NTT DaTa

Global Supply Chain

Agile supply chain powered by blended AI

Navigating uncertainties while improving efficiency and agility with blended AI adoption

"Supply chain experts are seeking new, streamlined processes, organizational models, and technical capabilities that enable rapid response to multiple disruptions. This improves supply chain resilience and empowers teams to take optimal actions in terms of service and cost, driven by a high level of automation."

Tackling complex supply chain challenges

In today's manufacturing landscape, disruption is no longer the exception; it's the rule. From geopolitical instability and climate-related uncertainties to labor shortages and regulatory shifts, the sector is navigating a perfect storm of complexity. Yet within this turbulence lies a powerful opportunity: to reimagine operations through digital transformation and build supply chains that are not only more resilient but also more intelligent and sustainable.

Recent industry insights reveal that manufacturers are moving beyond reactive strategies. They are embracing predictive technologies and data-driven decision-making to anticipate disruptions before they occur. Artificial intelligence (AI), blockchain and IoT are no longer buzzwords. They are the backbone of a new operational model that prioritizes agility and transparency. Predictive analytics helps reduce lead times and improve inventory turnover. Blockchain enables real-time visibility across fragmented supply networks.

Simultaneously, the sector is grappling with a critical talent gap. As experienced workers retire and younger generations seek different career paths, companies are investing in automation and immersive training technologies like virtual reality to boost productivity and retention. These efforts are not just about filling roles. They're reshaping the workforce for a digital-first future.

Sustainability, once a secondary concern, is now central to strategic planning. Companies are under increasing pressure to reduce their environmental footprint. Many are responding by adopting green manufacturing practices, optimizing energy use through IoT and integrating renewable energy sources into their operations. These initiatives help meet regulatory demands while also driving long-term cost savings and brand value.

Regulatory compliance adds another layer of complexity. With rules evolving rapidly across regions, manufacturers are turning to AI-powered compliance systems that monitor changes in real time and reduce the burden of audits.

Finally, the challenge of integrating new technologies with legacy systems and their data silos remains a significant obstacle. Indeed, data quality, governance, and security remain the industry's top challenges.

Our recommendation before starting any proof of value is to take care of data. Without quality data the results will

not meet business stakeholders' expectations, leading to roadblocks in further transformational AI initiatives.

Volatility is the new normal: Insights from supply chain leaders

A recent survey conducted by NTT DATA revealed a striking consensus among supply chain executives:

Financial implications

80% Experienced significant volatility in demand and supply over the past year

18% Increase in material acquisitioin costs

12% Increase in production and transportation costs

These cost surges not only erode margins, but also complicate long-term planning and supplier negotiations.

Service performance

Growing difficulty in maintaining customer satisfaction amid unpredictable conditions

25% One in four respondents reported a decline in service levels

Adaptive, intelligent supply chain strategies that respond to disruption in real time and preserve efficiency and service quality are critical.

Our business approach

The future of supply chain management will be shaped by organizations' ability to embrace agility, harness emerging technologies and respond proactively to market volatility. Based on industry insights and best practices, we recommend that companies focus on the following four key areas to create a truly agile supply chain.

1. Improve visibility

Organizations should prioritize end-to-end visibility across the entire supply chain, including third-party partners and suppliers. Implementing a "control tower" solution — an integrated platform that collects, analyzes and presents real-time data — can empower teams to manage volatility, improve efficiency and reduce costs through informed, proactive decision-making.

2. Strengthen decision-making

We recommend leveraging advanced technologies such as digital twins and generative AI (GenAI) to simulate scenarios and optimize decisions before implementation. Aligning cross-functional teams and integrating AI-driven analytics can enable more accurate forecasting, faster responses to disruptions, and seamless convergence between digital and physical operations.

3. Drive performance through automation and autonomy

To achieve optimal performance, companies should automate repetitive processes wherever feasible and invest in agentic AI systems capable of handling complex, dynamic environments. While automation increases efficiency, maintaining human oversight for critical interventions ensures adaptability and resilience. This approach paves the way for highly autonomous operations, aiming toward the concept of "dark factories."

4. Focus on customer satisfaction

A customer-centric supply chain is essential for sustained success. We recommend optimizing product availability and distribution through AI-powered route planning and flexible last-mile delivery models. By personalizing services and enabling responsive order management, organizations can improve customer satisfaction and foster loyalty.

By focusing on these four strategic pillars, organizations can develop what we refer to as an agile[1] supply chain — a model that delivers a distinct competitive advantage in today's fast-changing business landscape. Adopting these recommendations will help companies build supply chains that are not only resilient and efficient but also capable of thriving in the face of uncertainty and continuous change.

Value for the client

Bottom line	Top line	Working capital
+30% incidents HC reduction	+5% service level improvement for non-standard references	24 hours WIP SS reduction
8% reduction of rush transportation	+10% revenues of new products introduction	Reduction of components inventory in OEM's production line
		23% improvement of stock accuracy

[1]Agile (Oxford English Dictionary):(adjective) Able to move quickly and easily; (extended meaning) able to think and understand quickly.

Our technical approach

The agile supply chain framework powered by blended AI

NTT DATA, with its full-stack capabilities spanning innovation, business consulting, technology, infrastructure and managed services, enables organizations to make their supply chains more agile by identifying processes to be transformed, assessing the best technological solution, executing the implementation and ensuring the adoption. Strong partnerships (for example, Microsoft) and focused investments in disruptive technologies like GenAI/agentic AI position NTT DATA as the partner of choice for improving core key performance indicators (KPIs) and maximizing return on investment (ROI).

NTT DATA leverages the blended AI paradigm by developing a framework of advanced capabilities that is not just reactive, it's proactively intelligent. Together, the Smart AI Agent™ and Syntphony™ Autonomous Supply Chain solutions enable use cases such as inbound task manager, shopfloor assistant, smart logistics and smart orders, demonstrating how organizations can dynamically adapt to disruptions, optimize resource allocation and accelerate cycle times.

Agile supply chain powered by blended AI

Processes:	Procurement execution	Manufacturing execution	Stock & transport management	Order management
Use cases:	Inbound task manager	Shopfloor assistant	Smart logistics	Smart orders
Solutions:	Syntphony Autonomous Supply Chain + Smart AI Agent			
Data and actions:	Control Tower / ERP / MES / TMS / GMAO ...			

Each technology component within the agile supply chain framework contributes specific features to improve business processes. They help organizations shift from reactive to proactive operations and reduce delays and manual workloads while improving resilience, agility and end-to-end visibility across the supply chain.

