

**Deloitte.**



## **Real Estate Predictions 2024**

Building a sustainable and AI-driven business



Deloitte's Real Estate Predictions for 2024 will help you prepare for the transformative trends set to reshape the industry. Our experts delve into how cutting-edge technologies such as generative AI, digital twins, and mixed reality will revolutionize real estate. In addition, we explore the pivotal role of sustainability and advanced analytics in the development of smart buildings, emphasizing the critical need for robust cybersecurity measures.

Our predictions will challenge you to challenge you to think ahead and equip your business for the opportunities that these key trends bring. Are you ready to explore what's next in Real Estate?

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## Prediction 01

Six ways GenAI can amplify the impact of AI on commercial real estate



As the commercial real estate (CRE) industry embraces the digital age, the role of Artificial Intelligence (AI) is becoming increasingly significant. Taking it a step further, Generative AI (GenAI) is set to revolutionize the way we create, manage, and value buildings. In this thought-provoking piece, we delve into six transformative ways that GenAI can amplify the impact of AI on CRE. We explore how GenAI can innovate design processes, enhance property valuation, improve tenant engagement, support smarter building management, streamline lease administration, and even enable new revenue streams. Join us as we explore the immense potential of GenAI in reshaping the future of the CRE industry.



## Robust & flexible designing

Today's AI-powered generative design tools are making it possible to have data-driven and flexible building designs and plans. GenAI capabilities can help generate floor plans and high-resolution 3D renderings instantly, based on a few prompts based on the requirements. Beyond the initial design output, planning & design teams can easily restyle and edit as well.

In addition to speed and efficiency, GenAI can help architects and developers to create more robust designs by considering multiple parameters such as building codes, materials, spatial requirements, economics, feasibility, environmental considerations, and social governance, to produce innovative design alternatives. These alternatives can be tested by simulating different conditions and scenarios to create more robust designs and help reduce risk.<sup>1</sup> Developers can prioritize best options based on project success factors and return on investment.

More importantly, it is not a one-time exercise and planning & design teams can continually validate and scenario plan to adjust over time with integrated real-time modelling. GenAI tools can help the teams to be agile by interpreting any changes or updates which may be entered in the form of text, audio, image, and video.



## Rigorous property valuation

AI is transforming the traditional ways of real estate valuation, which was based on manual processes and human judgement. AI technologies and machine learning algorithms enable automated valuation models (AVMs) which can provide unprecedented speed, sophistication, and efficiency in real estate valuations. GenAI can help in analyzing data from different sources, thereby reducing the time, effort, and error in gathering, standardizing, and managing the data and assumptions.

The valuation models can analyze and consider large datasets on diverse parameters, such as location, demographics, built quality, and amenities to provide real-time, objective fair valuations for different property types. Further, by including forecasted data on aspects such as macroeconomic factors, capital costs, and demand-supply patterns, GenAI can help to more accurately forecast asset valuations and more accurately assess potential risk factors to asset value. This can have an immense impact on acquisition and disposition decisions for CRE owners and investors as they can take better informed decisions.



3

## Enhanced tenant engagement and personalized experience

GenAI can help drive a more personalized and engaging experience for tenants in many ways. Tenants' expectations have increased from a digital real estate standpoint. Our survey<sup>2</sup> showed that over half of CRE tenants are looking for more digital and personalized amenities, such as digital concierges, space personalization, digital assistants, and real-time visitor monitoring.<sup>3</sup>

GenAI-powered chatbots can offer personalized interactions with tenants, addressing queries and providing information instantly on a 24/7 basis. Based on the analysis of tenant behavior and preferences, owners and managers can provide more customized information and services, including amenities recommendations.

At a physical level, GenAI voice assistants integrated with smart building systems can enable tenants to control aspects such as lighting and temperature through voice commands, enhancing convenience. By incorporating these AI-driven solutions, CRE owners and property managers can enhance tenant experience, improve satisfaction, and foster greater engagement, ultimately leading to higher tenant retention.

4

## Smarter building management

GenAI can deliver unique insights by enabling building managers to query and analyze building and market data together. For instance, it can elevate predictive maintenance by answering queries on when maintenance is required, based on different internal and external variables. Further, it need not be transactional as GenAI agents can help with continuous monitoring of building performance data to identify anomalies, enabling early detection of equipment malfunctions. This can minimize the downtime, reduce repair costs, and extend the lifespan of building systems.

While AI can ease the day-to-day operations by automating certain tasks such as work order generation, assignment of maintenance tasks, tracking spare parts and supplies, and reordering supplies when stock is low, GenAI can help to analyze operations data and provide instant answers to different performance issues. This can increase the operational efficiency and reduce inventory costs.

**GenAI** can help owners and managers to analyze the data about people and processes, in addition to the building data, to provide a more operational context of the built environment. It can help building managers to understand the impact of building performance on occupants. For instance, they can explore how indoor air quality impacts tenant experience and occupancy. This can be a game-changer, allowing owners and managers to make more informed decisions based on combined insights from building systems, tenant demands, and user behavior.<sup>4</sup>

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## More efficient lease administration

AI is automating lease administration, making it more efficient and accurate. This includes extraction and abstraction of key information in lease agreements, including lease terms, escalation clauses, and renewal options. GenAI can enhance it further by facilitating better interpretation and visualization of data.

Further, AI tools can track rental payments, calculate escalations, monitor expense reimbursements, generate invoices, and send automated notifications to property managers and tenants. GenAI can provide greater insights in automated reports on lease performance, financial metrics, and compliance status.

GenAI can also facilitate faster lease audits by organizing and retrieving the lease documents and financial data swiftly. It can analyze lease data across the entire portfolio to identify trends and opportunities and help in making more informed decisions around lease renewals and negotiations.

## 6

### Enable new revenue streams & business models

As buildings become smarter, an integrated digital ecosystem can utilize building data in new ways and can be accessed via a single platform – essentially a marketplace accessible to different stakeholders. This platform business model has transformed many industries by connecting producers and consumers of information and services in new and innovative ways.<sup>5</sup>

AI can be a key enabler of new revenue streams for owners through ‘as-a-service’ models, where owners could consider expanding their rent-per-square-foot revenue model to include subscription-based services such as intelligent energy consumption, predictive maintenance

and automated work orders, and occupancy analytics. GenAI can enable many such services by aggregating and analyzing vastly unstructured buildings data and providing smart insights about asset performance and usage.

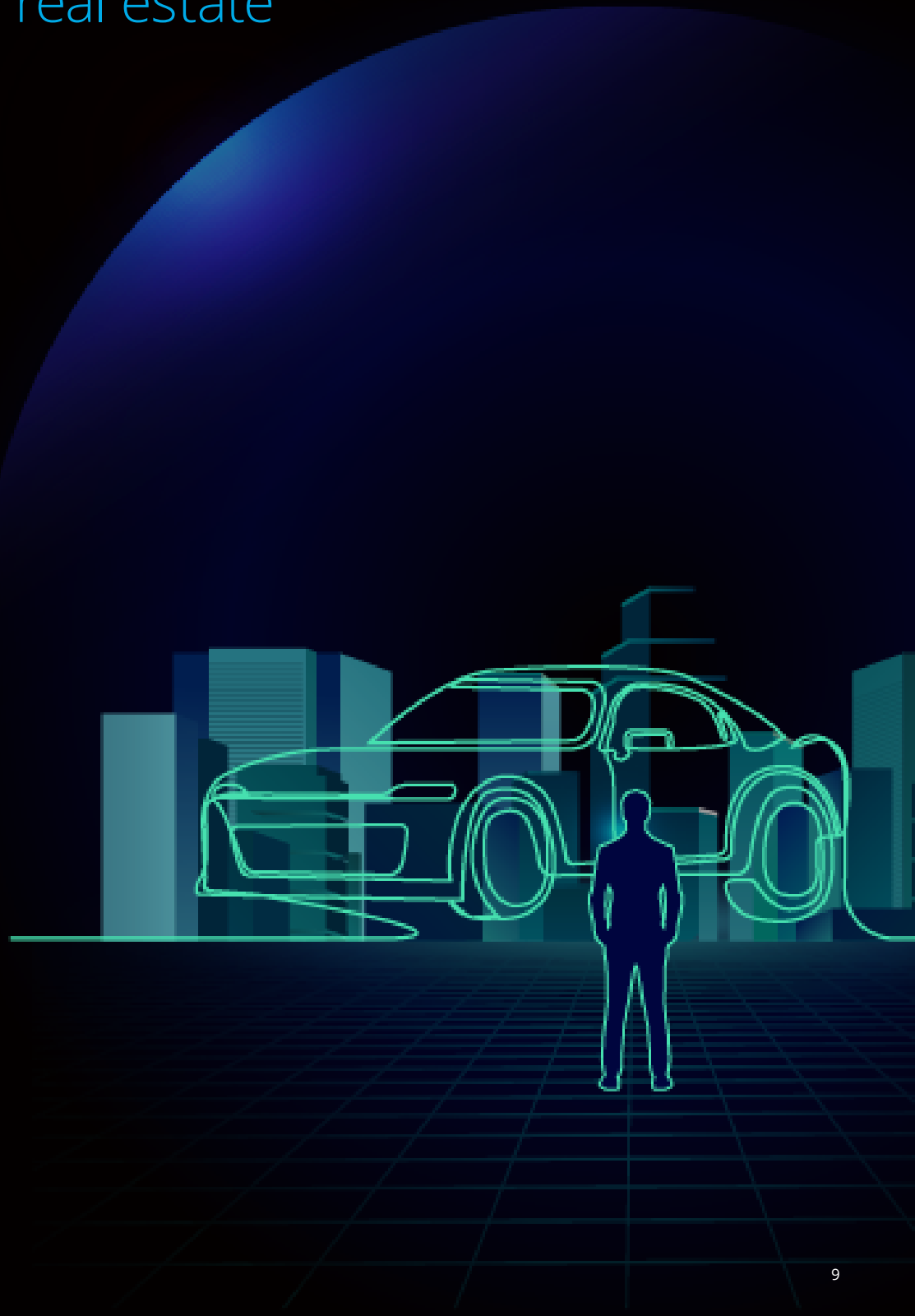
Our survey<sup>6</sup> revealed that most tenants would be interested in seeing their landlords provide new as-a-service models. For instance, 56% said they would be interested in paying their landlord to monitor renewable energy or water usage, reduce waste, or harvest rainwater. Half of the tenants also indicated interest in paying for occupancy analytics so they can optimize their space usage<sup>7</sup>

