Venture capital funding points to the hottest concepts in built-world tech

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Foreword

Technology has impacted virtually every industry on the planet in significant ways. Commercial real estate has had a longstanding reputation as a technology laggard, and its role providing the infrastructure for industry and commerce has placed it in a position to follow industry rather than lead it.

But today, the real estate industry has the potential to benefit greatly from those technologies. Over the past 10 years, the rise of the entrepreneurial class within real estate has created the global real estate tech movement — the so-called "built-world tech" marketplace.

Tech innovation in this sector has been a growing trend that is expected to accelerate in the years ahead. Since 2015, a total of 7,117 private real estate tech companies have received US$155b in funding globally. Of this, US$75.2b has been invested specifically in built-world tech. Today's real estate tech companies are creating new levels of transparencies and efficiencies, and, in many cases, they're creating entirely new business models.

The result of this extraordinary influx of venture capital (VC) into real estate has challenged the conventional wisdom of real estate practitioners, simultaneously bringing innovation to early adopters, and in the best cases, positively impacting their bottom line.

Surprisingly, while a lot has been written about the surge of VC in built-world tech, comparatively less has been said on its direction.

The term built-world tech itself is loose and can stand for many technological applications. As used in this report, built-world tech refers to the development or leveraging of technology to facilitate the purchase, management, maintenance or investment into either residential or commercial real estate.

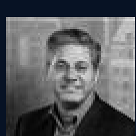
Much like the technologies themselves, investment trends are increasingly moving away from conventional concepts to those that are proving to have significant impact on the marketplace. Such patterns of activity present the owner or operator community with a game plan for future technology strategies.

Defining those directions is the purpose of this two-pronged initiative by EY and CRETech. In this first report, we spotlight emerging trends in VC movement in built-world tech, and what it means for owners and operators. In the spring of 2020, we will present the results of a major, global survey of VC participants and corporate decision-makers on the market's outlook based on future need and investment.

The ultimate objective is to help simplify the landscape of companies, identify new opportunities, understand the key trends and ultimately utilize technology to achieve their particular business objectives.

For real estate companies to compete in a new era where power has shifted to tenants and residents, embracing technology must be the cornerstone of their business strategy.

These reports seek to provide guidance for your creation of a plan of action, and a strategy for more comprehensive tech investment and adoption.



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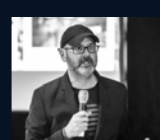
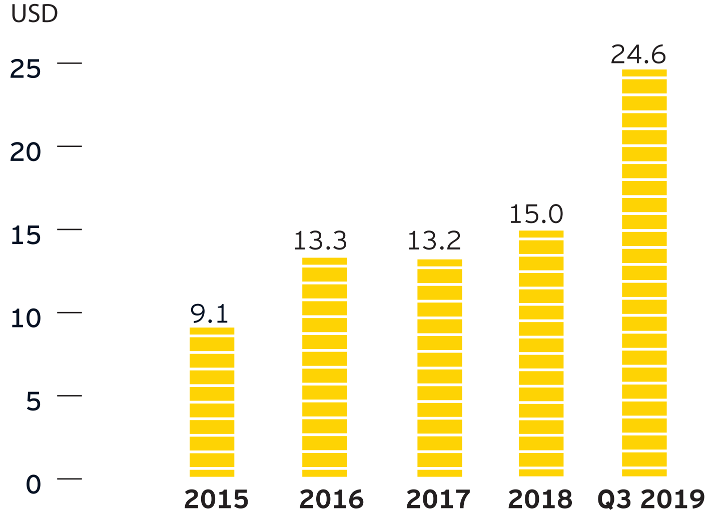


Michael Beckerman
CEO
CRETech

The evolution of built-world tech

VC in built-world tech is exploding. We are starting to see real estate owners and operators take action as they gain greater understanding of current and new technologies, and the benefits they can provide.

Fig 1. VC investments in built-world tech



Source: CRETech

Since 2015, VC firms have invested US$75.2b[1] into built-world tech, ramping up most recently, with US$24.6b investment upto Q3 2019 alone. This growth in recent investment highlights the fast-growing interest in the emerging built-world tech sector and the need for real estate owners to understand how the market is developing and providing opportunities to transform the sector.

But while investment is growing, it is also a nuanced picture in which some of the major companies have captured a disproportionate amount of capital.

This is a result of creating either a new business model or a value proposition that has scale across the sector. From our research, we see that the top 5 categories we've defined account for 93% of the cumulative funding since 2015, while other start-ups represent just 7%.

1. Investment volumes include M&A activity, and funding for companies that have gone public.

As the built-world tech market gained the attention of the VC community, there was initial concern that start-ups would redefine the core of real estate operations (much like new business models reinvented the hotel and taxi sectors).

But built-world tech has evolved with start-ups focused on solutions that can solve real estate owners' and operators' challenges (complementing rather than redefining their businesses). They are increasingly focused on cost-saving and profitability-enhancing solutions — in other words, enhancing return on investment (ROI). But the transition has been slow.

Moreover, while future growth projections in this area can be misleading, we can say that 2020 will be the year to watch for breakout companies to emerge, including VCs that have played in the market previously and are now eyeing new investment opportunities. As a result, we can expect funding rounds to increase along with deal sizes.

Built-world tech has evolved with start-ups focused on solutions that can solve real estate owners' and operators' challenges

VC activity: market maturity and the verticals to watch

This report segments the eight major disciplines, or verticals, in the built-world tech space and presents them in descending order of VC value:

1. Real estate and finance
2. Flexible space
3. Management
4. Internet of things (IoT) and smart buildings
5. Construction
6. Data and analytics
7. Visualization
8. Tenant experience

(Details on each discipline can be found in the "Verticals by funding" section of this report.)

