

2021 Emerging Technology Outlook

Forecasting the primary trends that will shape the emerging tech VC ecosystem in 2021

PitchBook is a Morningstar company. Comprehensive, accurate, and hard-to-find data for professionals doing business in the private markets.

Credits

Research

PAUL CONDRA Lead Analyst, Emerging Tech

BRENDAN BURKE Senior Analyst, Emerging Tech

ALEX FREDERICK Senior Analyst, Emerging Tech

ASAD HUSSAIN Senior Analyst, Emerging Tech

ROBERT LE Senior Analyst, Emerging Tech

KAIA COLBAN Analyst, Emerging Tech

Data

ZANE CARMEAN Quantitative Research Analyst

MATTHEW NACIONALES Data Analyst

Design

JULIA MIDKIFF

Contact PitchBook

RESEARCH

reports@pitchbook.com

Contents

Agtech	2
Artificial intelligence & machine learning	4
Cloudtech & DevOps	6
Enterprise health & wellness tech	9
Fintech	11
Foodtech	13
Information security	15
Insurtech	17
Internet of things	19
Mobility tech	21
Retail health & wellness tech	24
Supply chain tech	26

2021 predictions

- **Agtech:** We expect field robotics will receive a record level of VC investment in 2021.
- **Artificial intelligence & machine learning:** Within the horizontal platform segment of artificial intelligence & machine learning, natural language technology (NLT) will receive the highest VC funding.
- **Cloudtech & DevOps:** Remote work technology represents a long-term megatrend with significant exit opportunities likely in 2021.
- **Enterprise health & wellness tech:** We expect e-pharmacy incumbents to expand their reach across the drug distribution ecosystem via partnerships, along with increased M&A of startups that can deepen product offerings.
- **Fintech:** Consumer fintech companies will fuel a record year of VC exits via public markets.
- **Foodtech:** Plant-based, alternative protein and cultivated meat startups will see elevated M&A activity in 2021.
- **Information security:** We expect five infosec unicorns to go public in 2021.
- **Insurtech:** Insurtech VC investment will revert to higher levels driven by insurance distribution marketplaces and intermediaries in 2021.
- **Internet of things:** Industrial automation incumbents will return to internet of things (IoT) M&A.
- **Mobility tech:** A second wave of SPAC mergers focused on self-driving technology will mark 2021 investment in mobility tech.
- **Retail health & wellness tech:** We expect digital therapeutics (DTx) startups to receive a record level of VC investment in 2021.
- **Supply chain tech:** Last-mile delivery platforms are primed for major IPOs in 2021.

Published on December 16, 2020

COPYRIGHT © 2020 by PitchBook Data, Inc. All rights reserved. No part of this publication may be reproduced in any form or by any means—graphic, electronic, or mechanical, including photocopying, recording, taping, and information storage and retrieval systems—without the express written permission of PitchBook Data, Inc. Contents are based on information from sources believed to be reliable, but accuracy and completeness cannot be guaranteed. Nothing herein should be construed as investment advice, a past, current or future recommendation to buy or sell any security or an offer to sell, or a solicitation of an offer to buy any security. This material does not purport to contain all of the information that a prospective investor may wish to consider and is not to be relied upon as such or used in substitution for the exercise of independent judgment.

ALEX FREDERICK Senior Analyst
Emerging Tech
alex.frederick@pitchbook.com

Agtech

Prediction: We expect field robotics will receive a record level of VC investment in 2021.

Rationale: The pandemic has exacerbated labor shortages in the agriculture industry, and we now face rising long-term food demand on a global scale. Field robotics and smart field equipment could meet this need by helping farmers automate manual functions and reduce their reliance on human labor. While this technology may take several years to become fully commercialized, we expect VC interest to ramp up in 2021 due to strong market drivers and the potential for a large addressable market.

Caveat: Capital-intensive hardware companies have often struggled to raise funding during times of economic uncertainty. Although several robotics startups are piloting technologies on farms, it will likely take years for these devices to see widespread deployment.

Field robotics technology promises to dramatically increase farm productivity and safety while reducing reliance on human labor. This is especially important in the current environment, where sourcing seasonal labor poses a major challenge for many farmers. Longer-term labor challenges and increasing global demand for food represent steady tailwinds driving investment in field robotics technologies. While many companies have yet to reach major technological and regulatory milestones, early pilot programs show signs of success, and we believe field robotics & automation startups can potentially disrupt farm operations and machinery. Growing demand for organic and sustainable foods and farming practices will likely serve as additional growth drivers, fueling VC investment in this industry in 2021.

In the US, the agricultural workforce has dwindled. The number of self-employed and family farmworkers declined by 73% from 7.6 million in 1950 to 2.1 million in 2000, according to data from the National Agricultural Statistical Service. Simultaneously, the foreign seasonal farmworker population is shrinking, attributed to changing trade and immigration policies, better education and work opportunities in home countries, and an aging agricultural workforce.¹ Even with elevated wages, free housing, and other benefits, farmers have been largely unsuccessful in wooing Americans to do seasonal work.² These resulting labor shortages have led to wasted produce and reduced farm acreage, decreasing production and elevating crop prices.

While labor shortages cripple food production, global demand necessitates an estimated 30%-70% increase in food production by 2050.³ Field robotics & automation technologies could help increase productivity and reduce waste while also providing health and environmental benefits. For example, Greenfield Robotics' weeding robots eliminate the need for herbicides, helping farmers comply with organic or sustainable farming practices.

1: "Farm Labor Shortage," Agamerica Lending, December 2019.

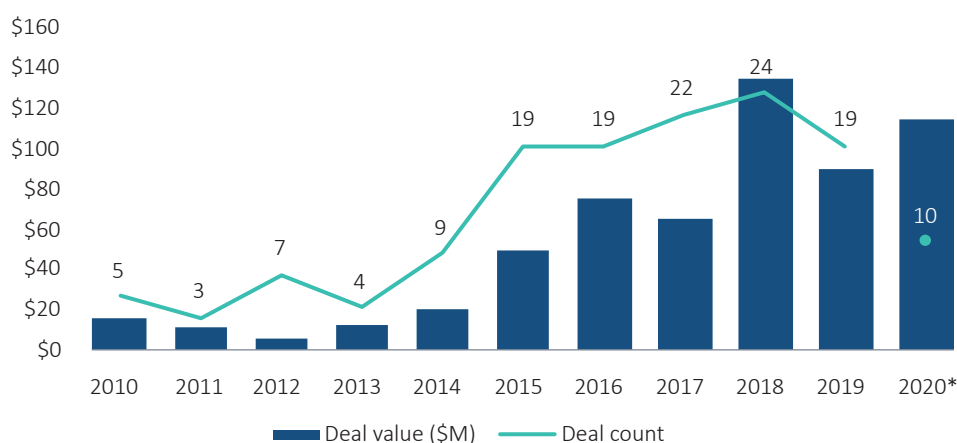
2: "Farmworker vs Robot," *The Washington Post*, Danielle Paquette, February 17, 2019.

3: "The Future is Knocking: Global Food Production to be Transformed Using New Technology," University of Copenhagen, ScienceDaily, May 20, 2020.

Many field robots are much smaller than traditional field machinery and offer unexpected benefits such as the ability to operate under challenging weather conditions and with reduced soil compaction.

Although a handful of field robotics companies have already rolled out pilots to begin testing and refining their technology, it will likely take years for these machines to see widespread deployment. Providers must account for the wide variety of crops and environmental conditions and the unique challenges of each. In addition, the deployment of fully autonomous tractors is likely years, if not decades away, despite the progress of limited field testing. Early commercial products will likely have limited initial use cases and require a high level of human monitoring. This could potentially reduce VC investment in the space.

Robotics & smart field equipment VC deal activity



Source: PitchBook
*As of September 30, 2020

Key VC-backed field robotics companies

Company name	Last financing date	Total VC raised (\$M)*	Last financing size (\$M)	HQ location
Blue Ocean Robotics	July 1, 2020	\$57.0	\$57.0	Denmark
Tevel (Other Hardware)	October 27, 2020	\$11.5	\$10.0	Israel
Harvest Automation	N/A	\$27.9	\$2.9	US
FarmWise Labs	April 15, 2020	\$24.0	\$16.5	US
QualySense	October 18, 2017	\$21.3	\$14.4	Switzerland
Naïo Technologies	January 9, 2020	\$21.2	\$15.6	France
Bochuangliandong	August 19, 2019	\$20.2	\$15.9	China
Abundant Robotics	February 19, 2020	\$19.5	\$7.5	US
The Yield	May 11, 2020	\$17.2	\$7.1	Australia
MagGrow	August 6, 2020	\$15.6	\$6.9	Ireland

Source: PitchBook | Geography: Global
*As of September 30, 2020

BRENDAN BURKE Senior Analyst
Emerging Tech
brendan.burke@pitchbook.com

Artificial intelligence & machine learning

Prediction: Within the horizontal platform segment of artificial intelligence & machine learning, natural language technology (NLT) will receive the highest VC funding.

