

SURVEY

RICS Tech Partner Programme Survey

July 2024



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Glossary

Term	Definition
360° cameras	Also known as a spherical camera, this is a camera that captures images and videos in all directions at once, creating a full 360-degree spherical view of the scene. They usually have two or more lenses that point in different directions. 360° cameras are used in a variety of applications, such as virtual tours, real estate and tourism. They can also be used to create immersive VR and AR experiences, as well as for creating panoramic images.
AI (artificial intelligence)	The simulation of human intelligence by computer systems. It includes processes such as learning (the ability to improve performance based on experience), reasoning (the ability to understand and draw conclusions from data) and self-correction. AI can be classified into two categories: narrow/weak AI and general/strong AI. Narrow AI is designed to perform a specific task, such as image recognition or language translation. General AI, on the other hand, has the ability to perform any intellectual task that a human can; for this reason, it is also called AGI (artificial general intelligence). Different techniques are used to develop AI systems, such as rule-based systems, decision trees, artificial neural networks, genetic algorithms, large language models, generative AI and neural networks. Generative AI refers to AI models and techniques capable of generating new content – such as images, text or sounds – that mimic or resemble human-created content. Neural networks are computational models inspired by the structure and function of the human brain. They consist of interconnected nodes (neurons) arranged in layers and are trained on data to learn patterns and relationships, enabling them to make predictions or decisions. The field of AI is constantly evolving and researchers are working on developing more advanced systems that can perform more complex tasks with a greater level of autonomy.

Term	Definition
AR (augmented reality)	A technology that enhances a user's perception of the real world by overlaying digital information such as images, videos or text onto the user's view of the environment. Unlike VR, which creates a completely simulated environment, AR enhances and augments the user's existing environment. There are different types of AR systems, including marker-based and marker-less AR. Marker-based AR uses a specific visual marker, such as a QR code, to trigger the display of digital information. Marker-less AR uses the device's camera and sensor data to identify and track the environment in real time. AR can be experienced through different devices such as smartphones, tablets, head-mounted displays and smart glasses. The technology can be applied in various fields; some examples: • gaming and entertainment • training and education • visualisation and design and • maintenance and repair. AR has the potential to revolutionise the way we interact with the world around us, making it more interactive, informative and efficient.

Term	Definition
Big data	The large volume of structured and unstructured data that is generated and collected by organisations and individuals. It can come from various sources, such as social media, sensors and transactional systems. The data can be so vast and complex that it becomes difficult to process using traditional data processing tools. Big data has several characteristics that make it unique: • volume: the sheer amount that is generated and collected • variety: the many different types of data, such as text, images, video, audio and sensor data • velocity: the speed at which data is generated and collected and • veracity: the uncertainty and lack of structure of the data. To handle big data, organisations use a combination of technologies and techniques such as distributed computing, NoSQL databases and advanced analytics. These technologies allow organisations to store, process and analyse large amounts of data in real time. Big data can be used for a wide range of applications such as customer analytics, fraud detection and predictive maintenance. It has the potential to provide organisations with valuable insights that can improve decision-making, increase efficiency and drive innovation.
Blockchain	A decentralised, distributed ledger technology that uses cryptography to secure and validate transactions. It is the underlying technology of cryptocurrencies such as Bitcoin, but it can also be used for a wide range of other applications. A blockchain is essentially a digital ledger that records transactions across a network of computers. Each 'block' in the 'chain' contains a record of multiple transactions, and once a block is added to the chain, the information it contains cannot be altered. This creates a permanent and transparent record of all transactions on the blockchain, making it difficult to tamper with or falsify records.

Term	Definition
Blockchain (continued)	Blockchain technology has several key features that make it attractive for various use cases. • Decentralisation: the ledger is maintained by a network of computers rather than a central authority, making it more resilient to censorship or tampering. • Transparency: transactions are recorded on a public ledger that can be viewed by anyone on the network. • Immutability: transactions are recorded in blocks that are linked together in a chain, making it difficult to alter or delete past records. • Security: transactions are secured using cryptography, making it difficult to hack or otherwise compromise the integrity of the blockchain. Blockchain technology can be used for a wide range of applications such as digital currencies, smart contracts, supply chain management and digital identity.
Cloud computing	The delivery of computing services – including servers, storage, databases, networking, software, analytics and intelligence – over the internet ('the cloud') to offer faster innovation, flexible resources and economies of scale. There are three main types of cloud computing service: • Infrastructure as a service (IaaS) provides virtualised computing resources over the internet. Examples include Amazon Web Services (AWS), Microsoft Azure and Google Cloud Platform. • Platform as a service (PaaS) provides a platform for the development, running and management of applications and services. Examples include AWS Elastic Beanstalk, Microsoft Azure App Service and Google App Engine. • Software as a service (SaaS) provides a complete software solution that runs on the cloud. Examples include Salesforce, Microsoft Office 365 and Google G Suite. Cloud computing has several benefits over traditional on-premises IT infrastructure. • Cost savings: cloud providers handle the maintenance and upgrades, so the user only pays for what they use.

