



# DELIVERING ON THE PROMISE OF DELIVERY: TOWARD A RESILIENT, SUSTAINABLE SUPPLY CHAIN

PREPARED BY: CATHY FISHER (QUISTEM), TERRY ONICA (QAD)

## PART 2 | ROADMAP AND ESSENTIAL SUPPLY CHAIN PROCESSES



# CONTENTS

STEP 1 Identifying Essential Automotive Supply Chain Processes 4

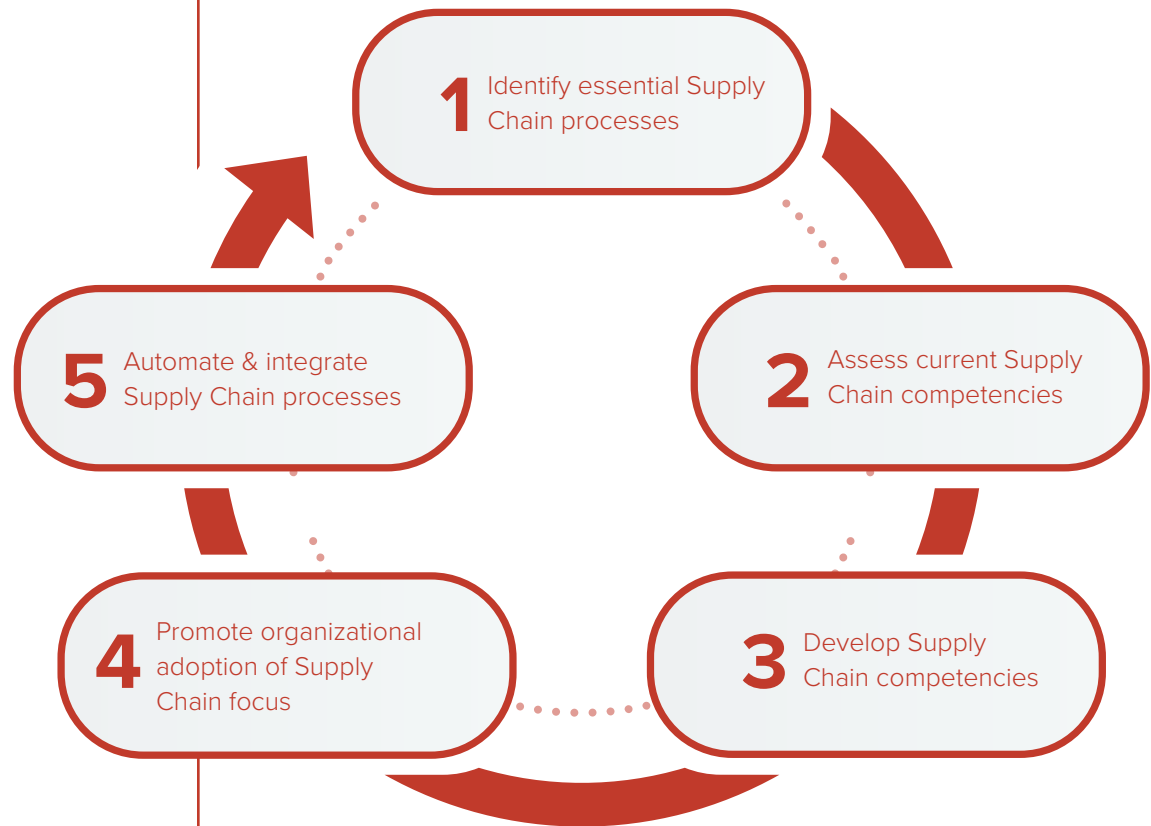
STEP 2 Assessing Current Supply Chain Competencies 5

STEP 3 Creating Industry Standards and Related Training 6

STEP 4 Promoting Organizational Adoption of Supply Chain Focus 7

STEP 5 Leveraging Automation & Advanced Technologies 9

## ROADMAP FOR IMPROVING SUPPLY CHAIN DELIVERY



---

With **recent disruptions** critically impacting the automotive supply chain and costing manufacturers millions in lost production and sales, it is clear that supply delivery issues now need the same level of attention as vehicle safety and quality. How can the automotive industry overcome systemic deficiencies to avert disaster when the next disruptions hit? OEMs, suppliers and industry groups must take action now. Here's a detailed look at our proposed five-step roadmap and 24 essential supply chain processes.

