SUPPLY CHAIN 2030: CONSIDERATIONS FOR THE FUTURE

Report Highlights

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The Best-in-Class are 59% more likely to manage outside suppliers and partners in the design process than All Others.

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The Best-in-Class are 70% more likely to segment demand by key product, customer, or channel characteristics.

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The Best-in-Class have 73% more contracts in a searchable electronic repository, which provides the opportunity to mine contract data in ways that have never been available before.

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The Best-in-Class are 86% more likely have closed-loop integration of planning and execution processes.

This report will explore what a 2030 supply chain will look like, how and where it will evolve from today, along with points of intersection with other technologies, such as IoT and industry 4.0 factories, plus some driving factors behind the changes.

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> **Our approach is based on the premise that Best-in-Class companies, those that represent the top 20%, based on performance, are good harbingers of direction for the next 5-10 years based on their leadership and adoption of technology and capabilities.**

There are many facets to predicting the Supply Chain of 2030. What current trends will continue and which ones will become dominant? What emerging technologies will have the most impact and in what way? How quickly will companies assimilate new technology? All this and more will be explored as we examine the supply chain of the future.

Our approach is based on the premise that Best-in-Class companies, those that represent the top 20% based on performance (sidebar on page 3 for definition) are good harbingers for the next 5-10 years of change based on their leadership and adoption of technology and capabilities. They provide a good indication of what the future will look like, but it *is* a prediction, and there will be some unforeseen changes, driven by new technologies, policies, and business models.

Technology Influencers

Technologies like the Internet of Things (IoT*)* are already driving change and influencing processes in ways never before imagined. The connectivity between devices and equipment, along with the resulting data, enables processes from design to planning to be automated, ultimately improving execution quality and efficiency.

Big data and analytics as a term, is often overused, but when it is estimated that we use less than 30% of the data we collect, applying analytics and data science to that untapped information is sure to unearth patterns that will improve predictability and actionable intelligence. As more data is leveraged to improve machine learning capabilities, predictability accuracy will increase as well.

3D printing is already having an impact on supply chains as well, affecting inventory deployment and order fulfillment strategies as production occurs closer to the point of need, improving

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Best-in-Class Definition:

- Best-in-Class – Top 20%
- Industry Average – Middle 50%
- Laggards – Bottom 30%
- All Others – Bottom 80% (sum of Industry Average and Laggards)

Best-in-Class Performance:

- Percentage of perfect orders (complete and on time) delivered to customers
    - Best-in-Class – 96%
    - All Others – 85%

- Cash-to-cash cycle
    - Best-in-Class – 30 Days
    - All Others – 60 Days

- Forecast accuracy at the product family level
    - Best-in-Class – 83%
    - All Others – 62%
    -
- Cost of Goods Sold (COGS) as a percent of revenue
    - Best-in-Class – 42%
    - All Others – 44%

postponement strategies. This postponement and positioning of manufacturing will also lead to lower logistics costs, due to a decrease in movement of goods. 3D printing has also had a significant impact on prototyping in the product innovation and design process, as well as the service parts business.

Mobility is another tremendous tool providing applications that improve the quality of life by offering access and connectivity. In supply chains, it has enabled the real-time capture of all transactions to paint an accurate picture of inventory positions, eliminating reviews and accelerating processes.

The *Digital economy* has increased the speed of business and accessibility of data to put consumers in command. They can access/find/order virtually anything from anywhere, with delivery options that meet their needs.

Cloud computing, on the other hand, has had an impact on how companies rethink their IT strategy. It is also the tool driving businesses back to standard processes, thus reducing the upgrade impact and enabling companies to adopt software innovation more quickly. Time to value and TCO (total cost of ownership) have both improved as well. The Cloud enables integration and connectivity as well as a migration path for additional functionality, without a complete "rip and replace" approach that often meant trouble for many enterprise software initiatives.

The umbrella of *Industry 4.0* encompasses all of the technology mentioned above, and describes them in a way that shows how the whole will be greater than the sum of its parts. An important unifying concept is that the logic of the past has been defined by the uncertainty of information. Wondering what a customer will order, when inventories need replenishment – and by how much,

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As complexity and service demands increase, the incremental steps and processes to provide those services and manage the complexity are not free, often increasing costs that must somehow be offset.

as well as when maintenance is required, is where we are today. The future will be dictated by the certainty of customer orders, how much inventory is needed and where, as well as the precision of when maintenance and replacement parts are required, and how they are incorporated into processes and decision making. These are just some examples, but Industry 4.0 will be characterized by the increased connectivity, the certainty of data, and the speed of information flow.

