



Manufacturing in Europe

Innovating to Survive and Thrive



Introduction

Europe's ability to manufacture at globally competitive prices has been hindered by several factors in recent years, such as the COVID-19 pandemic and the subsequent lockdowns, higher inflation, and rising interest rates. The continent also endured further structural hardships with soaring energy prices in the wake of the Russia-Ukraine war, which added to already elevated production costs. Add to it the perennial labour shortage, and it becomes clear that investing in technology has become all the more important to protect margins.

This whitepaper deals with Persistent's outside-in point of view on:

- / The high-level challenges and possible aspirations of European manufacturers.
- / The short- and long-term view of how business operations of European manufacturers can evolve for future trends.

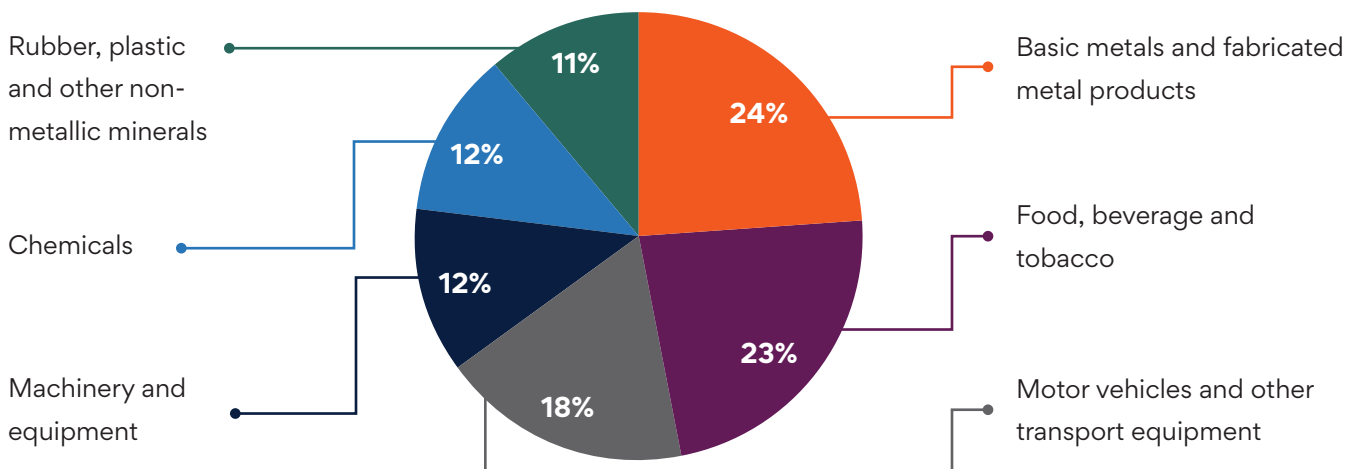
Industry Analysis

The manufacturing sector of Europe is the cornerstone of the economy of the European Union (EU). It is a diverse sector that includes many major global organizations. However, since the outbreak of the pandemic, the industry has been facing a series of challenges.

According to [Eurostat](#), the 6 largest segments in the European manufacturing industry are:

Largest segments in European manufacturing

with some prominent players in each segment



Some of the prominent players in each segment are:



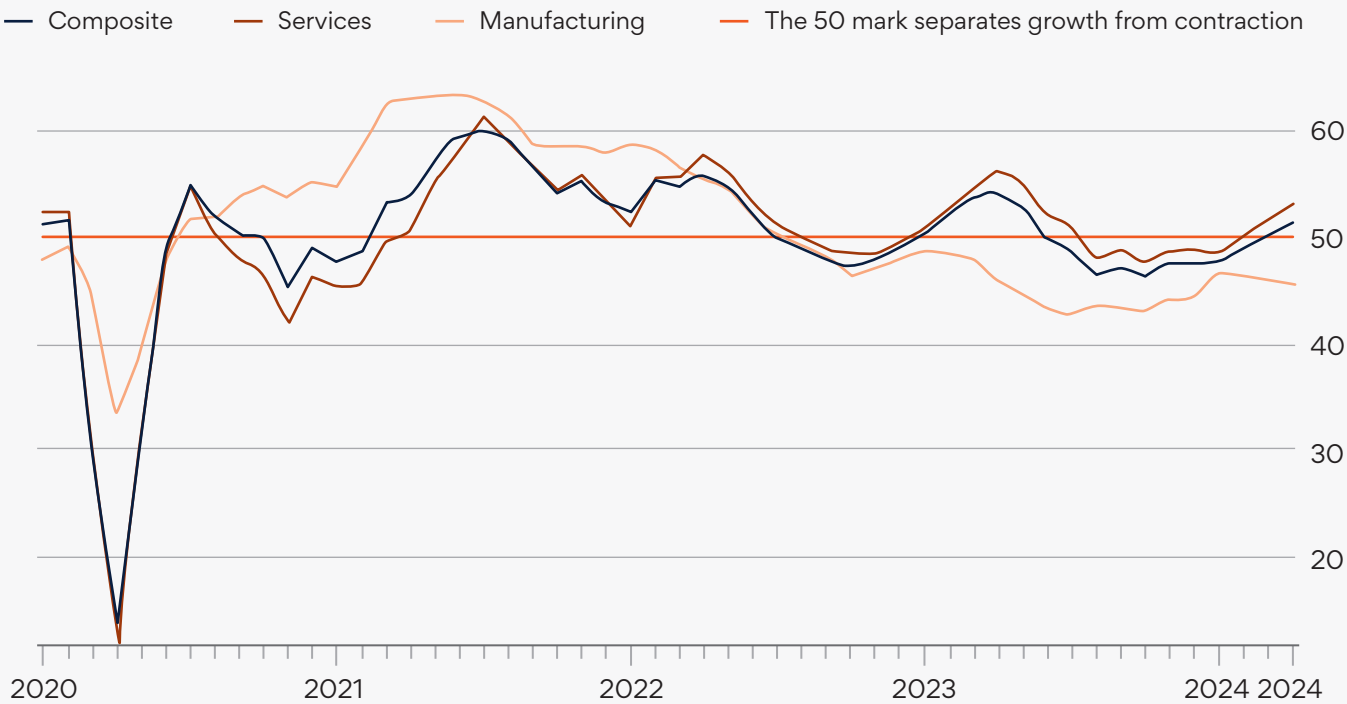
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Over the past 2 years, at a broader level, Manufacturing Purchasing Manager's Index (PMI) indicators in Europe have consistently reflected contraction, with levels below 50. However, there was a temporary surge above 50, during which European manufacturers increased ordering activity and created inventory. This inventory level reached an average of almost 23% in 2022, the highest inventory ratio since 2015.

However, consumer demand did not pick up as anticipated, and 2023 was mostly focused on reducing inventory levels. After the temporary surge, since late 2021, manufacturing PMI has seen a downward trend. In addition to the regional issues, the global economic slowdown has led to a decrease in demand for European exports.

Eurozone business activity picks up as service sector recovers.

Purchasing managers index



Source: S&P Global

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The growth rate of the manufacturing industry is perceptibly sluggish, as evidenced by the fact that only 30 manufacturing companies have secured a spot in the Financial Times' list of the 1,000 most rapidly expanding companies in Europe for 2024. Moreover, the manufacturing sector does not appear among Europe's [top 10](#) fastest-growing industries.

Trends

1. Falling competitiveness

Due to several recent crises, Europe’s ability to produce goods at globally competitive prices has faced significant challenges. The COVID-19 pandemic and subsequent lockdowns severely disrupted manufacturing and supply chains. Furthermore, higher inflation and rising interest rates have compounded these difficulties, making it increasingly difficult for European producers to maintain their competitiveness on the global stage.