Fig 2. Built-world tech VC investment by vertical

Deal investment (US$b), 2015-Q3 2019

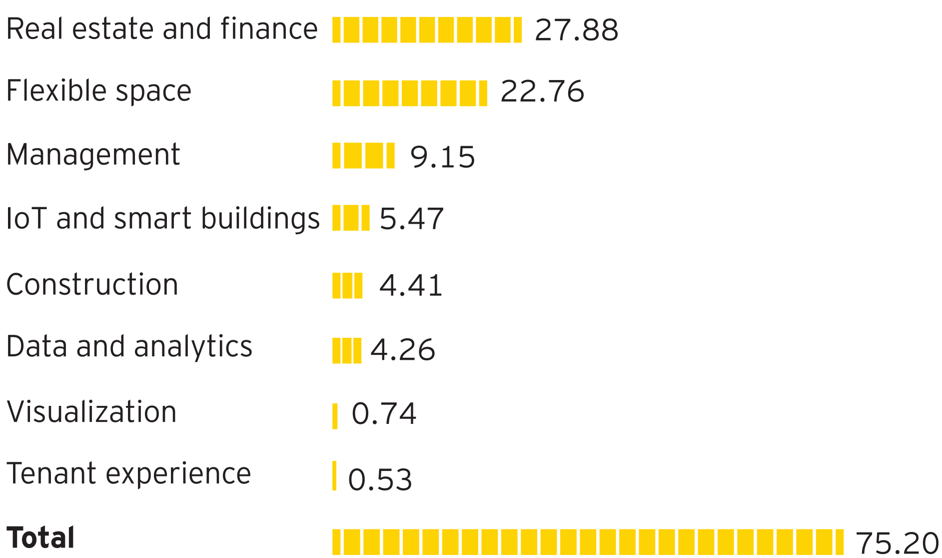
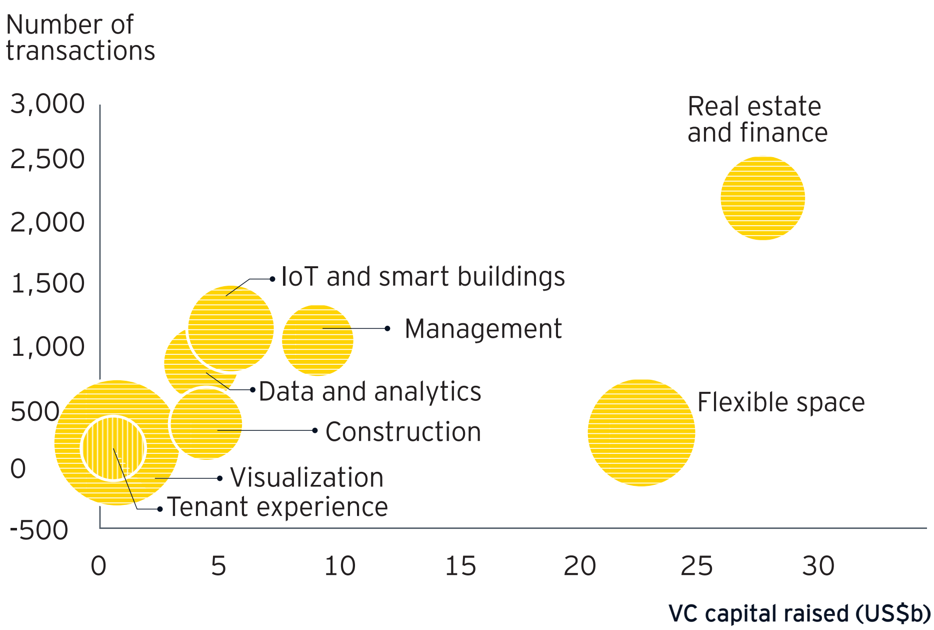


Fig 3. Transaction activity, 2015-Q3 2019



Note: Size of bubble represents median company valuation – Flexible space (US$35m), finance (US$23)m

Each of these eight verticals tells an intriguing story of VC investment, either in the long-standing interest they garner or their up-and-coming status in the VC world.

In this report, we have captured the number of transactions as represented by funding rounds. The availability of capital and interest in this sector would suggest that those willing to invest in a technology provide a reasonable proxy of the most commercially viable technologies.