Business Pressures for All Companies

For a glimpse into the future, recognizing the drivers that motivate companies to act is essential. Figure 1 provides the business pressures that all companies are facing. Starting with product development and innovation, most companies recognize the need to be first to market in order to maximize profitability for new designs before the 2nd entry arrives. This puts product development and innovation under tremendous pressure to collaborate with design locations and functions within the enterprise to minimize inefficiencies and delays.

Rising supply chain management costs are always first or second on the list and it's not always about the product. As complexity and service demands increase, the incremental steps and processes that provide those services and manage the complexity are not free, often increasing costs that must somehow be offset.

Customer mandates for faster, more unique fulfillment is a result of the digital economy being enabled by mobility, so that the consumer can shop, order, and schedule delivery at their convenience.

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Figure 1: Business Pressures Facing All Companies

Source: Aberdeen Group, September 2016
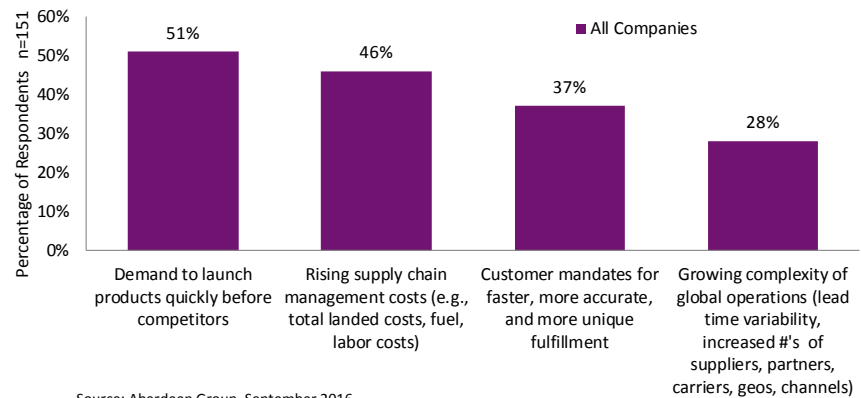
As connectivity, visibility, and mobility increase, the world continues to shrink from a supply chain perspective. Any business that can create a website can be found, which connects buyers and sellers more quickly than ever before. But complexity increases with each additional supplier, country, and cross-border movement that occurs, both import and export.

Innovation Starts with the Product

Given the pressure to get products to market ahead of the competition, managing all elements of the design process is critical. Figure 2 shows the Best-in-Class capabilities for product development and innovation.

Considering that the top challenge (39% of All Companies) within product development is to improve collaboration across all design locations in the development cycle, it's not a surprise that managing outside suppliers and partners in the design process is number one on the list for the Best-in-Class. This is followed by integration between R&D and downstream departments, which the Best-in-Class are 53% more likely to have in place. Integration

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The Best-in-Class are 47% more likely to focus on the *empowered consumer*, which would include incorporating feedback through social media for the product development team.

into S&OP (Sales and Operations Planning) is more closely aligned, but is still less than 50% for all.

Figure 2: Process Capabilities for Product Design/Innovation
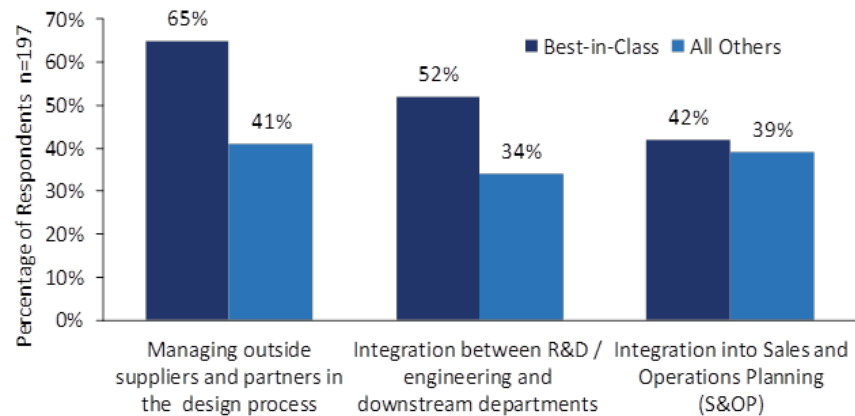
Source: Aberdeen Group, September 2016

Organizations are already leveraging *big data and analytics* by capturing the input from social media, as 44% of the Best-in-Class are capturing the voice of the customer (Figure 3 below) as input into product innovation and the design process.