The infusion of GenAI into CRE is a transformative force that can amplify the impact of AI across different areas of real estate lifecycle. For instance, we are seeing continuous innovation in smart glasses and AI could make them more effective by providing deeper insights and increased safety at construction sites.<sup>8</sup> As GenAI technology continues to evolve, its impact on CRE will likely become even more profound, ushering in an era of unparalleled efficiency, innovation, and sustainability.



## Prediction 02

How mobility is driving  
the future of real estate



Historically, real estate and employee travel were largely separate matters, but COVID-19 prompted employers to explore alternative ways of working, which will have significant real estate implications. Now, organisations are rethinking their mobility choices, including alternative modes of travel, or taking the office to the workforce. Here, we examine how mobility is changing, and transforming from an employee benefit into a cornerstone of how organisations operate and make their real estate decisions.

## Driving forces: navigating mobility in a post-pandemic world

The pandemic revealed many mobility options that could be adopted, but three drivers now make it imperative that they should be considered.

First, **imminent reporting legislation**, such as the EU's CSRD and for example in the Netherlands' work-related personal mobility (WPM), make organisations accountable for the CO<sub>2</sub> emissions from their buildings and employee travel, including commuting. Current research shows that 78% of organisations are concerned about the business impact of such reporting requirements, and 84% still lack the necessary data.

Second, **sustainability** (CSR and ESG) policies – which go beyond the statutory minimum – are increasingly being demanded by stakeholders, including shareholders, society (where travel occurs), and clients or suppliers who want to deal with sustainable organisations.

Third, present and future employees now have many options for balancing their lives, affecting where they work, how they get there, and the time it takes. Mobility will therefore be key to retaining and attracting talent – especially recent generations who, according to [Deloitte's research](#), are more attracted to employers offering remote or flexible working. Furthermore, new talent also favours organisations with clear and credible sustainability practices.

## Real Estate and mobility; finding balance

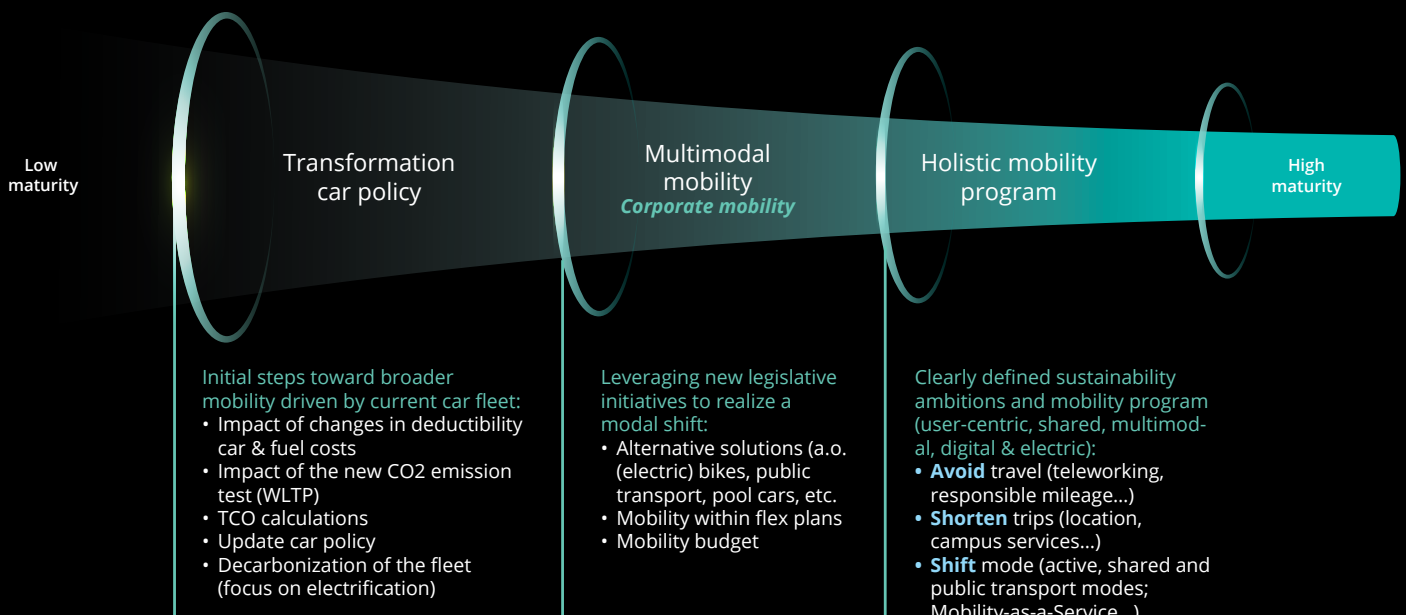
No single strategy will suit all organisations, but each one must recognise that real estate and mobility are becoming connected, and make the right choices to balance talent, sustainability, and costs.

For example, allowing employees to work remotely two days a week reduces the financial and environmental costs of both commuting and office space, and is more attractive to new talent. On the other hand, employers such as major player in the global semiconductor industry reported innovation to be lower during the pandemic, while a well-known sportswear brand attracts staff to its campus, with high-quality sports facilities.

While remote or hybrid working can satisfy employee expectations, and reduce the need for traditional office space, we also expect it to increase the demand for non-traditional space, for teaming, collaboration and co-working. Businesses must therefore improve their understanding of how traditional, non-traditional and home working spaces are used, and the associated costs.

Wherever employees work, their employers will become responsible for reporting on their travel (and thus emissions), and a widespread return to office working could increase the impact of such travel. Many employees moved further from the office during the pandemic, so the longer commute would increase road traffic, or put greater pressure on public transport. Most corporates are therefore aiming to expand their mobility options, reduce car fleets, and incentivise more sustainable behaviours.

The diagram below illustrates how organisations are rethinking their mobility options. Some focus on the company car (or allowance), as an employee benefit. For others, mobility is changing organically, to include alternatives such as bicycles or public transport allowances. The most mature organisations are taking a more deliberate approach, and transforming from employee travel benefits to a holistic mobility programme that embraces multiple modes of both travelling and working.



Arriving at the right solution involves many considerations, and we have identified six building blocks for developing a mobility strategy, as illustrated below.



