

E2E Supply Chain Visibility Technology is Here

Investments Modern Demand-Driven
Manufacturers are Making Today

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1. INTRODUCTION: THE LIBERATION OF DATA

The convergence of manufacturing digitization and Cloud-enabled technologies makes for a powerful combination for driving end-to-end supply chain visibility. As a platform for real-time visibility and communication, the Cloud enables the good kind of disruptive change - offering greater flexibility, scalability and often, more affordability.



VISIBILITY GAME-CHANGER

For manufacturers, the key disrupter is the liberation of data - the ability to quickly access and assemble data from multiple sources and transform it into decision-driving information. These technologies not only liberate data - freeing it for easy access and use - but liberate individuals, empowering them with the tools to perform their own analysis and create their own visual displays. In that sense, the IT group is liberated too. They no longer need to carry the weight of all the reporting and visualization requirements of the enterprise.

Technology driving end-to-end supply chain visibility *is* here. It is transforming how manufacturers communicate and collaborate; how they act and react. The applications for the technologies discussed in this paper are endless, and will be supported through a variety of use cases that demonstrate considerable value throughout the supply chain.

Read on to learn about the link between end-to-end supply chain visibility and modern Demand-Driven Manufacturing enterprises - and how manufacturers are gaining real power through liberating their data and transforming it into performance improving information.

TAKEAWAYS

- » A visibility game-changer: The liberation of data.
- » The link between modern Demand-Driven Manufacturing and end-to-end supply chain visibility.
- » Examples of how, where, and why manufacturers are applying visibility solutions today.
- » What to look for in new technologies and how to get started on the path towards end-to-end visibility.

2. THE CHANGING DYNAMICS OF VISIBILITY

In reviewing research reports on supply chain initiatives, the need for greater visibility always tops the list – and has for many years.

In 2011, Capgemini Consulting conducted a survey that identified Supply Chain Visibility Improvement as a top Supply Chain project. More recently, Gartner's 2016 Supply Chain Initiatives Study found Supply Chain Visibility and Transparency, and Supplier Collaboration and Service, to be top priorities. So, the question is: Are visibility requirements continually on the list because they have not been adequately addressed, or are the specific visibility needs evolving at a pace at which the market can't keep up? We'll argue that it's a mix of both and how more adaptive, Cloud-based solutions developed for the digitization of manufacturing may be the answer for filling today's visibility gaps.

SUPPLY CHAIN MANAGEMENT INITIATIVES

Viewed as Most Important to Achieving the Top Three Business Priorities

1. Supply Chain Visibility and Transparency
2. Business Intelligence and Analytics
3. S&OP/Integrated Business Planning
4. Asset and Inventory Optimization
5. Customer Collaboration and Service
6. Supply Chain/Network Redesign
7. Visibility into Manufacturing Capabilities
8. Supplier Collaboration and Service
9. Talent Management Programs
10. Collaborative Logistics Programs

There are several market drivers that appear to be creating this persistent need for supply chain visibility solutions, including:

1. Globalization. Through expansion, acquisition, or contracting out supply chain services, more manufacturers have a growing dependency on a global supply network. Keeping in step with real-time visibility into orders, advance shipment notifications (ASN), delivery data, transit issues, quality events, and more that impact up- and down-stream interdependencies, becomes invaluable.

2. Extended/outsourced supply chains. For manufacturers relying on external supply chains or outsourcing key functions (manufacturing, third-party logistics, planning, customer service, procurement, etc.), collaboration is critical. It has been said that 10% of companies that outsource one or more supply chain functions today, will outsource all executable supply chain functions and related business processes by 2021.¹ In these increasingly complex supply chain networks, the demand for visibility technologies that enable active, real-time information sharing provide a needed sense of control in communicating priorities and enabling trust in execution.

Manufacturers also need to actively monitor their outsourced providers against their contractual service level agreements (SLAs). 58% percent of electronic manufacturers noted this as one of the biggest supply chain visibility challenges.² With the right solution, this can be done proactively, by exception and in real-time.

ELECTRONICS MANUFACTURERS BIGGEST CHALLENGES with Visibility of the End-to-End Supply Chain

61% Need to maintain
excess inventory
to mitigate risk

58% Tracking and
reporting on vendor
service levels

Source: 2015 Jabil sponsored survey by Dimensional Research

GARTNER PREDICTS THAT THE NUMBER OF IOT ENDPOINT CONNECTIONS WILL INCREASE FROM ROUGHLY 5 BILLION TODAY TO 20 BILLION IN 2020.