The following table details some contributions of each AI capability:

Supply chain process	Machine learning	Generative AI	Agentic AI	Syntphony ASC	Agile benefit
Demand forcasting	Dynamic predictions	Scenario modeling	Real-time data integration, autonomous adjustment	N/A	Flexibility, responsiveness
Inventory management	Predictive analytics	Automated optimization	Dynamic stock adjustment, auto-replenishment	WIP optimization	Reduced waste, cost efficiency
Logistics and fulfillment	Route and delivery prediction	Route and delivery optimization	Autonomous rerouting	Disruption response	Faster, more reliable deliveries
Supplier management	Supplier performance prediction	Data-driven insights including unstructured data, automated communication	Performance monitoring, compliance checks	Incident management, task management	Stronger partnerships, fewer delays
Risk and resilience	Incident prediction	Scenario generation and simulation	Orchestration, human in the loop	Autonomous mitigation, proactive alerts	Enhanced resilience, continuity

Our blended AI ecosystem

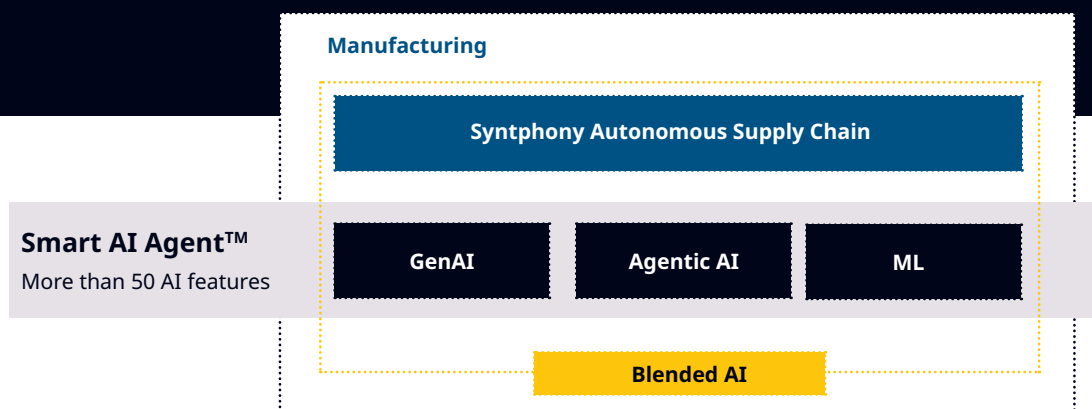## The best of each AI feature is seamlessly integrated into every use case

Our Smart AI Agent ecosystem includes generative AI, our own large language model (LLM) — Tsuzumi, agentic AI and machine learning (ML), among more than 50 other key capabilities, including:

- **Task planning:** Automating complex workflows by autonomously dividing tasks into streamlined processes.

- **Multi-agent collaboration:** Enabling multiple AI agents to work together on workflows for improved efficiency and effectiveness.

- **Advanced retrieval-augmented generation (RAG):** Providing contextual searches of internal corporate data for higher quality results.

- **Agent Ops:** Generating validation data from business documents to optimize operational processes.

- **User-in-the-loop (UITL):** Leveraging continuously improving agent workflows based on user feedback to create a cycle of autonomous optimization.

Plus, our consulting and advisory teams use advanced assessment tools to design your AI transformation journey. Examples include an agents heatmap, which helps prioritize and categorize agent-based transformation, and GenAI Maturity Model, which assesses each client's capabilities and develops a roadmap for GenAI adoption.

We developed our proprietary Syntphony Autonomous Supply Chain for the manufacturing industry (listed on the Microsoft Azure Marketplace) for use cases that have intensive processes with short lead times and multiple inter-connected steps and that require real-time access to data and smart decision-making.

- **Powered by cognitive intelligence:** Evaluates operational events in real time, optimizes decision-making and continuously improves processes efficiency.

- **Problem solving:** Leverages a collaborative set of intelligent agents to break down complex problems, generating adaptive, effective action plans across the supply chain.

- **Real-time sensibility:** Provides instant access to key data, enabling agile, accurate decisions based on up-to-date operational insights.

- **GenAI-native capabilities:** Integrates GenAI capabilities for human interactions such as providing explanations for decision-making processes.

Manufacturing

Syntphony Autonomous Supply Chain

Smart AI Agent™
More than 50 AI features

| GenAI | Agentic AI | ML |

Blended AI

Available on
Microsoft Azure Marketplace

Microsoft

The strategic alliance with Microsoft integrates our solution with the Azure platform, improving the innovation within Syntphony Autonomous Supply Chain. It provides access to Microsoft's commercial network across countries. In fact, we have leveraged Azure consumption rebates to fund first supply chain projects and MVPs, enabling our clients to capitalization on Azure consumption credits.

Syntphony Autonomous Supply Chain is available on Azure marketplace in co-sell.
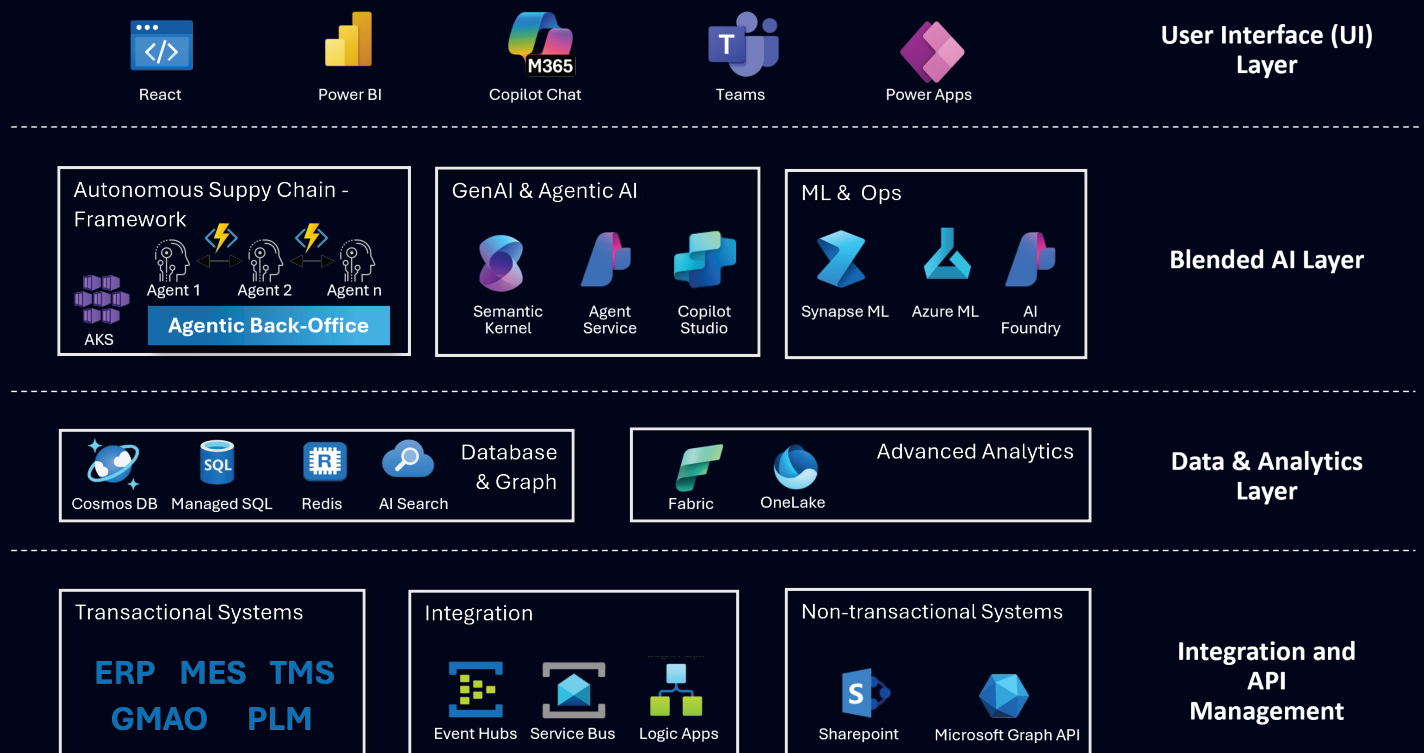
Blended AI on the Microsoft AI ecosystem

