WAVESTONE

INDUSTRY 4.0 Barometer

Market Trends and Experience Feedbacks
2024 Edition

FRANCE INDUSTRIE

LA FRENCH FAB

HUB FRANCE JA

Summary

Overview

For the ninth consecutive year, Wavestone is taking a step back to highlight the Industry 4.0 trends in France. The firm's experts share insights and recommendations to address the major industrial challenges of tomorrow.

The 2024 edition, published for the third year in a row in partnership with France Industrie and enhanced by contributions from la French Fab and le Hub France IA, focuses on tracking the technological and organizational maturity of a French industrial ecosystem sample, from small and medium-sized enterprises to large corporations.

Special attention has been given to topics that are central today: industrial data and artificial intelligence, along with sustainability and social responsibility. These are essential pillars for ensuring the long-term viability of French industry.

Following the model of the previous edition, the Industry 4.0 barometer is enriched with testimonials from key players in French industry.

Wishing you a pleasant reading!

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Associate Partner Wavestone

Vincent MOULIN WRIGHT

Managing Director
France Industrie

François-Xavier DE THIEULLOY

Director, Expertise Division
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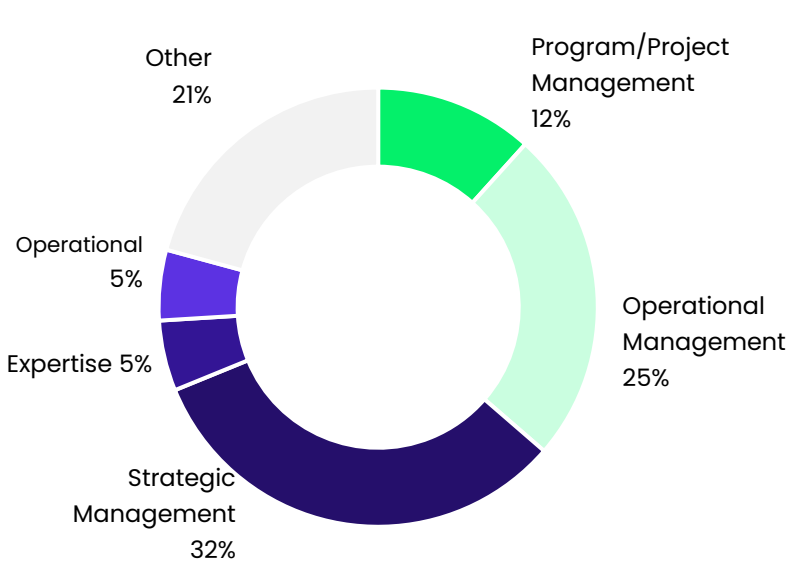
Methodology

An identical approach to previous editions :

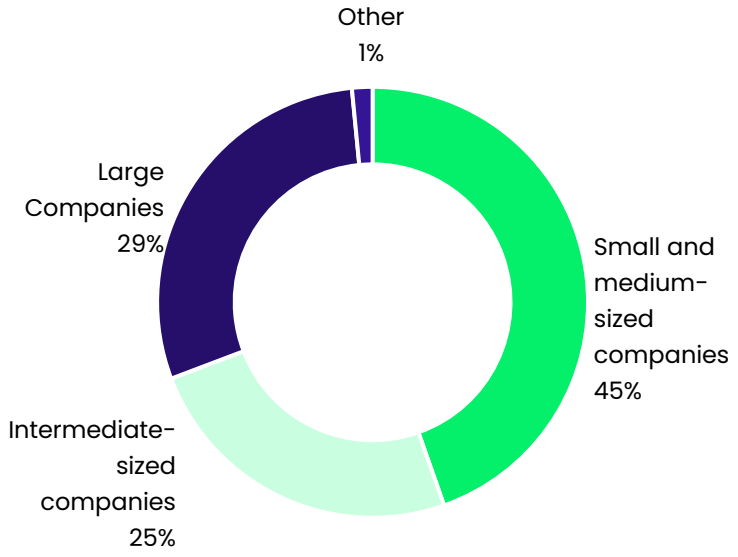
- An 18-question questionnaire launched during the summer of 2024
- A panel of respondents from the network of Wavestone, France Industrie, the French Fab, and Hub France IA
- Qualitative interviews to complete the survey results

Respondents with characteristics representative of the French industrial ecosystem

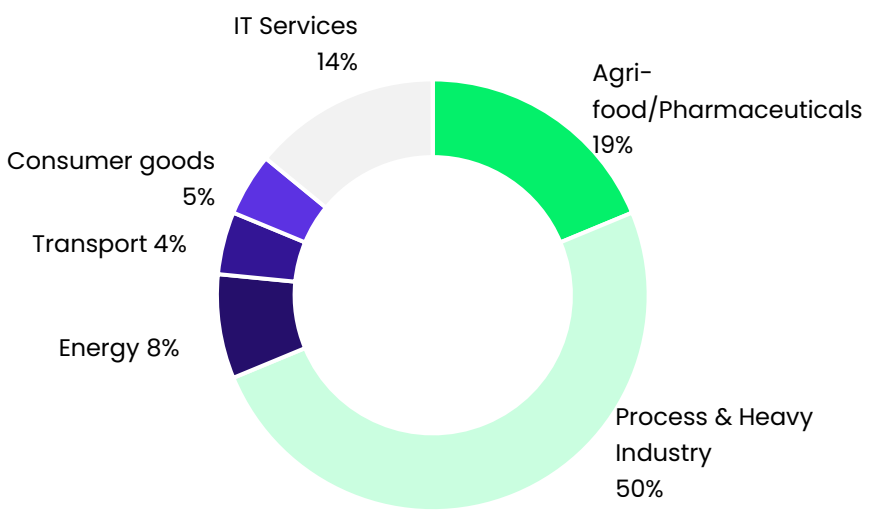
Function



Company size



Business sector



Key concepts

A simple categorization of Industry 4.0 technlogies

Algorithm

Machine Learning, Artificial Intelligence, Chatbots...

Automation and Robotics

Robots, Cobots, Automated Guided Vehicles, Drones...

Mobile Work Tools

Industrial Tablets, Smartphones, Collaborative Platforms, XR Headsets...

Data management

Data Platforms, Simple Analytics, BI, Models, Digital Continuity...

Operational Software Solution

WMS / CMMS / MES / PLM / Energy Management System...

Connectivity and IoT

Industrial Networks, IoT, Automata, Native Machine Connectivity...

Industrial Cybersecurity

Incident Detection System, BCP, DRP...

Management information Systems

ERP, CRM...

Key messages

Industry 4.0 : Performance, Data and Sustainability for Businesses

GLOBAL MATURITY

Digitalization as a Major Lever for Industrial Performance

In a complex economic environment, **digitalization and Industry 4.0 remain key levers for securing industrial performance.** expertise in Industry 4.0 solutions continues to advance. However, projects are subject to stricter selection, prioritizing initiatives **that generate a significant return on investment** (ROI). **Small and medium-sized enterprises (SMEs), however, struggle to keep pace with large companies** due to their limited capacity to absorb the initial costs of these projects, particularly the costs associated with replacing obsolete management software.

DATA/AI

A Shift in Priorities Toward Data Management

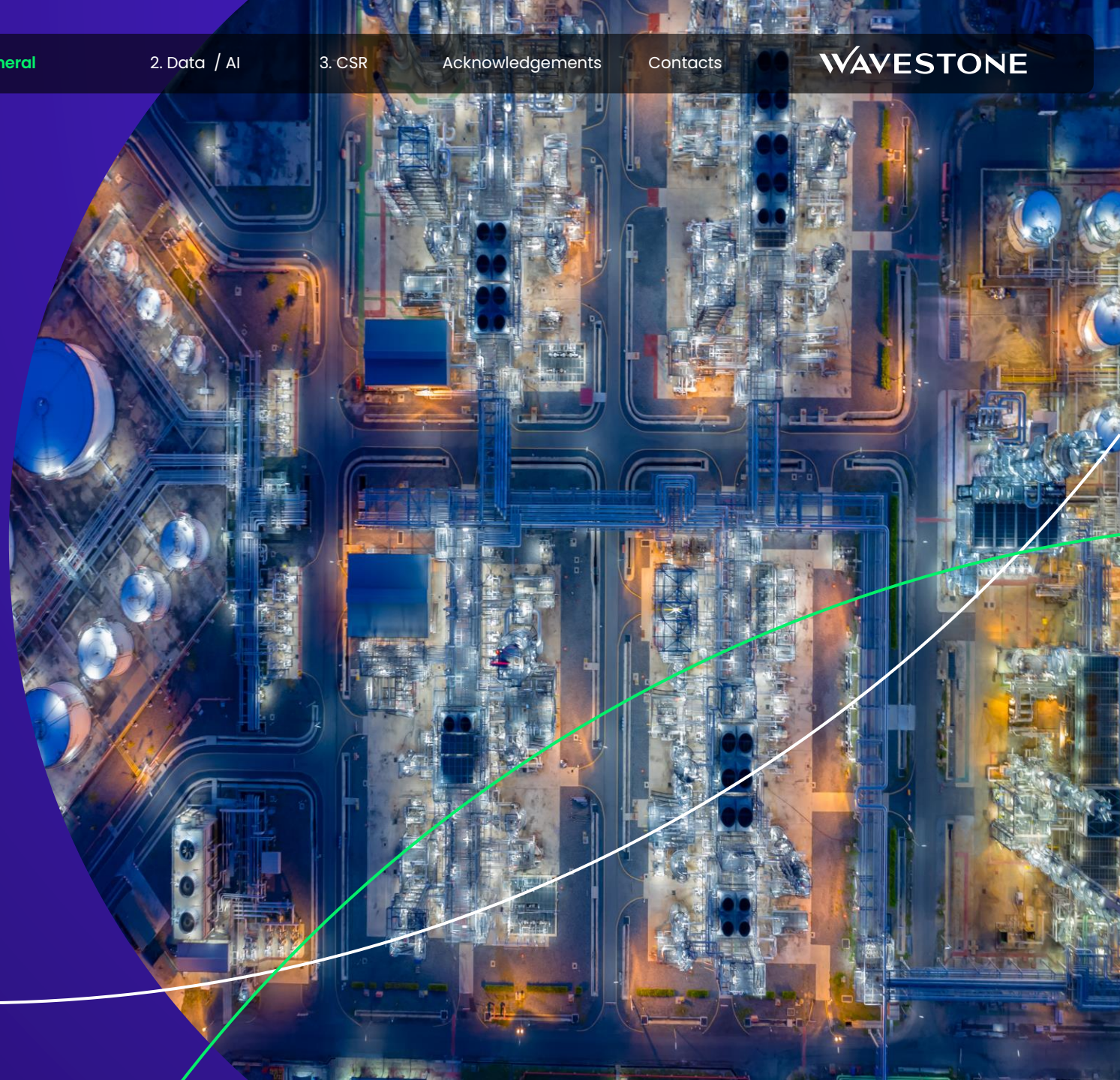
Concerns and initiatives are shifting to place **greater emphasis on data management.** However, **projects involving data exploitation using Generative AI remain rare.** The main challenges for industrial companies **are to ensure maturity in foundational areas**, combining digitalized production monitoring with process control through artificial intelligence**, while continuing to innovate in emerging technologies** such as real-time monitoring and advanced analysis via industrial data lakes that centralize data. These projects generate additional needs, leading notably to the renewal of operational information systems.

SUSTAINABILITY AND SOCIAL RESPONSIBILITY

Accelerating the Move to Action

Increased emphasis is being placed on these areas. This is evident, on one hand, in concrete projects aimed at **optimizing resource management (energy, water, etc.)**, particularly through the deployment of information systems for energy monitoring and carbon management. On the other hand, the **integration of the human factor and employee satisfaction** have become crucial elements for successful implementation.

