Investing in the Real Estate Value Chain

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Annie Veldman & Sidney Kanell

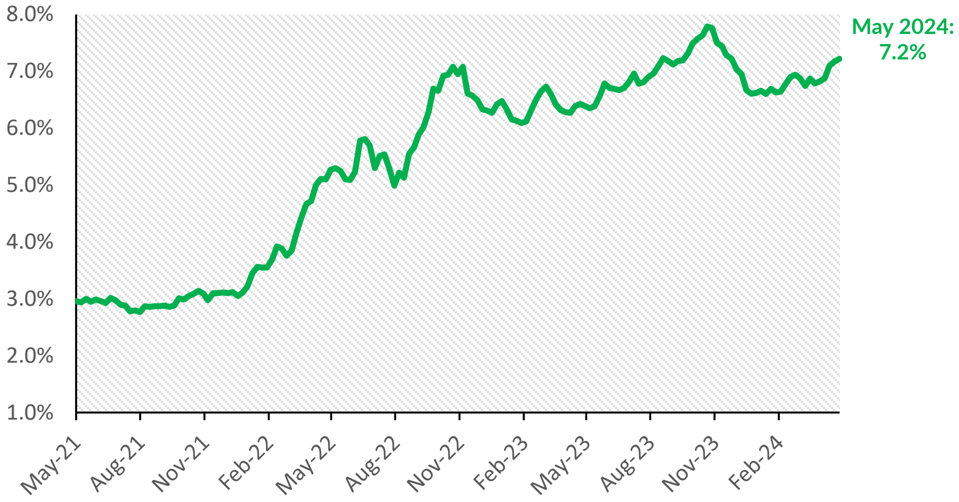
Market Overview

While an unfavorable market environment has recently hampered activity across the real estate sector, signals suggest that declining interest rates will fuel reacceleration, making now the time to proactively invest in PropTech

The heightened interest rate environment has caused the broader real estate sector to struggle

- Capital costs have substantially increased, making debt difficult to come by
- In the office sector, the impact is compounded by high vacancy due to the rise of remote work
- A housing crisis has emerged, with supply dwindling as homeowners are reluctant to sell and take out new mortgages; the build-up of excess demand has caused housing prices to remain high
- On the flip side, industrial and retail have remained relatively resilient, and growth in data centers has boomed from AI tailwinds
- Construction starts are materially down due to scarcity of capital, in addition to rising materials costs and labor shortages

U.S. 30-Yr Fixed Rate Mortgage: 2021 - 2024[1]



As a result, real estate stakeholders have cut costs and innovation has been put on pause

- Stakeholders tied to project and transaction volume have been focused on reducing fixed costs as revenue has decreased, wary of adopting new technologies that may compress margins short-term
- In response, investors cooled on the sector; U.S. PropTech growth equity funding decreased 62% YoY in 2023, disproportionate to the broader software growth equity market, which decreased 33% YoY, and companies that did raise money did so in smaller rounds, with the average U.S. PropTech deal size decreasing 45% YoY[2]

However, the majority consensus is that interest rates have reached their peak and the U.S. is poised for a near-term soft landing

- The Fed has signaled rate cuts may begin as early as 2H24; as rates decrease, transaction volume will pick up
- There will be an increase in both appetite and available capital to adopt technology in order to stay on pace with the market
- Going forward, the global PropTech market is projected to grow from $35B in 2023 to $133B in 2032, an ~16% CAGR[3]

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Sources: (1) Freddie Mac (2) Houlihan Lokey (3) Precedence Research

Why Now?

Favorable market forces, the ongoing degradation of information silos, and the advent of Artificial Intelligence are coming together to drive accelerated demand for technology in real estate

Market Forces

- Until rates went up and transactions slowed, the real estate market had been booming for over a decade
    - During the boom, stakeholders rejected change and technology adoption. Business was better than ever, and there was no logical reason to introduce incremental risk - "if it ain't broke, don't fix it"
- During tougher times, the focus has shifted towards efficiency and strategies to stay ahead of competition. Once the market turns, there will be a race to capture growth and stakeholders at the forefront of technology adoption will have an advantage over laggards
- There is an undersupply of inventory in multifamily, industrial, data centers, and healthcare facilities. After two stagnant years, the market is desperate for construction to resume, and developers are hungry to meet demand. There is a growing need for solutions that drive efficiency and combat margin pressure, which resulted from inflation of input costs and labor

