



EMERGING TECH RESEARCH

Supply Chain Tech Overview

Industry and taxonomy update with latest VC activity

2023

REPORT PREVIEW

The full report is available through
the PitchBook Platform.

Published June 12, 2023





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Institutional Research Group

Analysis



Jonathan Geurkink Senior Analyst, Emerging Technology
jonathan.geurkink@pitchbook.com
pbinstitutionalresearch@pitchbook.com

Data

Collin Anderson Data Analyst

Publishing

Report designed by **Megan Woodard**, **Joey Schaffer**, and **Chloe Ladwig**

Published on June 12, 2023



Supply chain tech landscape

- 1** Enterprise supply chain management
- 2** Warehousing tech
- 3** Freight tech
- 4** Last-mile delivery

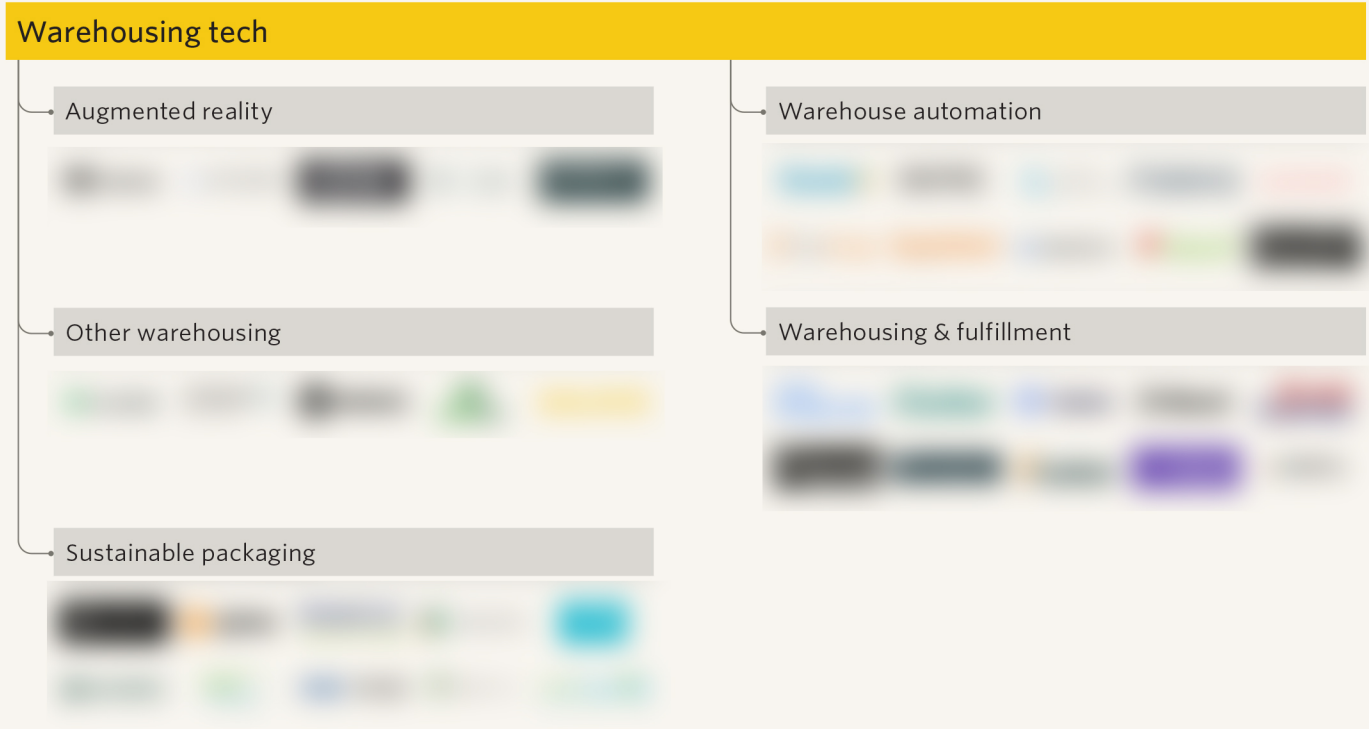
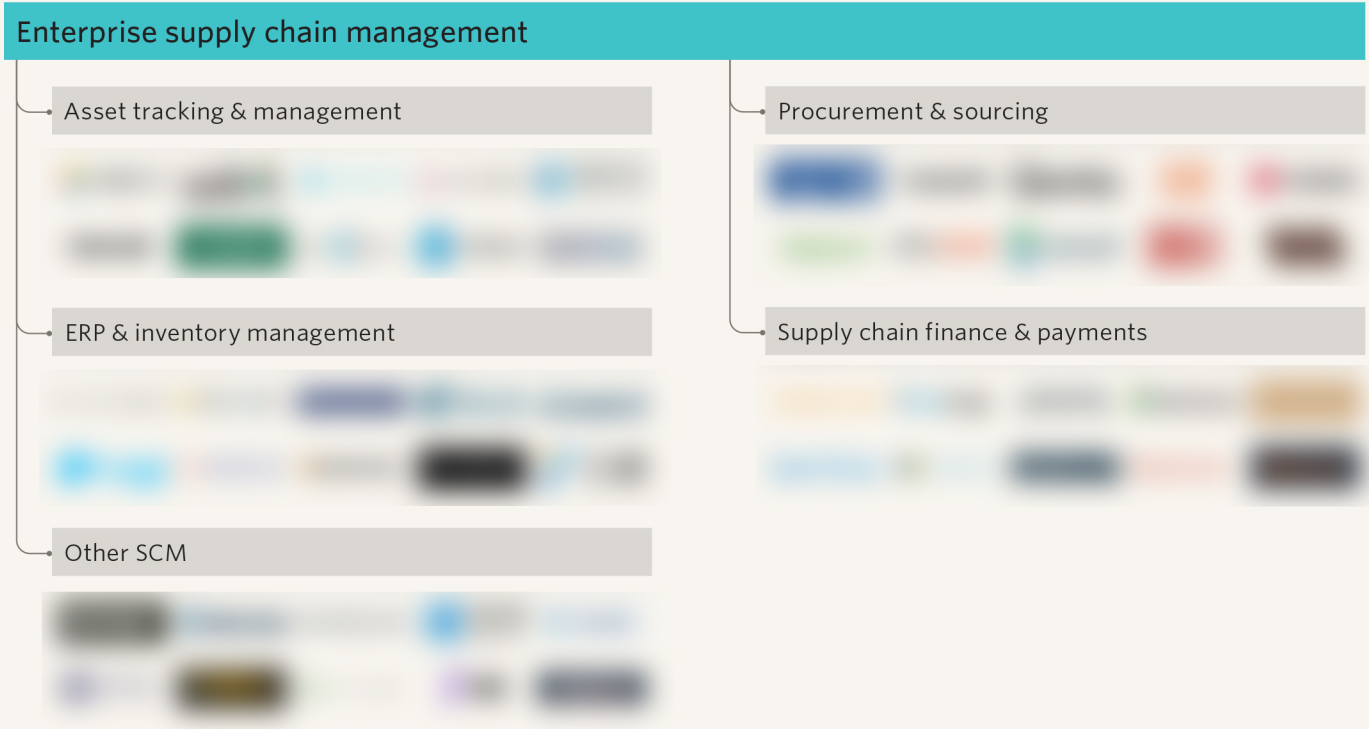




