

BEYOND THE SCHEDULE

**Turning operational complexity
into competitive advantage**

Why are plastics manufacturers
rethinking production planning?



A whitepaper for
the **Plastics Industry**

Operational complexity
is increasing.
Traditional planning is
reaching its limits.

APS is the next stage of
operational maturity



Align demand
with capacity



Balance priorities
in real time



Adapt continuously
to change



Deliver value
consistently

Executive Summary

Western Europe's plastics industry is entering one of the most challenging periods in its history. For decades, competitive advantage was built on scale, production efficiency and continuous operational improvement.

Manufacturers invested heavily in automation, enterprise resource planning, manufacturing execution systems, machine connectivity and industrial analytics. These investments fundamentally transformed manufacturing operations and created an unprecedented level of operational visibility. Yet despite these advances, **many organizations continue to face the same operational challenges. Production schedules lose validity within hours.**

Customer priorities change unexpectedly. Material shortages disrupt carefully balanced plans. Capacity constraints emerge without warning. Experienced planners become increasingly difficult to replace, while customers continue to expect shorter lead times, greater flexibility and near-perfect delivery performance.

EXECUTIVE INSIGHT

The problem is no longer
a **lack of information.**

The problem is
**transforming information
into coordinated
operational decisions.**

This challenge has become increasingly significant as the competitive position of European plastics manufacturing continues to evolve. Europe's share of global plastics production has declined from 22 percent in 2006 to just 12 percent in 2024, while Asia now accounts for more than half of global production and China alone represents over one-third of worldwide output. During the same period, the European plastics industry's turnover declined from €457 billion in 2022 to €398 billion in 2024.

Manufacturers are therefore expected to operate in an environment where operational complexity continues to increase while competitive margins become progressively tighter.

At the same time, the nature of plastics manufacturing itself has fundamentally changed. Product portfolios continue to expand. Batch sizes continue to decrease. Sustainability and circular manufacturing introduce entirely new planning constraints. Supply chains have become less predictable. Workforce availability remains under pressure. Every operational decision increasingly influences dozens of others across production, procurement, logistics, maintenance and customer service. The consequence is clear.

Operational complexity is now increasing faster than traditional planning methods were ever designed to manage. This represents a profound shift in manufacturing maturity.

For many years, operational excellence was achieved by improving visibility. Organizations invested in technologies that enabled them to understand what was happening across their operations. That investment delivered enormous value and remains essential today. However, visibility alone does not determine which customer order should receive priority, which production sequence minimizes disruption, how available capacity should be reallocated or which decision delivers the greatest overall business outcome.

Knowing what is happening and knowing what should happen next have become 2 fundamentally different capabilities. This is precisely where Advanced Planning & Scheduling (APS) creates value. APS should not be viewed simply as scheduling software or another layer of manufacturing technology. Its strategic value lies in its ability to continuously evaluate operational constraints, synchronize business priorities with manufacturing reality and coordinate decisions across the enterprise as conditions change. In doing so, planning evolves from a static scheduling exercise into a dynamic operational decision capability.

Manufacturers implementing APS frequently report measurable improvements in production efficiency, schedule adherence, inventory performance and customer delivery reliability. More importantly, they develop the organizational capability to respond to disruption with greater speed, confidence and consistency.

In an increasingly volatile manufacturing environment, that capability is becoming a lasting competitive advantage. This whitepaper has been written specifically for executives, operations leaders, supply chain managers and manufacturing decision-makers within the Western European plastics industry. Its purpose is not to promote software or present technology in isolation. Rather, it aims to explain why operational planning has become one of the defining capabilities of modern manufacturing, why many organizations experience a hidden coordination gap despite extensive digitalization, and how operational orchestration is emerging as the next stage of manufacturing maturity.

Across the chapters that follow, we explore the structural forces reshaping plastics manufacturing, examine why conventional planning approaches are increasingly reaching their practical limits, explain how Advanced Planning & Scheduling fundamentally differs from traditional planning systems, and demonstrate why planning quality is becoming directly linked to resilience, profitability and long-term competitiveness.

EXECUTIVE INSIGHT

Every plastics manufacturer is different. Product portfolios, production technologies, organizational structures and commercial priorities vary significantly from one organization to another. There is therefore no universal blueprint for operational excellence.

The greatest value of this whitepaper is not that it provides every answer, but that it helps identify the questions every manufacturing leadership team should now be asking.

The objective is not simply to introduce APS, but to **provide a practical framework that enables manufacturing leaders to evaluate their own planning maturity and identify where meaningful operational improvements can be achieved.**

If the themes discussed throughout these pages reflect the challenges within your own organization, we invite you to continue the conversation with our manufacturing specialists. Together, we can objectively assess your current planning maturity, benchmark your organization against recognized industry practices and explore how improved operational decision-making can create measurable business value within your specific manufacturing environment.

At ATS Global, we believe technology is only valuable when it enables better decisions. Because the future of plastics manufacturing will not belong to the organizations with the most operational data. It will belong to the organizations that consistently transform operational intelligence into better decisions—faster than operational complexity continues to increase.

