

THE SUPPLY CHAIN REVOLUTION

DIGITIZATION OF TRADITIONAL SUPPLY CHAIN MANAGEMENT

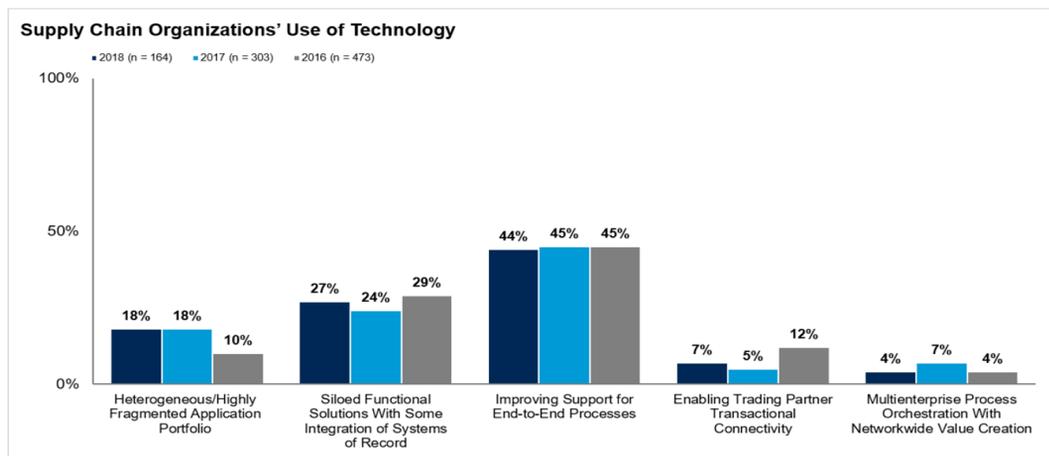
Historically, supply chain was a synonym for transportation or logistics and was more of an afterthought for businesses. Supply Chain Management (SCM) today encompasses a much broader definition - it includes everything from the planning of supply, analyzing of demand trends, and fulfilment of the order.

Whether the business is relying on a more traditional method of SCM or has transformed into fully digital, successful SCM must include reliability, predictability, and quality. While the digital planning/SCM definition carries different meanings for respective industries, its overarching goal is to remove digital waste, which may include waste related to data capturing and management (often a cause of human error), integrated process optimization, and physical process execution of humans and machines.

Digital Supply Chain is defined as the use of digital technologies such as cloud, big data, Robotic Process Automation (RPA), Artificial Intelligence (AI), and/or Machine Learning (ML) to improve or transform the quality of the planning decision making in the supply chain.

More broadly, digital supply chain solutions mean coming off spreadsheets and manual planning, automating the planning processes, and incorporating AI and ML to improve the accuracy of a prediction. From 2016 to 2018, businesses spent most of its attention on “improving support for end-to-end processes” (Exhibit 1). This is clearly in line with where startups in the supply chain industry are most thriving in today’s market.

Exhibit 1: Supply Chain Organizations’ Use of Technology⁽¹⁾



Sources:

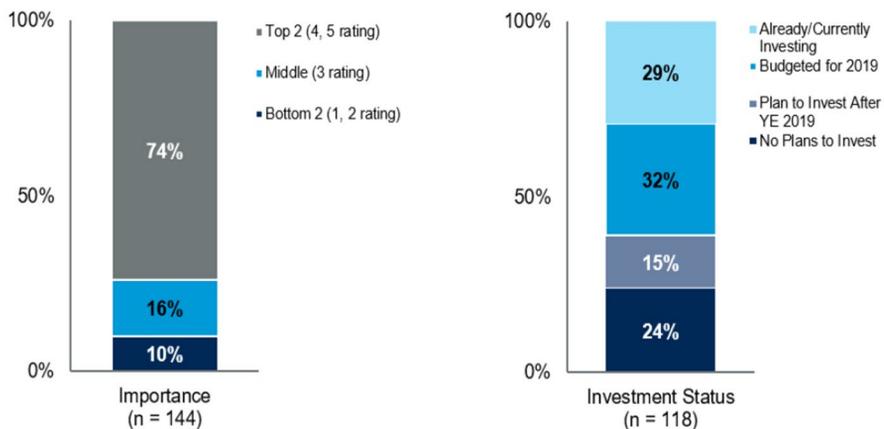
1. Gartner: Predicts 2020: Supply Chain Technology by Dwight Klappich, Rick Franzoso, Simon Tunstall, Tim Payne