Term	Definition
Cloud computing (continued)	• Scalability: cloud resources can be easily scaled up or down as needed. • Flexibility: cloud resources can be accessed from anywhere with an internet connection. • Collaboration: cloud services enable remote teams to access and work on the same resources and files. Cloud computing has become a popular way for businesses to access IT resources and services, and it is expected to continue to grow in popularity as more companies move their operations to the cloud.
Digital twins	A digital replica of a physical object or system that can be used to simulate its real-world behaviour and performance. It is a virtual representation of a physical asset, process or system that can be used to analyse, test and optimise it in a simulated environment. Digital twins can be used to improve the design and development of new products, optimise the performance of existing products, and predict and prevent potential failures. They can be created for a wide range of physical assets and systems, including buildings, bridges, machines, vehicles and even entire cities. They can be used in a variety of industries, such as manufacturing, construction, aerospace and transportation. Some examples of digital twin applications are: • improve the design and development of new products • optimise the performance of existing products, predict maintenance and prevent potential failures • monitor and control remotely, and • plan and simulate. Digital twins can be created using a combination of sensor data, 3D modelling and simulation software, and can be updated in real time with data from the physical object or system. They have the potential to improve efficiency, reduce costs and enhance decision-making across many industries.
Edge computing	This is where data is processed near where it is created, rather than the computation taking place in a datacentre or in the cloud. This approach reduces the time taken to react and the network bandwidth required to process data, improves data security and privacy, and allows data to be processed in real time. This approach is particularly useful for IoT devices and other applications that require rapid response times.

Term	Definition
IoT (the internet of things)	A network of physical devices, vehicles, buildings and other items embedded with electronics, software, sensors and connectivity, which enables these objects to collect and exchange data. These devices can be connected to the internet to transmit and receive data, which can be used for a variety of purposes such as automation, monitoring and control. Examples of IoT devices include smart thermostats, security cameras and wearable fitness trackers. The IoT allows for increased efficiency, accuracy and convenience in various industries such as healthcare, transportation and manufacturing.
LiDAR (light detection and ranging)	A technology that uses laser beams to measure distances and create 3D maps of the environment. LiDAR sensors emit laser beams and then measure the time it takes for the beams to bounce back, allowing the sensor to determine the distance to objects in its field of view. This information can be used to create detailed 3D maps of the environment, which can be used for a variety of applications such as self-driving cars, robot navigation and surveying.
Machine learning	A subfield of AI that provides systems with the ability to learn and improve from experience automatically, without being explicitly programmed. Machine learning algorithms can learn from data, identify patterns and make decisions with minimal human intervention. There are three main types of machine learning: • Supervised learning: the model is trained on a labelled dataset, where the correct output is provided for each input and the goal is to make predictions on unseen data. • Unsupervised learning: the model is not given any labelled data and the goal is to find patterns or relationships within the data. • Reinforcement learning: the model learns through trial-and-error interactions with an environment and the goal is to maximise a cumulative reward. Some examples of machine learning applications include: • image classification • natural language processing • predictive modelling and • recommender systems. Machine learning is becoming a crucial part of many industries, including healthcare, finance and transportation.

Term	Definition
Metaverse	A virtual shared space where users can interact with each other and digital objects in a seemingly real-world environment. It is often described as a combination of VR, AR and the internet, creating a seamless and immersive experience across multiple platforms and devices. The metaverse concept includes a wide range of digital experiences, such as virtual worlds, social VR, gaming and immersive entertainment. It also includes the ability to interact with digital objects and services, such as virtual commerce and education. It is still in its early stages, and the technologies and standards that will define it are still being developed. However, it has the potential to change the way we interact with each other and the digital world, creating new opportunities for communication, entertainment and commerce. Some of the main players in this field are companies like Google, Meta and Microsoft, as well as games companies like Epic Games and Roblox. The metaverse is expected to become a new paradigm for how we live, work and play in the digital age, creating new forms of human connections and economic activities.
VR (virtual reality)	A computer-generated simulation of a three-dimensional environment that can be interacted with using specialised equipment, such as a VR headset. The goal of VR is to create a realistic, immersive experience that allows the user to feel as if they are in a different place or situation. There are different types of VR systems, including non-immersive, semi-immersive and fully immersive. Non-immersive systems are those that allow the user to see virtual objects on a computer screen, while semi-immersive systems use projection screens or multiple monitors to surround the user with virtual images. Fully immersive systems use head-mounted displays or other equipment to completely surround the user with virtual images and sounds, blocking out the real world. VR technology can be used in many fields such as gaming, entertainment, education, training and therapy. It has been used to simulate dangerous or inaccessible environments for training purposes, as well as to create interactive and immersive gaming experiences. VR technology can also be used in fields such as medicine, architecture and design, allowing professionals to visualise and interact with complex structures and simulations.

Term	Definition
Web 3.0	The next evolution of the World Wide Web, where the web will become more intelligent, semantic and decentralised. The Web 3.0 vision is to create a more human-like web, where machines can understand and interpret the meaning of data and content, as opposed to just reading it. Web 3.0 is often associated with the emergence of decentralised technologies such as blockchain and peer-to-peer networks, which allow for the creation of decentralised applications (dApps) that can run on a distributed network without the need for a central authority. This enables users to have more control over their data and online identities, and enables new forms of interactions and transactions. It also includes the use of AI and machine learning to create a more personalised and intuitive web experience. It enables web applications to understand the intent of the user and to automatically provide the most relevant information. Web 3.0 also aims to provide a more interoperable web, where data and services can be easily shared and integrated across different platforms and applications, enabling new forms of collaboration and innovation. It is still in its early stage, and the technologies and standards that will define it are still evolving. Nevertheless, it has the potential to fundamentally change the way we use and interact with the web.

