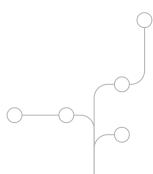
nuveen REAL ESTATE mipim **Engaging the future**

Investing in tomorrow's world







Investing in tomorrow's world

The real estate industry is well accustomed to dealing with cyclical change. However as we look to the future, it is essential to understand the fundamental structural change and disruption occurring in the industry. A collaboration between Nuveen Real Estate and MIPIM, with contribution from ESSEC Business School's students, this report includes our thoughts on the main drivers of structural changes that we believe are most relevant in shaping the future of real estate. We also highlight our favourite 'MIPIM talk' topics from this year's conference.

We recognise three main categories of structural change — demographics, technology and sustainability — all of which overlap with, complement and reinforce each other. As well as being a potential threat, we believe this disruption presents opportunities to create value. Therefore, it is key to have a deep understanding of the character and scope of these three megatrends in order to harness such opportunities. At Nuveen Real Estate, taking a strategic approach to these structural disruptors is part of our tomorrow's world philosophy. This sits at the core of our investment process, informing our long-term view of real estate investments for the enduring benefit of both clients and society.

Demographics

Real estate is fundamentally about the interaction of people with the built environment, with the movement and behaviour of people ultimately determining the scale and nature of demand for real estate. Having extensive knowledge of longterm demographic megatrends is therefore crucial to managing the built environment for tomorrow's world. Some of these trends have a crude positive impact on demand for real estate - urbanisation creates opportunities for real estate developers and investors to provide for a city's new inhabitants, rising middle classes drive consumption and demand for homes, hospitality, travel and retail. Other trends, notably the global shift of economic power and ageing populations, will change the requirements for real estate making some locations and asset types more compelling, leaving others less supported. Generational shifts in consumer preferences and changes in household formation will influence the way people use real estate, having varying influences across different geographies and sectors. For example, shrinking household sizes will change demand for housing. Where this is driven by inward migration and mobile millennials, demand will be focused on multifamily housing or variants such as co-living, however, where it is a result of ageing populations, demand will be directed towards senior living.

Long-term real estate strategies should be focussed on those locations that are best placed to benefit from structural megatrends and should prove resilient through market cycles, while monitoring emerging locations and sector types that will become more relevant in tomorrow's world.

MIPIM talk

At MIPIM 2019, there was a lot of conversation dedicated to these structural trends with a specific focus on technological, sustainability or demographic trends. However, these topics were also very prominent during general highlighted the importance of placing emphasis on structural trends as well as cyclical and market themes. For demographics, there were discussions of the move towards 'alternative' sectors that cater for specific demographics such as ageing populations and millennials, as well as the potential to invest in emerging markets with younger, growing populations. For technology, 2019 marked a next stage of maturity for Proptech, with the industry beginning to move beyond the technologies and buzzwords to really focus on the value the technology can generate for stakeholders across the value chain. For sustainability, the conversation continues to strengthen and evolve, with closer focus on alignment with the Paris Accord. Discussions on moving towards 'net zero carbon' and how real estate can play a positive role for the wider society were topics repeated throughout the conference.





Sustainability

As we transition to the low carbon economy, there is even greater pressure for buildings to become net zero carbon to maintain relevance in tomorrow's world. Buildings that do not have the capacity to make this transformation at a cost that will not damage investment return, are at risk of obsolescence. They will be less attractive to tenants and investors and at greater risk from the rapid policy change expected. At the same time, the physical impacts of climate change are starting to be seen and will increase in severity in the coming decades. Severe storms, flooding, heatwaves and drought will all have an impact on property values, whether directly or through insurance costs. Defensively, there is potential to protect value by selecting assets that are in locations that are less vulnerable to climate change and that have the technical potential to become net zero carbon. However, there is also the opportunity to enhance value by investing in the resilience and energy efficiency of assets today, which will become an increasingly significant factor for investors.