NTT DATA, in collaboration with Microsoft, has designed an architecture based on a secure and hybrid cloud technology stack tailored for the industrial sector. This architecture maximizes the value of platforms that support the blended AI lifecycle, such as Azure AI Foundry, among other resources and services. It is globally deployable and designed to meet requests from multiple regions, enabling the key principles of observability, regulatory and compliance standards, security and governance best practices.

The user interface (UI) layer provides the front-end tools that enable each user type to interact with the system. It includes platforms like Agent Studio by NTT DATA, Microsoft Power BI, Microsoft 365 Copilot Chat and Microsoft Teams, offering intuitive dashboards, conversational interfaces and collaborative environments. This layer ensures that users can easily access insights, interact with AI agents and make data-driven decisions in real time.

The application layer is the core of the solution, orchestrating intelligent operations. It features the Agents Management System, with an agentic back-office to coordinate multiple agents, and a robust intelligence and learning modeling environment powered by tools like Synapse ML, OpenAI Kernel and Semantic Kernel. The AI foundry supports the development and deployment of AI models, enabling adaptive, scalable and context-aware agent behavior.

Beneath this, the data and analytics layer and the integration layer ensure seamless data flow and system interoperability. The data layer includes Cosmos DB, SQL, Redis and Fabric OneLake for advanced analytics and graph-based data modeling.

User Interface (UI) Layer
- React
- Power BI
- Copilot Chat
- Teams
- Power Apps

Blended AI Layer

Autonomous Supply Chain - Framework
- Agent 1
- Agent 2
- Agent n
- AKS
- Agentic Back-Office

GenAI & Agentic AI
- Semantic Kernel
- Agent Service
- Copilot Studio

ML & Ops
- Synapse ML
- Azure ML
- AI Foundry

Data & Analytics Layer

Database & Graph
- Cosmos DB
- Managed SQL
- Redis
- AI Search

Advanced Analytics
- Fabric
- OneLake

Integration and API Management

Transactional Systems
- ERP   MES   TMS
- GMAO   PLM

Integration
- Event Hubs
- Service Bus
- Logic Apps

Non-transactional Systems
- Sharepoint
- Microsoft Graph API

Available on
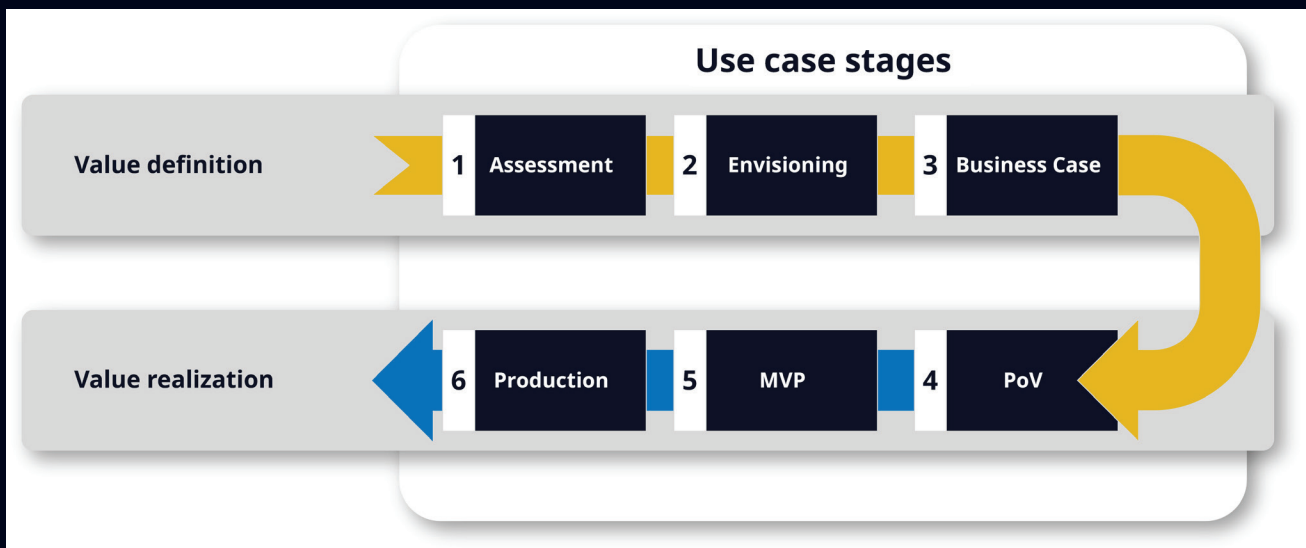**Microsoft Azure Marketplace**

Microsoft

Customer use cases

Real use cases with global manufacturers at various stages of implementation

Successful use case development begins with a clear definition of business value that transcends the technology solution itself. Focusing first on assessing business needs, aligning expectations and predicting impactful outcomes through agreed-upon metrics and KPIs should ensure that each initiative strategically aligns across business and technology stakeholders. This foundation enables subsequent phases to effectively generate value, maximizing the impact of use cases on supply chain processes and driving meaningful transformation.

