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ACTIVE CAPITAL

THE REPORT 2019

Research Highlights

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This report is a summary of themes from the full Active Capital Report.
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Knight Frank's Global Capital Markets Group has built a reputation for acting on the most high-profile property transactions around the world. The group acts for institutional investors, private equity, family offices, sovereign wealth and real estate companies in the cross-border acquisition and disposal of international property. Our services cover both commercial and residential sectors, as well as the specialist areas of student property and healthcare. Excellent information sharing and market intelligence ensure clients receive optimum advice, while we build relationships that are always based on trust. We believe the principal drivers of our success are our access to stock, the right client base and a highly collaborative network of global teams. We look forward to working with you.

ACTIVE CAPITAL

THE REPORT 2019

CONTENTS

EXECUTIVE SUMMARY

INTO EXTRA TIME

Less than a year ago, the global investment community was gearing up for higher interest rates and even recession: after all, the cycle was nearing maturity. Today, we find ourselves in a different scenario as dovish central banks rein in their ambitions for rate rises and economic growth expectations start to ease, yet capital remains as abundant as ever. In this world, the attractions of a real estate yield remain compelling, but investors must adopt strategies that reflect this extension to the cycle. That is what we set out to address within this edition of Active Capital. To do so, we have expanded our content and coverage, drawing heavily on our experiences from across our global network. This report represents highlights and summaries of this research, with the full range of topics, articles and case studies to be found on **knightfrank.com/activecaptial**. We hope you enjoy exploring our analysis and predictions, and find the report to be insightful and thought-provoking.

Below is a selection of additional topics available in the digital edition of Active Capital 2019 on the Knight Frank Intelligence Lab. knightfrank.com/activecapital

Hedging costs; our analysis and why they matter / Future capital allocations for pension funds
The rise of debt funds / Debt; the challenge for banks / The enduring role of real estate:
The view from the online fund manager / Madrid: Fringe as the new core / Identifying next gateway cities
Increasingly OpCo: From asset ownership to service provision / Valuing space as a service; our view
Connecting retail and residential: Case study Hong Kong / Capturing value from tenant governance
/ How ESG is shaping investment value

FIVE THEMES SHAPING ACTIVE CAPITAL

For our third edition of Active Capital, we introduce five themes destined to shape the next phase of global real estate investment

1 EXTRA TIME

Many major economies are facing the latter stages of a prolonged expansionary cycle. The signals are clear; global growth is slowing and interest rates remain stubbornly anchored near record lows. Quantitative easing remains a necessity in the eyes of many central bankers and governments are still borrowing heavily. There are certainly fewer tools left with which to fend off a global recession. But is it too early to predict one? We think so. Is it too early to strategise for one? Most certainly not.

This environment has important implications for real estate investors. It means accepting that many markets will not see returns hit recent highs. It demands caution when considering positions on the risk curve. For some, it will entail a greater focus on the detail of currency hedging, or leverage. Fundamentally, the real estate cycle is extended further.

2 CAPITAL GRAVITY

There remains a strong argument for investing in real estate as an asset class, the questions are where will the next waves of capital emerge from and where will it be deployed? Using our suite of gravity models, we analyse the factors preceding rising cross-border investment sources and destinations.

Allocations to retail and industrials are already changing and our models underline this shift. We predict that by 2023 industrial property will replace retail as a major component of portfolios, alongside an increase in specialist sector investment.

3 REINVENTION

If reinventing an asset's use to make it more valuable epitomises the creativity required by today's investors, then the successful conversion of shopping centres into other functional space is perhaps the holy grail of this challenge. Reinvention also encompasses geography. As pricing of central business district assets hits new highs, and a dearth of development finance reins in new supply, investors are seeking the next gateway cities and emerging fringe locations.

4 NOWNERSHIP

Occupier appetite for real estate is increasingly about the services available, rather than just the space itself. This trend has been growing in the office, hotel and residential sectors, however demographic changes are pushing similar requirements in the specialist sectors. As a result, investor interest in operational models is growing. This report considers the opportunities this creates for investors in this sector.