Technology

Technology is a relatively new trend in the world of commercial real estate, with the sector being a laggard in innovation historically, having been largely insulated from the technological forces that have led to the disruption and restructuring of other industries. However in the last 24 months, this has changed dramatically, driven by several forces. These include substantial increases in venture capital investment into real estate tech, 'Big Tech' companies moving into the built environment (e.g. Google's Waterfront Toronto project, Amazon's 'Go' concept and acquisition of Whole Foods), start-up disruptors like WeWork and Airbnb who have continued their ambitious expansions, and an explosion in the sheer number of PropTech start-ups. All sectors, from offices to residential and logistics to retail, have started to feel the impact of technology and new business models, some in more positive ways than others. For real estate investors to generate value from these technological impacts, there is certainly a defensive reaction required to ensure portfolios are as resilient and adaptable as possible, as the world continues to evolve at an accelerating pace. This also, however, presents a unique opportunity for real estate investors to create value by leveraging sophisticated technology and innovation strategies as a serious differentiator.

Envisioning the future

If we look to the built environment in 30 years' time and an urban environment optimised for demographics, sustainability and technology, the city of the future is likely to look very different from today.

From a demographic

perspective, it should be more densely populated than today, but also offer a higher quality of life and an inclusive built environment, with more multi-purpose, cultural spaces that bridge the public/ private sectors.

From a sustainability

perspective, it should be a healthier city with better air quality and a generous provision of green spaces, as well as being net zero carbon as a whole and on a building level. It should also have a clear focus on climate resilience, and greater emphasis on meeting the needs of the full range of society, with affordable provision of housing and services.

From a technology perspective, it could

be a city where much more is optimised based on data (collected with the appropriate level of transparency and consent), and a more flexible built environment that can adapt to changing consumer preferences and support new technologies. Excellent connectivity should be all but universal and the automation of many processes, such as driving, could foster new models of employment.

Although this is the optimistic, long-term vision of the future, it is a possible scenario which is one worth striving towards. However in order to get there, it is crucial to acknowledge the challenges that real estate faces to engaging with this vision of the future and begin the necessary steps today, to ensure a smooth transition into tomorrow's world.

MIPIM talk

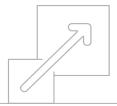
The concept of the future city came up several times throughout the conference, particularly with regard to the changes needed to mitigate climate change. As Ban Ki-moon stated in his opening address, "to cope with climate challenges we must have creative, sustainable and innovative cities." There was also a focus on building more inclusive cities, whereby urban planning plays a more strategic role and mixed-use environments that promote work, live and play are encouraged. In line with this, one of the key areas for improvement, which was highlighted in building this future, was more collaboration across the value chain and between different stakeholders in the built environment. The close links between real estate and transport was also noted repeatedly, particularly in how to approach a future where autonomous, electric and on-demand mobility networks are the norm. In most cases, however, technology was reassuringly talked of as a means to an end, not an end in itself.



Obstacles to overcome

Disruptors on a scale never seen before

Whilst the real estate sector is used to dealing with risk, the unprecedented impacts of climate change and the unpredictable reactions of human populations bring with them a level of change and disruption that it is extremely difficult to predict. Historical data on catastrophic events proves largely redundant when faced with the fundamental and potentially rapid changes that are anticipated. 17 of the 18 warmest years ever recorded have taken place in the last two decades and, globally, the number of extreme weather events increased by more than 250% between 1980 and 2013. This record-breaking trend is set to continue. Real estate owners must become comfortable with the use of scenario modelling to incorporate an assessment of the financial impacts of climate change into investment decision making and reporting. This will ensure that they are better placed to make informed decisions in our rapidly changing world.



While demographic megatrends are, by definition, long term and structural in nature, the consumer and end-user of the built environment is increasingly nomadic and discerning. With so much choice today, people's expectations of their experience from real estate are heightened. The challenge for real estate investors is designing an environment that remains relevant, as demand changes so quickly, whilst also remaining aligned with structural demographic trends that are playing out over an extended time horizon. Identifying a city which benefits from long-term megatrends is often easier than executing the strategy appropriately at the local level. Recognising the need for real estate development in a city carries more certainty than predicting changes in consumer behaviour that will transpire over the many years it takes to complete said development. To engage the future, buildings and leases need to be more flexible, in line with the expectations of their tenants and to compete with other options, often technology based.