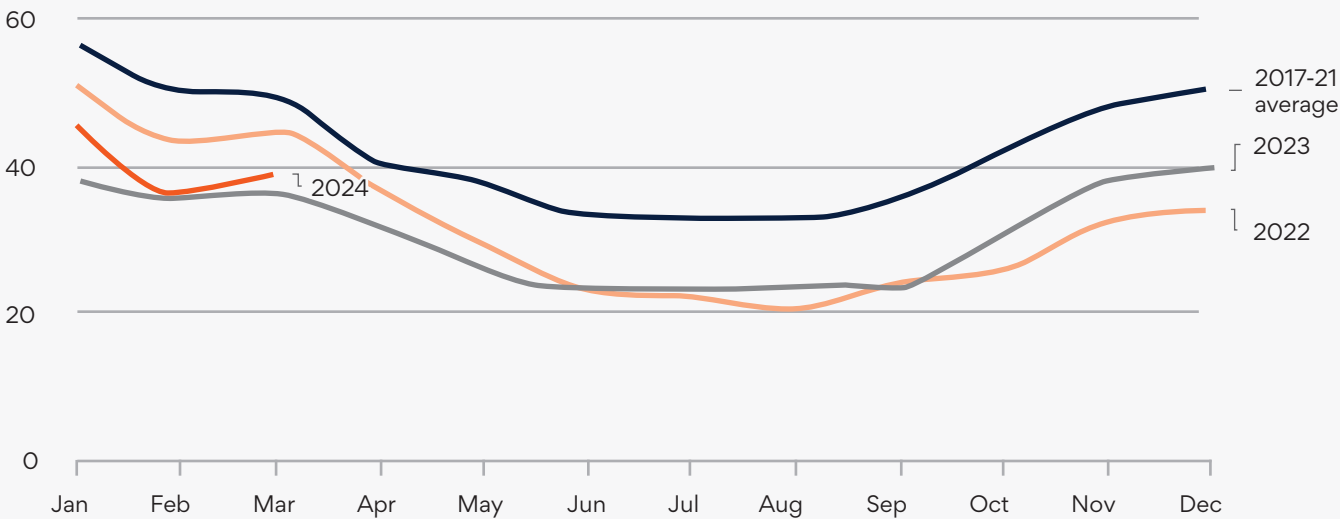
2. Soaring energy prices

The continent faced additional economic challenges due to the increasing energy costs following the Russia-Ukraine war, which added to the already high production expenses. As of April 2024, the European gas price benchmark remains significantly above the averages seen before the crisis, being nearly two-thirds more expensive than it was back in 2019, as reported by the commodities pricing agency, Argus. This has led to a reduction in gas demand compared to the period before the pandemic.

Gas consumption by Europe’s industrial sector fell by 24% in 2023 as compared to 2019. The agency forecasts that between 6 to 10% of the continent’s gas usage may be permanently lost due to a decline in demand.

Germany’s industrial gas demand sits below pre-crisis levels.

Sector gas demand by month, TWh



Financial Times
Source: ICIS

3. Weak consumer demand

European consumer demand is bleak, with high inflation eroding purchasing power and confidence. Pessimism prevails as households face financial strain, leading to spending cutbacks and increased savings withdrawals for essential purchases. Most consumers are avoiding non-essential spending.

4. Falling exports

Weakening exports have compounded the vulnerabilities within the industrial sector, which were exacerbated by a significant increase in energy costs. For example, declining exports to China have played a role in halting the progress of the German economy, the largest in EU. Last year, Germany's economy was the most underperforming among major developed nations, experiencing a contraction of 0.3 percent.

5. Trade regulations are biting back

Manufacturing firms in Europe are navigating through a particularly challenging period. Complaints about over-regulation, fierce competition from China, and the European Union's lack of an equivalent to the United States' Inflation Reduction Act are frequent. Amid these issues, a common concern among European companies is that regulatory actions seem to undermine rather than support them.

Consider the automotive sector, for example: European car manufacturers are concerned about their inability to compete with subsidized electric vehicles from China within their own market. Additionally, they are about to face another challenge: the cost of steel and aluminium is expected to rise significantly in the EU compared to other regions. This is because the EU is introducing its "carbon border adjustment mechanism" (CBAM), a levy on the carbon content of certain imported goods. While this could make EU efforts to produce "green" steel competitive against locally-produced "dirty" steel due to the high domestic carbon tax, they could still lose out to cheaper, carbon-intensive imported cars without a similar tax.

The CBAM aims to maintain a fair competition environment for Europe's producers of green steel and aluminium. However, manufacturers further down the supply chain, such as car producers, do not receive protection against products made with carbon-heavy materials or energy, like those produced in China.

6. Widening labour gap

The worldwide manufacturing industry is currently facing a significant shortage of workers. Within Europe, there has been a roughly 70% increase in job vacancies from 2020 to 2024. Since the start of 2022, these vacancies have remained at just over 500,000.

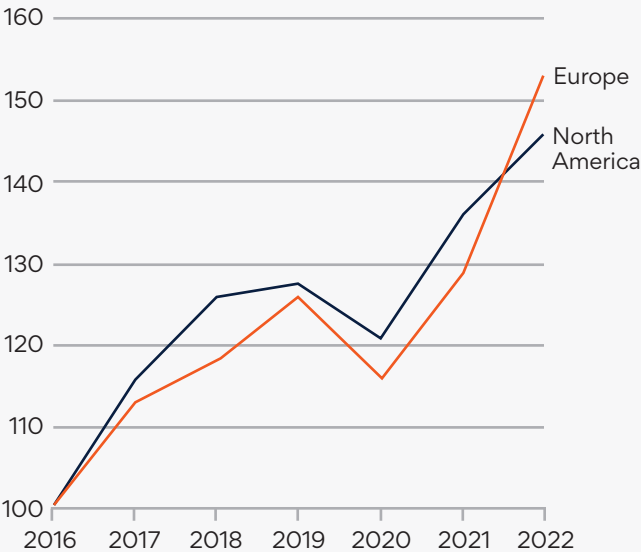
This challenge is attributed to an aging workforce, declining birth rates, and a mismatch of skills. The shortage is impacting production rates and growth, pushing companies to innovate in automation and seek policy support to attract talent.