Rationale: Natural language technology, commonly referred to as natural language processing (NLP), has experienced technical breakthroughs in 2020 that position the technology to become a building block for startups and enterprises alike going forward. The category has not historically been the highest-funded category of AI given its low performance relative to rules-based SaaS applications. As a result, it received lower levels of VC funding than AI automation platforms and AI core in 2020, a year after it posted the lowest results of any horizontal AI category.

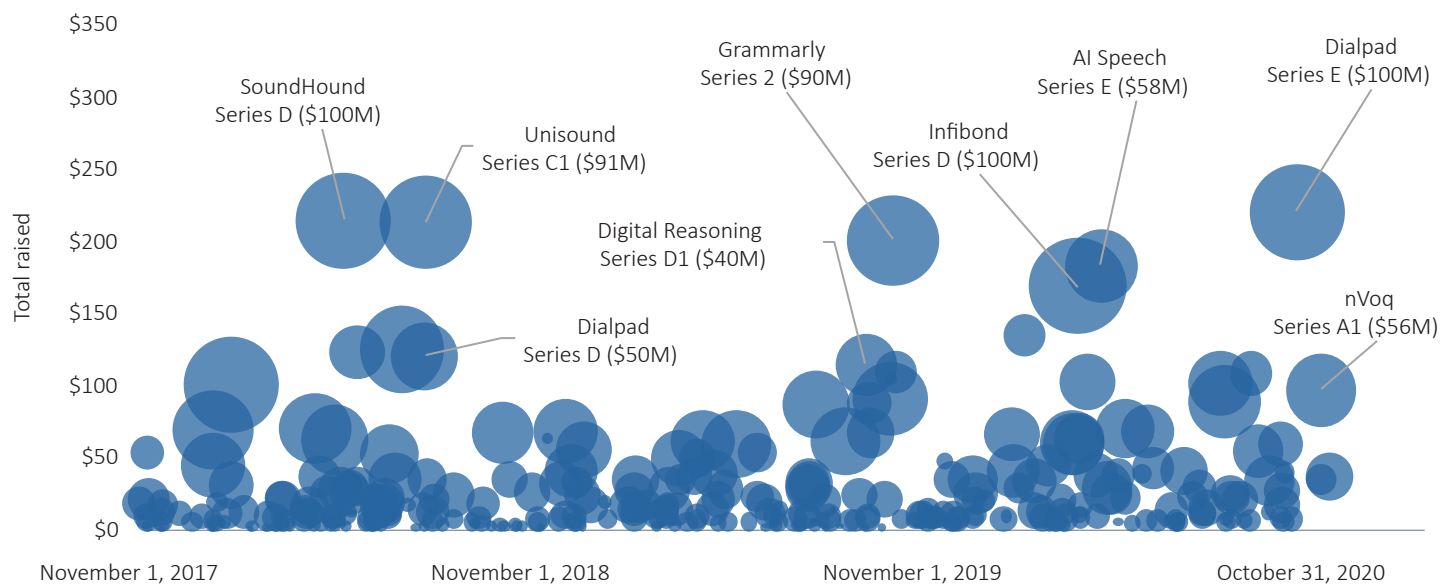
Caveat: NLT currently features few late-stage unicorns relative to other horizontal platform categories, including AlaaS, intelligent process automation, and computer vision. VC mega-deals (\$100 million+) for those unicorns may overwhelm the high valuation growth in NLT startups. The recent IPOs of Palantir (NYSE: PLTR) and Sumo Logic (NASDAQ: SUMO), as well as the pending IPOs of Databricks and DataRobot, lead us to believe that late-stage funding may taper off outside of NLT.

NLP, a subset of NLT, is experiencing scientific breakthroughs that computer vision achieved over six years ago. NLP refers to analysis and interpretation of human communications using neural networks. Transformer architecture has enabled rapid training of large language models and has yielded several breakthroughs in model performance. In late 2018, Google (NASDAQ: GOOGL) released BERT (Bidirectional Encoder Representations from Transformers). The framework's innovation of bidirectional text analysis enabled better contextual understanding of text. Since that time, emerging algorithms including ALBERT, RoBERTa, and OpenAI's GPT-3 have achieved state-of-the-art results on a range of NLP tasks. Model performance is increasing in lockstep with model size and computation power, suggesting increased investment could make further exponential gains possible.

The recent release of GPT-3 augurs a platform-based future for NLP in which large language models can serve as building blocks for a vast variety of use-case-specific models. Because of its record-setting 175 billion features generated from a massive sample of internet text, GPT-3 is generalizable across datasets, including text, mathematics, and code. Applications can connect a variety of inputs, an impossible feat before GPT-3. For this reason, we think of large language models as an operating system of AI that can support new companies and business functions. Microsoft's (NASDAQ: MSFT) exclusive partnership to distribute the model demonstrates the commercial opportunity and that 2021 will likely see commercial applications. The OpenAI-Microsoft collaboration may spur the founding of new startups and will present opportunities to existing NLP startups to scale their models.

Investment growth in 2020 demonstrates that NLP applications are attracting top AI talent and finding commercial traction. Contact-center automation vendors Replicant and Observe.AI have achieved high valuation growth in 2020, with a \$70.0 million Series A pre-money valuation and 2.6x Series B valuation step-ups, respectively. COVID-19 has required digitization of customer service, and enterprises have responded by both augmenting and supplementing human workers with NLP technologies. More broadly, conversational AI can enable a range of digital devices to speak with humans and understand basic commands. Siri, Alexa, and Cortana only represent the start of voice-based AI interactions. We expect innovation in conversational AI to emerge via messaging apps, personal assistants, and voice commands for edge devices. Code completion, document discovery, and enterprise search should also draw investment in the coming year. We have seen a consistent flow of late-stage VC deals in NLT that may create a wave of unicorns in the near future.

Natural language technology VC deal timeline (\$M)



Source: PitchBook | Geography: Global
As of October 31, 2020

Note: The left axis indicates total VC raised as of deal date. Bubbles indicate amount raised.
Dataminr is excluded for scale.

PAUL CONDRA Lead Analyst
Emerging Tech
paul.condra@pitchbook.com

Cloudtech & DevOps

Prediction: Remote work technology represents a long-term megatrend with significant exit opportunities likely in 2021.

Rationale: The COVID-19 pandemic catalyzed the need for remote as a means to ensure business continuity, concurrently driving demand for products and solutions promoting work-from-home (WFH) productivity. As companies implement remote infrastructure and workers acclimate to remote work, the trend of working from home will likely persist beyond the end of the pandemic—especially as employees increasingly choose to work for companies offering permanent WFH options. Startups selling into this opportunity benefit from step-function growth as the customer base expands and demand increases. These favorable conditions have attracted significant late-stage VC, with several late-stage companies likely to complete exits in 2021.

Caveat: Many organizations and employees will continue to prefer in-office work cultures. The track record of fully remote businesses spans only a handful of years, hence many organizations may not commit. Many aspects of in-person work, such as spontaneous meetings and forming relationships, are difficult to replicate virtually. The end of the pandemic will likely slow the growth of remote work and allow more companies to return to the office. Lastly, newer startups may find it hard to differentiate themselves from market leaders such as Zoom (NASDAQ: ZM) and Slack (NYSE: WORK), especially as these early pioneers grow and add new features and functionality.

The need to work remotely has created a cottage industry for digital collaboration tools. While the initial push toward remote work paved the way for widespread adoption of video communication tools such as Zoom, this market segment is quickly maturing into a deep ecosystem of digital and virtual collaboration tools. These tools focus on several enterprise use cases, including software development, product design, project scheduling, information hubs, employee management, virtual events platforms, and communication. Organizations are also investing heavily in digital infrastructure (VPNs, networking solutions, next-gen security, and cloud computing) to support remote work. We believe these investments will support a broader shift to permanent remote work arrangements.

While many of the startups in this space emerged before the pandemic, the COVID-19 crisis has catalyzed adoption—increasing both demand and stickiness as customers are forced to use these tools more than they may have otherwise. As a result, research & development (R&D) efforts have accelerated as providers obtain user data to help guide improvements. Simultaneously, venture investors are growing more comfortable investing in fully remote startups, opening the door for new companies to emerge with remote operating models and reinforces the need for remote work technology. Employees—particularly those based in tech hubs—are relocating to places that afford more space, thereby reducing both

cost of living and potential exposure to COVID-19. When the pandemic does subside, these workers will likely seek to continue remote working arrangements, which could encourage more companies to offer the option.