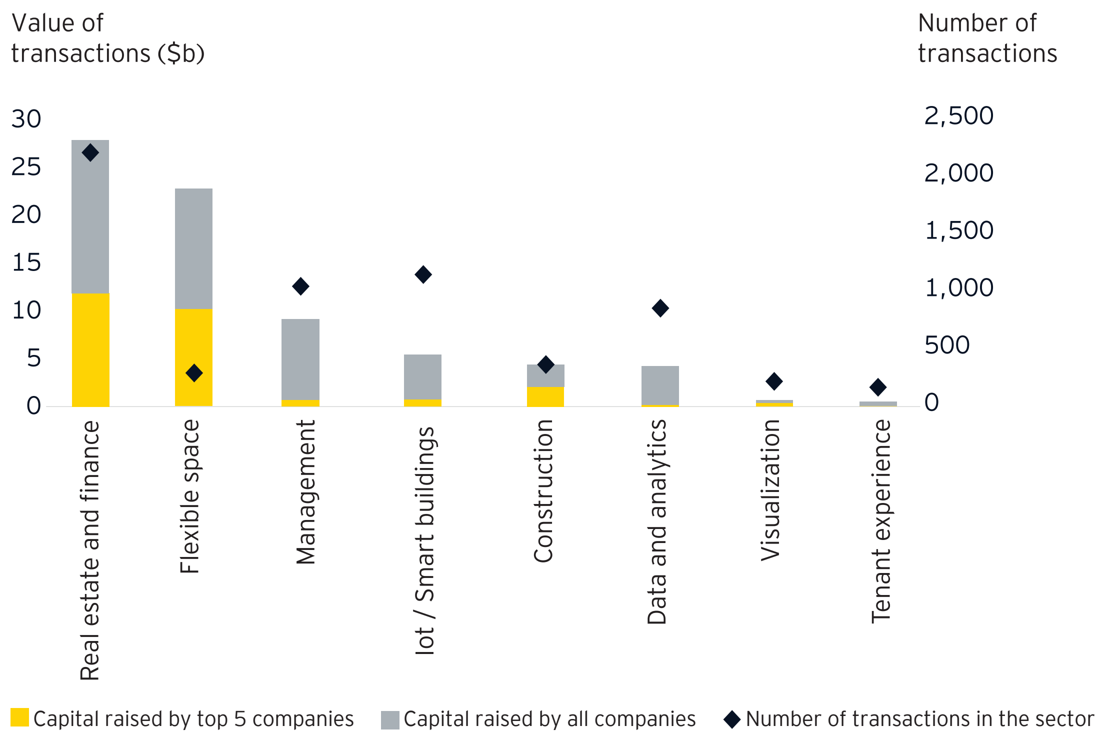
The leaders

Among the eight primary categories, real estate and finance, and flexible space lead the way in funding, with more than US$20b invested in each area (see figure 2). However, these two areas are also maturing in very different ways. As figure 3 shows, while overall investment volumes are similar, real estate and finance has seen this capital invested across more than seven times as many transactions, and median company valuations are, unsurprisingly, notably lower.

At first glance, real estate and finance appears unconsolidated, with several relatively small transactions funding a wide variety of solutions. But that does not imply that leaders and mature solutions do not exist.

The availability of capital and interest in this sector would suggest that those willing to invest in a technology provide a reasonable proxy of the most commercially viable technologies.

Fig 4. VC capital flows, 2015-Q3 2019

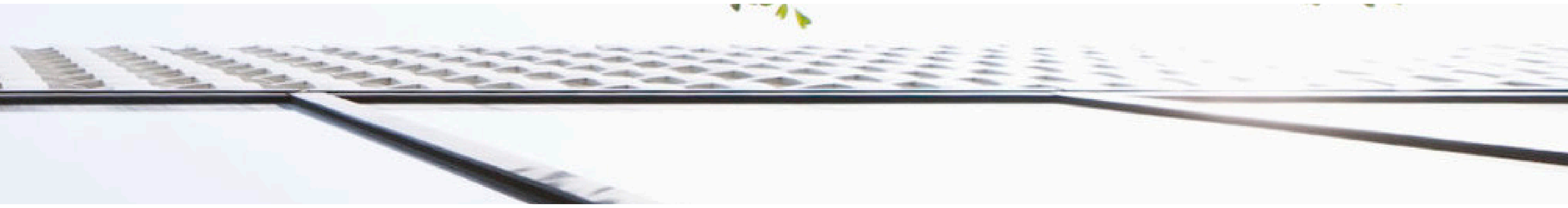


As figure 4 highlights, 43% of all capital raised in this space has accrued to the top five companies, much as in flexible space, with four of these organizations receiving over US$1b of capital each. Mature solutions do exist in the real estate and finance segment, but it is still a diverse area with an exceptionally wide range of potential challenges that VCs can invest in across the brokerage, marketplaces, investment solutions and blockchain areas.

One to watch

Although investment has been limited in visualization, it is a vertical to watch. While it has received relatively little capital to date, just US$0.7b across 222 transactions, the median valuation in this space is very high. Investors may be starting to back opportunities only now, but they are already marking out leaders with 43% of the US$700m invested going to just five firms.

Time will tell how successful this seemingly aggressive approach will be (and in the tech space, it has often proven to be highly effective). But in a volatile funding environment, companies are receiving strong backing from the VC community. This has the potential to enhance their ability to invest heavily in their products and, in doing so, differentiate themselves from competitors.



Slow to evolve

Two other interesting areas are construction and management. 47% percent of all capital invested in construction technology (contech) has accrued to five firms, but overall volumes are not so impressive. This is surprising given the wide range of challenges contech can address. Construction is a margin business and any technology that can reduce cost by a percent or two would be a huge differentiator. Yet many construction companies are deferring any form of investment until ROI can become more certain. We expect this to change as capital migrates increasingly to this space.

The management category is experiencing almost the opposite dynamic. It is the third-most active vertical by investment volume after real estate, and finance and flexible space, but is quite fragmented. Just 8% of capital has been received by the 5 best-funded companies.

This too is surprising given the nature of many management tools and the fact that a relatively small number of products can often dominate a market. But, again, this is likely a function of the relatively young built-world tech space generally. It is expected that, going forward, leaders will more clearly differentiate themselves from the pack and, in doing so, accrue a much higher proportion of VC capital as the sector matures.

The rise of AI and automation

There is one technology advancement that is underpinning a number of major verticals — in essence, supercharging them. Artificial intelligence (AI) and automation, designed for repetitive and predictable tasks, such as data entry, security scanning or site selection, have been the recipient of increasing interest. Since Q4 2018, AI and its subset, machine learning, have gained significant investment, increasing in deal volume by an average of 13.6% and in dollar volume by an average of 216.6%. (For more on AI, see Data and analytics, Section 6; and Visualization, Section 7.)

AI built into management and operational systems can run formerly manual processes and protocols. AI built into a heating, ventilation and air conditioning (HVAC) system, for instance, can monitor potential cost savings. This is where the market is heading.