01. MONITORING OF INDUSTRY 4.0 TRENDS AND DIGITAL MATURITY OF COMPANIES



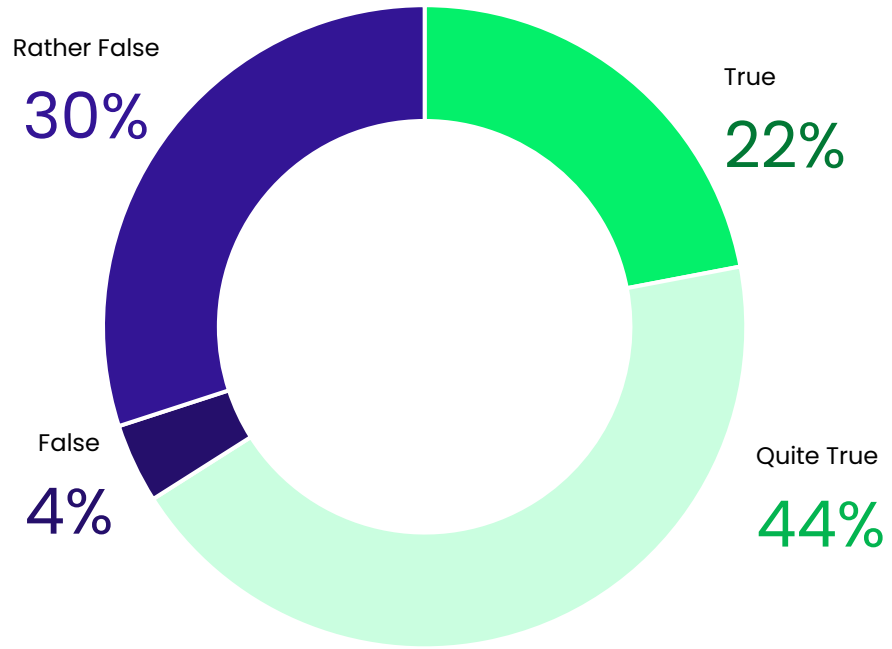
Industry 4.0: A Steady and Contrasting Progression

Industry 4.0 still appears as an obvious choice for industrialists. The expertise in Industry 4.0 solutions continues to grow (+8% since 2023).

In a more challenging economic context (inflation, rising energy prices), **22% of respondents** indicate **slowdowns in the implementation of their Industry 4.0** projects. Paradoxically, **25% of respondents** state that this context has led them to **accelerate investments in their Industry 4.0 projects**, where the projects allow them to generate ROI. For example, value can be quickly generated in projects such as robotization or energy consumption management.

17% of companies are able to deploy Industry 4.0 solutions at the initially planned pace, an improvement since 2023 (+10%): the subject remains complex to implement on a large scale.

My organization is fully mature in the deployment of Industry 4.0 solutions (technological and organizational basis)



Industrial performance and employee engagement, major drivers for 4.0 initiatives

What challenges are Industry 4.0 initiatives addressing in your organization?

Confirmed trend: **Optimizing operational performance** (improving quality and reducing costs) is the primary challenge for manufacturers in their Industry 4.0 initiatives. An example of a lever for optimizing business processes is the cross-analysis of industrial data from various sources.

Examples : predictive maintenance, automated quality control through machine vision, etc.

Ergonomics, well-being, and employee engagement: **Employee satisfaction** ranks second. It is an important factor in enriching tasks, improving job interest, or reducing hardship.

Examples: ergonomics, cobots, augmented reality-assisted training, etc.

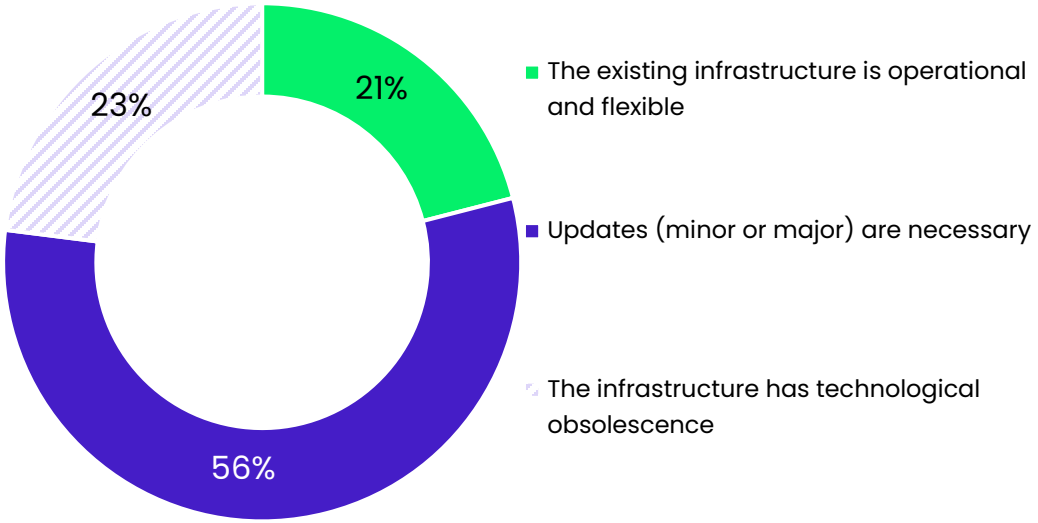
Improving traceability completes the podium once again. Sector-specific standards and regulatory constraints (ISO 9001 Standard, Food Hygiene Regulations, etc.) drive these investments.

Examples: raw material tracking, advanced quality control, batch management, etc.

This year, we note the increasing importance of issues related to **employee roles** (improving their satisfaction and enhancing collaboration) and **decarbonization challenges**. The inclusion of the human factor and CSR in these issues gives rise to the concept of **Industry 5.0**, which aims to define digitalization programs for industrial operations that are resilient, sustainable, and human-centered.

Industries are not yet fully capable of deploying Industry 4.0 initiatives on their current infrastructure

Is your current infrastructure capable of supporting the deployment of new Industry 4.0 projects ?



For 21% of the surveyed industrial companies, **the existing infrastructure is fully capable of supporting digital transformation projects** (a decrease of 6% since 2023). This decline is explained by the need to adapt technological foundations to accommodate new projects focused on Data and AI exploitation.

56% of industrial companies **need to make minor adjustments** to adapt their infrastructure to new initiatives. This figure is stable: +9% since 2023.

For large groups, these infrastructure modernization projects are often lengthy to implement. This can be explained by **the complexity and heterogeneity of the existing infrastructure of multisite groups.**

Modernizing infrastructure is a fundamental step to ensure the success of Industry 4.0 projects. Initiatives must rely on an infrastructure that is:

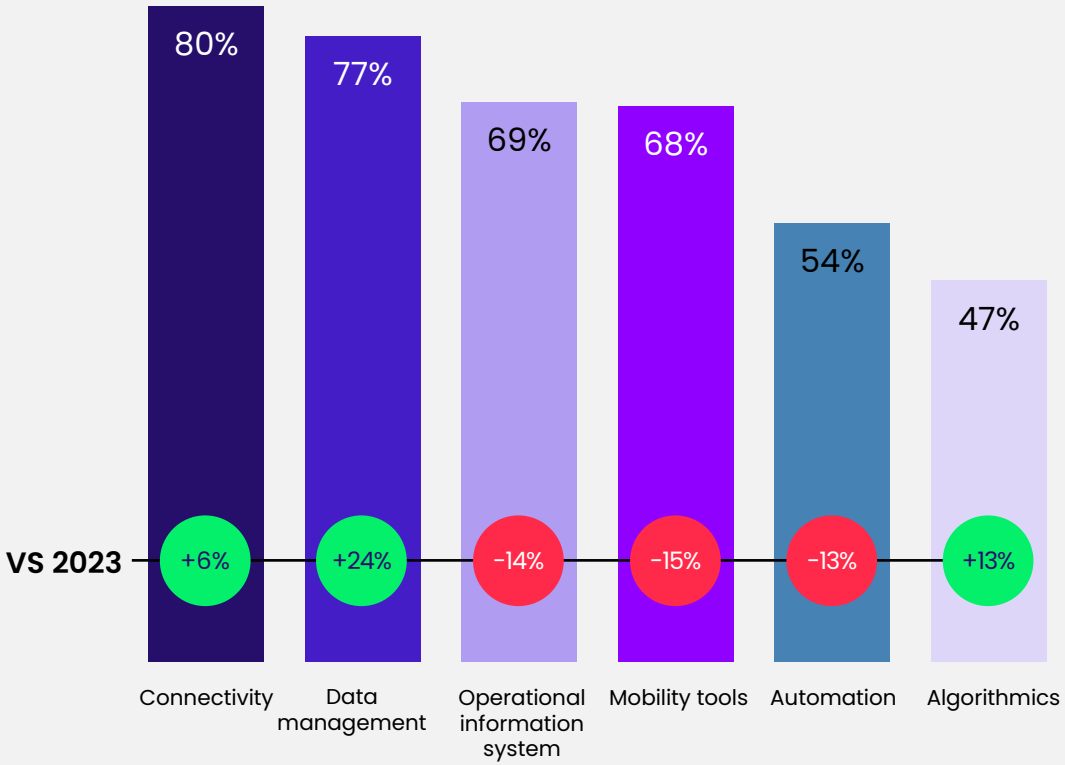
- **Reliable**, with a high-performance communication network and significant availability
- **Robust**, with substantial data storage and processing capacities (data lakes, relational databases, etc.)
- **Secure**, with access control and compliance with cybersecurity requirements
- **Modular**, with the ability to support various use cases (on-premise, cloud, etc.)
- **Aligned** with business and IT roadmaps to ensure its longevity over time

A global priority on data management

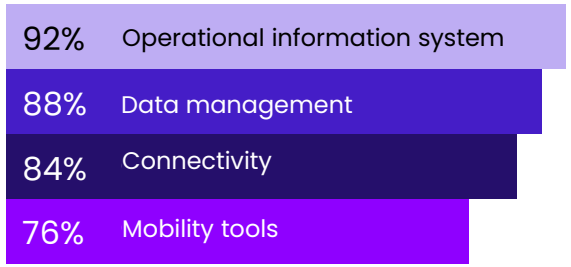
The **expertise in data management** (connectivity and data management) **ranks first** in our survey. This topic is also **progressing compared to last year,** unlike other non-data-related themes.

These developments confirm the **importance** of upstream thinking when implementing **data models** and optimizing data-centric tools. For example, to compare indicators from multiple sites, standardized collection and inter-compatibility of models **between factories are required.**

Level of expertise of the manufacturers by theme

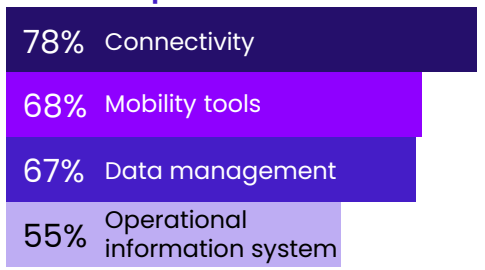


Large companies



Large corporations have been able to invest in operational information systems with more resources over the long term. These **complex** applications are now **mature** and **well-integrated.**

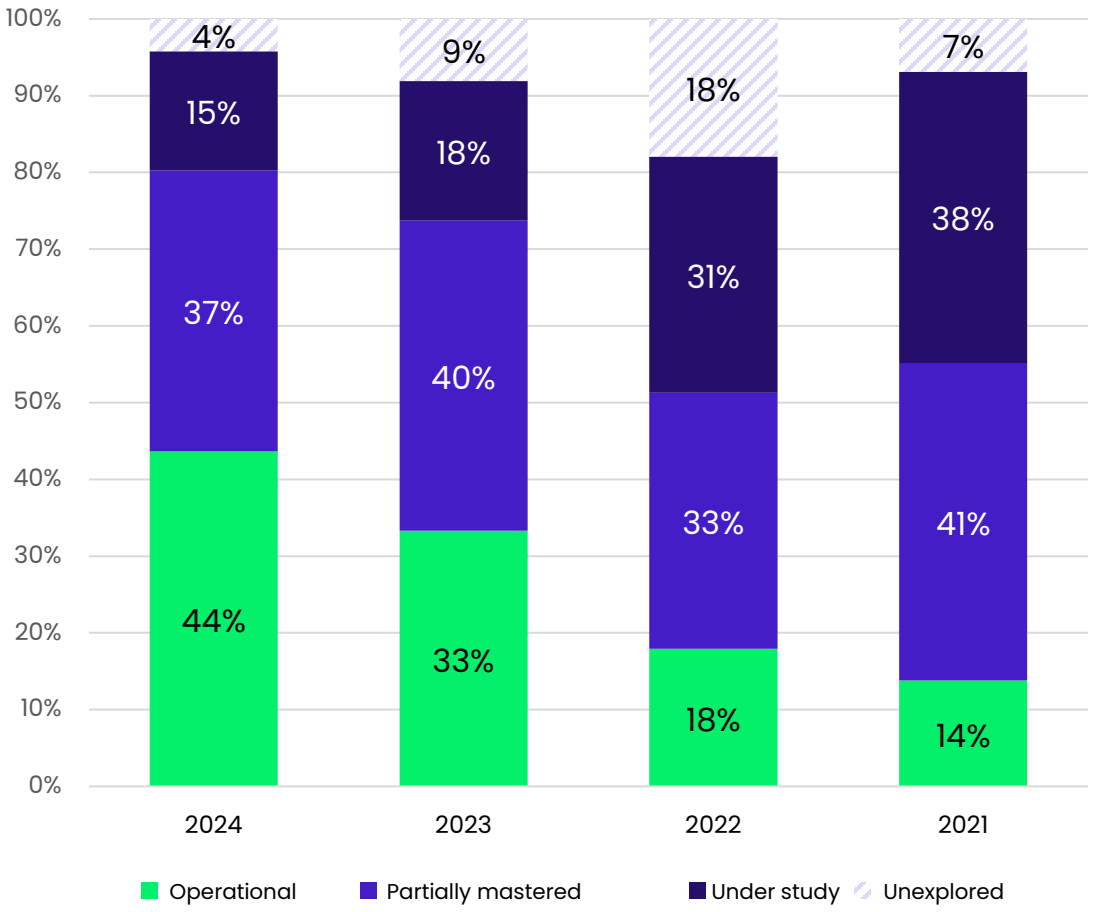
Small, medium and intermediate size companies