Leaders in the space recorded several \$50 million+ VC rounds, including Miro, Figma, and Notion, while outlier \$100 million+ VC rounds were recorded for MURAL and Airtable—with Asana's (NYSE: ASAN) IPO representing a notable exit. Tools helping software developers collaborate have also become important for digital enterprises; unicorn-valued startups, including GitHub and Postman, are likely exit candidates in 2021.

Prediction: Horizontal consolidation among software development and IT operations (DevOps) tool providers will increase as providers look to standardize user interfaces and as these tools become more relevant across the software development value chain.

Rationale: DevOps teams tend to use an array of homegrown, open-source, and vendor-supplied tooling to facilitate software development processes. Yet increasingly complex developer processes, the need to onboard new employees quickly, and the pressure to increase the speed of product-release cycles, underscore the importance of standardized toolsets that are easy to manage and applicable across hybrid computing infrastructure. For these reasons, an opportunity exists for providers selling single-suite platforms that help organizations more holistically manage and monitor DevOps processes.

Caveat: Large incumbents including Amazon (NASDAQ: AMZN), Google, and Microsoft are well-positioned to acquire smaller competitors or outcompete them by providing suite-level offerings embedded within core cloud-hosting products. Startups may struggle to successfully integrate acquisitions or fine-tune go-to-market strategies as value propositions and use cases evolve.

Enterprise digital transformation has been an important area of investment for several years, but the pandemic has accelerated the need for companies to establish sophisticated digital infrastructure and software development capabilities. To meet the demand for accelerated software development, enterprises are expanding DevOps teams and investing in new technology to help achieve digital goals. The fragmented market for DevOps tools currently consists of a wide range of incumbent and emerging technologies and products that assist DevOps workers. While these tools are improving in sophistication and ease of use, they often cater to niche use cases and pain points (secrets management, automated testing and delivery, or code quality analytics) that can lead to tool sprawl among developers. As more organizations seek to improve DevOps processes, we foresee growing demand for end-to-end DevOps platforms that allow businesses to manage multitudinous software development workflows via a single platform.

Because DevOps point solutions are both less likely to appeal to a broad user base and open-source alternatives pose higher levels of competitive risk, scaling these as a business model can prove difficult. We expect

this limitation will drive horizontal consolidation as providers seek to add lateral software development offerings to expand their addressable market. Positioning themselves as suite providers of continuous integration & continuous delivery (CI/CD) solutions can increase go-to-market competitiveness and help with positioning against the large catalogs of DevOps offerings from Microsoft, Amazon, and Google. In September 2020, Gartner referred to these platforms as “Value Stream Delivery Platforms,” forecasting that 40% of organizations will use these products by 2023—up from the present 10%. Startup leaders in this space that could be potential acquirers include CloudBees, GitLab, the newly public JFrog (NASDAQ: FROG), and Digital.ai, a PE-led rollup owned by TPG Capital with acquisitions including XebiaLabs, CollabNet VersionOne, Experitest, and Numerify.

KAIA COLBAN Analyst
Emerging Tech
kaia.colban@pitchbook.com

Enterprise health & wellness tech

Prediction: We expect e-pharmacy incumbents to expand their reach across the drug distribution ecosystem via partnerships, along with increased M&A of startups that can deepen product offerings.

Rationale: The avoidance of in-person pharmacies—a product of COVID-19—has expedited consumer conversion from traditional brick-and-mortar pharmacies to e-pharmacies. This adoption surge will likely drive expansion of the e-pharmacy industry, and we expect providers will embark on a multi-year strategy of partnering with or acquiring telehealth providers, pharmacy automation tools, in-store pharmacies and medication management providers.

Caveat: Large incumbents may build additional products in-house rather than acquiring startups. They may also focus on increasing partnerships with medical service providers or insurance companies.

E-pharmacies are e-commerce sites that sell and deliver over-the-counter (OTC) and prescription medicines to consumers. E-pharmacies have historically grown in popularity for their convenience, wide array of drug availability, and often lower drug price offerings. However, in 2019, only 4.9% of prescriptions dispensed came through the mail. Recently, government regulations and COVID-19 have served as a market catalyst.⁴ For example, CVS Health (NYSE: CVS) experienced a 500% increase in home delivery of retail prescriptions between Q1 and Q2 2020. This surge will encourage incumbents to build out their e-pharmacy functions.

In the US, most incumbents are owned by large retail companies (for example, Walmart (NYSE: WMT), Giant Eagle, and Amazon) or insurance companies (such as Anthem (NYSE: ANTM) and InGenioRX). We expect market share to remain consolidated among large players due to the following barriers to entry:

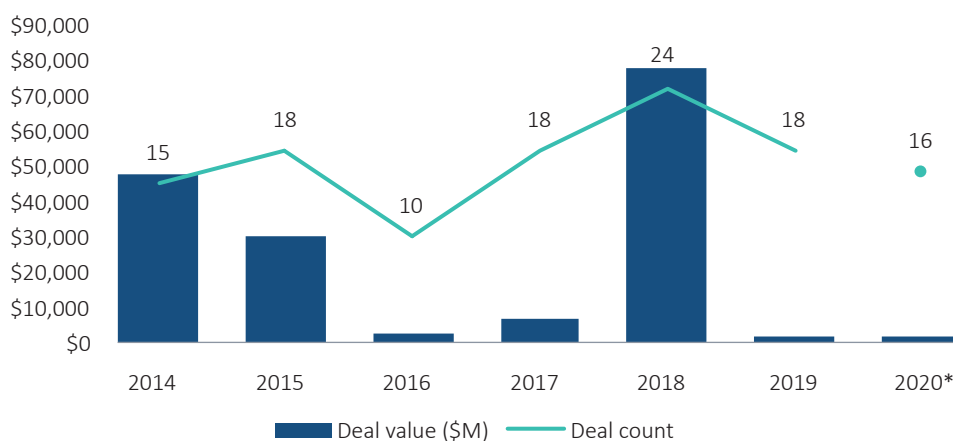
- **Network agreements and in-house management between pharmacy benefit managers (PBM) and pharmacies:** Large e-pharmacies may operate their own PBM (Express Scripts, IngenioRX, CareMarks, Humana Pharmacy). PBMs negotiate discounts and rebates with drug manufacturers, provide payment and claims processing, and aggregate consumer demand to lower pharmaceutical costs.
- **Ability to offer both home delivery and in-store pickup models:** Desire to immediately pick up urgent prescriptions and fear of delivery delays or incorrect shipments persuade consumers to select pharmacies with both delivery models. While delivery platform providers, such as startup ScriptDrop, offer delivery services for traditional brick-and-mortar pharmacies, we do not expect pharmacies without their own in-house courier system to remain price-competitive in the long run.

4: "Postal Service Pressure Turns to Prescriptions," Politico, Sarah Oweremohle, August 18, 2020.

While the opportunity for startups to take share in the pure-play e-pharmacy market may be limited, the opportunity to help incumbents broaden their product offerings could be an attractive area of VC investment. As consumer adoption grows, industry leaders will likely expand their services through partnering with or acquiring telehealth pharmacy automation tools and medication management providers. Potential acquisition targets include SpotRx a self-servicing medication kiosk startup and Insightfil, a medication adhere device and application provider.

Smaller e-pharmacies with notable differentiation may have more success attracting VC investment. For example, startup Nurx can both prescribe and deliver some forms of hormonal birth control. VC-backed Ro does not require insurance and will contact the patients' doctors directly instead of requiring patients to provide prescriptions.

Healthtech M&A activity for e-pharmacy incumbents



Source: PitchBook | Geography: Global

*As of November 10, 2020

Note: Duplicate round ID's have been removed from deal flow.

2018's spike was due to a \$70 billion M&A from Aetna.

ROBERT LE Senior Analyst
Emerging Tech
robert.le@pitchbook.com

Fintech

Prediction: Consumer fintech companies will fuel a record year of VC exits via public markets.

Rationale: 2020 saw numerous fintech IPOs including Lemonade (NYSE: LMND), nCino (NASDAQ: NCNO), and Root Insurance (NASDAQ: ROOT). The fintech industry is currently top heavy with consumer fintech companies; seven of the top 10 fintech unicorns in the US provide consumer fintech services.

Caveat: Rocky public market conditions can deter fintech companies planning to publicly list. In addition, private market investors could continue to provide capital for fintech companies, delaying any near-term IPOs. Incumbents aware of the disruptive threat of fintech companies can seek to step up acquisitions, a precedent set by Intuit's (NASDAQ: INTU) \$7.1 billion acquisition of Credit Karma in Q1 2020.