The capabilities in place today that integrate with, and leverage, the IoT and Industry 4.0 data capabilities call for fundamental process improvements within product development, particularly for All Others, who are well below the 50% adoption rate. It's entirely possible that products will help redesign themselves in the future!

Customer-Centric Requirements

At the most fundamental level, a supply chain must have a demand signal to function. Defining the signal from an actual order or forecast of expected sales is a better description of the net need when it comes to truly understanding the customer. Having a repeatable process is critical, but it's not all about the math when it comes to a customer-centric approach. With the IoT and Industry 4.0, the demand may be driven by replacement
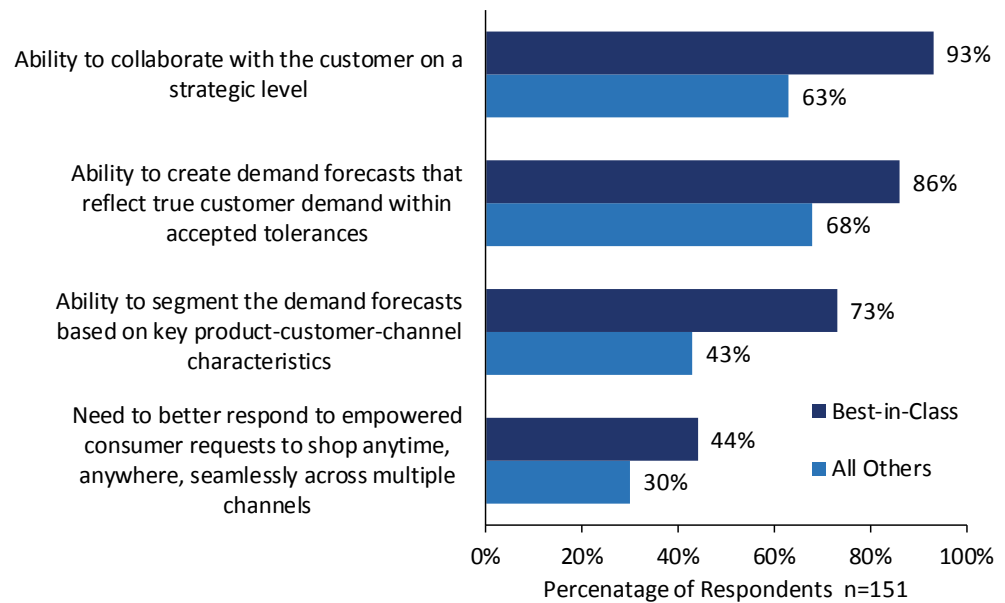
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signals coming from items that have already been sold, such as consumption or wear based items (cyclical or time based as an example).

Including the voice of the customer at the front end of the supply chain is essential. And the Best-in-Class are 47% more likely to focus on the *empowered consumer*, which would include feedback through social media for the product development team. The resulting corrections from this feedback could be made before the damage is too severe.

Figure 3: Understanding the Customer

Source: Aberdeen Group, September 2016

Preference insights related to audience demographics can be captured, for example, to provide intelligence on color, size, and popularity of a product. Any tangible correlations are a huge help in quantifying and segmenting demand. Twenty-eight percent of

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For *Supply Chain 2030*, it is apparent that to leverage better customer intelligence from Industry 4.0 capabilities, improving existing systems to make use of that intelligence is critical.

Best-in-Class companies are *taking action* to improve insights on customer preferences and needs.