With the rise of AI and automation, owners and operators need to start thinking like data companies.

Cleantech overshadows built-world tech in real estate VC race

While some US$75b in VC funds have gone into built-world tech, US$80b has been applied to clean technology (cleantech): technology that seeks to reduce negative environmental impact through significant energy efficiency improvements, the sustainable use of resources or environmental protection activities.

The discipline touches multiple categories in the technology ecosystem and, as a result, the cleantech recipients of VC funding cover a wide range of disciplines. Makers of hardware and equipment lead the way at US$64b. Technology, media and communications companies rank second with US$12b. Finally, other disciplines trail at US$4b.

So, within this category of VC, which companies are the best-funded? The following list breaks it down:

Company	Specialty	Total VC raise
Isagen	Power generation	US$1.99b
BrightSource	Solar technologies	US$669.52m
SunEdison	Renewable energy	US$300m
Noon	Home lighting provider	US$58m

The leading factors fueling the push toward clean and green are corporate social responsibility, cost and customer demand. In the built environment, properties are being upgraded and updated with energy-efficient HVAC systems, LED lighting, “energy star” appliances and energy-efficient IoT devices (See vertical 4 in the “Verticals by funding” section of this report).

Verticals by funding

Here, the eight vertical markets are listed in descending order of their funding dollars to date, along with the number of deals represented in that volume. This section also presents a deeper dive into the funding dynamics behind those numbers in each vertical and, where possible, the outlook for that sector.

Note: All data reflects the period from 2015 to the second quarter of 2019.

1 Real estate and finance

Evolving from concept to market share

VC activity to date — deal value: US$27.88b; deal volume: 2,216

Real estate and finance defined: This encompasses innovation or technology impacting real estate capital markets, including online marketplaces, investment and crowdfunding platforms, residential internet buying (ibuying), tech-enabled brokerages, mortgage, title and insurance technology, and blockchain applications.

It is not surprising this is the largest category in our groupings. It was one of the first to capture the interest of VC firms and provide a clear value proposition. The introduction of the sharing economy to millions of second homes, and the size of the residential housing market and associated aggregate transaction costs provide for a large-scale customer base. The next evolution of real estate and finance start-ups will have less to do with innovation and more with market sizing. Innovative growth will begin to slow as these companies compete for that market share and audience, and customer or client acquisition. That switch in focus, from innovation to market share, implies a shift toward providing what owners and operators want and need: solutions that provide a return on their investment.

With the over-commoditization of technology and access to an abundance of some technologies, companies that compete in this space will do so on the basis of growth (both financial and client or customer volume).

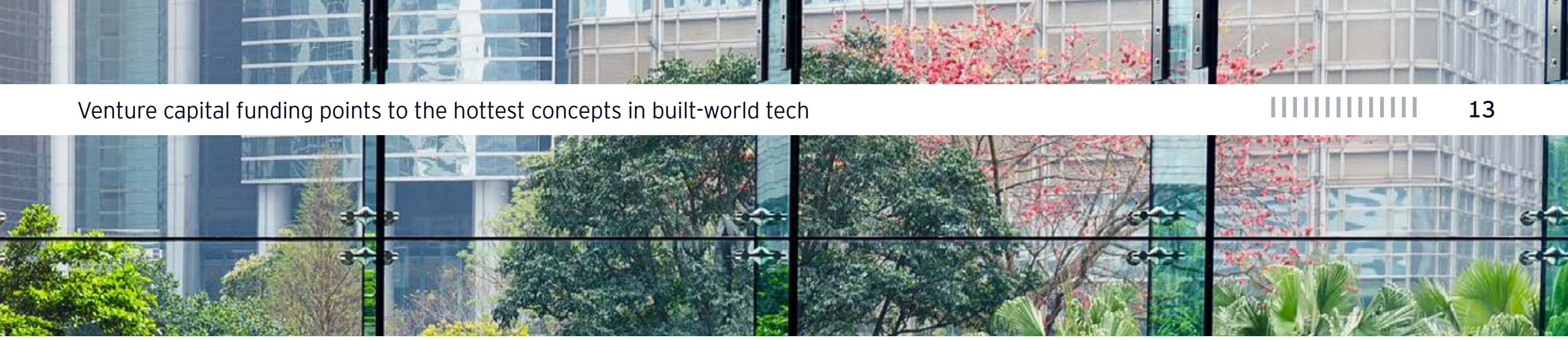
Real estate and finance has been the unexpected winner of the industry. There is great opportunity here — as the VC numbers substantiate — but it generally does not get a lot of attention, especially, from the media. Nevertheless, it has seen many concepts that have grown in popularity, such as the e-living trend.

VC investments have traditionally been distributed evenly throughout the sector. However, since 2017, mega-rounds of US$100m and more have become more prevalent.

A selection of leading companies in the real estate and finance space are:

Company	Specialty	Total VC raised
Airbnb	Online residential marketplace	US$1b+
Opendoor	Online home sales	US$1b+
Compass	Online home sales and rentals	US$1b+
Figure	Online mortgage provider	US$1b+
Lemonade	Online renter, owner insurance	US$250m–US$500m

Target customers for technology-driving real estate and finance include institutional and private investors, third-party service providers and owners or operators.



2 Flexible space

Getting more volatile

VC activity to date — deal value: US$22.76b; deal volume: 291

Flexible space defined: This refers to technologies impacting the concept of space-as-a-service, which includes the entire "co-everything" movement: flexible office, coworking, co-living and retail pop-ups. (It should be noted here that the Airbnb model, while on one hand can be termed co-living, has no real estate. Compare that to models, such as WeWork which with its brick-and-mortar portfolio, exists in the built-world marketplace.)