Breaking Down Silos

- Real estate is a largely relationship-driven industry revolving around real assets and a multitude of stakeholders (architects, engineers, developers, contractors, brokers, lenders, investors, property managers, service providers, tenants, and occupants)
    - These stakeholders are historically siloed, hindering communication and transfer of data
    - While certain inefficiencies stem from misaligned incentives and may prove challenging to disrupt in the short term, others are more susceptible to change due to market readiness and the availability of more advanced technology
- Technology has been hacking away at silos for decades, which has improved transparency, communication, and overall market efficiency. Examples include democratized market data (e.g., CoStar, Reonomy), online listing marketplaces (e.g., Zillow, Opendoor), and platforms that facilitate collaboration across key parties (e.g., Procore for construction, Qualia for closing)
    - Natural market forces point to a future where stakeholders are interconnected and information flows freely, and we are in the early innings

Rise of Artificial Intelligence

- Real estate is notorious for resisting technology due to old-fashioned attitudes and industry-specific complexity (e.g., data locked in physical assets, large web of stakeholders)
    - But AI represents a true step-function change in terms of increased productivity and ROI, establishing a catalyst for faster adoption
- Use cases include predictive analytics, data consolidation and optimization, automated maintenance, co-pilots and chatbots, computer vision monitoring, and robotics
- PropTech is dominated by a few large incumbents, which are difficult to displace despite their antiquated solutions. So far, the pain of ripping and replacing has generally outweighed the potential incremental benefit of a more modern alternative
    - But these large players are slow to innovate and will face competition from new entrants whose technology redefines what is possible in real estate

Real Estate Value Chain

PropTech will connect stakeholders and create leverage across the entire real estate value chain

Pre-Construction	Construction	Transaction	Management
Architecture & Design	Project & Workforce Management	Listings & Marketplaces	Building Automation
Cost Estimation	Materials & Equipment Marketplaces	Broker Tools	Leasing Tools
Permits & Compliance	Robotics & Tech-enabled Building	Underwriting & DD Tools	Property & Operations Management
Bid Management	Safety & Risk	Closing	Tenant Experience

Financing[1]

- Mortgage Market
- Fractional Ownership
- Underwriting Tools
- Lending Technology

(1) Excluded from this report

Trends Shaping the Future: Pre-Construction & Construction

Virtual Planning

- Design and build have become more tightly coupled, aligning architects, engineers, designers, and developers early, and establishing a continuous feedback loop
- Digital blueprints, virtual reality, and 3D models enable collaboration in a shared environment
- This results in improved decision making, accountability, and adherence to budget / timeline

Digital Twins

- Architects and developers use real-world data to construct virtual representations of buildings
- AI enables users to run scenario analyses and proactively identify problems (e.g., budget / timeline issues, design flaws), uncover process inefficiencies (e.g., excess costs, resource misallocation), and manage safety

Rising Demand

- Commercial construction demand is increasing amidst undersupply in the market, with the Infrastructure Investment and Jobs Act (IIJA) as a key tailwind
- Continued technology adoption within construction will help optimize workflows and manage costs, ultimately increasing efficiency to service this higher demand

Labor Shortages

- Demand for construction labor is outpacing current supply
- Companies are adopting project and workforce management software to increase the efficiency of the existing labor pool
- In addition, robotics and tech-enabled equipment can help address labor gaps

Alternative Materials

- The use of alternative materials such as decarbonized cement, recyclable steel, and photovoltaic windows is increasing, offering more energy efficient and sustainable solutions; going forward, demand will continue to grow due to climate regulations
- 3D printing and modular construction leverage these materials, and online material marketplaces are emerging, thereby broadening access

Focus on Safety

- Safety is a top focus in construction due to the frequency of worker accidents and a rising number of associated lawsuits
- Technologies such as computer vision and wearable devices monitor workers on site and flag hazardous situations
- Robots can be used to automate the most dangerous tasks

Trends Shaping the Future: Transactions

Desire for a Connected Ecosystem

- Both commercial and residential transactions involve a multitude of stakeholders, each of which has a siloed process consisting of multiple systems – examples include manual data entry and documentation, spreadsheets, lead generation software, emails, Google Docs, underwriting technology tools (especially commercial), e-signing, etc.
- Stakeholders are managing and paying for each of these solutions separately, as a comprehensive end-to-end solution has yet to penetrate the market
- The market needs end-to-end solutions, which connect all key stakeholders and workflows, from lead gen through close

Data Utilization

- Online marketplaces, public & private databases, transaction management software, and underwriting tools, introduce a vast amount of data into the ecosystem
- There is a large, untapped opportunity to activate data to improve probability to close and transaction speed
- Brokerages, lenders, and real estate investors can use this data to improve client lead generation, conversion, listing marketing efforts, due diligence efficiency, or even sell to third parties for market research or advertising purposes

Focus on Increased Efficiency

- Commercial Transactions: speed is an increasing differentiator in the transaction process – the faster a lender can model data and get a quote, or an investor can underwrite an asset, the more likely they are to win a deal
- Residential Transactions: the recent National Association of Realtors (NAR) ruling is expected to shrink commission dollars and increase barriers to entry, meaning brokers will need to become more efficient with both time and costs
- Technology that can automate tasks such as lead conversion, data collection, underwriting, and closing will see high demand