Mid-sized and small businesses opt for more flexible and accessible mobile work tools, which allow them to quickly improve their operational efficiency. Investments are primarily focused on tools with **easily achievable ROI.**

Connectivity: The Foundation for Data Collection

Expertise in Connectivity



Expertise in connectivity is making strong progress, **up 11% since 2023.**

Connectivity is at the core of the interconnection of objects, machines, and systems. The **collection and analysis of real-time data** allows for improved efficiency of industrial processes and informed **decision-making.**

A number of constraints must be addressed to successfully carry out a connectivity project:

- **Precise** description of the data usage case to choose the most appropriate solution
- **Data capture** from legacy systems not designed for communication on an industrial network
- **Compatibility** with all industrial protocols: OPC UA, MQTT, etc.
- **Data management** ensuring model interoperability
- **Redundant systems** to avoid single points of failure
- **Continuous monitoring** of the availability of collection tools

Interfacing with management information systems, a key element of digital continuity

Management information systems (ERP) are the basis for centralizing company data and processes. It is therefore essential to be able to interface with these to ensure **digital continuity.**

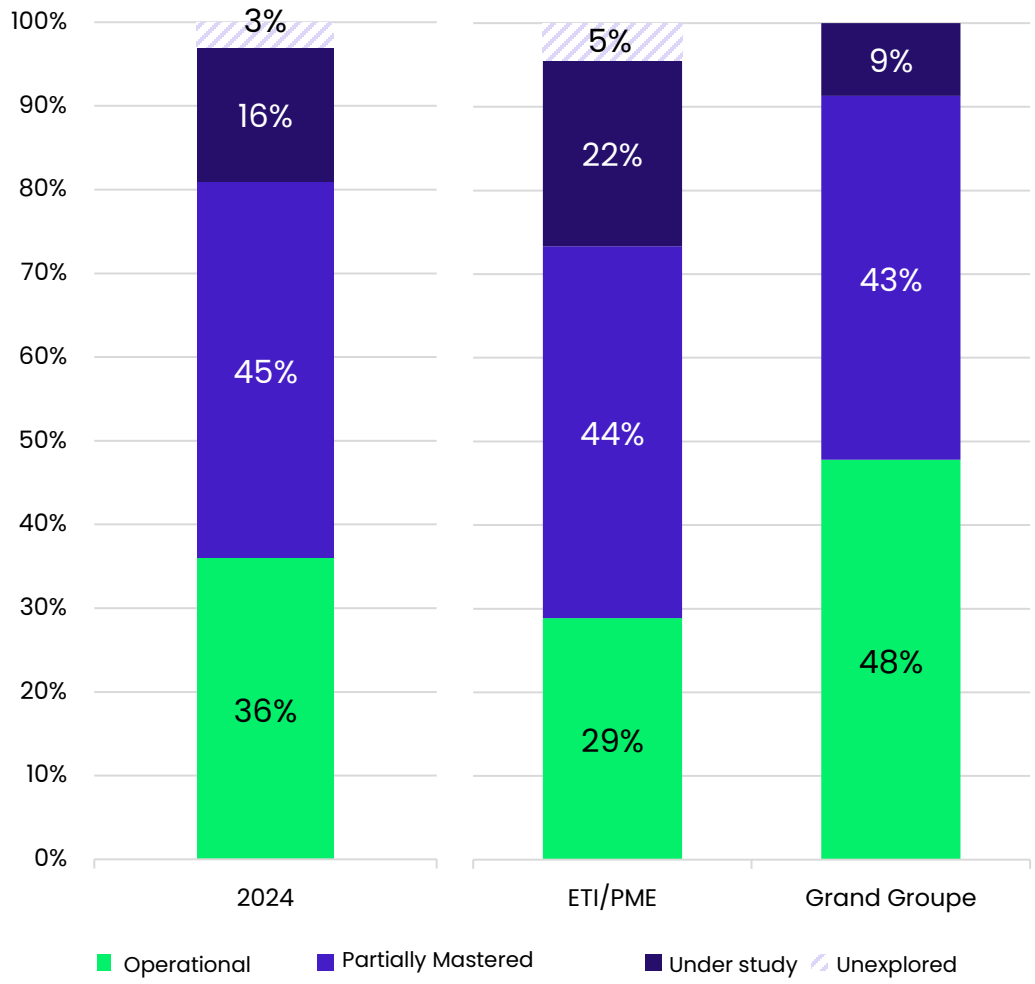
Interfaces between management IS (ERP) and industrial IS (MES, QMS, etc.) make it possible to :

- Avoid **data loss and re-entries**
- **Synchronize the flow of information in real time**

In order to successfully interface different information systems, it is necessary to ensure :

- Definition of a **functional core model, defining responsibilities for data processing**
- Harmonization of **data models**
- **Rationalization of technical resources** (middleware) between solutions

Maturity of interfacing with management information systems (ERP)



Mobility, a technology losing momentum

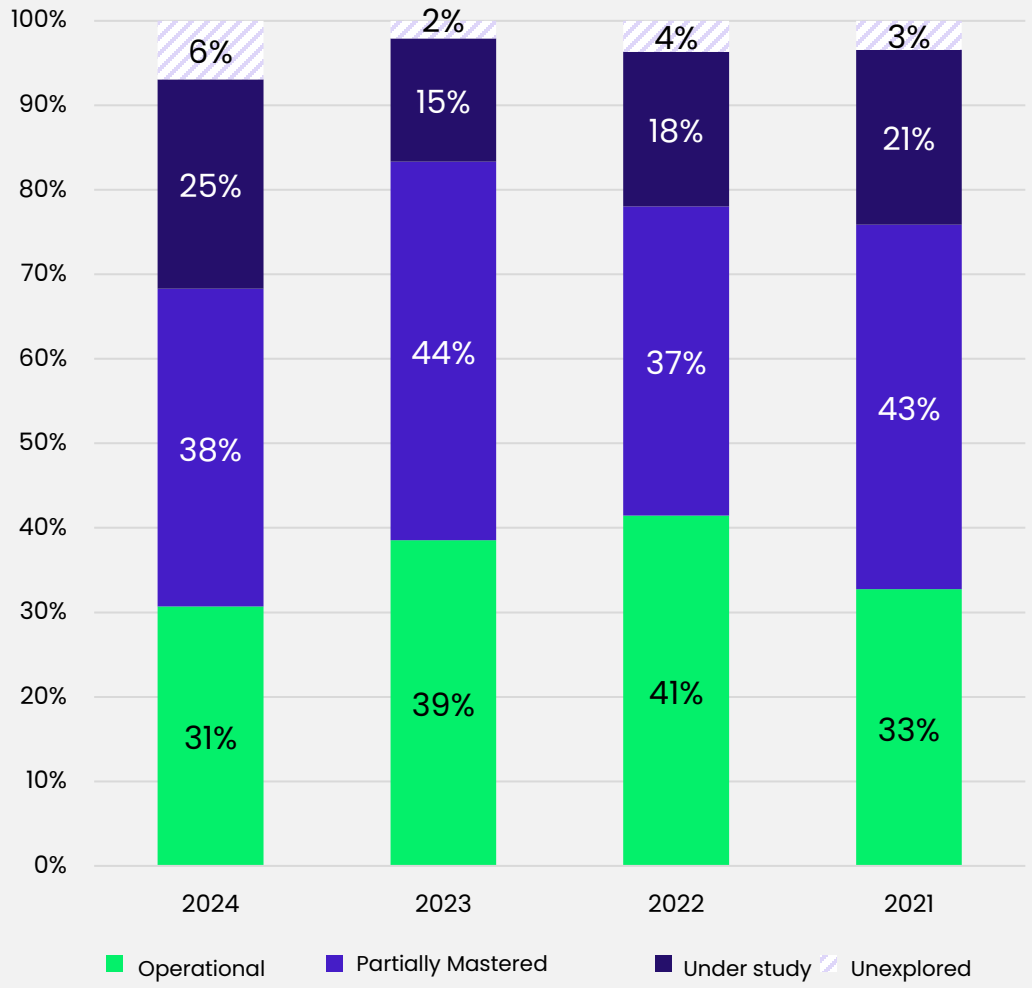
The level of expertise in mobile work tools is decreasing **(-8% in 2024).** However, these technologies have seen increasing adoption in previous years. Several factors can explain this decline:

- **Increasing automation and intelligent IT interfaces** reduce manual tasks and the need for human intervention, thus deprioritizing mobility projects
- **Technology perceived as less innovative** and deprioritized in favor of investments in data and AI, which promise a better ROI
- **Durability and maintenance costs** of mobile devices that wear out quickly and lack of reinvestment reduce the perceived effectiveness of mobility solutions

Mobile technologies in factories remain a lever for optimizing industrial operations:

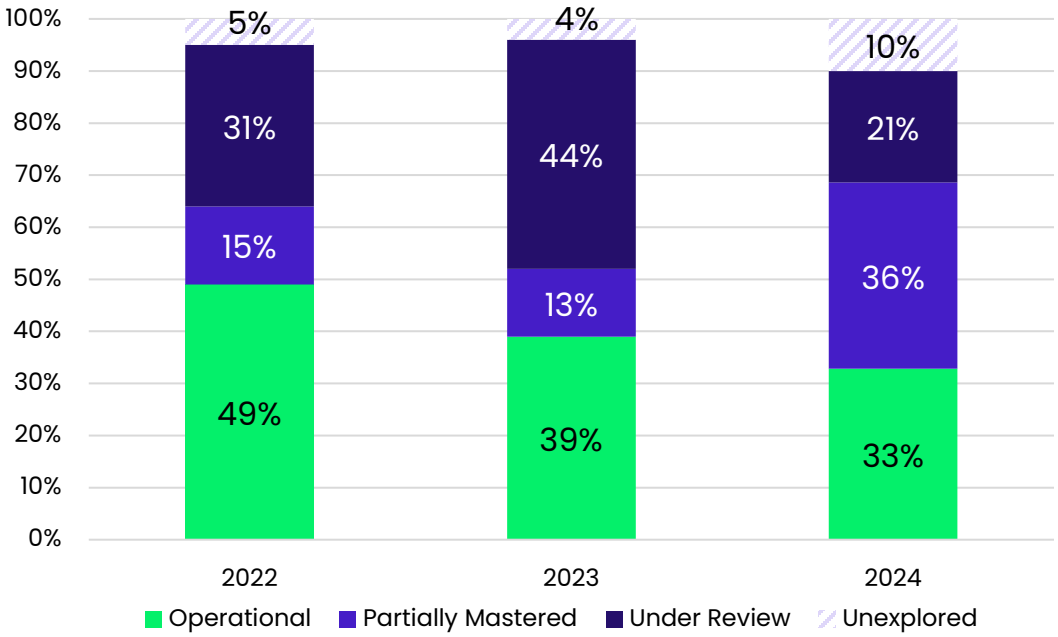
- **Real-time access for operators** to production data and necessary documentation
- **Enhanced training and real-time assistance** for complex tasks, through overlaying instructions directly in the user's field of vision
- **Increased collaboration and communication** between teams and departments