## ROADMAP FOR IMPROVING SUPPLY CHAIN DELIVERY

Systemic improvement in supply chain performance is an urgent priority for the automotive industry. To address the root causes detailed in [Part 1, Impact and Root Causes](#), we propose a 5-step roadmap for improvement:

1. Identifying essential automotive supply chain processes
2. Assessing current supply chain competencies
3. Creating industry standards/guidelines and training to develop supply chain competencies
4. Promoting organizational adoption of a supply chain-focused operating model
5. Leveraging advanced technologies to automate and integrate supply chain processes for improved supplier performance



# THE 24 ESSENTIAL SUPPLY CHAIN PROCESSES

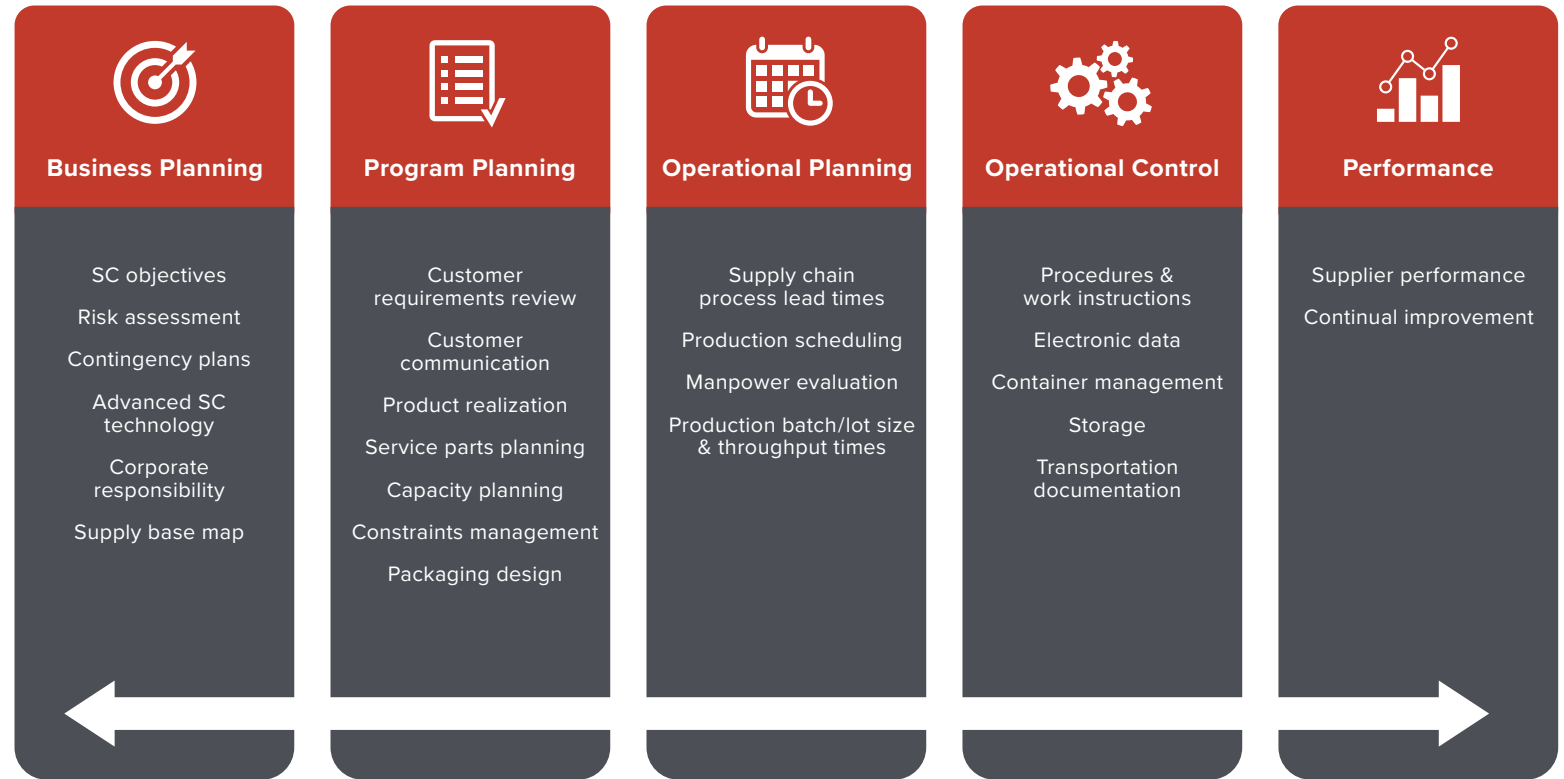


Figure 1

## STEP 1: IDENTIFYING ESSENTIAL AUTOMOTIVE SUPPLY CHAIN PROCESSES

The key to future automotive supply chain success is to identify and manage the essential processes for sustainable delivery performance. A comprehensive review of AIAG/Odette’s MMOG/LE version 5 and IATF 16949 has identified 24 essential processes that will improve the performance of the automotive supply chain. Automotive suppliers should consider integrating these into their existing management systems for better supply chain outcomes. Although each of these processes is applicable across all areas of operations,

we have aligned them within their initiating functions of the business (see Figure 1).

We vetted these 24 supply chain elements with over 20 automotive manufacturers -- including OEMs, Tier 1 and Tier 2 suppliers -- as well as several automotive industry associations. All agreed that these topics represent the key areas of concern regarding supplier delivery performance issues. They also agreed that a shift to a more disciplined supply chain focus is needed, especially as the industry continues to face more global supply chain disruptions (e.g, pandemics,

part shortages, geopolitical risks) and the move to electric and autonomous vehicle technologies.