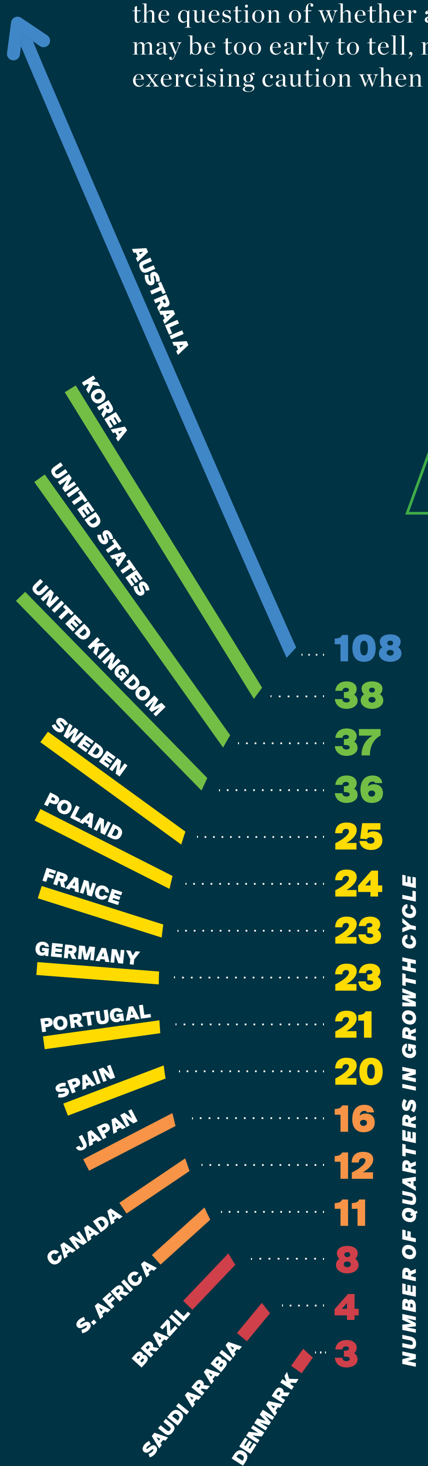
5 ALL CHANGE

Technology is playing an ever-greater role in real estate and is generating huge amounts of data in the process. Increasingly, this data is being valued as a commodity class of its own. We look at the value of data in its own right and how using data can benefit valuation models.

1 / EXTRA TIME

LATE CYCLE FOR LONGER?

Many major economies are experiencing prolonged economic cycles, raising the question of whether another global recession is on the horizon. While it may be too early to tell, real estate investors should strategise appropriately, exercising caution when seeking out future opportunities



ECONOMIC CYCLES ARE EXTENDING

Source: OECD, Knight Frank

At more than nine years, the current US economic cycle is double the average length of the previous 33. This phenomenon is not limited to the US, with the UK similarly nine years into its recovery from the global financial crisis (GFC), while Australia is more than 27 years into its cycle.

Some economies are facing headwinds. H2 2018 saw Italy dip into a light recession, which Germany narrowly avoided. Then, in March 2019, the US yield curve inverted, a leading indicator of recession. However, previous inversions that led to recession lasted months. At five days, economists see this inversion as too short to prompt alarm.

The inversion has prompted debate on when the next recession might be. The consensus is not yet, but no cycle lasts forever. Leading central banks are more dovish and some economic indicators have improved. Meanwhile, election campaigns in the US are rooted in supporting economic growth. Companies are holding cash and are under pressure to use it. Also, the digital revolution could gain momentum from 5G telecoms network roll-outs. These factors should comfortably extend the cycle through 2019 and 2020.

"IT'S FAR TOO EARLY TO PREDICT A RECESSION. BUT IT'S NOT TOO EARLY TO WORRY ABOUT ONE."

Ian Stewart, Chief Economist, Deloitte

Lower growth for longer

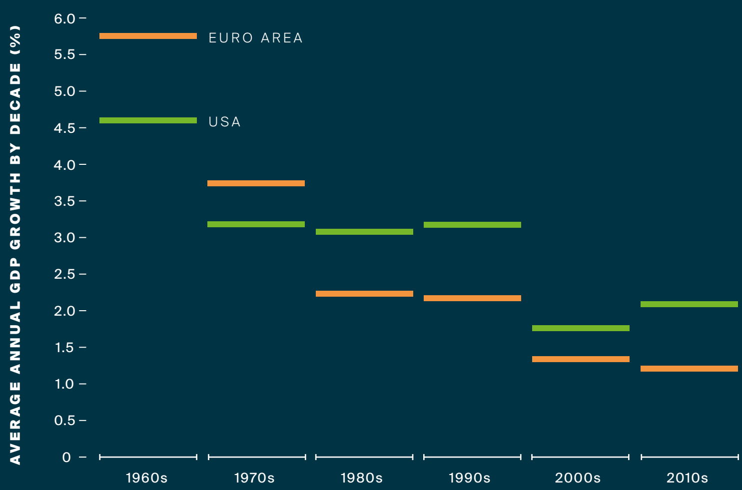
While many mature economies are enjoying elongated cycles, their long-term average growth rates are moderating. Post-war, during cycle downturns fiscal policy has been loosened through tax cuts and/or government borrowing. Expansionary monetary policy tools such as interest rate cuts and quantitative easing (QE) have also been applied. These policies should be reversed, once the cycle improves.

However, with each cycle, in many economies, expansion has only seen limited reversals, boosting wealth for sections of society and effectively pulling forward future growth. Spending more now is at the expense of spending less later. This means that while innovation, employment and social change continue to support growth, there are fewer expansionary tools left. This is leading to softening GDP growth and lower returns. This lower growth is also feeding into lower average interest rates. The Bank of England's interest rates are essentially the lowest in more than 300 years, reducing the risk free element of required returns.