Expertise in mobile work tools



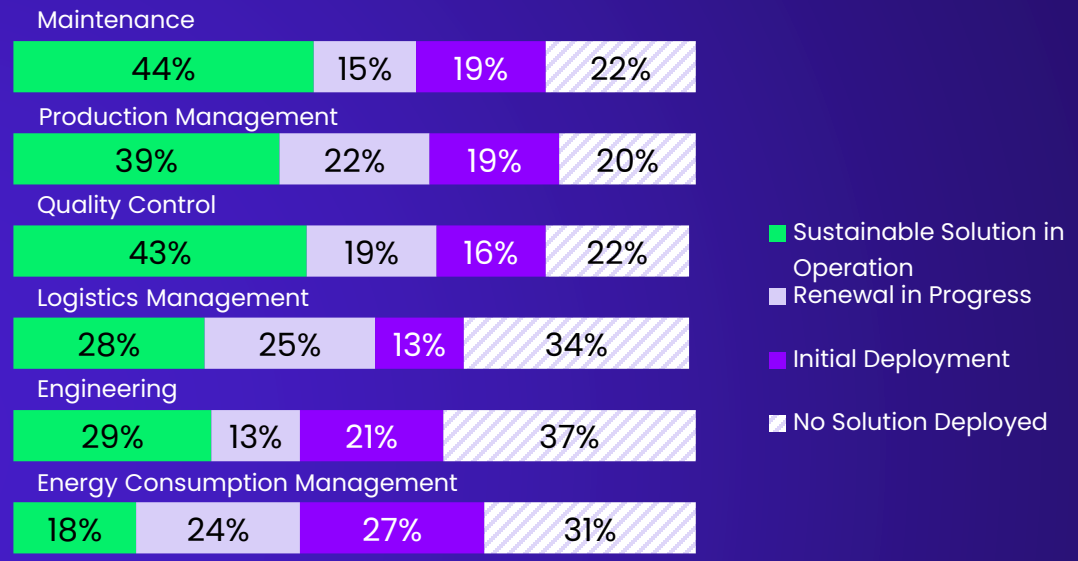
A global decline in maturity on Operational Information Systems

Evolution of the overall maturity of Operational Information Systems



High-value use cases require accessing and processing large amounts of **structured data.** This demand for digital continuity necessitates the renewal of Operational Information Systems, which is why we observe a **16% decrease in sustainable solutions in operation since 2022.**

Maturity by functional categories of Information Systems in 2024



Quality control and energy consumption monitoring solutions have been progressing since 2023:

- QMS and LIMS: +12%
- EMS, BMS, energy flexibility: +5%

These results align with the measured challenges of industrials in improving **production quality and accelerating decarbonization.**

However, there remains a disparity in the adoption of **energy consumption monitoring tools**: 32% for large groups compared to 6% for SMEs/ETIs. Indeed, SMEs/ETIs are not yet subject to the same regulations, which require better **control of energy consumption,** as large groups.

Operational priorities vary according to industry sectors

IT systems deployed based on industry sectors

Agri-food Pharmaceutical

- Maintenance 42%
- Quality control 42%
- Logistics management 33%

Energy

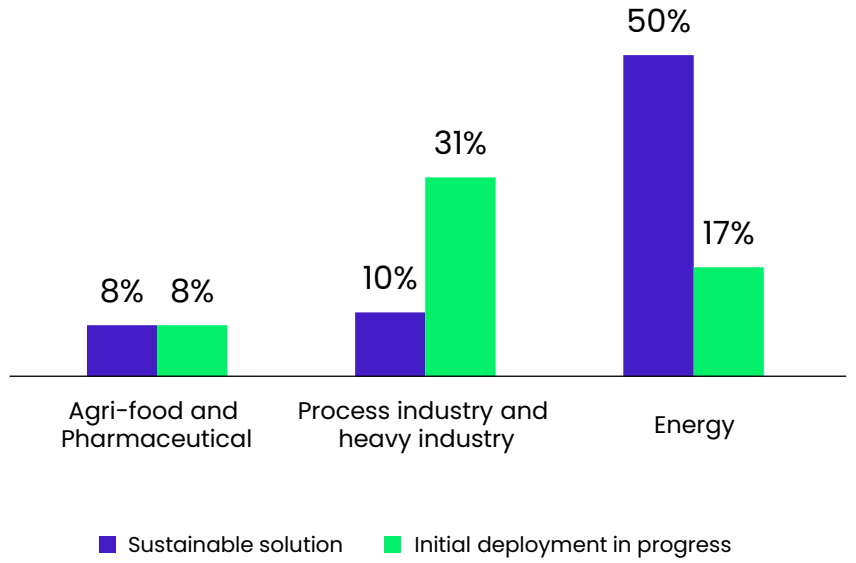
- Quality control 50%
- Energy consumption management 50%
- Engineering 33%

Process Industry Heavy Industry

- Production management 38%
- Maintenance 36%
- Quality control 31%

The deployment of quality control information systems is cross-functional across all sectors, particularly to ensure regulatory compliance, customer satisfaction, and to reduce costs and non-conformities.

Deployment of energy consumption management tools



Actors in **the industrial sectors are increasingly implementing energy consumption management tools**, such as an EMS (Energy Management System) or a BMS (Building Management System). This reflects a heightened awareness of the issues related to decarbonization and the reduction of energy consumption. These technologies enhance resilience to energy crises and the variability of energy prices.

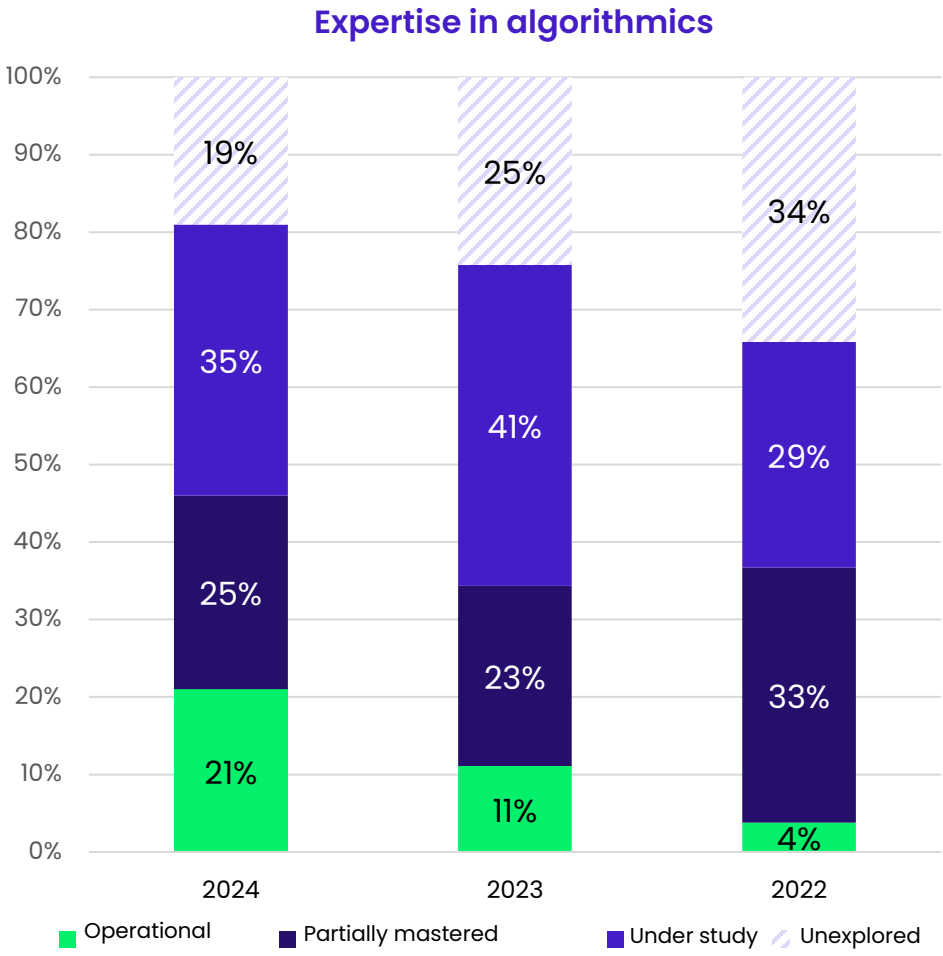
However, for some actors in the industry (food and pharmaceutical sectors), the deployment of these tools appears to be less of a priority. Since their energy consumption is lower, they generate a lower return on investment.

Algorithmics: a step towards decision automation

The expertise in algorithmics has significantly increased (+12% since 2023). Algorithmics contributes to the development of recommendations from information systems :

- **Predictive analyses** (predictive maintenance, etc.)
- **Process optimization** (self-regulation of production parameters, etc.)
- **Big data analysis**
- **Decision automation**

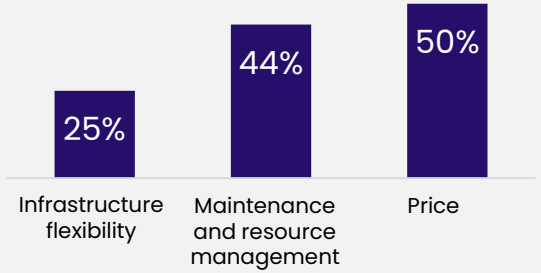
The implementation of an algorithmic use case relies on a **detailed understanding of the data model** in order to define the **operating rules**. This approach is different from new AI technologies (such as generative AI) which infer **operating rules based on learning from a large amount of data.**



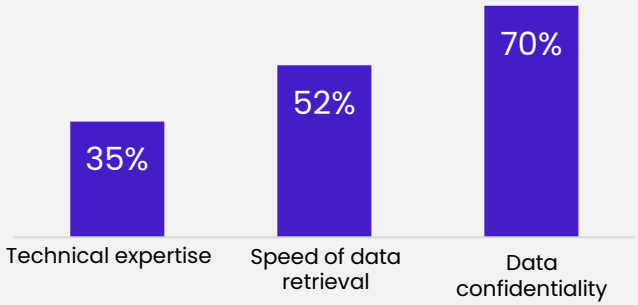
Hosting strategy: a strategic axis to evaluate carefully

The two main types of hosting, **on-premise** and **cloud**, each have specific advantages.

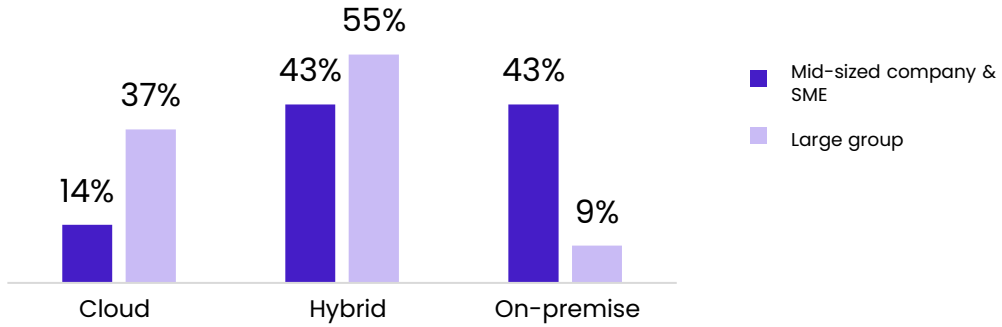
Criteria for choosing cloud hosting



Criteria for choosing on-premises hosting



Choosing the type of hosting based on company size



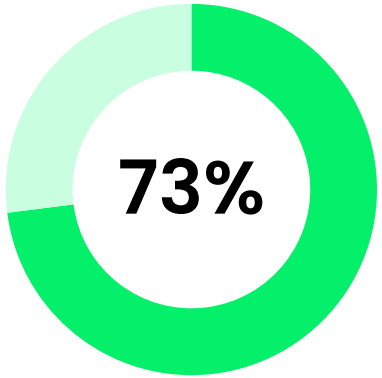
Small and medium-sized enterprises prefer on-premise hosting to maintain **full control over their data and for faster data access**.

Conversely, large enterprises favor hybrid hosting to have a **flexible and scalable architecture** while also optimizing costs. Indeed, consumption commitment agreements with cloud solution providers help **reduce data center operation costs**. Large corporations also have a greater capacity to internalize cloud expertise.