Foreword

This survey report provides insight on the journey that the built and natural environment sector is taking to adopt and realise the benefits of digitalisation, from the perspective of firms providing a wide range of services and solutions to the sector.

Since last year's inaugural survey, we have seen the rapid emergence of generative AI. The impacts and easy availability of tools such as ChatGPT has not only led to use cases for the built and natural environment sector, but has also raised awareness and interest in the potential to apply all types of AI to the sector.

This report shows that the data and technology sector has much to offer the built and natural environment sector. While barriers to adoption remain, the means to overcome those barriers, coupled with strong drivers for adoption, powerful emerging technologies and continued investment, paint a picture of a healthy sector. It will continue to support the built and natural environment sector on its journey to digitalise, and to realise the value of digitalisation, by addressing sustainability and ESG, and by delivering improved efficiency and cost savings for members and their organisations.

With technology solutions available in abundance, the challenges faced by organisations looking to digitalise their operations lie in change management, leadership, people skills and cultural change, as well as in working with solutions providers to deliver a clear return on investment – even more critical against the current backdrop of difficult economic conditions.

Technology, and AI in particular, is dependent on the data it uses. With issues remaining around the availability, quality, structure and consistency of built and natural environment sector data, the sector must accelerate the move from 'documents to data' and overcome the many technical and behavioural barriers that currently limit its use of data.

1 Introduction

1.1 The rise of AI

This second annual report on the development and adoption of AI, data and technology across the built and natural environment sector reflects on a year in which the rise of generative AI has arguably driven a step change in the focus on the use of data and technology across the built and natural environment sector, and looks forward to what lies in store for the sector in the second half of 2024 and beyond.

In addition to insight as part of RICS' ongoing engagement with the profession, this report has been produced by survey responses from our [Tech Partner Programme](#) community, a collaborative platform for innovative AI, data and technology across the globe that produces [thought leadership and market insight](#) for the profession. Our Tech Partners provide solutions across the full land and property life cycle, and are active in the UK, Europe, North America, the Middle East, sub-Saharan Africa, Asia and Oceania, providing multiple perspectives on their and their clients' journeys to digitalise the sector.

While the term **PropTech** has come to represent the emergence of innovative and disruptive firms developing solutions for the property sector, various other terms are applied to technology that either apply to other parts of the built and natural environment sector or are related to other sectors that themselves form part of the world in which the profession and its clients operate.

1.2 An alphabet soup of technology terms

We continue to find ourselves faced with a daunting and potentially confusing set of terms for the use of AI, data and technology across the built and natural environment:

- ConTech for construction
- InfraTech for infrastructure
- LandTech for land
- PlanTech for planning
- CRETech for commercial real estate
- ClimateTech to address climate change
- LawTech for the legal sector
- FinTech for the finance sector
- InsurTech for the insurance sector and
- RegTech and SupTech for the regulatory and supervisory sectors.

Given this proliferation of terms and the blurring of lines between the application of technologies, this report will simply focus on the application of AI, data and technology across the built and natural environment sector and will avoid unnecessary jargon.

The term PropTech, however, is still worth examining in more detail, having come to represent the emergence of start-up firms that have innovated, disrupted and challenged the incumbent real estate and property firms. As the sector continues to digitalise, it would seem likely that we will no longer recognise a separate PropTech sector, but an industry that uses external vendors, many of whom are mature and established firms, to complement their own internal capabilities.

1.3 The drive to digitalise

The digitalisation of the built and natural environment sector continues to be driven by various demographic, economic and behavioural trends, coupled with the threat of climate change, the continued legacy of the pandemic and the innovation and disruption that PropTech continues to deliver.

Many market participants continue to raise the conservative nature of the built and natural environment sector, its fragmented landscape, a continued lack of investment in research and development, and – as RICS recognises and is actively working to address – the lack of diversity across the profession. However, this report demonstrates that many market participants are now using AI, data and technology to deliver gains in efficiency and provide even better services to their clients and customers. It could be argued that we now have enough technology available that any remaining barriers to digitalisation are around data, leadership, people, culture, behaviours, processes and investment that can show a clear ROI.

In 2024, a key focus of RICS is the integration of AI. Acknowledging its potential to significantly enhance operational efficiency, decision-making processes and innovation, AI stands as a cornerstone of our strategic agenda. Collaborating closely with our Tech Partners, we are actively exploring the applications of AI in the built and natural environment sector.

1.4 Scope

Before we describe the results of the survey, let us remind ourselves of the depth and breadth of the solutions provided by AI, data and technology that are available to the built and natural environment sector by walking through the complete land and property life cycle. This is not exhaustive, but does provides a sense of scope for the solutions currently available.

Planning and development is supported with solutions that present visualisations of land parcels overlaid with numerous datasets to allow due diligence and the selection of land

for development, acquisition and disposal – with support for biodiversity net gain as well as mitigating nitrates, phosphates and other environmental and land use issues.

