

Supply Chain Tech for Ecommerce Industry Report



Harlem Capital



Key takeaways

Industry Overview

- Supply chain tech is a highly fragmented \$1.0¹ trillion market, driven by \$29 trillion in B2C and B2B e-commerce
- Enterprise Supply Chain Management is the fastest growing segment of the market with a 9% CAGR, followed by Last-Mile Delivery at 7% and Warehousing at 4%

Recent Trends

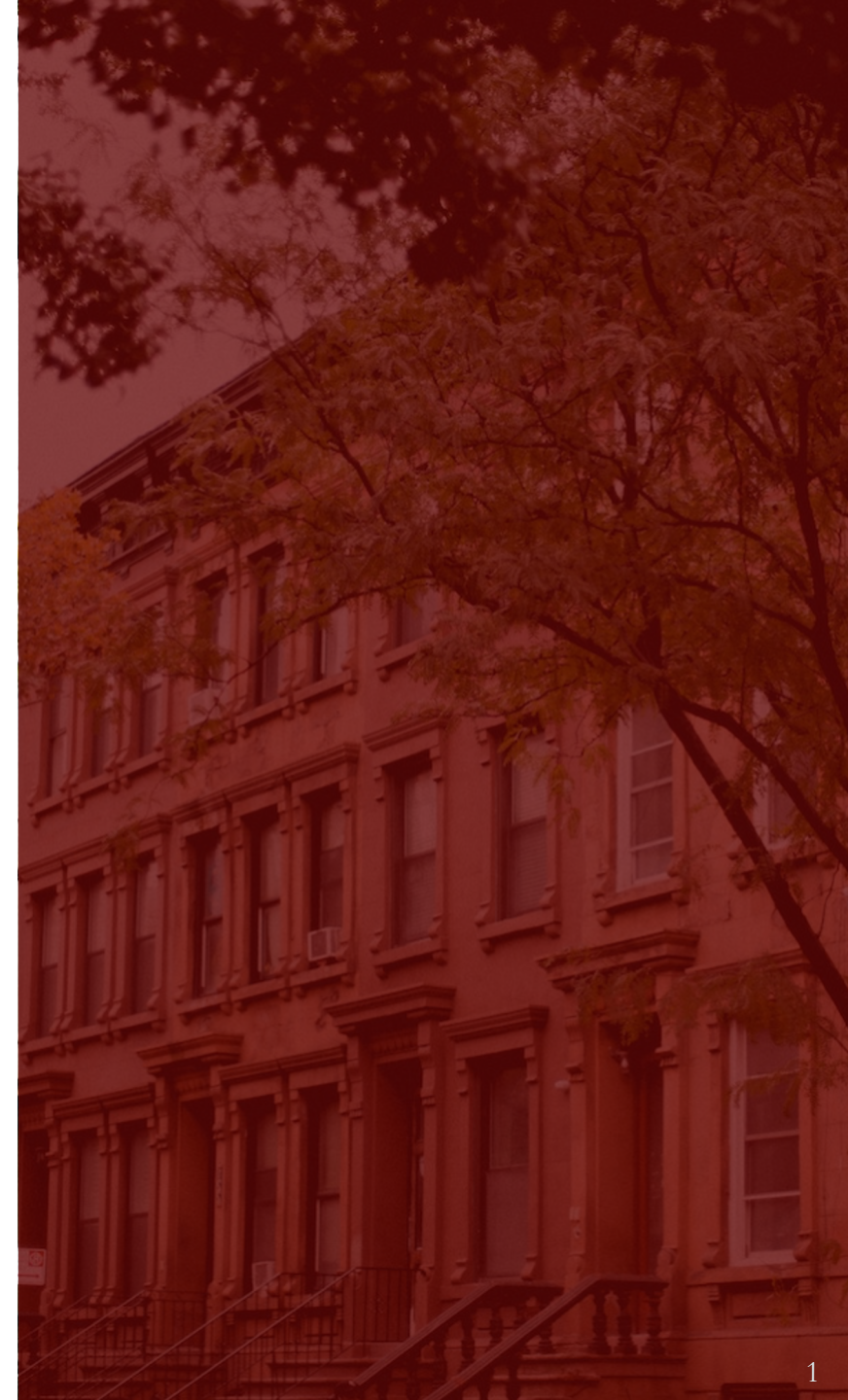
- Businesses and consumers are demanding better visibility, sustainability, and provenance across the supply chain
- COVID-19 expected to catalyze adoption and long-term investment as companies seek to diversify supply chains and mitigate future shocks via flexibility and automation
- Growing interest in Supply Chain-as-a-Service as subscription-based warehouse marketplaces and autonomous robotics gain traction