While flex-retail has had its moments, co-living (flex residential) is an up-and-comer. Three factors are driving this sub-sector's growth:

1. Macroeconomics: More people are moving into cities where the cost of living has become very expensive.
2. Deal economics: Co-living provides owners and operators with a higher price per square foot, increasing the value of the asset, while providing a unique value proposition to the customer.
3. Flexibility or community: "Community" is the current buzzword, the latest amenity, providing residents with instant friends in cities, addressing their loneliness while providing time and financial flexibility (regulatory restrictions notwithstanding) to the renter.

VC investments in flex-space providers have been among the highest in the industry although, unlike real estate and finance, it has not been distributed evenly throughout the sector, reflected in its skew toward WeWork.

A selection of leading companies in the flexible space sector are:

Company	Specialty	Total VC raised
The We Co. (WeWork)	Coworking space	US$1b+
Kr Space	Coworking space	US$1b+
Medici Living	Coliving space	US$1b+
Ucommune	Coworking space	US$500m–US$1b
Knotel	Coworking space	US$500m–US$1b
Convene	Coworking and meeting space	US$250m–US$500m
Industrious	Coworking space	US$50m–US$250m

Coworking has evolved from providing a home for start-ups and small shops to fulfilling on-demand space for all-sized firms, including multinationals. Landlords are capitalizing on the trend by either signing flex-firms as tenants or starting their own brands.

3 Management

Barriers to entry (part 1)

VC activity to date — deal value US$9.15b; deal volume: 1,052

Management defined: This entails software that provides full or partial automation of various workflows. Included in this concept are enterprise resource planning, property management, inventory management (space availability) and client relationship management.

There will be continued innovation and growth in the management sector which will attract funding. However, similar to coworking, investors have already picked their favorite companies, the result being that over time fewer companies will come to market.

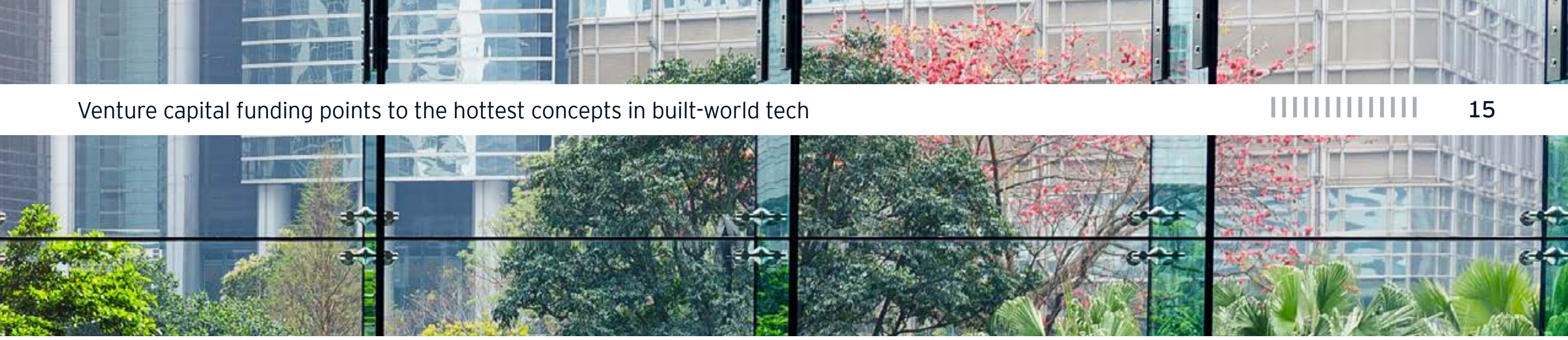
In addition, companies such as MRI and VTS, have begun to raise later rounds of funding. However, the uptick in activity and a lack of mega-rounds overall have stalled momentum temporarily. There are fewer companies coming to market because of the increasing barriers to entry. Once an owner or operator adopts a software, that platform can become entrenched, limiting the number of future deals.

Overall, VC investments in the sector have traditionally been distributed evenly.

A selection of leading companies in the management sector are:

Company	Specialty	Total VC raised
MRI	Property, portfolio management	US$50m–US$250m
Niido	Home sharing	US$50m–US$250m
VTS	Home sharing	US$50m–US$250m
Affinity	Community association services	<US$50m
ResMan	Property management software	<US$50m
Mynd	Residential property management	<US$50m
Building Engines	Property management software	<US$50m

Target customers for management technology include, but are not limited to, owners and investors, and third-party asset- and property-management organizations.



4 IoT and smart buildings

Barriers to entry (part 2)

VC activity to date — deal value US$ 5.47b; deal volume: 1,148

IoT and smart buildings defined: It is the real-time communication among building technologies, tenants and the cloud to harness data, and improve building information management systems and space utilization. It is the networking capability that allows information to be sent to, and received from, objects and devices (such as fixtures and kitchen appliances) using the internet. The overall concept includes access control and security, and connectivity.

IoT represents the highest barrier-to-entry sector among the eight verticals. Of growing interest to the VC community is electronic equipment and devices. Built-world tech frontrunners are starting to emerge from the traditionally even distribution of VC investments throughout the sector.

A selection of leading companies in the IoT and smart buildings sector are:

Company	**Specialty**	**Total VC raised**
Silver Peak	Connectivity	US$50m–US$250m
Latch	Apartment access control	US$50m–US$250m
Noon Home	Home automation	US$50m–US$250m
NavVis*	Digital-twin platforms	US$50m–US$250m
Latch	Apartment access control	US$167.82m
SmartRent	Connected-device control	<US$50m
CARTO	Smart spatial data use	<US$50m
Terminus	Information security management	<US$50m

As in management, potential users of IoT applications include owners and investors, and third-party asset- and property-management organizations.