The construction phase is supported with applications for:

- quantity take-off from 2D and 3D sources
- cost estimating
- benchmarking and project history
- quality assurance
- project and contract management
- AI-driven scheduling
- Building Information Modelling (BIM)
- payment management
- wireless site communications and
- material tracking.

There is also an increasing focus on environmental, social and governance (ESG); modelling; and prediction.

Project finance is available via peer-to-peer platforms, with tokenisation and other fractional forms of ownership being explored.

The use of automated valuation models (AVMs) across residential lending, mass appraisal for property taxation of domestic and non-domestic properties, and other use cases continues to grow. Other tools are also supporting commercial real estate by providing extraction, aggregation and analysis of lease and rent roll data, powerful locational datasets and bond-type ratings for managing occupier covenant strength and risk. Generative AI is being used to generate parts of valuation reports, and automated workflow applications are streamlining the process of producing valuation reports even when AVMs are not part of the process.

Agency and brokerage of property are being digitised with data for upfront information, due diligence, virtual viewings, online auctions, anti-money laundering, know your customer, anti-bribery and corruption, digital identity, qualified electronic signatures, platforms delivering 'one-click' rentals and other online transaction processing. Generative AI is also being used here to produce marketing materials and other promotional content.

With the focus on customer service, property management is supported with solutions around improving the occupier experience, client money handling, automated agreement documentation and payment processing and reconciliation. AI-powered chatbots are increasingly used to automate and improve the speed and responsiveness of issue handling and other service issues.

The role of asset managers is being supported with powerful AI and data analytics for acquisitions, performance optimisation, planning and disposal of assets.

Technology continues to drive cost savings in energy consumption and to improve the experience for occupiers using building management systems (BMS) that provide real time data and AI optimisation to control increasingly smarter buildings. And this approach is increasingly being deployed by retrofitting existing assets as well as on new developments.

Building surveyors can manage and predict the health and condition of assets using data collected by sensors, 360° cameras, smartphones and other devices. AI is now able to analyse signals such as noise and vibration to learn from and predict equipment failures. AI-driven computer vision has been trained to recognise common defects, with drones able to perform regular facade and other external surveys to identify potential defects.

As the focus on sustainability increases, the need to retrofit the huge number of existing assets is driving the adoption of solutions using thermal imaging, satellites, geospatial data, sensors and energy performance data to identify opportunities for solar power installations, local energy markets and improvements to building fabric.

2 Survey methodology

The survey of the RICS Tech Partner Programme community posed the following questions via an online questionnaire to establish the profile of the firms and their views on the sector:

- What sectors and practice areas are you active in?
- What asset types are you active across?
- In which country is your main office located?
- Which markets are you active in?
- Are you a start-up?
- What stage of fund raising are you at?
- What have been the main drivers of adoption of data and technology across the built and natural environment sector during 2023?
- What have been the main barriers to adoption of data and technology across the built and natural environment sector during 2023?
- What new technologies have emerged during 2023?
- What will be the main drivers of adoption of data and technology across the built and natural environment sector in 2024?
- What will be the main barriers to adoption of data and technology across the built and natural environment sector in 2024?
- What new technologies will emerge in 2024?
- There will be significant consolidation across the data and technology sector in 2024 (strongly agree to strongly disagree).
- There will be a significant reduction in investment in the data and technology sector in 2024 (strongly agree to strongly disagree).
- Does your solution use AI in one or more ways? If so, what kind of AI is your firm using?

In addition to 340 survey responses, the authors spoke to Tech Partners directly and recorded 70 separate video discussions during 2023, covering every area of practice and world region, to gain additional qualitative insight to inform this report.

We also compare data to the [RICS Tech Partner Survey 2023](#), which asked similar questions for the period 2020–2022 and includes predictions for 2023.