Investment Thesis

- Companies that can provide end to end platforms or centralization and integration across multiple combinations of SCM software for each participant in the supply chain will deliver significant value by providing visibility and unlocking predictive/AI analytics capabilities for inventory management and risk management
- Rather than finding the winner in the warehouse automation robotics space, companies providing hardware agnostic AI software to quickly teach and integrate robots at a rapidly growing number of warehouse facilities of varying capacity, size and product type will drive value in an industry experiencing significant margin and speed pressure

Investor Activity





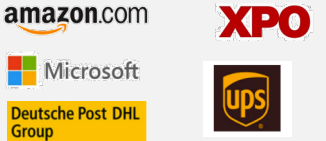

- \$11.5bn in investment was raised across 370 companies in 2019, with GV, Sequoia, NEA, Kleiner Perkins and Lightspeed being the most active investors in the space
- Median valuations have continued to grow to a median of \$6mm at the seed stage, \$31mm at the early stage and \$150mm at the late stage.



Industry Overview

Supply Chain Technology for Ecommerce

Overview
<ul style="list-style-type: none">Supply chain tech is a highly fragmented \$1.0 trillion ecosystem of disparate providers, each at different stages of technological maturityThe industry is driven by \$29 trillion in B2C and B2B e-commerce growing at 20-28% per yearBusinesses and consumers are demanding better visibility, sustainability, resilience and provenance across the supply chain, particularly as geopolitical and pandemics highlight need for analytics and monitoringWarehousing tech is seeing a surge in investment as companies seek to diversify supply chains and automate processes to decrease fulfillment costs and meet quick delivery expectationsInterest in Supply Chain-as-a-Service has grown as subscription-based warehouse marketplaces and autonomous robotics allow for smaller retailers and business to compete with Amazon and meet fluctuating demandLabor regulation a growing risk and margin strain for gig economy delivery companies

E-Commerce Supply Chain Tech Value Chain			
	Enterprise Supply Chain Management	Warehousing & Fulfillment	Last-mile Delivery
Market Size (\$B)	\$14.3	\$417	\$581
2019-2025 CAGR %	9%	4%	7%
EV/Rev	8.8x	1.9x	3.3x
'19 VC Investment (\$B)	\$1.1	\$2.8	\$4.6
Key Segments	<ul style="list-style-type: none">Asset trackingERP & inventory managementProcurement, sourcing & financing	<ul style="list-style-type: none">Warehousing & fulfillmentWarehouse automationWarehouse marketplacesAugmented reality	<ul style="list-style-type: none">Delivery servicesAutonomous deliveryDelivery management software
Industry KPIs	<ul style="list-style-type: none">Users under licenseLicense order valueReturn %Refund/warranty rateInventory turnsReject ratioQuality assurance (QA)	<ul style="list-style-type: none">On-time shippingOrder cycle timeDock-to-stock timeInventory accuracyRecordable incident ratio (RIR)	<ul style="list-style-type: none">GMVConversion rateAverage order value (AOV)LTVMAUMarket penetrationOn-time delivery
Notable VC-Backed Companies			
Incumbents			