Business value delivery

Use case stages

| Value definition | 1 Assessment | 2 Envisioning | 3 Business Case |
| Value realization | 6 Production | 5 MVP | 4 PoV |

Delivering business value at various stages to achieve agile supply chain adoption
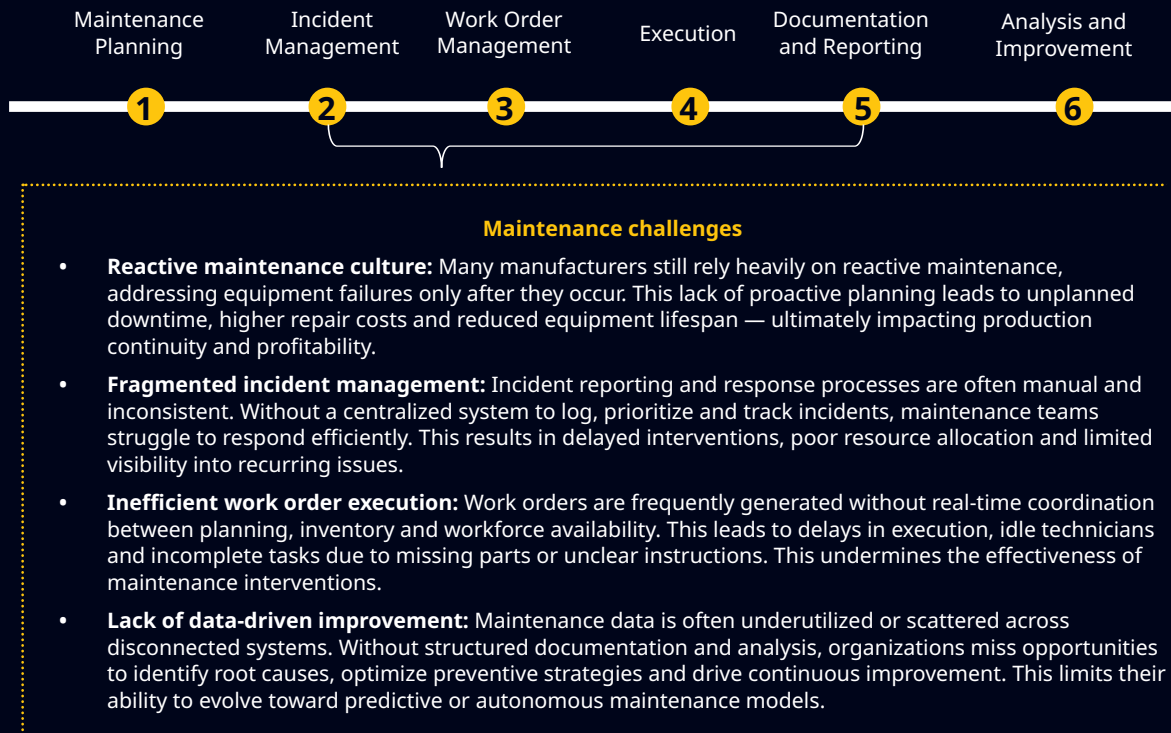
Below, we detail several real customer use cases where NTT DATA is accelerating the adoption of blended AI at leading manufacturing companies. These impactful use cases address different supply chain challenges and are currently in various stages of implementation, from proof of value (POV) to solution in production. Some of the challenges manufacturing companies in sectors such as vehicle manufacturing, steel, cosmetics, glass and drywall face include:

1. **Assisted maintenance:** Minimizing downtime, extending asset life and supporting operational excellence in manufacturing environments. Statis: Solution in production.

2. **Logistics optimization:** Integrating real-time data from across the plant enables synchronized material flows between transformation, shaping and finishing stages, significantly reducing idle time and boosting overall throughput. Status: Making PoV.

3. **Task management in inbound logistics:** Addressing these pain points requires a unified, intelligent approach to inbound logistics, one that centralizes communication, automates task assignment and provides real-time visibility across the entire process. Status: Delivering an MVP.

4. **Order management optimization:** Transforming order management into a self-learning, predictable and adaptable ecosystem that drives efficiency, accuracy and customer centricity at scale. Status: Delivering PoV.

5. **Transport efficiency:** Orchestrating communication between stakeholders and contract compliance, ensuring rapid resolution, minimal disruption and reduced operational costs. Status: Delivering PoV.

Assisted maintenance
Optimizing the maintenance process for industrial manufacturers

Maintenance Planning	Incident Management	Work Order Management	Execution	Documentation and Reporting	Analysis and Improvement
1	**2**	**3**	**4**	**5**	**6**

Maintenance challenges

- **Reactive maintenance culture:** Many manufacturers still rely heavily on reactive maintenance, addressing equipment failures only after they occur. This lack of proactive planning leads to unplanned downtime, higher repair costs and reduced equipment lifespan — ultimately impacting production continuity and profitability.

- **Fragmented incident management:** Incident reporting and response processes are often manual and inconsistent. Without a centralized system to log, prioritize and track incidents, maintenance teams struggle to respond efficiently. This results in delayed interventions, poor resource allocation and limited visibility into recurring issues.

- **Inefficient work order execution:** Work orders are frequently generated without real-time coordination between planning, inventory and workforce availability. This leads to delays in execution, idle technicians and incomplete tasks due to missing parts or unclear instructions. This undermines the effectiveness of maintenance interventions.

- **Lack of data-driven improvement:** Maintenance data is often underutilized or scattered across disconnected systems. Without structured documentation and analysis, organizations miss opportunities to identify root causes, optimize preventive strategies and drive continuous improvement. This limits their ability to evolve toward predictive or autonomous maintenance models.

Optimizing the maintenance management process

The maintenance management process in industrial manufacturing is a structured, end-to-end framework designed to ensure the reliability, safety and efficiency of production assets. It encompasses six key phases:

- **Maintenance planning:** Develop comprehensive maintenance schedules based on equipment usage, manufacturer guidelines and historical performance data. This proactive planning helps minimize unexpected breakdowns and ensures optimal equipment performance.

- **Incident management:** Implement a structured approach for reporting and managing incidents such as machine breakdowns. This phase involves prioritizing incidents, assessing their impact on production and mobilizing maintenance resources quickly to address these issues.

- **Work order management:** Generate and assign work orders that detail the maintenance tasks required, whether planned or in response to an incident. This includes ensuring that all necessary parts and personnel are available for efficient execution.

- **Execution:** Conduct maintenance activities as outlined in the work orders. This phase emphasizes adherence to safety standards and operational protocols, particularly during urgent incident responses to minimize downtime.

- **Documentation and reporting:** Record all maintenance activities, including routine tasks and incident responses. Documenting outcomes, resources used and any issues encountered is crucial for maintaining a historical record that supports future planning and analysis.

- **Analysis and improvement:** Conduct a thorough analysis of maintenance data, focusing on incidents and equipment performance trends. This analysis aids in identifying the root causes of breakdowns and facilitates the development of strategies for continuous improvement to reduce future incidents and improve overall operational efficiency.

This process is fundamental in minimizing downtime, extending asset life and supporting operational excellence in manufacturing environments.

Shopfloor assistant

NTT DATA partnered with a global manufacturing leader that designs, develops, and manufactures metal components for the automotive industry, focusing on innovation to create safer and lighter vehicles.

Existing challenges in maintenance

In the manufacturing industry, one of the most critical operational challenges is ensuring production continuity while minimizing unplanned downtime. Equipment failures on the production line not only disrupt workflow but also lead to significant financial losses, compromise product quality and jeopardize delivery timelines.