WHY READ THIS WHITE PAPER

Your roadmap to manufacturing excellence
in a more complex plastics industry.



Rising complexity.
Higher expectations.



Traditional planning
can't keep up.



APS gives you
the advantage.



Build resilience.
Win long term.



**> Make better decisions. Increase resilience.
Build a lasting competitive advantage.**

THIS WHITE PAPER WILL HELP YOU:



UNDERSTAND WHAT'S CHANGING

Explore the forces reshaping the plastics industry
and the new operational reality.



ASSESS YOUR MATURITY

Identify gaps in your current planning capabilities
and where to focus next.



DISCOVER THE IMPACT OF APS

See how APS improves service, reduces costs,
increases agility and drives performance.



BUILD RESILIENCE AND AGILITY

Learn how APS helps you respond faster,
adapt to change and stay in control.



STRENGTHEN YOUR COMPETITIVE EDGE

Understand how operational orchestration
supports growth, sustainability and long-term success.



**SMARTER
PLANNING.
STRONGER
PERFORMANCE.
LASTING
SUCCESS.**

Start your journey
towards operational
excellence today.



Read this white paper to gain clarity,
sharpen your strategy and take the next step
towards **smarter, more resilient manufacturing.**



How to read this whitepaper?

A practical roadmap for understanding the next generation of manufacturing planning for plastics.

Manufacturing is changing rapidly. Increasing operational complexity, volatile customer demand, supply chain uncertainty and growing sustainability requirements are forcing plastics manufacturers to rethink how production is planned and coordinated.

This whitepaper is organised into five parts, each building on the last. Follow the sequence to develop a clear understanding of the challenges, opportunities and next steps for your organisation.

PART 1 PAGES 7-11

Why the Rules of Manufacturing Have Changed

Purpose

Understand the structural shifts that are fundamentally reshaping plastics manufacturing and why planning has become a strategic capability rather than an operational support function.

You'll discover

- Why planning has become significantly more complex.
- Which market forces are driving operational change.
- Why traditional manufacturing assumptions no longer apply.
- Why operational coordination is becoming a competitive differentiator.

Outcome

Develop a shared understanding of why today's plastics manufacturers require a fundamentally different approach to planning and operational decision-making.

PART 2 PAGES 12-19

Why Traditional Planning Is Reaching Its Limits

Purpose

Explore why conventional planning methods increasingly struggle to cope with the complexity, variability and pace of today's manufacturing environment.

You'll discover

- The evolution of manufacturing maturity.
- The difference between operational visibility and operational orchestration.
- Why organisations experience a growing coordination gap.
- The hidden costs of reactive planning and continuous replanning.

Outcome

Recognise that the greatest operational challenge is no longer a lack of information, but the ability to coordinate decisions quickly, consistently and across the entire organisation.

How to read this whitepaper?

PART 3

PAGES 20-25

APS as the Next Stage of Operational Maturity

Purpose

Understand how Advanced Planning & Scheduling transforms planning from a scheduling activity into a continuous operational decision engine.

You'll discover

- How APS functions as an operational decision engine.
- The value of constraint-based planning.
- How scenario planning improves decision quality.
- Why integrating planning with manufacturing execution creates greater operational stability.

Outcome

Understand APS not simply as planning software, but as a strategic capability that enables continuous operational orchestration across the manufacturing organisation.

PART 4

PAGES 26-28

Why APS Matters for Plastics Manufacturing

Purpose

Translate APS concepts into the operational reality of plastics manufacturing and understand why the industry has unique planning challenges.

You'll discover

- How APS addresses demand volatility and supply chain disruption.
- The impact of sustainability and circular manufacturing on planning.
- Planning challenges across injection moulding, extrusion, thermoforming and other plastics segments.
- Why operational resilience is becoming a lasting competitive advantage.

Outcome

See how APS delivers measurable operational value within the unique operating environment of plastics manufacturers by improving responsiveness, planning quality and production stability.

PART 5

PAGES 29-32

Building a Competitive Advantage

Purpose

Connect planning maturity directly to business performance and understand how operational excellence becomes a long-term strategic differentiator.

You'll discover

- Why better operational decisions improve financial performance.
- How planning maturity supports growth, profitability and resilience.
- Why future-ready manufacturers invest in operational orchestration.
- How APS contributes to sustainable competitive advantage.

Outcome

Gain a strategic perspective on how planning maturity strengthens profitability, customer satisfaction, operational resilience and long-term business success within the plastics industry.

PART 1

WHY THE RULES OF MANUFACTURING HAVE CHANGED

Understanding why
operational complexity has
fundamentally changed in
plastics manufacturing.

The new operating reality in plastics manufacturing

The operating environment for plastics manufacturers has fundamentally changed. The assumptions on which production planning was traditionally built no longer reflect today's manufacturing reality. Increasing product variation, shorter production runs, more frequent colour and material changes, recycled material integration, supply chain uncertainty and shifting customer priorities have transformed planning from a periodic scheduling activity into a continuous operational discipline.

