# THE PRESENT & FUTURE
# OF PROPTECH

MARCH 2022

Data provided by PitchBook.

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# INTRODUCTION

The property technology space—commonly known as proptech—is dynamic and fast-growing. But what really is the true scope of proptech? What does it include? Although there can be differing views as to the exact parameters of a given industry, proptech primarily can be defined as new business models and technology aimed at real estate markets, most commonly in software and platforms. More specifically, proptech consists of the application of software solutions to real estate needs and transactions, from data analysis to automated monitoring to energy consumption usage reviews and more. In addition, some software solutions also are utilized in the creation of novel approaches to real estate market situations, such as investment platforms for retail investors that seek exposure to real estate assets within their personal portfolios. There are also a host of technologies used in the management of residential, office and retail properties affecting marketing and sales, leasing, renters' insurance, security deposits, as well as communication between tenants and managers and the creation of "community" among renters. In this inaugural Valley Bank report on the present and future of proptech, we review important trends shaping not only private investment within this space but also industrywide and technical factors.

Due to different definitions of such technology as well as the types of real estate markets, estimates of market sizes and private investment activity within proptech differ widely. For the purposes of this report, we viewed proptech through a much more rigorous lens, using the PitchBook platform to construct five distinct segments: asset utilization; finance and investments; construction, maintenance and renovation; property management; and transaction solutions. The five segments are somewhat self-apparent, but to provide more granularity, construction, maintenance and renovation included all companies with keywords pertaining to those three areas. Transaction solutions included all companies that are involved in facilitating the sale or purchase of property, as well as back-end architecture and organization of software. Finance and investments also included a variety of other types of platforms that are involved in enabling access to financing and financial exposure to real estate assets. Asset utilization speaks to a broader category of how proptech companies enable owners to better monetize and use their various assets, such as co-living and homesharing. Property management spanned both residential and commercial purposes, from both the tenant and landlord perspectives.

We believe these five segments capture the reality and entirety of the proptech space. Using a wide variety of keywords, we defined those five segments into their own specific populations of companies, and then combined the overall population of companies to analyze overall market trends. Then, ensuring that the segments were deduped so that each company was sorted into its correct segment, we analyzed trends in investment activity for each of those five segments. There are further details in the methodology at the end of this report, which explain more about the criteria for each segment especially as it pertains to the market map within this report.

From there, PitchBook's standard methodologies for private investment were used to arrive at a broad array of private investment datasets that show the key trends defining the surge in capital flowing into the proptech space over the past several years. We hope you enjoy reading the report.

Digitization in construction and development has mitigated many of the effects felt from inflationary pressures and labor shortages.

# ABOUT US

## VALLEY BANK

Valley National Bank is a regional financial institution with approximately $43 billion in assets and more than 200 branches located throughout New Jersey, Manhattan, Brooklyn, Queens, Long Island, Florida and Alabama. Valley was founded in 1927 on the simple principle of creating better banking opportunities for our customers and helping communities grow and prosper. For over 90 years, our professional banking associates have embraced this spirit by providing a full range of retail and commercial banking services, home mortgage and commercial lending, wealth, insurance and estate planning solutions to help our customers and communities achieve financial success. We believe that better banking begins with a conversation. That's why we work hard every day to provide personalized financial solutions that help our clients address their toughest challenges and embrace their greatest opportunities.

In September of 2021, Valley National Bancorp entered into a merger agreement whereby Valley will acquire Leumi, the US subsidiary of Bank Leumi Le-Israel B.M., and parent company of Bank Leumi USA. This combination further solidifies Valley's position as a top-tier, relationship-focused commercial bank. The pro forma company will be the 29th largest publicly traded U.S. bank by assets, and will be well-positioned for strong, sustainable, and diversified growth.

## LEUMI USA BANK

Bank Leumi is a relationship-driven boutique bank with global ties. We've been operating in the United States for more than 60 years. Headquartered in New York City, with offices in Chicago, Los Angeles, Palo Alto and Aventura, we serve the communities where our clients live and work.

Our commitment to excellence and focus on shared values defines how we do business. Our team of talented banking professionals goes beyond the expected to understand your needs and deliver world-class solutions and the exceptional service you deserve.

## ELI ELEFANT, CHIEF EXECUTIVE OFFICER

Mr. Elefant has two decades of experience investing & managing a diverse set of real estate assets, from urban office buildings, mixed-use value-add projects, to specialty asset classes and venture investing. Elefant employs an entrepreneurial mindset and ground up analytical approach to investing and managing real estate and companies convening at the intersection of real estate and technology. He served as CEO of Property & Building Corp. US presiding over $3B of commercial real estate and was a managing director at Winthrop Capital where he oversaw special situation investing, joint venture and portfolio transactions. Mr. Elefant serves on several non-profit boards and is an investor and adviser to a select group of prop-tech and fin-tech companies.

## CHRIS GREEN, FOUNDER & CEO, GREENPOINT PARTNERS

Chris Green is the founder and the Chief Executive Officer of Greenpoint Partners. He is also on the board of Goodman Funds Management Ltd., Goodman Ltd., Goodman Group and Goodman Industrial Trust. Chris was previously the global head of real estate for Macquarie Group and has worked as a consultant in a range of companies like Kingfisher, GAP and Hackett.

### Greenpoint Partners

Greenpoint Partners is a global alternatives firm investing at the intersection of real assets, technology and sustainability. They invest in high-growth technology companies underpinning the digital transformation of the real assets industry, as well as in the underlying real assets themselves.

## EYAL REGGEV - 166 2ND LLC & PRINCIPAL, LIR HOLDINGS

Eyal is a highly skilled and accomplished real estate executive with vast experience in Multifamily, Retail, Ultra luxury condos development and Proptech. During the last 18 months Eyal was involved in the acquisition of over $1B of high-end class A multifamily properties. Eyal is the former president of Stonehenge NYC, one of Manhattan's leading multifamily players. Until late 2010 Eyal served as the CEO of Habas Group, a leading Israeli publicly traded development company. Eyal is deeply involved in the Proptech world, investing, mentoring and advising founders, VC's, and startups.

## JEFFREY E. BERMAN, GENERAL PARTNER, CAMBER CREEK

Jeffrey Berman has more than two decades of executive management experience and deeply rooted relationships in the start-up, real estate, and venture capital ecosystems. Prior to Camber Creek, he was a principal at one of the Washington DC area's largest privately held real estate development and management companies.

### Camber Creek

Camber Creek is a venture capital firm providing strategic value and capital to operating technology companies focused on the real estate market. Camber Creek contributes in a direct and significant way to the success of its portfolio companies by leveraging the real estate expertise, operating experience, and portfolio of assets of its partners, investors, and advisors. Our investment team has investing, operating, and technology experience and expertise across a range of real estate businesses, including construction, property management, development, and leasing. Our investors own, operate and manage billions of square feet of real estate in the U.S., giving us a unique competitive advantage as an investor and value-added partner in the real estate technology space. The firm manages over $500MM of assets.

## SIMON B. JAWITZ, CHIEF INVESTMENT OFFICER, COMMON LIVING INC.

Simon B. Jawitz is the Chief Investment Officer at Common Living Inc. Formerly a banker at J.P. Morgan and Goldman Sachs, he was on the board of directors of Bank Leumi USA from 2014-2022.

### Common Living Inc.

Common is the nation's leading residential brand and operating platform that designs, leases, and manages multifamily properties that appeal to today's renters. Through smart design and tech-enabled property management, Common delivers exceptional experiences to thousands of residents in co-living, microunit, and traditional apartments in cities from coast to coast. Founded in October 2015 with a focus on co-living and affordability, they are now the preferred choice for renters looking for a stress-free apartment experience from a trusted brand, and for real estate owners seeking reliable, above-market returns.

# EXECUTIVE SUMMARY

The complexities of the current economic recovery from the COVID-19 pandemic represent both promising growth and significant challenges for real estate developers and investors. However, property tech (Proptech)—defined by PitchBook with a custom methodology here—looks set to benefit from key macro factors in this dynamic, challenging environment, as real estate players of all kinds strive to digitize further.

After the slow down in deal volume following onset of the COVID-19 pandemic in 2020, deal-making rebounded sharply in 2021, with a record $5.1 billion in venture capital invested across a record 219 transactions. Refer to the methodology here for how these figures may differ from other data providers' tallies.

Across multiple Proptech subsegments, venture funding is tilting to the later stages (defined by PitchBook as Series C or later), signaling maturation of cohorts of key companies within each subsegment.

The Proptech space is still nascent, so significant liquidity only ticked up in the past few years. However, 2021 saw the first massive surge in venture-backed exit values in the order of billions of dollars and there was a surge in overall M&A. Nearly $11 billion occurred via financial and strategic M&A in the year, while just a handful of public listings accounted for $18.3 billion, thanks to the equity markets' record performance in 2021 and the SPAC phenomenon.

A broadening base of investment firms is growing active in the space, with corporates and nontraditional players joining in a flurry of larger late-stage rounds, contributing significantly to the surge in late-stage deal activity.

Property management and transaction solutions remain the most active Proptech subsegments due to the diversity of markets and consequent transaction types that offer multiple entry points for startups. However, we expect unifying platforms will likely emerge as category leaders in the coming years. With that said, all Proptech subsegments are producing growing platforms that are increasingly raking in large fundings from prominent investors.