Performance vis-a-vis American manufacturing companies

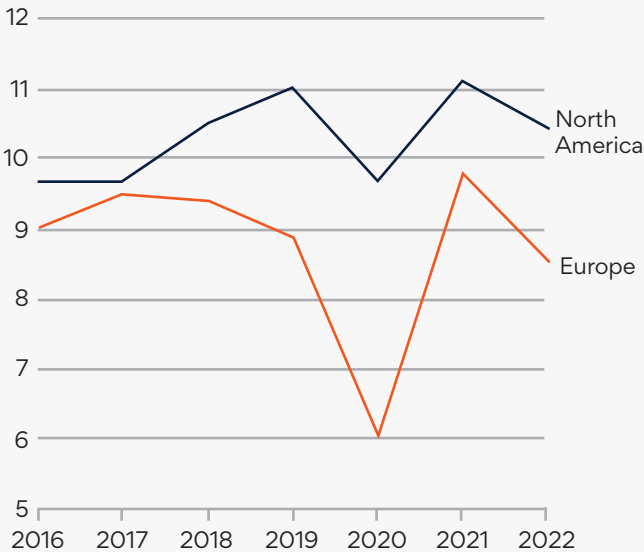
European companies have not been able to expand margins as quickly as their American counterparts. For example, [McKinsey's Machinery Benchmark](#) reveals that when comparing several financial and operational metrics, European machinery companies are progressing slower than those in North America. Although they have experienced significant revenue increases, companies in the European sector have not kept pace in terms of margin expansion, mergers and acquisitions, and productivity improvements, as shown below.

Revenue development has been similar across regions, but European companies have lagged behind their North American peers in profitability since 2016.

Revenue development, index (2016 = 100)



Average EBIT margin, %



Note: North America: n = 39; Europe: n = 68.
Source: McKinsey Machinery Benchmark, 2023

As technology becomes increasingly integral across all sectors, Europe is not keeping pace in eight out of ten key cross-sectoral technologies as per McKinsey. These ten pivotal technologies are becoming essential across various industries, with seven of them closely tied to digital advancements, characterized by strong “winner-takes-most” dynamics and significant network effects that disadvantage Europe. For example:

- / In the domain of AI, U.S. companies are investing six times more than their European counterparts.
- / Regarding 5G technology, while Europe boasts strong manufacturers, it falls behind in its rollout.

The application of AI alone is projected to contribute between €1 trillion and €2 trillion to the gross value added by 2040. Despite this potential, Europe is markedly trailing in several key indicators of applied AI. This is the case even though there's been an uptick in public investment and the region is a leader in scholarly publications.

Currently, the United States holds the leading position in the field of applied AI, with its companies accounting for 65 percent of the world's private investments in this technology.

Regarding private investments in AI companies, the United States outpaces Europe by six times and China by more than double. In 2020, American private sector spending on AI reached approximately \$24 billion, significantly higher than China's \$10 billion and the European Union's \$4 billion.

The US not only leads in AI investment but also dominates the global AI market, boasting a robust ecosystem of both established tech giants and emerging startups poised to revolutionize hardware and cybersecurity sectors. Among the top seven AI industry leaders, four — Alphabet, Amazon, Meta, and Microsoft — are based in the US, while the remaining three — Alibaba, Baidu, and Tencent — are Chinese companies. Additionally, the US is the home to two major hardware companies, Intel and Nvidia. Looking at the ten most valuable AI startups globally, half are located in the US, four in China, and one in Europe (Switzerland).

In terms of adopting practical AI applications like facial recognition, voice recognition, and fintech, Europe trails behind both the US and China. According to McKinsey's Global Survey on Artificial Intelligence in 2021, around 61 percent of Chinese organizations have implemented AI in at least one business area, compared to 51 percent in North America and 46 percent in Europe.