Identification of essential supply chain processes also leads to better control of supply chain performance by monitoring key supply chain performance indicators. Typical supply chain KPIs such as on-time delivery and instances of premium freight represent process outcomes at the supply chain interfaces -- between OEMs and Tier 1 suppliers, between Tier 1 and Tier 2 suppliers, etc. However, they do not provide insight as to which supply chain processes



are not functioning effectively. A May 2020 [joint publication from ODETTE and AIAG](#) provides an industry-wide recommendation for standardized supply chain performance indicators (related to materials management and logistics) for production and service parts suppliers.

Industry-wide adoption of these recommended supply chain KPIs would encourage automotive suppliers to define, measure and optimize internal processes that contribute to these outcome metrics.

### **Integrating Supply Chain Management and Quality Management**

With OEMs measuring supplier performance based on on-time delivery as well as product quality, one option for standardizing and deploying these essential supply chain processes throughout the automotive supply chain could be through the enhancement of existing industry standards with these 24 essential processes. Integrating quality and supply chain functions leads to customer satisfaction.

IATF 16949 already recognizes supply chain as an essential part of automotive supplier performance with specific requirements related to:

- Customer Satisfaction, (9.1.2.1) with delivery performance indicators including customer disruptions and delivery schedule performance including premium freight
- Production Scheduling, (8.5.1.7) with production scheduled based on customer orders/demand, and
- Extensive requirements, (section 8.4) related to supplier management.

***“There is great value in bringing purchasing and operations functions together, getting them thinking differently about value-add, as money is really made through the supply chain, not just on the shop floor.”***

**– Scott Aselage,**  
Plant Manager, Hendrickson

## **STEP 2: ASSESSING CURRENT SUPPLY CHAIN COMPETENCIES**

Next, we assess the current level of competency in managing these essential supply chain processes effectively. An AIAG effort is currently underway to establish a supply chain basics assessment to evaluate current knowledge of basic supply chain processes.

Organizations throughout the automotive supply chain can use this AIAG’s self-assessment to evaluate baseline competencies and determine training needs for employees newly assigned to supply chain activities. In particular, this assessment will target:

- Tier 1 suppliers who have hired new or back-up personnel who may not have the necessary supply chain experience
- Tier 2-n suppliers that don’t have extensive supply chain management departments or resources
- Quality function personnel who must interface with sub-suppliers and OEM customers on quality and delivery issues
- Automotive industry IATF 16949 auditors, as QMS auditing often leads to audit trails related to supply chain activities (e.g., on-time delivery performance on customer-provided supplier scorecards)

By determining current supply chain competency gaps, hiring needs can be more readily identified and targeted competency development programs can be provided.



### STEP 3: CREATING INDUSTRY STANDARDS AND TRAINING TO DEVELOP SUPPLY CHAIN COMPETENCIES

The accumulated results of the supply chain basics assessment can inform the key topics and scope of competency development needs. Closing the existing knowledge gap related to supply chain competencies will require immediate action on the part of several stakeholders:

- a. Automotive industry associations - can ensure standardization and consistency in supply chain competency development and knowledge resources
- b. Technical college and universities - can encourage students to pursue supply chain-focused degree and certificate curricula

- c. Automotive manufacturers - OEMs in particular can promote the use of industry best practices throughout the supply chain

Considering the most recent semiconductor shortage, key supply chain processes requiring immediate supplier training and adoption include:

- Forecasting and customer demand management
- Demand deployment throughout the supply chain
- Lead time management for critical part identification
- Assessment of suppliers based on customer-specific supply chain requirements/policies

- Inventory management throughout the supply chain

These are a subset of the identified 24 essential supply chain processes. Industry best practices and training for these key topics is already available within the MMOG/LE.

Guidelines and training for key quality processes, (e.g. Automotive Core Tools) have been available for several decades, leading to improved vehicle quality and safety. Likewise, ensuring similar guidelines and training opportunities for essential supply chain processes would advance supply chain management knowledge throughout the automotive supply chain and improve supplier delivery performance.