The Best-in-Class are 48% more likely to collaborate strategically with the customer to better understand their business and align forecasts or replenishment to eliminate a majority of uninformed estimates. They are also 70% more likely to segment demand by key product, customer, or channel characteristics. The practice of collaboration, segmentation, and analysis culminates in the demand forecast. And the Best-in-Class are 27% more likely to generate these forecasts within acceptable limits compared to their competition. As demand certainty improves based on specific signals, companies that incorporate these additional feeds into their demand management process will see improved forecast accuracy as the unknown elements give way to more known elements.

For the *Supply Chain of 2030*, it is apparent that leveraging better customer intelligence from Industry 4.0 capabilities requires improving existing systems to make use of that intelligence. If, however, the Industry 4.0 capabilities can provide precise demand signals by customer or product that can be incorporated directly into the forecast**,** a more efficient process is created with greater certainty of data.

Planning: Internal Process with "End-to-End" *Point-of-View*

The planning process, often under the umbrella of S&OP (Sales and Operations Planning) or IBP (Integrated Business Planning), is managed as a centralized process within the company. But the scope and visibility are clearly an end-to-end view of the supply chain, from the customer's customer to the supplier's supplier.

S&OP is not new as a process, nor are the supporting planning capabilities that make it work, apart from accessibility improvements in the Cloud. However, the belief is that with the
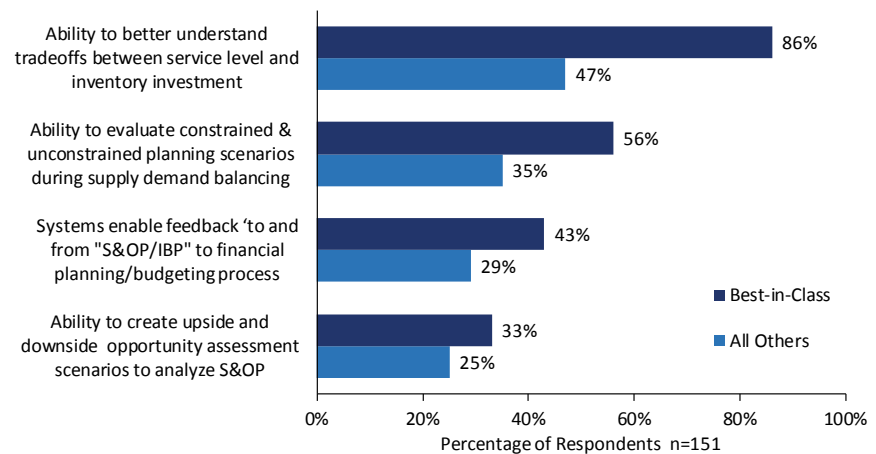
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➜ Read the full report
"S&OP: Beyond the
Demand/Supply
Match – A Journey,
Not a Destination"

➜ Related Research
"Integrated Business
Planning (IBP):
Capability Advantages
for IBP Users vs. Non-
Users"

machine learning that is now available for planning and the speed and access to signal changes, S&OP will evolve to more of a continuous process as the plan of record. And when the fundamental supply/demand balancing capability is considered a *best practice,* yet the competition are only at 35% adoption, a red flag is raised. Those companies without S&OP will struggle with Industry 4.0 capabilities because they do not have basic controls in place to balance supply and demand. As speed and automation increase, they are likely to get into trouble more quickly without the proper controls.

Figure 4: Key Planning Capabilities in S&OP

Ability to better understand tradeoffs between service level and inventory investment: Best-in-Class 86%, All Others 47%

Ability to evaluate constrained & unconstrained planning scenarios during supply demand balancing: Best-in-Class 56%, All Others 35%

Systems enable feedback 'to and from "S&OP/IBP" to financial planning/budgeting process: Best-in-Class 43%, All Others 29%

Ability to create upside and downside opportunity assessment scenarios to analyze S&OP: Best-in-Class 33%, All Others 25%

■ Best-in-Class
■ All Others

0%   20%   40%   60%   80%   100%
Percentage of Respondents n=151

To create confidence in the S&OP model, Best-in-Class companies run scenarios that test upside and downside scenarios for demand, which requires information on the customer's customer. Similarly, to run scenarios for supply risk, knowing the long tail suppliers in the chain and the supplier's supplier are also critical. The decision to pursue demand and capacity (manufacturing and/or suppliers), is an executive one in the *Supply Chain of 2030*.

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Common platforms for the entire *Source-to-Settle* process have become available in the Cloud, enabling the integration and end-to-end capabilities to tie disparate applications together.