3. Advancing digitization, the Industrial Internet of Things, and the Cloud. The value proposition of manufacturing digitization and the Industrial Internet of Things (IIoT) is ubiquitous, real-time data sharing across machines, tools, sensors, systems, and suppliers – any source that collects useful data. The ability to do such will help manufacturers work smarter and more competitively, impacting not only core KPIs, but more forward-thinking initiatives that will keep production moving and downtime to a minimum. Consider the following use cases:

Pin-pointing global supply issues. Through a single screen, a global supply chain manager can quickly identify issues in the supply network. At a high-level, visualizations can monitor inventory levels, order status, logistics, environmental conditions and more across their ecosystem for a quick read on overall status. Data is easily assembled from a variety of systems to make this happen, including: inventory management, eKanban, ERP, production planning, scheduling and execution, logistics management and environmental management at either a local or a multi-enterprise level. Through status indicators in the high-level visualization, the supply chain manager can click through to get into greater detail to pin-point problem areas. Issues are easily identified and quickly resolved.

A single screen with plant-level and multiple role impact. A single work cell production screen can have plant-level impact; displaying visualizations that include real-time order information, schedule adherence, machine status, scrap percentage, OEE by shift, delivery rates, and days since the last recordable safety incident. In this case, data is accessed from machines (PLC or HMI data) and a variety of enterprise software systems, including: Asset management, alert management, planning and scheduling, MES, safety, and quality. This visualization provides value to operators, planners, quality, process engineers, maintenance and operations in keeping production flowing.

Cloud technology gives supply chain executives – and everyone along the end-to-end supply chain – not only easier access to data, but the ability to quickly identify issues and diffuse risk. (Figure 1) It can also lead to new opportunities for innovation and further automation. Manufacturers are using this technology to initiate new digital supply channels that can open the door to new geographies, avenues for product expansion, and cost savings.

ELECTRONICS MANUFACTURERS

Does the lack of visibility introduce RISK in any areas of your supply chain?

96% | YES

58% Long lead time

53% Extra shipping time

47% Difficult to manage capacity

42% Hard to change location

25% Hard to manage part quality

Source: 2015 Jabil sponsored survey by Dimensional Research

Figure 1: Risks associated with a lack of visibility.

4. Robotics and smart machines. The blending of robots and smart machines with human operators also impacts supply chain visibility and collaboration. When planning and scheduling resources, manufacturers need to drive decisions based on data reflecting the capabilities and capacities of robotics and how these resources impact their constraints and pace of production flow.

5. Responsive to demand. Increasing product customization requirements and a growing competitive landscape are requiring manufacturers to be even more focused on service. The ability to be highly adaptive to changes in requirements or demand is expected. Think about the online purchases you make today. As soon as you hit the submit button, you get a confirmation email which is shortly followed by shipment tracking information. You expect this type of visibility from your suppliers (at least for the last mile), and your customers expect it of you.

6. Hunger for domain expertise. With increasing levels of digitization in the manufacturing environment, comes increasing volumes of data generated. Data is housed in isolated business systems, machines, tools, data lakes, and data warehouses. While all this data exists, the challenge is not only getting easy access to it, but how to get it to the right people who can make good use of it. A single thread of data can mean different things when viewed by quality, engineering, maintenance and supply chain professionals. Take for example, a machine that falls out of tolerance. What happened when and why? Did a machine part fail or are the climate controls in the work space off? Were incompatible orders run on the machine? The ability to access machine process data along with contextual data from the environmental management system, not only pin-points the issue and gets you back up and running faster, but provides guidance for future prevention.

DEFINITION

“E2ESCV is a capability that provides controlled access and transparency to accurate, timely and complete plans, events and data — transactions, content and relevant supply chain information — within and across organizations and services to support effective planning and execution of supply chain operations.”

Source: Gartner

3. THE LINK BETWEEN END-TO-END SUPPLY CHAIN VISIBILITY AND DEMAND-DRIVEN MANUFACTURING

The strategic alignment between [Demand-Driven Manufacturing](#) and end-to-end supply chain visibility (E2ESCV) revolves around the concept of a single, central supply chain planning system of record. That is, a source for planning and collaboration both internally and among external suppliers, service providers, and contract manufacturers that synchronizes orders, schedules, partners, materials/parts/assemblies – any resources required to execute the order and achieve optimal production flow.