Positioning investment in a lower for longer environment

Commercial real estate (CRE) has a strong story at this stage in the cycle. While investors need to be mindful of illiquidity, CRE is a diversifier of equities and bonds. It provides the relative stability that equities are lacking and the income that low yielding bonds are increasingly missing.

LONG TERM ECONOMIC GROWTH IS SLOWING



Source: World Bank, Knight Frank

However, within CRE, there is temptation among some investors to move up the risk curve to maintain returns in this lower growth environment. Investors across the risk spectrum should not lose sight of their risk exposures and consider looking for return more defensively. The themes of Active Capital 2019 consider ways for commercial real estate investors to find alpha, i.e. return without the same proportional increase in risk, in such a late-cycle environment.

The story is local

We expect some investors to lock on to structural, demographic and technological shifts. The economic story is increasingly stronger at a local rather than country level due to urbanisation. Not all cities are enjoying urbanisation equally, however. It is important to look at the specific demographic trends of an area, to target the right city and the right assets for that city. This should also encourage movement into specialist commercial property sectors, such as senior living and healthcare where populations are aging, or private rented sector (PRS) where growth is coming from a younger cohort. The caveat is that accessing returns in these sectors often requires exposure to operational businesses and greater reputational risks, which may be unpalatable or even structurally impossible for some investors.

Targeting lower beta

We also expect investors to target economies and sectors less prone to volatility, i.e. lower beta. Even better if such economies and markets are also poised to benefit from innovation and urbanisation. Gateway cities with diversifying economies such as London, as well as new gateway cities with a foundation in strong universities, improving standard of living, good connectivity, culture and diversity are prime examples. For example, through the GFC, the office market in the lower beta university city of Cambridge (UK) enjoyed yield compression and rental growth.

Within the gateway cities, investors are moving to new emerging fringe locations due to tight pricing in the central business district and increasing lack of availability of assets to invest in. Having identified target locations, the potential for higher returns through reinvention and redevelopment will be attractive for some. Investors should be mindful that as demand for secondary assets and locations grows due to lack of prime product, there is a risk of yields compressing below their natural risk premium, reducing the gap between prime and secondary, and leading to mispricing.

Positioning through debt

Uncertainty over the position of the real estate cycle and the outlook for returns is also encouraging investors to target different types of real estate exposure. Real estate debt is one such approach supported by the change over the last decade in Basel regulatory capital rules for banks, which has created space for debt funds. This is a way to consider core and non-core real estate from further down the capital stack, therefore relatively more insulated from risk than a direct equity play.

CRE investors are also seeking real estate exposure through proptech. Two thirds of investors are looking to invest 10% to 30% of their capital in proptech over 2019.

Adapting to a new normal of lower returns, amid other structural changes are key challenges for investors. The current environment is undoubtedly beneficial for commercial real estate. For investors, the danger is that expectations remain anchored in the days of higher returns, leading to the chasing of unrealistic performance at the cost of elevated levels of risk. However, for those undertaking appropriate strategies, we believe the cycle will continue to deliver.

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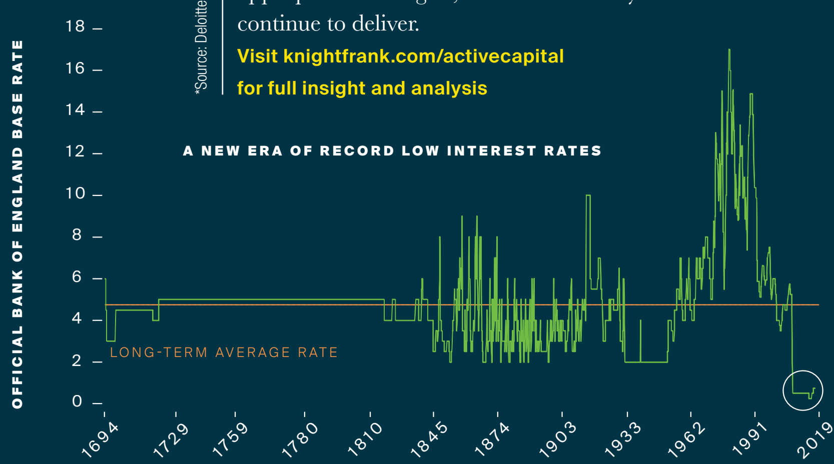
*Source: Deloitte

A NEW ERA OF RECORD LOW INTEREST RATES



Source: Bank of England, Knight Frank

CAPITAL FLOWS: OUTLOOK 2019

Long-term lowering of GDP growth and interest rates in a late-cycle environment are encouraging an increase in cross-border capital flows to both diversify risk and chase enhanced returns. As cross-border investment grows, we analyse the likely sources and destinations of capital over the coming year

TOP 10 MOST LIKELY SOURCES OF CROSS-BORDER CAPITAL IN 2019

United States, Luxembourg, Germany, Switzerland, Norway, Qatar, United Arab Emirates, Singapore, Taiwan, Japan

Wealth, financial freedom, innovation, tax burden and unemployment contribute to a high likelihood of these countries releasing capital in 2019. Singapore has already invested more than $4 billion into Mainland China, South Korea, the UK and Australia this year. We expect further outbound capital from the Middle East, including Qatar and the UAE. The Qatar Investment Authority has announced it intends to increase US-bound capital in real estate, technology and exchanges by $15 billion. A strong treaty network and EU participation exemptions makes Luxembourg an attractive base for cross-border investment into Europe, although EU tax laws are evolving, which may influence this. In terms of Europe-bound cross-border investment, South Korea will remain key.