Source: Pitchbook

Supply Chain Tech Market Map

ERP & Inventory Management

Supply Chain & Logistics Analytics



Procurement, Sourcing, Financing

Delivery Management

Wholesale Marketplace

E-Commerce Logistics

Warehouse Marketplace

Warehouse Automation

Fulfillment & Microfulfillment

Last-Mile Delivery

Problems in the Industry

Supply Chain Technology for Ecommerce

1

Unit Economics are strained

- Labor regulations supporting gig economy workers and consumer expectations of next-day delivery has put a strain on already low unit economics
- Globally, businesses spent over \$86B on last-mile delivery in 2017, which accounts for 28% of the total transportation cost associated with a product

2

Inability to predict demand due to siloed data

- Retailer's JIT inventory management and pressure to reduce net working capital don't allow for flexibility in responding to demand
- Retailers lose \$144B annually due to out-of-stock inventory, don't have the supply chain visibility to manage inventory up/downstream

3

Warehousing cost pressure

- Increased pressure to localize supply chain assets in order to reduce distance to the customer for faster delivery and decreased last mile delivery expenses
- Higher urban population density has put cost pressure on warehouse space, with significant real estate acquisitions by Blackstone, Prologis to build capacity

4

Risk exposure is hard to assess

- Lack of visibility into derivative, global supply chains constrains ability to assess risk and respond quickly
- Access to more wholistic company data (financials, customer concentration) for comprehensive risk evaluations introduces privacy and competitive concerns

5

Supply chain disruptions

- Reduced labor supply, COVID-19 and trade disputes have highlighted a need for supply chain technologies and automation to ensure business continuity
- High fixed cost nature of fulfillment business does not allow small businesses to compete and adapt to shocks

6

Disintermediated customer experience

- Online brands invest heavily on user experience, only to relinquish control to a 3rd party for fulfillment
- Last mile delivery platforms own the customer in an increasingly commoditized space

Industry Analysis

Supply Chain Technology for Ecommerce

Strengths

- The proliferation of SaaS/IoT has helped digitize players across the supply chain, subsequently allowing for better tracking, visibility, optimization and planning from manufacturing to warehousing to transportation
- Sales through online channels has increased 93% year-over-year due to the pandemic, pulling forward both the demand and supply that was expected to move online by several years, a lot of which is expected to remain
- Amazon has been a forcing function for the industry to move to fast, low-cost delivery as the standard – this has sped up the need for and investment in technology at every point upstream to enable the agility needed to remain competitive and financially viable

Opportunities

- In the journey to a fully autonomous supply chain, AI and machine learning will be crucial on both the hardware and software fronts to enable warehouse automation/robotics, extract insights as inventory data is accrued across the supply chain
- Globally, businesses spent over \$86B on last-mile delivery in 2017 which accounts for about 28% of the total transportation cost associated with a product. Micro-fulfillment can reduce distance, cost and time by bringing the product closer to the buyer.
- Supply-chain-as-a-service will enable retailers to simultaneously own their customers and compete with Amazon's speed and convenience, while helping them turn fixed expenditures into variable costs

Weaknesses

- Transportation is 60% of supply chain costs, yet autonomous/drone delivery adoptions are low. Platforms like Postmates can fulfill effectively but they control the user experience and own the customer
- While the market for food delivery is large and has gained momentum with COVID, food delivery margins are structurally low and decreasing further as customer incentives are needed to expand market share for commoditized services, limiting investor returns
- Retailers use about 1.25M square feet of warehouse space for every \$1B in sales, according to CBRE. With e-commerce sales rising 15-20% every year, retailers are facing a crucial real estate challenge as warehouse pricing and availability turn scarce.

Threats

- The current downturn could reduce spending on capital intensive projects to build and automate warehouses while large incumbents take market share and launch competing products like UPS Ware2Go (on-demand warehousing and fulfillment)
- Labor regulation reform can make contractor-dependent business models unsustainable. California's state senate passed a bill that entitles gig-economy workers to receive minimum wage and other benefits and New York lawmakers are exploring similar options. Online food delivery platforms are also facing scrutiny as government seeks to reduce fees to 10-15% of gross transactions (down from 10-40%), putting pressure on growth and already low margins.
- Adding to the troubles, in the face of new automated solutions like micro-fulfillment and autonomous last-mile delivery, crowd-sourced delivery networks may fall out of favor in the years to come.