The key characteristics that make technology a challenge for real estate to engage with are the inherent uncertainty around its development and adoption, its ability to act exponentially and its global scale. Real estate as an industry typically operates with an expectation that the future will be

MIPIM talk

It was clear at MIPIM that, particularly for institutional real estate capital, the ESG capability of managers investing in and managing their assets is a key part of the comes from a growing recognition that there is no need to sacrifice long-term value to meet short-term earning targets. The heightened awareness of sustainability across the institutional market has meant that the industry has moved from looking at ESG as a pure risk-based approach, towards exploring the role of ESG for value enhancement opportunities. This has moved the conversation towards thematic and impact-based investment strategies which have specific sustainability 'green capital' available, provides the whole real estate value chain with an opportunity to position themselves as the preferred partners of the future. Several of pointed towards the huge role commitments made as part of the Paris Accord – in some cases offering more attractive financing for 'green' investments.

MIPIM talk

If 2017's conference was the year technology really forced its way into the real estate conversation and 2018 was a year of peak excitement and noise around technology's buzzwords, 2019 signified a healthy evolution as the conversation moved onto really focusing on the value that technology can generate for stakeholders across the value chain. with dedicated space for start-ups, however technology increasingly felt part of real estate's core narrative, rather than something happening on the side of the industry. Innovation topics were present from a wide variety of speakers and sessions outside of the innovation forum, with technology often making its more groups are realising that this is a priority they need to address, and almost all large players have now set up some form of top-down technology and innovation strategy.

strictly linear. Compounding this, real estate hold periods are very significant, typically between five and ten years, which means exit positions are being underwritten today that will occur in the late 2020s. With the accelerating pace of technological change, 2029 will likely look extremely different from 2019, as 2009 does from today. As an exponential and medium-term megatrend, technology presents a substantial challenge to real estate by being within typical hold periods, yet highly unpredictable.

Technology is also a truly global disruptor, with almost every technological trend, for example, data, e-commerce, automation, and 'as a service' business models, being largely unconstrained by geography. Almost all major cities will be impacted by these trends in a relatively similar way, albeit often on different timeframes. The traditional response of how to position portfolios defensively (geographical diversification) can, at best, only delay the impact of these trends temporarily, rather than reducing the risk at source. The best approach is to fully engage with technology's structural impact on real estate and understand how these can be turned into an opportunity. This means embracing the future and approaching real estate in new ways to create something innovative that generates value.

Ability to react to disruptors

Faced with the start of the transition to a low carbon economy, asset owners are beginning to understand the potential level of investment required to transform buildings. They must balance the need to quickly decarbonise with the requirement to deliver a consistent return. Whilst zero carbon buildings will undoubtedly be better 'future-proofed' and more valuable, the pace of investment should ideally match the pace of growth in demand. Asset owners are faced with the challenge of judging the pace at which locations and asset classes will be at greatest risk of obsolescence first, whilst knowing that ultimately the entire building stock must make this transformation within 30 years. As technology rapidly advances and the cost of low carbon upgrades reduces, it becomes ever more achievable to deliver returns.

Demographic megatrends should be gradual enough for investors and developers to position themselves strategically to meet changing real estate requirements. However, although strong demographic growth ought to imply economic strengthening and solid demand for real estate, this is not inevitable. Poorly managed growth and migration can lead to compromised air quality, congestion and a flawed built environment that is ultimately inadequate for tomorrow's world. Investors should favour cities that are managing

MIPIM talk

The talk of a net zero carbon strategy wasn't even in the room a year or two ago. This year the market has moved, with real estate investors viewing a net zero carbon strategy as a vehicle to deliver on their 'Paris Proof' commitments. A growing number of investors also believe that a net zero carbon strategy is good for value – acting as a defensive value protector (e.g. reputational accretive value driver (e.g. rent premiums, lower operating expense and higher net operating income). Over the last year, some investors have spent time developing their strategy to meet these increased demands, however, this is still a and managers who have a coherent net zero carbon capability, and are able to demonstrate a well-executed track record in this new frontier, will be at an advantage when it comes to future manager selection.



their growth sustainably and responsibly through good local governance and infrastructure.