Strategic response to trends

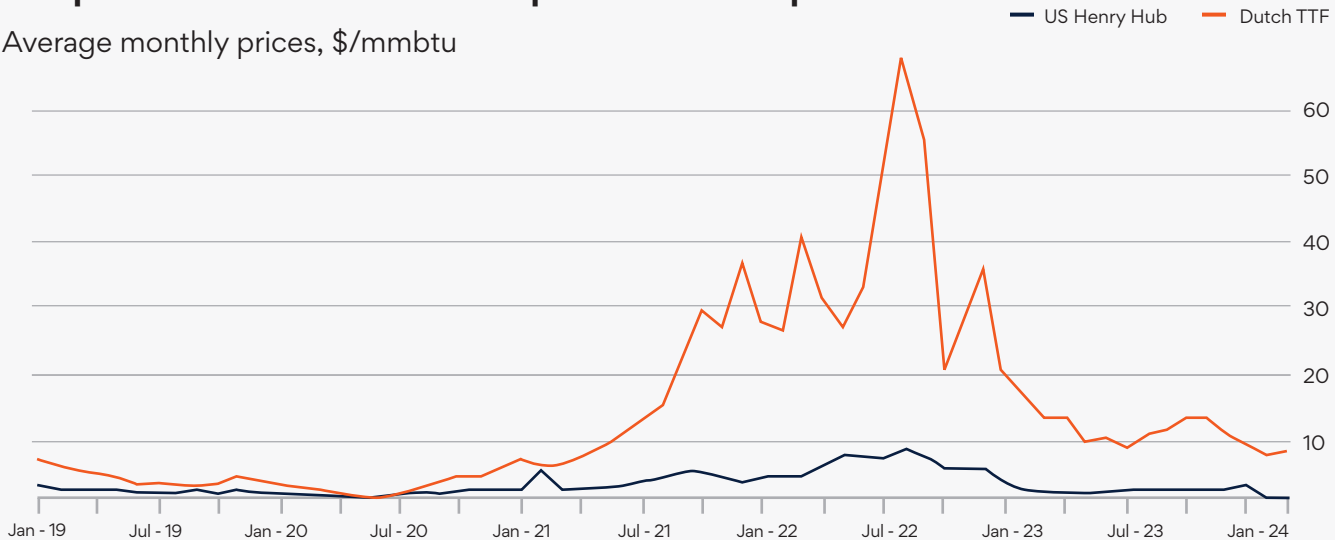
Moving energy-intensive manufacturing out of Europe

No place has exemplified the impact of structural difficulties more profoundly than Germany, where a fifth of the nation’s total economic output is derived from manufacturing. This percentage is nearly twice that of countries like the US, France, and the UK. A recent report by the German Chamber of Commerce and Industry highlighted that almost one-third of domestic industrial firms planned last year to increase their production outside of Germany. This shift is driven by concerns over Germany’s energy future without Russian gas. Leaders in energy-dependent sectors, such as the steel and chemical industries, along with various political figures, have started to alert about a gradual “deindustrialization” affecting Europe’s biggest economy.

In search of more favorable conditions, companies and investors have explored relocating to countries that offer enticing subsidies and lower energy costs. [Samantha Dart](#), who leads natural gas research at Goldman Sachs, has observed a trend of industrial capacities in Europe shutting down permanently, unlikely to be revived. As a result, companies are increasingly looking towards the US. A [survey](#) conducted last September by the German Chamber of Commerce and Industry showed that 43% of major industrial firms were considering moving their operations out of Germany, with the US being the preferred choice. The move is largely motivated by the significantly lower energy costs in the US, where gas prices are just a fraction of those in Europe, and the appealing subsidies provided by the Inflation Reduction Act for decarbonization technologies. Last year, German businesses committed a record \$15.7 billion to projects in the US, a significant increase from \$8.2 billion the previous year, making it the most sought-after destination for foreign investment, as per data from fDi Markets, a Financial Times affiliate. Although the European Union has introduced its competitive industrial policy aimed at retaining investments, companies have pointed out that it does not match the straightforwardness and financial strength of the IRA.

Gas prices in the US are far cheaper than in Europe.

Average monthly prices, \$/mmbtu



Source: Argus

Recommendations



European manufacturers are faced with the imperative to scrutinize each aspect of their value chain meticulously to maximize margins efficiently.

Beyond the confines of the value chain, it is essential that they ensure their suppliers and energy providers are aligned with their goals to fulfill transparency commitments. Such comprehensive measures necessitate the adoption of new technologies on a significant scale. Automation stands out as a pivotal investment, offering immediate improvements in areas characterized by repetitive tasks, and presenting a solution to labor shortages. Concurrently, embarking on a strategic data analytics initiative in selected segments of the value chain is advisable. This will establish the groundwork for a data-driven organization that is not only optimized but also capable of fostering new revenue opportunities. These strategic imperatives can be broadly categorized into the following three strategic areas:



Address the growing labor shortage



Spur data-driven decision making at scale



Decarbonize, and shift toward sustainable energy sources

Address the growing labour shortage

Skilled labour is increasingly hard to find because of unfavourable demographics and younger generations picking up jobs in sectors other than manufacturing. In such a scenario, automation of repetitive tasks and decisions become necessary.