Gartner research has many reports citing the need for E2ESCV and states that it is a foundational and critical component for becoming demand-driven. We agree that E2ESCV is a critical component of modern Demand-Driven Manufacturing and our definition of this method speaks to the reasons why:

Modern Demand-Driven Manufacturing enables a synchronized, closed loop between customer orders, production scheduling, and manufacturing execution - all while simultaneously coordinating the flow of materials and resources across the supply chain. The key components are synchronization and flow.



“End-to-end supply chain visibility is a foundational and critical component for becoming demand-driven.”

Source: Gartner

Visibility matters in Demand-Driven Manufacturing

Demand-Driven Manufacturing is based on actual customer orders or consumption (demand) rather than a forecast. Because demand-driven manufacturers operate in real, or near real-time, the coordination of people, materials, machines, and processes can be quite complex and highly variable. When executed well, however, the trade-off is real; driving all relevant KPIs in the right direction, including increased capacity, right-sized inventory, greater on-time delivery, and improved profitability. Visibility matters and becomes a catalyst for simplification. These are the core areas modern Demand-Driven Manufacturers focus on when it comes to visibility:

1. Demand and Supply. While this is a given, in modern demand-driven environments, real-time visibility and synchronization of the demand signal, material availability, and execution (resource availability) drives uninterrupted and end-to-end production flow.

For fully automated Demand-Driven Manufacturers, this level of visibility typically results in higher rates of on-time delivery because all production variables are synchronized and scheduled against the customer's required date.

2. Production Flow Indicators. Because synchronization and production flow represent the foundation of modern Demand-Driven Manufacturing, having visibility into factors impacting production flow is critical. Real-time visibility into stock buffer levels, constraints (machines, processes or parts/assemblies) and shop floor events/interruptions can make the difference in profitability.



Figure 2: Examples of visibility needs across the supply chain.

3. Priorities. Modern Demand-Driven Manufacturing technologies are highly adaptive to changes in demand. Subsequent shifts in priorities need to be communicated across the supply chain in real-time to maintain optimal flow. Schedulers need visibility into available resources to off-load work; operators need visibility into what to work on next; suppliers need visibility into replenishment adjustments; and service providers need visibility to optimize transportation.

4. DIGITIZATION, THE INDUSTRIAL INTERNET OF THINGS, AND VISIBILITY ENABLERS

Digitization of manufacturing enables the Industrial Internet of Things (IIoT). As mentioned earlier, the value proposition of the IIoT is the universal real-time sharing of data across machines, tools, sensors, systems – and suppliers.

A Cloud-based visualization and analytics layer across this data is the key to interpreting, utilizing, and gaining value from data collected through IIoT devices. And the supported ecosystem of the manufacturing enterprise, outsourcing partners, service providers, suppliers, etc. is the key to end-to-end supply chain visibility and working smarter, more competitively and collaboratively. (Figure 3)