**01 VISION & PRINCIPLES**

- Vision
- KPIs
- Guiding Principles
- Clear narrative of the purpose
- Fit in Reward strategy



**02 COST/DATA ANALYSIS**

- Geographical data
- Demographical data
- Work regime data
- Cost data
- Employee needs and preferences



**03 MOBILITY SOLUTIONS**

- (Electric) Car / Fuel
- Train / Bus
- (e-) bicycle (lease)
- Carpool / Pool car
- Remote work / Flex hub
- Parking



**04 TOOLS & ENABLERS**

- Parking / mobility apps
- Mobility Platform
- Hardware



**05 POLICIES & PROCEDURES**

- Car / mobility policies
- Supporting processes



**06 COMMS & ACTIVATION**

- Assist to facilitate the change throughout the entire organization (e.g. campaigns, incentives, ambassadors, trainings HR / business)

## Mobility Strategy; Vision, costs and Integration

An important starting point is to understand the organisation's vision and priorities, including facilities, HR, finance and sustainability perspectives. Our experience suggests that HR and sustainability functions usually lead this conversation, while real estate has traditionally been the driver when an office move is involved. However, a holistic approach must consider real estate as an increasingly important element in any mobility strategy.

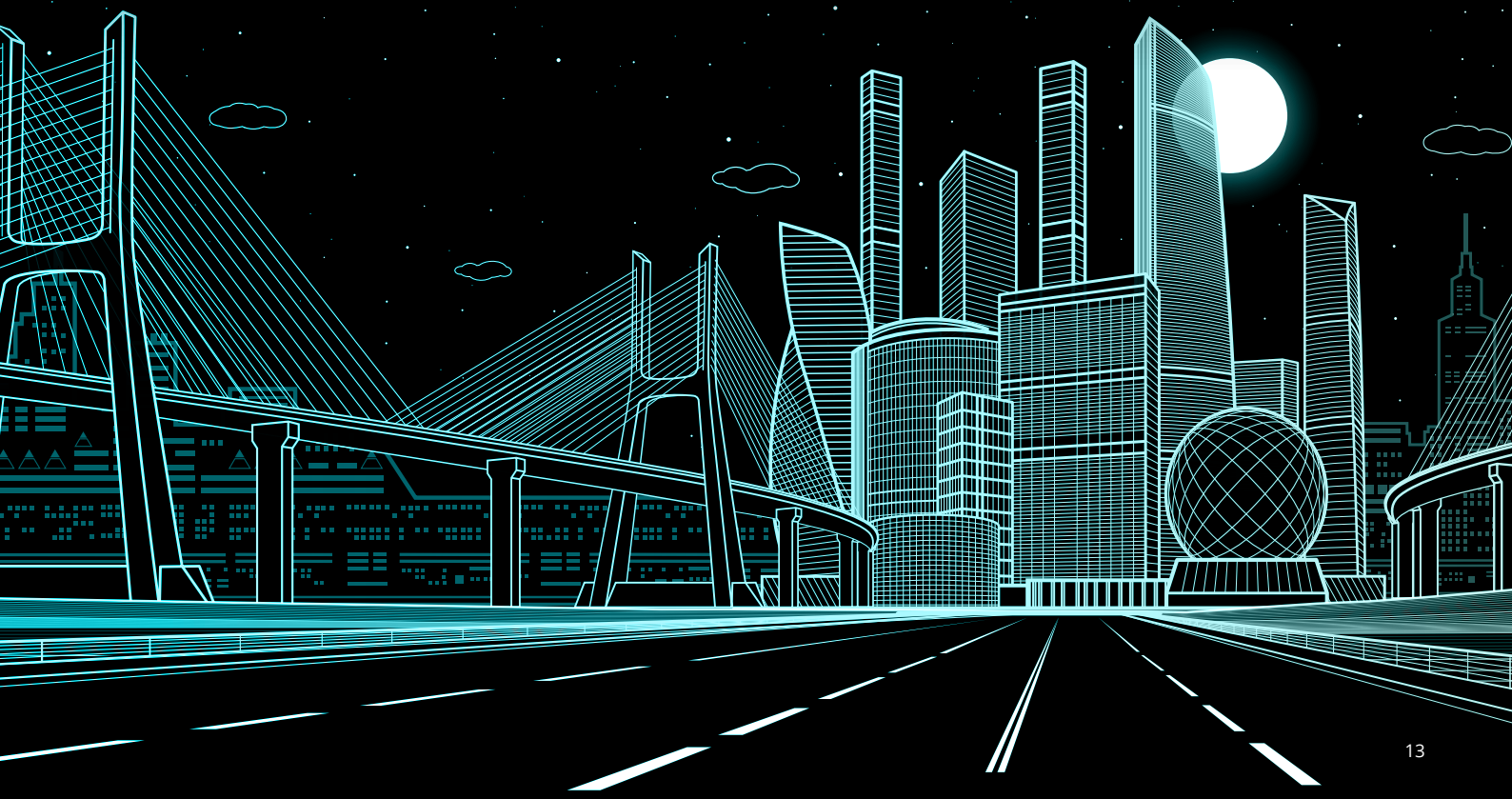
Evaluating current and future scenarios requires the right information. Even when organisations can measure their real estate needs, it's also important to establish data on mobility patterns and costs. In the Netherlands and Belgium, new mobility solutions are emerging and maturing, along with policy initiatives such as tax incentives or low-emission zones, so good data (including CO<sub>2</sub> and financial costs) helps to quantify each option. For example, even if the total cost of ownership for a company car scheme is known, mobility data should also reflect the range of other options.

With these three considerations – vision, costs, mobility options – in place, an organisation is well-placed to make informed decisions about its mobility programme, and identify the enablers that will make the vision a reality. Software tools – such as videoconferencing or mobility as a service – can support multimodal working, but the office itself can also be an enabler.

**Organisations must fundamentally shift their thinking, from mobility being a service for a given office location, to real estate being one component in a broader mobility strategy.**

That role might involve office location and construction, or building new facilities such as EV charging, bicycle storage, or showers.

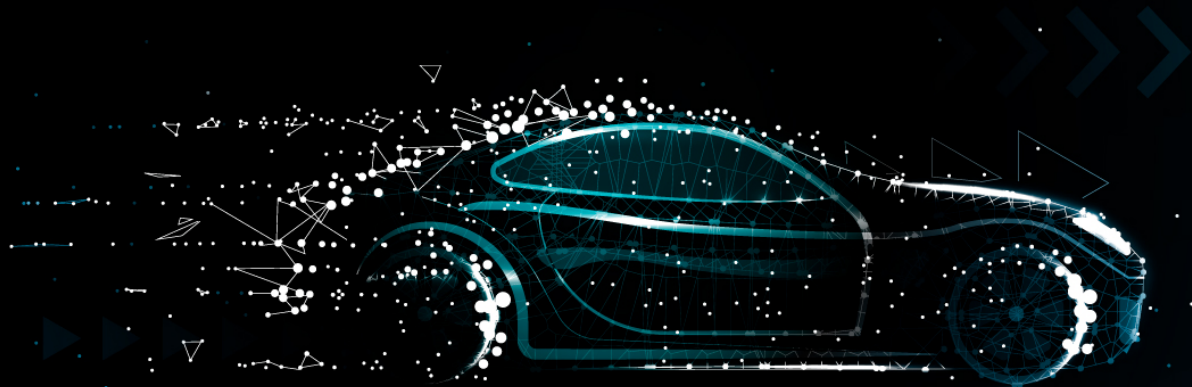
To put it into practice, the mobility strategy should be enshrined in policy and – importantly – communicated. Working patterns are often being central to employees' lives, so this might require significant behavioural change. Effective leadership is essential: not simply with launch announcements, but also through active and sustained demonstration, with leaders visibly adopting new work and travel behaviours themselves.



**These changes are already happening. For example, AAVN, the Dutch employers' association, reports that 85% of its members are working to 'green' their employment terms, and half have already enshrined such changes in their collective agreements. Deloitte Belgium's mobility strategy cut its fleet (which represented 69% of its total CO<sub>2</sub> emissions before the new mobility programme was rolled out) by 700 cars, and reduced its overall CO<sub>2</sub> footprint by more than 30%. A large telecom company incentivised**

**cycling and walking with travel allowances that exceed not only the company's car allowances, but also the country's tax-exempt maximum, while another major telco now promotes an initiative to 'drive less, drive greener.' Acting now can help your business start reaping early commercial benefits, and demonstrate social responsibility, rather than simply reacting to legislation.**

The six building blocks will help any organisation, in any country, develop a mobility strategy that balances its environmental, financial and talent needs. Whether your business aims to be a leader in sustainability, or simply keep up with legislation, mobility is now a priority, which can offer strategic benefits for talent and real estate.