* Could also be categorized as visualization. A number of companies are blurring the lines between IoT, visualization and data and analytics.

5 Construction

Under-served means VC opportunity

VC activity to date — deal value US$4.41b; deal volume: 366

Construction defined: This encompasses the various technologies for architecture, design and development (the heavy lifting of construction and physical materials) and productivity (process and software).

In the VC world, construction is among the most under-served markets, and technology here is still in the early stages of innovation. High barrier-to-entry and cash-heavy sectors, such as development will have their moment in the spotlight in terms of dollar volume. However, we also anticipate an increase in activity in productivity platforms that provide the software to ease the process.

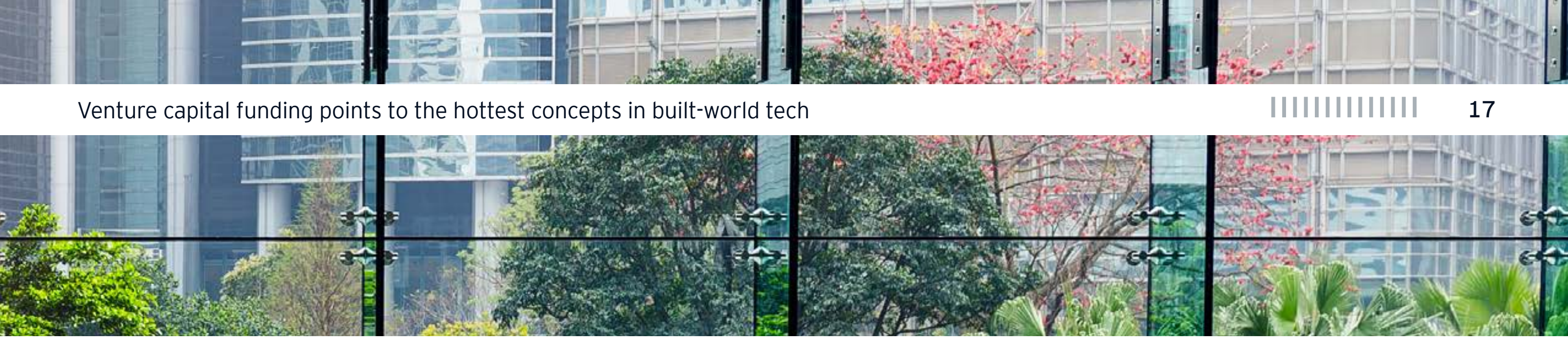
VC investments in contech to date have been focused on two main categories: productivity platforms, and construction and engineering. Collectively, 48% of all VC investments in contech has gone to both categories.

A selection of leading companies in the construction sector are:

Company	Specialty	Total VC raised
View	Construction materials	US$1b+
Katerra	Design and construction	US$1b+
Procore	Construction management	US$500m–US$1b
Kinestral	Construction materials	US$50m–US$250m
Honest Buildings*	Project management and procurement	US$50m–US$250m
Rhumbix	Project management and procurement	<US$50m
Blokable	Construction materials and process	<US$50m

Everyone involved in the construction cycle is a potential customer, from the project owner and the architect or designer, through to the construction manager the vendors of goods and services, such as electrical and HVAC.

* Acquired by ProCore



6 Data and analytics

AI provides overlapping solutions

VC activity to date — deal value US$4.26b; deal volume: 856

Data and analytics defined: This refers to software and other technology utilizing data and AI to provide business insights that increase or improve real estate decision-making. AI and its subset, machine learning, are examples of applications that can take over such tasks.

The industry has begun the shift toward a hybrid form of data and analytics, and — as implied in the IoT section — will be heavily connected to IoT and Visualization (see Number 7 below) platforms. This connectivity will allow owners and operators to run simulations on their assets in a scalable platform that can create 2D, 3D and virtual visualization of those assets. That information can then be continuously updated with information on project status and live building operational data. Thanks to the nature of AI, this information itself facilitates increased machine learning capabilities.

Built-world tech frontrunners are starting to emerge from the traditionally even distribution of VC investments throughout the sector.

A selection of leading companies in the data and analytics sector are:

Company	Specialty	Total VC raised
Reonomy	Data analytics and sharing	US$50m–US$250m
Ojo Labs	AI-driven chatbot	US$50m–US$250m
Remine	MLS platform	<US$50m
Cape Analytics	AI and geospatial analytics for insurance underwriting	<US$50m
GeoPhy	Property-specific analytics	<US$50m
Spacemaker	Modular software solution for logistics	<US$50m
Compstak	Crowdsourced data platform	<US$50m

There is no sector in the commercial or residential real estate marketplace that cannot apply some aspect of data and analytics in their decision-making process.