The current stage of Proptech—dubbed "Proptech 3.0"—continues to mature; the next wave of Proptech, "Proptech 4.0," will be unified by two key themes: sustainability and cybersecurity. Companies will focus on solutions as the world races to curb emissions and adapt to climate change, and the increasing interconnectivity between the digital and physical world will drive the need for more information and physical security. This will engender an even greater wave of private investment in startups tackling these emerging Proptech niches.



"Proptech 4.0" will be unified by two key themes: sustainability and cybersecurity. Companies will focus on solutions as the world races to curb emissions and adapt to climate change, and the increasing interconnectivity between the digital and physical world will drive the need for more information and physical security.

# INDUSTRY TRENDS

**The US economy** has continued to recover from the pandemic-related dip in equities in 2020. According to CBRE Research, US GDP is set to grow well above 4% in 2022.[1] Despite market jitters in the early weeks of the year, there remains significant strength in multiple segments across the economy. Healthy growth rates, combined with volatility in equities, should prompt institutions and fund managers to consider changes in capital allocations to mute excessive shifts.

**Even as interest rates** are set to rise, contributing to market volatility and changes in bond market outlooks, the 10-year Treasury yield is not anticipated to rise much beyond 2%. Inflation, on the other hand, is currently expected to decline below 3% per the Federal Reserve's latest remarks, by year's end.[2] That said, the annual inflation increase estimated at 7.5% in January 2022 was the highest in some time, so the economic picture remains complex.

**According to Kiplinger**, based on forecasted interest rate rises, mortgage rates are also anticipated to rise by approximately 0.5%.[3] That could help boost home purchases in the near term as buyers look to lock in mortgages at currently lower rates, though it remains to be seen if consumer anticipation differs in opinion. Depending on interest rate rises and their speed and size, however, adjustable-rate mortgages will likely decline in popularity, while in the longer term, it is possible default risk will rise.

**In a survey conducted by PwC**, well over 80% of respondents stated that they anticipated good to excellent profitability prospects for 2022, indicating that optimism is on the upswing even given the ongoing COVID-19 pandemic.[4]

In that same survey, flexibility was most emphasized by real estate respondents, which bodes even better for proptech adoption given that increasing digitization eases workflows and improves efficiency.

**The debate** over returning to the office rages on, yet it seems clear that hybrid work models are here to stay. Industry insiders are watching office leasing trends, primarily in expensive urban downtowns. However, flexible or co-working locations could rise due to a proliferation of satellite offices leased by remote employees who prefer to work in a location separate from their home.

**Increasing emphasis** on sustainability and alignment with environmental, social, and governance (ESG) principles has also led to substantial investment in research and development (R&D) by proptech companies to include energy usage monitoring capabilities in their suite of products and services. New ventures are generally focused on climate-friendly solutions, such as greener, recycled building materials.

The US real estate market is so vast that it remains critical to both asset managers and investors. Zillow's 2020 estimate put the total value of the US housing market alone at $33.6 trillion.[5] Furthermore, allocations to real estate may grow even more as a hedge against inflation. This means there will be strong incentives for companies to keep investing heavily in proptech to stay competitive.

**Key technical advances** to watch in proptech include the growing utilization of and improvement in virtual or augmented reality for property tours and home appliances; increasing automation of monitoring of property conditions; access to and analysis of previously inaccessible datasets; relationship management; and more efficient asset utilization due to improved forecasting and monitoring of occupation and usage, among others.

1: "2022 US Real Estate Market Outlook," CBRE Research, December 8, 2021.
2: "Interest Rates: The Fed is Ready to Act," Kiplinger, David Payne, February 3, 2022.
3: Ibid. 4: "Emerging Trends in Real Estate: 2022," PwC and the Urban Land Institute, September 2021.
5: "US Housing Market's Combined Value Hits $33.6 Trillion in 2020," The World Property Journal, Michael Gerrity, January 20, 2020.

# INVESTMENT TRENDS

As real estate markets worldwide grow more immense in size and value, innovation and dealmaking in proptech will only intensify. Multiple proptech segments are now seeing category leaders emerge and mature, attracting sizable rounds of financing. Consequently, the bulk of all dealmaking across proptech remains centered within venture.

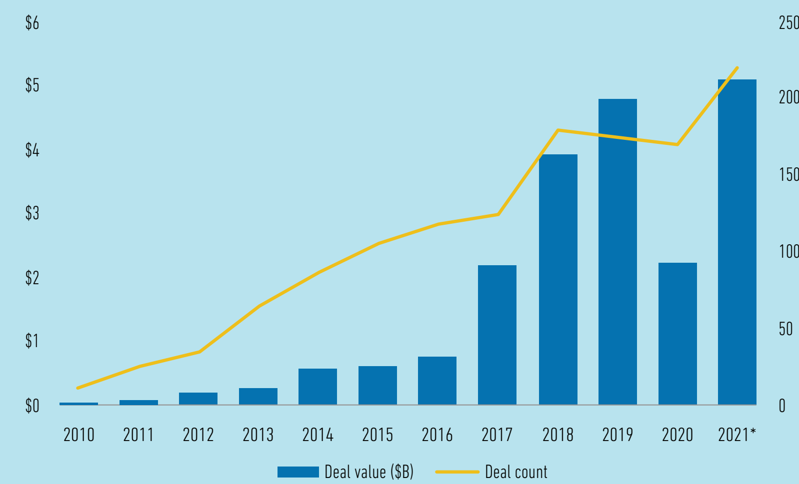
**The largest asset class in the world—real estate—is slowly being transformed via digitization, leading to record financing activity in proptech.**

2021 saw a record 219 transactions across the US within the proptech space, for a record sum of $5.1 billion in aggregate deal value. Moreover, the first half of 2021 saw the highest quarterly tallies of venture financing volume within proptech on record. Despite the high levels of proptech financing volumes from 2018 to 2020, 2021 set new highs for deal sizes and valuations. After a dip in 2020 due to the impact of the COVID-19 pandemic, both median and average venture financing sizes resurged in 2021, the former to a record $9.7 million.

**The median pre-money valuation in proptech doubled between 2020 and 2021 to $50 million.**

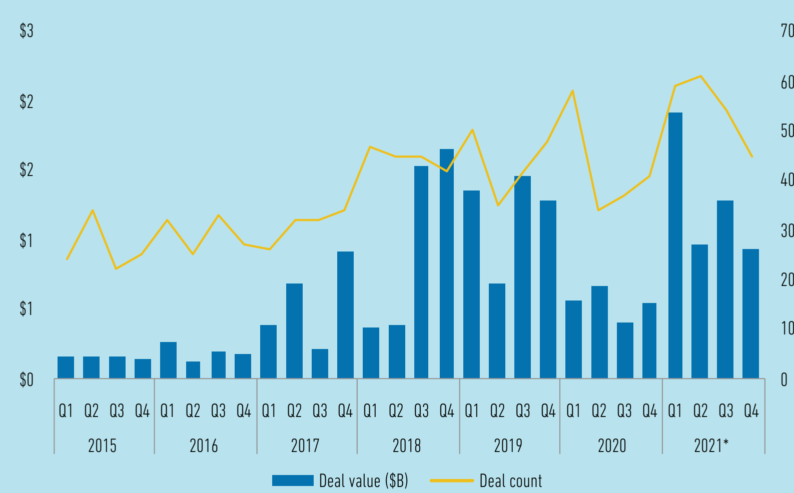
This resurgence in funding signifies the proliferation and maturation of multiple companies spanning the key segments of proptech, from asset utilization to transaction solutions to property management. As the world grapples with the ongoing COVID-19 pandemic, the intersection of technology and real estate has rarely seen as much interest and innovation as in the past few years.

**VC deal activity in proptech**




**Source:** PitchBook | **Geography:** Global
*As of December 31, 2021

**VC deal activity in proptech by quarter**



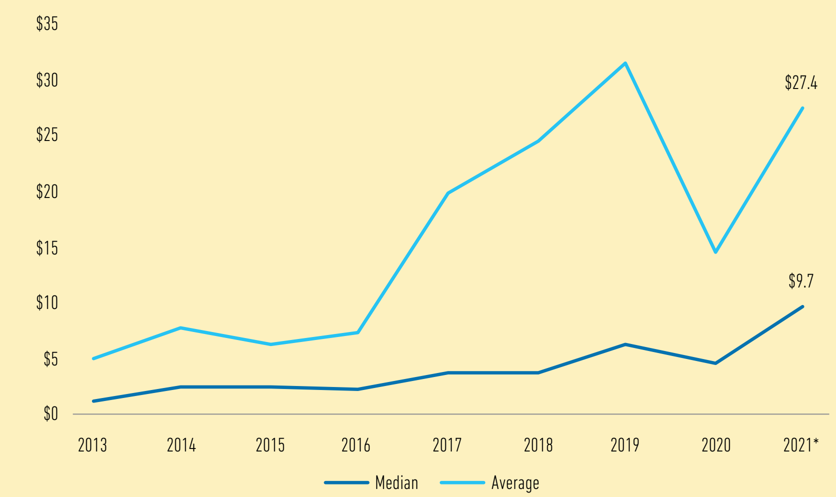

**Source:** PitchBook | **Geography:** Global
*As of December 31, 2021

For example, air quality monitoring and cleansing systems are now much more incorporated into construction projections, while existing building management teams are investing heavily in similar upgrades. Beyond such initiatives directly tied to the pandemic's impact, multiple startups over the past decade were launched in proptech to improve every phase of real estate transactions, from data collection and analytics to empower buyers and owners, to virtual tours of properties to facilitate remote purchasing. Later in this report, we highlight emerging startups with significant momentum and category leaders across propech's main subsegments.