Investment Thesis

Supply Chain Technology for Ecommerce

Key Areas of Interest

▪ Microfulfillment and Supply-Chain-as-a-Service

- Smaller retailers cannot compete with current logistics infrastructure and speed, and will need to rely on microfulfillment to combine the proximity of localized stores with the efficiency of large, automated warehouses
- New pricing and service models like Supply-Chain-as-a-Service will allow retailers to own the customer, sell across multiple channels from any source and turn previously fixed costs into variable subscription costs that are easily scalable to respond to seasonality and demand shocks

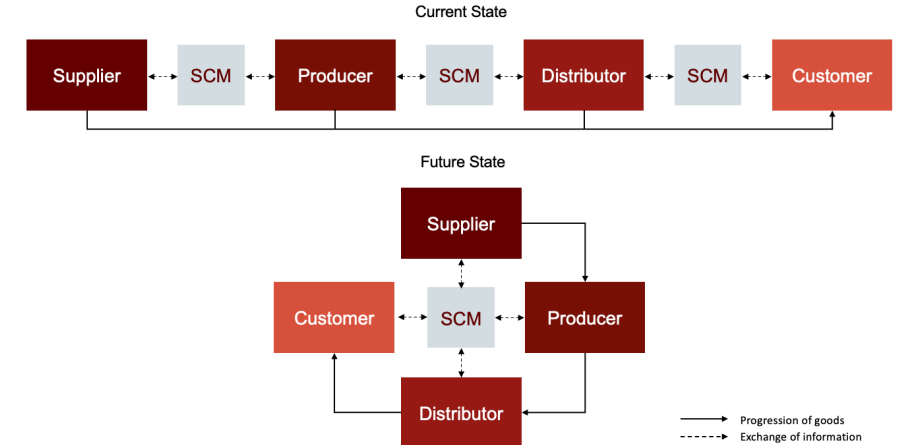
▪ Supply Chain Integration & Visibility

- It is not good enough for companies to manage their data in a silo. Companies that can provide end to end platforms or centralization/integration across multiple combinations of SCM software for each participant in the supply chain will unlock valuable predictive/AI analytics capabilities for inventory and risk management
- Companies *need* good data on demand and inventory velocity if they want to leverage microfulfillment. With a smaller space, its crucial that they make good stocking decisions and know their customers on a hyper local, neighborhood specific scale

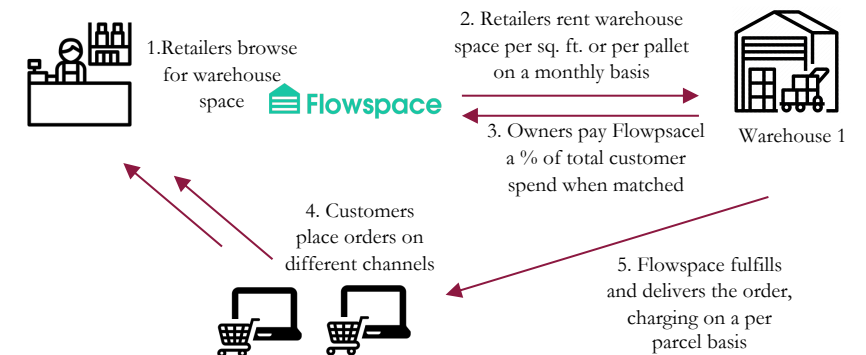
▪ AI Software for Warehouse Automation

- Though robotics remains a huge area of focus in the warehouse automation space, many players are developing non-compatible technologies in parallel and startups in the space face significant partner risk as incumbents develop or acquire in-house warehouse automation capabilities
- There is a need for companies providing the infrastructure behind the robotics technology – a hardware agnostic AI software that can quickly teach and integrate robots as they're deployed to a rapidly growing number of warehouse facilities of varying capacity, size, location and product types