3 Survey results

3.1 Sectors and practice areas

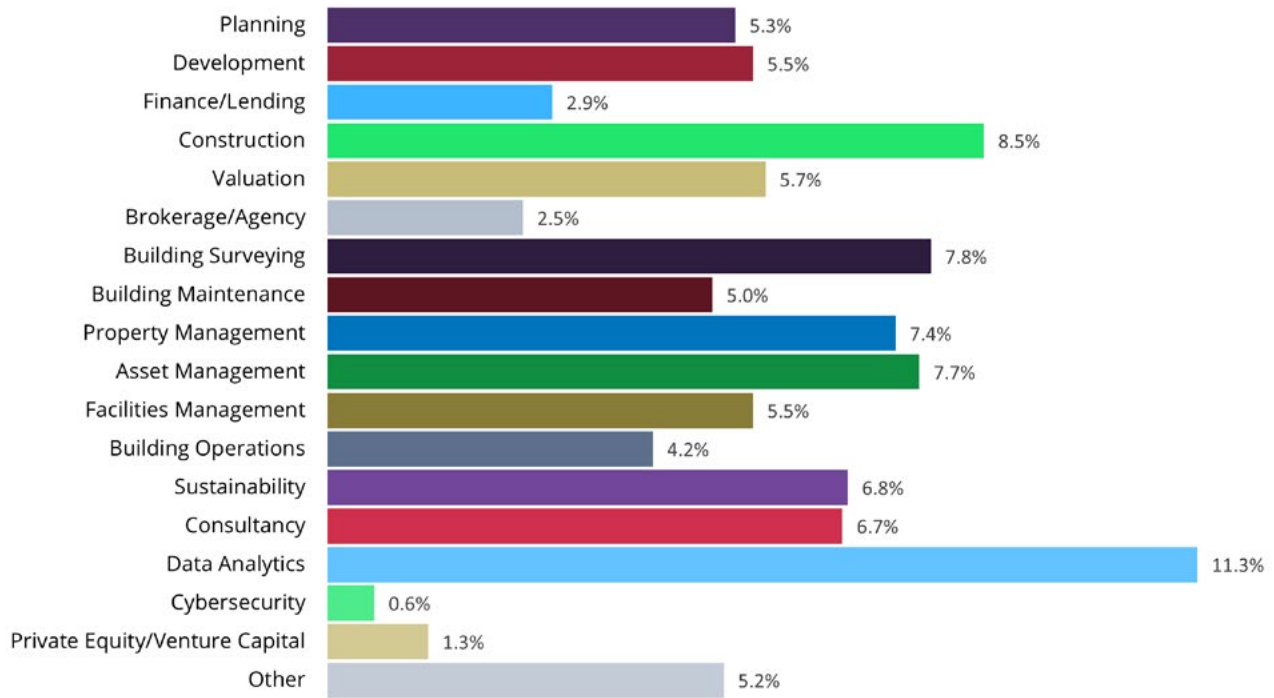


Figure 1: What sectors and practice areas are you active in?

The wide range of sectors and practice areas covered emphasises the need to apply broader terms and thinking to the benefits of applying AI, data and technology across the life cycle of the built and natural environment sector. It is worth highlighting the large number of respondents active in data analytics; turning often unstructured, siloed data into a format that supports improved decision-making is one of the key areas where technology can benefit the sector and is also a critical prerequisite for effective AI.

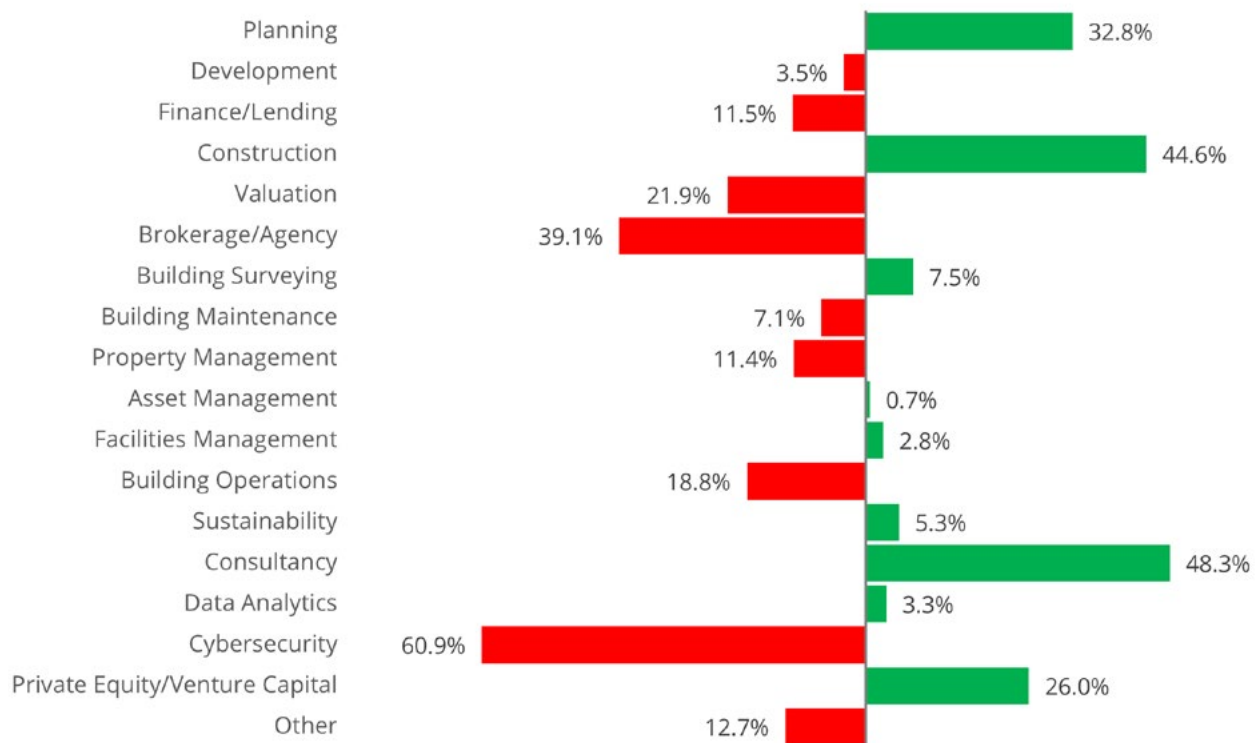


Figure 2: Sectors and practice areas year-on-year percentage change

Comparing the sectors and practice areas active in last year's survey to those in this year's survey reveals notable shifts and trends. While certain areas like planning, development and finance/lending saw minor fluctuations, others experienced more significant changes. Construction and consultancy, for instance, witnessed substantial increases in activity, highlighting a growing focus on these domains. On the other hand, brokerage/agency and cybersecurity experienced declines, indicating potential shifts in priorities or market dynamics. As noted above, data analytics remained consistently active, underlining its importance in leveraging data for informed decision-making.