The **hybrid model** combines the advantages of the cloud with those of on-premise infrastructure, offering companies **a flexible infrastructure.** Each of these solutions presents benefits:

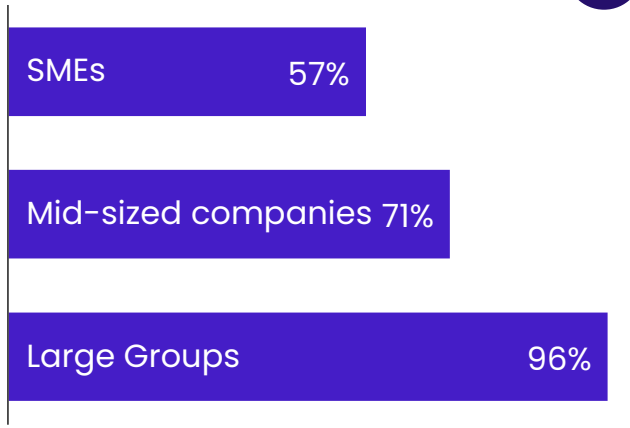
- **Cloud:** better risk distribution, rapid scalability, and greater computing capacity
- **On-premise:** ability to handle use cases that require data processing close to the machines for real-time decision-making

Industrial Cybersecurity: An Essential Requirement



of industrials claim to have reached maturity in integrating industrial cybersecurity criteria within their organization.

Breakdown by company size



The majority of respondents indicate that cybersecurity is widely integrated into all industrial activities, especially for large corporations. These companies are more exposed to cyberattacks due to:

- The potential impact of service interruptions on their global operations
- The high value of their data
- Their aging industrial infrastructure

Main Challenges in Cybersecurity:

- **Obsolescence Management:** Managing vulnerabilities induced in the industrial IT infrastructure
- **Lack of Skills:** Shortage of resources and skills in cybersecurity, particularly in industrial cybersecurity at the convergence of IT and OT
- **Difficulties in Finding the Right Level of Governance and Investment:** Difficulty in establishing cybersecurity governance at the appropriate group level, which hinders project funding due to a lack of visibility on ROI

VERBATIMS

Trend monitoring Industry 4.0

Pierre RAYMOND
Head of digital supply chain & manufacturing solutions, Saint Gobain

Daniel BLENGINO
CEO, Visionairy

What is your view on the maturity of the technical foundation for deploying Industry 4.0 initiatives? And how do you approach these Industry 4.0 project roadmaps?

"Generally speaking, we must avoid taking shortcuts when launching a new 4.0 initiative, because while it may save a little time and money at start-up, it could seriously compromise scalability. And in most of the industry 4.0 use cases I've observed**, scalability is the factor that enables the estimated return on investment to be achieved in the valorisation phase. […] It is essential to move from Proof of Concept (POC) to Proof of Value (POV), by demonstrating the concrete economic value rather than the technical feasibility of a use case**, because 4.0 technologies are already sufficiently mature.

It is therefore extremely important to **invest more or less massively in layers of enabling technologies**. The idea is to build strong foundations, a robust technological base that can cover a wide variety and typology of use cases.

Next, it is also important to ensure that by design, these platforms are sufficiently modular, so that they can be shared across multiple use cases as well as various business units within the group.

We can imagine **iterations on the POCs in several phases** depending on the level of automation achieved. We start with information gathering and the construction of dashboards for real-time data visualization on the shop floor, before evolving towards a more predictive model. Then, we reach more advanced levels of prescription, automation, and regulation. These phases can initially focus on specific use cases on the shop floor, eventually leading to a complete optimization of the industrial process.

Finally, one of the major obstacles I observe concerns the heterogeneity and aging of the shop floor, whether at the level of industrial IT or even OT. Compliance, particularly from a cybersecurity perspective of the shop floor, is something that can sometimes cost more than the implementation of the use case itself, and therefore all this requires significant investments. "

Pierre RAYMOND

What are the other major obstacles you can identify today in the implementation of 4.0 solutions?

"The first obstacle we identify is the support from the **hierarchy** for the 4.0 project.

The second obstacle we may encounter, particularly in SMEs and mid-sized companies, is the **lack of resources** […] and sometimes even the lack of qualified resources suitable for the deployment of digital solutions in the industry.

Finally, one last obstacle I identify is the gap that can exist today between digital and industry, and the **perception of value** which can be **completely different on each side."**

Daniel BLENGINO

VERBATIMS

Trend monitoring Industry 4.0

Vincent MOULIN WRIGHT
Managing Director, France Industrie

Philippe MUTRICY
Director of Studies Evaluation and Foresight, Bpifrance

Given your contact with many industrialists, what is your vision of Industry 4.0?

"In France, **SMEs have a significantly lower level of digital intensity** compared to the European average; 23% of French companies use at least one Cloud solution, which is almost half the European average (39%); 6% of French companies have already adopted AI solutions, 2 points less than the EU average.

The **4.0** initiative has been a success, as it has expanded the scope of Industry 4.0 to **SMEs and mid-sized companies**, although some still have a level of digital intensity significantly below the European average.

This automation is essential for reindustrialization as it increases productivity and compensates for **labor shortages**, improves **workplace safety**, and **reduces operational costs.**

Today, it is crucial to consider this automation not only as a step towards Industry 4.0 but also as preparation for **5.0**, integrating **artificial intelligence** as the next step."

Vincent MOULIN WRIGHT

Can we imagine a collaboration between SMEs/mid-sized companies and large groups in the realization of Industry 4.0 projects?

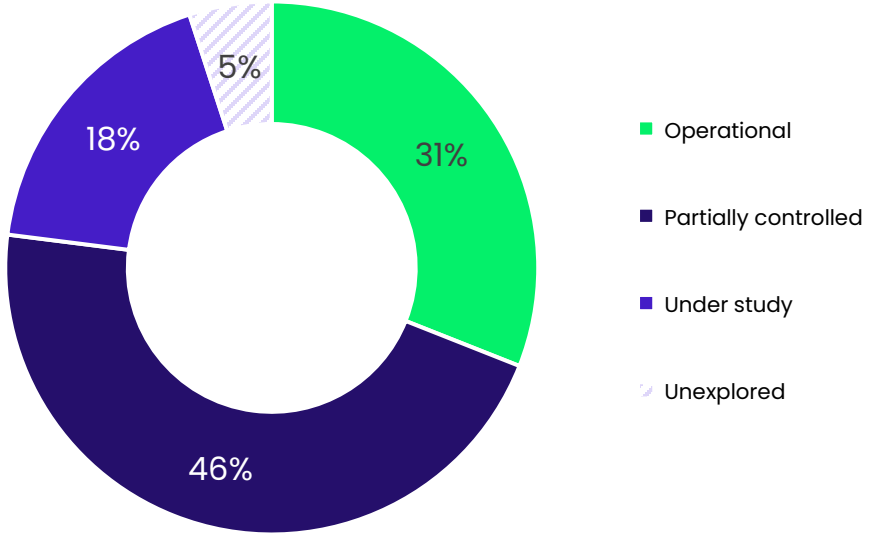
"For initiatives to be effective and function properly in the industry, there must be a **sharing of strategic decisions made by principals within the sector.** A complete integration of their strategic vision is necessary, including supply chains and subcontractors."

Philippe MUTRICY

02. DATA MANAGEMENT AND AI: ACCELERATED GROWTH

Building a solid foundation for the utilization of industrial data

Level of proficiency in data management

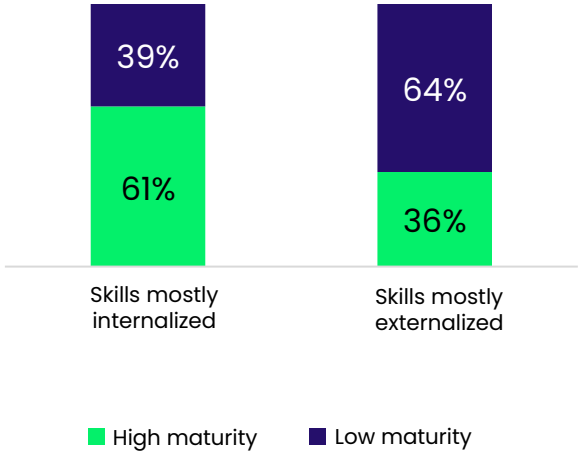


31% of respondents
feel that they are up and running with their data management, but **23% have no dedicated solutions.**

Companies that have mostly internalized their data skills consider themselves more mature in terms of exploiting their industrial data.

This dynamic is also illustrated by the emergence of **new data-related professions** such as Data Steward, **Data Miner**, **Data Ethicist**, **Machine Learning Engineer**, and Data Protection Officer.

Level of proficiency in Data Management according to the distribution of skills



To ensure a solid foundation for leveraging their data, industrial companies must work on the following aspects:

- QUALITY MAINTENANCE
- ANALYSIS
- GOVERNANCE
- INTEROPERABILITY with industrial protocols
- PRESERVATION

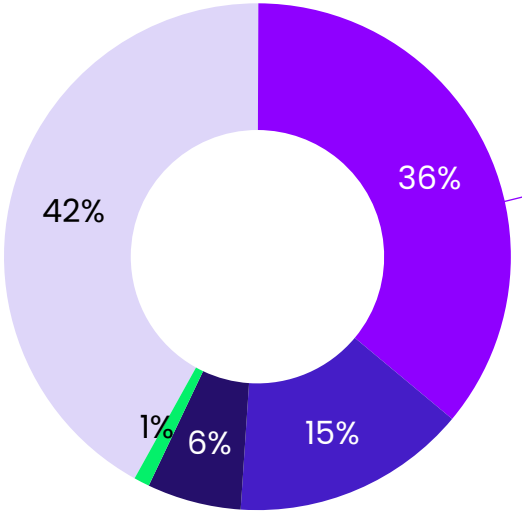
Barriers to fully exploiting the potential of industrial data

As in 2023, the lack of data/AI culture and skills remains the main barrier for industries in exploiting their data.

Establishing the right roles, processes, and a company culture around data usage allows for effective structuring, exploitation, and integration of data into decision-making processes (analysis, continuous improvement, etc.) and helps to derive more value.

Generative AI: The 2024 Trend That Hasn't (Yet) Conquered the Industry

What is the current level of use of generative AI technologies within your organization's value chain?



36% of large industrial groups are at least at the experimental stage compared to **10% for SMEs and mid-sized companies.**

Level 4: Generative AI implemented in industrial processes
Level 3: Generative AI integrated into some processes
Level 2: PoCs (Proofs of Concept) completed or in progress
Level 1: Scoping in progress
Level 0: No use of generative AI

Generative AI is generally at the same level across all functional areas:

- Maintenance
- Production
- Quality, traceability
- R&D & Design
- Supply Chain - Logistics

To ensure **a successful PoC**, the foundations of a generative AI project must be based on:

- A **quality** and **representative dataset**
- **Context** on data insertion
- Iterative **fine-tuning** on increasing volumes of data

To **successfully interface between different IS**, it is necessary to ensure:

- The **definition of a functional core model** that defines responsibilities for data processing
- The **harmonization** of **data models**
- The **rationalization of technical means** (Middleware) between solutions

Examples of AI and Generative AI use cases for operations:

- **Maintenance:** guided machine maintenance, creation of virtual sensors
- **Production:** energy consumption management, automated report generation, service load forecasting
- **Quality:** consolidation of customer feedback, monitoring and analysis of quality incidents
- **R&D & Design:** optimization of the design-to-manufacturing process, optimization of manufacturing parameters
- **Supply Chain:** management and scheduling of supplies, optimization of the supply chain

VERBATIMS

Data Management and AI

Ludovic DONATI
Vice-President of Afnet

Philippe MUTRICY
Director of Evaluation, Studies, and Foresight, Bpifrance

Vincent MOULIN WRIGHT
Managing Director, France Industrie

What can explain the growing importance of data-related topics and what can they bring to the industry?

"What is clearly apparent is that the **core of the subject and digital transformation is data,** and having data that is of high quality and can circulate freely within the company to be used in the best possible way. We realize in all companies, and even between companies, that it is the basis for exchanging information and making decisions that will support the entire movement of reindustrialization, decarbonization, etc. What is remarkable about the ongoing digital revolution, and particularly the availability of this data, is that we are able to make worlds that were very siloed within companies communicate with each other.
Data management is a major topic in Industry 4.0 to derive the best value from all use cases."