## Prediction 03

Securing the future of sustainable smart buildings



**Traditionally, real estate is about bricks and mortar, but its future lies in advanced analytics and improved user experience. Sensors and servos will collect and deploy data intelligently, as the lifeblood of smart, efficient buildings that respond to users' needs. This convergence of innovation and infrastructure will enable the jobs of the future, underpin economic prosperity, and drive the move to greater sustainability.**

**Technologies such as water conservation, HVAC optimisation, solar panels and other renewable sources can transform the environmental impact of buildings, while building automation systems and predictive maintenance can streamline their management. This minimises wasted time, materials, costs and energy. Buildings currently represent 40% of global energy consumption and 33% of all greenhouse gas emissions, so smart buildings will give the real estate sector a leading role in shaping a sustainable future.<sup>1</sup>**

## Data-driven benefits...

This opportunity to shape the future is huge, and will depend on equipping buildings with connected devices. Operationally, connected firewalls can reduce response times in emergency situations, motion sensors can help manage heating and lighting to save energy, while digital access controls can tailor access to spaces and thoroughfares for different individuals.

Data from such devices can also provide behavioural insights for building management, but must be used effectively and ethically, to maximise its benefits while respecting individual privacy.

For instance, patterns in the data might reveal that an employee commutes a short distance by car instead of walking, which might prompt the building manager to consider the reasons for such behaviour. These insights can then inform human solutions, such as an employee shuttle bus or working patterns that avoid walking alone at night, to promote both sustainability and employee wellbeing. Smart buildings can provide the data that helps organisations ask smart questions and work better.

## ...but exposure to risk

The big emerging threat, though, is a cyber-attack, which is gaining prominence in many portfolios' risk registers. Such cyber-attacks could have a severe commercial impact on businesses that rely on digitalisation to meet performance targets, and cannot afford to lose any uptime.

<sup>1</sup> [Why buildings are the foundation of an energy-efficient future](#), World Economic Forum, February 2021.



Unlike traditional buildings, the fabric of smart buildings – with many interconnected devices – presents a large attack surface, which must be secured. Legacy systems might have been designed for a less connected age, digital products might be insecure, and the wide variety of devices, vendors and standards could lead to major vulnerabilities. Internet of Things (IoT) devices, for instance, often lack secure protocols or consistent standards, making it hard to be certain that a smart building is also a secure building. Meanwhile, at national level, there are [growing security concerns](#) that some vendors' devices could be vehicles for hostile powers.

Bad actors might include nation states, disgruntled ex-employees or organised crime, and attacks are already a reality. [Building managers have lost control when automation systems have been hijacked, hacked HVAC systems have jeopardised the safety of hospitals, and thousands of solar panel stations have been found to have security vulnerabilities.](#) Meanwhile, shopping centres, hotels and parking garages – particularly those that have embraced digital transformation – can be susceptible to a range of cyber-attacks, and make attractive targets for cyber criminals, due to their essential function in society.



## Environmental considerations

While such attacks can do commercial or reputational damage to the organisations concerned, they can have a wider impact on global sustainability. Not only do they undermine the environmental benefits of building management technologies, but they also spread fear and slow the adoption of sustainable solutions.

The good news is that such risks can be mitigated. The technology, and associated risks, might be new in real estate, but they are well-known in other sectors. New threats are constantly emerging, but the art of staying watchful is well-developed. Such vigilance does, however, require the existence of threats to be acknowledged, and many real estate companies have not yet woken up to their reality.



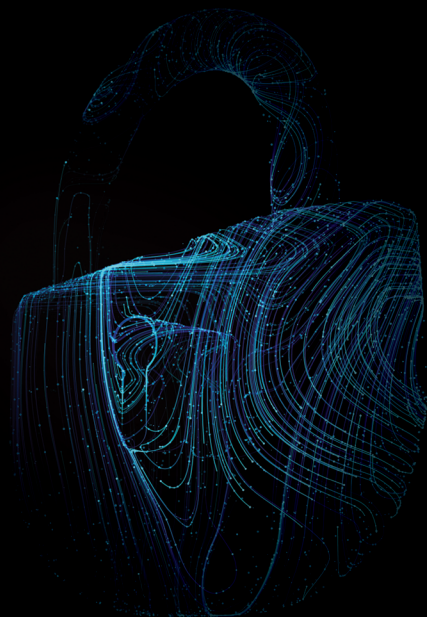
## Effective security

Once the challenge is acknowledged, cyber risk real estate experts can advise on the most effective way to move building management systems and other estate technologies from their current state to a state in which cybersecurity is managed. At the heart of this approach is a clear understanding of each organisation's particular business, critical priorities, assets and operations. They then consider the building's current network architecture and cybersecurity risks, rules and regulations, to show how a secure system would look. This knowledge is distilled into a roadmap that identifies the steps needed to move from the current state to a connected building that operates in a safe and secure fashion. However, making that shift a reality requires the right organisation to be put in place, including allocating clear responsibilities and ownership for cybersecurity, which are still lacking in many real estate companies.

For example, the complex security ecosystem of a smart building involves many parties: the asset owner, the integrator of the technology, the building operator and the technology manufacturers. Devices must be manufactured, specified and procured to suitable security standards (including passwords and encrypted

communication), configured by the integrator to work to the same standards across all devices and systems, and operated under policies and procedures that preserve security through updates and maintenance. All parties must therefore work together in a co-ordinated way to ensure that the building is truly secure.

Without a strategic approach, cybersecurity can become a fire-fighting exercise, reacting to each new threat with a different tool, which can lead to overspending. The threat landscape of today might be different in ten years, or three months, or two hours, so security activities – such as intelligence-gathering, due diligence and penetration testing – must be an ongoing responsibility. By establishing pre-emptive awareness and adaptation as routine processes, a well-designed security organisation will take cyber-obstacles in its stride.





## Regulation, collaboration, opportunity

Furthermore, besides the need for building effective security, companies now face the challenge of demonstrating compliance. For example, the EU's Network & Information Security (NIS2) initiative aims to achieve a consistent level of cybersecurity in critical sectors across all member states, while the Cyber Resilience Act (CRA) will establish security standards for digital devices. However, just as with sustainability regulations, the right strategic perspective can turn a compliance obligation into a business opportunity, to develop effective and resilient building management systems.

Another parallel between cybersecurity and sustainability is their greater focus on collaboration, using openness and transparency to promote sector-wide best practice. Although concealing any cyber vulnerabilities or attacks might appear to protect market confidence, the most effective responses to cyber-attacks have in fact involved making them public, and sharing the key learnings more widely.

Smart buildings are the future of real estate but, for them to deliver their commercial and sustainability benefits, they must also be built on a solid foundation of robust cybersecurity.

## Prediction 04

Transforming real estate from what's next to what's now with Gen AI and immersive tech



Right now, the media is awash with talk of AI (artificial intelligence). Just a couple of years ago, ‘the metaverse’ was the big news, which is also now often referred to as immersive technology or spatial computing, depending on its focus and use. Technology trends are arriving more and more rapidly, and the pace can seem bewildering. However, the real challenge is not to chase the latest wave, but to recognise the broader potential of such technology for real estate.

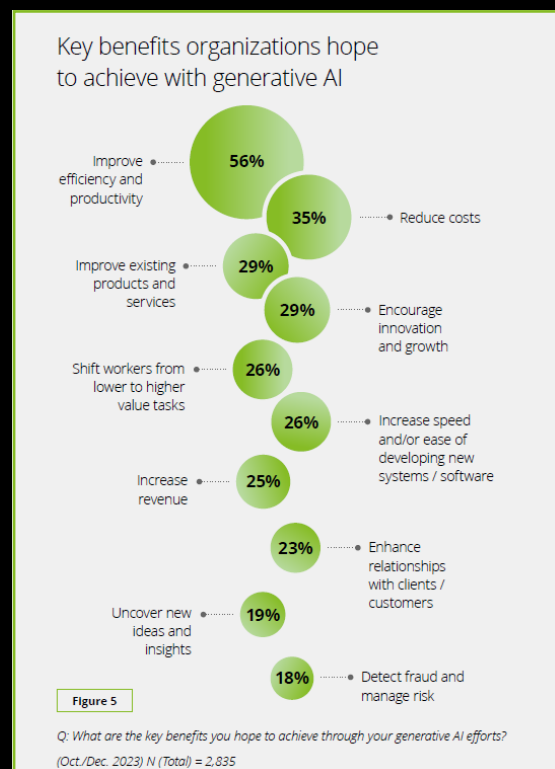
One scenario might see a broker sitting on a beach, while manifesting online as a realistic avatar, to accompany clients on virtual walk-throughs of properties all over the world. Another might see an asset manager’s routine workload being handled by an AI agent, allowing them to focus on high-value human interactions and relationship-building – or sipping cocktails.