Manufacturers can adopt a systematic approach to automating processes. One of the ways to do this is process mining. Process mining can help discover areas of improvement in existing processes. Manufacturers can improve outcomes and efficiencies based on historical and factual data points and patterns instead of relying on gut feel. For example, process mining can help discover that invoices for items with standard rates or invoices below a certain value are queued up for manual approvals and are slowing the revenue realization cycle. Automating workflows for such invoices can help with cash flow and reduce the burden on employees. Other candidates for process mining-led improvements are:



Finance

- / Accounts Payable
- / Accounts Receivable



Supply Chain

- / Order to Cash
- / Purchase to Pay
- / Inventory Management



Customer Experience

- / Customer Service Management

How can Persistent help?

Persistent has over 14 years of experience delivering intelligent automation solutions to global enterprises. Persistent leverages its intelligent automation expertise, multi-industry knowledge and strong low-code platform alliances to build high-impact, future-proof enterprise grade applications in weeks, not months and years.

Our Intelligent Automation CoE has more than 4,000 practitioners with dedicated centers in the US, India and Mexico. We are recognized by sourcing advisories such as Zinnov and Gartner for our automation capabilities. Forrester cites us as a Leader among Digital Business Automation Providers with a 5/5 Delivery Excellence Rating.

Spur data-driven decision making at scale

In today's manufacturing landscape, cost reduction is a constant battle cry. Data products can prove to be valuable in determining the right optimization areas. By leveraging insights gleaned from data, manufacturers can optimize each stage of their value chain, leading to significant cost savings. Let's delve into how data products can empower cost reduction across various components:

1. Procurement and Supply Chain Management

Optimizing Supplier Selection: Data analysis can identify the most cost-effective suppliers. Historical purchasing data reveals buying trends, allowing manufacturers to negotiate better bulk discounts. Data products to categorize suppliers based on factors like cost, performance, and risk, can enable informed sourcing decisions.

Predictive Inventory Management: Inventory data, coupled with sales forecasts, helps manufacturers predict demand accurately. This minimizes the risk of stockouts or excess inventory, both of which are costly. Data products can generate reorder points based on real-time consumption rates, optimizing inventory levels and reducing storage costs.

Proactive Risk Mitigation: Real-time data from supplier locations helps anticipate delays in material deliveries. This allows manufacturers to adjust production schedules or source materials from alternative suppliers, minimizing production disruptions and associated costs. Early detection of potential issues in the supply chain translates to proactive planning and cost avoidance.

2. Production Planning and Scheduling

Minimizing Downtime: Sensor data from machines can predict equipment failures. This enables preventative maintenance, reducing unplanned downtime and costly repairs. Additionally, data analysis helps identify bottlenecks in production lines, allowing for process optimization to maximize machine and labor utilization.

Dynamic Scheduling with Real-Time Visibility: Production scheduling software powered by data can account for real-time changes in demand or material availability. This allows for dynamic adjustments, ensuring efficient use of resources and minimizing production delays and associated costs.

Production Efficiency and Quality Control: Real-time production data allows for monitoring of production line performance. Deviations from ideal parameters can be identified quickly, preventing the creation of defective products. Data-driven insights enable manufacturers to continuously improve production processes, leading to increased efficiency and reduced scrap rates, ultimately saving money.

3. Logistics and Distribution

Route Optimization: Delivery route optimization software analyzes historical traffic patterns and fuel consumption data. This helps plan efficient delivery routes, minimizing fuel costs and driver overtime. Additionally, data on product dimensions and weight allows for optimal truckload planning, maximizing space utilization and reducing transportation costs.

Warehouse Management: Warehouse management systems (WMS) track inventory levels and locations in real-time. This optimizes storage space utilization and reduces wasted floor space. Additionally, WMS can analyze historical data to predict demand patterns, allowing for efficient allocation of storage space and minimizing product handling costs.

4. After-Sales Service

Predictive Maintenance for Customers: Sensor data collected from connected products can predict potential failures. This allows manufacturers to offer preventative maintenance services to customers, minimizing downtime and enhancing customer satisfaction. Additionally, data analysis can identify recurring product issues, enabling proactive design improvements and reducing future warranty claims.

Customer Segmentation and Targeted Service: Customer data analysis helps identify high-value customer segments. Manufacturers can then tailor service offerings and pricing strategies specifically for these segments, optimizing service costs and maximizing customer lifetime value.

How can Persistent help?

