in industrial




Madrid contains
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of Spain's retail workforce and
43%
of its defence workforce

Barcelona accounts for
24%
of manufacturing employment and hosts the country's largest life sciences cluster

# **Market summary –** United Kingdom




## The UK has a strong industrial workforce base, with a major opportunity to build the next generation of technical talent

The United Kingdom has around 588,000 manufacturing workers, 1.2 million retail workers and the largest identified defence workforce in the study. Its modelled transition rates in manufacturing, life sciences and defence also indicate meaningful progress in developing new collar capability.

The high number of under-18s in the UK population represents a longer term opportunity, but only if young people, parents, educators and careers advisers understand the new collar occupations emerging across the economy and the routes available to enter them.

The geographic opportunity is substantial but uneven. London and the Thames Gateway, the Midlands and Manchester combine significant workforce and logistics capability, while the Oxford-Cambridge corridor adds a strong innovation base. Connecting surrounding communities to employment and training in these locations will be central to broadening participation in industrial growth.

### Why this matters

The UK starts from a relatively strong industrial position, but future demand spans multiple sectors and regions simultaneously.

### What the research tells us

**The UK contains some of Europe's largest workforce pools**

The country has around 588,000 manufacturing workers, 1.2 million retail workers and the largest identified defence workforce in the study at 171,500 workers. London alone accounts for 32% of the national retail workforce.

**Several sectors have established foundations for further transition**

The United Kingdom's manufacturing new collar transition rate is approximately 15%, life sciences stands at 12.4% and defence at 9.1%. These figures indicate meaningful movement into emerging roles, but specialist demand and uneven regional provision mean that further workforce development will still be required.

**Different industrial corridors offer different workforce opportunities**

London and the Thames Gateway provide large retail, logistics and construction workforces. The Midlands and Manchester offer substantial industrial and manufacturing capability, while Oxford and Cambridge add life-sciences and innovation strengths. These locations should not be treated as one national talent pool, particularly where emerging roles must be performed close to physical assets.

### What this means

The UK can address employer demand and improve economic participation through clearer new collar career routes linked to real occupations and industrial locations. Employers, colleges and local government should map pathways into roles with direct entry, apprenticeship and experience-led requirements, while coordinating provision around shared demand across sectors. Existing technical-education investment provides a strong platform, but greater awareness of new collar careers and clearer connections between training and employment will be critical.

The UK has around
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...and the largest identified defence workforce in the study at
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workers

# About the research

Randstad Advisory works with organisations across Europe to help them understand changing workforce requirements and prepare for future labour market challenges. As automation, AI and digital technologies reshape industrial and operational roles, employers are increasingly seeking a blend of technical, practical and digital capabilities that do not fit traditional workforce models.




This research was undertaken to better understand the emergence of these "new collar" roles and the implications for employers across Europe. A cross-sector approach was particularly important because many industries are now competing for the same talent pools and facing similar workforce challenges.

Our partnership with SEGRO provided an opportunity to examine these trends across multiple sectors, geographies and industrial clusters. The result is a broader view of workforce readiness and the practical actions needed to support future growth.

## Research objectives and methodology

This research was commissioned by SEGRO to provide insight into the evolving landscape of new collar skills across Europe. The primary objective was to understand how workforce requirements are changing across the sectors that take its space, including manufacturing, retail, transportation and logistics, defence, life sciences, construction and other emerging sectors, moving beyond traditional blue-collar workforce models.

The analysis covers the Czech Republic, France, Germany, Italy, Netherlands, Poland, Spain and UK, and combines labour market data, census information, company workforce data, professional social platform data and job posting analysis to assess both workforce availability and demand. Approximately 13,000 companies and more than 400,000 job advertisements were analysed across the eight markets.

The research focuses on four areas:

- Workforce supply and demand for emerging new collar occupations.
- The transition of traditional blue-collar roles into more digitally enabled new collar roles.
- The skills experiencing the strongest growth across sectors and industries.
- Geographic patterns that influence workforce availability and competitiveness.

To ensure consistency across markets, country-specific occupations, job titles and skills were mapped into common role families and capability clusters. Findings were tested against official labour market statistics, industrial policies and workforce initiatives to provide a robust view of future workforce requirements.

New collar roles are defined as frontline, operational and technician-level occupations that combine practical sector expertise with automation, digital, engineering or data capabilities. These workers increasingly operate, monitor, maintain and optimise technology-enabled systems and processes.

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