Supply chain tech VC ecosystem market map



Market map is a representative overview of venture-backed or growth-stage providers in each segment. Companies listed have received venture capital or other notable private investments.

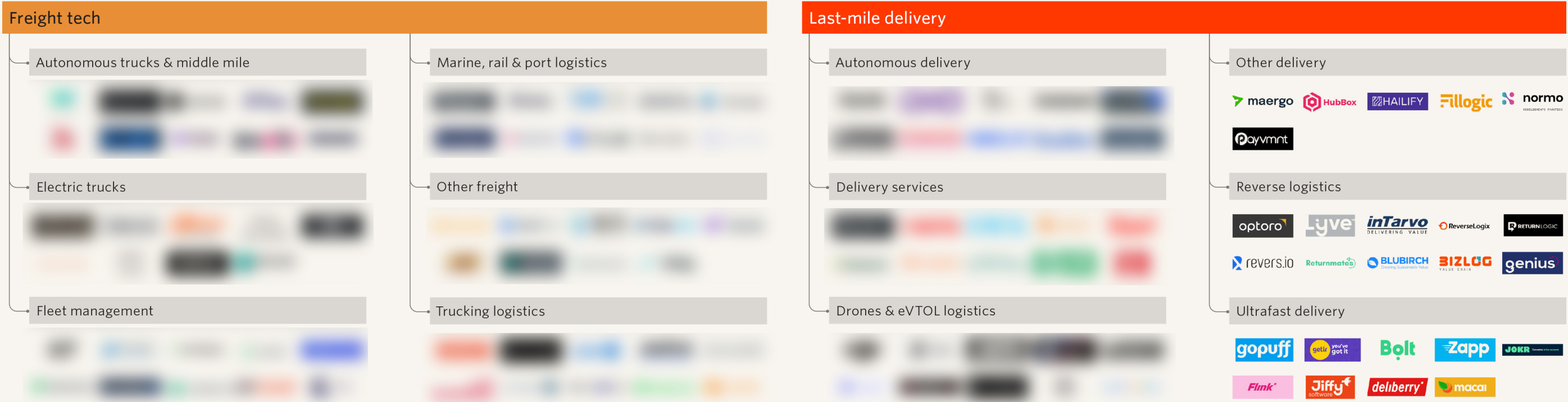




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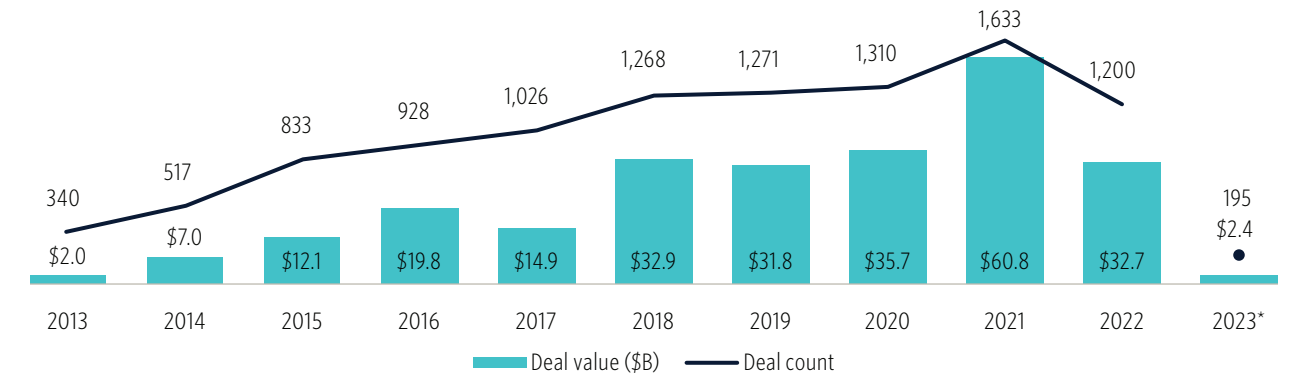


VC activity

During the first quarter of 2023, VC activity took another leg down from 2022's slower pace. The \$2.4 billion in deal value for supply chain tech companies represented a 45.3% decline QoQ and an 81.8% decline YoY. The overall Q1 deal count of 195 was down 19.4% QoQ and 49.7% YoY. Deal activity was higher in the first part of the quarter, possibly reflecting caution in March related to the issues surrounding Silicon Valley Bank's collapse. Across segments, freight tech experienced the greatest decline with deal value down 81.8% QoQ and Q1 deal count just one-third of Q4 2022 levels. The relative weakness in freight tech deal value stems largely from the segment's strength in Q4 2022, with outsized deals from [Einride](#) and [Volta Trucks](#), which were two of the largest deals across the entire vertical that quarter. Enterprise supply chain management saw the smallest QoQ decline for Q1. Across stages, angel and seed deals saw a slight improvement in Q1, rising 3.6%. Venture growth and early-stage VC experienced the largest declines QoQ, down 63.5% and 52.0%, respectively.