Persistent's end-to-end offerings help you define the data strategy roadmap, implement a modern cloud data stack, put together the governance and security frameworks, and manage the data quality using modern data mesh and operations principles. We help you put together master data management and data cataloging solutions. Our robust data science capabilities can help you improve your business processes by leveraging the power of AI and ML solutions. Our ML Ops offerings can help you launch and maintain your data science use cases quickly and systematically. Finally, our purpose-built business solutions and accelerators can deliver results 3x faster than custom integrations.

Build a data foundation you can rely on with our partner ecosystem developed over 30 years as an engineering and implementation partner for leading data technology providers and an award-winning practice which has 3,000+ certified professionals and is recognized by all leading sourcing advisories.

Decarbonize and shift toward sustainable energy sources

In the face of escalating environmental concerns and stringent regulations, European manufacturing companies are increasingly recognizing the importance of monitoring emissions. Monitoring Scope 1, Scope 2, and Scope 3 emissions is crucial for achieving sustainability objectives, ensuring compliance with regulations, and fostering corporate responsibility. Digital technology plays a vital role in this process, offering precision, efficiency, and the ability to make informed decisions based on real-time data.



Scope 1 Emissions

Direct emissions from owned or controlled sources — represent the immediate impact of a company's operations. Monitoring these emissions with digital tools allows for the identification and mitigation of direct pollution sources, such as emissions from manufacturing processes or company vehicles. Digital technologies enable companies to track these emissions accurately, helping to pinpoint areas for reduction and optimize energy use. Apart from emissions, tracking energy efficiency in various parts of the operations is another important area where technology can be a savings enabler.



Scope 2 Emissions

Indirect emissions from the generation of purchased energy highlight the importance of energy sourcing decisions. Digital monitoring solutions can track the amount of purchased energy and its associated emissions footprint, encouraging companies to shift towards greener energy sources and reduce their indirect environmental impact.



Scope 3 Emissions

All other indirect emissions that occur in a company's value chain are often the most challenging to monitor due to their dispersed nature. However, digital technologies provide a means to gather and analyze data from across the supply chain, from the procurement of raw materials to end-product disposal. By analyzing data on shipping routes, modes of transportation and supplier locations, companies can minimize the carbon footprint associated with sourcing raw materials and distributing finished products and reduce transportation-related emissions. This comprehensive visibility enables companies to engage with suppliers on sustainability practices, reduce waste, and optimize logistics for lower emissions.



By leveraging digital technology to monitor Scope 1, Scope 2, and Scope 3 emissions, European manufacturing companies can gain a holistic understanding of their environmental impact. This not only aids in compliance and reporting but also drives operational efficiencies, cost savings, and ultimately, a competitive advantage in a market increasingly focused on sustainability. By demonstrating a commitment to sustainability and accountability, companies can enhance their brand reputation and attract environmentally conscious partners, customers, and investors.

How can Persistent help?

Persistent can help to optimize your manufacturing processes, enabling seamless sales, serve customers efficiently and improve customer engagement. We help to enable real-time visibility into the production process, inventory management, order fulfillment and more. We help to enable synchronized flow of information between CRM, ERP, and any external systems for insights impacting key processes — from order management to logistics.

We deliver client value through industry offerings built on Salesforce Industry Clouds, predictive and GenAI-powered Data Cloud solutions, and domain expertise. Persistent is one of the Top 10 Salesforce partners globally with over 19 years of implementation and consulting experience.

Our Service Lines

Fueling the next wave of digital transformation for our clients.

Digital Strategy and Design

Experience Design
Digital Innovation Lab
Technology Advisory
and Consulting

Software Product Engineering

Product and Platform Strategy
Product and Platform Engineering
Product Modernization
Product Sustenance and Support

CX Transformation

CX Strategy
Salesforce Cloud
Implementation
CX Platform Integration
Customer Analytics and Insight
Salesforce Industry Solutions
and Accelerators

Enterprise Applications and Integration

Application Portfolio Rationalization
Application and Platform
Development
Application Modernization
Application Maintenance
and Support
Enterprise Integration

Data and Analytics

Data and Analytics Advisory
Data Governance, Management
and Security
Data Stack Modernization
Data Connectors and
Certification
Data Science and Machine
Learning

Cloud and Infrastructure

Cloud and Infrastructure Advisory
Cloud Migration and
Modernization
Hybrid and Multi-Cloud
Transformation
Data Center Modernization
Intelligent IT
Operations

Intelligent Automation

Hyperautomation Strategy
Business Process Management
Low-Code Development
Robotic Process
Automation
Conversational AI

Enterprise Security

Cyber Resiliency Strategy
Security Assurance and Data
Security
Identity Access Management
Governance, Risk and Compliance
Managed Security Services

Focused on Delivery Excellence

Persistent utilizes a three-pronged approach to ensure delivery excellence for its clients.