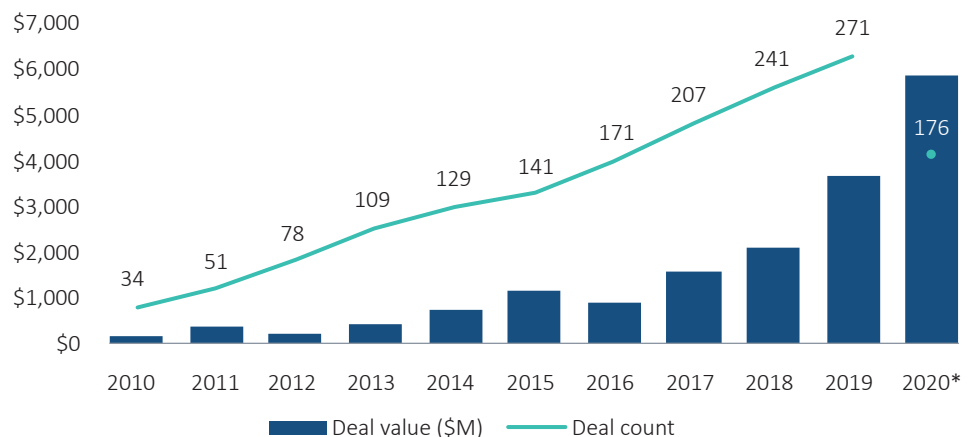
Consumer fintech companies have attracted significant investor interest in recent years. In North America and Europe, these companies raised \$11.7 billion from 2018 to 2020 YTD. Through the first three quarters of 2020, startups raised \$5.9 billion, already far surpassing 2019's full-year record of \$3.7 billion. The COVID-19 pandemic has altered how consumers and businesses manage their finances. High unemployment, limited brick-and-mortar bank access, and stay-at-home orders have altered the landscape and created demand for flexible banking solutions. Many consumer fintech startups have responded by offering new ways to access and manage finances, helping 2020 notch a watershed year for financial apps and other digital banking and money management services. For example, digital bank Chime enabled early access to Federal stimulus money for its customers using its SpotMe feature. Debt management app Tally allowed customers to postpone payments and enroll in flexible payment plans.

As consumer fintech companies scale, we expect they will continue to close the gap in regards to financial service offerings with traditional retail banks such as Wells Fargo and Chase Bank. Product bundling ([a trend we predicted in 2018](#)) is gaining momentum and helping startups retain and acquire more customers. This strategy entails offering an initial wedge product, such as lending or trading, then expanding into other retail financial services. For instance, SoFi started out as a student loan refinancing service, then pivoted to retail financial services. Now, the company offers personal and home loans, checking and savings, credit cards, stock trading, and retirement accounts. While SoFi's product offerings closely resemble that of traditional retail banks (and the company received preliminary approval in October 2020 for a national bank charter), management views the company as a disruptive fintech. We expect unicorns such as Affirm and Klarna to follow a similar strategy of diversification into other areas of consumer financial services to maintain growth.

Square (NASDAQ: SQ) provides more evidence of strong consumer fintech adoption and product bundling. While core payment products serve retailers and other merchants, Square has shifted its focus during the pandemic to its Cash App, which has experienced strong growth in active users and revenues. As Square's seller ecosystem took a hit, Cash App's revenues jumped to almost 600% YoY in Q3 2020 to \$2.1 billion, accounting for the majority of the company's \$3.0 billion revenue. Cash App started as a peer-to-peer (P2P) money transfer application, similar to Venmo. However, in the past few years, the company has introduced additional consumer financial services through the app, including debit cards, savings accounts, and stock and Bitcoin trading. Square stock has performed well in 2020, which we view as a potential proxy for public market investor confidence in consumer fintech companies.

There have been several consumer fintech public market exits so far in 2020, including Root Insurance, Lemonade, and Opendoor (via SPAC Social Capital Hedosophia II). As fintech models improve, consumer adoption expands, late-stage startups come under pressure to IPO, and public fintech stocks remain positive, we expect 2021 to post an even stronger year for consumer fintech exits into the public markets. See the accompanying table for potential IPO candidates in 2021.

Consumer fintech VC deal activity



Source: PitchBook | Geography: North America & Europe
*As of September 30, 2020

Potential consumer fintech IPOs in 2021

Company name	Year founded	Total VC raised (\$M)	Latest deal date	Latest deal type	Latest deal amount (\$M)
Robinhood	2013	\$2,171.9	September 2020	Series G	\$660.0
Klarna	2005	\$1,947.1	October 2020	Late-stage VC	\$650.0
Affirm*	2012	\$1,608.5	October 2020	Series G	\$510.0
Chime	2012	\$1,541.3	October 2020	Series F	\$533.8
SoFi	2011	\$3,299.0	May 2020	Late-stage VC	\$879.0
Varo	2015	\$419.3	June 2020	Series D	\$241.0

Source: PitchBook | Geography: North America & Europe
*Filed S1 with SEC in November 2020.

ALEX FREDERICK Senior Analyst
Emerging Tech
alex.frederick@pitchbook.com

Foodtech

Prediction: Plant-based, alternative protein, and cultivated meat startups will see elevated M&A activity in 2021.

Rationale: Alternative proteins, such as plant-based foods, have gained traction among consumers. While many “big food” incumbents have legacy plant-based brands, these companies will likely turn to next-gen plant-based foodtech to compete more effectively with the emerging leaders in this space, such as Beyond Meat (NASDAQ: BYND) and Impossible Foods. The venture funding of plant-based food startups has surged over the past two years, leading to a crowded, competitive environment. We believe these conditions will foster increased M&A as this industry consolidates around winners.

Caveat: Eight of the top 10 meat companies already have some form of plant-based product offerings. Large food companies likely have food science capabilities to develop plant-based offerings. At this point, there may be a limited pool of acquirers.

Plant-based foods have grown in popularity over the past decade, spurred by the launch of next-gen providers such as Beyond Meat and Impossible Foods, which have created realistic plant-based facsimiles of meat products. Unlike earlier iterations such as the Boca Burger and black bean burgers aimed at vegetarians, modern plant-based patties target a wider audience looking to reduce animal meat consumption for health and environmental reasons. The strategy appears successful; Beyond Meat’s total revenues have grown at a 164% CAGR between FY2016 and FY2019.

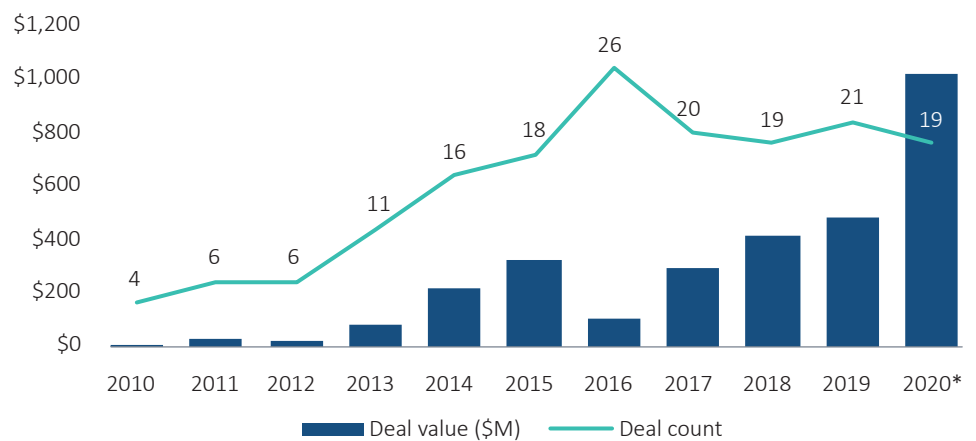
Although Beyond and Impossible have led the plant-based food movement, we tally over 50 PE and VC-backed companies (over 100 including incumbents) globally competing for a share of the plant-based meat market. As incumbents seek to solidify their positions in this market, we believe the conditions are set for a period of active M&A.

Investors have been fueling growth in the sector, with \$1.0 billion VC invested through October 31, 2020, up 112% from the \$482.2 million invested in 2019. While VC-level funding will likely continue, several late-stage companies may seek an M&A next year, including Sol Cuisine and Meatless Farm. M&A activity in the bio-engineered foods sector has increased over the past decade, peaking at 12 deals in 2018, though we expect deal count could surpass this figure in 2021.

While traditional animal meat companies have been slow to enter the plant-based segment, we’ve seen this start to shift. Eight of the top 10 largest meat companies now have plant-based product lines, and some, such as Cargill and Tyson (NYSE: TSN), have begun to refer to themselves as “protein companies” instead of “meat companies.” However, developing a successful plant-based protein product requires significant time and capital. These R&D efforts are distinct between proteins, meaning the capability to develop convincing plant-based hamburger will not necessarily translate to other meat products, such as chicken breasts.