For many years, plastics manufacturers operated in relatively predictable environments where production schedules remained stable, customer demand fluctuated within manageable boundaries and the availability of polymer grades, additives and packaging materials was generally reliable. Planning focused primarily on creating efficient production campaigns, maximising machine utilisation and maintaining operational stability. Today, that environment has changed fundamentally. Demand volatility, smaller batch sizes, frequent mould and tool changeovers, labour constraints, sustainability initiatives, material shortages and increasing formulation complexity continuously reshape operational priorities. A production plan can begin losing accuracy almost immediately after it is created as customer priorities change, materials become constrained or production conditions evolve, requiring planners to continuously reassess priorities and coordinate decisions across the manufacturing operation.

Operational challenges rarely occur in isolation. A delayed polymer delivery, an unexpected quality hold or a change in customer demand may simultaneously affect production sequencing, machine availability, tooling, labour allocation, inventory, outbound logistics and customer commitments. As manufacturing complexity increases, manual coordination becomes increasingly difficult, while the impact of every planning decision extends across the entire value chain. Operational excellence is therefore no longer defined by creating the perfect production schedule. It is defined by the ability to continuously make coordinated operational decisions as conditions change. The manufacturers that consistently outperform their competitors are not those experiencing fewer disruptions, but those that can rapidly rebalance demand, materials, capacity and production constraints with greater confidence.

Throughout this whitepaper, each chapter demonstrates how Advanced Planning & Scheduling (APS) transforms these operational challenges into measurable business improvements for plastics manufacturers. Rather than discussing planning concepts in isolation, the chapters connect APS capabilities to the operational metrics manufacturing leaders rely on—including OTIF, schedule stability, machine utilisation, inventory, changeover performance and planner productivity, showing how better planning decisions translate into improved operational performance, customer service and sustainable business results.

EXECUTIVE INSIGHT

Organizations that successfully evolve from visibility towards **operational orchestration** are better positioned to:

- | **Improve** delivery reliability.
- | **Increase** operational agility.
- | **Reduce** reactive firefighting.
- | **Strengthen** operational resilience.
- | **Compete** more effectively in increasingly dynamic markets.

Chapter 2

The 6 structural forces reshaping plastics manufacturing

The plastics industry is operating in a fundamentally different environment.

Six key structural forces are driving complexity and demanding a new level of operational coordination.



Increasing product variation and SKU proliferation



Shorter lead-time expectations



Rising demand volatility



Supply chain instability



Sustainability and circularity requirements



Workforce constraints and knowledge loss

Chapter 3

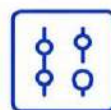
The Coordination Gap



MES systems provide real-time production visibility.



ERP platforms improve enterprise integration.



SCADA delivers machine-level transparency.



Industrial IoT generates enormous volumes of operational data.

The coordination gap

However, visibility alone does not coordinate an operation.



Knowing that a **machine is unavailable** does not automatically determine which customer order should be prioritised.



Knowing that **material arrives late** does not automatically determine which production sequence minimises customer impact.



Knowing that **maintenance is delayed** does not automatically coordinate production, logistics, purchasing and customer service.

This is the emerging **coordination gap**.

It is the growing difference between the amount of operational information organisations possess and their ability to transform that information into coordinated operational decisions.

As manufacturing environments become increasingly dynamic, this gap widens.

The consequences of the coordination gap



Planners spend more time reacting than improving.



Schedules lose credibility.



Departments optimise locally.



Customer commitments become increasingly difficult to protect.



The challenge facing modern manufacturers is therefore no longer obtaining more information.

The challenge is enabling better operational coordination.

Why this matters more than ever



**Visibility tells
you what is
happening.**

**Coordination
determines what
should happen
next.**



Western European plastics manufacturers operate in one of the world's **most demanding competitive environments**.

Labour **costs** are among the highest globally. **Energy** prices continue to fluctuate. **Sustainability** regulations are becoming increasingly stringent. Customers expect greater **flexibility** while simultaneously reducing acceptable delivery windows.

Manufacturers can no longer compete solely through production capacity or labour cost advantages. Competitive differentiation increasingly depends on **operational excellence** — the ability to consistently deliver **reliable performance** despite growing operational complexity.

This shift fundamentally changes the **role of production planning**.

Organisations capable of coordinating decisions faster than **operational complexity** increases will **outperform** those that continue relying on traditional planning approaches.

The future of plastics manufacturing will therefore belong to organisations capable of transforming operational intelligence into **coordinated operational action**.



Visibility creates awareness.
Coordination creates performance.

PART 2

WHY TRADITIONAL PLANNING IS REACHING ITS LIMITS

Understanding the limitations of conventional planning in today's complex and dynamic manufacturing environment.

The evolution of manufacturing maturity

Manufacturing has never stood still. Over the past four decades, organisations have continuously invested in improving operational performance through successive waves of technology and process innovation. Each stage solved a different challenge and laid the foundation for the next.

Initially, the focus was simple operational control.