# THE MMOG/LE SUPPLY CHAIN MANAGEMENT PROCESS MODEL

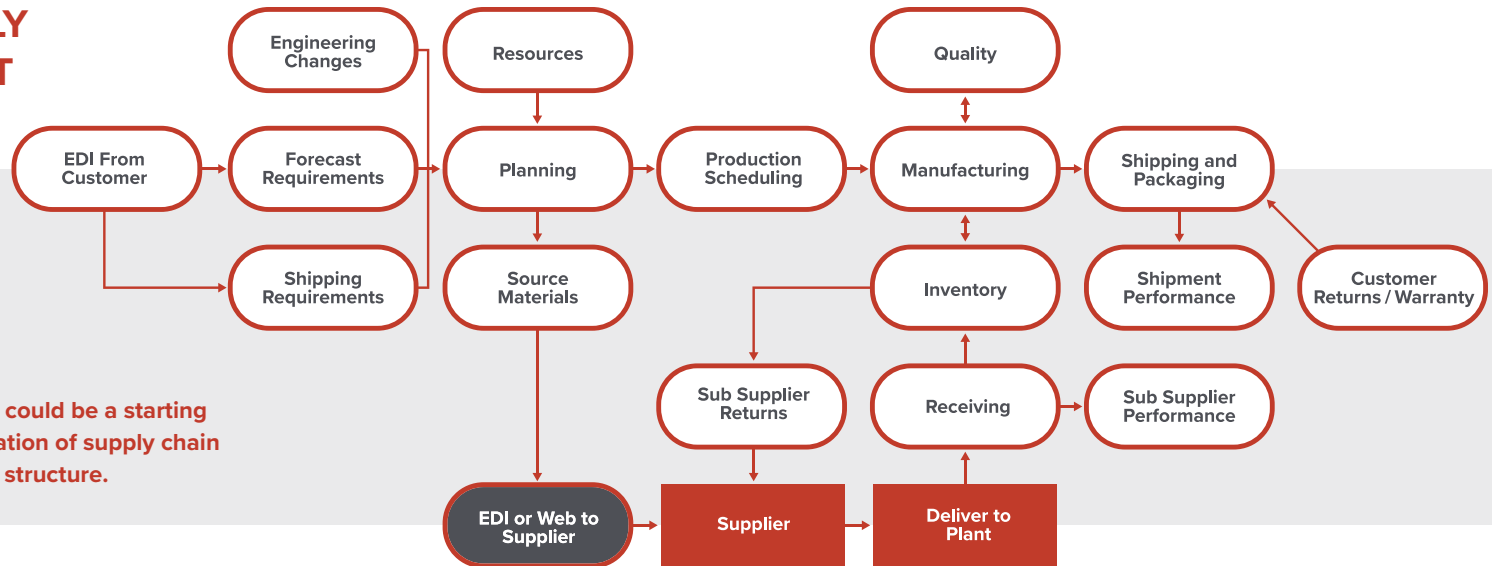


Figure 2

This model, developed by AIAG/Odette, could be a starting point for organizations to ensure integration of supply chain management into their overall business structure.

## STEP 4: PROMOTING ORGANIZATIONAL ADOPTION OF A SUPPLY CHAIN-FOCUSED OPERATING MODEL

Although industry actions can facilitate a shift towards supply chain focus, ultimately automotive manufacturers must implement specific actions within their organizations to realize sustained supply chain performance:

### a. Identify organizational supply chain processes –

As a starting point, automotive manufacturers should determine key interfaces between the organization, its suppliers and customers, then identify the activities to align these interfaces. Defining these essential supply chain processes, assigning process ownership as well as establishing key process performance indicators formalizes these activities as the organization’s way of doing business and ensures consistent fulfillment of customer-related supply chain requirements.

### b. Develop in-house supply chain competencies

– Organizational knowledge and competencies related to essential supply chain processes must be established to ensure sustainability of these key activities regardless of organizational changes. Supply chain processes tend to be the least documented relative to work instructions and other means for preserving organizational knowledge and best practices. A major OEM indicated that following the Great Recession in 2009 more than a third of its suppliers lost preferred supplier status due to loss of key organizational knowledge and expertise.

### c. Establish a supply chain focused organizational structure

– Historically, the automotive industry has been manufacturing-focused, to the extent that manufacturing processes are viewed as the only value-add activities in the business. With the transformation of automotive to “auto-mobility” and a more consumer-focused business model,

automotive manufacturers must rethink their organizational structure and where business value is truly being created.

For example, in early 2020, Volvo announced a global organizational restructuring focused around supply chain. Talking to Automotive Logistics, Martin Corner, head of global SCL, explained that – to support its growing global footprint with plants in the U.S., Sweden, Belgium, China, India and Malaysia – Volvo Cars transformed its supply chain and logistics organization into a strategic in-house function.

The MMOG/LE Supply Chain Management process model (*see Figure 2*) reflects the relationship of typical supply chain functions within the context of manufacturing operations. This model provides a starting point for organizations to ensure integration of supply chain management into their overall business structure.

**d. Implement an automated supply chain strategy –**

With clearly defined essential supply chain processes supported by the necessary competencies, automotive manufacturers can consider the best solutions for automating their supply chains to ensure integration with other key business activities. For manufacturers, it's about accessing and applying the "right" data to support real-time decisions that impact outcomes, cost and quality. Step 5 of this Roadmap for improving supply chain performance prioritizes key processes for automation as well as consideration of advanced technologies to improve the efficiency of supply chain activities.