7 Visualization

A market in search of a frontrunner

VC activity to date — deal value US$0.74b; deal volume: 222

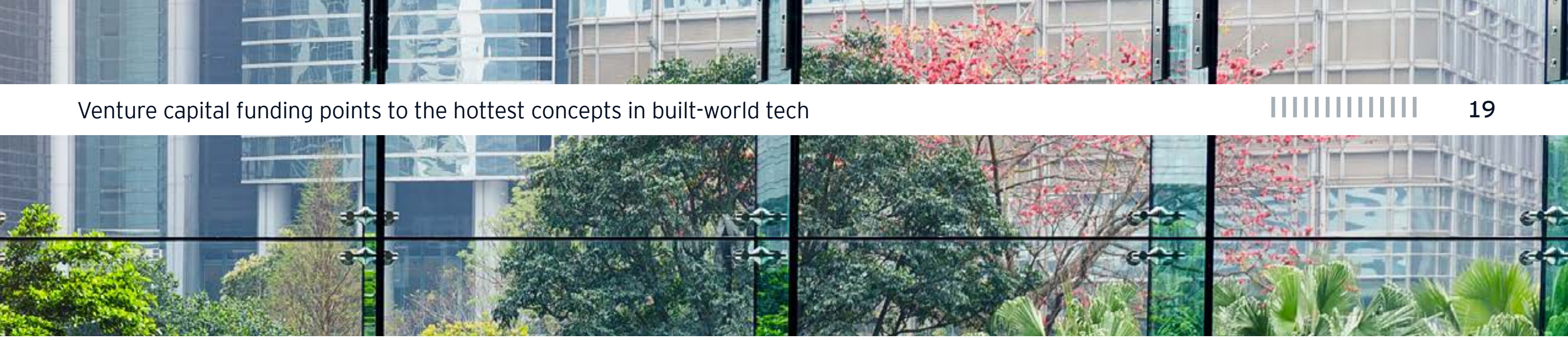
Visualization defined: This entails imaging technologies that provide immersive experiences for users by enhancing or completely replacing existing physical reality.

Applications of the technology are designed to enhance leasing, marketing, design and construction applications. However, the stability and even distribution of capital across companies leaves the market wide open for a clear and distinctive frontrunner.

A selection of leading companies in the visualization sector are:

Company	Specialty	Total VC raised
Matterport	3D camera and virtual tour platform	US$50m–US$250
Skycatch	Drone mapping and analytics platform	US$50m–US$250m
Hover	3D modeling	US$50m–US$250m
Modsy	3D residential modeling	US$50m–US$250m
Drone Deploy	Drone mapping and analytics platform	US$50m–US$250m
Havenly	Online interior design and e-commerce platform	<US$50m
IrisVR	Digital prototyping	<US$50m

In terms of potential customers, visualization capabilities touch on areas, such as construction, interior and exterior design, facilities management, landscaping, and property management.



8 Tenant experience

Will owners and operators outpace start-ups?

VC activity to date — deal value US$0.53b; deal volume: 168

Tenant experience defined: It includes the study of services or technologies impacting the concept of an amenities-based asset, where the tenant is viewed as a consumer of that space. It includes concierge services from dry cleaning to groceries, as well as processing maintenance requests and access control.

VC investments in the sector have been traditionally low and spread evenly, with several owners and operators adopting early, especially, in multi-family and residential. However, owners and operators pose the biggest “threat” to start-ups and VCs, as they look to utilize or create their own concierge and community services.

A selection of leading companies in the tenant experience sector are:

Company	**Specialty**	**Total VC raised**
Managed by Q*	On demand office services	US$50m–US$250m
Hello Alfred	Residential concierge services	US$50m–US$250m
Comfy (M&A)**	Tenant engagement platform	<US$50m
HqO	Customized tenant amenities	<US$50m
Amenify	Residential concierge services	<US$50m
Office App	Tenant engagement platforms	<US$50m

Owners and operators of real estate and their third-party agents are the most-likely customers.

***** Acquired by The We Company ****** Acquired by Siemens

Small steps for big gains

Business enhancement opportunities for owners and operators reside in each of the verticals. These opportunities range from improved data accuracy, tenant engagement and retention to decreased expenses, improved operations and the ongoing benefits of tech-company investment. The ability of an owner or operator to aggregate those benefits is a positive signal for adoption going forward.

On the horizon

While the second part of this extended work will do a deeper dive into the future of built-world tech, and the intentions and expectations of both the real estate industry and VC funds, we can set the stage with a view of the future on the basis of current trends:

- Data and information are critical. AI and automation will also assume importance as owners and operators start leveraging them.
- The future lies in ROI. There is a huge opportunity for start-ups to build platforms to deliver better ROI for owners and operators.
- Watch for emerging leaders. Many start-ups have reached their tipping point and the race to get direct acquired is on.
- Owners and operators become acquirers. They are assessing current processes and pain points, focusing on the tools that can aid their operations, cut costs and increase profitability.

A lot of the current tech might have enhanced efficiency or added new insights, but without a quantifiable impact on ROI. For example, tenant engagement apps and the complexities of renewing space, which are driven by many factors, of which landlord engagement is only one.

This is one reason why so many built-world tech start-ups to date have struggled to convert strong engagement into measurable sales. They lack an attractive offering with clear ROI benefits or, at least, the means to measure such impact. We expect the next wave of solutions to provide definitive ROI implications.

Akin to that are tech and real estate convergence opportunities for tech-based property start-ups that also own physical assets. This bridge over the built-world tech or real estate gap will be an interesting storyline to follow in future months. It raises the question of "will some of the best real estate landlords of the future start out as built-world tech companies?". There is a great opportunity here to deploy their start-up tech into their own portfolio and, if it genuinely shows ROI benefits, that trajectory will point to more efficient ownership and management.

Other trends to watch

Over the longer-term, we expect to see a number of further trends develop and shape the built-world tech industry:

- Existing companies in the built-world tech market to evolve their business models to better suit the real estate market in which they operate.
- Crowdfunding future: It is growing but tied to the regulatory market. While, there are opportunities for companies with syndicated investment opportunities, we expect crowdfunding might be more fruitful around a digital syndicate.
- Internet shopping becoming local: We already see red flags around areas, such as co-retail since it is not so partnership-aligned as players in the coworking and co-living spaces.
- The crowded flex space: Profitability here depends on scale and operational expertise. Frontrunners are already well along the adoption scale, and we expect hyper-local or niche solutions will emerge now.
- The rise of co-living: Corporate apartments, apart-hotels and co-living are all growing in popularity. Could student living be the next big opportunity?