Production depended heavily on manual planning, paper-based processes and individual expertise. As automation increased, manufacturers invested in PLCs, SCADA platforms and machine control systems to improve consistency, throughput and equipment reliability.

The next major step was digital visibility.

MES platforms, ERP integration, historians and Industrial IoT enabled organisations to monitor production in real time, improve traceability and gain unprecedented insight into operational performance. Data became available across the enterprise, allowing faster reporting and more informed decision-making.

Operational complexity is increasing faster than visibility alone can manage.

Organisations may know exactly what is happening on the shop floor, yet still struggle to determine the best operational response.

The next phase of manufacturing maturity is therefore no longer centred on collecting more information.

It is centred on coordinating decisions.

Operational orchestration becomes the capability that connects business priorities with manufacturing reality—continuously, intelligently and at the speed modern operations demand.



The future belongs to organisations that move beyond visibility and master the art of operational coordination.

From visibility to operational orchestration

Manufacturing Maturity Evolution



From Visibility to Operational Orchestration



This distinction represents one of the most important shifts in modern manufacturing.



Visibility answers the question:
“What is happening?”



Operational orchestration answers a much more valuable question:
“What should happen next?”

This capability enables manufacturers to evaluate constraints simultaneously, compare alternative scenarios, synchronise operational functions and continuously align planning with manufacturing reality.

The competitive advantage no longer belongs to organisations with the most dashboards.

It belongs to organisations that make the best operational decisions.



The journey continues.

From visibility to orchestration. From data to decisions. From reacting to leading.

Chapter 7

The hidden maturity gap

Many plastics manufacturers have invested significantly in improving operational visibility. Machines continuously report production status, MES and ERP systems capture transactional data, dashboards display OEE, throughput and quality performance, while production events, material consumption and downtime become visible almost immediately. This provides valuable operational insight, but visibility alone does not improve operational performance.

The hidden maturity gap emerges when organisations can clearly see what is happening across production but are still unable to determine what should happen next. Information exists throughout the business, yet operational decisions remain fragmented, manual and heavily dependent on planner experience. Production, maintenance, procurement, warehousing, quality, logistics and customer service often optimise their own priorities rather than collectively balancing the constraints of the entire manufacturing operation. A delayed polymer delivery, an unexpected quality hold, a mould change or an urgent customer order rarely affects a single department; it impacts the entire production schedule.

EXECUTIVE INSIGHT

As manufacturing complexity increases, this gap becomes increasingly significant.

Frequent changes in demand, material availability, equipment status and customer priorities require continuous coordination across multiple functions. Without structured decision support, organisations spend more time reacting to disruption than proactively managing it.

Closing this maturity gap requires more than better visibility. It requires the ability to transform operational information into coordinated, constraint-aware decisions that continuously balance customer demand, material availability, machine capacity, tooling, labour and production priorities. True operational maturity is therefore achieved not when organisations can see more, but when they can consistently translate visibility into better operational decisions across the entire plastics manufacturing value chain.

Chapter 8

Common symptoms of The coordination gap



The coordination gap rarely announces itself directly.



Instead, it appears through operational symptoms that many organisations mistakenly treat as isolated planning problems.



Production schedules require constant intervention.



Planners spend their day firefighting rather than improving performance.



Operators lose confidence in production schedules because priorities change continuously.



Departments optimise their own objectives while unintentionally creating problems elsewhere in the organisation.



Customer service increasingly depends on expedited shipments and reactive communication.



Management invests in additional reporting, more meetings and more dashboards, yet operational stability continues to decline.



These symptoms often trigger local improvement initiatives.

Typical operational symptoms



Frequent firefighting



Low schedule stability



Planner dependency



Reactive expediting



Disconnected decision-making



Limited scenario capability



The coordination gap hides in plain sight.

It creates instability, consumes capacity and limits performance.

Recognition is the first step. Closing the gap is the next.

Why traditional planning models struggle

For decades, production planning followed a relatively predictable pattern. Demand forecasts were converted into production plans, capacity was allocated, schedules were generated and manufacturing execution followed until the next planning cycle. This sequential planning model proved highly effective in manufacturing environments where operational conditions remained relatively stable. Production schedules could often remain valid for days or even weeks with only minor adjustments.

The operating environment within today's plastics industry is fundamentally different. Customer priorities change throughout the day. Material deliveries become uncertain. Equipment availability changes unexpectedly. Labour constraints emerge without warning. Quality events interrupt production, while sustainability requirements and increasing product variation introduce additional operational complexity.

Planning therefore no longer manages a stable production environment. It manages continuous change.

Every operational event immediately influences the feasibility of the production schedule. A delayed raw material delivery may require resequencing multiple moulds. An unplanned machine stoppage can affect tooling availability, labour allocation, packaging operations and outbound logistics simultaneously. What initially appears to be a local disruption quickly becomes an organization-wide coordination challenge.

This is precisely where traditional planning models begin to struggle.

Conventional planning systems were designed to create production schedules. They were not designed to continuously evaluate changing operational constraints, assess alternative scenarios and coordinate decisions across multiple departments in real time.