Current State vs. Future State



Supply-Chain-as-a-Service



VC Investor Activity

VC Ecosystem

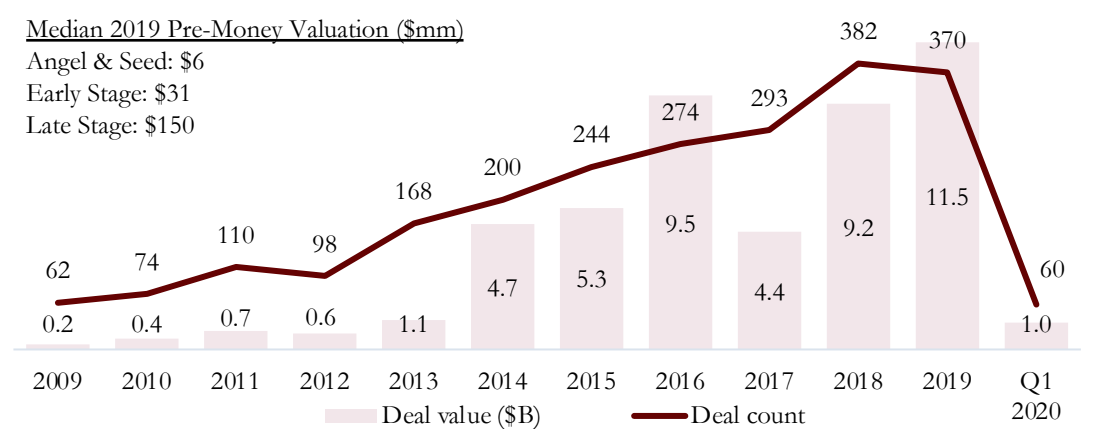
Overview

- Deal size and count grew despite trade war headwinds, rising costs and record high valuations, with late-stage deals rising 43% YoY to \$150mm but remaining at 5.0x-6.5x historical multiples
- Last-mile logistics driving deal activity as retailers invest heavily into delivery facilities and fulfillment centers, form partnerships with third-party delivery providers
- Blackstone announced acquisition of 800mm sq. ft. of warehouses to capitalize on rise of online shopping and undersupply of urban warehouses capable of quick deliveries
- COVID-19 expected to catalyze long term investment as companies seek to diversify supply chains and mitigate future shocks via visibility, flexibility and automation
- Supply chain automation drove deal activity in Q1 2020 as investors made large bets on emerging robotics technologies for warehousing and industrial applications
- Over the past five years, the median late-stage pre-money valuation has risen by a CAGR of 22%. Meanwhile, the median valuations of angel & seed and early-stage deals rose by a CAGR of 9% and 13%, respectively.

Source: Pitchbook | Geography: North America & Europe

¹ Includes Freight

Supply Chain Tech VC Deal Activity¹



Top 10 VC Investors	
Investor	# Deals
Kleiner Perkins	35
GV	34
NEA	32
Sequoia	29
Khosla Ventures	28
Lightspeed	24
Accel	23
Shasta Ventures	21
First Round	20
Notion	19

Top 10 VC Backed Companies	
Investor	Post-Money Valuation (\$B)
DoorDash	\$13
Instacart	7.8
C3.ai	3.3
Flexport	3.2
Convoy	2.8
Nuro	2.7
Deliveroo	2.1
Postmates	1.9
Zipline	1.3
KeepTruckin	1.3