THE TOP SOURCES OF CAPITAL SO FAR IN 2019

United States, Canada, France, Germany, Singapore, Mainland China, Hong Kong

These countries house the top 20 global cross-border buyers in Q1 2019. The US and Canada invested circa $133 billion internationally, with another $129 billion of cross-border investment from Hong Kong, Mainland China and Singapore. Equity funds, investment managers and real estate operating companies were among the most active, investing in assets from PRS in Madrid, Spain, to shopping centres in Hong Kong. Canadian pension funds were also active, investing in apartments in the UK and US as well as office and industrials, in their mission to liability match obligations. South Korea remained a key source of cross-border capital into Europe.

PRIVATE EQUITY: A LEADING INDICATOR FOR FUTURE CAPITAL FLOWS?

France, Italy, Norway, Finland, Singapore, Mainland China, Hong Kong, Japan

PE investment acts as a leading indicator for cross-border capital flows from other sources. Mainland China and Hong Kong absorbed $5 billion of international PE cross-border capital in Q1 2019 and Japan over $1.3 billion into office and retail. Norway and Finland saw $1.7 billion of PE capital, up from $706 million over the full year in 2018. PE invested $510 million in hotels and offices in Italy in Q1 2019, on the back of tourist flows and local economic strength, even as the country hit technical recession and government bond yields spiked amid the 2018 budget stand-off with the EU.

WHERE NEXT FOR PRIVATE EQUITY?

We expect the PE story to be sector-focused rather than geographically focused over 2019. Proptech, data centres, specific sub-sectors of industrials such as cold storage, as well as operator-led business models in specialist sectors such as senior housing, could see increased PE interest. From a geographical perspective, parts of Latin America have experienced geopolitical turmoil and currency depreciation against the dollar in recent years. There are indicators that things could stabilise in some areas, however, providing scope for opportunistic PE investment.

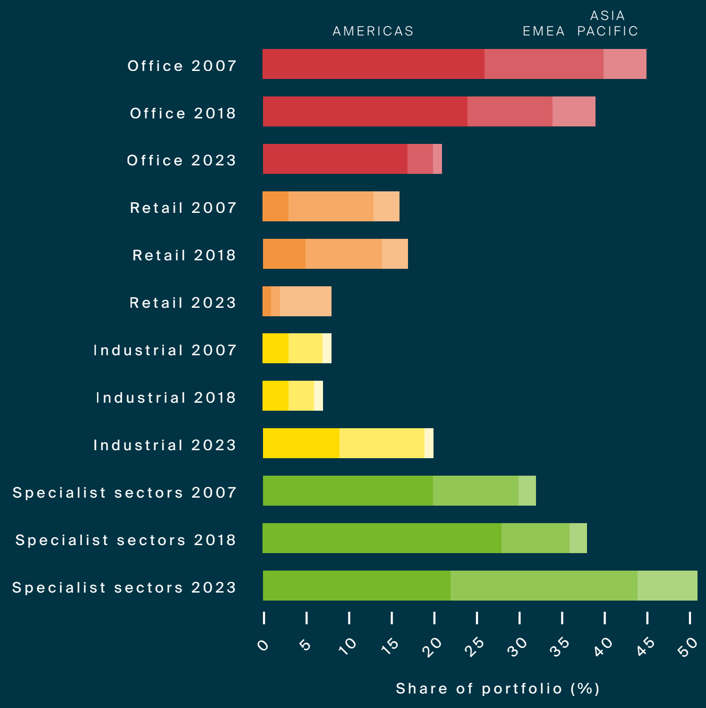
CHANGING CAPITAL ALLOCATIONS

CASE STUDY: PRIVATE EQUITY

We have analysed the change in global CRE allocations of private equity pre- and post-global financial crisis. Additionally, using an augmented Black Litterman portfolio optimisation model and forecast returns, we also simulate future optimal CRE allocations.

The result? Historically weighted towards office and specialist services, we predict a rotation by PE funds from office assets into industrials and an increased weighting of specialist services by 2023. Retail exposure could fall to just 8%.

EVOLVING PRIVATE EQUITY ALLOCATIONS



Source: RCA, MSCI IPD, Knight Frank

"THERE WILL BE A CONTINUED ALLOCATION TO REAL ESTATE BECAUSE WE HAVE AN AGEING POPULATION … THERE IS A DEMAND FOR PENSION FUNDS TO MEET THEIR OBLIGATIONS"

Kim Politzer, Fidelity Investment

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Westside Pavilion Mall, Los Angeles

Getty Images

3 / REINVENTION

THE CHANGING FACE OF REAL ESTATE

Commercial real estate investors are rethinking how to generate returns by reinventing unloved assets such as shopping malls

In the shadow of late-cycle economics and structural changes, investment stories are increasingly local, with more interest in fringe-of-core locations and new gateway cities. There is also a challenge to reinvent assets in unloved sectors.