Traditional reactive maintenance models lack real-time visibility and harmonization, are highly dependent on manual escalation, and have poor coordination between roles and unstructured data capture.

Proposed solution

To address the inefficiencies of traditional maintenance workflows, we deployed an integrated AI agent-like virtual assistant into the production environment. This agent acts as a first line of support for operators when a breakdown occurs. It guides them through standardized troubleshooting procedures and enables immediate escalation when necessary.

The solution is built on a connected digital ecosystem that integrates key platforms and tools: MES, ERP, CMMP and Knowledge Base. The digital platform is based on the Microsoft cloud and AI stack (cloud services on Azure and Semantic Kernel as the GenAI orchestrator).

Achieved benefits

- **Reduces downtime:** Improves overall equipment effectiveness.

- **Improves role efficiency:** Optimizes distribution of workload maintenance tasks.

- **Delivers faster access to technical knowledge:** Enables operators to retrieve relevant documentation and procedures instantly.

- **Allows complete traceability:** Logs every incident to gather the conversation context, enabling root cause analysis and continuous process optimization.

- **Provides scalability and standardization:** Allows the solution to be replicated across different production lines and sites.

Intra- & inter-logistics optimization

Optimizing the Source to Delivery (STD) process for industrials manufacturers

Inbound Transportation	Primary Transformation	Intra-Logistics	Shaping	Finishing	Outbound Transportation
1	**2**	**3**	**4**	**5**	**6**

Logistics between factories

- Lack of real-time visibility and operating with fragmented systems that do not provide real-time tracking of material movements. This may lead to inefficient internal movements between the different stages of the productive process, such as delays, misplaced inventory or inefficient routing of goods between production stages.

- Significant time spent by the scheduling team planning material movements and reviewing it as changes or exceptions appear (quality issues, material availability, machine breakdowns, urgencies and so on).

- Difficulties and inefficiencies generated while manually managing exceptions in tense flows, high amount of available data and variability in the process.

Logistics within factory

- Internal logistics often rely on human schedulers to coordinate material transfers. This manual process is time-consuming, error-prone and unable to adapt quickly to changing production conditions or disruptions. This leads to inefficient internal movements between different stages of the process.

- Uncoordinated material flows. Due to unsynchronized planning between production lines and logistics, material may arrive too early or too late. This causes bottlenecks, idle machines or excessive work-in-process inventory (WIP).

- Inefficient use of handling equipment. Forklifts, AGVs, conveyors and other equipment are frequently underutilized or misallocated due to lack of dynamic task assignment. This leads to increased lead times, reduced throughput and higher operational costs.

Optimizing the source to delivery

The source-to-delivery process in industrial manufacturing is a complex, multistage journey that transforms raw materials into finished goods ready for customer delivery. This process spans six critical stages:

- **Inbound transportation:** Raw materials are received from suppliers and transported to the manufacturing facility.

- **Primary transformation:** Initial processing of raw materials into intermediate forms suitable for further shaping.

- **Intra-logistics:** Internal movement of materials between production stages within the plant.

- **Shaping:** Mechanical or thermal processes that define the product's geometry and structure.

- **Finishing:** Surface treatments, coatings or final adjustments to meet quality standards and customer specifications.

- **Outbound transportation:** Final products are packaged and shipped to customers or distribution centers.

Among these stages, intra-logistics often represents a hidden bottleneck. Unlike external logistics, internal flows are subject to dynamic, real-time conditions — machine availability, operator shifts and unexpected delays. Traditional scheduling systems struggle to adapt, requiring manual intervention and valuable supervisory time. The result is inefficient material movement, increased lead times and underutilized resources.

To address these challenges, NTT DATA deploys our Syntphony Autonomous Supply Chain solution. Powered by a multi-agent system, the platform operates continuously to detect, interpret and autonomously resolve disruptions as they occur. By integrating real-time data from across the plant, it enables synchronized material flows between transformation, shaping and finishing stages, significantly reducing idle time and boosting overall throughput.

Use case 2: The solution

Smart logistics

NTT DATA partnered with a global steel leader to implement an innovative autonomous agents solution, automating and intelligently adapting critical production scheduling for both intra- and inter-plant material transfers.

Challenges in intra- and inter-logistics

The client faces significant operational challenges at its large metallurgical facilities, where continuous production is essential. Among them are:

- **Dynamic and unpredictable conditions:** Fluctuating demand and unforeseen incidents (equipment failures, quality issues); transportation delays between plants and evolving internal logistical needs.

- **Inflexible manual scheduling:** Inability to adapt to real- time changes and disruptions leads to outdated plans and production line downtime.

- **Logistical bottlenecks and inefficiencies:** Complex inter-plant coordination causes missed consumption windows. Uncertain transfer times and manual oversight lead to sub-optimal inventory (over/under-stocking). Inefficient internal material movement results in poor resource utilization and potential last-minute production stoppages.

Proposed solution

NTT DATA implemented Syntphony Autonomous Supply Chain to automate and optimize the client's metalworking operations as follows:

- **Autonomous continuous scheduling:** Dynamically adjusts production schedules in real time. Responds to triggers like low stock, demand shifts, incidents and transport delays.

- **Intelligent inter-plant material transfer:** Real-time supervision of material shipments between plants.
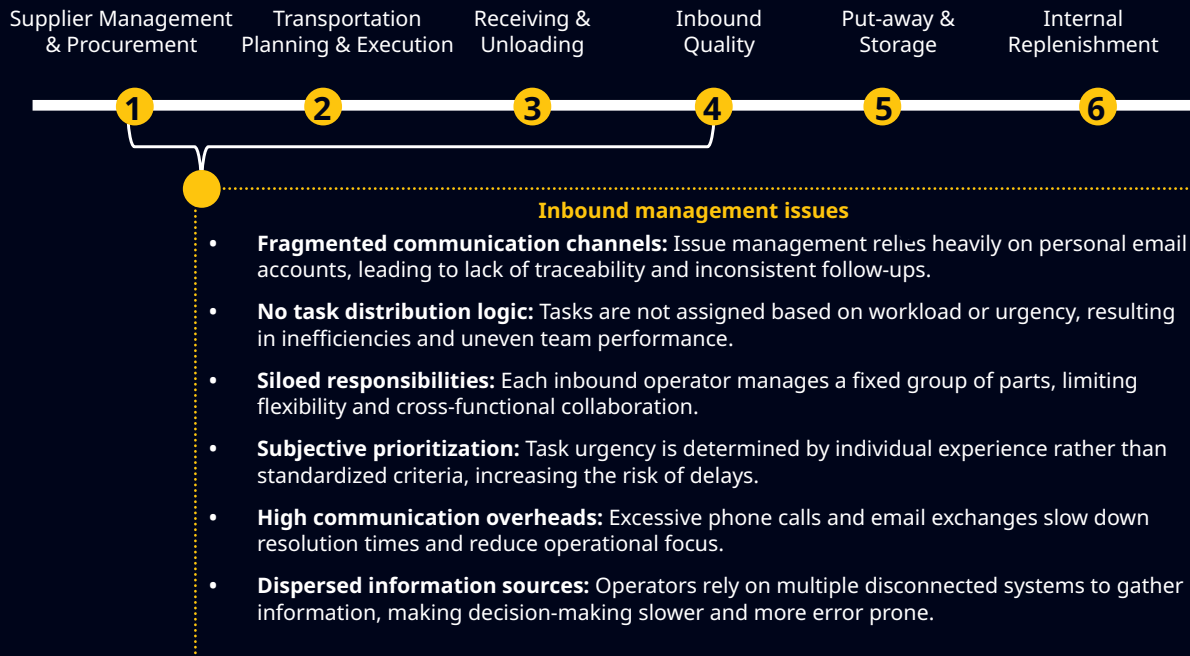
Achieved benefits