VC Investor Activity

Recent Funding Rounds

Funding						
Date	Name	Round	Raise (\$M)	Pre-Money Valuation (\$M)	Investors	Industry Segment
Feb-19	Nuro	Series B	\$940.0	\$1,760.0	Softbank	Warehouse Automation
Jun-19	Aera	Series C2	\$80.0	\$250.0	DFJ Growth, Georgian Partners, NewView Capital	ERP & Inventory Management
Oct-19	Fabric	Series B	\$110.0	N/A	Corner Ventures	Warehouse Automation, Microfulfillment
Oct-20	Faire	Series D	\$150.0	\$850.0	Lightspeed, Khosla, Golden Ventures, YC	Wholesale Marketplace
Sep-20	C3.ai	Series H	\$50.0	\$3,250.0	BlackRock	ERP & Inventory Management
Nov-19	DoorDash	Series G	\$700.0	\$12,000.0	Sands Capital Ventures, Darsana Capital	Last Mile Logistics
Jan-20	Vecna Robotics	Series A1	\$50.0	\$175.0	Blackhorn Ventures, Tectonic Ventures	Warehouse Automation
Jan-20	Tradeshift	Series F	\$240.0	N/A	Gray Swan, IDC Ventures, Goldman Sachs	Supply Chain Financing
Jan-20	Berkshire Grey	Series B2	\$263.0	N/A	Softbank, Khosla Ventures, Canaan Partners, NEA	Warehouse Automation
Jan-20	Bond	N/A	\$15.0	N/A	Lightspeed	Last Mile Logistics, Microfulfillment
Feb-20	Deliverr	Series C	\$40.0	\$170.0	Activant, 8VC, Alumni Ventures, GLP	Fulfillment
Feb-20	Riskmethods	Series C	\$9.4	\$79.0	Digital + Partners, Bayern Kapital, EQT Ventures	Supply Chain Risk Management
Feb-20	Grab	Series H	\$886.0	N/A	Mitsubishi UFJ Financial, TIS	Last Mile Logistics
Mar-20	Interos	Series B	\$17.5	\$100.0	Kleiner Perkins, Venrock	Supply Chain Risk Management
Mar-20	Noodle.ai	Series B2	\$21.0	\$275.0	Dell Technologies, Mitsubishi, TPG Growth	Supply Chain Optimization
Mar-20	Gojek	Series F	\$3,000.0	\$9,500.0	Tencent, JD.com, Alphabet, Facebook, Paypal	Last Mile Logistics
Apr-20	Bringg	Series D	\$30.0	N/A	Salesforce Ventures, Next47, GLP	Delivery Management Platform
Apr-20	Deliveroo	Series G	\$575.0	N/A	Amazon, Fidelity, The Strand, T.Rowe Price	Last Mile Delivery
Jun-20	Clearpath Robotics	Series C	\$29.0	N/A	BMO Capital Markets, RRE Ventures, Inovia Capital	Warehouse Automation
Jun-20	DoorDash	Series H	\$400.0	\$15,600.0	Fidelity, Durable Capital, Dragoneer, T.Rowe Price	Last Mile Delivery
Jul-20	Taulia	Series G	\$60.0	\$340.0	Ping An Insurance, Zouk Capital, J.P. Morgan	Supply Chain Financing, Process Automation
Apr-20	Grab	PE Growth	\$200.0	N/A	STIC Investments	Last Mile Logistics
Median			\$95.0	\$340.0		
Average			\$357.5	\$3,411.5		

Source: Pitchbook

Notable Exits







Supply Chain Technology

Overview
<ul style="list-style-type: none">Large, incumbent strategic buyers show preference for partnering or acquiring key technologies rather than developing in-housePE investors tend to target end-to-end enterprise solutions, prioritizing profitable growth, margin improvement, and capital efficiencySignificant activity seen in last mile segment as platforms try to scale their way to better economicsActive Strategic Buyers: Amazon, Walmart, UPS, SAP, Oracle, Infor Global Solutions, Echo Global Logistics, XPO Logistics, DSVActive Financial Buyers (Deal Count): Golden Gate Capital (6), Accel-KKR (5), Klass Capital (5), ABS Capital (5), Summit Partners (4), EQT (4), New Mountain Capital (4), Thoma Bravo (3), Petra Capital Partners (3)