While many of the top meat companies have developed plant-based product lines, we believe M&A strategies may prove the most viable route for incumbents seeking to enter this market in a more significant way. For example, in September 2017, Nestlé (SWX: NESN) acquired Sweet Earth, a provider of plant-based burgers, burritos, pizzas, and other foods. Others have pursued internal development. Tyson's "blended meat" products are sold under the Raised and Rooted brand and contain both animal meat and plant protein. Although Tyson has not made any alternative protein acquisitions, its CVC arm, Tyson Ventures, has invested in at least five different alternative protein startups, including Beyond Meat.

Plant-based meat, dairy & seafood VC deal activity



Source: PitchBook | Geography: Global
*As of September 30, 2020

Top 10 US meat companies by net sales and their plant-based brands

Meat company	Plant-based brand(s)/product(s)
JBS	Ozo, Seara
Tyson	Raised & Rooted
Cargill	Cargill plant-based patty & ground products
Sysco	Simply Meatless burger patty
Smithfield	Pure Farmland
Hormel	Happy Little Plants
National Beef Packing	N/A
Perdue Farms	Chicken Plus
OSI Group	N/A
Conagra	Gardein

Source: PitchBook | Geography: US
*As of September 30, 2020

BRENDAN BURKE Senior Analyst
Emerging Tech
brendan.burke@pitchbook.com

Information security

Prediction: We expect five infosec unicorns to go public in 2021.

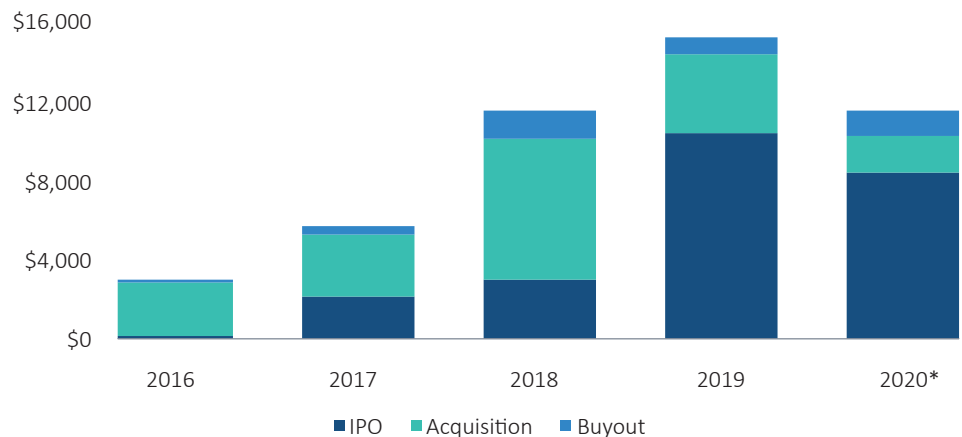
Rationale: Zscaler (NASDAQ: ZS), Okta (NASDAQ: OKTA) CrowdStrike (NASDAQ: CRWD), and Cloudflare (NYSE: NET) have demonstrated the appeal of information security unicorns to public markets. IPOs of VC-backed companies were limited in 2020, with only two in North America and Europe, both in Q3. Numerous private companies have achieved the scale and institutional funding required to pursue listings. Further, the SPAC boom will likely extend to infosec in the near future.

Caveat: Each year since 2017 has seen only two substantial infosec IPOs. Some late-stage VC-backed companies have actively resisted the public markets and may pursue a self-sustaining route. Others may raise private IPO rounds or pursue PE exits. As a result, a high number of IPOs is not guaranteed.

As substantial recurring revenue has helped startups resist acquisition overtures and raise successive rounds of funding, 2020 has disproportionately benefited late-stage VC companies in infosec. More late-stage VC rounds have been raised than early-stage, limiting the ability of fledgling startups to invest in sales and marketing. As a result, we believe a return of double-digit spending growth in 2021 will flow to incumbents and late-stage market leaders in established categories.

This concentration of revenue growth will likely further the trend of increasing IPO exit value over the past two years led by IPOs from CrowdStrike, Cloudflare, Sumo Logic, and JFrog. Historically, given the appetite of incumbents and lower valuations on public markets, acquisition values have been competitive with IPOs. This has changed with the receptiveness of public markets to cloud-native SaaS, regardless of profitability. Before the pandemic, a pipeline of IPO candidates had formed to take advantage of market conditions. COVID-19 has deferred some of these listings, and we think that at least five unicorns will still see public markets as the ideal next step for their companies.

Cybersecurity VC exits (\$M) by type



Source: PitchBook | Geography: Global
*As of September 30, 2020

M&A has become a more limited pathway with the struggles of leading incumbents Symantec and McAfee (NASDAQ: MCFE). Symantec's sale of its enterprise business to Broadcom (NASDAQ: AVGO) confirmed low expectations for future growth, and McAfee received a relatively low valuation in its return to public markets. Few incumbents are willing to pay over \$1 billion for acquisitions, preferring instead to stitch together portfolios of lower-valued targets. No acquisitions have surpassed the deal value of Cisco's (NASDAQ: CSCO) acquisition of Duo Security for \$2.4 billion in September 2018, making IPOs a clear route for high-growth unicorns.

An IPO pipeline has developed across segments in high-growth categories. We have identified 12 companies that appear to be on the verge of listing, though disclosure is limited. Cloud-native unicorns are benefiting from accelerated digital transformation. During the pandemic, secure networking gained traction as enterprises aimed to set boundaries around remote employees. Netskope has become an essential component of remote work security, as evidenced by its partnership with leading incumbents including Okta, Proofpoint (NASDAQ: PFPT), and CrowdStrike. Illumio, a zero-trust networking vendor, has seen demand rapidly expand and may capitalize on its momentum. Darktrace and Menlo Security also protect enterprise perimeters and thus benefited this year from IT priorities. Identity & access management (IAM) and endpoint security also feature disruptive next-gen technologies across endpoint detection & response, fraud prevention, and access management that have grown throughout the pandemic. These challengers may scale to the size of incumbents in the medium term.

2021 infosec IPO pipeline by segment

Network security	Identity & access management	Endpoint security	Security operations
 DARKTRACE	 Auth0	 cybereason®	 exabeam
 illumio	 ForgeRock®	 SentinelOne®	
 Menlo Security	 pindrop®	 TANIUM.	
 netSKOPE	 riskified		

Source: PitchBook

ROBERT LE Senior Analyst
Emerging Tech
robert.le@pitchbook.com

Insurtech

Prediction: Insurtech VC investment will revert to higher levels driven by insurance distribution marketplaces and intermediaries in 2021.

Rationale: VC investment into insurtech companies slowed down in 2020 after years of growth. We largely attribute this slowdown to the COVID-19 pandemic as the broader insurance industry faced unprecedented losses. However, the pandemic also spurred the acceleration of digital transformation within the industry, as insurers increasingly relied on online and digital services to engage and sell to customers, underwrite and service policies, and settle claims. Insurtech companies will likely benefit from this acceleration.

Caveat: Incumbent insurers that invest in insurtech companies could pull back capital if claims and reimbursements related to COVID-19 severely affect net profits. Additionally, insurers that typically partner with insurtechs could choose to develop technologies in-house as they become more technologically proficient.

Venture investment into insurtech companies started off strong in 2020 with over \$420 million in VC deals closed in January. However, as COVID-19 spread, wary investors held back investments in a volatile and uncertain market. The first quarter of 2020 posted less than \$900 million in invested capital, notching the lowest quarter for capital invested in the space since Q2 2018. However, investment recovered toward the end of Q2 and into Q3. In fact, the \$1.9 billion in VC invested in Q3 amounted to the strongest quarter since Q4 2017. (Excluding Ping An Insurance's \$2.2 billion deal in Q4 2017, Q3 2020 was the largest on record.) We expect this strong investment trend to continue into 2021, partially driven by nontraditional investors.