IBP is a layer in the planning process that integrates S&OP with the financial planning and budgeting process, along with other internal systems. This capability moves an organization into a more prescriptive process that can provide tangible improvements.

One exciting opportunity in planning is the impact of IOT on spare parts and maintenance. IoT could bypass the forecasting and demand planning process entirely by having a device trigger a demand signal directly on inventory for routine maintenance, or an early warning alert for replacement parts.

Another option might even be a replenishment application based on a location chip, indicating that the product has moved or been consumed, which would then trigger a replenishment signal. Any Industry 4.0 data automation that involves inventory and replenishment can be a huge benefit to the efficiency of planning and scheduling functions, keeping them informed of any change at the earliest possible moment.

Sourcing to Settlement

Procurement has received plenty of attention in recent years as common platforms for the entire *Source to Settle* process have become available in the Cloud. The integration and end-to-end capability is a significant technology enabler, tying disparate applications together and providing the Best-in-Class with a significant advantage, as shown in Figure 5.

The Best-in-Class have 85% of their spend under management, which is 74% higher than their counterparts, giving them a competitive edge.
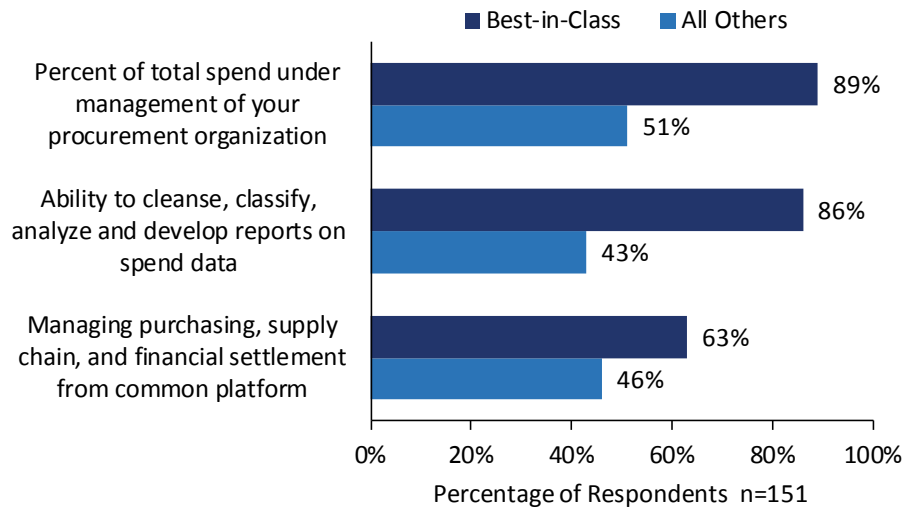
The need for big data and analytics in sourcing cannot be overstated. The Best-in-Class are twice as likely to have the ability to cleanse, classify, and develop reports on spend data to support

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a strategic sourcing process. Once basic reporting is established, analytics can be used to identify further spend and sharpen the focus of the sourcing team.

The other area for big data and analytics procurement is in common platforms for the entire *Source to Settle* process, which have become available in the Cloud. The integration and end-to-end capability is a significant technology enabler tying disparate applications together.

Figure 5: Best-in-Class Procurement for Supply Chain 2030

Source: Aberdeen Group, September 2016

The Best-in-Class have 73% more contracts in a searchable electronic repository, which provides the opportunity to mine contract data in ways that have never been available before, with the exception of the select few.

As a result of the digital economy, procurement has moved, or is moving from paper to digital. The Best-in-Class have 73% more contracts in a searchable electronic repository, which provides the opportunity to mine contract data in ways that have never been available before. Through contract reporting analytics, actual performance by vendor, product, geography, pricing, risk, quality, and compliance are now available for all suppliers to address any non-compliance or out of tolerance conditions.

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Partner and Supplier Network and Visibility

Supply chain performance depends on the *certainty of data*, but visibility and quality are the keys to certainty. Figure 6 provides the visibility, tracking, and collaborative capabilities for the Best-in-Class compared to their competition.