Such examples won’t come from simply adopting the latest single technology, but by recognising how they can be harnessed most effectively, and in combination. Here, we review the recent developments of generative AI and immersive technology, and consider how they could drive the future of real estate.

Artificial intelligence is not new – in theory or practice. AI is a well-established general class of technology for understanding and learning intellectual tasks such as communication, but it’s now making headlines because of recent advances in generative AI (Gen AI). Gen AI allows machines to create new and plausible content – text, code, audio or images – by learning from a much larger pool of source data than previously. As such, it’s simply the latest stage in the evolution of AI, from intelligent automation, speech recognition and predictive analytics, through virtual assistants, machine learning and visual recognition, and toward future developments such as artificial general intelligence.

Although its ability to create new material has seized the public imagination, Gen AI offers huge potential for businesses, in cost reduction, revenue generation, product and service innovation, or customer relationships. In Deloitte’s own work, our AI Institute provides a thought leadership hub, while the Gnosis Intelligence Center uses our in-house language model (integrated with ChatGPT) to deliver an unprecedented level of market intelligence, based on around four million news articles daily.

Our [Gen AI Survey](#), of 2550 participants, revealed the likely disruption across industries, and indicates particularly high impact on rental, hiring and real estate services, and – to a lesser extent – on construction. Further key findings in our [latest study](#) on Generative AI was that the majority of organizations is targeting tactical benefits such as improving efficiency, productivity and cost reduction.



**Current generative AI efforts remain more focused on efficiency, productivity and cost reduction than on innovation and growth.**

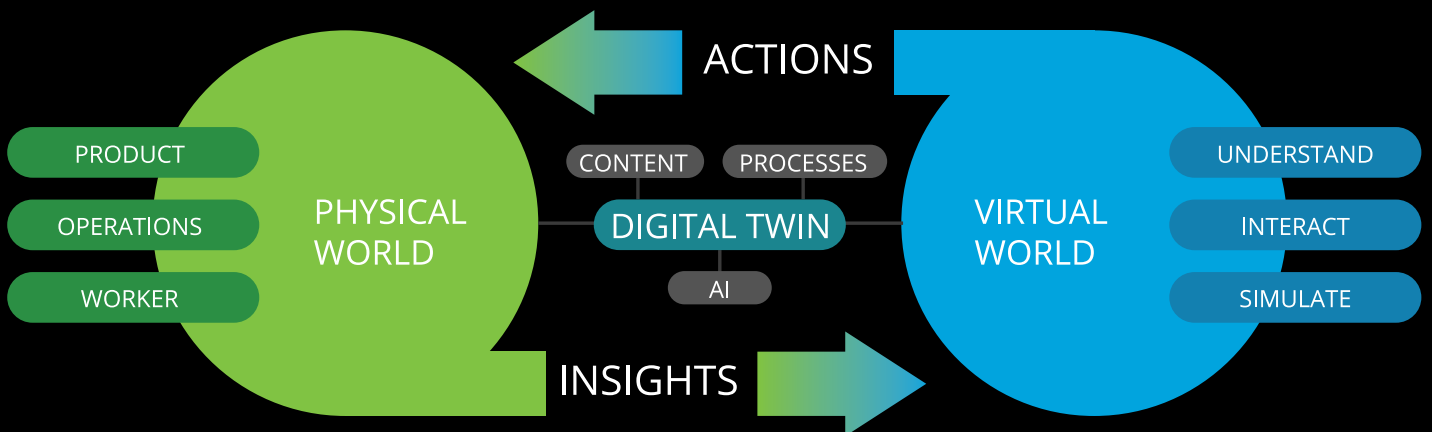
In practical terms, [our analysis](#) identifies more than 60 use cases across six major industries, showing the wide-ranging impact of generative AI. Real estate practitioners are therefore invited to identify which use cases are most applicable to their needs, and our own research has already revealed at least ten ways in which the sector could be transformed over the next two to three years. For instance, generative AI can analyse portfolios, lease contracts and general company data, to create a reliable and accurate fact-base for decision-making and forecasting, in areas such as sustainability, rentability and space utilisation. Service delivery chatbots can deal intelligently and plausibly with customers (e.g., complaints, ticketing or visitor management), in forms that range from cross-platform plain text through to photorealistic 3D avatars with speech and motion -

giving customers an improved experience, and freeing up agents to focus on high-value tasks. For buildings, Scan-to-BIM intelligently converts videos and scanned plans into digital twins, using accurate 3D/BIM models for visualisation and simulation, to optimise activities such as maintenance, repair or modification. Finally, Generative AI will also have a huge impact on the [future of work](#). In its perfect state, it can bolster innovation, productivity and outcomes while making work easier for people. Generative AI isn't designed to replace humans, but to change how we work and collaborate.



'The metaverse' was a much-hyped expression a couple of years ago, although the practical reality is less a single virtual world and more a variety of immersive experiences, built from a combination of technologies: 3D interaction, AI and machine learning, blockchain, internet of things, cloud computing, and 5G networks. These immersive environments will disrupt how we work and learn, transform how companies operate, and stimulate new business models and revenue channels. As with generative AI, such technology represents the current evolution of interactive technologies, from passively reading documents and photos, through simple interactions with two-dimensional screens (mouse, then touch), to occupying three-dimensional environments and interacting through natural gestures and language. For a sector that's all about three-dimensional physical environments, this technology will be crucial.

The latest advancements in AI video generation technology already provide a glimpse into the future of 3D scene creation. By transforming AI-generated videos into 3D point clouds (so called Gaussian Splatting), fully immersive virtual environments can be utilized with the ability to freely explore, navigate or model these scenes for planning, collaboration or sales, while preserving an astonishing level of quality and detail on any device. A central real estate application will be enterprise simulation, which allows businesses to create digital twins of existing buildings, construction projects or even whole cities, to simulate the operation of physical assets in real time. Using extended reality (XR) and AI, such simulations will improve the effectiveness and efficiency of planning, 3D design, and process development. Technology leaders are already rolling out XR platforms, and Deloitte's Unlimited Reality offering extends our partnership with NVIDIA, using its Omniverse technology to provide real-time collaboration in virtual architectural scenes.



**Artificial Intelligence (AI) and Extended Reality (XR) will empower Digital Twins to be the major driver for the convergence of the physical with the virtual world.**



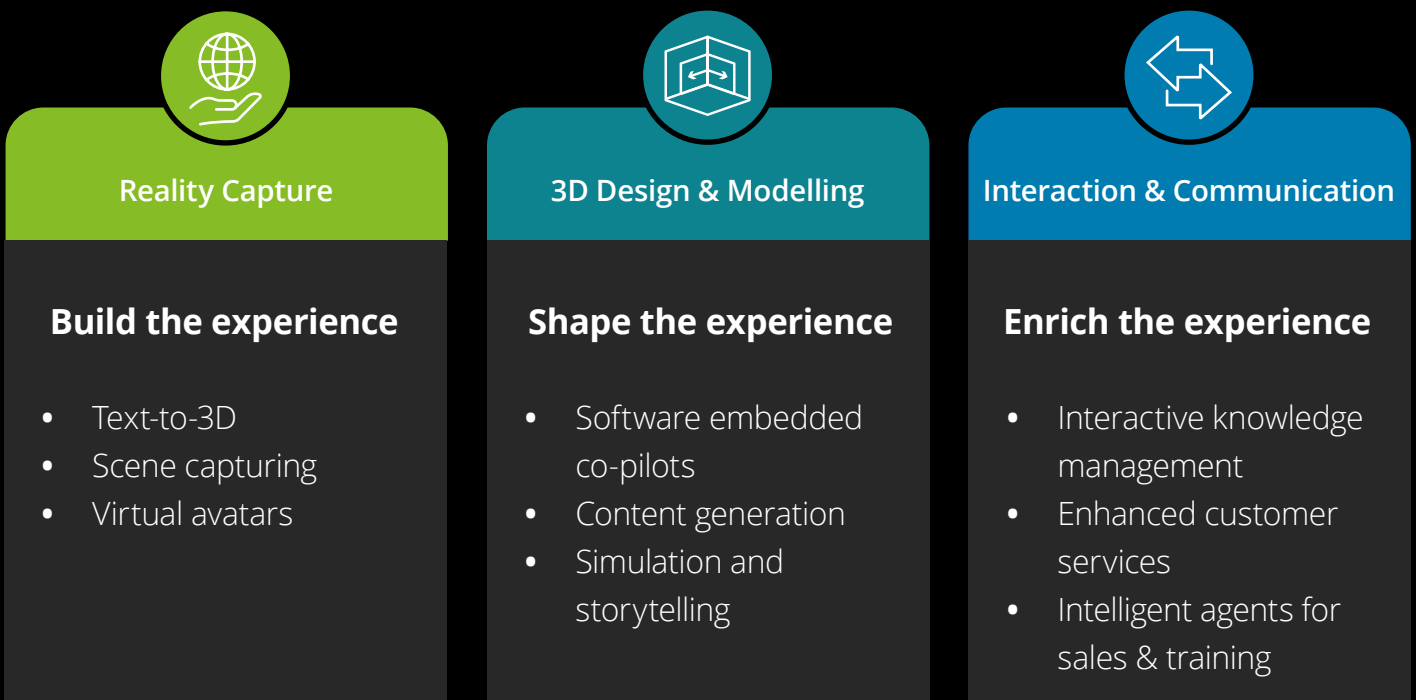
Immersive technologies will also provide an augmented workforce experience, and enhance how people work together in organisations. Hybrid working has already proved to be cost-effective, sustainable, and popular with many employees – it’s even a deal-breaker for the newest talent. Immersive technology could give employees a more rewarding and productive remote working experience, such as three-dimensional meeting rooms that promote effective collaboration, training and development, or a choice of task-specific virtual workspaces. The technology could also enhance personal workspaces with spatial computing, using XR to display interactive virtual screens and augment interactions with the physical environment. Spatial computing - as a new era after mobile computing - enables spatial interactions in 3D with digital assets, information and environments through gestures, movements, eyes and voice. It blends virtual experiences with the physical world through the use of AI, computer vision and XR.