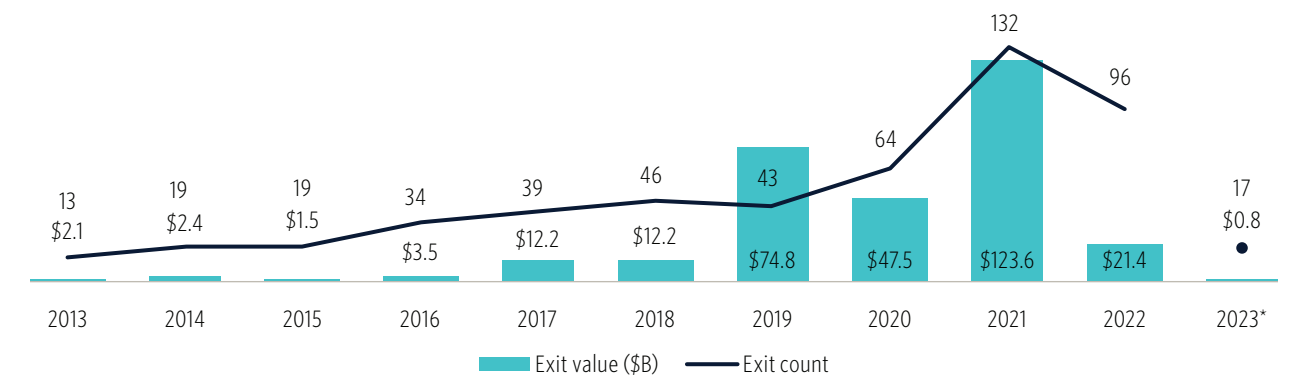
Notable deals in the quarter include Chinese software company JD Industrial Products raising \$300.0 million on March 9, 2023, in a deal led by G42 Global Expansion Fund and Mubadala Development Company. The deal resulted in a 3x valuation step-up and a pre-money valuation of \$6.0 billion. The company also filed to go public later in March. In January 2023, [Oxbotica](#), a UK-based developer of autonomous vehicles, completed a Series C round raising \$140.9 million, which resulted in 2.9x valuation step-up. The valuation improvements stand out against a broader backdrop of investor caution. The largest exit among supply chain tech companies in Q1 was the \$630.0 million acquisition of VIA Motors on January 26, 2023. The commercial electric vehicle (EV) truck manufacturer was acquired by Ideanomics.