INDUSTRY OVERVIEW

Compared to other business functions, digitization of SCM has been rather sluggish. Crescent Cove believes SCM is ripe for digital transformation in the next five years as (i) small and medium sized enterprises (SME) and enterprise companies are continually struggling with end-to-end visibility, (ii) businesses are increasingly valuing and garnering data, which coupled with AI/ML will give massive push toward transformation, and (iii) the rise of e-commerce is making demand planning more critical than ever.

If we assign companies to five stages of digital SCM maturity level rating (1 being analog and 5 being fully digital), only 11% of companies have progressed beyond Stage 3 maturity, with 45% currently in Stages 1 and 2. As illustrated in (Exhibit 2) below, Gartner’s survey indicates digital transformation of business is at the top of the list of importance, with 74% of supply chain users rating it extremely important.

Exhibit 2: Importance of Digital Business and Investment Status ⁽²⁾



Categories of Digital SCM Companies Based on Components and Functions

1. Advanced Planning and Analytics: Predictive analytics in demand, Closed-loop planning, Automation of knowledge work, Advanced profit optimization, Scenario planning
2. Physical Flow Management: Automation of warehousing, Autonomous and smart vehicles, human-machine interfaces, smart logistics planning, and in-situ 3-D algorithms
3. Performance and Order Management: Automated root cause analyses, Digital performance management, and Online transparency; order processing, Real-time re-planning, and Reliable online order monitoring

Sources:

2. Gartner: Hype Cycle for Supply Chain Execution Technologies, 2020 by Dwight Klappich

INDUSTRY OVERVIEW

“The global supply chain management market size was valued at \$15.85 billion in 2019, and is projected to reach at \$37.41 billion by 2027, growing at a CAGR of 11.2% from 2020 to 2027 (3)”

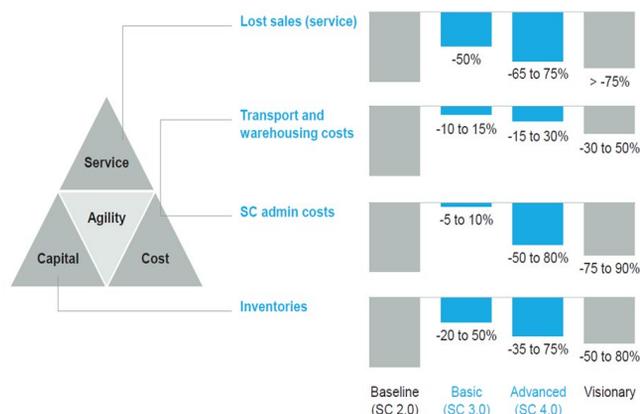
5-year Forecast of Strategic Planning Projections

Digitization of supply chain will lead to higher quality planning decisions and clearer visibility of the supply chain, which will solve key issues that regularly degrades supply chain functions, including variability, human bias, data, and model. Crescent Cove believes this will drive the growth of the global SCM industry forward. Gartner estimates that by 2023, more than 30% of large enterprise supply chain organizations will have invested in at least one autonomous mobile robot. And by 2024, 50% of Warehouse Management Vendors will embed machine learning capabilities to enhance workflows between automation and humans. Lastly, also by 2024, 50% of Manufacturing Execution Systems solutions that track raw materials will include industrial Internet of Things (IoT) platforms; and 0% of companies will have achieved autonomous planning.

As indicated in (Exhibit 3), digital transformation will have a major impact both financially and operationally. Namely, McKinsey forecasts, 30% reduction in operational costs, 75% decrease in lost sales, and up to 75% decrease in inventories. Other benefits include:

- Reduces delivery time by using advanced forecasting to predict internal demand and external market trends (weather, construction, and machine status)
- Ad hoc and real-time planning allow flexible reaction to change in demand
- Being able to adapt to increasingly popular trend of micro-segmentation
- Performance management systems provide real-time transparency

Exhibit 3: Financial and Operational Impact of Digital Transformation (4)



SOURCE: McKinsey

Sources:

3. <https://www.alliedmarketresearch.com/supply-chain-management-software-market>