It's no coincidence that everyone's talking about XR glasses as a spatial computer right now. Future developments are likely to bring further advances in how human interactions are captured and represented digitally. For example, Deloitte's Metaverse Lab is now collaborating with the Neuroscience Institute to assess the implications of the Neuroverse, such as machine-recognition of more subtle physiological and psychological human behaviours. For instance, eye movements or galvanic skin response might be captured to record subtle customer preferences within virtual environments, and provide richer insights for product and service design.

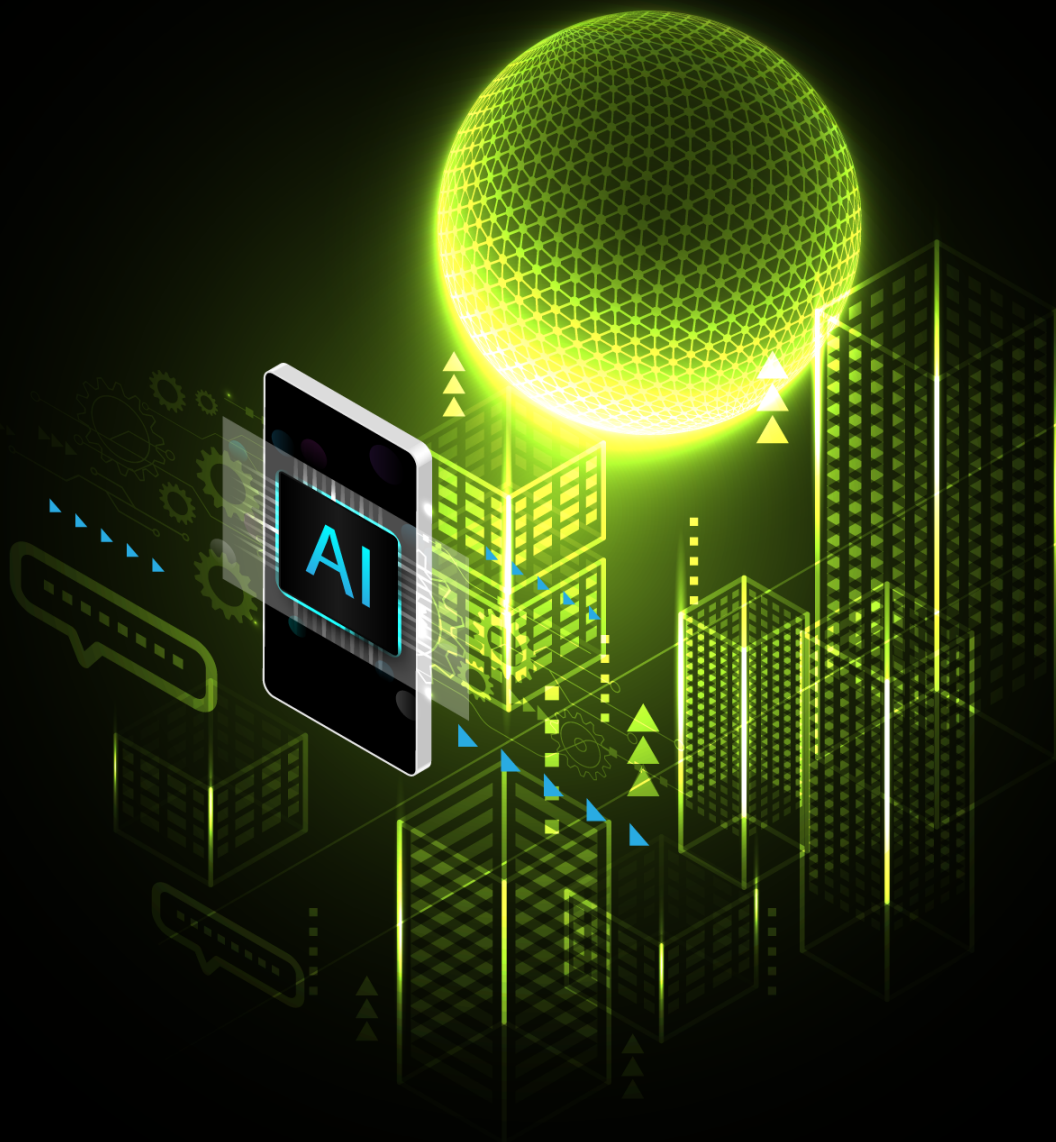
Right now, we are already seeing how Gen AI and immersive technologies are converging, to create digital functionality and experiences that are richer and more intelligent than ever before, to offer unprecedented potential for businesses.

## How Generative AI is shaping the Metaverse

**The convergence of Generative AI and immersive Tech as a key enabler to build, evolve and interact within extended realities and virtual environments.**



Far from being competing trends, generative AI and immersive experiences will both become part of the bigger picture. That picture might be in three dimensions, in real time, and inhabited by your workforce or clients. It could replicate existing or future buildings precisely, or provide the perfect workplace even if no such place exists physically. For a sector that already understands physical space, now is the time for real estate to get virtual.



## Prediction 05

Transforming the Property Landscape:  
The Powerful Impact of Mixed  
Reality on Real Estate



**In the ever-evolving landscape of the built environment, the advent of mixed reality (MR) technology and spatial computing, heralded by industry giants such as Meta and Apple, marks a significant inflection point. As we witness an unprecedented integration of digital and physical realms, the implications for real estate and the built environment are both profound and transformative. This intersection of technology and physical space not only challenges our traditional perceptions of real estate but also opens up new avenues for innovation, value creation, and human-centric design.**

**The MR market is expected to expand from ~USD 2 billion in 2023 to an astounding USD 2,512 billion by 2035, at**



## Real Estate as a Canvas for Digital Expression

With the uptake of MR technology, real estate is poised to transition from being merely a physical container of activities to a dynamic canvas for digital expression. This transformation suggests a future where physical structures serve as platforms for immersive digital overlays, allowing individuals to customize their surroundings according to personal preferences, needs, or moods. Imagine walking through a vacant office space and using MR glasses to visualize different interior designs, layouts, and furniture arrangements in real-time. In this scenario, the intrinsic value of a physical space may increasingly be determined by its compatibility and adaptability to digital enhancements, rather than its material characteristics alone.

**a compound annual growth rate (CAGR) of ~78%,<sup>1</sup> underscoring the burgeoning relevance of this technology in reshaping industries, including real estate.**

**The integration of MR into our daily lives is more than a technological novelty; it represents a paradigm shift in how we interact with our surroundings. By superimposing a digital tapestry over our perception of the physical world, MR technology allows for a personalized and enhanced experience of space. This seamless blend of virtual and real elements not only enriches our sensory experiences but also significantly impacts the functionality, value, and perception of physical spaces.**

This shift challenges the real estate industry to rethink the design, development, and management of built environments. Architects, designers, and developers can showcase their vision to potential buyers or tenants, allowing them to experience the space before it's even built or redesigned. They will need to embrace a more fluid and flexible approach to space creation, one that accommodates the integration of digital elements from the outset. This entails not only the incorporation of advanced technological infrastructure but also a design philosophy that prioritizes adaptability, interactivity, and user personalization.