Large Network Effects

- Commercial Transactions: large intermediaries and investors leverage the same legacy reporting and valuation software, like ARGUS and CoStar – these tools are deeply engrained into workflows and are often interconnected across key parties in the transaction
- Residential Transactions: listing marketplaces like Zillow benefit from network effects as they aggregate supply and demand. Platforms that have the most listings attract the most buyers / sellers which in turn attracts more agents
- This establishes a challenging dynamic for new entrants, but those that can break through and capture the attention and wallets of the largest stakeholders are poised to benefit from a flywheel effect

Trends Shaping the Future: Management

Modern Property Management

- A few large incumbents dominate property management (PM) software, resulting in a rise of point solutions
- The scope of PM has broadened as portfolios have increased in complexity (e.g., mixed-use properties, diverse ownership structures) and tenant experience has become a top priority
- The traditional PM model is cumbersome; a combination of best-in-class tech and services can displace traditional property managers (especially in resi), allowing owners to keep more margin and gain better insight into property performance

Accessible Leasing

- Brokers and PMs leverage technology to access and engage a broader range of prospective tenants
- 3D and virtual tours allow prospective renters to view properties sight unseen, at any time of day, increasing both reach and efficiency
- Flexible payment platforms and deposit alternatives are expanding prospective tenant bases, while providing additional security to PMs

Action-Oriented Building Automation

- IoT devices such as sensors, lights, thermostats, and energy meters have become widely available, more cost effective, and easier to install; as such, smart buildings are on the rise across residential and commercial real estate
- So far, building automation has centered around data collection and production of insights
- The next generation of building automation will focus on driving action (e.g., controlling energy consumption, assigning predictive maintenance tasks, activating security measures etc.)

Tech-forward Tenant Base

- Property managers need to meet young, digitally-native renters where they are, from leasing, to move-in, and ongoing communication and engagement
- Digital payments and maintenance portals are increasingly table stakes; nice-to-haves such as AI chat-bots and neighbor communication platforms are early but gaining traction
- In the office sector, occupant-facing solutions were gaining steam, especially as hybrid workforces became the norm, but budget cuts have hindered growth for the short term

Real Estate Value Chain: Market Landscape

Pre-Construction	Construction	Transaction	Management

Incumbents & Leaders

Pre-Construction	Construction	Transaction	Management
AUTODESK, Trimble, Matterport, HEXAGON, Bentley	Trimble, PROCORE, ORACLE PRIMAVERA, AUTODESK	CoStar, realtor.com, REDFIN, LONE WOLF TECHNOLOGIES, ARGUS, Zillow	YARDI, entrata, appfolio, REALPAGE, BuildingLink

Rising Stars

Pre-Construction

Architecture & Design
qbiq, PELLES.AI, Arcol, Drawer AI, HYPAR, Higharc

Project Estimation
TRUEBUILT, pinpoint, ALICE TECHNOLOGIES, FOHLIO, TAILORBIRD, AIRWORKS

Permits & Compliance
Pulley, PERMITS.com, Cloudpermit, greenlite, ATC, PermitFlow

Bid Management
planHub, STACK, construct connect, Bidtracer, SMARTBID by ConstructConnect, ARCHDESK

Construction

Project & Workforce Management
INGENIOUS.BUILD, eSUB construction software, trunk tools, LUMBER, Buildertrend, Siteline

Materials & Equipment Marketplaces
Gearflow, BOOM & BUCKET, AMAST, Buildstock, bundle, Buildport

Robotics & Tech-enabled Building
KEWAZO, RUGGED ROBOTICS, PAINTJET, BUILT ROBOTICS, ToggleRobotics, DUSTY ROBOTICS

Safety & Risk
AI Clearing, OnsiteIQ, Raken, safesite, SafeAI, intenseye

Transaction

Listings & Marketplaces
Opendoor, appear [here], zumper, Storefront, Apartment List, deskpass

Broker Tools
SKYSLOPE, PERCY AI, AVENUE 8, follow up boss, RADIUS, RealScout

Underwriting & DD Tools
builders patch, Archer, blooma, DEALPATH, ROCKPORT, endpoint

Closing
PropLogix, bowery, Qualia, VALCRE, snapdocs, TRANSACTLY

Management

Building Automation
seam, actuate, quext, notion, LATCH, ring

Leasing Tools
peek, LeaseAccelerator, Rhino, theGuarantors, Qira, LeaseLock

Property & Operations Management
Latchel, turbotenant, Hemlane, cove, PREDICT AP, breezeway

Tenant Experience
moved., rentgrata, EliseAI, TULU, amenify, HELLO Alfred

Note: This landscape is intended to be a representative sampling and is not an exhaustive list.

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Please send any inquiries to annie@catalyst.com or sidney@catalyst.com