Supply chain tech VC deal activity



Source: PitchBook • Geography: Global • *As of March 31, 2023

Supply chain tech VC exit activity

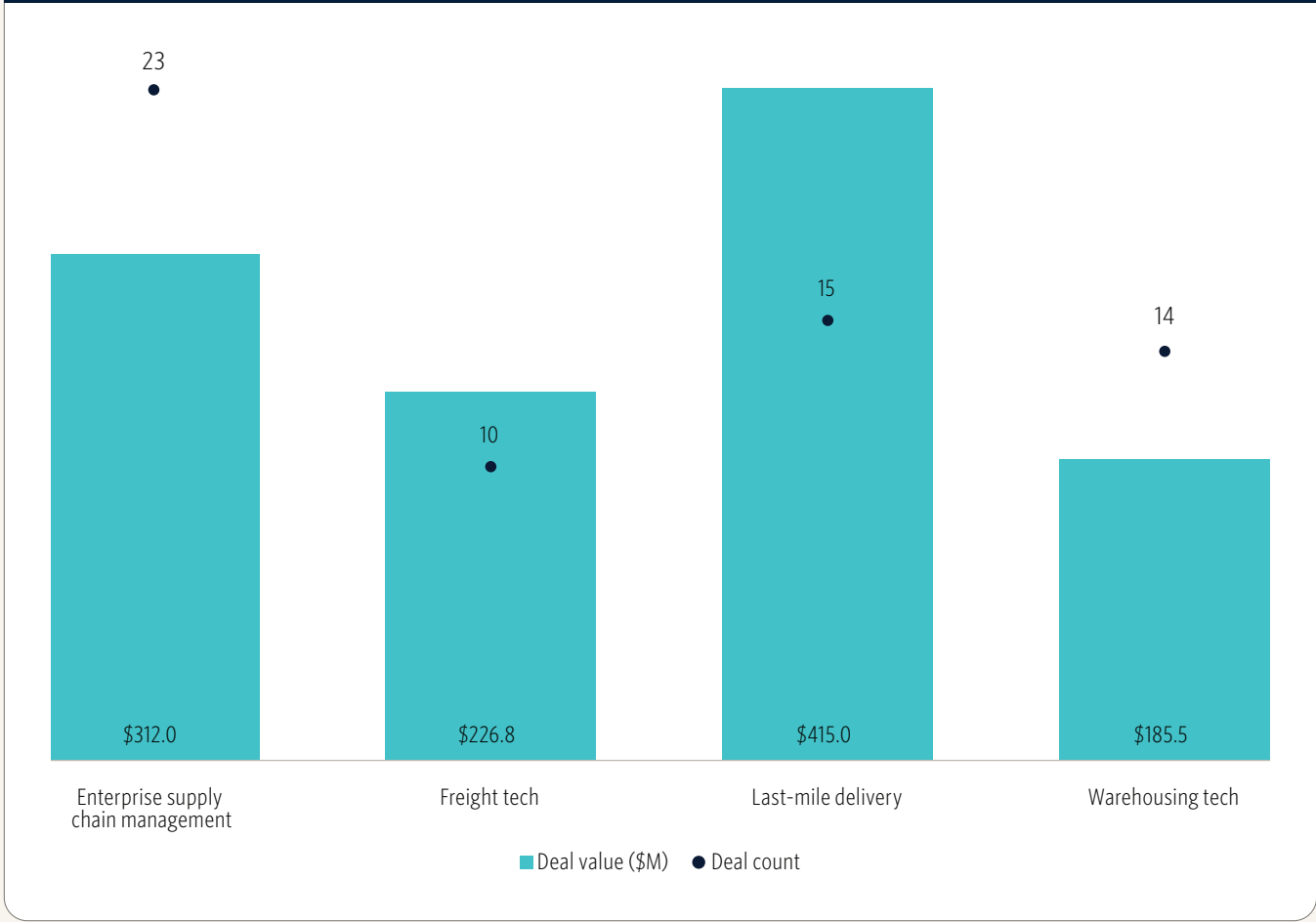


Source: PitchBook • Geography: Global • *As of March 31, 2023



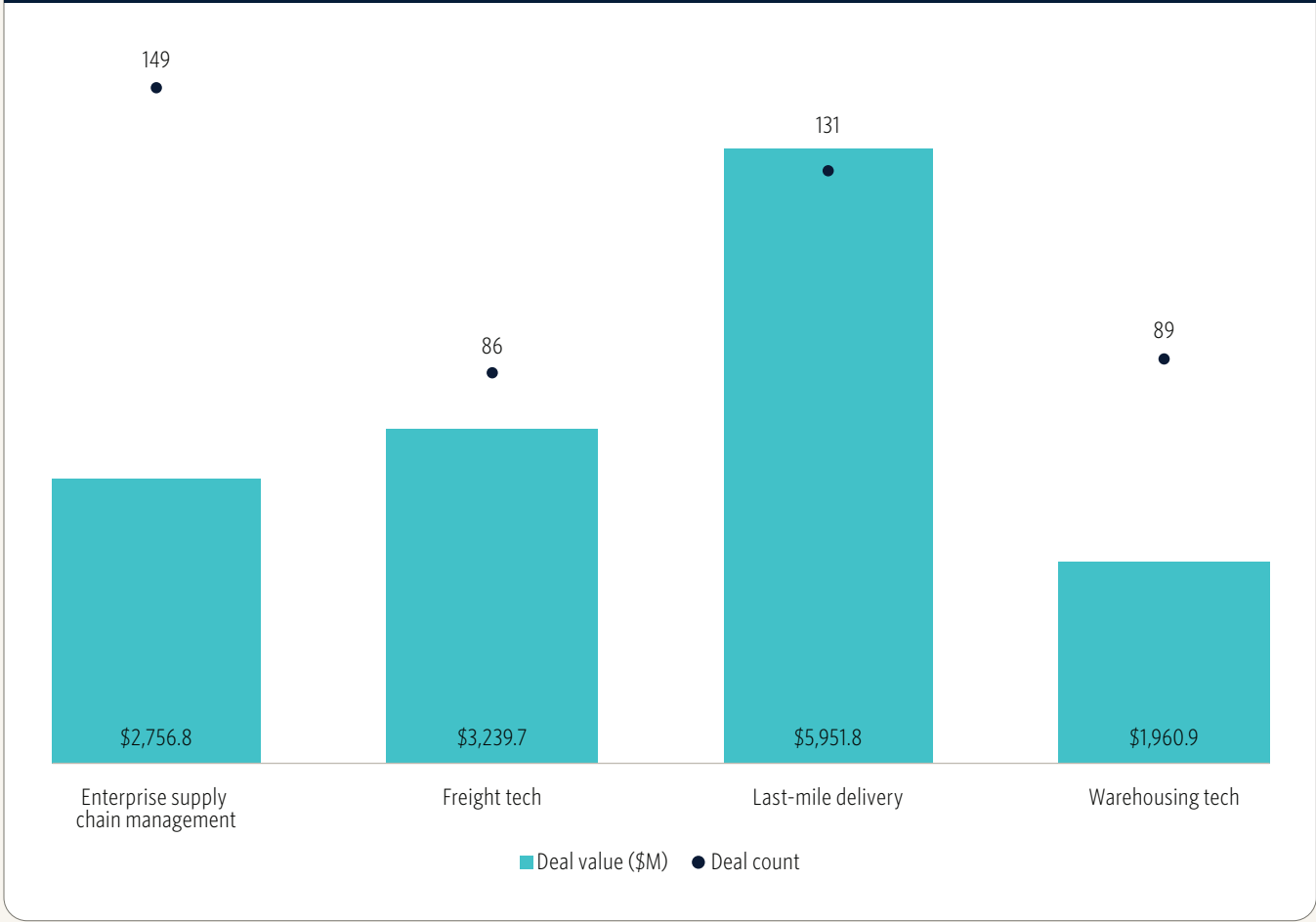
VC ACTIVITY

Q1 2023 supply chain tech VC deal activity by segment



Source: PitchBook • Geography: Global • *As of March 31, 2023

Q1 2023 TTM supply chain tech VC deal activity by segment



Source: PitchBook • Geography: Global • *As of March 31, 2023



Freight tech

Overview

Freight and the movement of goods comprise a sizable portion of global supply chain activity. In the US in 2019 the transportation system moved an average of 55.2 million tons of freight worth more than \$54.0 billion every day.⁸ Trucking represents most of the freight movement in the US, accounting for 64.7% of shipment weight and 63.5% of shipment value in 2022. It's sensible, then, that VC investment in freight tech is weighted toward trucks and trucking logistics. However, turnover among truck drivers is notoriously high, the median age is significantly above the average for US workers—especially among private fleet drivers—and it's estimated the shortage of drivers could be as high as 160,000 by 2028.⁹ To reduce fatigue and accidents, regulations also limit the number of hours drivers can spend behind the wheel every day. Overcoming these constraints with technology has been a big focus for VC investors. Investment raised to date in autonomous truck technology represents the largest subsegment in freight tech at 40.0%.

Truck manufacturers have made significant strides toward reducing hydrocarbon emissions over the past couple decades; however, fuel efficiency for single-unit trucks continues to hover around 7.5 miles per gallon and just 6.0 for combination trucks.¹⁰ Greenhouse gas emissions for trucking represented 23.6% of total transportation emissions in 2021 and 76.0% of emissions from freight transportation specifically. Weaning the trucking sector off fossil fuels has been another major focus of freight tech investors. The electric truck subsegment has seen some notable IPOs in recent years by startups focused on hydrogen and battery powertrains.