Additional standout companies that recently raised significant sums include:

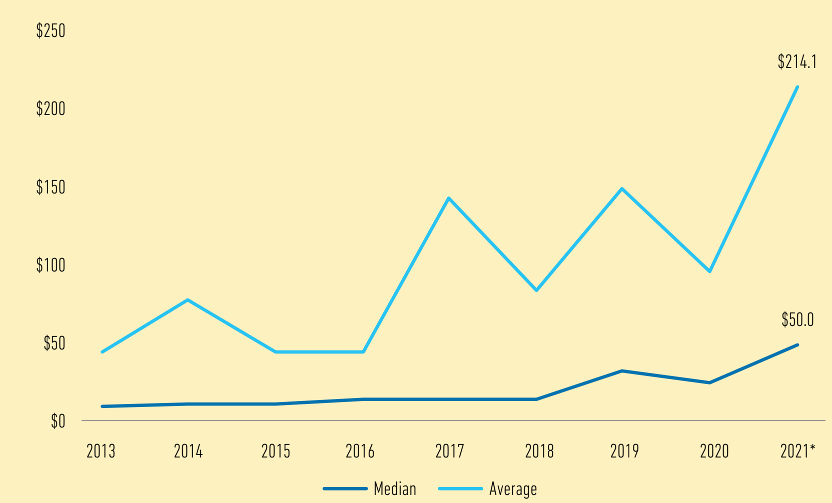
- Flexible workspace provider Industrious, which closed on $200 million in February 2021.
- Residential real estate platform Bungalow, which aims to match young professionals with roommates and provide associated suites of tools, that closed on $75 million in Series C funding in August 2021.
- Commercial real estate data and analytics platform Reonomy, which was acquired for just over $200 million in fall 2021 after raising nearly $160 million in total capital prior.
- Digital home buying platform Orchard, which raised $100 million in September 2021.
- Property management platform Entrata, which closed on more than $500 million in July 2021.
- Multifamily property management provider RealPage, which garnered $290 million in debt financing from Goldman Sachs for future acquisitions in summer 2021 after being taken private by Thoma Bravo for $10 billion.

**Median and average VC deal size ($M) in proptech**




**Source:** PitchBook | **Geography:** Global
*As of December 31, 2021

**Median and average VC pre-money valuation ($M) in proptech**



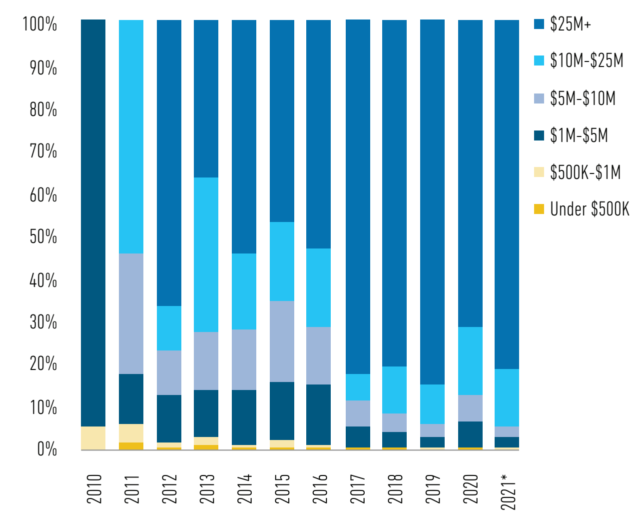

**Source:** PitchBook | **Geography:** Global
*As of December 31, 2021

# INVESTMENT TRENDS

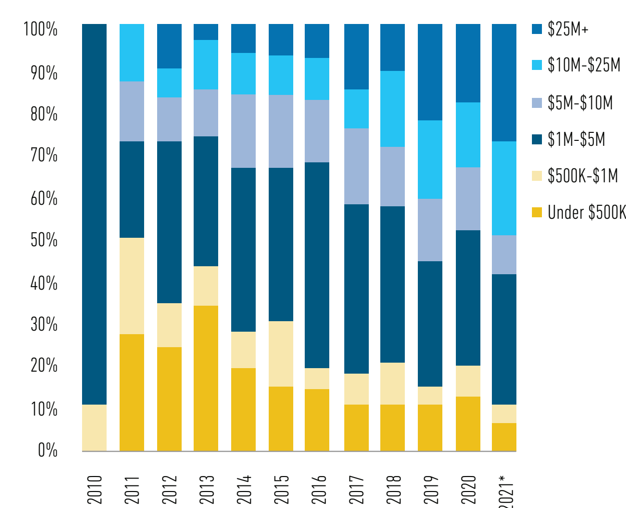
**Transaction solutions and property management remain the most heavily funded proptech subsegments.**

This maturity in the proptech space has meant that VC activity broken out by size and series shows a gradual tilt toward the late stage. For the first time, over 50 rounds sized at $25 million or more closed in 2021, while the volume of rounds sized between $10 million and $25 million nearly doubled YoY. In addition, the role of corporate players and nontraditional investors within proptech has contributed to this late-stage surge. Both firm types generally tend to participate in larger rounds, and a quarter of the total VC deal count in 2021 involved corporate players. Increasingly, fund managers and corporations have looked to garner exposure to startups spanning multiple sectors to supplement their R&D, diversify their portfolios, and in the case of corporates, strengthen their strategic advantages.

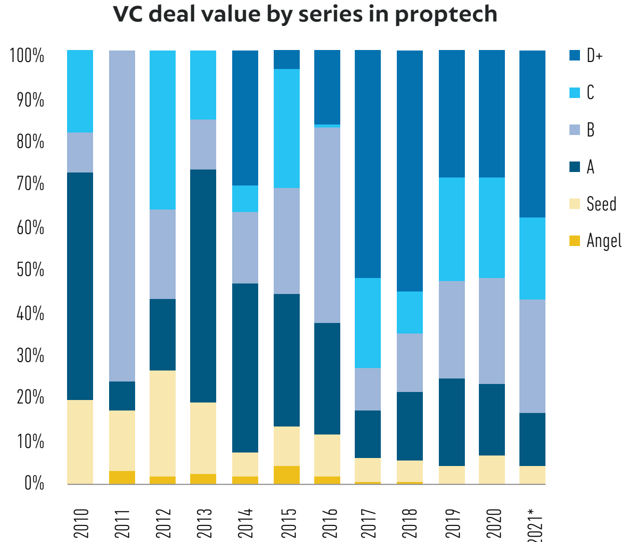
VC deal value by size bucket in proptech



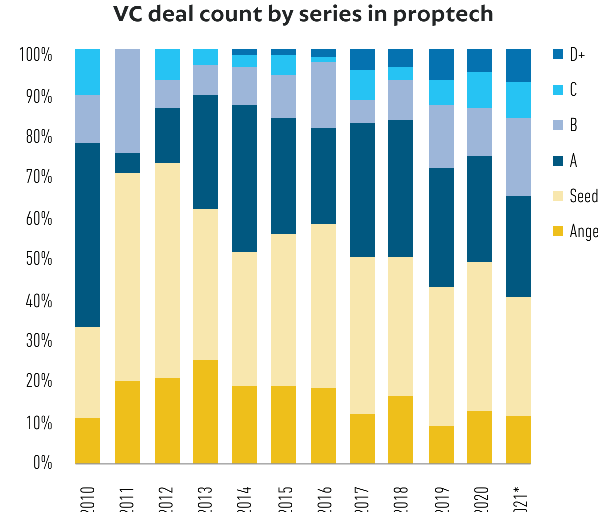

VC deal count by size bucket in proptech




VC deal value by series in proptech




VC deal count by series in proptech

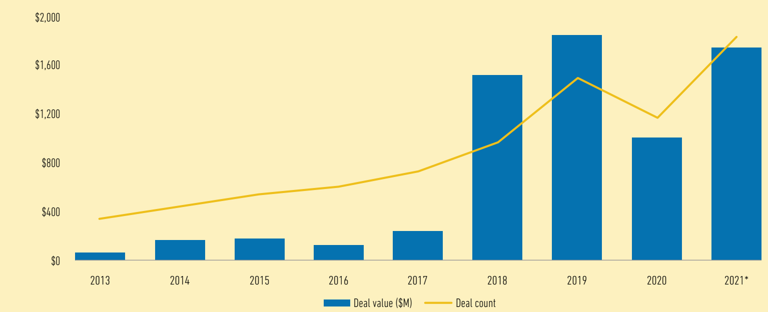



**Corporate and nontraditional investors' push into proptech has supported the surge in late-stage funding.[6]**

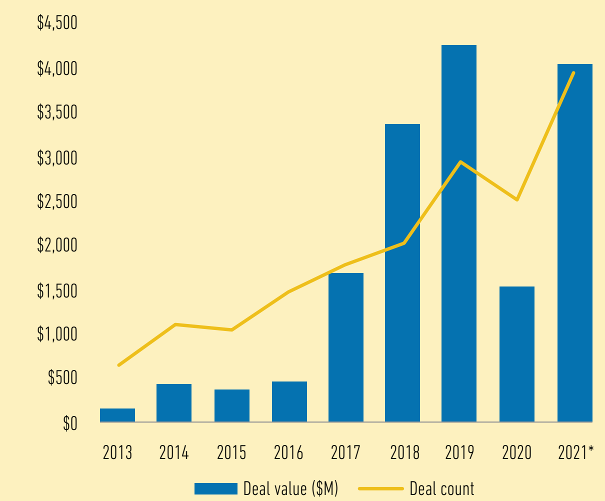
When looking at segments, the bulk of this surge in dealmaking has been in the two largest and most popular proptech subsegments: property management and transaction solutions. Property management has benefited from the sheer number of property types within the real estate market, which necessitates a diverse array of digital tools for owners and/or management teams to utilize. A growing focus on sustainability, for example, has led to searches for even more capabilities in monitoring energy consumption across buildings and incorporating smart building management tools alongside more traditional features. Multiple use cases have led to a proliferation of many competing startups and emergent category leaders for a given niche, such as multifamily housing. The transaction solutions space has experienced similar factors. The complexities of real estate transactions and the variety of transaction types can lead to multiple different product focus areas. That said, with economies of scale and increasingly diversified transactional tools, platforms can begin to accrue incumbency advantages, which could lead to category leaders emerging within each subsegment.