- Minimizes downtime
- Achieves faster, optimized planning
- Improves logistics
- Increases availability and trust

Inbound Logistics

During the inbound logistics process, it is necessary to manage incidents efficiently

Supplier Management & Procurement	Transportation Planning & Execution	Receiving & Unloading	Inbound Quality	Put-away & Storage	Internal Replenishment
1	**2**	**3**	**4**	**5**	**6**

Inbound management issues

- **Fragmented communication channels:** Issue management relies heavily on personal email accounts, leading to lack of traceability and inconsistent follow-ups.

- **No task distribution logic:** Tasks are not assigned based on workload or urgency, resulting in inefficiencies and uneven team performance.

- **Siloed responsibilities:** Each inbound operator manages a fixed group of parts, limiting flexibility and cross-functional collaboration.

- **Subjective prioritization:** Task urgency is determined by individual experience rather than standardized criteria, increasing the risk of delays.

- **High communication overheads:** Excessive phone calls and email exchanges slow down resolution times and reduce operational focus.

- **Dispersed information sources:** Operators rely on multiple disconnected systems to gather information, making decision-making slower and more error prone.

Optimizing inbound logistics processes

Inbound logistics is a critical component of the manufacturing supply chain. It encompasses all activities, from supplier coordination to the internal delivery of materials to production lines. The process typically includes six key stages: supplier management and procurement, transportation planning and execution, receiving and unloading, inbound quality control, put-away and storage, and internal replenishment. Each of these steps must function seamlessly to ensure that materials arrive on time, in the right condition, and are efficiently integrated into production workflows.

However, many manufacturers face persistent inefficiencies in managing this process. One of the most common issues is fragmented communication channels. Incident management often relies on personal email accounts, making it difficult to track, prioritize or escalate issues effectively. This lack of traceability leads to inconsistent follow-up and delays in resolution. Additionally, the absence of a structured task distribution system means that workloads are unevenly assigned, reducing overall team efficiency.

Another major challenge is the siloed nature of responsibilities. Inbound operators are typically assigned to fixed groups, which limits flexibility and prevents dynamic reallocation of tasks based on real-time needs. Prioritization is often subjective. It relies on individual experience rather than standardized criteria, which increases the risk of overlooking critical issues. These inefficiencies are compounded by high communication overheads, such as excessive phone calls and email exchanges that slow down operations and distract resources from core tasks.

Finally, the use of multiple disconnected systems to access information further complicates decision-making. Operators must navigate various platforms to gather data. This not only consumes time but also increases the likelihood of errors. Addressing these pain points requires a unified, intelligent approach to inbound logistics — one that centralizes communication, automates task assignment and provides real-time visibility across the entire process.

Task manager

NTT DATA partnered with an automobile maker to optimize inbound operations during vehicle manufacturing.

Existing challenges in inbound logistics

Automobile makers navigate a complex global automotive manufacturing environment, balancing just-in-time (JIT), direct delivery and non-JIT logistics. Maintaining a continuous material flow for fluctuating production schedules is critical but hindered by:

- **Dynamic schedules and diverse supply bases:** Frequent changes in production orders and managing a vast global supplier network with varying lead times.

- **Visibility gaps and manual incidents:** A lack of real-time visibility on critical stock levels leads to numerous time-consuming manual tasks for urgent issues.

Proposed solution

Our solution combines intelligent task creation from diverse sources using predefined rules and hyper-automation via Syntphony Autonomous Supply Chain. This results in significantly faster incident handling times, near real-time risk mitigation for production-critical materials and direct improvement in operational efficiency. Ultimately, this led to greater assembly line responsiveness, fewer unplanned stoppages and better collaboration between logistics teams across multiple plants.

Main features:

- Autonomous agents proactively manage real-time deviations by processing alerts from various systems and leveraging generative AI to interpret unstructured data (like emails), extracting critical operational insights.

- The task manager automates task creation based on predefined rules and continuous monitoring of stock levels, consumption and production plans. It categorizes material needs into high, medium or low priority to address issues ranging from critical JIT or direct delivery stock-outs to preventive actions, ensuring efficient material flow.
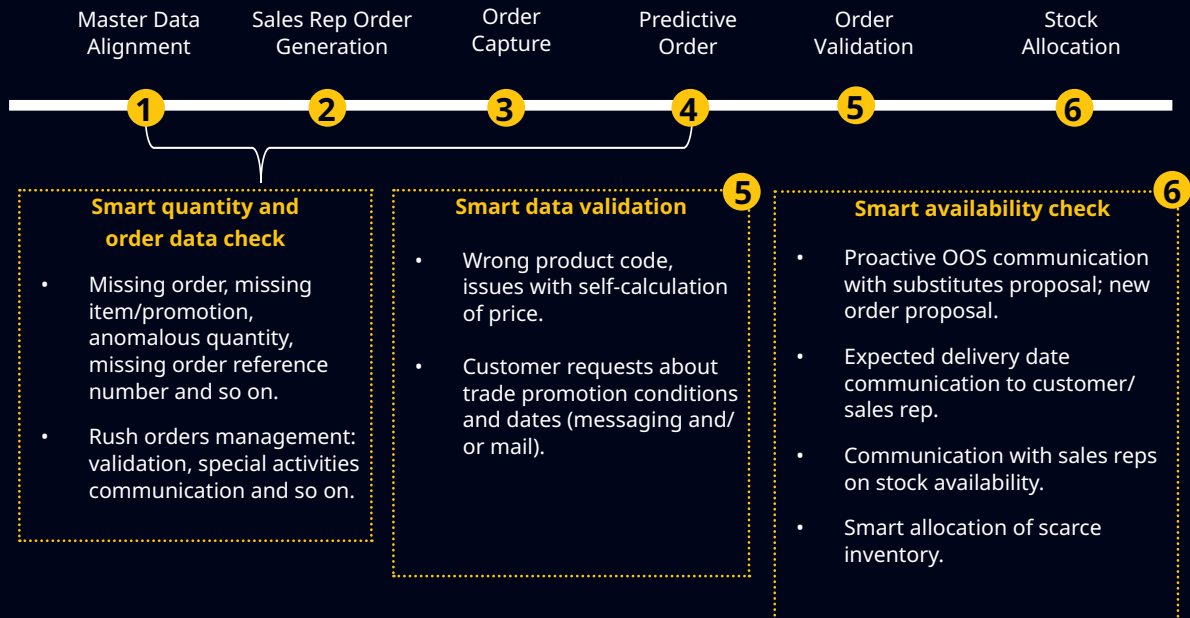
Achieved benefits:

- Processes tasks faster
- Automates critical workflows
- Improves tasks visibility and clarity
- Increases inbound operations efficiency

Order management optimization

Optimizing order management is key to improving supply chain excellence

Master Data
Alignment — **1**

Sales Rep Order
Generation — **2**

Order
Capture — **3**

Predictive
Order — **4**

Order
Validation — **5**

Stock
Allocation — **6**

5

6

Smart quantity and order data check

- Missing order, missing item/promotion, anomalous quantity, missing order reference number and so on.

- Rush orders management: validation, special activities communication and so on.

Smart data validation

- Wrong product code, issues with self-calculation of price.

- Customer requests about trade promotion conditions and dates (messaging and/ or mail).

Smart availability check

- Proactive OOS communication with substitutes proposal; new order proposal.

- Expected delivery date communication to customer/ sales rep.

- Communication with sales reps on stock availability.

- Smart allocation of scarce inventory.

Optimizing order management processes

Supply chain and ML algorithms revolutionize order management by embedding intelligence into every phase of the process. In the initial stages, smart quantity and order data checks ensure complete and accurate data by detecting missing items, anomalous quantities or absent references. This enables real-time validation of rush orders and seamless communication of special activities, reducing manual workload and accelerating order cycle times through autonomous, self-correcting mechanisms.

As the process progresses, smart data validation improves operational reliability by automatically resolving product code discrepancies and recalculating pricing errors. It also manages customer inquiries related to trade promotions through intelligent messaging, ensuring timely and accurate responses. These capabilities not only reduce the risk of human error but also elevate customer experience by enabling faster, AI-driven resolution of complex requests. This frees up human agents to focus on higher-value interactions.

In the final phase, smart availability check leverages predictive intelligence to optimize inventory allocation and customer communication. By proactively identifying out-of-stock scenarios, suggesting substitutes and forecasting delivery dates, the system ensures transparency and continuity in order fulfillment. AI-driven allocation strategies maximize the use of limited stock, while real-time updates to sales reps and customers foster trust and agility. Together, these use cases demonstrate how blended AI transforms order management into a self-learning, adaptive ecosystem that drives efficiency, accuracy and customer-centricity at scale.

Smart orders

NTT DATA partnered with a renowned cosmetics and personal care brand to optimize their Order to Delivery (OtD) process using our blended AI approach.

Existing challenges in order management

Finished goods rounding: Automatically adjusting non-integer case order quantities to the nearest full or partial case number, reducing manual complexity and picking costs associated with split cases.

- A significant portion (42%) of daily orders could be rounded.
- Identified over 98 thousand lines that could be rounded annually across thousands of SKUs.
- Some customers showed high rounding potential for specific products.

Outlier order management: Handling orders with quantities that significantly deviate from standard demand patterns that cause stockouts and require careful, strategic response.

- Hundreds of annual outlier events were identified (~+1300).
- Many could lead to secondary out of specification issues across multiple SKUs.

Proposed smart orders approach

We deployed Syntphony Autonomous Supply Chain to analyze incoming orders in real time against historical data, business rules and demand forecast. It automatically:

- Detects rounding opportunities.
- Manages order frequency adjustments for efficiency.
- Flags outlier orders for intervention.

Integrated Smart AI Agents™ capabilities summarize the analysis results and potentially generate optimized customer communications or alerts, enhancing decision-making speed.
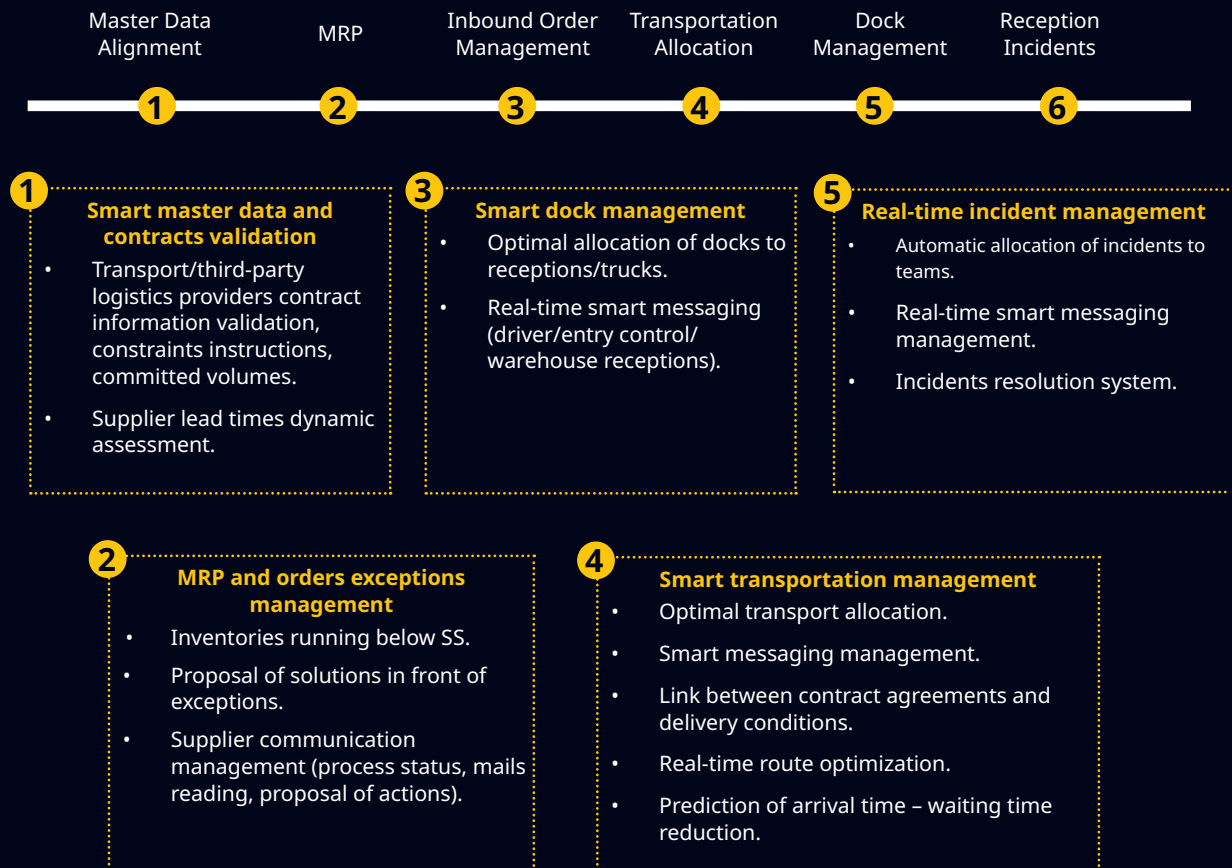
Expected benefits

- Significantly reduces manual effort.
- Increases operational efficiency and cost savings.
- Improves accuracy.
- Adds strategic value and builds customer satisfaction.