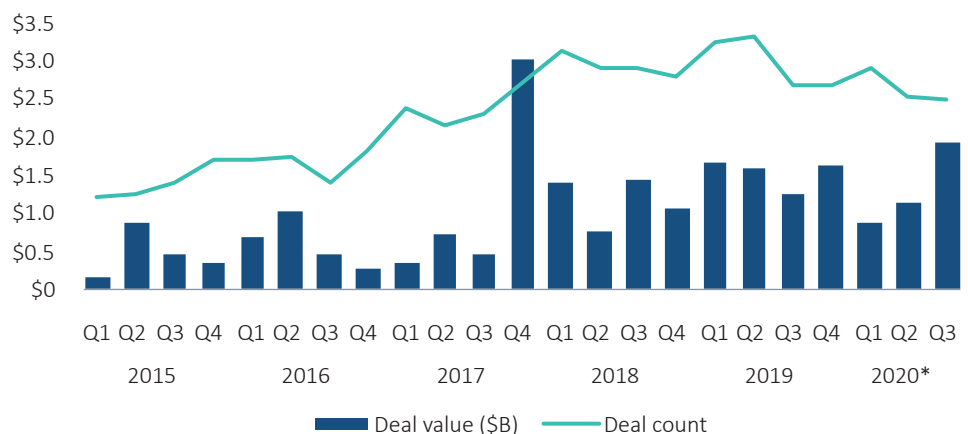
While nontraditional investors pulled back from participating in VC investments during the global financial crisis (GFC), CVCs of insurance companies have remained committed to insurtech investments during the pandemic. Notable deals with nontraditional investor participation include Next Insurance's \$250.0 million Series E (MS&AD Insurance Group), Acko's \$60.0 million Series D (Munich Re) and BIMA's \$30.0 million growth round (Allianz). These deals validate our view that insurers are getting better at understanding innovation initiatives and the strategic value they bring to the business. The second half of 2020 YTD has also included several successful insurtech IPOs (Lemonade, GoHealth (NASDAQ: GOCO), Duck Creek Technologies (NASDAQ: DCT), and Root Insurance), further reinforcing nontraditional investors' confidence in the space.

We expect the bulk of insurtech investment capital to go to insurance platforms, which exhibited strong momentum in 2020. Similar to how Bookings Holdings (NASDAQ: BKNG) and Expedia Group (NASDAQ: EXPE) disrupted the travel agency model with their online marketplaces, insurance platforms such as Policygenius, Wefox, and PolicyBazaar—which all raised

large venture rounds in 2020—are seeking to change the traditional agent/broker insurance distribution model. Insurance marketplaces make it easier for consumers to discover insurance policies, compare pricing, and learn about different types of coverage. These marketplaces have increasingly become trusted sources of insurance information for consumers. Over the long term, as insurance marketplaces continue to proliferate, we expect substantial consolidation similar to what occurred in the online travel industry.

Other insurance distribution intermediaries will also see a boost in funding in 2021 as they benefit from changes in how consumers buy coverage. Historically, companies have sold insurance ad hoc, but we are seeing a paradigm shift in which customers prefer to buy alongside related products and services. This “embedded insurance” trend consists of bundling insurance coverage within digital platforms and ecosystems. Embedded insurance providers develop APIs that connect insurance carriers to these platforms, enabling them to offer insurance products to their end customers. For example, in October, QuickBooks launched QuickBook Insurance, which allows customers to buy insurance directly through the company’s accounting platform. We anticipate similar insurance products will be sold directly to merchants on Stripe or PayPal (NASDAQ: PYPL) or an insurance product sold alongside a product or service that an end user just purchased via those payment providers. Embedded insurance greatly reduces acquisition costs and has the potential to improve loss ratios through increased data collection. Embedded insurance startups likely to raise new funding in 2021 include Qover (gig economy platforms), Clyde (e-commerce platforms) and Boost (multiple use cases).

Insurtech VC deal activity



Source: PitchBook | Geography: Global
*As of September 30, 2020

BRENDAN BURKE Senior Analyst
Emerging Tech
brendan.burke@pitchbook.com

Internet of things

Prediction: Industrial automation incumbents will return to internet of things (IoT) M&A.

Rationale: Industrial automation incumbents have been inactive in IoT M&A, relying on outdated IoT product suites that are susceptible to disruption. The COVID-19 pandemic has caused manufacturing & supply chain customer preferences to change, with automation and worker safety increasing in importance. Industrial automation incumbents have had to update their product offerings and are beginning consider M&A to adapt to the new reality. In particular, manufacturing sensors and supply chain tracking have developed pent-up demand. Going forward, we expect significant spending snapbacks in manufacturing, construction, and supply chain IoT in 2021, which will enhance the revenue synergies of startup acquisitions.

Caveat: Industrial conglomerates have multiple competing needs and may not prioritize IoT over other robotics, automation, and IT infrastructure opportunities. A vaccine's potential failure to restore typical consumer behavior may challenge the velocity of manufacturing and supply chains and cause industrial leaders to continue risk-averse decision making. IoT deployments have failed to deliver clear and repeatable ROI, so continued economic recession could lead to deferral of risky projects.

IoT market leaders have not prioritized M&A in IoT startups, leading to a depressed VC exit market in the space. We believe key industrial IoT incumbents include General Electric (NYSE: GE), Siemens (ETR: SIE), Robert Bosch, ABB Group (NYSE: ABB), and National Instruments (NASDAQ: NATI) based on their IoT revenue and mindshare in the industry. Despite partaking in broader M&A activity, none of these incumbents have led the charge in IoT. Explanations for this lack of activity include low revenue growth in IoT and an innovator's dilemma for incumbents with strong market positions. Leading industrial automation and device vendors have registered few acquisitions in recent years. We believe this lack of activity has led to low exit values in IoT overall, with no year reaching \$4.0 billion in VC exit value since 2014, which featured Nest's \$3.2 billion exit to Google.

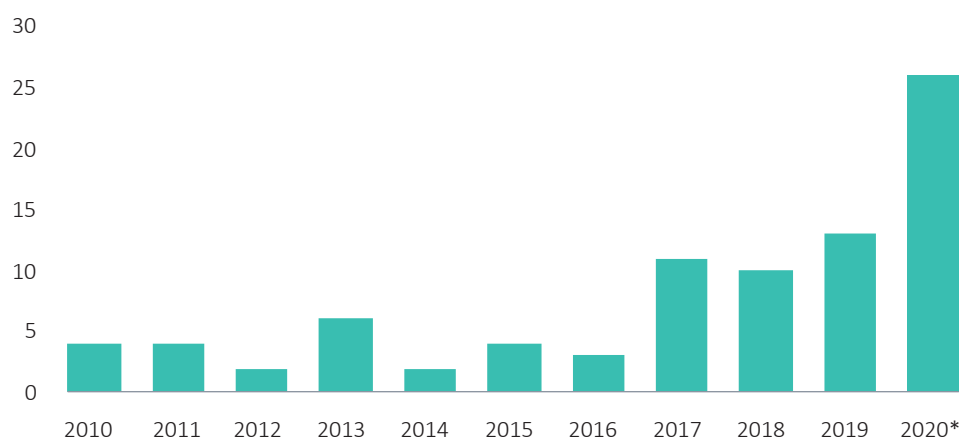
Recent IoT acquisitions by key industrial IoT incumbents

Acquirer	Company name	Close date	Segment	Subsegment	Exit size (\$M)
Siemens	Omatic	July 30, 2018	Industrial IoT	Manufacturing & supply chain	N/A
Siemens	J2 Innovations	May 27, 2018	IoT software	Middleware	N/A
Siemens	Enlighted	May 23, 2018	Connected buildings	Connected commercial real estate	N/A
GE	Bit Stew Systems	November 15, 2016	IoT software	Middleware	\$153.0
Bosch	ProSyst Software	February 13, 2015	IoT software	Middleware	N/A

We believe that market conditions are changing to favor increased M&A by industrial automation incumbents. Manufacturing & supply chain, the largest category of IoT in terms of end-user spending, is positioned for a high-growth year in 2021. We estimate the category will reach \$106.9 billion in end-user spending in 2020 and experience a snapback in demand in a vaccine-supported recovery scenario in 2021, with over 30% growth. We expect manufacturing sensors, assembly automation, construction monitoring, and supply chain tracking to experience the most growth. Predictive maintenance and facility monitoring can utilize manufacturing sensors, giving visibility over worker safety and reducing in-person service visits. Assembly automation includes augmented reality glasses for industrial worksites, which have gained traction as a result of virtual training during the pandemic. Already in Q4 2020, ABB acquired hygienic robotics startup Codian Robotics, demonstrating the gaps in industrial automation portfolios that have emerged as a result of shifting preferences. We believe new sources of demand will require acquisitions to keep up with the market.

Some manufacturing & supply chain IoT startups have grown through the pandemic and attracted strategic investments from industrial automation incumbents, suggesting the development of an acquisition pipeline. Predictive maintenance startup UpKeep achieved a 6.5x valuation step-up into its Series B in May 2020, demonstrating demand for sensor-enabled workforce management software during COVID-19. In June, industrial data integration platform Element Analytics raised a Series B with participation from Schneider Ventures, Honeywell Ventures, and ABB Technology Ventures, illustrating that incumbents are keeping track of innovation occurring in the space. Those corporate VC (CVC) arms have substantially increased their VC activity in 2020, suggesting that manufacturing & supply chain IoT companies may be using this quiet period in the market to look ahead to the future.