Collectively, these key actions can achieve a supply chain-focused organization that represents a cultural change, not only for each automotive manufacturer but also for the overall industry. Most significant to this cultural change is the breakdown of silos which currently exist between quality and supply chain functions. As mentioned earlier, supplier performance requirements in IATF 16949 are continuing to put further pressure on the need for better integration of supply chain and quality processes.

The pandemic also highlighted the need for this shift towards a supply chain focus in automotive manufacturers. The [AIAG Operational Restart and Recovery Survey Report](#) which had a significant response from quality professionals, found the most challenging activities for restarting operations were related to supply chain coordination (e.g., meeting immediate customer requirements, verifying supplier status, labor shortages), not quality or manufacturing-related issues.

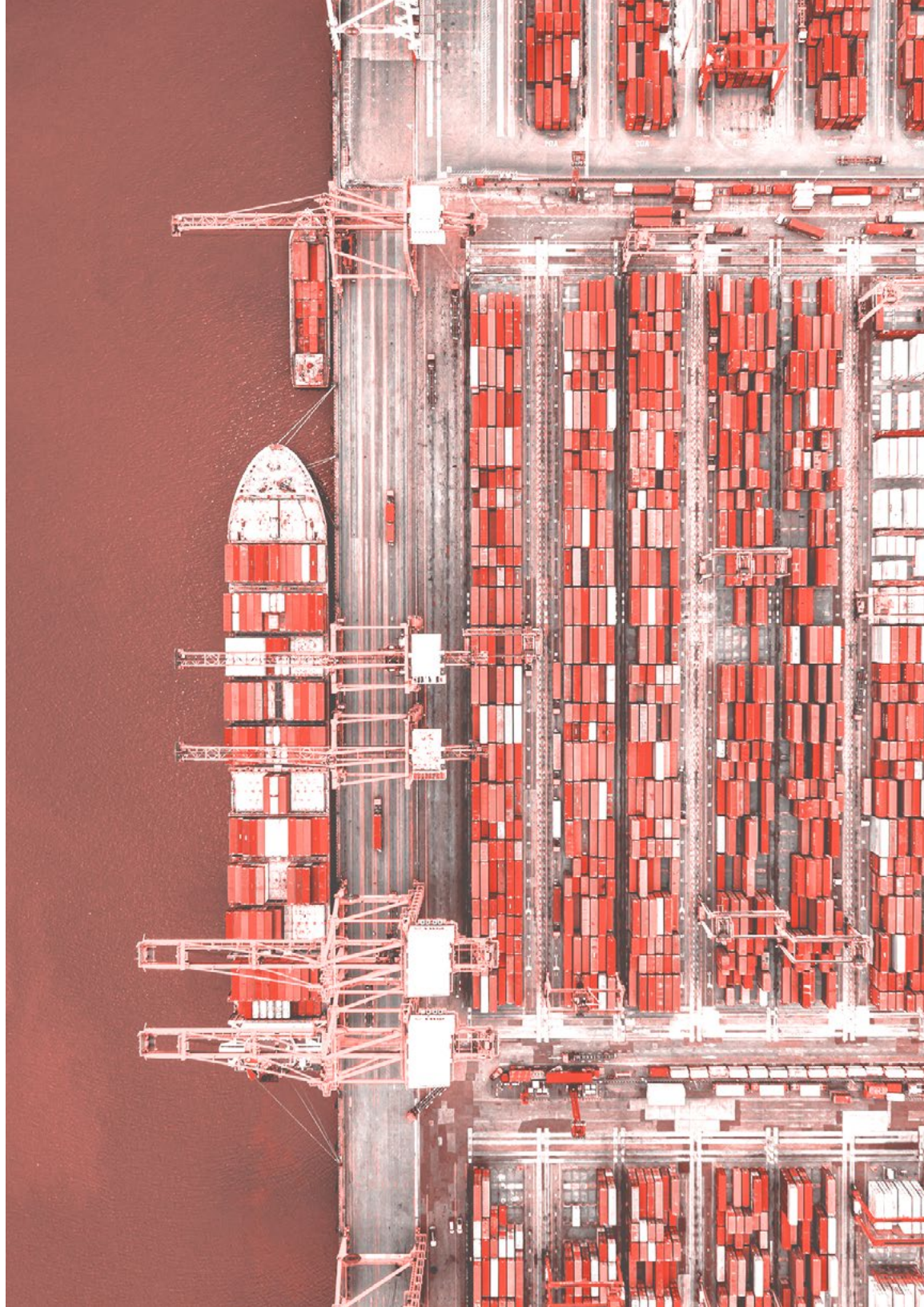




Figure 3



### STEP 5: LEVERAGING ADVANCED TECHNOLOGIES TO AUTOMATE AND INTEGRATE SUPPLY CHAIN PROCESSES FOR IMPROVED SUPPLIER PERFORMANCE

To ensure sustainable improved supply chain performance, especially as the automotive industry becomes more consumer-focused and the velocity of the supply chain activity increases, automating and integrating key business functions and processes is critical. Despite the availability of fully integrated ERP solutions, manufacturers tend to implement piecemeal solutions or develop in-house systems that can be myopic in their application, only addressing isolated business functions. This partial application of automation creates the need for interface activities, especially in supply chain planning, which often are filled by Excel spreadsheets or require interfaces to your ERP. The problem with incremental and manual solutions is that they are not in sync, up to date or readily accessible by all functions requiring such data.