3.2 Asset types

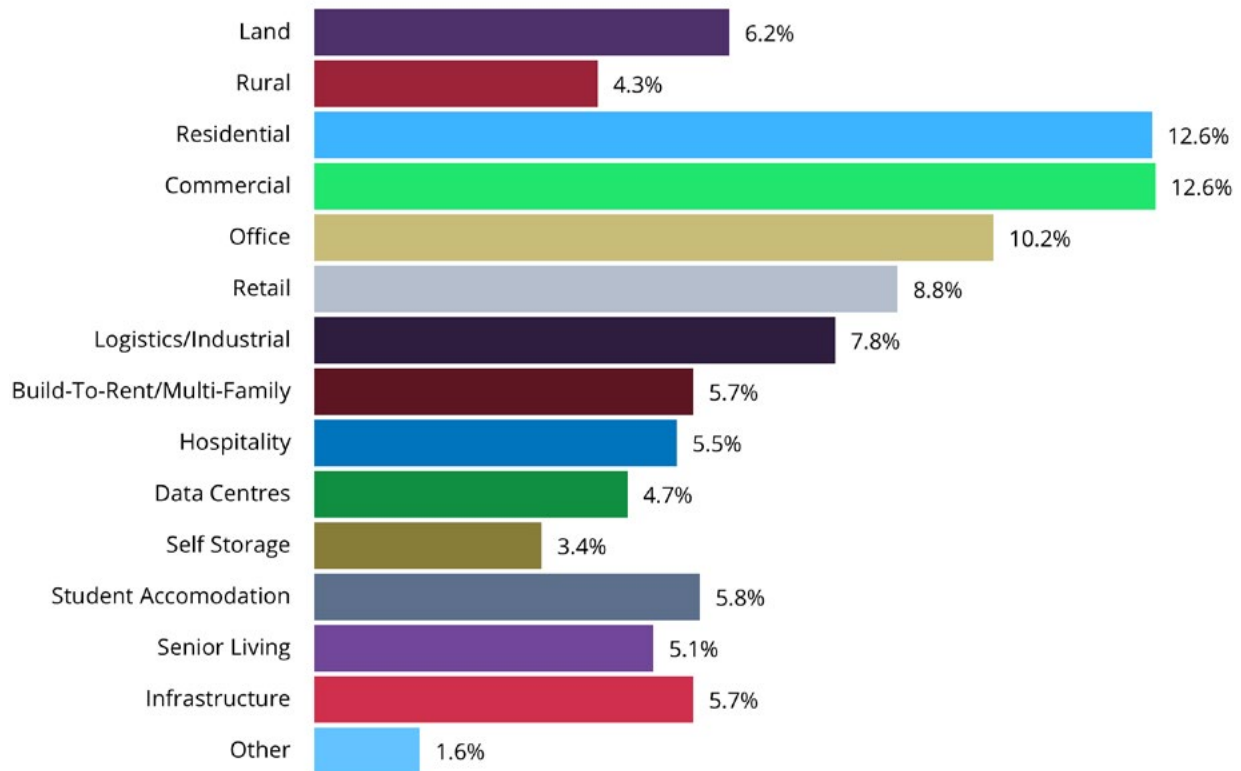


Figure 3: What asset types are you active across?

As with sectors and practice areas, a wide range of asset types are being supported. The rise of alternative assets is also highlighted, with activity across these now familiar operational real estate assets. Residential stands out as an area of special focus with activity around valuation, property management, brokerage and client money handling, examples of common use cases.