VC deals (#) for Honeywell Ventures, ABB Technology Ventures, and Schneider Electric



Source: PitchBook | Geography: Global
*As of October 31, 2020

ASAD HUSSAIN Senior Analyst
Emerging Tech
asad.hussain@pitchbook.com

Mobility tech

Prediction: A second wave of SPAC mergers focused on self-driving technology will mark 2021 investment in mobility tech.

Rationale: Reverse mergers with special purpose acquisition companies (SPACs) present an attractive go-to-market strategy for autonomous vehicle companies given their ability to quickly go to market at high valuations with lower levels of scrutiny relative to traditional IPOs. We believe public market investor enthusiasm toward electrification will expand to include self-driving technology, shepherding in a new wave of SPAC market debuts for autonomous vehicle technology companies.

Caveat: Sentiment toward SPAC debuts could shift as direct listing and alternative listing options gain momentum. Whereas the timeline for revenue generation might be measured in quarters for electric vehicle startups, autonomous vehicles will likely take many years to generate revenue, creating additional uncertainty for potential investors in the space.

Publicly traded electric vehicle stocks have experienced a strong runup in the last few months. As of December 2020, Tesla's (NASDAQ: TSLA) valuation has surpassed that of Walmart, Nikola's (NASDAQ: NKLA) market capitalization stands at over \$7.0 billion despite having yet to produce even a functional prototype, and Chinese electric vehicle companies Xpeng (NYSE: XPEV), NIO (NYSE: NIO), and Li Auto (NASDAQ: LI) have reached a combined valuation higher than that of Detroit's "Big Three" (GM, Ford, and Fiat-Chrysler).

Investor enthusiasm for electrification is strong right now, and it is an opportune time for electric vehicle companies to raise capital from public market investors, as valuations in the space are high. Because they offer quicker time to market and less scrutiny, SPACs are an attractive listing option for electric vehicles companies and, more broadly, highly capital-intensive startups in the pre- to early revenue stages. Several electric vehicle startups are capitalizing on this trade by going public through reverse mergers with special purpose acquisition companies (SPACs). Startups Canoo, Chargepoint, Faraday Future, Fisker, Hyliion, Lordstown Motors, Nikola Motors, QuantumScape, Romeo Power, and XL Fleet have announced plans to debut on public markets via SPAC reverse mergers, representing over \$6.0 billion invested in 2020 so far.

We believe enthusiasm among public equity investors for mobility technology companies will drive a second wave of SPACs focused on the self-driving space. Going public via a SPAC debut is attractive for autonomous vehicle companies for many of the same reasons it makes sense for electric vehicle companies. Going public through a SPAC allows companies to raise at a higher valuation, thereby lessening dilution of exiting ownership, relative to raising a financing round in the private markets. Additionally, going public through a SPAC enable companies to face a lower level of scrutiny relative to what companies typically face leading up to an IPO. Most autonomous vehicle startups seeking to raise

capital will not generate meaningful revenue for several years. Many of these companies will require hundreds of millions of dollars in capital to attract talent and invest in vehicles and additional sensors/hardware. While such early-stage, high-risk companies would likely struggle to find buyers in a traditional IPO, a SPAC merger provides a means to raise money via a public vehicle already listed on an exchange. Since the SPAC route functions more like a traditional acquisition, the private company primarily negotiates with just one party rather than a host of investors on a road show. This enables greater flexibility for the company to share its vision by providing financial projections without being burdened by regulatory requirements.

We believe lidar companies will mark the first wave of autonomous vehicle SPAC debuts. In September 2020, spinning automotive lidar pioneer Velodyne began trading under the public equity ticker VLDR following the completion of its business combination with SPAC Graf Industrial. As of November 15, the company holds a \$2.5 billion market capitalization. Following in Velodyne's footsteps, lidar startup Luminar, which has partnerships with Volvo, Daimler, and MobileEye, has debuted on public markets through a combination with SPAC Gores Metropoulos, surging to a \$8.0 billion+ market capitalization. In November 2020, Porsche-backed lidar startup Aeva announced it would merge with SPAC InterPrivate Acquisition at a \$2.1 billion post-deal market valuation. Anecdotally, we have heard of significant interest among SPACs to take additional lidar companies public. Ideal candidates for future SPAC mergers include AEye, Innoviz, and Insight Lidar.

Following the market debut of several lidar startups, we expect full-stack autonomous vehicle developers will be the next to go public through SPACs. Companies such as Aurora Innovation, Nuro, Pony.ai, and Voyage could be attractive candidates for SPAC mergers. These companies will likely need to raise capital soon to continue to develop their technologies and stay competitive with corporate-backed leaders in the space such as Waymo (backed by Alphabet), Cruise Automation (GM, SoftBank, Honda), Zoox (Amazon), Argo AI (Ford & VW), Apollo Auto (Baidu), and Mobileye (Intel).

Although self-driving startups will likely generate significant buzz as they debut on public market, there is still a great deal of uncertainty in investing in these companies. Whereas the timeline for revenue generation for electric vehicles might be measured in quarters, many autonomous vehicle startups could take years to generate material revenue, let alone profit. Moreover, whereas electric vehicle startups only face a legacy auto industry that has historically been slow to innovate, the self-driving space experiences much more robust levels of competition. Self-driving startups face an uphill battle competing with large tech companies such as Google, Apple (NASDAQ: AAPL), Amazon, and Intel (NASDAQ: INTC), which are extremely well-capitalized and have strong strategic interests in the future of transportation.

Recent mobility tech SPAC deals

Company	Deal date	Deal size (\$M)	Post-money valuation (\$M)*
Aeva (NYSE: IPV)	November 2, 2020	N/A	\$2,100.0
Fisker (NYSE: FSR)	October 30, 2020	N/A	N/A
Lordstown (NASDAQ: RIDE)	October 26, 2020	N/A	N/A
CarLotz (NASDAQ: ACAM)	October 22, 2020	N/A	\$827.0
Shift (Internet Retail) (NASDAQ: SFT)	October 13, 2020	N/A	N/A
Romeo Power (NYSE: RMG)	October 5, 2020	N/A	\$1,330.0
Hyllion (NYSE: HYLN)	October 1, 2020	N/A	N/A
ChargePoint (NYSE: SBE)	September 24, 2020	N/A	N/A
XL Fleet (NYSE: PIC)	September 18, 2020	N/A	N/A
QuantumScape (NYSE: QS)	September 3, 2020	N/A	N/A
Luminar (NASDAQ: LAZR)	August 24, 2020	\$400.0	\$3,400.0
Canoo (NASDAQ: HCAC)	August 18, 2020	N/A	\$2,400.0
Velodyne LiDAR (NASDAQ: VLDR)	July 2, 2020	N/A	N/A
Nikola Motor Company (NASDAQ: NKLA)	June 3, 2020	N/A	N/A
Transphorm (PINX: TGAN)	January 27, 2020	N/A	N/A
Last Mile Holdings (TSX: MILE)	October 23, 2019	N/A	N/A
Facedrive (TSX: FD)	September 19, 2019	N/A	N/A
Diamond S Management (NYSE: DSSI)	March 28, 2019	N/A	N/A
Waitr	November 15, 2018	\$308.0	\$308.0
DropCar	January 31, 2018	N/A	N/A
Omnivision Technologies	December 1, 2016	N/A	N/A
Smith Electric Vehicles	August 21, 2014	N/A	N/A
Terra Imaging	February 8, 2014	\$10.4	\$10.4
Faraday Future	N/A	N/A	N/A
Proterra	N/A	N/A	N/A

Source: PitchBook | Geography: Global
*As of deal date

KAIA COLBAN Analyst
Emerging Tech
kaia.colban@pitchbook.com

Retail health & wellness tech

Prediction: We expect digital therapeutics (DTx) startups to receive a record level of VC investment in 2021.

Rationale: While still in the early stages, we have seen a rise in VC funding activity in the DTx space. Startups in this industry have the potential to help close the gap in care with traditional therapeutics by providing scalable, easy-to-manage, data-driven treatments. DTx technology can efficiently monitor and adjust these treatments in real time, providing a more patient-centric approach to healthcare.

Caveat: A nascent regulatory pathway for this industry means companies in the DTx space have no clear set of criteria for approval. Furthermore, obtaining insurance coverage for a new therapeutic through traditional health plans is a complex process. DTx targeted toward treating chronic conditions may need to conduct lengthy longitudinal studies to gain regulatory approval and insurance coverage.

Emerging digital therapeutics represent a category of products and services that relies on software and data to provide health treatments. DTx can represent entirely new approaches to treatment, as well as supplement existing approaches.