As operational complexity increases, organizations often respond by adding more manual coordination rather than improving decision capability. Additional spreadsheets are created. Planning meetings become more frequent. Escalation processes increase. Individual planners work harder to maintain production stability.

While these actions may temporarily reduce operational disruption, they rarely address the underlying cause. The challenge is not a lack of visibility. Nor is it a lack of experienced planners. The fundamental limitation is that decision-making remains fragmented across the organization. Information exists, but operational decisions are still coordinated manually. As a result, planners spend increasing amounts of time recovering production schedules instead of continuously optimising them. For plastics manufacturers, this distinction is becoming increasingly important.

Competitive advantage is no longer determined by producing the most detailed schedule. It is determined by the ability to continuously sense operational change, evaluate its impact across the production network and coordinate the most effective response before disruption propagates throughout the factory.

This shift represents more than an evolution in planning technology. It represents a new operating model in which planning becomes a continuous operational capability rather than a periodic scheduling exercise.

EXECUTIVE INSIGHT

Traditional planning does not struggle because planners lack expertise.

It struggles because manufacturing has evolved from a relatively predictable environment into a continuously changing operational system.

Sustainable operational performance therefore depends not on creating better schedules, but on continuously orchestrating better decisions.

Chapter 10

The hidden cost of continuous replanning

Many organisations measure the visible costs of operational disruption.

	Premium freight.
	Overtime.
	Expedited shipments.
	Scrap.
	Unplanned downtime.
	These costs are important.
	However, the largest losses are often invisible.



The Invisible Cost



Constant replanning creates decision fatigue.



Schedule credibility declines.



Operators stop trusting planning.



Inventory buffers increase.



Machine utilisation decreases.



Cross-functional alignment deteriorates.



Experienced planners become organisational bottlenecks.



Over time, the organisation accepts firefighting as normal.

This hidden operational tax quietly reduces productivity, profitability and customer satisfaction long before it appears in financial reporting.

The greatest cost of instability is therefore not disruption itself.

It is the organisational performance that disappears without being measured.



**The greatest cost of instability is not the disruption itself.
It is the performance that quietly disappears.**

Chapter 11

Planning horizons are compressing



Perhaps the clearest indicator that manufacturing has fundamentally changed is the shrinking planning horizon.



Planning cycles that once remained stable for several days now require revision multiple times within a single shift.



Manufacturers increasingly operate in environments where customer demand, material availability, equipment status and operational priorities evolve continuously.



Planning therefore becomes an ongoing operational activity rather than a periodic administrative exercise.



Traditional planning systems were designed for optimisation at fixed intervals.



Modern manufacturing requires continuous optimisation.



This shift fundamentally changes what manufacturers should expect from planning technology.



FROM THIS QUESTION

“Can the software generate a production schedule?”



TO THIS QUESTION

“Can the organisation continuously coordinate operational decisions as reality changes?”

That distinction defines the next generation of manufacturing maturity—and provides the bridge to the solution explored in Part III, where Advanced Planning & Scheduling is introduced as the operational decision engine that enables continuous, constraint-aware orchestration.



Planning is no longer about building the best plan.
It is about continuously adapting to what is real.

PART 3

APS AS THE NEXT STAGE OF OPERATIONAL MATURITY

Moving from reactive scheduling to continuous operational decision-making with Advanced Planning & Scheduling.

Chapter 12

APS as an operational decision engine

Planning has traditionally been viewed as the process of creating production schedules. Orders are released, capacity is allocated and a schedule is generated to guide manufacturing execution. In stable manufacturing environments, this approach proved effective because operational conditions changed relatively slowly. Today's plastics manufacturers operate in a fundamentally different environment. Customer priorities shift continuously, material availability fluctuates, equipment status changes unexpectedly and production constraints evolve throughout the day. As a result, production schedules begin to lose relevance almost immediately after they are created.



Planning therefore evolves beyond schedule generation. It becomes the continuous process of evaluating operational constraints, business priorities and available resources to determine the best operational response at any given moment. This is where Advanced Planning & Scheduling (APS) fundamentally differs from traditional planning systems. Rather than asking "What is today's production schedule?", APS continuously asks "Given everything that has changed, what is now the best operational decision?"

APS continuously synchronizes manufacturing reality with business objectives by evaluating multiple scenarios, balancing competing constraints and recommending the most effective course of action across production, materials, capacity and customer commitments.

Planning is therefore no longer an administrative activity. It becomes a strategic operational capability. APS functions as the operational decision engine that enables manufacturers to move from reactive planning towards continuous operational orchestration.

EXECUTIVE INSIGHT

**APS is not simply
a better scheduling solution.**

**It is the operational decision engine
that continuously
transforms
changing operational conditions
into coordinated business decisions.**

Chapter 13

APS continuously evaluates

Advanced Planning & Scheduling (APS) continuously evaluates operational constraints, business priorities and available resources to determine the most effective course of action in real time. Rather than relying on static production schedules, APS continuously adapts planning decisions as operational conditions change, ensuring that production remains aligned with both manufacturing realities and business objectives.