4. McKinsey: Supply Chain 4.0 – the next-generation digital supply chain

INDUSTRY OVERVIEW

The SCM industry, historically dominated by giant enterprises that offer holistic offerings from SCM to logistics, is changing dramatically with a myriad of start-ups taking advantage of technological advances and IoT to target specific segments of the supply chain industry

Between 2010 and 2016, there has been a significant increase in the number of SCM & Logistics related start-ups, giving a push to the completion of several investment deals, and dramatically increasing related company valuations. In 2016 alone, more than \$5 billion of investments came from Venture Capital (VC) in start-ups in the SCM & Logistics industry globally (figure not available as of today), doubling the prior year's funding sum and representing a ten-fold increase over the previous three years.

Deloitte's research ⁽⁵⁾ indicates that 74% of start-ups in the SCM industry have been founded since 2011. This is in line with the target list we have put together and we believe that there will be ample investment opportunities for financing rounds in the next few years. Many companies in the SCM industry struggle with scale, and often run into integration issues with customers. Crescent Cove found several companies in the pre-series B&C rounds that are at the cusp of a breakthrough.

Most of these companies we have identified leverage technology and big data and incorporate a function of AI & ML. They are asset-light light businesses that can quickly reach scale. However, as mentioned earlier, SCM start-ups struggle with the fact that integration not only needs to come from the customer-end, but from all point-of-sales, making the switch often difficult. Most players focus on a very specific component of the supply chain and provide a more focused approach to solutions and concentrates on solving specific issues.

Crescent Cove's investment mandate in this industry is focused on identifying companies in three categories: 1) advanced planning & analytics, 2) physical flow of the supply chain, and/or 3) performance & order management.

The SCM industry is forecasted to reach north of \$37 bn by 2027, Crescent Cove sees ample opportunities in the space and we believe the winners will be the companies that can provide seamless integration with all point-of-sales, allowing to reach scale quickly and build competitive moat.

Sources:

5. Deloitte: *POV Supply Chain Startups are Coming of Age*

1. ADVANCED PLANNING AND ANALYTICS

Supply chain planning enables businesses to make better decisions in the supply chain.

These decisions include:

- How much does the company expect it will sell?
- How much materials/components to order?
- What trade-offs to make between markets/ customers in case of product shortage?
- When should the inventory level be?



Rise of big data and advanced analytics will drive the future of supply chain planning. Specifically, predictive analytics in demand planning and closed-loop planning will have the biggest impact. Predictive analytics in demand and closed-loop planning is used to analyze internal and external demand influencing variables, including weather and machine failures. Analysts forecast predictive analytics in demand planning will significantly improve demand forecast accuracy, reducing the forecasting error by 30 to 50%⁽⁴⁾.

Closed-loop demand process allows advanced algorithms to provide probability distributions of the expected demand volume rather than a single forecast number, allowing for advanced inventory management. Safety stock will be a thing of a past as each replenishment planning will consider the expected demand probability to fulfill an exact stock level as required. Also, advanced planning process helps identifying consumer demand level at the individual level, thereby enabling the businesses to charge a more accurate price based on demand levels using dynamic pricing models.

Examples of Advanced Planning & Analytics companies:

- **Alloy.AI** - based in San Francisco, CA, Alloy develops a cloud-based platform that automates the collection and harmonization of retail, e-commerce, and supply chain data. It has raised \$12M from notable VCs, including Eight Partners and Menlo Ventures.
- **Simfoni** - based in Chicago, IL, Simfoni provides spend analytics and spend automation products to leading global enterprises. Provides rapid time to value through ML and AI that automates key aspects of the procurement process. It has raised \$3M from Boost.
- **Solvoyo** - based in Boston, MA, Solvoyo provides cloud-based supply chain planning, analytics, and optimization solutions on an integrated SaaS platform. It is still early stage but has raised capital from 212 LTD and 3TS Capital.

Sources:

4. McKinsey: Supply Chain 4.0 – the next-generation digital supply chain

2. PHYSICAL FLOW MANAGEMENT

Physical flow in supply chain management refers to warehouse operations, transport operations, and assessment and tender of logistics.