Shopping centres: The phoenix rises?

Structural changes to shopping habits have been forcing retail reinvention for some time. Shopping centres in particular face challenges, and even successful centres face higher costs of maintaining footfall as customer demand veers towards the experiential. In light of this, not all shopping centres will survive in their current form.

Where can retail reinvention work?

There is a certain amount of correlation between the performance of shopping centres and other assets. For example, in certain areas of eastern Germany, where structural changes relate to depopulation, demand for commercial real estate generally is in decline and successful reinvention is harder to achieve. At the other end of the scale, in the south-east region of the UK and London, residential values above £450 per sq ft create an impetus for reinvention. However, in these locations retail rents remain high while yields are low, making it harder to justify converting property away from retail use. Even where there is demand for alternative uses and retail performance is poorer, there is often undeveloped land in the vicinity, particularly for out-of-town shopping centres in the US. This land does not need additional demolition or redevelopment costs associated with reinventing an existing retail structure.

However, where the demographic and supply story works, a number of developers and investors are considering shopping centres as a source of distressed stock for potential repositioning programmes. City centre locations offer potential for residential provision and in wider conurbations, there is potential for more office space. Hotels, student accommodation and retirement living are also all being considered as new uses for retail space. Specialist sectors bring different operating challenges, but enable the investor to respond to the reinvention of occupier demand away from just provision of space, to the services offered within it.

INVESTORS ARE INCREASINGLY SEEKING TO REPOSITION AND REINVENT ASSETS TO DRIVE RETURNS

Case Study: Westside Pavilion Mall, LA

The Westside Pavilion in West Los Angeles serves as one of the best examples of a retail space being transformed for commercial purposes. Google has announced that it is set to occupy 584,000 sq ft of space on a 14-year lease from 2022. The former mall has good public transport links and is a six-minute walk to Westwood/Rancho park Station on the Expo Line. Retail outlets adjacent to the former mall will remain standing, as will the dining and cultural amenities in the form of the Westside Tavern and Landmark theatre.

REINVENTING FRINGE AS THE NEW CORE

Pricing and supply across central business districts are pushing investors towards fringe-of-core

The trend of urbanisation is reinventing the optimal investment thesis to one that is increasingly local, based on the structural factors of an area. As pricing of central business districts (CBD) reach new highs and supply becomes more constrained, investors are looking to suitable fringe locations worldwide to deploy their capital.

Case Study: Paris' Fringe

Over the next decade, several new markets in Paris, France, will open to investors as the Grand Paris rail project completes. 'Saint-Denis/Pleyel' in northern Ile-de-France, will benefit from four new lines, as well as the infrastructure promised for the 2024 summer Olympics in France. A number of new developments and refurbishment projects are underway and the office market is already gaining traction. Investment volumes in the northern inner suburbs increased +105% across 2018, including Ivanhoé Cambridge's purchase of the 9,000-sq ft Cap Ampère building – the largest office sale in France in 2018.

We also expect Nanterre will benefit from the Grand Paris project. Located near La Défense, the area will be connected to the southern rim and the northern inner suburbs once the line is completed. It will also benefit from the extension of the existing suburban railway line E. Construction giant Vinci is building its headquarters there. Other future hubs include Fontenay-sous-Bois in the east and Villejuif and Bagneux in the south.

And inside Paris...

Beyond areas directly benefitting from new Grand Paris stations, the chase for yield by investors is creating demand for other fringe-of-core developments, most of which are around the city's transport hubs. In the 13th arrondissement, the "Paris Rive Gauche" **[1 in map]** development zone will ultimately host 7,500 housing units, 7.2 million sq ft of public facilities and nearly eight million sq ft of office space. "Bercy-Charenton" **[2]** is an urban development zone in Paris' 12th arrondissement, which comprises more than two million sq ft of office space and 4,000 new residential units, while former industrial sites in the 18th and 19th arrondissements are being transformed into mixed-use areas, such as the "Chapelle International" **[3]**, a 3.3 million sq-ft office project, which was acquired by Blackstone in 2018.

WHAT IS THE GRAND PARIS EXPRESS?

The "Grand Paris Express" is Europe's largest transport infrastructure project. As well as accelerating development and increasing land values in secondary areas, the project will connect existing commercial hubs in the inner and outer suburbs, supporting the investor investment thesis.

To date, the impact on the commercial property investment markets has been limited, but several zones are to benefit from the shortening of transport time and the development of new schemes near the main transit stations.