Ludovic DONATI

How are data-related and generative AI topics integrated into the industrial sector?

"According to Bpifrance Le Lab surveys, **only 3%** of small and medium-sized enterprises (SMEs) **use generative AI regularly**, and 12% use it occasionally. It becomes clear that without specific use cases, business leaders do **not prioritize significant investment in generative AI.** They are aware that it is the future, but due to the difficulty of having precise use cases, we are more, at this stage, at a **level of awareness** and **monitoring** rather than on massive investment plans. Nevertheless, there is a growing awareness of the wealth and value creation that can be derived from all this data, as long as it is well **optimized, structured, exploited, and protected."**

Philippe MUTRICY

What is your vision on the use of data in the industry?

"To reindustrialize France, the adoption of these new technologies and artificial intelligence is vital, and involves several projects.

First, **a modernization project, particularly on infrastructure.**

Then, we need to **accelerate the use and analysis of data by using new solutions.** Less than 40% of companies worldwide gain significant benefits from artificial intelligence, even though the industry is the largest source of data in the world, and that demonstrates that we don't know how to use it.

We need to **accelerate data architectures to make better use of it.** We need to focus not only on collecting data, but also on processing it in the right way to feed algorithms. What is very important is to access the real-time use of this data, which obviously leads to a significant productivity gain."

Vincent MOULIN WRIGHT

VERBATIMS

Data Management and AI

Pierre RAYMOND
Head of digital supply chain & manufacturing solutions, Saint Gobain

Daniel BLENGINO
CEO, Visionairy

What are the priority and highlighted topics around data and possibly AI today?

"Mainly those that generate the **most hard savings**. Being quite pragmatic, we are really focused on projects that allow for **optimization of product quality and energy consumption**, and that can especially have a significant impact on the roadmap, particularly related to **carbon impact**, which is also crucial. What is essential is to consider an approach that is very **iterative over time**. We cannot start directly by managing **a fully automated industrial process** with AI. However, we are moving towards this automation, this prescription, and automated regulation loop. And it also comes with significant **financial benefits** that **generate ROI."**

Pierre RAYMOND

From your perspective, what use cases are gaining the most traction in the field?

"The industry remains very **pragmatic and crystallized** around the three pillars: **cost, quality, and time**. Topics are driven by the hierarchy when there is a **return on investment (ROI) and true pragmatism** in the implementation of these solutions. Indeed, it is necessary to find a use case, but with a better understanding of what technology allows. We could also find more and thus have more levers of competitiveness to modernize and accelerate the management of operations."

Daniel BLENGINO

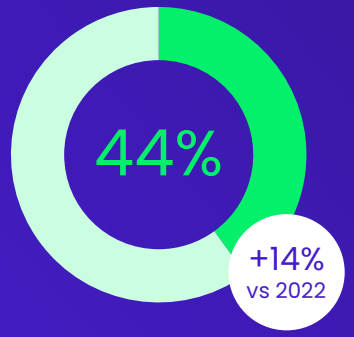
What other challenges should be anticipated when launching this type of project to ensure a successful implementation?

"First, there is **cybersecurity**. When we talk about AI, we talk about data and its processing, and often about the Cloud as well. The second issue is **education** around AI. AI brings something complementary and, for example, will allow for more variability, whereas it is often thought that it will replace. Finally, there is the regulatory aspect, especially in sectors like pharmaceuticals. Indeed, AI is intended to evolve with data over time. The more data evolves, the more AI evolves and becomes efficient, which continuously improves this AI model. This provides **consistency** and **operational robustness** over time."

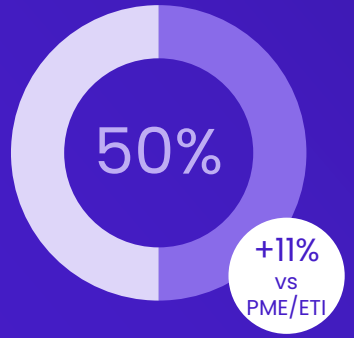
Daniel BLENGINO

03.
SUSTAINABILITY AND SOCIAL RESPONSIBILITY: AT THE HEART OF CONCERNS

Driven by regulatory impetus, the deployment of CSR action plans is accelerating further for large French companies



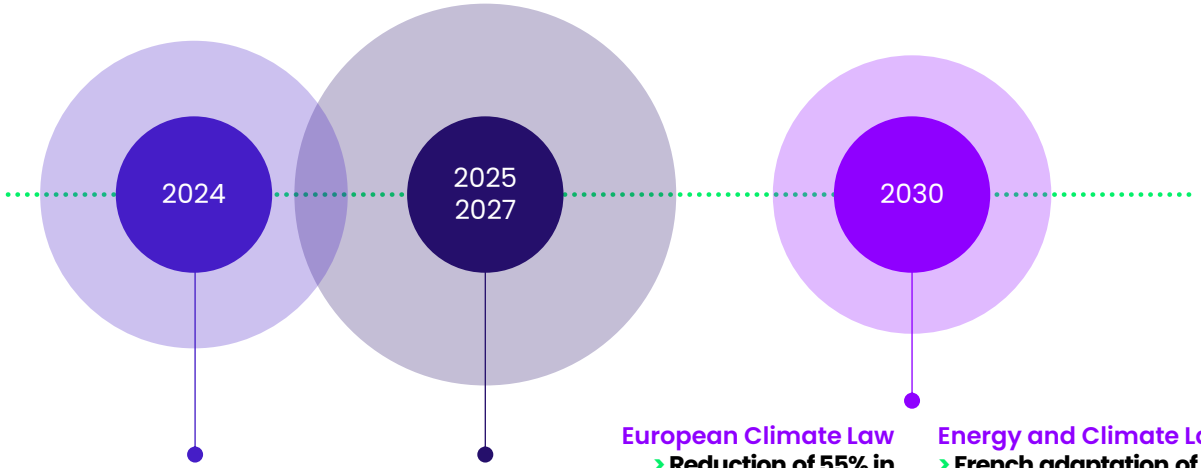
Industrials have begun deploying their **CSR action** plans



Large companies have begun deploying their CSR action plans

The imminent enforcement of regulations is driving the **professionalization of reporting and the deployment of CSR roadmaps**.

Excerpt from the regulatory commitments to which states and industrial companies are subject



CSRD
Entrée en Entry into force for companies with 500+ employees, sales of €50m & + €25M sales

› **obligation to publish a certified annual non-financial report on ESG topics** (environment, social, governance, etc)

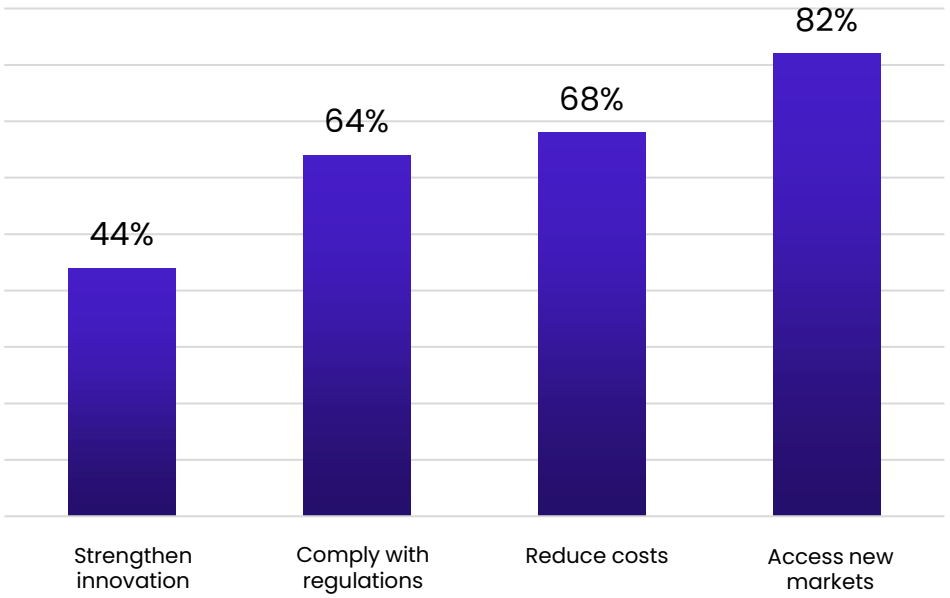
Gradual implementation of the CSRD for all publicly listed companies with activities within the European Union

European Climate Law
› **Reduction of 55% in greenhouse gas** emissions compared to 1990 for EU member states
› **42.5% of renewable energy** in the European energy mix
› **310 million tons of CO_2** absorbed by natural carbon

Energy and Climate Law
› **French adaptation of the Paris Agreement objectives (carbon neutrality):**
- 40% reduction in fossil energy compared to 2012.
- Cessation of electricity production from coal in 2022.
- Mandatory installation of solar panels or other renewable energy sources

Labeling Sustainability Initiatives: A Value-Generating Methodological Framework?

Why do industries choose to get labeled?



Labeling sustainability initiatives sets emission reduction targets, encouraging industries to adopt **concrete measures to achieve** them. These measures are sometimes **already underway with their existing transformation programs** (deployment of EMS, QMS, etc.) .

Knowledge of these labels is essential, as it allows to highlight a **dual objective** of performance and decarbonization, making possible to :

- **Enhance** Industry 4.0 projects within CSR initiatives
- **Facilitate** funding for digitalization initiatives

Including a decarbonization component in an Industry 4.0 project helps accelerate ROI by opening up the possibility of obtaining public funding.

The SBTi Label Establishes Itself as the Benchmark for Supporting Corporate Decarbonization.

Launched in 2015, the Science Based Targets Initiative (SBTi) helps companies align their climate goals with the Paris Agreement to limit warming to 1.5°C. Companies must set greenhouse gas (GHG) emission reduction targets based on scientific data, mandatorily including scopes 1 and 2 of the Greenhouse Gas Protocol, and scope 3 if it exceeds 40% of total emissions.

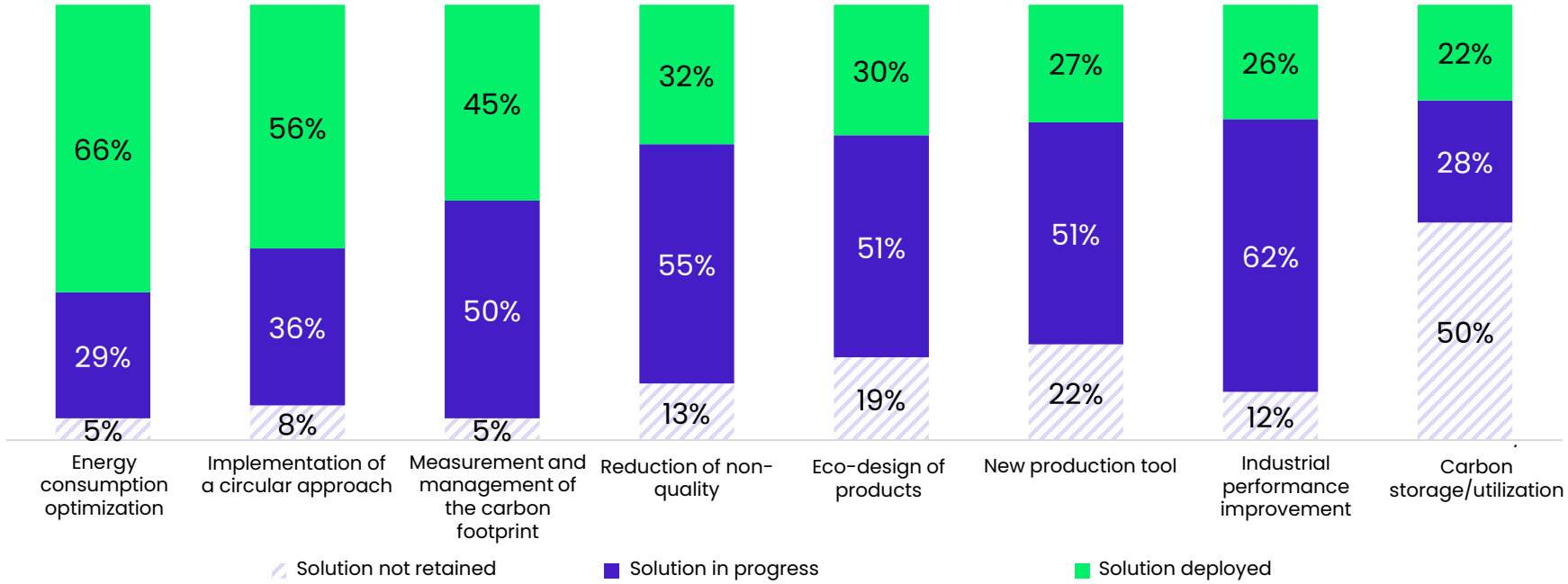
+5500 SBTi-labeled companies worldwide (2x vs 2022), including 400 French companies

73% CAC 40 companies have targets aligned with the SBTi framework

SBTi Monitoring Report 2023 - Science Based Targets Initiative

The performance optimization levers used by industrial companies also allow them to decarbonize production.