8: "Moving Goods in the United States," US DOT, n.d., accessed May 24, 2023.

9: "Millennials and the Driver Shortage: Can They Help?" Netradyne, August 24, 2021.

10: "Freight Transportation Energy Use & Environmental Impacts," US DOT, n.d., accessed May 24, 2023.

Trucking logistics is another sizable subsegment within freight tech. Startups have deployed AI and predictive systems to optimize truck loads, scheduling, and routing. Electronic logging devices (ELDs) for tracking a driver's hours of service have become mandatory in the US in recent years, but like contemporary passenger cars, new trucks can broadcast vast quantities of data from a wide array of sensors and cameras, which can be used to monitor and predict driving habits, fuel efficiency, and vehicle maintenance. The success and widespread adoption of ride-hailing apps has spread to trucking logistics, enabling digital freight matching and a marketplace for shippers and brokers, as well as automation of many freight processes. The pace of technology adoption in freight tech continues to accelerate with startups bringing new business models and efficiency to a highly fragmented segment of the supply chain industry.

Subsegments include:

- **Trucking logistics:** Development and commercialization of networked and app-based models to organize the flow of loads across freight and driver networks.
- **Marine, rail & port logistics:** Development of platforms to orchestrate flow of loads and containers across freight networks and nodes, including customs and international shipping.
- **Autonomous trucks & middle mile:** Development of autonomous vehicles for freight and shipping applications as well as AV trucking networks.