6: For an overview of the methodology behind corporate and nontraditional investors, please see the methodology.

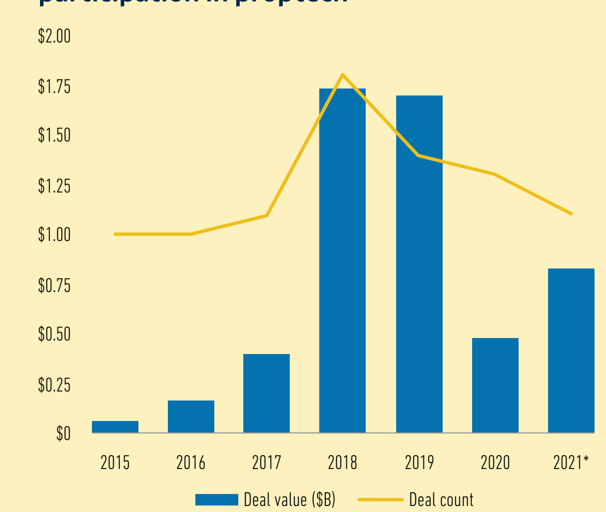
VC deal activity with corporate participation in proptech




VC deal activity with nontraditional investor participation in proptech




VC deal activity with real estate company participation in proptech




**Source:** PitchBook | **Geography:** Global *As of December 31, 2021

**35%** LATE-STAGE **VENTURE**

financing volume represented just over one-third of all proptech VC activity in 2021.

**$18.3 BILLION**

Thanks in large part to the SPAC boom, proptech companies notched a staggering sum in exit value in 2021.

**187** FIRST-TIME **VENTURE**

No fewer than 187 first-time venture financings of proptech startups have occurred in the past four years, for an aggregate of $1.6 billion in deal value.

**5 VS 9**

Exits have been primarily via acquisition for proptech companies given the nascence of the space, but 2021 saw five public listings, the most ever, versus nine completed strategic acquisitions over the same timeframe.

**120**

H1 2021 saw the highest volume of venture financing for proptech ever in the U.S.

**$185.1 MILLION**

The median late-stage VC pre-money valuation in proptech surged to a record high in 2021.

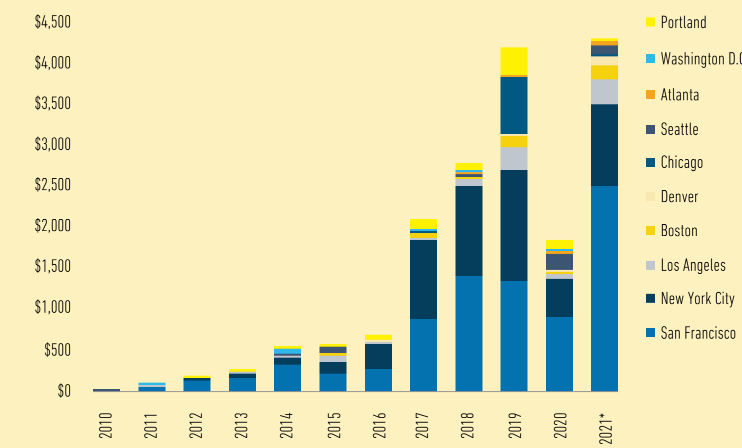
# INVESTMENT TRENDS

Digging deeper into venture financing by proptech subsegment, the maturation of companies is also evident in the remaining subsegments over the past few years. For example, the finance and investments subsegment has seen a gradual rise in late-stage financing volume throughout the second half of the 2010s, culminating in a record $730.9 million in late-stage investment in 2021. Asset utilization has seen a recent surge in late-stage funding after peak angel and seed activity in the late 2010s. All in all, multiple proptech subsegments are experiencing a clear rise in late-stage financing activity, rather than a few successful areas driving activity.

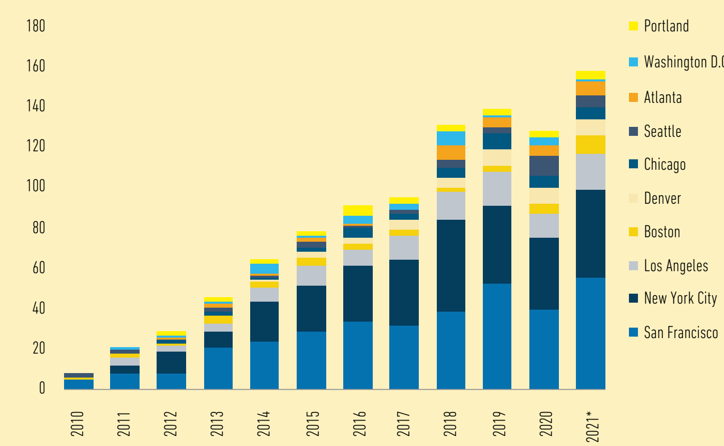
**Mid-2010s' early-stage financing volume is paying off, with multiple proptech subsegments seeing companies raise large late-stage rounds.**

Asset utilization is one theme which has seen continued growth, especially as COVID-19 underpinned the necessity to understand and react to occupancy data. Additionally, as construction costs remain exacerbated by supply chain challenges, property owners are looking to better monetize and improve overall utilization of all types of assets they employ. Increasing urban densification in key metro areas coupled with the uptick in hybrid work models has caused growing demand for flexible workspaces with parking or other nearby transportation options. Owners of assets, such as parking lots in decentralized office buildings, that were formerly unused when workers commuted to downtown areas can now benefit from revamping and investing more into their extant assets, especially in the realm of digital management of parking access. For retail space owners, using digital platforms to better monitor and manage holdings, while identifying potentially better tenants as some chains collapse, is another route forward to better asset utilization.

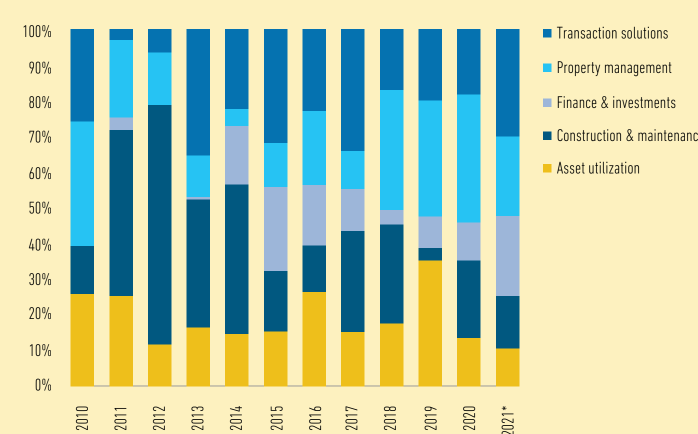
**VC deal value ($M) by top metro areas**



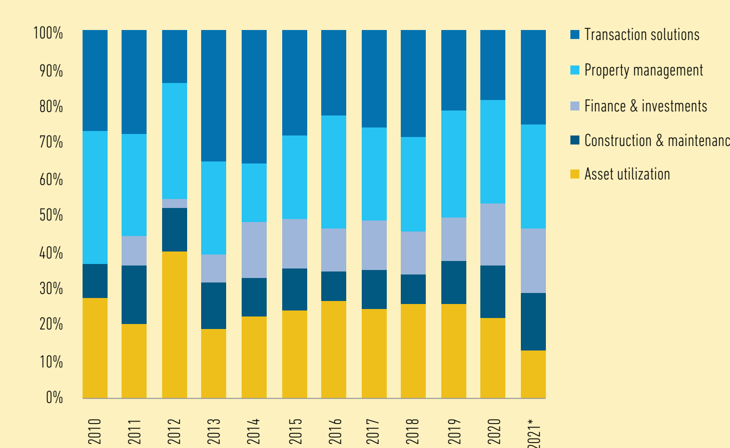

**VC deal count by top metro areas**




**VC deal value by proptech segment**




**VC deal count by proptech segment**



# INVESTMENT TRENDS

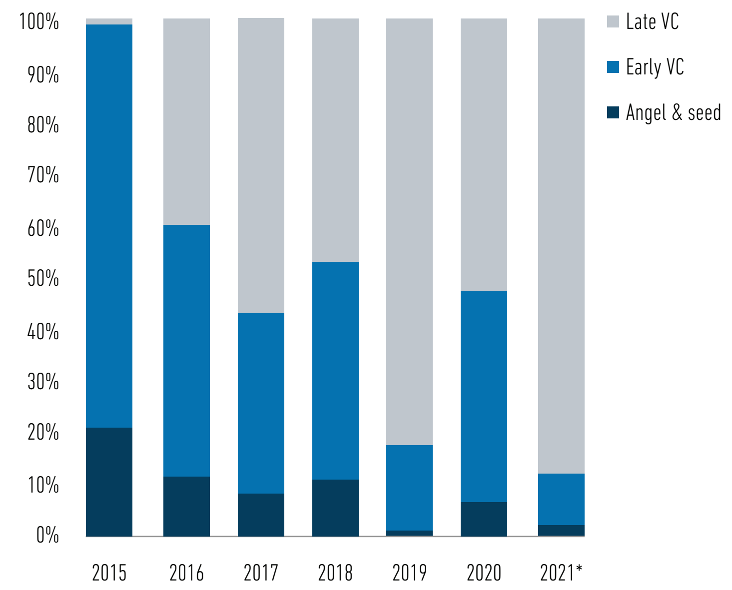
**Asset owners are increasingly looking for more creative ways to better utilize and monetize their existing properties.**