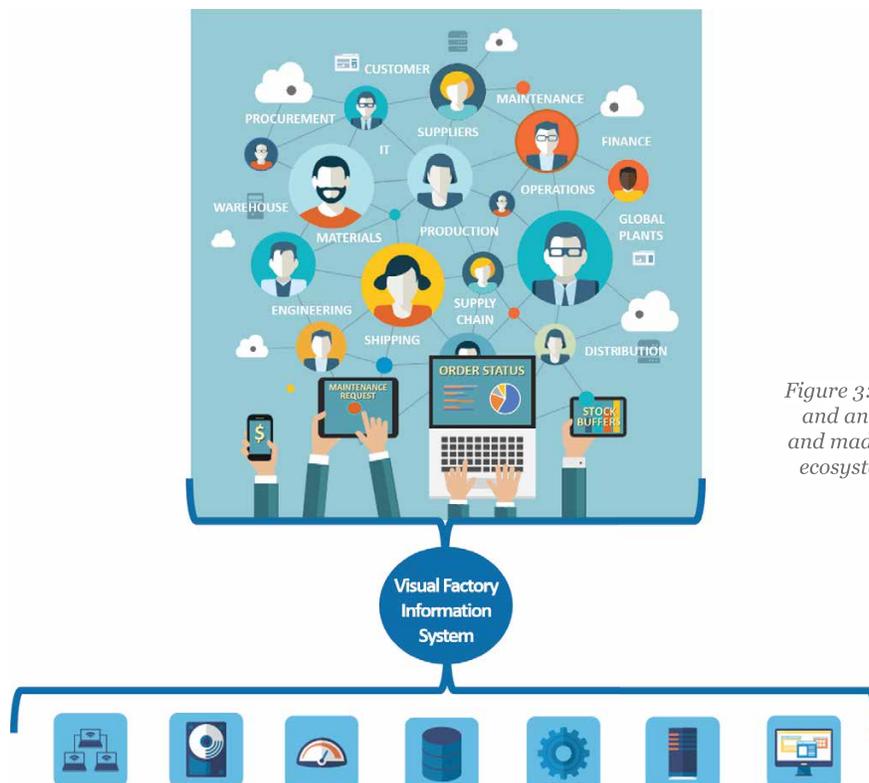


Figure 3: Data is collected, aggregated, and analyzed from multiple sources and made visible to the manufacturing ecosystem through a manufacturing visualization system.

Visibility needs are in the eyes of the beholder

When we talk about end-to-end visibility, we're talking about getting various stakeholders along the supply chain ready access to the information they need to drive performance. As production execution gets closer and closer to the demand signal, visibility needs become more time-sensitive for everyone. Consider the quality engineer alerted to an issue on a part. What is the value in downtime and scrap savings if they could singularly access data from multiple machines to quickly get at the root cause of the issue? Not to mention mitigating a potential delay in customer delivery and/or the cost of expediting freight. (Figure 4)



Figure 4: View multiple data sources from a single screen to quickly get to the root cause of an issue – and fix it.

Visibility Use Cases

In these examples, data is compiled from multiple sources to paint a clearer picture of reality. Organizations are empowered with smart manufacturing insight resulting in enhanced service levels, improved performance, and reduced costs.

An aerospace and defense manufacturer uses [SyncView™](#) manufacturing visualization software to provide both leadership and operators the ability to easily show and monitor metrics and other information related to their core KPIs of safety, quality, delivery, employee, and cost. With the heightened level of visibility the system provides, they can quickly respond to maintenance issues and keep downtime to a minimum; address quality concerns by drilling down into data to perform root cause analysis; and monitor KPI dips to ensure throughput is maximized.

» **VISIBILITY PAYOFF: Reduced downtime; increased capacity.**

A recreational vehicle manufacturer wanted to visually track movement of vehicles across the assembly line – from station to station - showing the percentage of completion at each work cell. An important KPI for them is rate – the number of vehicles completed/number of hours. They track this against their planned capacity and cycle time – and will signal visual alerts if they are slipping from the projected rate so that performance issues can be quickly resolved.

» **VISIBILITY PAYOFF: Increased capacity and greater throughput.**

A large electronics manufacturer that sub-contracts parts to manufacturers around the globe had no visibility into the status of their contracted orders. This resulted in disruptions up and down their inter-dependent supply chain. End-to-end supply chain visibility to them means real-time communication and status on order receipts, replenishment, and delivery to keep production flowing across their enterprise.

» **VISIBILITY PAYOFF: Reduced stock outs, expediting, and downtime.**

A tire manufacturer implemented several supply chain enterprise solutions in a single, big-bang approach. During this process, their supply chain visibility system served as a window to view how their data and processes were falling in line with the new systems. IT could immediately validate data flow and production reporting – and identify technology areas they needed to proactively correct. Following go-live, the visibility system serves operators and supervisors by providing a clear indication of production priorities and performance.

» **VISIBILITY PAYOFF: Higher-performing supply chain technology network; increased production flow tracking.**

A milling manufacturer with multiple plants, each producing unique item numbers needed to improve level-loading across their plants and 20+ warehouses. The plants needed visibility into warehouses stocking parts and finished goods in order to understand demand more clearly. They also wanted visibility across the supply chain – from requirements planning to shipping.

» **VISIBILITY PAYOFF: Right-sized inventory; reduced waste.**

Finally, a microchip manufacturer proved an interesting case for improving both supply chain visibility and data standardization (normalization). A growing part of their business was providing global supply chain services where they would receive parts from original equipment manufacturers (OEMs) and supply them to contract manufacturers. On both ends of the spectrum, they would receive forecasts – all in different data formats. They also managed a couple thousand stock keeping units (SKUs). They were in constant state of flux, working to manually standardize data from multiple sources (spreadsheets) while trying to juggle the variation of supply and demand. They needed a single screen to view real-time, aggregated replenishment, inventory, and order status information – and provide similar views to their OEM and contract manufacturing partners.