DTx technologies promise to help close the gap with traditional therapeutics by providing data-driven treatments that are scalable, easy to manage and monitor and can be adjusted in real-time, thus providing more patient-centric approaches to healthcare. New technologies—such as smart sensor innovation, machine learning, artificial intelligence, and internet of things—enable the widespread use of low-cost sensors with reduced hardware requirements, the expansion of connected devices, and real-time progress measurement. DTx can leverage these technologies to develop platforms and devices that provide personalized insights, track patient behaviors, and update treatments as needed.

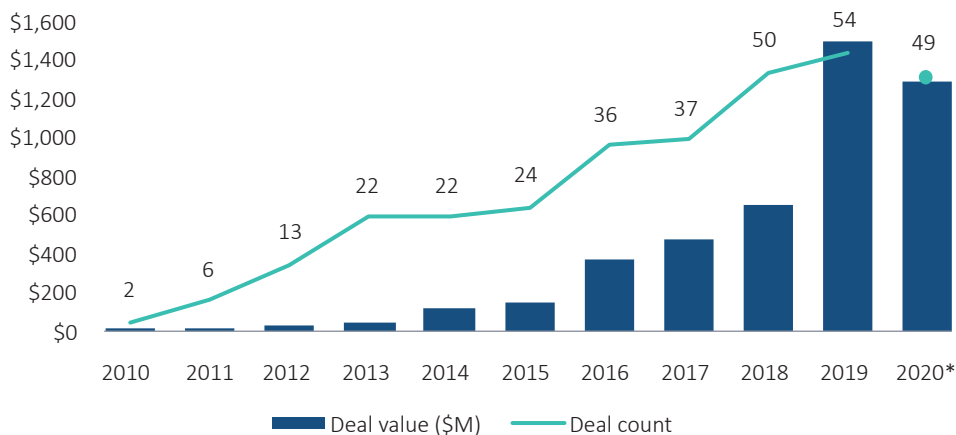
A clearer path towards regulatory approval will likely attract investments. The FDA is currently working to streamline regulatory processes for DTx. In 2017, the FDA announced the creation of a Digital Health Software Precertification Program, a pilot program for approving software-based medical devices.

We believe DTx has the potential to take a sizable chunk of market share from the traditional therapeutic industry, and estimate the market will reach \$6.9 billion by 2025, growing at a CAGR of 26.7%.⁵ In 2019, we recorded \$1.5 billion in VC investment across 52 deals. As of October 2020, we recorded \$1.3 billion invested across 49 deals. Notable startups in the space include Bright Health, which has achieved unicorn status, and Omada. We expect the number of deals and the average deal size to increase as the

5: "Digital Therapeutic (DTx) Market by Application, Sales Channel - Global Forecasts to 2025," Markets and Markets, March 2020.

industry matures and achieves a clearer regulatory pathway. Furthermore, we anticipate big tech firms to enter the market by acquiring DTx companies. However, investors take on a great deal of risk and uncertainty when picking winners in an undefined ecosystem. Tech firms may wait before backing eventual winners or investing in DTx startups without a path to acquisition.

Digital therapeutics VC deal activity



Source: PitchBook | Geography: Global
*As of September 30, 2020

ASAD HUSSAIN Senior Analyst
Emerging Tech
asad.hussain@pitchbook.com

Supply chain tech

Prediction: Last-mile delivery platforms are primed for major IPOs in 2021.

Rationale: Businesses such as DoorDash (NYSE: DASH) and Instacart represent an opportunity for investors to gain exposure to a fast-growing consumer subsector with secular tailwinds and a rapidly expanding addressable market. The last-mile delivery space also allows investors to allocate to a relatively insulated industry in the face of future COVID-19-related shutdowns and shelter-in-place restrictions.

Caveat: Public market volatility could delay IPOs in the space or lead to curtailed valuations. Increased scrutiny over fees charged to restaurants could weigh on investor sentiment. Rapid vaccine deployment and return to normalcy could reduce market growth.

Last-mile delivery platforms serve a large, rapidly growing, and underpenetrated addressable market that has seen an expansion due to the COVID-19 pandemic. Social-distancing requirements have expanded adoption and attracted more users to these services, leading to a 44.5% YoY growth in retail e-commerce sales in Q2 2020 and 140% and 230% YoY revenue growth for food delivery apps Uber Eats (NYSE: UBER) and DoorDash, respectively, in Q3 2020.⁶ We estimate global revenue from last-mile delivery services reached \$347.3 billion in 2019 and forecast this to grow to \$578.8 billion by 2025, implying a CAGR of approximately 7.7%. While the overall market for delivery is growing, we expect venture-backed and pre-IPO app-based food, grocery, and convenience item delivery services such as DoorDash, Instacart, and GoPuff to post significantly faster growth. These companies spend heavily on marketing and serve an underpenetrated market relative to general e-commerce delivery. For example, as of Q3 2020, consumers on the DoorDash platform represented less than 6% of the US population.⁷ We believe last-mile food, grocery, and convenience item delivery providers have a long runway of growth ahead.

Investors must weigh a key risk when allocating to the last-mile delivery space: Will this market expansion fizzle out once the pandemic subsides, or will customers continue to utilize last-mile delivery services? In our view, the shift in customer behavior will likely persist in the long term. In general, evidence suggests that altered behavior in other areas affected by COVID-19 will likely affect consumers for some time. For example, use of mass transit, which declined significantly during the early months of the pandemic, remains 16% and 45% below normal levels in Denmark and New Zealand respectively, two countries that were relatively successful in containing the spread of COVID-19. Moreover, we believe consumers have grown accustomed to the convenience offered by food, grocery, and convenience item delivery, making it more likely they continue to use these services even after the necessity for them dissipates.

6: "Retail E-commerce Sales in the United States from 1st Quarter 2009 to 2nd Quarter 2020," Statista, August 2020.

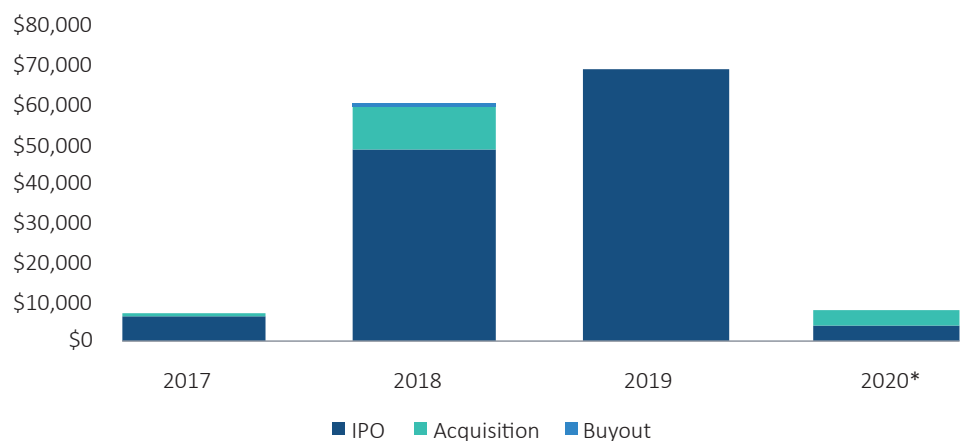
7: "Form S-1 DoorDash Inc," SEC, November 2020.

Potential labor regulation for gig-economy workers poses another key risk for companies in the last-mile delivery space. However, two major recent developments stemming from the November presidential election in the US could ease investor concerns about rising labor costs. The passing of Prop 22 in California, which exempts ridesharing and delivery companies from gig-economy worker protections, and a high likelihood of a divided government make sweeping federal reforms targeting the use of contracted labor unlikely.

Finally, investing in last-mile delivery companies such as DoorDash and Instacart could allow investors a way to hedge against future COVID-19 shutdowns and stay-at-home mandates. For investors concerned about long-lasting pandemic ramifications, last-mile delivery applications continue to provide a safe haven.

Given these factors, we believe public equity investors will exhibit strong demand for exposure to the fast-growing last-mile delivery sector, which has received strong levels of private funding, including \$8.4 billion in the first three quarters of 2020. In December 2020, DoorDash went public and soared in its first day of trading to a market capitalization of \$72.0 billion. In our view, DoorDash's successful IPO validates venture backing of early-stage mobility startups. We expect DoorDash's exit to set a strong precedent for future last-mile delivery IPO candidates such as Instacart and GoPuff. Additionally, we anticipate VC funding toward the space to increase as investors deploy capital into last-mile delivery, warehousing tech, and other supply chain sectors with pandemic-induced tailwinds.

Last-mile delivery VC exits (\$M) by type



Source: PitchBook | Geography: North America & Europe

*As of September 30, 2020

Note: Excludes DoorDash IPO.