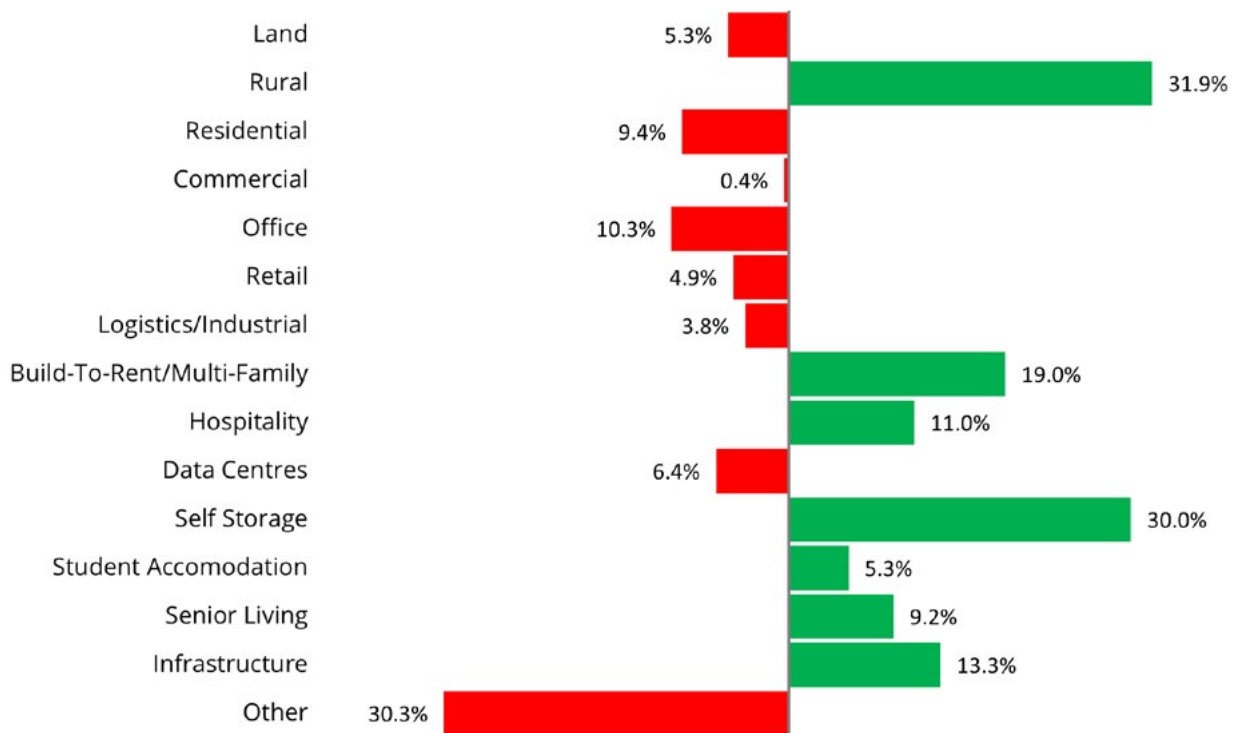


Figure 4: Asset types year-on-year percentage change

This comparison between last year's survey and the current data seems to indicate shifts in investment preferences across the real estate market. While some sectors experienced decreases in their share percentages, such as land, residential, office, retail, logistics/industrial and data centres, others saw increases, including rural, build-to-rent/multi-family, hospitality, self-storage, student accommodation, senior living and infrastructure. These fluctuations may reflect the evolving trends and opportunities within the real estate landscape, with investors potentially reallocating resources based on factors such as market demand, economic conditions and emerging industry sectors.

3.3 Location of main office

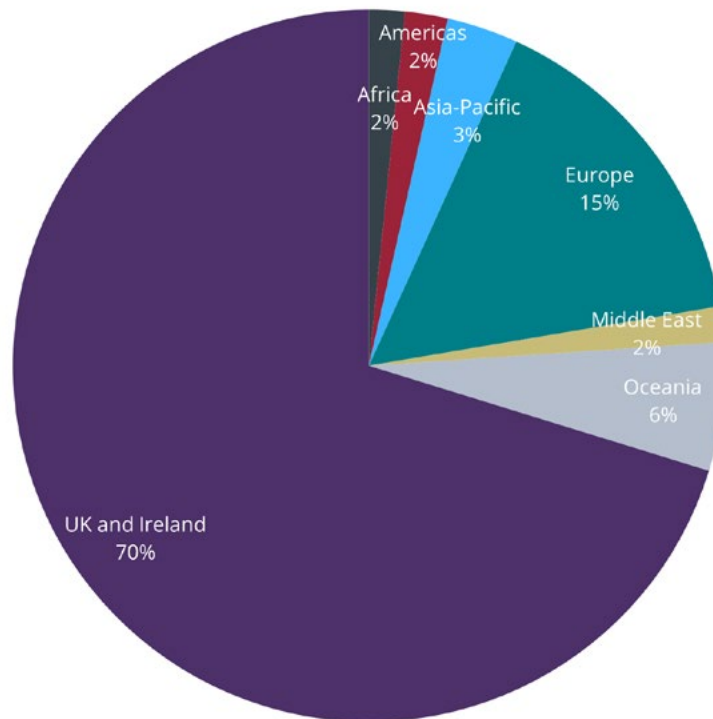


Figure 5: In which country is your main office located?

The distribution of Tech Partners largely reflects RICS' membership, with over two-thirds headquartered in the UK and Ireland, with additional representation from Europe, the Middle East, sub-Saharan Africa, North America, Asia and Oceania.

However, it would be wrong to assume that the reach and ambition of these firms is limited to their home countries. While many aspects of land and property have specific jurisdictional aspects, many fundamental practice areas are common and allow technologies to be developed and adopted across boundaries. In addition to supporting the growth ambitions of firms, this cross-border adoption should also provide useful learning from other markets to enhance the overall productivity of the sector.

Anecdotal evidence indicates that start-up firms tend to develop and launch in their home markets, and then embark on international expansion country-by-country and region by region. Interestingly, many expansion plans do not follow the gravity model of trade by entering new markets that are geographically close; instead, market attractiveness drives destination based upon size, language, similar legal systems, maturity of property market, etc. For example, a UK firm might expand first to the Middle East and Australia, an EU firm may expand first to the UK rather than an immediate European neighbour and many firms will explore the US as their first international opportunity.