Instead of optimizing individual machines, production orders or isolated resources, APS optimizes the performance of the entire production system. By balancing capacity, material availability, tooling, labour, customer priorities and operational constraints simultaneously, APS enables manufacturers to make faster, better-informed decisions that improve delivery reliability, increase responsiveness and maximize overall operational performance.



Customer priorities

Continuously reflects changing customer demands, requested delivery dates and service level commitments.



Material availability

Considers inventory levels, inbound supply, lead times and alternative materials to prevent shortages.



Production capacity

Evaluates available capacity across lines, shifts and resources to maximise throughput and utilisation.



Machine constraints

Takes into account machine status, speeds, compatibility, changeover times and planned/unplanned downtime.



Tooling availability

Ensures the right tools, moulds and fixtures are available and ready at the right time and location.



Labour capacity

Considers operator skills, availability, shift patterns and labour regulations to build feasible plans.



Maintenance activities

Incorporates preventive maintenance plans and equipment inspections to avoid disruptions.



Delivery commitments

Aligns production with confirmed orders and promised delivery dates across all customers.



Business objectives

Balances operational decisions with cost targets, inventory levels, sustainability goals and overall business strategy.



By continuously evaluating these interconnected factors, APS identifies the best possible operational decisions in real time.



Respond faster

React immediately to changes on the shop floor and in the supply chain.



Improve performance

Increase on-time delivery, reduce lead times and maximise production efficiency.



Reduce risk

Minimise disruptions, bottlenecks and inventory risks through proactive decision-making.



Increase agility

Adapt quickly to new constraints, opportunities and changing business priorities.

Constraint-based planning In dynamic manufacturing



Every plastics manufacturer operates within constraints. Capacity is finite. Materials arrive unpredictably. Tooling requires changeovers. Skilled labour is limited. Customer commitments cannot simply move. The challenge is not the existence of these constraints. It is that they change continuously—and rarely in isolation.

A delayed material delivery can immediately affect machine sequencing, tooling, labour, packaging and customer delivery commitments. As operational complexity increases, planning individual constraints no longer works.

Traditional planning typically evaluates constraints sequentially. Capacity is planned first, materials are checked afterwards, and disruptions are resolved manually. This often creates locally optimized decisions that reduce overall operational performance. APS replaces this approach with constraint-based planning. Instead of evaluating constraints independently, APS continuously considers capacity, materials, tooling, labour, maintenance and customer priorities simultaneously. Every planning decision reflects the complete operational reality, not theoretical capacity.

The objective is not to create the fastest schedule. It is to create the most achievable schedule. As conditions change, APS rapidly evaluates alternative scenarios, measures their operational impact and recommends the most effective response. Planning becomes proactive rather than reactive, allowing organizations to maintain stable production despite constant disruption.

For plastics manufacturers, constraint-based planning transforms planning from schedule creation into continuous operational decision-making. The result is higher schedule reliability, faster response to change, improved customer service and greater operational resilience—enabling manufacturers to perform consistently in increasingly dynamic manufacturing environments.

— EXECUTIVE INSIGHT

**APS continuously balances
operational constraints
across the entire
manufacturing system—**

**transforming planning from
local optimisation
into enterprise-wide
operational orchestration.**

Scenario planning and better decision quality

One of the greatest limitations of traditional planning is that decisions are often made before their consequences are fully understood. When disruption occurs, planners must respond quickly, relying on experience, intuition and incomplete information to determine the next course of action.

While experienced planners frequently make sound decisions, today's manufacturing environment has become too dynamic and interconnected to depend solely on individual expertise. Every operational decision creates consequences elsewhere in the production system. A change in customer priority may require production resequencing. Delaying maintenance can improve short-term output but increase operational risk. Introducing overtime may improve delivery performance while reducing profitability.

These trade-offs are rarely visible when decisions are made manually. Advanced Planning & Scheduling (APS) addresses this challenge through structured scenario planning. Rather than evaluating a single production schedule, APS enables planners to generate, compare and validate multiple planning alternatives before committing to a decision. Each scenario is assessed against the same operational constraints, allowing organizations to understand not only what is possible, but which option delivers the best overall business outcome.



Scenario planning shifts operational decision-making from reactive judgement to evidence-based evaluation. Instead of asking "What should we do?", planners begin asking "Which option creates the best outcome?"

Decisions are therefore based on measurable operational consequences rather than assumptions or intuition. This capability fundamentally changes the role of the planner. Rather than spending valuable time rebuilding schedules after disruption occurs, planners continuously evaluate alternatives, understand operational trade-offs and select the response that best supports business priorities. Decision-making becomes faster, more consistent and significantly more transparent across the organization.

EXECUTIVE INSIGHT

Competitive advantage is no longer created by making faster decisions.

It is created by consistently selecting the best decision before committing operational resources.

For plastics manufacturers, where customer demand, material availability and production conditions change continuously, this capability provides a substantial competitive advantage. Organizations become more agile, reduce operational firefighting and maintain greater confidence in production commitments despite increasing operational complexity. Scenario planning therefore represents far more than an additional planning feature. It transforms planning from schedule generation into continuous operational decision support, enabling manufacturers to respond proactively rather than reactively while consistently selecting the best available operational outcome.