Notable Exits					
Name	Valuation (\$M)	Acquiror	Acquisition Date	Last Funding Round/Raise/ Pre-money Valuation	Industry Segment
Shipt	\$550.0	Target	Dec-17	Series B/\$40M/\$165M	Last Mile Logistics
6 River Systems	\$394.0	Shopify	Sep-19	Series B/\$25M/\$125M	Warehouse Automation
Scout RFP	\$540.0	Workday	Dec-19	Series C/\$34.5M/\$150M	Procurement & Sourcing
Pointy	\$163.0	Alphabet	Jan-20	Series B/\$12M	ERP & Inventory Management
PeopleVox	\$24.6	Descartes Systems	Feb-20	Series A/\$6.2M/\$12.5M	Warehouse Management
Woowa Brothers	\$4,000.0	Delivery Hero	Apr-20	Series G/\$320M/\$2.28B	Last Mile Logistics
Deliv	N/A	Target	May-20	Series B	Last Mile Logistics
Dada	\$3,240.0	IPO	Jun-20	Series G/\$500M	Last Mile Logistics
GrubHub	\$7,300.0	Takeaway.com	Jun-20	IPO	Last Mile Logistics
Cornershop	\$459.0	Uber	Jul-20	Series B/\$21M	Last Mile Logistics
Postmates	\$2,650.0	Uber	Jul-20	PE Growth/\$225M/\$2.17B	Last Mile Logistics
Stitch Labs	N/A	Square	Jul-20	Series C/\$15M/\$50.7M	ERP & Inventory Management
TradeGecko	\$80.0	Intuit	Aug-20	Series B/\$10M	ERP & Inventory Management
Median	\$545.0				
Average	\$1,932.1				

Notable Startups

Supply Chain Technology

Name	Latest Stage	Latest Valuation (\$M)	Total Funding (\$M)	Notable Investors	Description
 covariant	Series B	\$240.0	\$67.0	Index Ventures, Amplify Partners, Radical Ventures, SV Angel, Lux Capital	Developer of an artificial intelligence-based software designed to teach warehouse robots to see, reason and act on the world around them through deep imitation learning, deep reinforcement learning and meta-learning, enabling users to program a robot by using a VR headset to guide the robot through a task.
 FLEXE	Series B	\$193.0	\$63.6	Tiger Global Management, Activate Capital Partners, Prologis Ventures, Redpoint, Madrona	Online marketplace solving inventory overflow and fulfillment needs by connecting retailers and brands requiring warehousing and fulfillment services with warehouse operators who have it, enabling enterprises to strengthen their distribution network by accessing affordable spaces and warehouse providers on demand without significant capital outlay.
 FOURKITES	Series C	\$575.0	\$98.4	Bain Capital Ventures, August Capital, Hypde Park Angels, Hyde Park Venture Partners	Predictive supply chain platform that provides real-time tracking data and analyzes enterprise supply chain data to enable customers to lower their operating costs, improve on-time performance and strengthen their end-customer relationships. The company's platform offers supply chain visibility, allowing better collaboration between shippers, 3PLs and others.
 OSARO	Series B	\$63.0	\$30.1	Founders Fund, Comcast Ventures, iRobot Ventures, King River Capital, Pegasus Tech Ventures	Hardware-agnostic AI software to power robots in factories and distribution centers that works directly with warehouse technology providers to accelerate systems integration. The company's AI software automates common manual tasks like picking and placing products and parts and is used for high velocity inventory including grocery and ecommerce fulfillment centers.
 project44	Series C	\$280.0	\$110.5	Sapphire Ventures, OpenView, Insight Venture Partners, 8VC, Emergence Capital Partners	Enterprise cloud company providing supply chain visibility and connectivity. Project44 delivers a network of web service APIs that facilitate real-time information flow between global supply chain partners so that retailers, e-commerce businesses, suppliers, 3PLs and trucking companies are able to communicate critical data with the rest of their supply chain in a synchronous, real-time manner.
 unioncrate	Series A	N/A	\$12.3	Gradient Ventures, Founders Fund, Susa Ventures, Bain Capital, Techstars	Online platform designed for demand planning and supply chain management. The company's platform utilizes AI to find demand patterns between products, people and places by automating daily operational tasks and generating demand predictions, enabling consumer goods companies to solve core operational problems along their entire supply chain.
Median		\$240	\$65		
Average		\$270	\$64		