The finance and investments subsegment has seen growth for related reasons. In the investment realm, the 2010s were marked by two interrelated trends: the explosive surge in alternative investments' assets under management (AUM) and retail investors' growing demand for exposure to a broader array of investment opportunities. Real estate was a key area of attraction for retail investors that desired more risk-mitigated, inflation-resistant assets in their portfolios. As a result, multiple tech platforms launched that sought to offer investment opportunities in real estate assets, related credit, and more.

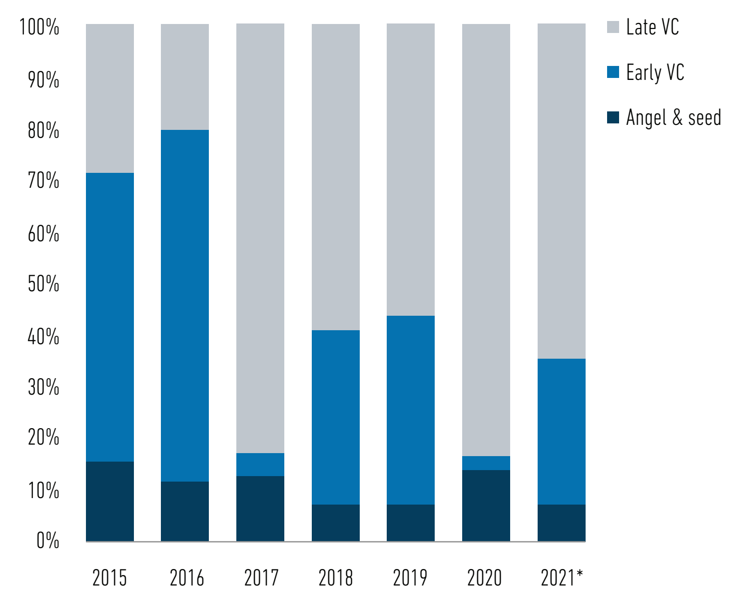
In addition, the usual digitization overhaul of clunky, antiquated tech in commercial lending and financing platforms overall offered a ripe prospect to multiple startups. These platforms have also layered in financial innovations, such as bundling and aggregating rental contracts to offer tenants the ability to leave before a contract expires by matching with new applicants. In addition, traditional financial firms engaged in real estate investment have benefited significantly from a slew of startups offering much-improved data and analytics tool suites that have helped improve returns via transparency and more efficient projections, among other insights.

**Source:** PitchBook | **Geography:** Global
*As of December 31, 2021

VC deal value by stage in asset utilization




VC deal count by stage in finance & investments

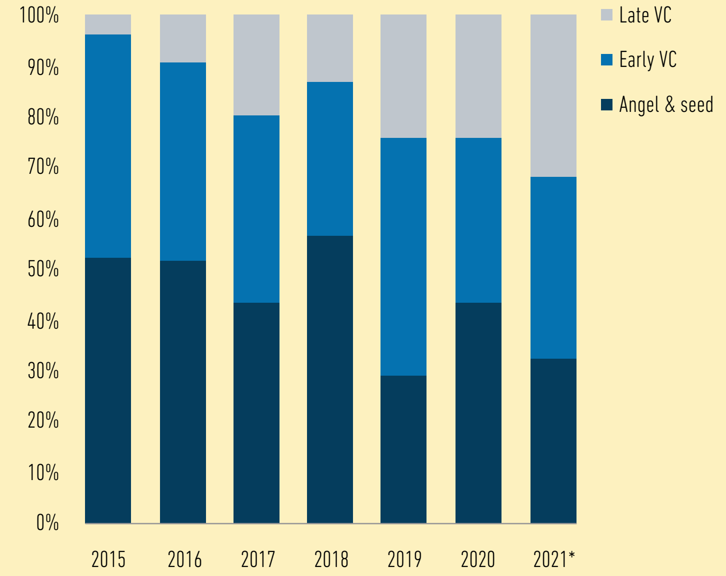



**We are seeing continued innovation in the transactions and deal access space across real estate, credit, and more.**

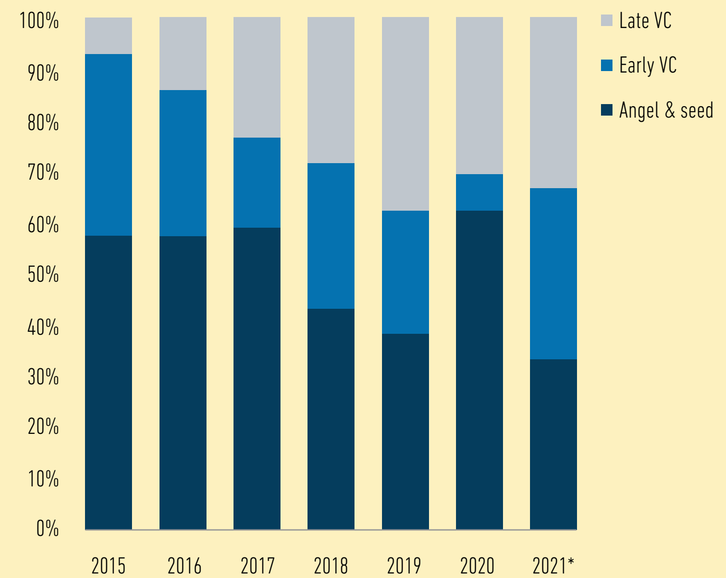
In a similar way, improved analytics and data aggregation tools have also become increasingly important in empowering sustainability efforts. In addition, builders are increasingly sourcing and using more sustainable materials while embracing leaner processes wherever possible and curbing emissions is also increasingly achievable via an internet of things (IoT) overlay of existing properties. Empowering tenants down to the level of an individual is also a burgeoning trend, wherein residential apartment dwellers can directly modify the specific energy consumption of their own appliances.

Overall, all proptech segments are experiencing more innovation. Consequently, the space is drawing interest even from other nontraditional players, such as PE growth funds or even buyout firms, that hope to back the most mature proptech players ripe for operational tune-ups. The space is still nascent enough that venture-backed exits have not yet surged markedly, but since 2018, there has been a fair clip of exits per year, albeit not for much in terms of aggregate exit value. But thanks to the historic rise in public equities and the SPAC phenomenon, 2021 saw a mammoth $18.3 billion in exit value achieved by just a handful of public listings. In addition, across the entire proptech space, a handful of blockbuster transactions enabled nearly $11 billion via both financial and strategic M&A across just 30 transactions (not all were venture-backed exits, however).