The Best-in-Class are 36% more likely to have visibility into in-transit shipments and they are 127% more likely to have visibility into suppliers' quality and manufacturing processes. For visibility and tracking, IoT is already being leveraged through the use of GPS tracking and RFID for inventory movement. Integrating these components into location systems and exception alerts for orders is where the *certainty of data* will improve. The Best-in-Class also report that they are 50% more likely to have visibility into supplier inventories and three times as likely to have visibility across all DC's.

Figure 6: Visibility Drives Data Certainty

Source: Aberdeen Group, September 2016   Percentage of Respondents n=151
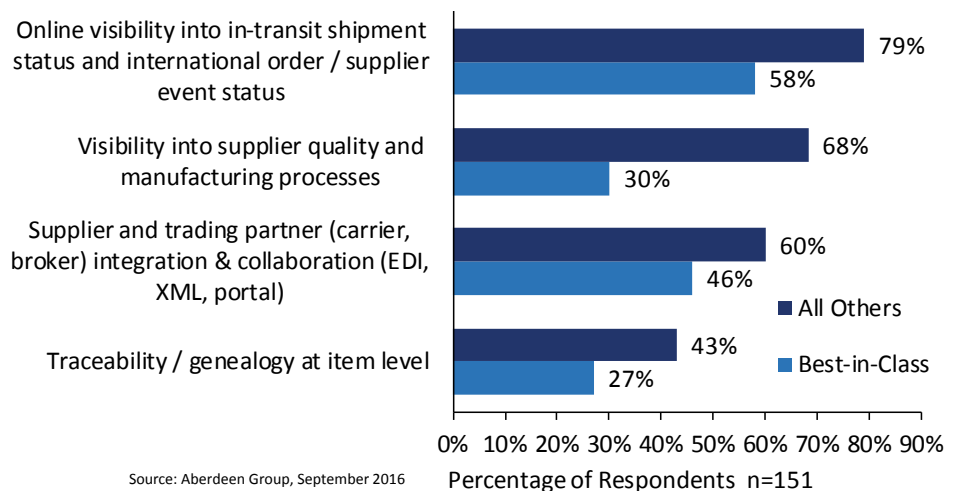
It's easy to envision that Industry 4.0 abilities will only enhance visibility, but again, the issue for all others is building the tools to leverage this data, or rethink processes to eliminate inefficiencies.

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To minimize delays and batch processes, the Best-in-Class are 86% more likely have closed loop integration of planning and execution processes.

Traceability and genealogy at the item level is a great product-based IoT capability to enable self-reporting so that location and item identification is always available. Extending this ability to critical point of failure components is also likely.

The Best-in-Class are 30% more likely to have supplier and trading partner integration in place. But connectivity and real-time tracking or disruption alerts from social monitoring sites will be dependent on the capabilities of the supplier and partner community as well.

IoT capabilities have also been used for security by providing telemetry for tampering and quality via sensors for environmental vibrations.

Fulfillment and Omni-channel

Distribution and warehouse management are under siege from B2B and B2C convergence with new event-driven fulfillment in addition to labor-intensive split-case picking, and same or next day delivery. This raises concerns over labor productivity in all operations due to direct-to-customer shipments. With 70% of companies citing more efficient warehouse and store-level processes as the top pressure to reducing their fulfillment operating expenses.

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The Best-in-Class are also 57% more likely to orchestrate total logistics management by combining inbound and outbound requirements for better efficiency. By getting involved on both sides of the movement, there are fewer empty trucks moving in and out of the point of distribution.