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THE RESIDENTIAL LIFECYCLE

From student to multifamily, single family to senior living, more people are beginning to rethink the idea of owning their property in favour of something more flexible and affordable. This structural move is creating a new field of opportunity for investors

The idea of space as a service in the context of offices has been around for a few years. But while we've spent time exploring the techniques required to value this phenomenon, it is not just offices where this change is happening. Societal, demographic and tenure changes mean that more people are choosing to live in rented accommodation operated by large-scale operators.

This journey starts at university. Student numbers are rising around the world, and an increasing number of undergraduates and post-graduates are living in purpose-built student accommodation that provides the space and services to suit their needs.

In many countries, new graduates often move directly into the rented sector, given the flexibility it allows. Institutions have created a market here by offering co-living that has affordability of accommodation in the best locations at its heart.

Flexibility of living, alongside affordability issues, are also leading to an increase in renting among all age-groups in some geographies previously dominated by the owner-occupier model. This phenomenon is occurring later in the life cycle, too, as rapidly aging populations mean there's a rising demand for senior living accommodation, which can allow independent living for longer, as well as care homes, as nursing needs intensify. This structural move towards renting has led to residential investments taking their place among more established real estate asset classes.

CASE STUDY
Bright, Rotterdam, NETHERLANDS, Greystar
Units: 612
Scheme opens: Q2 2021

AGE 17 25 30 40

STUDENT PROPERTY

University student numbers have hit record levels around the world. In China, enrolments have risen by 35% since 2014, and there are currently around 20 million students in the EU. Students are now more mobile, too, with the number studying outside their home country forecast to rise from five million to eight million by 2025.

KEY FACT: 19.6 million students in the EU in 2016

"GSA'S PRIME LOCATIONS, ALL-INCLUSIVE RENTS, CUSTOMER SERVICE AND GREAT COMMUNITY SPACES SETS IT APART IN THE SECTOR" *GSA*

CASE STUDY
University Square, Melbourne, AUSTRALIA
GSA
Beds: 345
Scheme opened: Jan 2019

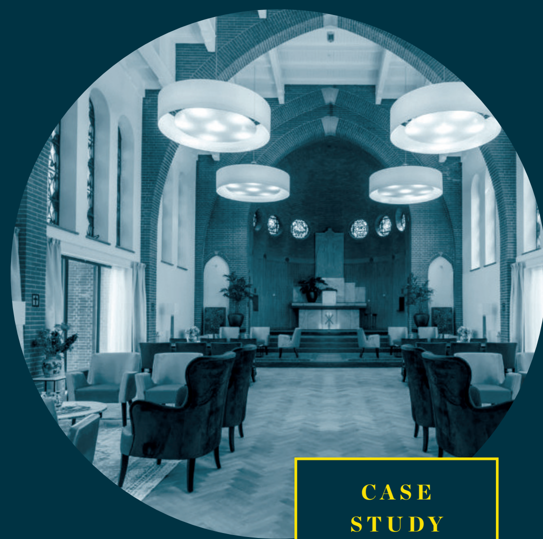
CO-LIVING

Co-living offers tenants more compact units and larger shared amenities, with good locations and affordability at the heart of many schemes. Day-to-day bills are often included in the rent, and in some cases additional services such as cleaning or laundry are also offered. Some co-living operators also put on events for their residents, acting as a draw for new tenants while fostering a closer sense of community among those already living in the building.

KEY FACT: 73% of Australian tenants say affordability is a key priority when choosing a property

PRS

Already an established market in countries such as the US and Germany, investment-grade PRS is expanding rapidly in many markets, including the UK and Australia. Structural changes related to affordability and socioeconomic factors, as well as a desire for more flexible tenure, are creating increased rental demand not just for young professionals but across many age-groups. Policy changes are also impacting the market. In the UK, for example, increased regulation for individual landlords is suppressing the supply of rental accommodation, creating opportunity for large-scale investors. There is global demand among investors for this asset class which is largely demographic and employment-driven.



CASE STUDY

Villa Gardiaan, Stepping Stones care villas, Dongen, NETHERLANDS, Korian Group
Units: 260 specialist apartments
Scheme opened: May 2018

HEALTHCARE

An ageing population and the increased demand for formalised care is a trend driving the healthcare sector in many regions. In Europe, the nature of the healthcare sector is drawing particular interest from real estate investors with long-term strategies, due to high occupancy rates (90%) and long lease lengths of healthcare assets of 25 to 30 years. Indeed, senior living and elderly care are representing an increasing share of real estate transactions.

"INVENTING A SOCIETY WHERE PEOPLE LIVE LONGER IS A GLOBAL CHALLENGE – BY 2030 OVER-65S WILL MAKE UP A QUARTER OF EUROPE'S POPULATION" *Korian*

50 **60** **70** **80+**

CASE STUDY

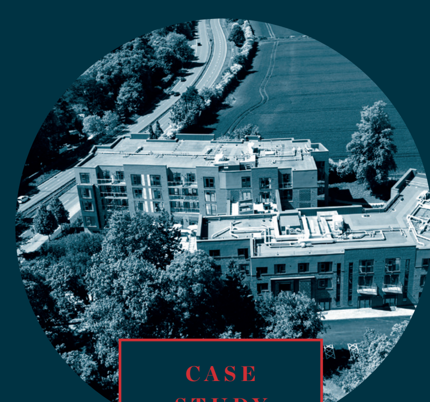
The Fizz, Hamburg Altona International Campus, GERMANY
Units: 777 (453 student apartments, 214 young professional apartments, 110 junior apartments)
Scheme opening: 2020

SENIOR LIVING RENTAL

The global population is ageing rapidly, with the number of people aged 60 or over expected to triple to more than three billion by 2100. At the same time, the idea of 'retiring to the country' is becoming outdated for some, with more older people looking to live in or around city centres, using care solutions that help them live independently for longer.