FREIGHT TECH

- **Electric trucks:** EV powertrains for trucks and freight applications.
- **Fleet management:** Software and platforms to manage mileage, maintenance, and hours for fleet vehicles and drivers.

Industry drivers

- **E-commerce:** The demands of e-commerce continue to transform the freight landscape, pushing faster and more flexible deliveries. E-commerce activity spiked during the COVID-19 pandemic, but with just 15% of US retail it appears to have plenty of room to continue to grow.
- **Labor shortages:** High turnover and shortages in drivers and yard and warehouse workers are driving demand for automation, remote management, and autonomous operation.
- **Advances in cloud and app computing:** Cloud computing enables IT efficiencies as well as rapid deployment of microservices and customized solutions. App computing and mobile communication unlock more efficient load scheduling and transfers, payments, and confirmation.
- **Sustainability and regulation:** Regulations around carbon emissions are driving significant transformation across trucking, marine, and air freight services.

Market size

Freight tech spans many large and diverse markets from vehicles to software and services. Globally, the heavy-duty truck market exceeds \$250 billion, with more than 60% in the Asia Pacific region.¹¹ Today the share of EV trucks is negligible, as more than 80% of trucks have diesel powerplants, and the next largest portion runs on natural gas—although hybrids are taking a growing share. Nearly all major truck manufacturers are working on EV models, however, and adoption should expand rapidly with increased emissions regulation, cost reductions, and customer acceptance. In a 2021 survey of fleet owners, more than 60% said they expected to have a significant portion of EVs in their fleets by 2025.¹² EV truck growth could exceed 40% annually through the end of the decade, driven initially by adoption of light-duty EVs and then scaling up to larger vehicles as battery technology and range improve.¹³

Autonomous and advanced driver assistance systems (ADAS) should see strong growth in the decade as regulations promoting safety through forward-collision, lane-departure warning, and blind spot detection systems increase.

The fleet management market is just over \$20.0 billion in 2022 and is expected to grow at slightly more than 10% per year over the next decade.¹⁴ Growth drivers include expansion of sensors and data beyond traditional ELD and GPS systems and further cloud-based adoption. Marine, rail, and

11: "Industry Statistics," Global Market Insights, March 2023.

12: "Commercial Vehicle Market," Fortune Business Insights, n.d., accessed May 24, 2023.

13: "Electric Trucks Market," Fortune Business Insights, n.d., accessed May 24, 2023.

14: "Fleet Management Market Size to Reach USD 52.50 Billion by 2030 at CAGR 10.6%—Valuates Reports," Cision PR Newswire, February 18, 2022.



About PitchBook Emerging Tech Research

Independent, objective, and timely market intel

As the private markets continue to grow in complexity and competition, it's essential for investors to understand the industries, sectors and companies driving the asset class.

Our Emerging Tech Research provides detailed analysis of nascent tech sectors so you can better navigate the changing markets you operate in—and pursue new opportunities with confidence.

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PitchBook Data, Inc.

John Gabbert Founder, CEO

Nizar Tarhuni Vice President, Institutional Research and Editorial

Paul Condra Head of Emerging Technology Research

Additional research

Eric Bellomo
eric.bellomo@pitchbook.com
Gaming
E-Commerce

Brendan Burke
brendan.burke@pitchbook.com
Internet of Things
Information Security
Artificial Intelligence & Machine Learning

Aaron DeGagne
aaron.degagne@pitchbook.com
Medtech
Digital Health

Alex Frederick
alex.frederick@pitchbook.com
Agtech
Foodtech

Jonathan Geurkink
jonathan.geurkink@pitchbook.com
Supply Chain Tech
Mobility Tech

Derek Hernandez
derek.hernandez@pitchbook.com
Enterprise SaaS

Ali Javaheri
ali.javaheri@pitchbook.com
Emerging Spaces

Robert Le
robert.le@pitchbook.com
Web3/DeFi
Insurtech
Crypto

John MacDonagh
john.macdonagh@pitchbook.com
Carbon & Emissions Tech
Clean Energy Tech

Rebecca Springer
rebecca.springer@pitchbook.com
Healthcare Services
Healthcare IT

Rudy Yang
rudy.yang@pitchbook.com
Fintech

Coming soon
Biotech
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