Figure 7: Fulfillment and Omni-channel Support

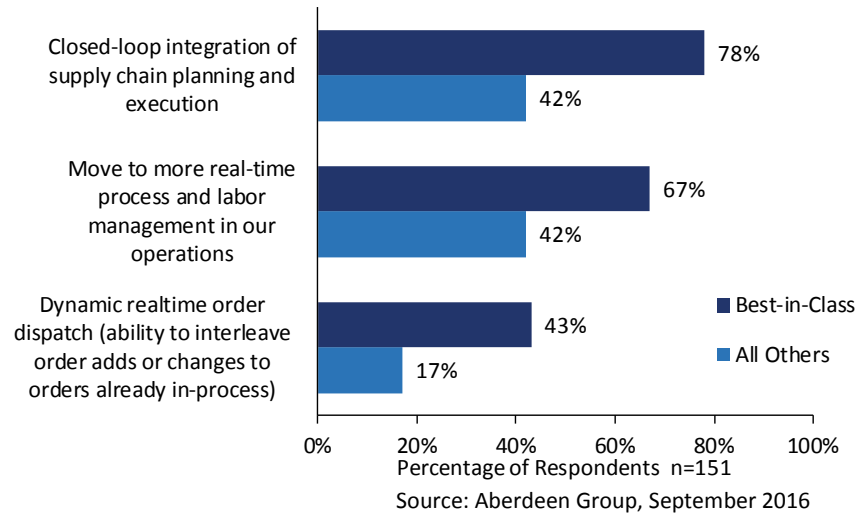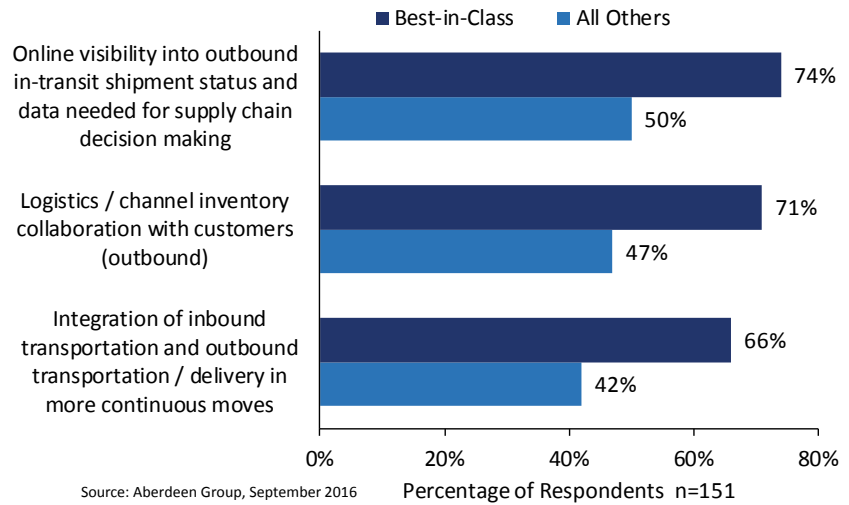Source: Aberdeen Group, September 2016

Figure 7 shows that the Best-in-Class are 60% more likely than their competition to move to real-time process and labor management in their operations. They are also 153% more likely to have real-time dynamic order dispatching to interleave single orders, or changes with orders in process. This capability is necessary to handle omni-channel requirements.

To minimize delays and batch processes, the Best-in-Class are 86% more likely to have closed-loop integration of planning and execution. The concept is not new, but their competition needs to move their processes ahead to leverage the automation that Industry 4.0 is likely to enhance.

Outbound Logistics and Fulfillment

Figure 8 shows the outbound logistics management, including channel collaboration with customers on inventory. The Best-in-Class are 51% more likely to communicate with their customers on last minute refinements to fulfilling orders and inventory adjustments. This closes the loop with the customer by fine-tuning execution to their needs.

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Figure 8: Outbound Logistics and Fulfillment

■ Best-in-Class   ■ All Others

- Online visibility into outbound in-transit shipment status and data needed for supply chain decision making: Best-in-Class 74%, All Others 50%
- Logistics / channel inventory collaboration with customers (outbound): Best-in-Class 71%, All Others 47%
- Integration of inbound transportation and outbound transportation / delivery in more continuous moves: Best-in-Class 66%, All Others 42%

Source: Aberdeen Group, September 2016   Percentage of Respondents n=151

The Best-in-Class are 67% more likely to outsource some, or all, of their logistics execution by leveraging their partner network.

In order to make those refinements in execution, the Best-in-Class are 48% more likely to have online visibility to in-transit shipments and access to supply chain data for decisions such as inventory and lot traceability in the event of a shipment reroute. For businesses that rely on established delivery routes to replenish their customers stock, the tracking and adjustments can make a difference in customer service. Using GPS and inventory visibility is the key to keeping track of inventory after it ships.

The Best-in-Class are also 57% more likely to orchestrate total logistics management by combining inbound and outbound requirements for better efficiency. By getting involved on both sides of the movement, there are fewer empty trucks moving in and out of the point of distribution. And with visibility to a wider logistics network, the opportunity for more flexibility when making adjustments increases.