Closing the loop between planning and execution



Traditional approach:
Planning and execution operate as separate disciplines.



Planning creates schedules.



Execution attempts to follow them.



In reality, manufacturing execution rarely unfolds exactly as planned.



Machine failures occur.



Operators identify quality issues.



Production speeds fluctuate.



Materials arrive late.



Customer priorities change.



Without continuous feedback, planning rapidly diverges from operational reality.



APS approach:
Planning is continuously synchronised with execution.



When integrated with Manufacturing Execution Systems (MES), ERP platforms and shop-floor data, APS receives real-time operational feedback.



APS immediately evaluates whether planning adjustments are required.



This creates a continuous planning cycle rather than isolated planning events.



Planning becomes a living process that evolves alongside manufacturing.



The result is improved schedule stability, faster response to disruption and significantly greater confidence in production commitments.



Rather than replacing MES or ERP, APS complements both by transforming operational information into coordinated planning decisions.

Closed-loop manufacturing



Together these systems establish a closed-loop manufacturing environment in which planning and execution continuously reinforce one another.



Closed-loop synchronisation between planning and execution creates agility, reliability and performance.



Greater visibility



Faster response



Improved stability



Reduced disruption



Stronger performance

PART 4

WHY APS MATTERS FOR PLASTICS MANUFACTURING

Applying advanced planning
to the unique challenges
and opportunities in
plastics manufacturing.

Material availability as a planning constraint



Supply chain stability can no longer be assumed. Fluctuating raw material availability, extended supplier lead times, transportation disruptions and geopolitical uncertainty have fundamentally changed production planning.

For plastics manufacturers, this challenge is particularly acute because polymer grades, additives, colorants, recycled materials and customer-specific formulations are often non-interchangeable. Material shortages therefore impact far more than inventor. They influence production sequencing, machine utilization, customer commitments, WIP, changeovers and ultimately OTIF, OEE, inventory turns and service levels.

Traditional planning responds to these disruptions after they occur. Schedules are manually rebuilt, priorities are adjusted and planners spend valuable time firefighting. While operations continue, the result is often greater schedule instability, excess WIP, lower planner productivity and higher operational costs. APS takes a fundamentally different approach. Instead of treating material shortages as isolated events, APS continuously evaluates material availability alongside capacity, tooling, labour, inventory, supplier lead times and customer priorities. Within seconds, planners can compare alternative production scenarios and quantify their impact on OTIF, OEE, inventory turns, WIP, changeover time, planner productivity and service levels before committing operational resources.

As conditions change, planning automatically adapts to updated material deliveries, inventory movements and customer priorities. Rather than protecting individual production orders, APS optimizes the performance of the entire manufacturing system. For plastics manufacturers, this capability goes beyond better planning. It strengthens operational resilience by enabling organizations to maintain delivery reliability, production stability and customer confidence while continuously improving the operational KPIs that drive profitability and long-term competitive advantage.

EXECUTIVE INSIGHT

Material shortages are no longer exceptional events—they are planning constraints.

APS continuously transforms changing material availability into coordinated operational decisions across the entire manufacturing system.

Typical planning focus by segment

Plastics manufacturing spans different technologies and operating models. Each with unique planning priorities and constraints. While the specifics vary, the goal is the same: maximize throughput, minimize changeover and waste, and deliver reliable customer outcomes. APS provides a consistent planning framework that adapts to the realities of every environment.

 Injection Moulding	 Extrusion	 Blow Moulding	 Thermoforming	 Recycling
				
 Mould availability Ensure the right mould is available at the right time to meet demand.	 Campaign planning Plan long, efficient campaigns to reduce setups and material transitions.	 Packaging coordination Align preform, cap and packaging availability with production plans.	 High product variation Manage a wide range of SKUs and frequent format changes.	 Feedstock variability Account for inconsistent input quality and quantity in planning.
 Changeover optimisation Minimise changeover time and clean-downs to increase effective capacity.	 Material transitions Sequence material changes to minimise purging, scrap and downtime.	 Production sequencing Sequence jobs to minimise changeovers and stabilise output.	 Capacity balancing Balance demand with machine capacity and operator availability.	 Material quality Plan quality checks and sorting to meet outgoing specifications.
 Machine loading Optimise machine utilisation and balance work across cells and lines.	 Line balancing Balance line speeds and downstream processes to avoid bottlenecks.	 Delivery synchronisation Synchronise production with customer delivery windows and logistics constraints.	 Demand responsiveness React quickly to priority changes and short-term schedule adjustments.	 Flexible routing Dynamically route materials through available processes and destinations.

PART 5

BUILDING A COMPETITIVE ADVANTAGE

How operational excellence
drives stronger performance,
resilience and long-term
business success.

From Planning to competitive advantage

Advanced Planning & Scheduling is often introduced as a production planning solution. In reality, its role extends far beyond generating production schedules. APS represents a different way of operating, one in which planning becomes a continuous process of evaluating constraints, balancing priorities and coordinating operational decisions across the manufacturing organisation.