VC deal count by stage in asset utilization

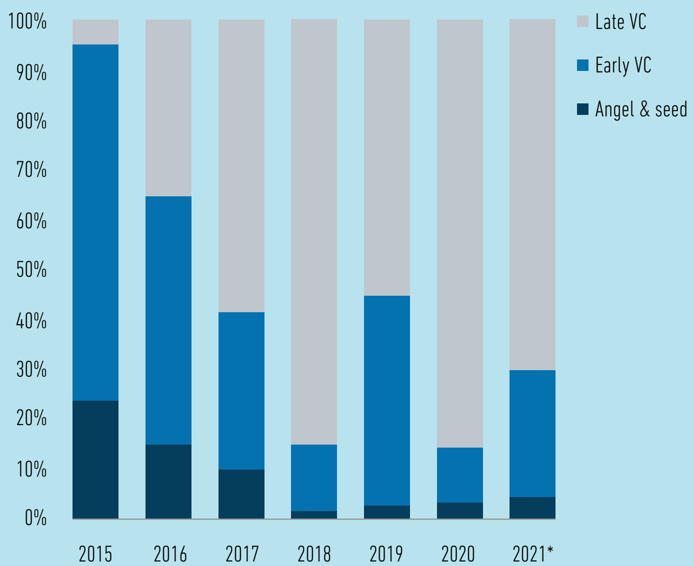



VC deal value by stage in finance & investments

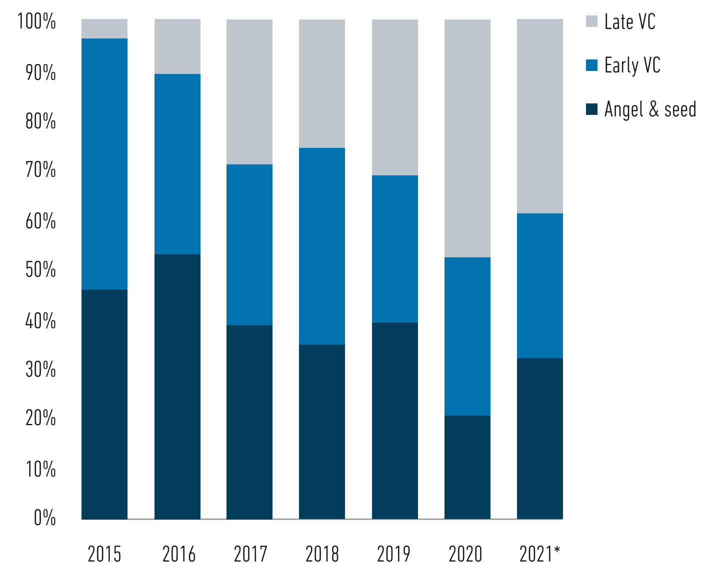


# INVESTMENT TRENDS

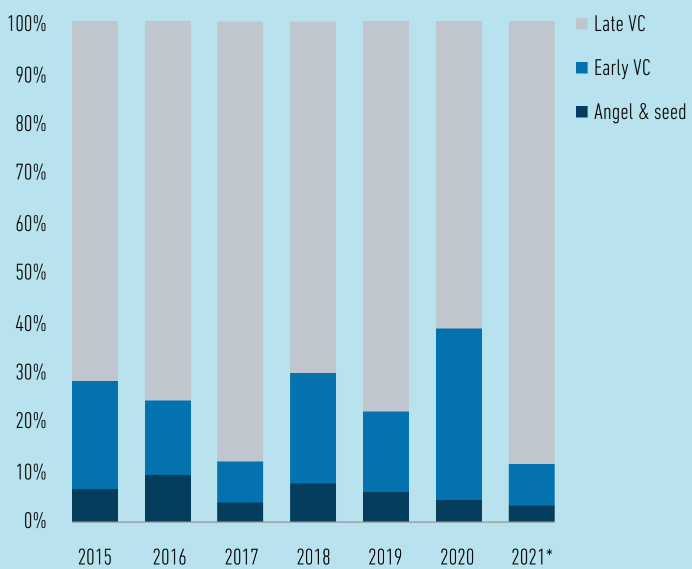
### VC deal value by stage in property management