KEY FACT: By 2050, the number of people aged 60+ will nearly double to 2.1 billion globally

"AVERY BELIEVE THERE IS A STRONG DEMAND FOR RENTAL MODEL SENIOR HOUSING … AND WE ARE WELL POSITIONED TO DRIVE ITS EVOLUTION"
Avery



CASE STUDY

The Hawthorns, Northampton, UK
Avery Healthcare
Units: 78
Scheme opened: April 2018

REAL ESTATE INVESTMENT: A DATA REVOLUTION?

Data capture and use is rapidly on the rise in the commercial real estate sector, increasing transparency and creating challenges and opportunities for investors. We explore these themes below

Technology is increasingly embedded across real estate, from city design, to construction, architecture and operation. But how is the data that it generates influencing the future of real estate and how is it creating value for investors?

Greater transparency

Historically the commercial real estate sector (CRE) has lacked the same level of transparency and data capture as the residential sector. This is changing. Compared to other investment classes, relationships and asset expertise have been a differentiator for investors in the opaque CRE sector. These factors remain important, but skill set requirements will expand to include data capture and analytics. As transparency in the market improves, relationships and personal knowledge is not enough, as barriers to entry reduce. This has already happened in other financial markets. For the agile real estate investor these structural changes will provide an opportunity to enhance value in new ways.

Technology, tenant lease lengths and price performance

In the office sector, while overall co-working is still a small proportion of total space, it is disrupting what tenants want from the wider sector in terms of flexibility and lease lengths. This has implications for relative returns, as traditionally it is longer, secure income that has helped support yield.

In contrast, in the logistics sector, technology is serving to extend average lease lengths. We estimate that fit-out costs of modern warehouses can be up to four times the construction cost of the base building. It is not uncommon for tech fit-outs for some e-commerce companies to run into the millions. These high fixed costs mean that expected lease lengths of the mega distribution centres are extending, providing further scope for yield compression.

The rise in proptech

As investors respond to the ‘lower-for-longer’ environment with technological advancements, they are also widening their portfolio to include proptech. Deloitte found that two thirds of global commercial real estate investors are looking to invest 10% to 30% of their real estate capital in proptech over 2019. According to Real Estate Board of New York (REBNY) and Royal Institute of Chartered Surveyors (RICS), 72% of proptech firms are targeting the commercial real estate sector, providing a rich pool of investment options and showing how CRE investors need to be poised for disruption.

Analytics outperformance

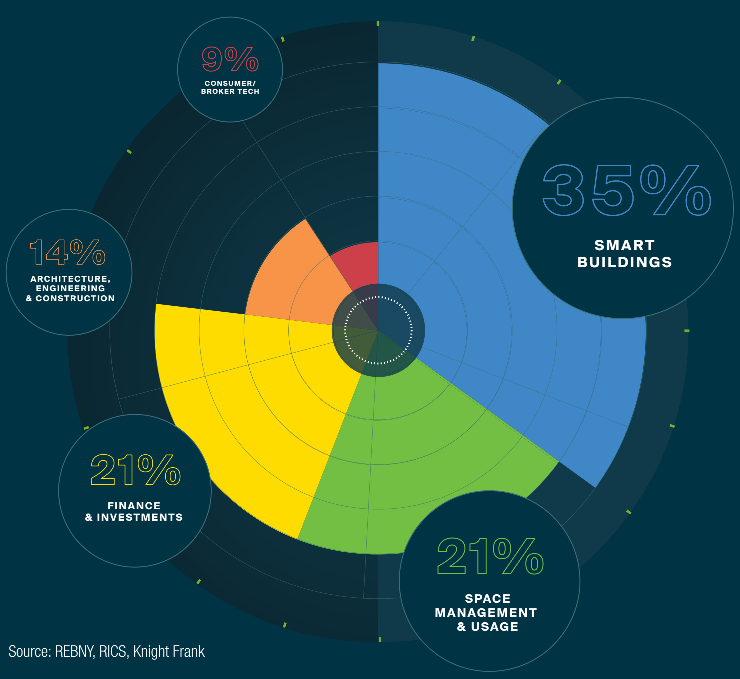
Geographical Information Systems (GIS) have long been used to understand and optimise location, while Building Information Modelling (BIM) is optimising the form, build and use of structures.