Transport efficiency

Achieving higher levels of efficiency to maintain profitability

Master Data Alignment	MRP	Inbound Order Management	Transportation Allocation	Dock Management	Reception Incidents
1	2	3	4	5	6

1 Smart master data and contracts validation
- Transport/third-party logistics providers contract information validation, constraints instructions, committed volumes.
- Supplier lead times dynamic assessment.

3 Smart dock management
- Optimal allocation of docks to receptions/trucks.
- Real-time smart messaging (driver/entry control/ warehouse receptions).

5 Real-time incident management
- Automatic allocation of incidents to teams.
- Real-time smart messaging management.
- Incidents resolution system.

2 MRP and orders exceptions management
- Inventories running below SS.
- Proposal of solutions in front of exceptions.
- Supplier communication management (process status, mails reading, proposal of actions).

4 Smart transportation management
- Optimal transport allocation.
- Smart messaging management.
- Link between contract agreements and delivery conditions.
- Real-time route optimization.
- Prediction of arrival time – waiting time reduction.

Optimizing transport management processes

Under the smart transport paradigm, the integration of blended AI — through Smart AI Agents, Syntphony Autonomous Supply Chain and ML algorithms — redefines how logistics operations are executed across every phase. In the early stages, intelligent validation of master data and contracts ensures that supplier agreements and transport constraints are automatically verified and dynamically updated. This not only eliminates manual inconsistencies but also improves planning accuracy by continuously learning from lead time variations and contractual performance. It also enables a more adaptive and resilient supply chain foundation.

As the process advances into order and transport management, Syntphony Autonomous Supply Chain enables real- time decision-making through autonomous agents that optimize transport allocation, dock scheduling and route planning. These agents interpret contextual data, predict arrival times and adjust operations dynamically to reduce waiting times and improve delivery reliability. The synergy between ML and smart messaging ensures that every decision is both data-driven and operationally aligned, significantly reducing costs and increasing service levels.

In the final stages, incident management and reception processes are transformed by autonomous systems that detect, classify and assign issues in real time. The Smart AI Agent orchestrates communication between stakeholders, ensuring rapid resolution and minimal disruption. This end-to-end intelligence not only accelerates response times but also feeds back into the system to refine future decisions continuously. The result is an automated, self-optimizing supply chain capable of learning, adapting and improving with every transaction.

Smart transport

NTT DATA partnered with a French manufacturer to optimize their transport management execution (TME) process using our blended AI approach.

Existing challenges in transport management

The client, a global leader in sustainable building materials, embarked on an innovative project called Smart Deliveries to optimize the TME process. This case study showcases how AI can revolutionize logistics and transportation management, helping the client overcome several critical challenges in the logistics chain.

The smart deliveries solution integrates blended AI functionalities across six key stages of the TME process:

- **AI contract reading:** Automates extraction and analysis of key contract terms.

- **Shipment scheduling:** Optimizes scheduling based on real-time data and predictive models.

- **Transportation execution:** Efficiently coordinates carriers and confirms departures.

- **Delivery management:** Monitors and manages deliveries in real time.

- **Performance evaluation:** Continuously assesses carrier performance and process optimization.

- **Load cost management:** Conducts dynamic cost allocation and KPI analysis.

Expected benefits

The expected benefits from the preliminary results of the proof of concept demonstrate significant improvements:

- **Reduction in allocation time:** Load assignments reduced to less than three hours.

- **Optimal allocations:** Increases daily loads per plant to 120, with coordination across 75 different carriers.

- **Cost reduction:** Achieves a 4.2% reduction in logistics costs.

- **Contractual compliance:** Improves compliance with carrier agreements and minimizes penalties.

Authors

Jordi Vilardaga

Head of Supply Chain
Center of Excellence, NTT DATA, Inc.

jordi.vilardagagarciacascon@nttdata.com

Sergio Gomiz

Head of Digital Supply Chain &
Innovation, NTT DATA, Inc.

sergio.gomizmorcillo@nttdata.com

Pedro Bejar

Supply Chain Global
Offering Lead, NTT DATA, Inc.

pedro.bejarcastan@nttdata.com

Sergi Montardit

Industry Marketing,
NTT DATA Group

sergi.montardit.sicart@nttdata.com

Glossary of terms

AI — artificial intelligence: Simulation of human intelligence in machines that are programmed to think and learn like humans

Agentic AI: AI systems that act autonomously to make decisions and take actions to achieve specific goals with minimal human supervision

API — application programming interface: Specifications that allow different software applications to communicate and exchange data with each other

Blended AI: A combination of various AI techniques or approaches for more effective and practical solutions

Blockchain: A shared, digital record of transactions across a network of computers; a secure and transparent way to track information and assets

ERP — enterprise resource planning: Software system used to integrate core business processes

GenAI — generative AI: Type of AI that creates new content in various formats based on user prompts

IoT — internet of things: A network of interconnected devices that collect and exchange data with each other using the internet

Kernel: A core component of an operating system that bridges hardware and software

KPI: Key performance indicators

LLM — large language model: An AI program that can understand and generate human-like text and search results, among other tasks

MES — manufacturing execution system: A software system that oversees the entire manufacturing process, from raw materials to finished products

ML — machine learning: Systems that can learn and adapt using algorithms and statistical models without explicit instructions

MMP — maintenance management process: A structured, end-to-end framework designed to ensure the reliability, safety and efficiency of production assets

OOS — out of specification: Results that vary from established, predefined acceptance criteria for a product, material or process

OtD — order to delivery: The end-to-end process of managing orders, from order placement to delivery

RAG — retrieval-augmented generation: A technique to enhance the performance of LLMs by combining them with an information retrieval system

ROI: Return on investment

Shopfloor: The area in a factory where the goods are made

StD — source to delivery: A multistage journey where raw materials are transformed into finished goods for customer delivery

SKU — stock keeping unit: A code, assigned to a particular product or service for inventory management and tracking

SQL — Structured Query Language: A programming language for storing and processing information in a relational database

TME — transport management execution: Management of moving goods from one point to another within the supply chain

UI — user interface: How a user interacts with a device, application or website

VR — virtual reality: Technology that simulates reality in a computer-generated environment

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