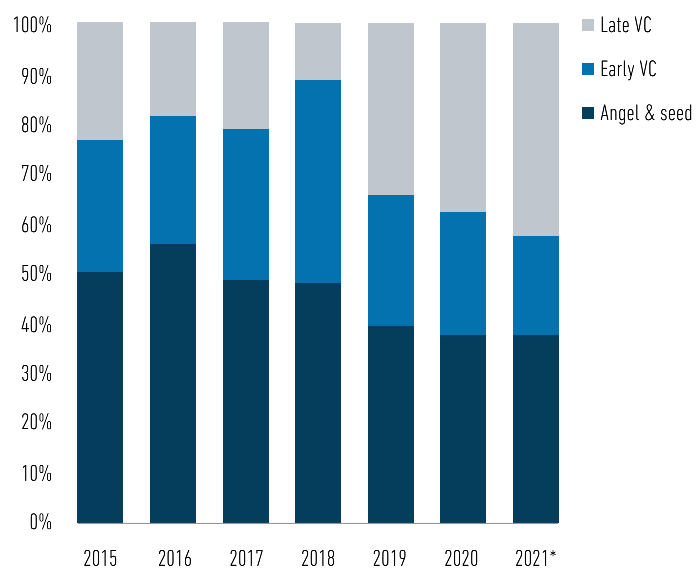

### VC deal count by stage in property management




### VC deal count by stage in transaction solutions



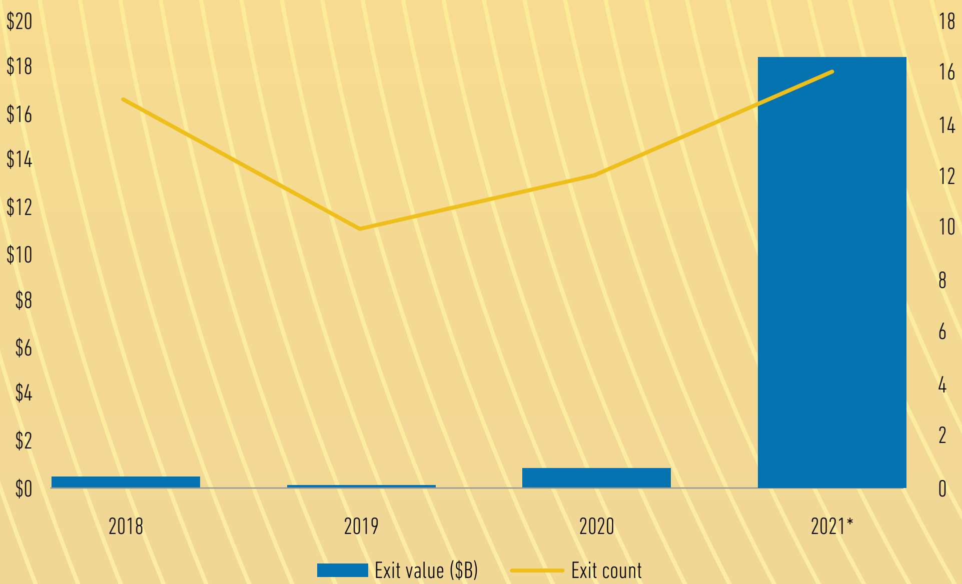

### VC deal value by stage in transaction solutions



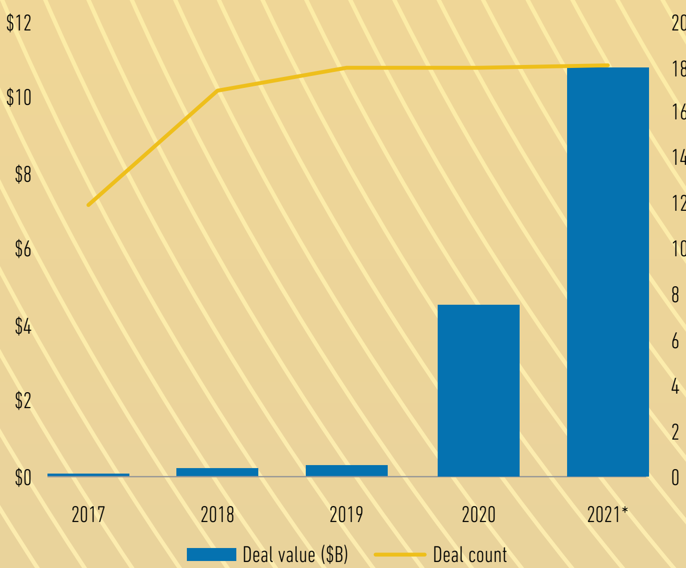

Source: PitchBook | **Geography:** Global
*As of December 31, 2021

# INVESTMENT TRENDS

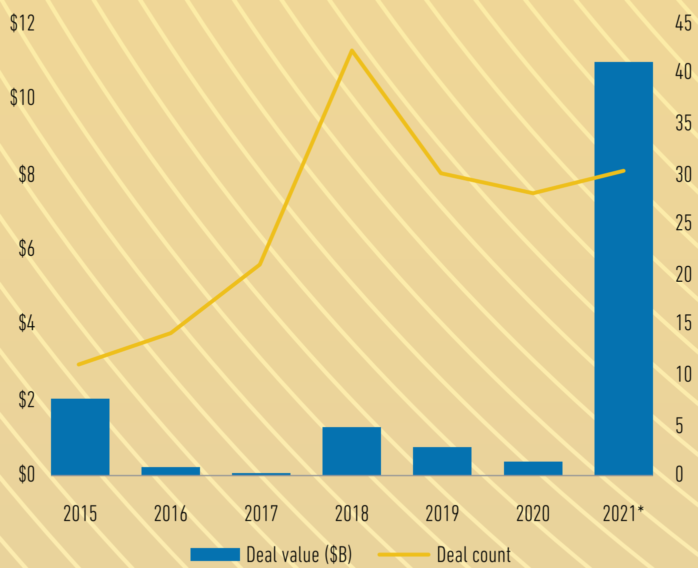
### VC exit activity in proptech

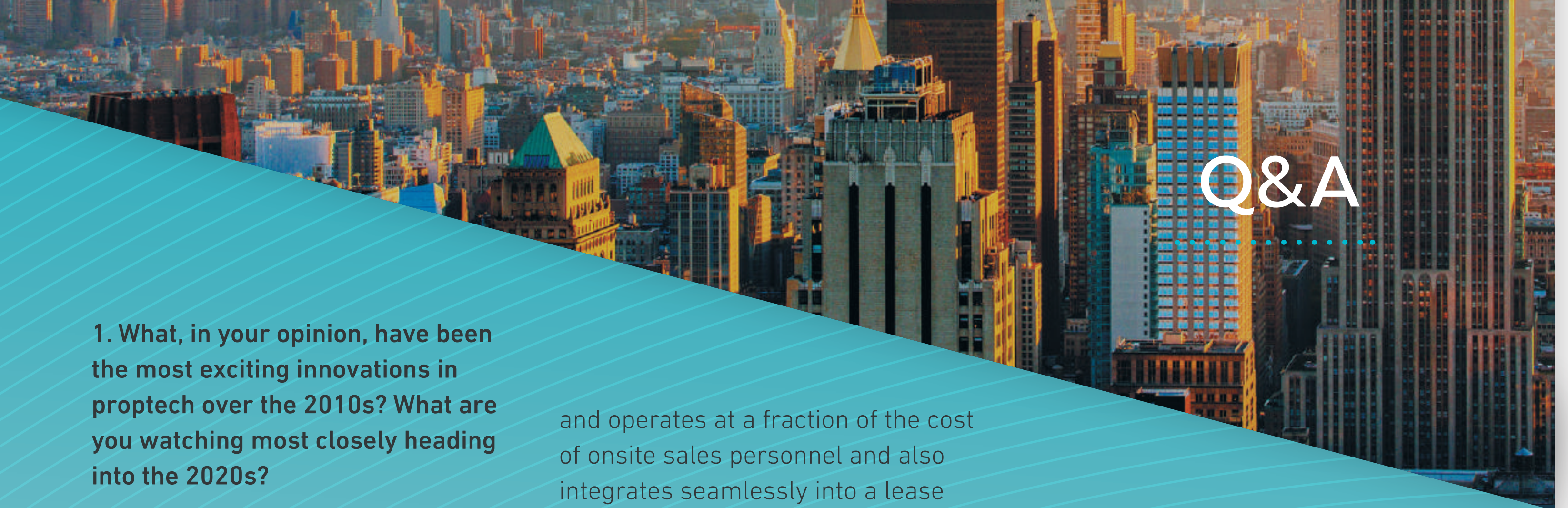



### PE deal activity in proptech




### M&A activity in proptech





# Q&A

**1. What, in your opinion, have been the most exciting innovations in proptech over the 2010s? What are you watching most closely heading into the 2020s?**

**Cook:** Over the past decade, perhaps the rise in financing innovation was one of the most exciting developments. It's been rewarding to collaborate with so many players in the industry that are looking to expand financing options on both sides of the buyer and seller equation when it comes to monetizing property. Looking ahead, the 2020s are likely to be characterized more by bridging the divide between virtual and physical universes even more seamlessly.

**Jawitz:** Obviously, over the past decade almost every aspect of real estate has been touched by the application of technology, whether in the form of hardware or software. I use the term "touched" very deliberately, as some impacts have been transformative while others have been marginal at best. From my seat at Common, what I have seen most closely and have had the privilege of being a part of, is the move beyond point solutions to the creation of vertically integrated technology platforms that can provide end-to-end solutions. Sure, it is great to use available technology to offer virtual tours to make the renter experience better while reducing costs as well. But integrating that ability with multi-channel marketing, an inside sales function that is centralized and operates at a fraction of the cost of onsite sales personnel and also integrates seamlessly into a lease execution function that can automate background and credit checks, offer renters insurance and security deposit alternatives and complete the lease execution within an hour—now that becomes exciting for all parties involved. We are in the early stages of this new world, but new software programs and APIs are being created almost daily by talented software engineers and the 2020s will definitely see the explosion of this approach to property management.

**Green:** Real estate has experienced innovation across almost all sectors and asset classes over the last decade, especially as investors have adjusted their portfolios to align with macro-economic shifts. This has been an exciting and quickly growing period for proptech, namely in property and building management, IoT/smart home integrations, market data tools, flexible office solutions and access control. In the coming years, many of these trends will continue, and we are closely watching the rise of innovation in last-mile logistics, construction technology and sustainability solutions that play a role in the decarbonization of real assets.

**Gregg:** Enabling greater access to real estate, which remains the world's largest asset class, has been an exciting development over the past decade. Multiple platforms now exist that offer a variety of ways for even retail investors to be able to gain financial exposure to the asset class, which often benefits portfolio performance and stability.

**Kaufman-Gafter:** Sustainability is going to be a defining theme across multiple sectors in the coming decade. How proptech plays into that trend even more fully than it did in the 2010s, with innovations in energy consumption monitoring and management, improvements in the types of datasets made accessible for companies and consumers to gain insights, greener construction methods and novel materials, will be something to watch closely.

**2. Investment in proptech is diversifying further across key proptech segments like real estate transactions, particularly with regard to easing the buying and selling of units/homes. From your perspective given your role, how do you think the interaction between lender and property owners could further develop through proptech developments?**

**Cook:** We've seen increasingly sophisticated innovation in tech that can enable better management of loan portfolios as well as improve access to tapping equity for homeowners in a variety of ways. As that interaction has improved, the key challenge that remains is actually more in ensuring that the top of that funnel – new property construction – can keep up with growing and shifting demand, especially during the hybrid era, where older millennials are now looking to establish families in more suburban, affordable areas.

**Gregg:** Competition for real estate assets has only intensified given the unique macro conditions of the past decade. PE firms are acquiring housing, consumers are looking to move to more affordable areas as jobs go remote, and with inflation rising alongside wages for tech workers in particular, competition looks set to only get fiercer. So from a lending perspective, those firms that can keep developing holistic solutions to ease every step of the process that tie in well together will likely win out.

**Kaufman-Gafter:** We are likely to see more bespoke and complex avenues being invented so property owners can more readily tap their equity and use it in more of an income-generating model, as opposed to the "house-rich, cash-poor" phenomenon.

**Green:** Supply/demand fundamentals continue to drive the need for development in both the commercial and residential sectors, inspiring entrepreneurs to deliver innovative solutions that enhance connectivity between lenders and property owners. We've seen continued growth across construction lending platforms which leverage technology to empower the broader financing ecosystem. Innovation across residential real estate and financing programs has helped create a world that provides more people access to homebuying solutions, as consumers have faced rising home prices and changes in living preferences.

**3. What are the key risks in real estate and related lending that proptech solutions help solve?**

**Cook:** Proptech has helped dampen risks in real estate transactions by expediting processes and enabling faster fulfillment for buyers and sellers, which has always been a challenge. In addition, improvement in dataset aggregation and analytics has improved pricing, though you have to have a mix of automation and human judgment, as was evidenced by the Zillow example last year.

**Green:** Proptech has helped create a connected ecosystem between investors, lenders and property managers, contributing to more automated transactions processes and improving transparency and visibility underpinning impactful investment decisions. Integrating innovation across real estate has also provided investors and related parties with access to data to proactively manage their real estate portfolios alongside shifts in the macro environment. Digitization in construction and development has mitigated many of the effects felt from inflationary pressures and labor shortages.

**Gregg:** By streamlining processes such as underwriting, proptech lending solutions allow for more time and resources to be spent on assessing the true risks of a transaction. In addition, more sophisticated tools can also uncover more data and insights that then can better price transactions as well.

**Kaufman-Gafter:** We now have the tech to manage increasingly large portfolios of real estate assets, which have emerged in the wake of institutional capital flooding into the space over the past decade. So now, very capable administration systems software can help mitigate formerly manual processes, thereby reducing key-man risk. Property management solutions will need to become increasingly powerful and diverse too given the labor shortages looming.

We will likely see even more innovation in the types of data that we'll be able to collect as the IoT continues to grow, which in turn should hopefully help offer even more insights presuming sufficient analytics tools exist. That could help minimize all types of risk across the board, from transactional to person to climate.

**4. In the context of the ongoing pandemic, which macro trends are you watching closely that could affect real estate overall? How about proptech specifically?**

**Cook:** Any rise in interest rates will be reflected in mortgages likely declining somewhat in volume while refinancings also generally tend to follow suit. It'll be interesting to see how in the current environment, whether that pace will be shifted due to unique economic conditions. For proptech in particular, given pressures on consumer incomes, there may well be a slowdown in home improvement projects.

# Q&A

**Jawitz:** Hopefully, we are in the closing stages of the pandemic. However, the world is not going back to the way it was in terms of where and how we live and work, notwithstanding that several large and prominent firms have announced that their employees need to come back to the office (at least) five days a week. What that means in terms of real estate is that offices need to be reimagined, e.g. smaller and more flexible spaces, and that employees will have greater choices of where to live, e.g. suburbs v. city centers and secondary metropolitan areas rather than the traditional options of NYC, DC, Chicago, San Fran and Los Angeles. The impact of these trends is hard to overestimate which is not the same as saying that markets can't get ahead of things or that capital is always allocated in the best and most productive manner. But technologies that improve business communications or make real estate markets in emerging growth markets more transparent and efficient are bound to benefit in the years to come.

**Green:** There are a number of macro trends today that are creating both challenges and opportunities across real estate. Namely, the rapid growth of e-commerce has put ongoing pressure on logistics and last-mile real estate, especially as participants search for suitable technology to manage shipping volumes and supply chain costs. Proptech companies improving touchless access and flexible workplace solutions have been further accelerated by the COVID pandemic, in addition to technology which allows for remote project management (especially in construction and development). Real estate technology will continue to evolve with high conviction investment themes across the industry.

**Gregg:** Inflation could begin to put pressure on household budgets, which could be a challenge for many renters' margins and also rates of home buying. In addition, for new construction, there still appears to be significant challenges and volatility in supply chain ripple effects worldwide, so the cost of inputs will be something to monitor. Re proptech specifically, solutions for lowering costs of construction will be of great interest.