The performance **optimization levers used by industrial** companies also allow them to decarbonize production. To accelerate their decarbonization, industrial companies rely on **levers already used in digitalization programs to optimize their industrial performance** (reduction of non-quality, renewal of production tools, waste recovery, etc.). The rationalization of energy consumption is the most used lever and fits into this **dual objective of performance optimization and decarbonization.**



PROJECT PROGRESS

Levers that have accelerated significantly over the past year:

+13% Transformation projects of the production system within **large groups**

+19% **Ongoing** projects aimed at reducing non-quality

+22% Waste recovery projects and/or implementation of a circular approach

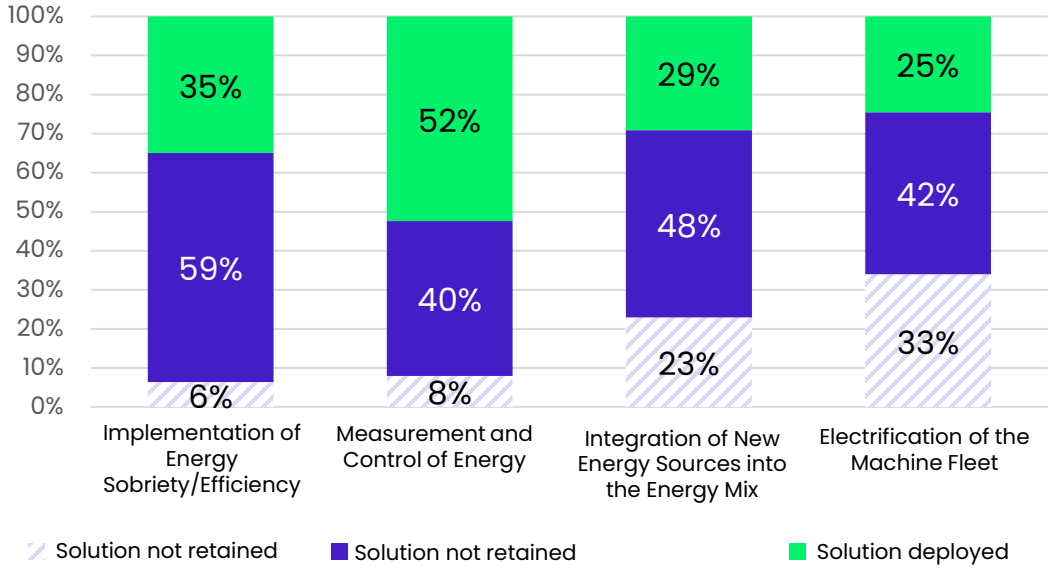
+16% Carbon storage/valorization projects

Energy: a key focus area for industrial companies to minimize their carbon impacts

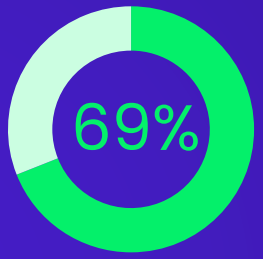
The management of energy supply and consumption is now an essential part of CSR roadmaps because:

- Little dependent on upstream and downstream factors, and thus within the control of industrial companies in the short term
- Technical solutions are available and can be deployed quickly (< 1 year)
- Encouraged by financial and regulatory issues (e.g., ISO 5001 on energy performance)

Selection of technical solutions for energy management

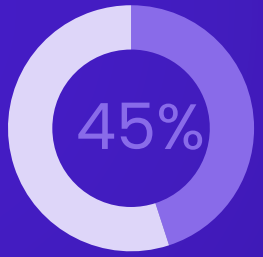


Energy management solutions are more favored than carbon management tools.



Industrial companies are deploying energy **consumption monitoring** solutions

92% of large groups



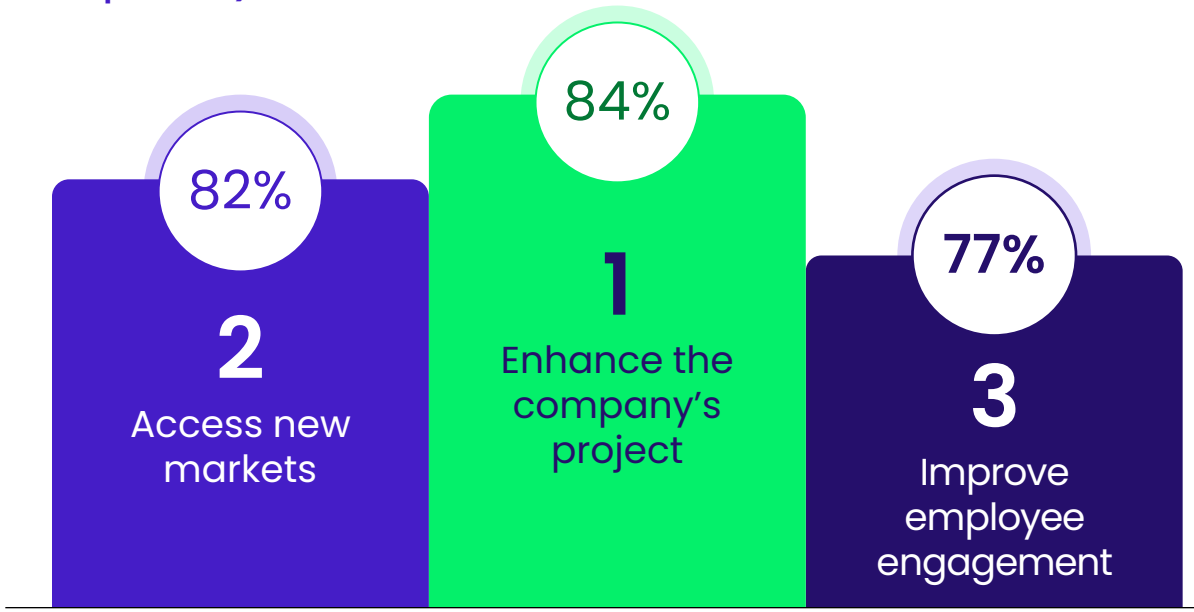
Industrial companies are deploying carbon emissions management solutions

64% of large groups

+8% Energy consumption monitoring or **carbon emissions management solutions** since 2023.

By combining Industry 4.0 and the human factor, Industry 5.0 is part of an HR and market positioning strategy

TOP 3 sustainable transformation challenges for industrial companies (% of respondents who consider the challenge 'important')

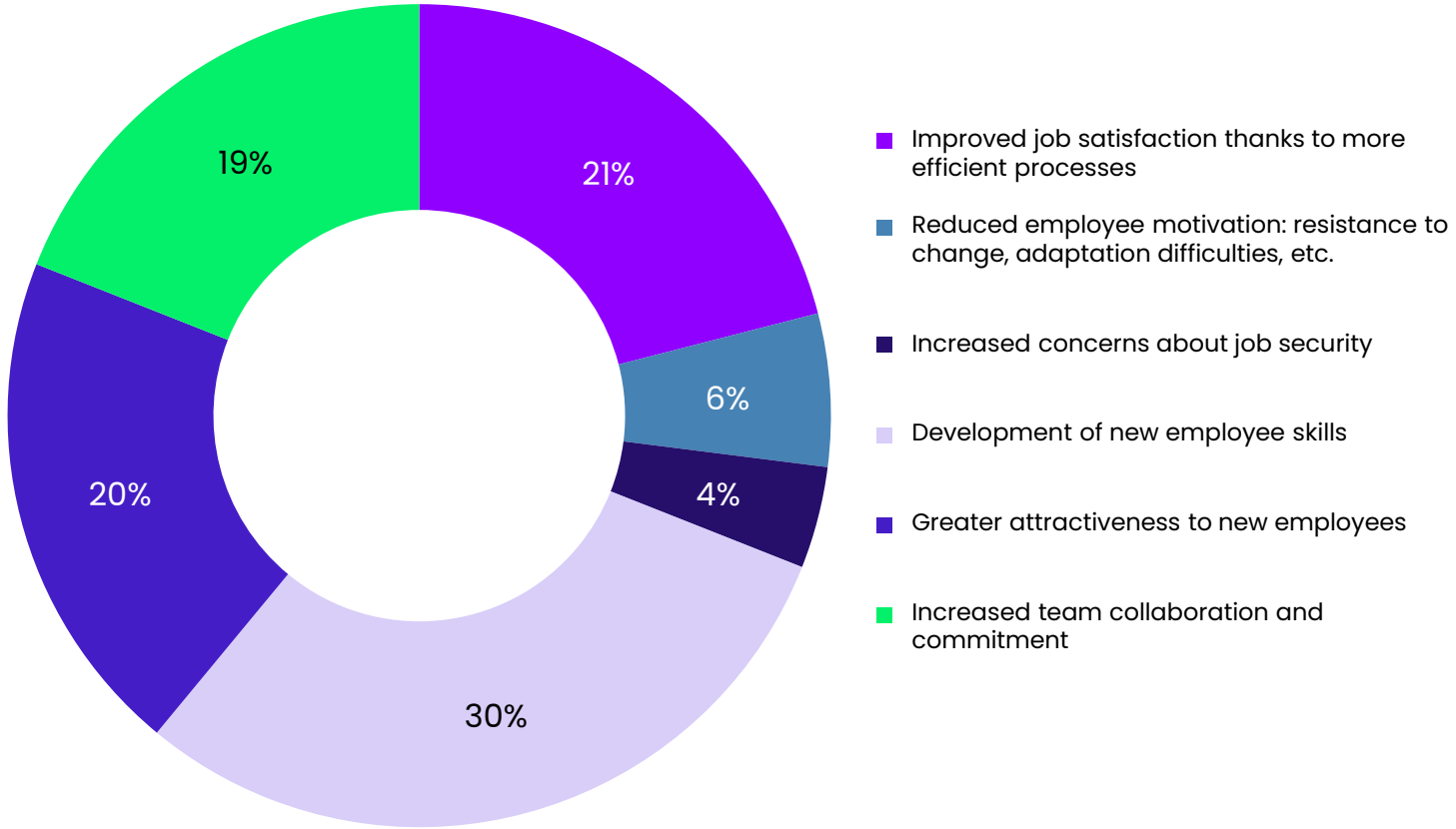


By adopting an approach that takes the human factor into account, industrial companies reconcile economic performance, technological innovation, and social responsibility. This strengthens their position in a world where environmental and social expectations are increasingly high and standardized.

These concepts give rise to the notion of **Industry 5.0**, which redefines digitalization programs towards resilient, sustainable, and human-centered industrial operations.

A positive impact of 4.0 initiatives on employees and attractiveness

What is the impact of Industry 4.0 projects on the members of your organizations?