» **VISIBILITY PAYOFF: Enhanced customer service; reduced inventory carrying costs.**

5. THE EVOLUTION OF VISIBILITY TECHNOLOGY

Modern Demand-Driven Manufacturers are leveraging real-time Cloud-based visualization and collaboration systems to view data from multiple, disparate sources while keeping the data in its original, host environment. The value of these visualization systems is in their inherent flexibility. Once the data connections are made, they can be accessed and used (with appropriate permissions) at any point along the end-to-end supply chain spectrum. There is no limit to the data sources that can be connected or how the data can be sliced and diced and made visual to accommodate the different layers and levels of the manufacturer's ecosystem.

A single version of the truth generated through a multi-enterprise manufacturing visualization system enables a more compliant, consistent, Lean, and waste free supply chain. Visualizations can be created or configured to the individual user, work center, plant or multi-plant/enterprise, supplier, or customer level. Order, replenishment status, inventory levels, machine maintenance, system alerts, KPIs, logistics tracking, and more can be made accessible to the appropriate parties anytime, anywhere, providing a single source for real-time information. *(Figure 2)*

ELECTRONICS MANUFACTURERS

70%

Have real-time status updates for less than half of their supply chain.

Source: 2015 Jabil sponsored survey by Dimensional Research

Examples of Visibility Value Across Supply Chain Layers

- » **CUSTOMERS** gain visibility into order receipt, status, and delivery data. In ETO environments, visibility tools can provide further collaboration capabilities on product specifications and requirements.
- » **SUPPLIERS** receive real-time demand signals with the ability to exchange purchase order and projected delivery information. **SUPPLY CHAIN MANAGERS** can collectively visualize and track the performance of all suppliers against their service level agreements (SLAs).
- » **INDIVIDUAL USERS** have easy access to information they can act on to analyze issues and improve performance. **CUSTOMER SERVICE** representatives can follow the status of their customer's order and confirm delivery details; **OPERATORS** have a clear view of priorities and an understanding of what to work on next; **QUALITY ANALYSTS** are immediately alerted to issues and can quickly trace the source of the problem.
- » **WORK CENTERS** can monitor all the machines in their area through a single screen to collectively determine overall equipment effectiveness (OEE) and gain insight for preventative or prescriptive maintenance.
- » **INDIVIDUAL PLANTS** can visualize real-time end-to-end production flow and the status of safety, compliance, and key performance indicators (KPI) at any level in the facility.
- » **REGIONAL PLANT NETWORKS** can connect to **WAREHOUSE/DISTRIBUTION CENTERS** to better manage excess inventory and monitor status from **THIRD PARTY LOGISTICS (TPL)** providers.
- » **MULTI-NATIONAL ENTERPRISES** can connect to global data sources - including **SUPPLIER** networks and **CONTRACT MANUFACTURERS** - to assess individual plant performance and collectively view and track logistics flow throughout their enterprise.

Standardizing data formats – the key to universal, real-time accessibility.

The strategy for standardizing – or normalizing – data is not new, but today there is a more efficient and cost-effective approach. Through Cloud-based technology, data is accessed from its host environment and aggregated, analyzed, and shared by standardizing the data and making it accessible in real-time through technology tool sets like SignalR. In embedding such tools within a visualization system, data becomes fluid, making it easy to flow within the boundaries set.

These web-enabled technologies are rapidly replacing costly hardware devices used for data standardization. Modern Demand-Driven Manufacturers are responding to these lighter weight, more flexible - and this is important - *scalable* software systems that can standardize data, make it accessible, and help effectively transform that aggregated data into performance-improving information and communications.

Data lakes are also associated with making data accessible for improved supply chain visibility. A data lake is a pool of structured (relational databases), semi-structured (CSV, XML, logs) and unstructured data (images, audio, video files) from various sources in its raw, native format. When the data is needed, the data structure and requirements are determined.

In 2014, Gartner issued a cautionary press release about data lakes, noting that they lack governance as there is no associated metadata; data can be placed in the data lake without any oversight, exposing potential risks. There are also performance-related issues with data lakes to be considered. In addition, due to the lack of consistency in the data, users need to be highly skilled at data manipulation and analysis to benefit. If considering a data lake, map its query capabilities and performance speed to your visualization requirements to ensure a proper fit.

BENEFITS OF DATA STANDARDIZATION:

- » Data integrity
- » Optimized queries
- » Faster index creation and sorting
- » Faster update performance
- » Improved concurrent data resolution



Technology considerations.