Rather than responding to change through manual intervention, APS continuously transforms changing operational conditions into coordinated decisions. By simultaneously balancing demand, capacity, material availability and business priorities, organisations can convert operational complexity into a sustainable competitive advantage. The journey towards operational maturity therefore does not begin with software. It begins with recognising that the role of planning has fundamentally changed. As manufacturing environments become increasingly dynamic, planning evolves from creating schedules to continuously orchestrating better operational decisions.

This shift delivers measurable business value. While every implementation is unique, organisations consistently report improvements across the operational areas that matter most: significantly shorter planning cycles, higher delivery reliability, lower inventory investment, fewer schedule disruptions and substantially higher planner productivity. Independent industry research and published implementation studies consistently identify these as the primary value drivers of Advanced Planning & Scheduling, reflecting the transition from reactive planning towards coordinated, data-driven operational decision making.

Manufacturers that embrace this evolution achieve far more than improved production schedules. They build more resilient operations, strengthen customer relationships through greater delivery reliability and establish a foundation for sustainable growth in increasingly complex manufacturing environments. In practice, these improvements are often reflected in faster planning processes, higher On-Time-In-Full (OTIF) performance, reduced work-in-progress and inventory levels, fewer expedited production orders and more effective utilisation of planning resources. Ultimately, the future of manufacturing will not be defined by organisations with access to the most information. It will belong to those capable of consistently transforming operational intelligence into the best operational decisions.

About ATS Global

ATS Global helps manufacturers accelerate operational excellence through digital manufacturing solutions, industrial software and consulting services.

With decades of experience across the plastics industry and other process and discrete manufacturing sectors, ATS supports organisations in improving planning, manufacturing execution, quality management and operational performance.

Our Advanced Planning & Scheduling specialists work closely with manufacturers to assess planning maturity, identify operational improvement opportunities and implement APS solutions that deliver measurable business value.

Whether your organisation is beginning its planning transformation or looking to optimise an existing manufacturing environment, our experts are ready to help.

Discover where your organization stands today, and where operational orchestration can create measurable business value tomorrow.

Throughout this whitepaper, we have explored how increasing operational complexity is fundamentally changing the way plastics manufacturers plan, coordinate and execute production. The challenge is no longer improving operational visibility. It is consistently transforming operational information into better operational decisions.

There is no universal blueprint for operational excellence. Every manufacturer operates within its own combination of products, processes, technologies and business priorities. The most valuable starting point is therefore not selecting new technology but objectively evaluating how operational decisions are made today. Before deciding what, the next step should be, ask yourself four simple questions

- 01** Can we still trust today's production schedule by the end of the shift?
- 02** How much time do our planners spend reacting instead of improving?
- 03** Are we consistently making the best operational decision or simply the fastest one?
- 04** Are we optimizing individual departments, or the performance of the entire manufacturing system?

Fig: Every successful operational transformation begins not with new technology, but with asking the right operational questions.

For many organizations, these 4 questions reveal more about planning maturity than any dashboard or KPI. They often expose hidden coordination gaps that limit delivery reliability, operational agility and overall business performance. If these questions reflect the reality of your organization, continue the conversation with ATS Global. Our manufacturing specialists work with plastics manufacturers across Western Europe to objectively assess planning maturity, benchmark operational capabilities and identify practical opportunities to improve operational performance. Whether APS ultimately proves to be the right next step or not, every successful transformation begins with a clear understanding of your current operational reality.

Assess your operational planning maturity!

Every manufacturing journey is unique!

Our APS specialists are here to understand your situation, your challenges and your goals and help you navigate your path forward, at your pace.



Talk to an APS specialist

One of our scheduling specialists will reach out to you to understand your needs and challenges. We'll talk through your situation, share relevant best practices and explore how APS can help you achieve measurable results.

- ✓ Understand your unique challenges
- ✓ Explore opportunities for improvement
- ✓ See what's possible for your organisation
- ✓ Get practical guidance on next steps



Join our events and workshops

We host open conversations, forums and industry workshops for manufacturers in the plastics industry — bringing together customers, prospects and specialists to share insights, experience and practical solutions.

- ✓ Learn from real-world examples
- ✓ Exchange ideas with peers and experts
- ✓ Discover proven approaches to common challenges
- ✓ Stay informed about trends and innovations



See solutions in action

Want to see how APS could work in your environment? We can schedule a personalised demo tailored to your industry, processes and objectives.

- ✓ See key capabilities in action
- ✓ Understand how APS fits your operations
- ✓ Explore value, ROI and implementation options
- ✓ Get answers to your questions



Let's start the conversation.

Reach out to one of our APS specialists to discuss your needs, explore possibilities and take the next step on your journey towards operational excellence.

Contact an APS Specialist >



Request a demo

See how APS can address your specific challenges.



Attend an event

Register for an upcoming forum or industry workshop.



Ask a question

Have a question about APS? We're here to help.