## 2

## The Evolution of Real Estate as an Enabler of Digital Transformation

Far from rendering physical real estate obsolete, the rise of MR technology underscores its evolving role as an enabler of digital transformation. MR technology is reshaping every stage of the real estate lifecycle. For instance, architects & engineers can use MR to collaborate on designs in a virtual environment, identifying potential issues before construction begins. Physical spaces are set to become more connected, intelligent, and responsive, acting as interactive platforms that enhance the MR experience. This evolution will require a concerted effort to modernize existing real estate assets and infrastructure, making them conducive to digital integration.

The development of smart buildings and cities, equipped with IoT devices, sensors, and advanced connectivity solutions, exemplifies this trend.

These technologies not only facilitate the deployment of MR applications but also enable buildings and urban spaces to adapt to the changing needs and preferences of their occupants in real-time. Consequently, the real estate industry has a unique opportunity to drive the adoption of MR by creating environments that are not just physically accommodating but are also digitally immersive and engaging. Further, MR can help at the back end in building management as well. For instance, property managers can leverage MR applications to monitor building systems and perform maintenance tasks more efficiently. By integrating MR into existing workflows, real estate players can streamline operations, reduce costs, and improve overall productivity.

3

## Unlocking New Value Streams and Business Models

The adoption of MR technology in real estate unlocks a myriad of monetization opportunities, particularly through the development of bespoke applications that enhance the functionality and appeal of physical spaces. Landlords and developers have the potential to partner with technology providers to create immersive experiences that can be monetized directly or used to attract a higher caliber of tenants and visitors. Furthermore, the data generated through the interaction of individuals with MR-enhanced environments presents valuable insights for real estate owners, operators, and occupants. This data can inform better decision-making regarding space utilization, energy management, and occupant well-being, among other aspects. Consequently, real estate stakeholders are positioned to not only capitalize on the direct benefits of MR technology but also to harness the power of data analytics for operational optimization and strategic planning.

For instance, retail and entertainment venues can leverage MR to offer highly personalized and interactive customer experiences, thereby enhancing engagement and loyalty. Similarly, workplaces can utilize MR to foster collaboration and creativity among employees, regardless of their physical location.

4

## Forecasted Market Growth and Strategic Implications

The projected growth of the MR market, with estimates suggesting a leap to USD 2,512 billion by 2035, illustrates the scale of opportunity at hand. This exponential growth trajectory indicates a swiftly expanding demand for MR applications across various sectors, including real estate. As such, industry stakeholders must proactively embrace MR technology, investing in the necessary infrastructure and capabilities to support this digital transformation.

For real estate professionals, this means not only rethinking the design and functionality of spaces but also exploring innovative business models that leverage MR to create value. Whether through enhanced user experiences, new service offerings, or data-driven optimizations, the integration of MR technology offers a pathway to differentiate and future-proof real estate assets in an increasingly digital world.

5

## A Call to Action for Industry Leaders

As we stand at this pivotal juncture, it is incumbent upon industry leaders, including architects, developers, and consultants, to champion the integration of MR technology into the built environment. This requires a forward-thinking approach that embraces innovation, invests in digital infrastructure, and prioritizes the creation of adaptive, user-centric spaces. Moreover, it necessitates a collaborative effort among technologists, designers, and policymakers to establish standards and guidelines that ensure the responsible and equitable deployment of MR technology.

6

## Conclusion


The intersection of mixed reality and real estate marks a pivotal moment for the industry. Far from diminishing the importance of physical space, the advent of MR technology highlights the evolving role of real estate as an enabler and beneficiary of digital innovation. By embracing this shift, real estate stakeholders can unlock new value streams, engage users in unprecedented ways, and play a central role in the digital transformation of the built environment. The journey towards MR-enhanced real estate is not without its challenges, requiring strategic investments, cross-sector collaborations, and a commitment to innovation. However, the potential rewards—a more adaptive, engaging, and valuable built environment—underscore the imperative for action. As we look to the future, the convergence of digital and physical realms through MR technology promises to redefine our experiences of space, offering a glimpse into a new era of immersive, personalized, and dynamic environments. For more insights on digital transformation in real estate and new revenue models, please refer to our report [Future of real estate: Shift to phygital.](#)

## Prediction 06

Digital twins and the Metaverse  
in the construction industry







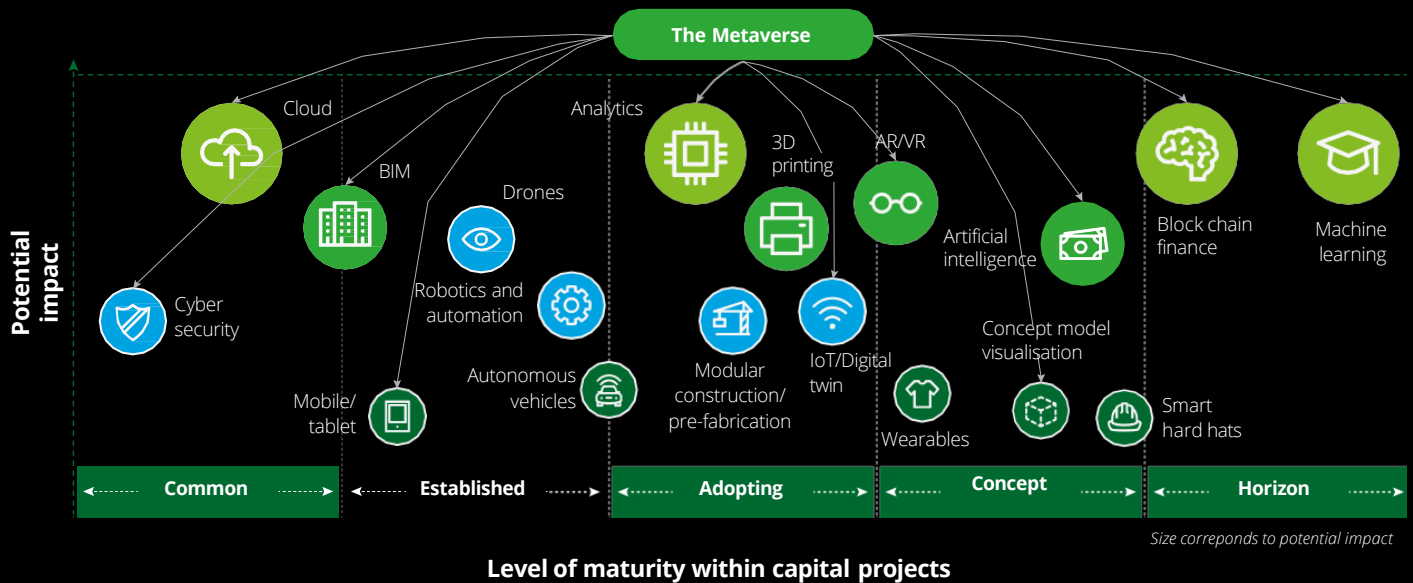
In an era where the boundaries between the physical and digital worlds are increasingly blurred, the concept of the metaverse has captured the global imagination. This digital expanse promises to revolutionize the way we interact with each other and with virtual environments, yet its full potential is just beginning to be understood. Meanwhile, digital twins—exact virtual models of physical objects or systems—are transforming the property and construction industries with their precision and utility. These two technological frontiers are converging, heralding a new age of innovation and efficiency.

This article delves into the heart of this convergence, exploring how the integration of digital twins within the metaverse is not

just reshaping the lifecycle of property development but also redefining stakeholder engagement and customer experience. We will examine the implications of this synergy for various industry practices, from design and construction to operations and maintenance, and how it opens the door to a future where virtual and physical realities coexist in unprecedented harmony.

Join us as we navigate through the digital landscapes of the metaverse and its burgeoning relationship with digital twins, uncovering the transformative effects on architecture, urban planning, and beyond. We will also look at current trends, the state of the technology, and the exciting possibilities it holds for businesses, consumers, and investors alike.

# Metaverse



**Figure 1. Technology maturity spectrum**

The metaverse simultaneously draws on many of the below technologies, with almost infinite potential for expansion. As adoption of the metaverse and digital twins increases, integration across technologies will also increase.

Despite the global attention it has received recently, the metaverse can be best understood as a universal term for the diverse creative uses of virtual worlds. It's a digital domain where users can engage with each other and with virtual objects and environs in a manner that mirrors the physical world, a concept that holds immense potential.