Adopting a 360-degree enterprise view of the supply chain (see Figure 3) provides real-time data across key business activities. Most importantly, enterprise ERP solutions provide virtual integration of these essential supply chain processes with related key business activities, leveraging data across functions for better risk management and decision-making. A fully integrated ERP also provides the basis for adopting advanced technologies to improve the efficiency of essential supply chain tasks and facilitate the use of analytics.

### STEPS TO AUTOMATING THE SUPPLY CHAIN

The first step in automating essential supply chain processes is implementing ERP software. An “ERP based on a platform” is at the foundation of a 360-degree collaborative view into your supply chain.

ERP is used to effectively plan and manage all the core supply chain, manufacturing, services, financial and other processes of an organization. ERP synchronizes reporting and automation by eliminating the need to maintain separate databases and spreadsheets that must be manually merged to generate reports and/or perform data analysis for real-time business decision-making.

An ERP platform allows organizations to rapidly adapt to changing business conditions and leverage advanced technologies like data lakes, machine learning, robotic process automation and connected IoT devices. This ensures business processes stay aligned while providing early warning detection in a constantly evolving business environment. It also allows organizations to expand the ERP's functionality via apps to adapt to changing business conditions.

In a supply chain focused organization, a cloud ERP platform provides full visibility of an organization's overall supply chain by integrating and automating quality and delivery processes with customers and suppliers while also extending critical information to supply chain partners via a portal. As an example, by applying the platform's machine learning capabilities, the cloud ERP platform can avoid costly disruptions by predicting and then alerting when a machine needs to be repaired, a troubled supplier or a customer forecast is inaccurate. Platform embedded analytics and KPI tools provide the organization with real-time business insights for better decision-making, leading to improved supply chain performance and reduced overall costs.

---

***According to Automotive Logistics, during the pandemic, while the industry resorted to the reliable and familiar methods of Excel spreadsheets and using the telephone at the outset, leading players also adopted more sophisticated digital tools to communicate faster and gain operational transparency.***

Once manual processes are removed and replaced with an ERP system based on a platform, data can now be extracted easily and proactively analyzed across the enterprise. At this point, quality and supply chain data can be used to begin an organization's digital transformation.

Based on the results of the AIAG Operational Restart Survey, in addition to focusing on the ERP's planning system, respondents also identified three areas to further automate and improve supply chain processes to aid in restart operations.

- Scenario planning
- Quality management system
- Supplier delivery system

Automation of these key supply chain processes coupled with ERP will begin to provide an enterprise with a 360-degree supply chain view.

## SCENARIO PLANNING

In these uncertain times, it is critical to analyze the various impacts of a pandemic, new model launch, new business and/or the decreasing business on the organization's supply chain. According to the AIAG Operational Restart Survey, scenario planning is one of the top five actions organizations sought to take in response to COVID-19 to assess supply and demand in order to optimize revenue and profit. Forecasting scenarios enable organizations to better understand the impact on capacity and financial planning. Scenario planning integrated with ERP provides a robust set of repository information which includes all the history from ERP, new OEM programs and industry data (e.g.. IHS). Especially in light of new and delayed launches, it is critical to get an accurate simulation and plan both internally and with suppliers.

By acting immediately based on the results of scenario planning, organizations can avoid costly premium freight, overtime, obsolescence and poor performance.