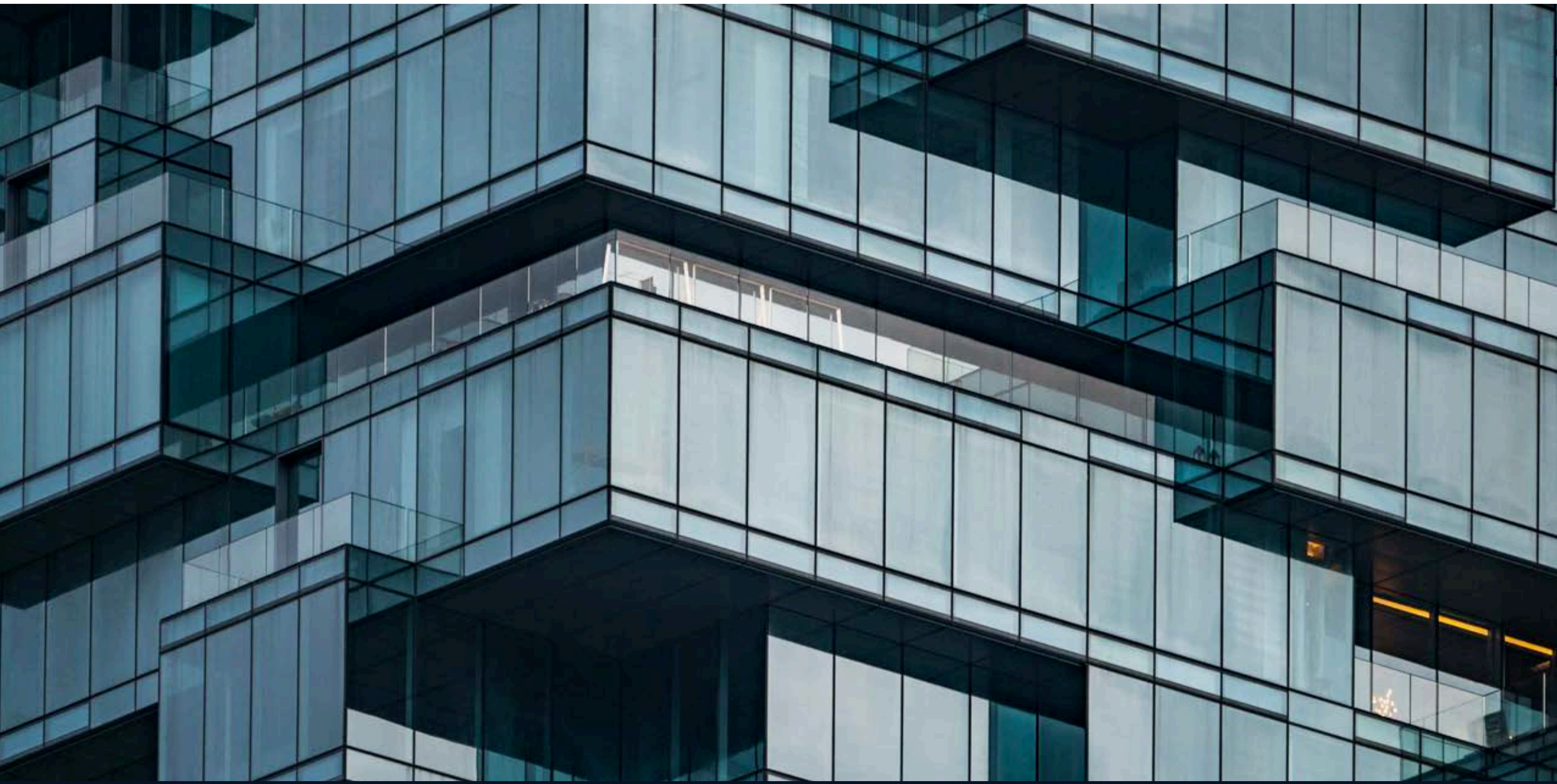
Conclusion

In all, VC activity in the built-world tech market can be defined by two dynamics. On one hand, it is a marketplace driven by an astounding influx of capital. On the other hand, adoption, while evident, lags behind the flow of capital. There are three hurdles standing between VC investment and adoption: infrastructure; the absence of any product that offers a single-source, overarching solution; and ROI.

- Infrastructure: For owners and operators to address their operational and value challenges through technologies, there are infrastructure issues that need to be addressed, such as hiring the right talent, analyzing the processes and functions that would benefit the most by replacement technologies, and developing strategies that will deliver those needs. The opportunities are evident for organizations to improve their processes and reduce costs by taking a closer look at the solutions on the market and bringing in the right talent to implement adoption.
- Absence of single-source solutions: On the provider side, greater adoption may occur if start-ups considered creating connected-umbrella solutions to solve a range of challenges and needs. The buyer profile in our industry does not always make a move when a value proposition is not clear, yet innovation is incremental. Also, firms need to demonstrate that their solutions are adaptable and have an acceptable shelf life.
- ROI: Ultimately, this is what all commercial real estate firms, no matter the size, are looking for. In current product offerings, there are few quantifiable returns on investment, such as an anticipated reduction in costs or increase in revenues. However, over time, as more technology is adopted and outcomes are measured — and the needs of the market are more clearly identified — a more definitive link between product and ROI will be established.

While we are yet to see these three hurdles overcome, we are still in the early stages of built-world tech development. And that is a very hopeful sign for the direction of the market.

This, we believe, forms the foundation of the next wave of built-world tech advancement — a convergence of the product capability and the needs of the owner or operator.



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