Delivery predictability

Our delivery excellence and delivery orgs ensure predictability through SQA reviews, robust risk management practices, metrics management, and internal quality audits.



Engineering excellence

We're constantly enhancing engineering practices by utilizing tools and automation to improve cost, quality, and cycle time. We also provide recommended action plans, business value articulation and metrics for ongoing improvement.



Customer experience

We value customer feedback and our customer relationships to improve overall CX and CSAT, leveraging comprehensive CSAT surveys and QBRs with relevant stakeholders.

Our Delivery Excellence initiatives include Delivery 360°, which is focused on Customer, Commercial, Contract Engineering, and Team Excellence, as well as enhancing our internal Quality Management Systems.

Delivery Excellence

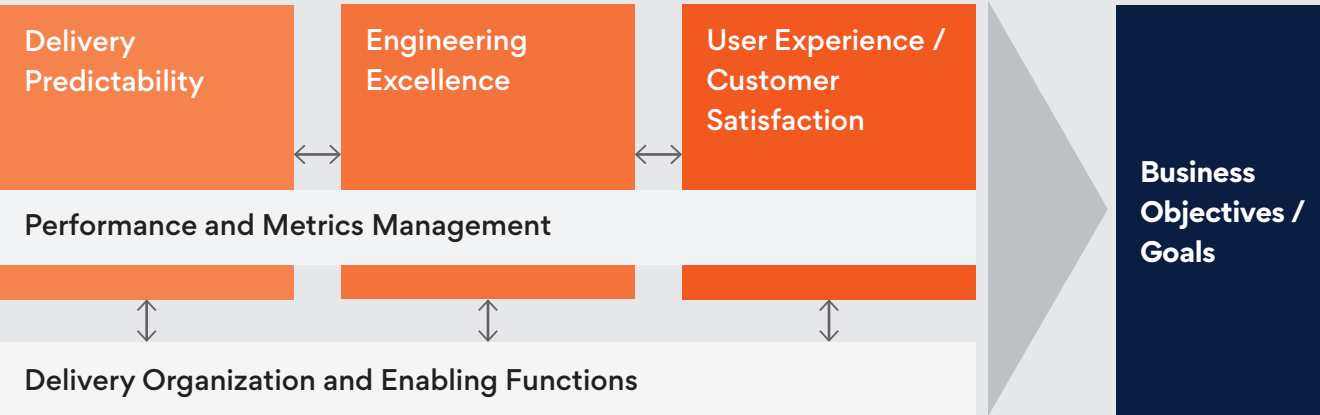


Figure: Persistent Delivery Excellence & Metrics Management Framework

Culture

Persistent's remarkable culture is founded on six commitments.

Support one another in being vulnerable, bold, and human, with mandated EQ training for all managers.

Build trusted relationships and encourage peer feedback from workplace collaborators.

Activate an innovator's mindset by scaling participation and promoting outcomes of our global hackathon.

Recognize efforts, celebrate success (with a dedicated project success celebration fund), and learn from failures.

Nurture our differences to tap the potential of everyone, with new quarterly awards for advocacy in Diversity, Equality & Inclusion.

Cultivate an environment of belonging to help employees bring their human side to work.

To build a sustainable cultural movement, we will measure our progress through the Persistent Culture Score, a composite measure of the overall health of the culture across the company.

Corporate Governance



Persistent Systems has been honored with the **Golden Peacock Award for Excellence in Corporate Governance 2023 in a national category (IT Sector)**

Persistent adopts special measures to bring transparency and accountability to its governance. The Chairman of the Board also conducts sessions for the directors and newly appointed directors, at regular intervals, to share current and global business scenarios.

We also have a one-of-a-kind stakeholders Relationship Committee to communicate with all key stakeholders, and through its foundation have supported numerous programs related to education, health, community development, and relief from natural calamities.



See Beyond, Rise Above

About Persistent

With over 23,000 employees located in 21 countries, Persistent Systems (BSE & NSE: PERSISTENT) is a global services and solutions company delivering Digital Engineering and Enterprise Modernization. As a participant of the United Nations Global Compact, Persistent is committed to aligning strategies and operations with universal principles on human rights, labor, environment, and anti-corruption, as well as take actions that advance societal goals. With 268% growth since 2020, Persistent is the fastest-growing Indian IT Services brand according to Brand Finance.

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