On the valuation side, some machine-learning (statistical) models can outperform traditional investment valuations by improving forecasts of income and yield. For example Mckinsey found that machine learning can achieve more than 90% accuracy in forecasting apartment rents, but that 60% of forecasting power comes from non-traditional data sources, such as proximity to local cafés or grocery stores.

Sophisticated analysis of text through natural language processing to create sentiment analysis has been shown to enhance cap rate modelling for investors. This method has also been a leading indicator in trading algorithms for some time and can be applied to the relatively inefficient CRE market.

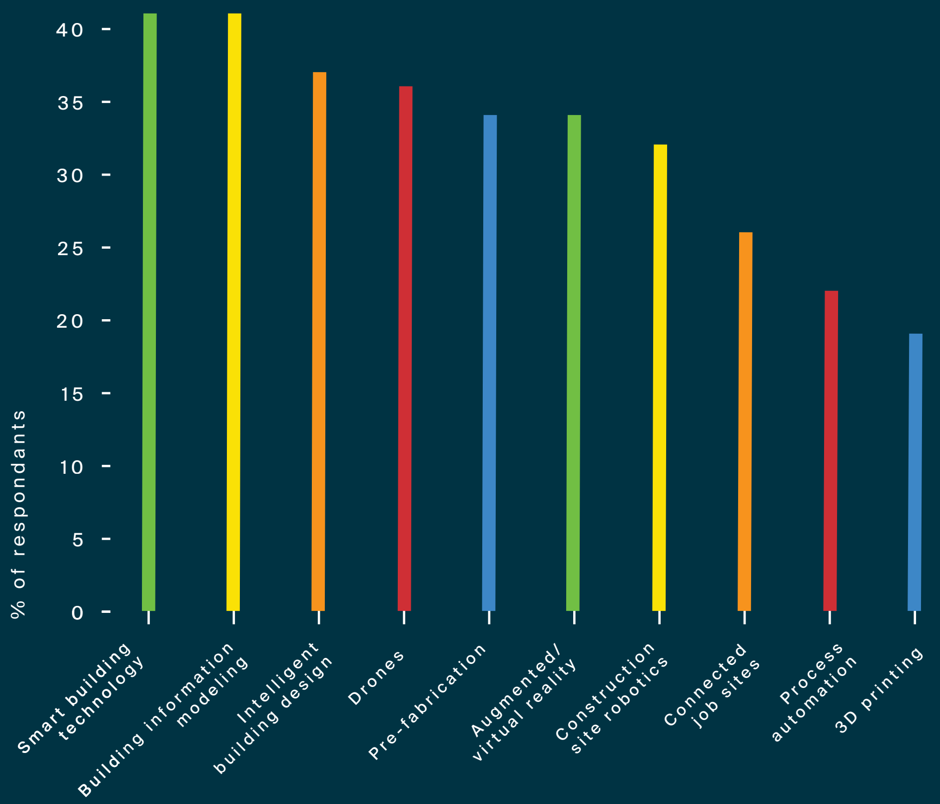
Investors are also using machine learning and non-traditional methods to identify cities that are best poised to take advantage of innovation and urbanisation to drive the wealth and population growth needed for well performing real estate markets.

BREAKDOWN OF PROPTECH INVESTOR SECTOR



Source: REBNY, RICS, Knight Frank

HOW WILL PROPTECH IMPACT GLOBAL REAL ESTATE INVESTMENT AND DEVELOPMENT?



Source: Altus Group, IDC, Knight Frank

Value from data and technology

In addition to technology and data helping to optimise investment decisions, we expect data to drive value in itself. In the office sector, services are increasingly offered through apps, enabling tracking of use, which helps support customer services, operators and owners to maximise use of space. Data is also generated through this tracking of occupants. If investors are able to retain rights to this data, this will provide value in itself. Just like cross-border investors becoming de facto foreign exchange traders, technology will mean some CRE investors become de facto technology firms.

> "INVESTORS ARE GETTING MORE SOPHISTICATED IN THEIR APPROACH TO REAL ESTATE"
>
> *Andrew Milligan, Aberdeen Standard*

The connectivity premium

Technology is making buildings more valuable. The average household in Sweden has 16.9 devices connected to the internet and it is estimated that there will by nine IoT devices for every human on the planet by 2025. This increasing requirement to always be connected also extends to the workplace and is expected to feature heavily on the list of occupiers' must-haves going forward. Digital connectivity will play a large role in CRE valuation in the future, with highly rated buildings based on WiredScore connectivity certification, for example, potentially commanding a premium.

Data challenges

While data and technology have almost unlimited scope, there are challenges for the real estate investor who embraces technology. Data security is paramount. The cost and risks around this should not be underestimated, including the reputational risk and cost of potential data breaches. With sophisticated data modelling and data mining come sophisticated tests needed to ensure output is robust. Privacy concerns are also an issue. Regardless of these challenges, data and technology is changing real estate. It is essential for commercial real estate investors to be aware of changes and be agile in their response.

Sources: Telia Company, Statista, IHS Forbes.com, United Nations

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