IT spending on visualization tools is growing – and will continue to as the digitization of manufacturing continues. While every manufacturing enterprise has different needs and business use cases, there are some general considerations that manufacturers are evaluating beyond the given analysis and graphical capabilities:

Manufacturing know-how. Was the technology developed specifically for manufacturing? This really matters in the expanse of E2ESCV. At the base level, it goes back to understanding production flow – and all the interdependencies and variables that can impact flow. Working with a technology provider who understands this – along with all the auxiliary manufacturing data sources – can save a lot of time and frustration. These providers will likely have a library of common dashboards and visualizations that can be edited for different environments. This can be helpful in quickly getting started with a basic layer of visibility.

Empowering users with self-service tools. It has typically been the burden of the IT team to take the requirements and requests from all departments and generate reports, dashboards, and visualizations for the organization that span multiple data sources. Depending upon the backlog, it could take weeks or months to complete these custom views.

Newer Cloud technologies offer more intuitive interfaces with drag-and-drop functions and natural language queries, empowering non-technocrats with self-service tools to perform their own analysis and create their own dashboards and visualizations. Once IT has set up the necessary data connections on the backend, users can easily build, modify, and share their own creations. Consider this functionality for its critical time-saving ability and the value in giving users the power to quickly get at the information they need to make decisions and increase performance (both their own and the company's).

Ability to scale and support any point along the supply chain. Cloud enabled technology makes for solutions that are highly flexible, scalable, and affordable. Those that take a data neutral (or standardized) approach can connect to any data source along the supply chain and generate valuable information which can be shared as you see fit. Along with this level of agility is the flexibility to easily scale. Scale in users, data connections, visualizations, etc. as needs grow and evolve.

“We have don’t need another data warehouse – the problem is getting to the right data at the right time.”

Aerospace and Defense Manufacturer

Performance - having the data you need when you need it. This goes beyond being able to connect to any data source. It’s delivering the right information at the right (real) time to make a difference in decisions and supply chain performance. It means being able to select data, build visualizations and publish them within a matter of minutes. An IT manager at an aerospace and defense manufacturer commented that they have two large data warehouses that do not provide any real value because it’s so hard to get to the right data when they need it. A supply chain visibility system needs to generate real, or near real-time information to provide decision-driving value. As such, the visualization technology needs to be high performing and may require some infrastructure improvements based on the environment.

6. THE PATH TOWARD END-TO-END SUPPLY CHAIN VISIBILITY.

Evolution or revolution? End-to-end supply chain visibility is more like an evolution and a *revelation*. The process of gaining more visibility will likely provide enlightenment in many different areas. Enabling E2ESCV is a large, ongoing endeavor; and success will come to those who attack it in a focused, measured way.

Most manufacturers start within their four walls. Most, to provide real-time visibility to the shop floor - arming supply chain managers, operators, engineers, maintenance, operations, and customer service with real-time status indicators. For instance, the progression of orders as they are moving through production; status of inventory levels; real-time machine performance data or maintenance alerts; and how the plant is tracking against key performance indicators, including on-time delivery, resource utilization, safety initiatives, and more. As visibility gains are achieved internally, manufacturers start thinking more strategically, looking at where visibility tools can impact performance beyond the four walls.

Adopt a pragmatic approach to managing visibility projects. Start with a tight focus and create some early, quick wins. Become comfortable with the technology tools and pay attention to usability - iterate to get the data visualized in the best way for the user(s) to quickly digest the information they need to know and/or take action on. Work to gain user adoption of the tools - and find some evangelists to help facilitate further adoption.

KEY DRIVERS FOR INVESTING IN SUPPLY CHAIN VISIBILITY TECHNOLOGY

- » Need for enhanced decision making
- » Reduce operating and support costs
- » Orchestrate processes across functions

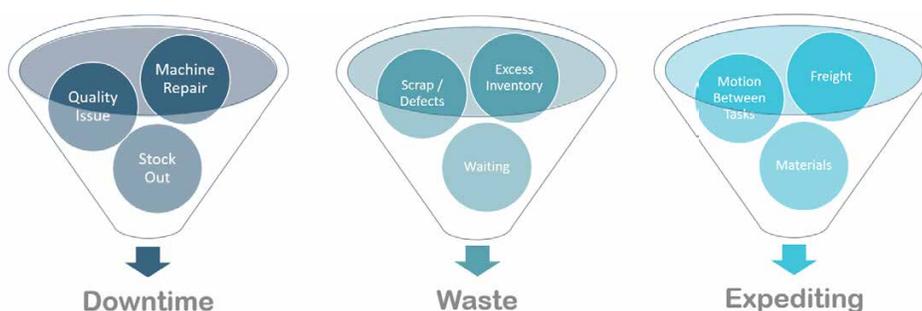
Source: Gartner

1. As with any project, take a pragmatic approach. In general, start with a tight focus and create some early quick wins. Learn the tools, iterate to get it right, gain user adoption (and some evangelists) and move on to the next area.