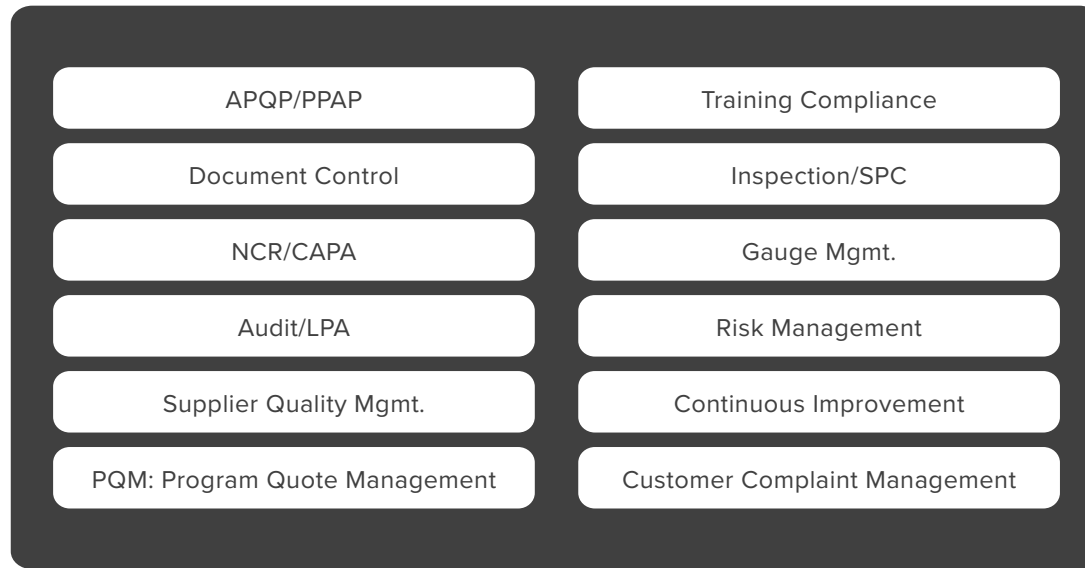


“

ARaymond, an automotive fastener supplier, indicated their forecast plan built using their scenario planning solution is 80% reliable compared to 50% reliable when using customer forecasts. In addition, ARaymond reduced the number of expedited shipments, where prior to

implementation it was necessary to use taxi or air freight for some shipments to meet customer requirements. “Just-in-time” became easier without the need for expensive last-minute solutions, resulting in substantial cost cuts.

IATF 16949 Software Suite	✓
ISO 9001 Making Compliance Easy	✓
ISO 13485 Software Suite	✓
ISO 14001 Software Suite	✓
ISO 45001 Software Suite	✓
MMOG/LE	✓



**FULLY  
INTEGRATED  
SOLUTION**

Figure 4

### QUALITY MANAGEMENT SYSTEM (QMS)

The cost of poor quality can be as much as 40% of a manufacturer's operational cost. Organizations that take a comprehensive approach to prevent quality issues and standardize processes across the enterprise can reduce costs. Manufacturers that fail to implement integrated enterprise quality management processes and reporting are left at a strategic and competitive disadvantage.

An integrated QMS helps manufacturers manage quality from end-to-end and integrate quality functions with other operational activities such as supply chain processes. This allows organizations to optimize manufacturing operations, manage customer performance, comply with industry-specific quality standards and facilitate risk management analysis. It ensures suppliers comply with quality standards and

advanced product quality planning (APQP) while also providing a holistic view of corrective actions, performance and risk. *(see Figure 4)*

SMR, part of the Motherson group and a manufacturer of rear view mirror systems and intelligent camera technologies, realized that consistent quality in their business processes and the ability to supply excellent products and services to their customers was vital to their business. They wanted to eliminate the need for manually-maintained data in spreadsheets, PDFs, and printed reports. An automated QMS, fully integrated with ERP at implementation, now allows SMR to connect their suppliers for status checks and documentation and improve their supply chain risk management with visibility across the supply chain of all corrective actions, contingency plans, documents and sharing.

### SUPPLIER DELIVERY MANAGEMENT SYSTEM

One key benefit to demand and delivery in a Supplier Relationship Management (SRM) portal is real-time communication and collaboration with suppliers by making forecast, shipping and inventory data visible to suppliers via secure internet access in the cloud. By implementing a SDMS, organizations have achieved up to 60% reduction in inventory and 18% reduction in premium freight. Overall, organizations experience better alignment with customer demand as well.

YFAI, an automotive interiors manufacturer, improved productivity, reduced costs and consistently met customer needs by implementing an SDMS portal. Prior, YFAI experienced a lack of communication with suppliers which often caused problems with inventory control overages as well as shortages and the timely completion of customer orders. Procurement was

performed manually using a spreadsheet. Forecasts were sent to suppliers but not updated in real-time. This meant changes were not communicated consistently and in real-time which caused problems with parts not arriving on time, unknown dates of dispatch and lack of information on whether suppliers were sending partial or full order quantities. This routinely caused premium air freight when customer orders were not completed in time for normal shipping.

Today, YFAI furnishes forecasts and rolling plans to suppliers in realtime. This led to a 25% reduction in inventory, 90% reduction in missed deliveries, and a drop in premium freight costs from one-two per month to only two instances in eight months. With the ability to send real-time Advanced Shipping Notifications (ASNs), suppliers indicated reduced confusion on forecasts, scheduling and supply needs.

An SRM portal with end-to-end supply chain visibility allows manufacturers, in addition to demand and delivery, to manage strategic sourcing, on-boarding,

performance scorecards, quality, risk assessment, corrective actions, bulletins and auctions with suppliers. Such a portal serves as a central hub for data sharing and communications with lower-tier suppliers, allowing a full 360-degree supply chain view.

In today's disruptive environment, another key feature of an SRM portal is the ability to map suppliers. GM reported a dramatic reduction in time to identify the impact of supply disruptions after implementing a solution that included mapping -- from six weeks after a 2011 Japan tsunami to just six hours after a 2016 Japan earthquake.