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The Best-in-Class are 67% more likely to outsource some, or all, of their logistics execution by leveraging their partner network. This relates to the actual execution, not the control or decision support. But being an expert in all phases of outbound movement to all points, in all modes and countries, would be rare for most companies. Recognizing that they don't have all the skills in-house for every shipment improves their efficiency and allows them to concentrate on the overall orchestration.

The advent of mobility has been one of the enablers behind outsourcing due to the real-time capture and reporting of movement and delivery transactions. Being able to respond to the customer on their shipment status up until the point of delivery is a point of control that most companies want to maintain.

Key Takeaways

The vision for the *Supply Chain of 2030* is one of a seamless end-to-end supply chain, with visibility into the planning and execution at all levels. This starts with product innovation and customer centric requirements to the upstream shipments from long tail suppliers, and through to customer fulfillment. Industry 4.0 will be a huge enabler for data visibility to all levels, whether it is from in-house manufacturing, suppliers and logistics partners, or customers and distribution centers. The supply chain will no longer be driven by uncertainty in demand and execution capabilities, and will be characterized by continuous collaboration and flow of information.

To embrace the Supply Chain of 2030, companies should follow the Best-in-Class to extend collaboration and visibility across the end-to-end supply chain. In doing so, all data can be seamlessly connected in order to make better decisions and improve performance. Aberdeen makes the following recommendations to

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prepare and embrace the opportunities presented by the *Supply Chain of 2030*:

➔ Continued movement to the Cloud should be the first consideration for any new or replacement applications. This will accelerate time to value, minimize TCO, and leverage Industry 4.0 connectivity afforded by the Cloud.

➔ Establish a customer-centric approach to capture the voice of the customer in product design and hidden demand nuances that can better refine segmentation, inventory deployment, and fulfillment. As the flow of product data from IoT improves, greater collaboration, integration, and visibility will be the keys to improving supplier management in the development process while tying engineering to downstream execution.

➔ Establish S&OP to ensure that the fundamental supply/demand match is in place. As the speed of execution increases, S&OP will evolve to a more continuous process for managing the plan of record and companies will find themselves in trouble more quickly without fundamental controls and boundaries in place.

➔ Look for opportunities in scheduling and planning to eliminate steps and automate schedule adjustments as the certainty of data from IoT processes is incorporated as part of the process and becomes the standard.

➔ Look for opportunities to rethink processes based on uncertainty, such as maintenance and spare parts ordering

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triggered by the products themselves leveraging IoT capabilities.

➔ Leverage big data and analytics in spend management and contract management for new insights. The digital economy has made access to data available that was not previously possible.

➔ Improve collaboration and connectivity with suppliers and partners for better upstream visibility and data certainty.

➔ Upgrade internal warehouse and order management systems to address the increasing costs driven by B2B and B2C convergence in support of omni-channel workflows.

➔ Leverage logistics partners to outsource execution where in-house capabilities do not exist. Consider all fulfillment options, including partners for positioning inventory in competitive situations.

➔ Combine transportation management for inbound logistics with outbound logistics to maximize efficiency and improve decision making.

The Best-in-Class boast advanced capabilities that are characterized by the availability and connectivity of data. Upgrading and rethinking internal processes to take advantage of this advanced connectivity is the true differentiator for the supply chain of 2030.

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For more information on this or other research topics, please visit www.aberdeen.com.

Related Research

Integrated Business Planning (IBP): Capability Advantages for IBP Users vs. Non-Users; May 2016

B2B and B2C Convergence: A Call to Action; July 2014

S&OP: Beyond the Demand/Supply Match – A Journey, Not a Destination; June 2016

Operational Readiness for B2B and B2C Convergence: Are You Prepared?; December 2014

Author: Bryan Ball, Vice President and Group Director, Supply Chain and Global Supply Management Practices

About Aberdeen Group

Since 1988, Aberdeen Group has published research that helps businesses worldwide improve their performance. Our analysts derive fact-based, vendor-agnostic insights from a proprietary analytical framework, which identifies Best-in-Class organizations from primary research conducted with industry practitioners. The resulting research content is used by hundreds of thousands of business professionals to drive smarter decision-making and improve business strategy. Aberdeen Group is headquartered in Waltham, MA.

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