Digital twin, however, is an exact digital duplication of a physical object or system, such as a building or a large-scale infrastructure project. With digital twin technology, developers, architects, and contractors can perfect the design, minimize mistakes, and enhance the performance of a building. While digital twins are typically created for the construction phase to enhance interdisciplinary coordination and as a tool for visualizing for stakeholders, they are widely utilized during building operations to supervise performance, execute simulated scenarios, and optimize maintenance.

Neither of these concepts is novel, but their relevance to property and construction industries is increasing, with the integration of digital twins

into a metaverse setting taking center stage. The integration can lead to substantial efficiencies throughout the property development cycle by prolonging the usefulness of digital twins, from concept design for marketing and sales purposes, to operations for maintenance, integration with connected devices, and even to decommissioning.

This fusion not only ushers in vast opportunities for incorporating emerging technologies, as depicted in Figure 1, but it also demonstrates how the metaverse can be a nexus for a multitude of technologies with vast potential for growth. As the adoption of both the metaverse and digital twins progresses, so too will the interplay between various technological spheres.

Moreover, technological advancements and increased investment are paving the way for potential partnerships between firms at various stages of the capital project lifecycle. This results in enhanced collaboration, higher market and customer engagement, and continuous operational and end-user benefits that can validate the investment in these technologies..

## Attracting the attention of customers and stakeholders

Architects, design firms, and creative agencies typically produce concept renditions, visuals, and animations of new projects for marketing and sales, which are expensive and offer little flexibility for reuse. A project-wide digital twin developed in the early design stage is a viable solution to this. Combined with advancements in photorealistic visualization technology, there are limitless possibilities for customer and stakeholder engagement, including marketing content creation, virtual, VR, and AR tours, and immersive design experiences.

Furthermore, as the design develops, the granularity of detail within the digital twin can be enhanced. This allows stakeholders and customers to gain an increasingly accurate and tangible feel for the final product, fostering a stronger connection and higher engagement with the project.

Just as in social media, the focus and engagement of potential customers and stakeholders in the metaverse can be tracked and evaluated, unlocking new possibilities for user experience

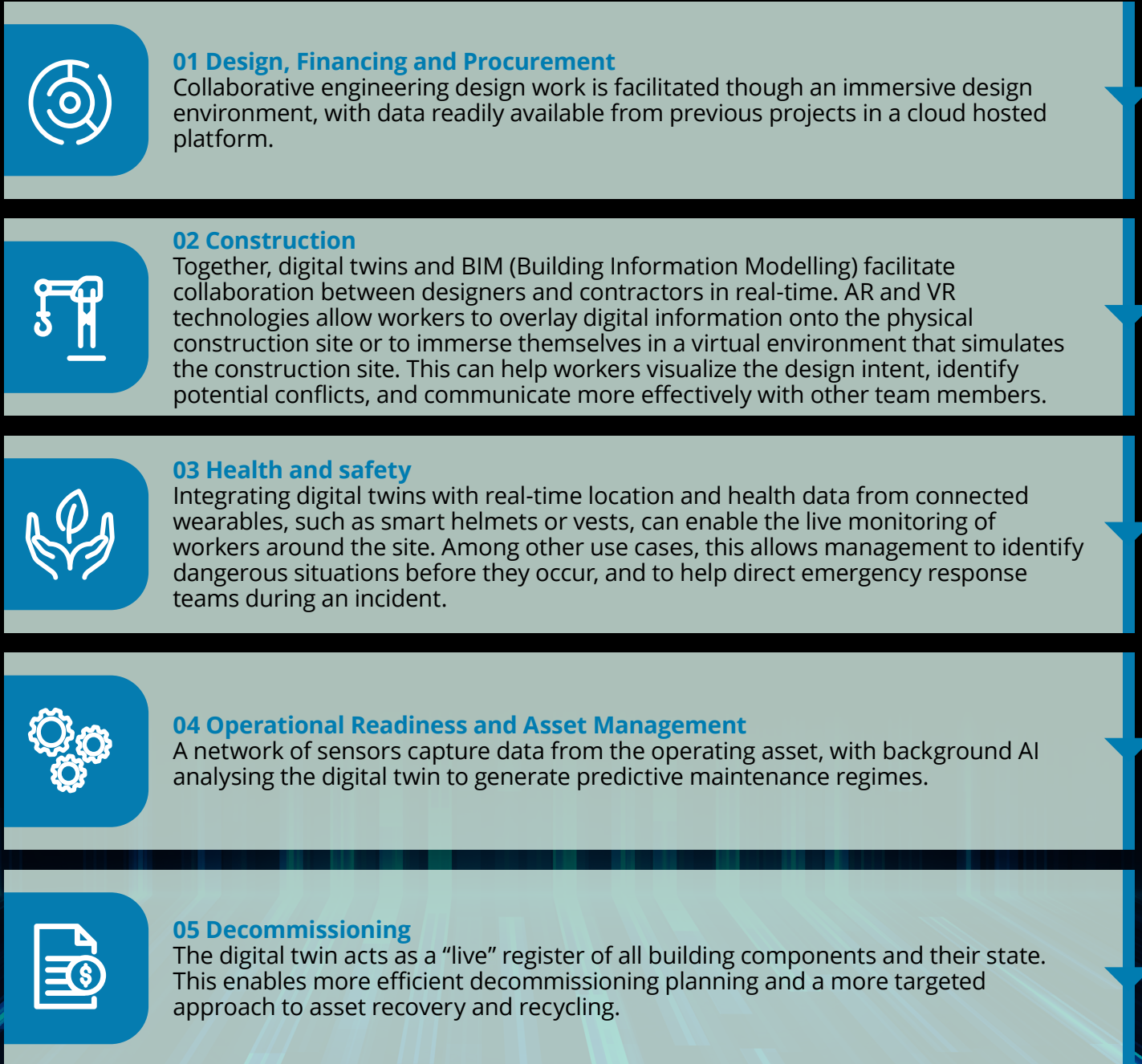
design. Digital twins can be used during the detailed design and construction to facilitate collaboration, allowing for real-time communication and coordination, reducing delays and design clashes, and increasing efficiency..

Digital twins in the metaverse can be used to enhance design based on end-user experiences, such as virtual reality walkthroughs of the building, allowing stakeholders to experience the building before it's built. This can be used to showcase the building to potential clients and investors, as well as to train workers on how to navigate the construction site or building safely.

Upon completion and handover, the same digital twin serves for continuous monitoring and analysis of the building's performance. Digital twins can be used to simulate different scenarios to optimize the operations and maintenance of the building, and reduce operating costs.

For residential and hospitality assets, the use cases for digital twins and the metaverse include device connectivity, security and privacy, and other smart home applications. Assets with these features can command a price premium, and as these technologies become more common, consumers will begin to expect these features as standard, which will further drive investment in and adoption of these technologies.

Figure 2. Real-time Collaboration and Feedback



## Current state of play

A combination of technological limitations and a lack of tangible ROI has previously kept digital twins out of the metaverse. However, giga-projects like in the Middle-East with enormous budgets and a passion for driving technological innovation have helped bridge this gap. The UAE government, for instance, has recently announced its plans for a "Ministry in the Metaverse", and Dubai's new "Metaverse Strategy" has listed digital twins as one of its key pillars.

By integrating Digital Twins into the metaverse, the useful life of assets can be considerably extended and integration with a multitude of other technologies can be unlocked, further augmenting the value of the digital twin and even the asset itself. It is therefore vital for leadership to stay abreast with the latest developments in this technology and dedicate resources to explore potential opportunities and risks.

## Conclusion

The exploration of the metaverse and digital twins heralds a new era where virtual and physical realities merge, promising incredible advances in how we live, work, and interact. This powerful synergy provides a transformative platform for the property and construction industries, offering innovative ways to design, build, and manage assets with unprecedented precision and efficiency.

As we have seen, the potential of these technologies extends far beyond current applications, influencing everything from stakeholder engagement to the optimization of operations and even redefining user experiences. With trailblazing initiatives already underway, particularly in the Middle East, the future of digital integration in asset management and development is not only promising—it's practically upon us.

**In closing, the marriage of the metaverse and digital twins is not merely an incremental change; it's a quantum leap into a future where the boundaries between the digital and the tangible are seamlessly blended. For industry leaders and decision-makers, now is the moment to embrace this shift, to invest in these technologies, and to pave the way for a brave new world of opportunities. The future is here, and it's ours to shape. Let's rise to the challenge and unlock the full potential of this digital revolution.**

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## Endnotes

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