While the identification of global demographic megatrends is straightforward, the execution of appropriate strategies is far from simple. Many trends point to new 'alternative' sectors or new geographies, pushing some investors outside their comfort zone or requiring partnership with a specialist operator. A reliance on backward-looking track records in emerging niches will see some missing out on long-term structural growth. Similarly, too much focus on market cycles will mean some miss the bigger picture, more resilient, structural opportunities.

The unpredictability of technological megatrends makes them difficult to price in, budget for and plan around. However where uncertainty is high, the correct response is to attribute premiums to assets that have a greater flexibility of utility and are directionally well-aligned with the emerging technological trends of today. Keeping up with an accelerated pace of obsolescence is a challenge that real estate is struggling to adapt with across underwriting, business plans and portfolio strategies because it cannot be precisely priced. In response, the emphasis should shift towards how a building could deal with the variety of circumstances that may arise, rather than pushing for certainty on exactly what that future will look like.

Opportunities for progress

Cities

The story of the past century has been one of dramatic population shifts that coincided with relentless industrialisation in many parts of the world. Over the past 100 years, the pace of urbanisation has retained its momentum as people migrate from rural to urban areas to seize greater economic opportunities and experience the dynamism of the world's metropolises. According to the United Nations, more than half of the world's population already live in urban areas today, a percentage predicted to rise to 68% by 2050.

While urbanisation is putting pressure on the built environment globally, this is far from uniform. Rural to urban migration in North America and Europe has slowed on the whole, while in Asia Pacific it continues at pace. By 2030, Asia Pacific, led by China and India, will account for nearly half of the world's output, more than 50% of the world's urban population growth and most of the top 50 global cities by population. It would seem likely that these economies will see their share of global real estate investment grow to closer reflect their economic importance and share of the global economy, opening the door to new and increased sophisticated real estate strategies as they mature. Tomorrow's world cities will be resilient, inclusive and green. However in order to get to that goal, there must be extensive and meaningful collaboration between many stakeholders, with those involved having a bold vision. Carbon reduction and the needs of people will often be prioritised above other concerns, resulting in a significant shift in the way development decision making is undertaken. For some cities, the need for protection from the physical impacts of climate change will dominate urban planning, while for others, the decarbonisation of their energy consumption will be a greater focus.

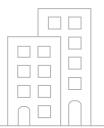
Renewable energy is now as affordable as energy from fossil fuels in many areas, meaning that fossil fuel usage is likely to peak in the next decade. Developing countries with less established energy infrastructure to deliver energy are potentially better placed to take advantage of this move away from fossil fuels — although European electricity grids are also predicted to decarbonise over the next 30 years. Economies and cities that are more reliant on the fossil fuel industry are likely to experience greater volatility.



Technology's macro impact on cities will be to reduce diseconomies of scale that have created negative externalities such as congestion, pollution, overcrowding and inequality. Albeit through green technologies, automation, greater gathering of data or business model innovation - the progress of technology will ultimately allow cities to operate more efficiently at a larger scale than they can do so today. These 'smart cities' of the future will also have to be much more flexible and embrace new models of collaboration between the public and private sector that approach the city as a platform. Taking the analogy of a computer, the city's core infrastructure and governance system should act as the operating system (OS), which allows different permissioned groups to build a variety of apps on top — be they applications of workspace, entertainment, transport, a combination of these, or something completely new. Crucially, the OS must be flexible enough to support a wide range of apps and adaptive enough to install, update and uninstall these apps with minimal cost.

MIPIM talk

Within smart cities, data was a major topic of conversation, particularly in how to effectively combine data collected at different levels of scale, for example data on the community within the building, data on the use of the space, data from the operation of the building itself, and data on the broader urban environment. Currently these areas — which can be labelled as smart buildings and smart cities - are often being approached by different stakeholders in silos. More work will need to be done in the future to bridge the gaps between these areas and ensure that the governance in sharing of this data is well understood.







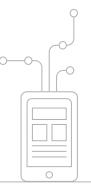
Data

The availability of new sources of data on climate change and greater transparency on building energy performance means a more accurate understanding of the extent to which buildings are at risk and what can be done to make them more resilient, is emerging. An appreciation of this risk will start to be incorporated into real estate value in the near term and to a certain extent, already is.