By automating and integrating quality and delivery processes, manufacturing enterprise performance improves at all levels of the supply chain, building a path for improving the supply chain network, and providing flexibility and resilience in operations. These three focus areas must be automated to incorporate advanced technologies on enterprise data for real-time analytics, predictions and warnings.

### **LEVERAGING ADVANCED TECHNOLOGIES**

Major global disruptions drive businesses to think differently and promote innovation and further automation. In the automotive industry, organizations looked to digitization to manage contactless truck shipments on campus, remote plant maintenance, GPS shipment tracking and robotic automation of daily employee tasks. Many organizations embraced digitizing the supply chain as a way to minimize customer delivery disruptions, increase performance, and overcome employee labor shortages.

According to McKinsey, even before COVID-19 hit, 92% of companies thought their business models would need to change given digitization and 79% were already in the early stages of their technology transformation. Clearly, CEOs and CIOs are now driving digitization for its strategic value instead of "just" the cost of supporting the business. The AIAG Operational Restart and Recovery Survey Report found that organizations at the top of list of those surveyed were investing in risk management tools/services and implementing advanced technology tools (e.g., artificial intelligence, machine learning, deep learning, virtual reality, improved ERP) for demand planning and early warning detection.

Many organizations realize a digital approach can replace costly, reactive, error-prone and slow manual processes with more predictive, real-time processes. Once data is housed in an ERP cloud platform, it can be found and leveraged, something that is impossible to do with spreadsheets, which are scattered across the enterprise. Predictive, real-time processes are then enabled by access to more accurate and easily retrievable data. This provides better visibility and alerting as well as real-time insights to significantly increase supply chain performance. It also reduces the very disruptive nature of labor shortages by automating routine processes with robotic process automation (RPA), which allows employees to focus on exceptions, not routine tasks.

Today's ERP platforms and extended supply chain solutions for scenario planning and quality and supplier management provide organizations with the agility and innovation needed to rapidly respond to a complex



customer and supplier environment while delivering operational and financial efficiencies. However, these benefits will never be gained or accomplished until supply chain solutions are completely automated on an ERP cloud platform that can easily grab all the necessary data for early warning detection and prevention.

## MOVING FORWARD

Vehicle safety and quality will remain the essential mandate of automotive manufacturers. However, with the rapidly changing landscape of the automotive industry due to new technologies and evolving consumer expectations, automotive manufacturers must develop robust supply chain processes which integrate seamlessly into their business systems.

Actions must be taken at the industry level as well as by automotive manufacturers throughout the supply chain to systematically improve supply chain performance and ensure the future success of the automotive industry.

At the industry level, the key actions include:

- Promoting the identification of essential supply chain processes and encouraging adoption of

these processes at all levels of the automotive supply chain

- Providing industry-specific tools for assessing basic supply chain competencies to support identification of current gaps in industry supply chain knowledge
- Developing industry guidelines and training to encourage expansion of basic supply chain competencies across the automotive supply chain
- Encouraging automotive manufacturers to implement ERP, automation and advanced technologies to improve supply chain transparency and business systems integration

Specifically, automotive manufacturers throughout the supply chain must:

- Define and effectively manage essential supply chain processes from their sub-suppliers to their customers
- Ensure development of supply chain competencies within their organization

- Adopt a supply chain focused organizational structure and integrate supply chain processes within their operating systems, and
- Invest in supply chain automation and advanced technologies to improve risk management, enhance business decision-making and ensure rapid response to unexpected supply chain disruptions

Want to know how the industry got to this critical point and why there's such urgency to act? [Read Delivering the Promise of Delivery: Fixing the Next Big Auto Supply Chain Break, Part 1, Impact and Root Causes.](#)

## NOTE

To facilitate the identification of essential supply chain processes, two existing automotive industry standards were considered:

- [IATF 16949:2016 Global Automotive Quality Management System requirements](#)
- [MMOG/LE version 5, \(Materials Management Operations Guideline/Logistics Evaluation\)](#)



“

*Integration of quality and supply chain processes and measures could be one of the most powerful steps to enhance OEM and supplier performance and relations.”*

– Bill Hurles,

retired executive director, supply chain, General Motors



**AUTHORS:**

CATHY FISHER, PRESIDENT, QUISTEM LLC

TERRY ONICA, DIRECTOR, AUTOMOTIVE, QAD INC.

**RESEARCH ASSISTANT:**

KAITLYN CLARK, MARKETING STRATEGY INTERN, QAD INC.

Copyright © 2021 QAD and Quistem. All rights reserved. The word and design marks set forth herein are trademarks and/or registered trademarks of QAD and/or related affiliates and subsidiaries. All other trademarks listed herein are the property of their respective owners.

[www.qad.com](http://www.qad.com)

QAD Inc., 100 Innovation Place, Santa Barbara, CA 93108, USA