Industry 4.0 goes beyond transforming industrial processes :

- Improves the **employee experience** by developing their **skills** and **enriching their tasks**
- Increases **employee satisfaction**, making companies more attractive
- Enhances **employer image**

These benefits can translate into **better overall company performance.**

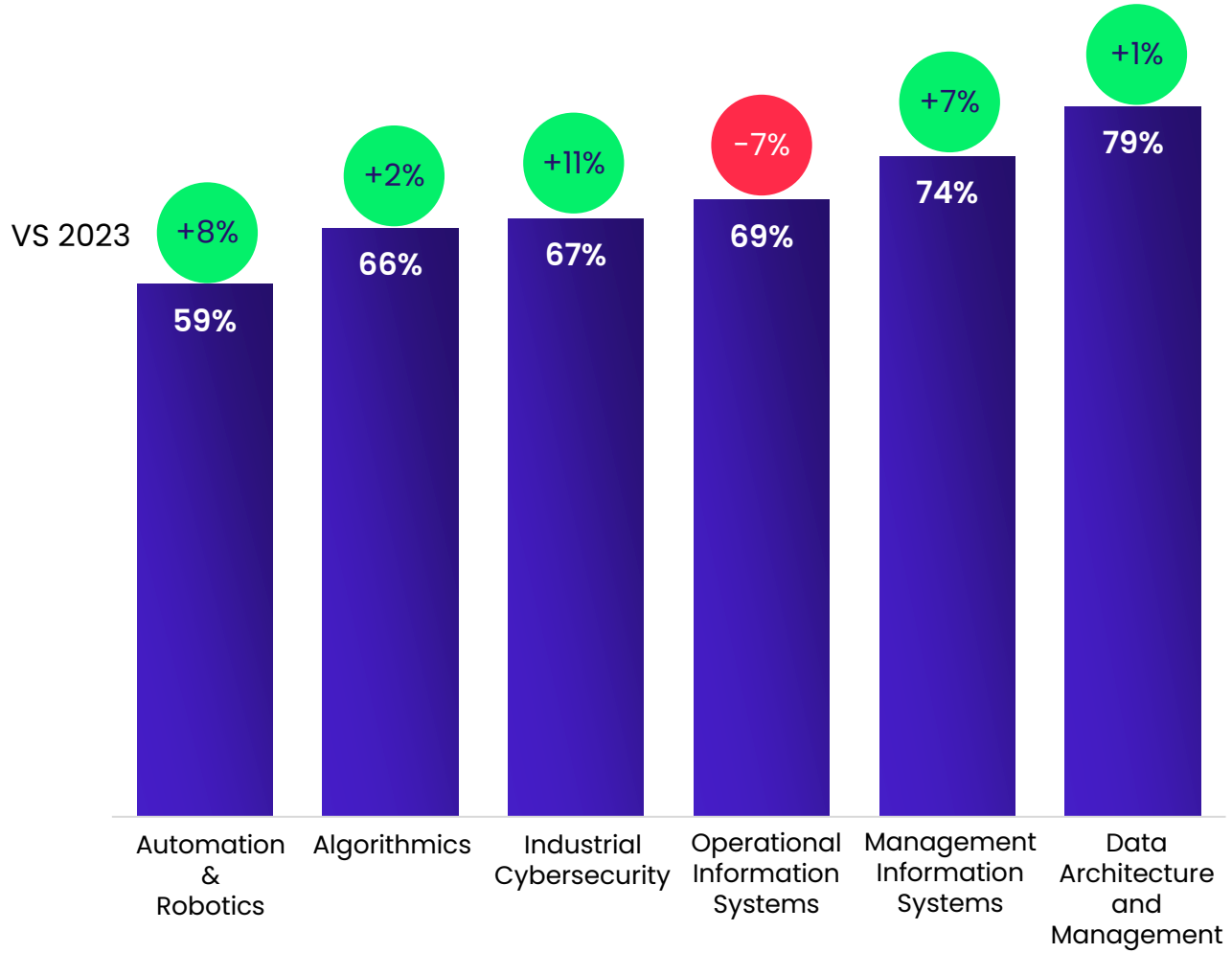
Skills development: a strategic and significant focus area

Data management, **management information systems (MIS), and operations skills are mostly internalized** because they require expertise of the functional domain and a fine understanding of the business.

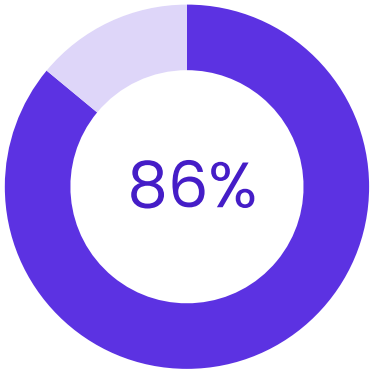
Industrial cybersecurity and algorithm skills are outsourced because they are more dynamic and require constant updating.

Robotics skills are weakly internalized in smaller companies because they do not require replication. However, large industrial companies, especially in the automotive sector, massively replicate robotics in factories and therefore prefer to develop strong internal expertise.

Internalization of skills by functional domain



Project financing: opportunities to seize

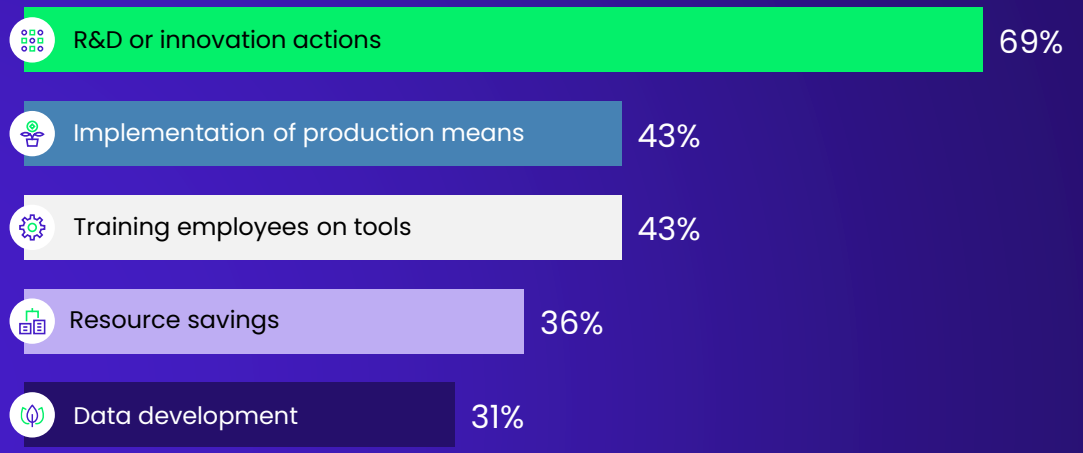


Surveyed industrial companies are aware of and seek public funding

Decarbonization is an essential condition for accessing public funding.

Since the Climate and Resilience laws of August 22, 2021, and No. 2023-973 of October 23, 2023, 'relating to the green industry,' **public authorities** have strengthened the **consideration of environmental criteria** in the allocation of aid.

For what type of project do you mobilize public funding ?



Public funding mechanisms are mainly sought for R&D and innovation projects. The Research Tax Credit (CIR) is the main funding mechanism (In 2024, more than **15,000 companies will benefit** from it, for a total of 7.6 billion euros). It encourages companies of all sectors and sizes in France to invest in research.

However, other sources of funding still need to be promoted to industrial companies. France 2030, the national funding framework program, particularly encourages and supports data-related initiatives (data space, usage, platform development), but only 31% of respondents seek funding for this type of project

VERBATIMS

Sustainability and responsibility

Ludovic DONATI
Vice-President
of Afnet

Daniel BLENGINO
CEO, Visionairy

How have the use and sharing of data enabled progress in CSR?

"The issue of traceability is extremely important. We need to be able to trace not only all operational data, but also all impacts in terms of consumption. In the case of metals, for example, we need to be able to trace CO2 impacts, impacts linked to the use of resources and local spin-offs. This involves a great deal of data management, knowing where the data is located, how it can be measured, ensuring that it is reliable and how it is made available to the company's customers and stakeholders. **One of the aims of Industry 4.0 and data management is clearly to meet the challenges of the energy transition**."

Ludovic DONATI

New technologies such as AI can profoundly change business processes and professions. What have you seen on this subject?

"Today, factories are finding it hard to recruit for highly repetitive tasks. Some plants have set up production islands for operators. Instead of working on a repetitive task, operators will be allowed to pilot a small island of machines and digital solutions autonomously.

By increasing the operator's precision, we reduce the number of rejects, which not only improves environmental impact, but also relieves the operator's workload.

AI will not replace work, but on the contrary, will transform it."

Daniel BLENGINO

VERBATIMS

Sustainability and responsibility

Ludovic DONATI
Vice-President
of Afnet

Philippe MUTRICY
Director of Evaluation,
Studies, and Foresight,
Bpifrance

Vincent MOULIN WRIGHT
Managing Director,
France Industrie

What environmental impacts need to be considered when implementing digitalization projects?

"In this process of digital transformation, we need to be able to identify a return on the environment, i.e. to see what the impact will be in terms of decarbonization of the digital solutions proposed in the overall portfolio.

This would enable decisions to be taken on the launch of digital projects not only in terms of ROI, but also in terms of whether the project will have a positive impact on the company's carbon footprint, or on the contrary be neutral, or even negative, because it implies deploying a huge amount of hardware and equipment, and retrieving very large volumes of data that need to be stored."

Ludovic DONATI

How are CSR issues integrated into the industrial sector?

"Today's threats to Industry 4.0 are not just the traditional economic ones: strikes, energy costs, transport, and so on. What can stop a factory is a flood, or a drought decree if the factory uses water in its production processes. These are very concrete problems that need to be addresses and which are groups together under the heading of "adaptation to climate change". The study on reindustrialization published last May by Bpifrance Le Lab, reveals that this issue is given too little consideration by company managers when choosing where to locate their plant: only 3% say they are considering it.

Company managers must also take all these environmental factors into account when making strategic decisions. "

Philippe MUTRICY

"An important aspect of the digital transition is that it is obviously a gas pedal of the environmental transition that is required of all companies. Today, industry is one of the few sectors in the French economy with a positive balance sheet and an extremely ambitious trajectory. Digitization will enable us to accelerate the environmental transition by processing data more finely and providing real-time data. However, we need to remain cautious when it comes to planning and locating datacenters and digitization in general, since it may also contribute to increasing electricity requirements. This acceleration needs to be planned, particularly in terms of infrastructure.

These past and future digital transitions raise the question of the sustainability of investments. Industry needs public support, especially when extra-financial ROI cannot be financed spontaneously."

Vincent MOULIN WRIGHT

Glossary

Key Concepts

Industry 4.0: A concept referring to the contribution of new technologies and, more broadly, digitalization to improve industrial performance and transform operational methods.

Industry 5.0: Industry that fully integrates environmental and social issues at the heart of its priorities.Socles informatiques industriels: Encompasses all industrial infrastructures (network, connectivity, cybersecurity, data…) underlying the technologies implemented by Industry 4.0.

Socles informatiques industriels: Encompasses all industrial infrastructures (network, connectivity, cybersecurity, data…) underlying the technologies implemented by Industry 4.0.

Sustainability: Economic, social, and environmental development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Other Definitions

Research Tax Credit: Tax Credit for Research and development expenses.

CMS (Carbon Management System): Tool for measuring, tracking, and managing greenhouse gas emissions.

Datalake: Storage system that allows for the retention of large amounts of raw data for later analysis.

Data management: Collecting, storing, organizing, and protecting data to ensure accessibility, reliability, and security.

EMS (Energy Management System): Solution technologique permettant de surveiller, Technological solution for monitoring, controlling, and optimizing energy consumption.

ERP: Enterprise Resource Planning.

CMMS: Computerized Maintenance Management System.

BMS (Building Management System): Building Management System: supervision and control of a building's technical systems (heating, ventilation, lighting, etc.).

AI: Artificial Intelligence.

Industrial infrastructure: Low-level technological foundation, not highly differentiated by sector, with a common goal of being state-of-the-art to support Industry 4.0 initiatives (Data management, OT, network, cybersecurity, Data platform, IoT, etc.).

IoT (Internet of Things): Network of interconnected physical objects equipped with sensors, software, and communication technologies, enabling data collection, exchange, and analysis for various applications.

IT (Information Technology): Set of tools, devices, systems, and processes used to collect, store, process, transmit, and manage data and information within an organization.

LIMS (Laboratory Information Management System): Management of data and processes in a laboratory.

MES : Manufacturing Execution System.

PCA/PRA (Business Continuity Plan, Disaster Recovery Plan): Plan developed by an organization to ensure the availability and continuity of its operations in case of major disruptions.

PoC: Proof of Concept.

PLM: Product Lifecycle Management.

QMS (Quality Management System): Automation of quality management processes.

ROI (Return On Investment): Financial indicator that measures the return on an investment.

Greenhouse gas emission scopes:

- Scope 1: Direct emissions from a company's activities.
- Scope 2: Indirect emissions associated with the energy purchased and used by the company.
- Scope 3: Indirect emissions not under the company's control (suppliers, etc.).

SI: Information Systems.

SMS (Sustainability Management System): Organized structure helping companies plan, implement, monitor, and improve sustainability performance.

WMS: Warehouse Management System.

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