2. Develop use cases from across the supply chain. Collect and assess use cases and flush out the top 2-5 cases with the most critical visibility needs. For example, issues jeopardizing the capable to promise date (CTPD), areas causing costly downtime, bottlenecks impacting global performance, etc.

Link the use cases to specific, actionable metrics. These are metrics to monitor that you can take immediate action on to improve performance or results – and will provide an easy way to quantify the value of the use case once implemented. For example, a use case providing visibility into CTPD performance could be linked to a metric monitoring schedule adherence. A use case providing visibility into stock outs that disrupt production, could be linked to the measurement of inventory turns.

3. Assess the avoidance costs. In getting started, it may be easier to assess the expenses you will avoid by enabling real-time visibility than the benefits gained. (You'll be able to quantify benefits easier upon enabling visibility – and linking them to actionable metrics as noted above.) Typically, avoidance costs can be funneled into three areas:



- 4. Outline the information needed to support the use case.** What information needs to be made available, at what interval (e.g. real-time), and to whom. Is there analysis that you need the technology to perform? Who will be making decisions based on the availability of this information?
- 5. Identify the data resources.** What are the host system(s), machines, etc. that you need to connect to in order to provide the required level of data to support the use case?
- 6. Usability.** This is key for user engagement and adoption. How do you want to present the information (blueprints, charts, graphs, gauges, etc.) and how do you want the user to interact with it? For example, providing the ability to drill-down into deeper levels of data to get to the root cause of a machine going down; or posting an on-screen safety notice to all viewers.
- 7. Continuous improvement.** Of course, we wouldn't be good stewards of Demand-Driven Manufacturing if we didn't include this, but it's important - especially as visibility needs change. Easier data access and improved visibility lends greater focus to continuous improvement programs. Make a connection between a specific use case and a relevant continuous improvement effort - this will help in gaining buy-in and showing the value of the technology.

7. SUMMARY: TAKE IN THE VIEW

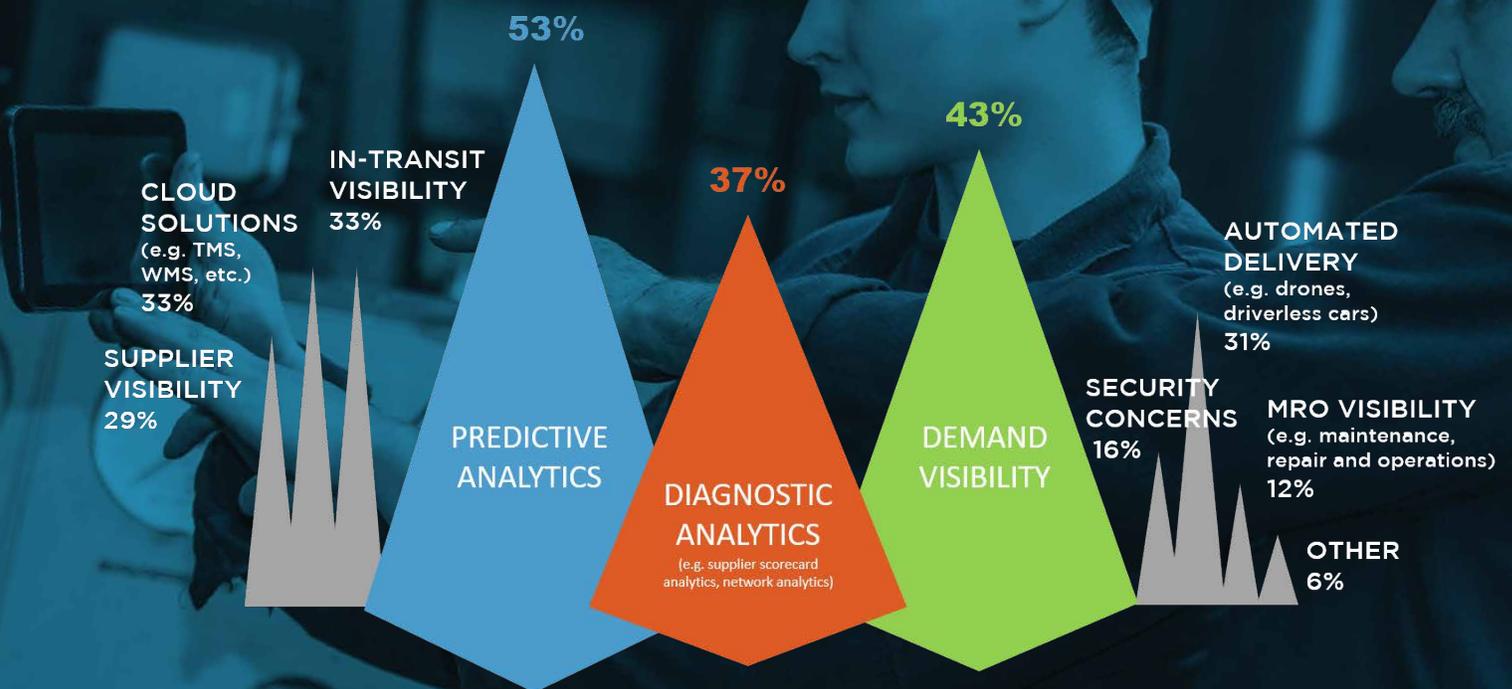
With manufacturing and technology converging in so many areas across the industry, it can be difficult to assess priorities and determine where an investment will provide the greatest return.