Sensor technology has developed quickly in recent years and good quality affordable sensors are now readily available to provide information on equipment, condition and indoor environment factors such as temperature, light and air quality. Coupled with the real time data which is readily available on energy consumption, a very different way to manage buildings starts to emerge, with the incorporation of artificial intelligence making self-managing buildings a distinct possibility in the near future.

In the past few years, new 'alternative' datasets have become available that can enable a better and more data-driven understanding of the built environment and real estate assets. Examples include mobile geolocation data, transaction data, open data and data sets that can be pulled from the internet, such as points of interest and social media data. These are certainly valuable, yet we are only scratching the surface of what will eventually be possible. The technological transformation that the industry will experience in the next decade will result in a dramatic increase in the volume, velocity, variety and veracity of data available to all real estate stakeholders, including investors. The possibilities for leveraging this data are further enhanced by the development of advanced data analysis techniques such as machine learning and other forms of artificial intelligence. Exactly what outputs will be created with this data remains to be seen, but what is certain is that those who have the expertise to collect, analyse and extract insights from it will ultimately be well positioned to create value in tomorrow's world.

In response to the millennial movement, locational and space requirements are also evolving rapidly. Softer measures of success, as opposed to more traditional metrics, relate less to prosperity and more to personality, for example measuring the liveability and likeability of a city. A leading example of this is assessing how well-connected cities are, in relation to other global cities as well as internally, through the provision of good public transport, walkability, bike-ability and average commute times. Quality of life and wellbeing are becoming increasingly important to consumers and businesses alike. Metrics relating to the provision of healthcare, education, culture or green space, for example, are increasingly being dissected by corporates looking for new headquarters and therefore should also be incorporated in any real estate strategy. Innovation is another significant influencer that determines how compelling a city is to both occupiers and talent, supporting growth, infrastructure and quality of life. Cities that score well on digital connectedness, foster start-up technologies and have emerging tech hubs will become increasingly influential and desirable.



MIPIM talk

As the saying goes, 'you can't manage what you can't measure'. In any market, benchmarks play a central role in the price formation of financial instruments and provide a useful tool for investments as they allow tracking and performance measurement, and, therefore, allocation strategies accordingly. Within the real estate market, portfolio-level ESG benchmarking has been led by the Global Real Estate Sustainability Benchmark (GRESB). However, this offers limited transparency on underlying asset performance, and where asset-level benchmarks do exist, they do not provide owners pursuing a low-carbon or 'Paris Proof' investment strategy with a reliable index to benchmark their performance. This increases transaction costs and has the potential to heighten reputational risk. Throughout MIPIM, there were a plethora of start-up tech firms promising the golden egg of a portfolio-management tool which provided effective energy efficiency benchmarking of investments, against other anonymised market participants. The integration of platforms that meet the demand for more frequent and detailed quasi-mandatory disclosures was also discussed.

Government collaboration and regulation

Although governments and regulators often struggle to keep up with the fast-moving pace of technology, for real estate, proactive and thoughtful involvement is highly beneficial, as real estate stakeholders are typically risk-averse and uncertainties surrounding the legal or regulatory risk of a technology or product are likely to significantly restrain adoption. This is particularly relevant in the areas of data and Fintech. For data, Europe has led the way. Although there remains a degree of uncertainty around some facets of GDPR, it is a net benefit to the data ecosystem in Europe because it provides a foundation of clarity on the macro data governance framework. In the adjacent space of Fintech, and especially for applications of the public blockchain, deep collaboration between those innovating at the cutting edge and regulatory bodies is even more crucial to enabling this movement to meet its potential and achieve buy-in from the real estate industry.

Regulatory change is essential to deliver green buildings, green infrastructure and green spaces that will be critical to cities in tomorrow's world. There is a danger that regulation is not being introduced early enough which means that when it does arrive it will be accelerated and therefore less benign to the business community. Building regulations need to be adapted to reduce embodied carbon in developments, to massively improve the energy efficiency of buildings in operation and to ensure that real estate is protected against the impacts of climate change. Australian cities have already achieved one of these goals with their successful transition of office real estate to be almost zero carbon in operation over the past two decades. A key part of this success has been the role that local government has played in demanding higher standards as well as working with the private sector to deliver this in a sustainable way. When it comes to climate adaptation, cities such as Tokyo, Miami and Shanghai have all started to take steps to protect themselves from extreme weather, and the business community will increasingly look to governments to provide certainty about the level of protection that can be expected. The reality is that there will be some areas that will become inappropriate for development and governments will need to play a strong role in ensuring that the economic impact of this change is well managed.