**Kaufman-Gafter:** To expand on supply chains that Gregg brought up, given the ongoing effects of the COVID-19 pandemic, they are likely to persist into 2023, even as some countries drop all COVID-related restrictions. On that front, some changes in proptech solutions, such as monitoring of open desk space, allocation of spaces, contactless technology and more will all likely last for the foreseeable future given the impact the pandemic made on those fronts. In addition, it is possible that the forefront of air quality monitoring and cleaning systems will get an overhaul as companies rethink ventilation.

**5. What about regulatory developments that you are watching closely that could affect the overall real estate and by association proptech sectors?**

**Cook:** It remains to be seen what the impending Build Back Better legislation really has in scope, but it could start off the gradual, long-term process of significant government funding having ripple effects for demand in infrastructure upgrades that will require a host of proptech solutions, from project and site management software to analytics to sustainability assessments.

**Kaufman-Gafter:** At this point, with the level of innovation that proptech has currently, it's time to ensure that consideration for global standards across multiple aspects of real estate and proptech usage occurs, for example, updated codes for building standards that are better informed by new types of datasets being made available and resultant analytics.

**Gregg:** To take a different tack, the evolution of zoning regulations for the most expensive urban areas to live could begin to improve housing supply, which in turn could stimulate demand for construction of new multifamily housing.

**Green:** Regulatory requirements around carbon targets and climate change have heightened the focus on sustainable technology in real assets. Real estate owners and operators are concentrated on finding solutions to help them trend towards net-zero carbon emissions; GreenPoint is actively seeking such solutions and connecting them with our expansive real assets network. Regulatory requirements in the last-mile space are top of mind as we see policies that vary by city due to differing infrastructure and market demands.

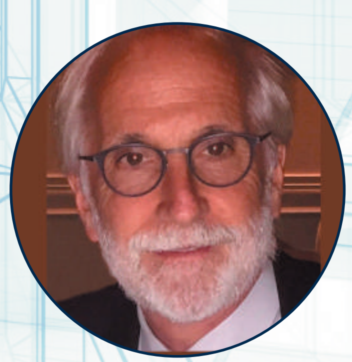
**Jawitz:** Here again, let me draw on my experiences over the past seven years at Common. We began our mission focused on affordability and how innovation in physical design and technology could help to address the housing crises in major urban areas around the US. Immediately, we were confronted with regulatory hurdles in many cities making it virtually impossible for unrelated individuals to share apartments. It took time and effort but cities around the country began to embrace "coliving" as one of many tools to be used to help make apartments more "affordable" (lower case 'a'). This was followed by increased interest among developers and investors--including large institutional investors--in innovative design and projects started to get built in many cities both in the US and abroad. Covid brought this and other development to a halt in 2020, but by 2021 building was back and the number of coliving projects under construction has never been greater. What does this have to do with proptech? You cannot own, operate or manage this type of real estate without software engineers, proprietary software technology, and the ability to integrate a dozen or more out of the box software systems. Which is where I started and why this continues to be exciting and challenging.

**Stuart Cook**
*Chief Product Officer, Valley Bank*

**Ori Kaufman-Gafter**
*Head of International & Tech, Bank Leumi USA*

**Chris Gregg**
*Head of Real Estate, Bank Leumi USA*

**Chris Green**
*Founder & CEO, Greenpoint Partners*



**Simon B. Jawitz**
*Chief Investment Officer, Common Living*

# PROPTECH MARKET MAP

## PROPERTY MANAGEMENT

**Residential tenant management**
home365 Property Management, Pronto Housing, entrata, HAPPYco, SmartRent

**Security deposit alternatives**
Rhino, Obligo, LeaseLock

**Building operations, analytics, operations**
Zerv, Logical Buildings, fetch, envizi an IBM Company

**Commercial tenant management**
Building Engines, mri Real Estate Software, Worksmith, VTS, sms assist

## CONSTRUCTION, MAINTENANCE & PROJECT MANAGEMENT

**Project management**
Versatile, Procore, SiteAware

**Construction robots**
Built Robotics, Canvas, Dusty Robotics, Mighty Buildings

**Modular construction**
blu Homes, Boxabl, Factory_OS, Veev

**Architecture, design & planning**
IrisVR, houzz, OpenSpace, Replica

## ASSET UTILIZATION

**Co-working & flexible workspace**
Bond Collective, Expansive Workspace, The Wing, ility, deskpass

**Residential**
Culdesac, Tripalink, Vacatia

**Co-living & Homesharing**
Common, Tripalink, kasa

**Retail**
Cloud Kitchens, Workplace iQ, b8ta

**Event Space**
Lyric, peerspace, convene

**Industrial/Logistics**
Aura, metropolis, Infinium Logistics, RealMassive, LoopNet

## FINANCE & INVESTMENTS

**Investment platforms**
Cadre, Fundrise, L3 Capital, PeerStreet, roofstock, Sharestates

**Commercial lending & financing**
Matterport, Skyline, Plum, dv01, built

**Mortgage tech**
snapdocs, Valon Mortgage, Staircase, handle, Reggora, Tomo

**Insurance**
Archipelago, TensorFlight, obie, Policygenius, Steadily

## TRANSACTION SOLUTIONS

**Marketing**
buildout, find-space An MRI Software Company, RealMassive, Funnel, Bankrate

**Homebuying/Selling**
Orchard, knock, Divvy, ribbon, Sundae

**Agent tech & tools**
RealConnex, bowery, Propertymate, side

**CRE marketplaces**
CREXi, Ten-X Commercial, BuildingBits

**Data & analytics**
cherre, CoreLogic, Real Capital Analytics, Juniper Square

The companies in this market map are intended to be representative of each given segment and do not constitute an exhaustive list given the volume of companies present within each space overall

# CONCLUSION

Over the 2020s, the future of proptech will likely unify around two key themes of sustainability and security. The first iteration of proptech, dubbed Proptech 1.0, was the aggregation of information on platforms such as Zillow and Redfin, alongside multiple competing websites that listed properties and relevant information. Proptech 2.0 saw a proliferation of startups across multiple categories, from flexible co-living spaces to prefabricated home manufacturing to commercial lending launches, and raised increasingly large sums throughout the 2010s. Proptech 3.0 is here and now, defined by maturation in key proptech subsegments to the extent liquidity for venture backers is finally occurring at a more substantive rate.

Proptech 4.0 will not only build on these successive foundation layers but will see much more emphasis from both investors and startups across all proptech subsegments on curbing emissions and conserving materials. Property owners will be required to produce sustainability-related data for investors and asset managers, further encouraging the development of even more powerful data platforms. Construction firms will source recyclable materials and sink carbon into substances such as concrete to obtain credits. In short, across multiple venues, going green will occur in many different iterations, producing new types of products and investment opportunities.

Proptech security solutions will also be increasingly important in an era of climate change from a financial perspective. Proptech companies will have to build the tools for institutions and asset allocators to mitigate climate-change-related risk, while builders will also have to invest more heavily in resilient buildings in many hotbeds of development, especially the coasts of developed nations. And as the IoT proliferates to create more smart building features, the security of tenant data and the ability to prevent critical functions from being hacked remotely will only become more important. Residents' information will need to be safeguarded more closely as increasing amounts of personal data are tracked and logged in online systems, while remote monitoring security systems for homeowners will require a baseline level of security protocols.

All these needed innovations will ensure that Proptech 4.0 will see an even greater surge in investment activity, especially in venture funding. The 2020s are set to be even more active than the past decade.

Proptech has helped create a connected ecosystem between investors, lenders and property managers, contributing to more automated transactions processes and improving transparency and visibility underpinning impactful investment decisions.

# METHODOLOGY

Proptech was defined using a custom mix of keywords and industry verticals within the PitchBook Platform to arrive at five distinct segments: construction, maintenance & renovation, asset utilization, property management, finance & investments and transaction solutions. Subsegments for each included: construction & maintenance (project management, architecture, design and planning, modular construction, and construction robotics); asset utilization (co-working and flexible workspace, residential, co-living, homesharing, retail, events, and industrial); property management (residential tenant management, commercial tenant management, building operations and analytics, and security deposit alternatives); finance and investments (investment platforms, commercial lending and financing, mortgage tech and insurance); and transaction solutions (home buying or selling, agent tech, marketing, data and analytics, and commercial real estate marketplaces). All five of the principal segments were then pooled to arrive at the entire population of companies that were deemed proptech, with each segment being deduped so that there was no double counting for any overall datasets. Each distinct segment was deduped from the other in descending order from largest to smallest, for its individual breakout datasets.

PitchBook's standard venture, M&A, and PE methodologies otherwise applied to all transaction types and datasets. The market map had additional segmentation below the five main proptech segments, which were not broken out in terms of datasets, but were utilized to identify relevant, prominent companies within each proptech subsegment to represent a given subsegment, such as mortgage tech, in the market map. Only completed transactions were included. As proptech within this report has a custom definition based on a curated population of companies, these figures are more accurate and differ from other estimates of proptech financing activity. Corporates were defined as private or public companies, not institutional venture firms. Real estate companies were defined likewise, with their primary industry having to be tagged as real estate within PitchBook (based on a group of related industry codes). Other nontraditional investor types included hedge funds, sovereign wealth funds and asset managers.

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