With the continuation of shift from brick and mortars to e-commerce, warehouses face increasing storage burden. Manual warehouses lead to slow processes, inefficient workflows, and human errors. Deloitte's survey ⁽⁵⁾ found that 66% of consumers have chosen one e-commerce vendor over another based-on delivery options and 54% of consumers consider "fast shipping" to be less than two days. This suggests that seamless supply chain is essential in customer retention for businesses.

While warehouse operations have reached maturity in several areas, all areas of transport operations remain nascent with innovations to follow in the future. Businesses across all industries are poised to see a significant increase in autonomous and smart vehicles within warehouse operations.



Better connectivity, advanced analytics, additive manufacturing, and advanced automation will change warehouse management and logistics. Advanced robotics solutions have emerged for the improvements in transportation and product handling. Self-guided vehicles (SGV) in controlled environments or on-premise solutions as well as in warehouse are already operational and are expected to further grow significantly. IoT in warehousing further includes sensors and wearables that enable location-based instructions.

Examples of Physical Flow Management Companies:

- **Surgere** - based in Canton, OH, Surgere brings together multiple forms of sensor technology to "see" inventory with 99.9% accuracy, thereby mapping the entire supply chain in the automotive industry. It has raised capital from Cypress Growth.
- **INVIA Robotics** - based in Los Angeles, CA, INVIA develops automation solutions for e-commerce fulfillment centers for ground up to pick and restock items in warehouse. It has raised ~\$30M from notable VCs, including Point 72 Ventures and Upfront Ventures.
- **Bossa Nova Robotics** - based in San Francisco, CA, Bossa Nova provides real-time, on-shelf product data for the global retail industry. It has raised over \$100M from notable VCs, including WRVI Capital, Cota Capital, and Paxion Capital.

Sources:

5. Deloitte: *POV Supply Chain Startups are Coming of Age*

3. PERFORMANCE AND ORDER MANAGEMENT

Performance and order management systems are both evolving rapidly, and now granular data is available in real time from internal and external sources, providing clear visibility into Key Performance Indicators (KPI) and orders.

Visibility is key when it comes to performance and order management. Number of startups using IoT are attempting to addressing this issue. Through no-touch order processing and real-time re-planning, supply chain management has benefited greatly. These benefits include lower costs through automation of efforts, higher reliability due to granular feedback, and superior customer experience through immediate responses.

Automated root cause analyses couples ML and AI to identify the root causes of an exception by either comparing it to a predefined set of underlying indicators or by conducting big data analyses. No-touch order processing and real time re-planning fully automate the ordering process, where no manual intervention is required between order intake and order confirmation.



The ability to readily identify risks in the supply chain helps reduce delays in shipping and handling. It also provides real-time internal and external data (i.e. weather) causing delays, so businesses can act or respond to a customer quickly, increasing the customer experience. Real time visibility finally reduces damaged and lost goods, as well as equipment damage.

Examples of Performance and Order Management Companies:

- **Freightroll** - based in Ann Arbor, MI, Freightroll is an enterprise software focused on automating bill of lading to provide better visibility of shipments stored on trucks. The company is working with customers like Nestle to accurately keep track of all the shipments throughout the supply chain process.
- **Project 44** - based in Chicago, IL, Project 44 provides a cloud-based visibility platform for shippers and third-party logistics companies. It has raised over \$90M from notable VCs, including Insight Venture, Pritzker Group, and Chicago Ventures.
- **ClearMetal** - based in San Francisco, CA, ClearMetal provides a platform that couples a continuous methodology with ML technology to improve freight delivery. It has raised over \$30M from notable VCs, including Prelude Ventures, Prologis, Sapphire Ventures, Eclipse Ventures, and SAP.iO Fund.

Sources:

1. Gartner: Predicts 2020: Supply Chain Technology by Dwight Klappich, Rick Franzoso, Simon Tunstall, Tim Payne

2. Gartner: Hype Cycle for Supply Chain Execution Technologies, 2020 by Dwight Klappich

3. <https://www.alliedmarketresearch.com/supply-chain-management-software-market>

4. McKinsey: Supply Chain 4.0 – the next-generation digital supply chain

5. Deloitte: POV Supply Chain Startups are Coming of Age

Other Sources:

1. Gartner: Defining Digital Supply Chain Planning by Tim Payne

2. Goldman Sachs: Which industries could do more onshoring in the US; Regionalization, Resiliency of supply chains is on the rise