Successful investment in a city requires understanding of how a building or development sits within the fabric of that city. Consideration should always be given to adjacent uses, common space and public realm in between buildings. Investors and developers should seek to collaborate with local governments to understand where there are supply shortages or how a building can support the success of the local area, as well as ensuring there are minimal adverse impacts on the environment or local residents. In this arena, effective public and private sector collaboration is critical and ought to drive the best outcomes at both the asset, local area and city level.

Building the right industry culture

It must be recognised that a key obstacle to engaging the future is the culture of the real estate industry which is not as dynamic, innovative or inclusive as it could be. In order to achieve this, more diversity is needed across all areas — people with different backgrounds, skills, attitudes and perspectives.

To successfully bring real estate into the 21st century, the industry needs to include more hard and soft competencies — more people with sophisticated digital and data skills, and more people with hospitality/user experience skills. These skillsets are relatively commonplace in other areas of the economy and high performers from other industries need to be attracted to real estate in order to revitalise the culture, to encourage new models of thinking, innovation and experimentation. There is already a strong argument that having a surveyor's background is no longer the best knowledge base for someone starting out in real estate today — an argument that will likely get stronger over time. More fundamentally, as a core decision-maker about the built environment and cities, real estate needs to better represent the stakeholders who are ultimately experiencing the consequences of these decisions. We need to acknowledge that no building exists in a vacuum, and that all buildings create significant externalities, both positive and negative, on their local environment. Being representative, therefore, means being representative of society, not just the direct clients of the building.

The real estate industry will suffer if it relies solely on market forces and the natural cycle of talent churn to evolve itself. A conscious effort needs to take place within the industry to help drive this at a more accelerated pace. Those who can grasp the mantle and create this new reality will be rewarded by being better placed to engage the future.

MIPIM talk

The 'diversity deficit' of the real estate industry was a hot topic during the conference, particularly from a gender perspective and also regarding skills, age and background. In spite of the mounting evidence that more diverse teams make better decisions and lead to better business outcomes, real estate has remained a diversity laggard. Although efforts to change this are certainly gaining momentum across the board, there was a strong consensus that more needs to be done. It was also noted that this was not just a matter of hiring, but that it is linked to broader questions such as the perception of real estate for those choosing career paths and how to make the overall culture of the industry more inclusive. Finally, in seeking to improve the diversity of the industry, it was suggested that we should hire more from other industries, especially at a senior level, which would help to bring different skills to the table, as well as enabling change from the top down. With real estate going through a high degree of structural change, there is greater need than ever to avoid groupthink, encourage different points of view and build new competencies — all of this requires a much more diverse industry than exists today.

Conclusion

Real estate is going through an exciting period, on the cusp of structural megatrends that, in many ways, are truly disruptive to the status quo within the industry. The challenge for real estate, and for all stakeholders along the value chain, is to be able to react fast enough to the acceleration in change of consumers, technology and the climate and to make a success of this to create a city of the future that serves the needs of society. There are many obstacles that the industry must overcome to fulfil this potential, however, real estate is not used to dealing with the unpredictability, scale or timeframe that these megatrends operate in. To overcome these obstacles, thinking creatively about cities, increased collaboration and more data-led decision making will be key factors to success. A crucial foundation to enabling all of this is the people and culture that make up the real estate industry itself, where an acceleration is needed to bridge the diversity deficit.

Those who position themselves defensively in light of these structural changes will survive in the short term, but those who can create opportunity will be able to drive true value in tomorrow's world and fully engage the future.





Nuveen Real Estate

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Our investment, asset management and corporate strategies grow from a deep understanding of the structural trends that we believe will shape the future of real estate and responsible investing beyond market cycles. This 'tomorrow's world' approach sits at the core of our investment process and business operations, informing our long-term view of real estate investments for the enduring benefit of both clients and society.

*Includes 287 real estate investment professionals, supported by a further 260+ Nuveen employees Source: Nuveen, 31 Dec 2018.

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