As manufacturing becomes increasingly digitized and data-driven, there is a growing hunger across the ecosystem for instant information - and the need for a foundational visualization system of record for real-time communication, collaboration, and continuous improvement.

Visibility concerns top the project lists of supply chain managers across the globe. For Demand-Driven Manufacturers who focus on synchronizing all areas of production to optimize flow, real-time visibility drives peak performance on all cylinders.

This paper offers guidance in building a business case for end-to-end supply chain visibility technology by covering how, why, and where Demand-Driven Manufacturers are investing today. In our next paper, we will take a deeper look at end-to-end planning, scheduling, and execution and the impact of real-time visibility and collaboration within the context of production.

BIGGEST IMPACT ON VISIBILITY IN NEXT FIVE YEARS



“Which of the following will have the biggest impact on supply chain visibility over the next 1-5 years?” (Select top three)

Source: The Clear Peak Supply Chain Advisory Council

Additional Resources

Video: [Visual Factory Software Overview](#)

Video: [How Orbital ATK is Leveraging the IIoT and Visual Factory Technology to Drive Continuous Improvements](#)

White Paper: [Demand-Driven Manufacturing Metrics that Drive Action](#)

White Paper: [How Technology Will Connect Your Enterprise and Create the Demand-Driven Factory of the Future - Today](#)

White Paper: [Supply Chain Advisory Council - Data-Driven Visibility and the Next Revolution in Supply Chain Management](#)

Sources

¹ Gartner, Predicts 2017: Supply Chain Trends and Innovations.

² 2015, Jabil sponsored research by Dimensional Research.

About Synchrono

Synchrono® LLC enables the demand-driven visual factory of the future, synchronizing people, processes, machines, materials and data to drive production flow from order inception to delivery. The award winning Synchrono Demand-Driven Manufacturing Platform includes a synchronized production planning, scheduling and execution system; ekanban inventory replenishment and supply chain collaboration software; a data collection, historian and automated workflow engine; alert management and monitoring software; and a real-time visual factory information system. The Platform components may be implemented independently to provide outstanding results. And when installed collectively, these systems connect the entire manufacturing operation and extended supply chain in real-time, generating the Internet of Things intelligence for instant decision-making and providing an unprecedented foundation for communication, collaboration and continuous improvement.

Synchrono helps clients manage constraints, improve flow and drive on-time delivery to maintain a competitive edge. Look to Synchrono for software that meets your demand. Sync with us at www.synchrono.com and follow the Demand-Driven Matters blog at www.synchrono.com/blog.

About SyncView Software

SyncView is a self-service visual factory information and analytics system for manufacturers to see and understand everything happening in their factory floors and beyond in real-time. Using SyncView, manufacturers keep close to the information and metrics that matters most. SyncView easily connects users to information available in applications, machines, and IIoT devices. The information comes to life in a unified view through dynamic visualizations built in an intuitive interface. Users at every level of the enterprise and extended supply chain are empowered with data and insight. Visit www.synchrono.com for more information.