Source: Pitchbook





Diverse Startups

Supply Chain Technology

Name	Latest Stage	Latest Valuation (\$M)	Total Funding (\$M)	Notable Investors	Description
 Aera	Series CC	\$330.0	\$174.0	DFJ Growth, NEA, Sierra Ventures, Georgian Partners, NewView Capital, Harmony Partners	The company's supply chain technology focuses on domain-based business intelligence that brings together cloud, Big Data and a next-generation BI stack to deliver insights into the supply chain, enabling businesses to make real-time recommendations, predict outcomes and take actions autonomously.
	Series C	\$90.0	\$25.6	Techstars, Silverton Partners, NextGen Venture Partners, RPM Ventures, MCVC, Capital Factory, Corsa Ventures	Delivery experience management platform designed to enable retailers to take control of the customer delivery experience. The company's software aggregates and normalizes disparate data across carriers, retailer and customer systems, enabling retailers to get complete supply chain visibility, predictive insights and take action through shopper communication, exception management and transportation analysis.
	Series D (Est.)	N/A	\$65.0	Lightspeed, GE Ventures, Fontinalis Partners, AME Cloud Ventures, Flextronics, China Broadband	Developer of a supply chain management platform designed to make supply chain simple and hassle free. The company's supply chain management platform provides real-time insights, analysis and early warning signals of potential disruptions, enabling businesses to manage risks, monitor key performance indicators and track shipments
	Series B	\$117.5	\$25.9	Kleiner Perkins, Venrock	Cloud-based ecosystem monitoring and assurance platform helps customers improve their supply chain transparency and risk management by identifying patterns from real-time events, such as geopolitical, day-to-day business operations, financial markets, regional conflict, and acts of nature allowing customer to act on the ripple effects that could impact their supply chains.

Diverse Startups

Supply Chain Technology

Name	Latest Stage	Latest Valuation (\$M)	Total Funding (\$M)	Notable Investors	Description
 NuORDER	Series D	\$80.0	\$80.0	Greycroft, Upfront Ventures, Argentum Group, NewSpring, Cowboy Ventures, Box Group	Cloud and mobile based B2B eCommerce platform that provides a central hub to browse different brand's products and catalogues, access real-time inventory data and place orders, enabling brands and retailers to quickly respond to customer requests and store inventory needs and establish partnerships through an exclusive marketplace.
	Series B	\$40.0	\$31.7	Partech Ventures, Shasta Ventures, Salesforce Ventures, Streamlines Ventures, Inventus Capital Partners	Provider of a supply-chain management software offering supply chain resiliency and risk management services. The software identifies and quantifies potential supply-chain vulnerabilities by mapping actual manufacturing sites and providing early notification of disruptions close to supplier locations, enabling companies to access to advanced multi-tier mapping and part origin intelligence.
	Series C	\$500.0	\$86.0	IGNIA, Forrestal Capital, Ataria Ventures, H2O Capital Innovation, Food Retail Ventures	Provider of hyperlocal micro fulfillment services intended to assist grocery retailers to bring their grocery operations online. The company's services use automated technologies to fulfill the orders using robots in micro fulfillment centers, enabling retailers to attain profitable online growth by leveraging automation at a hyperlocal scale.
	Series A	N/A	\$15.8	Redpoint, Green D Ventures, Alumni Ventures, Background Capital, Peterson Partners, FJ Labs	Online wholesale marketplace that helps brands diversify distribution with smaller retailers and facilitates wholesale transactions where buyers save by buying directly from the supplier without fees, enabling businesses around the world to buy and sell products instantly and online with freight included, simple checkout and easy delivery.
Median		\$104	\$48		
Average		\$193	\$63		