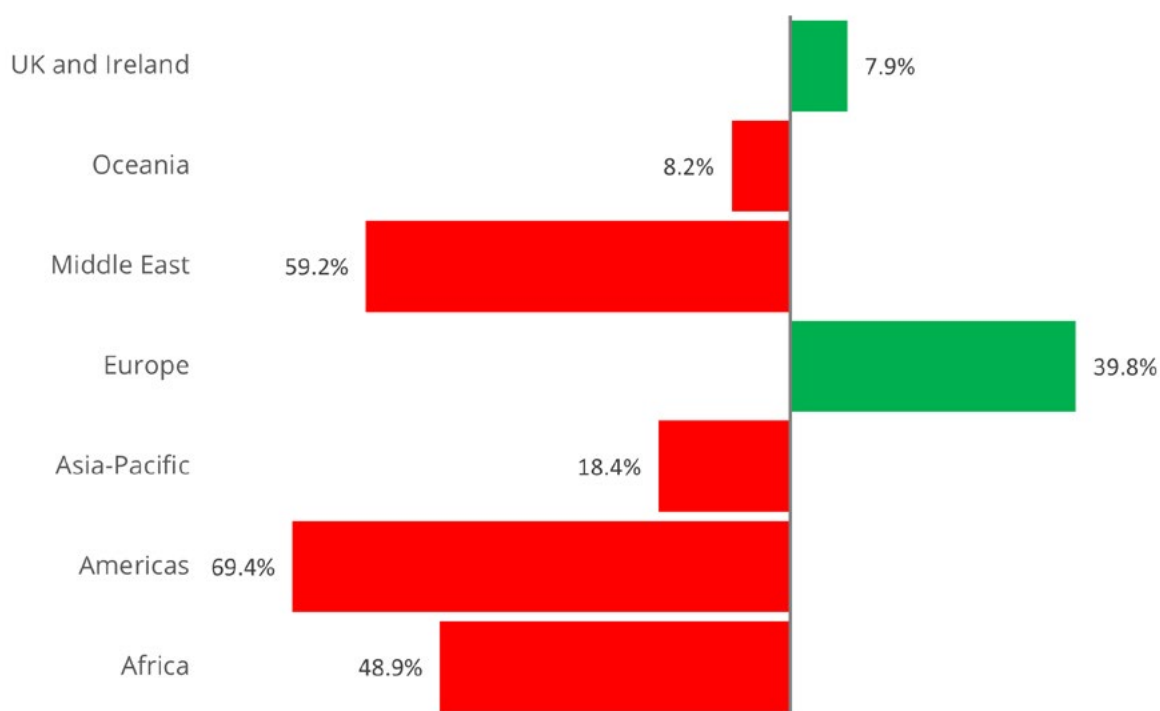


Figure 6: Location of main office year-on-year percentage change

A comparison with last year's survey reveals notable variances in the percentage distribution of Tech Partners across different regions. While the UK and Ireland saw a modest increase, Europe experienced a more significant rise. Conversely, the Americas, Middle East and Africa witnessed substantial decreases. Oceania saw a slight decline and Asia-Pacific region experienced a relatively minor decrease when compared to the other world regions. These shifts in distribution probably highlight dynamic changes in the geographic presence of Tech Partners, rather than underlying reflections of evolving market dynamics and strategic expansion initiatives within the industry.

3.4 Active markets

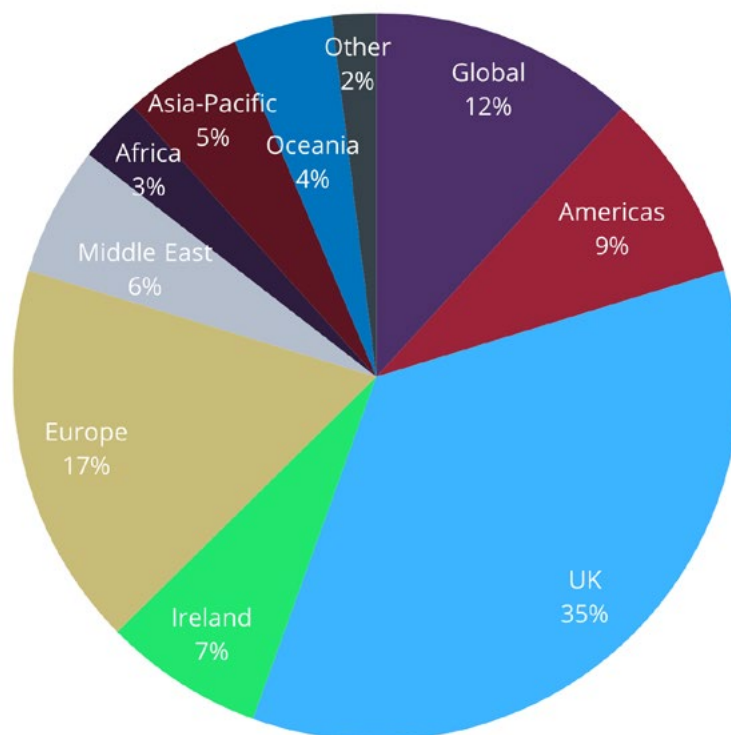


Figure 7: Which markets are you active in?

While the previous question highlighted the high percentage of UK-based firms, the scope of market activity reported highlights that while most firms are not active on a fully global basis, firms are still in the main operating on a regional basis, rather than a single country. Even being restricted to a region can impact their ability to scale their turnover and profitability.

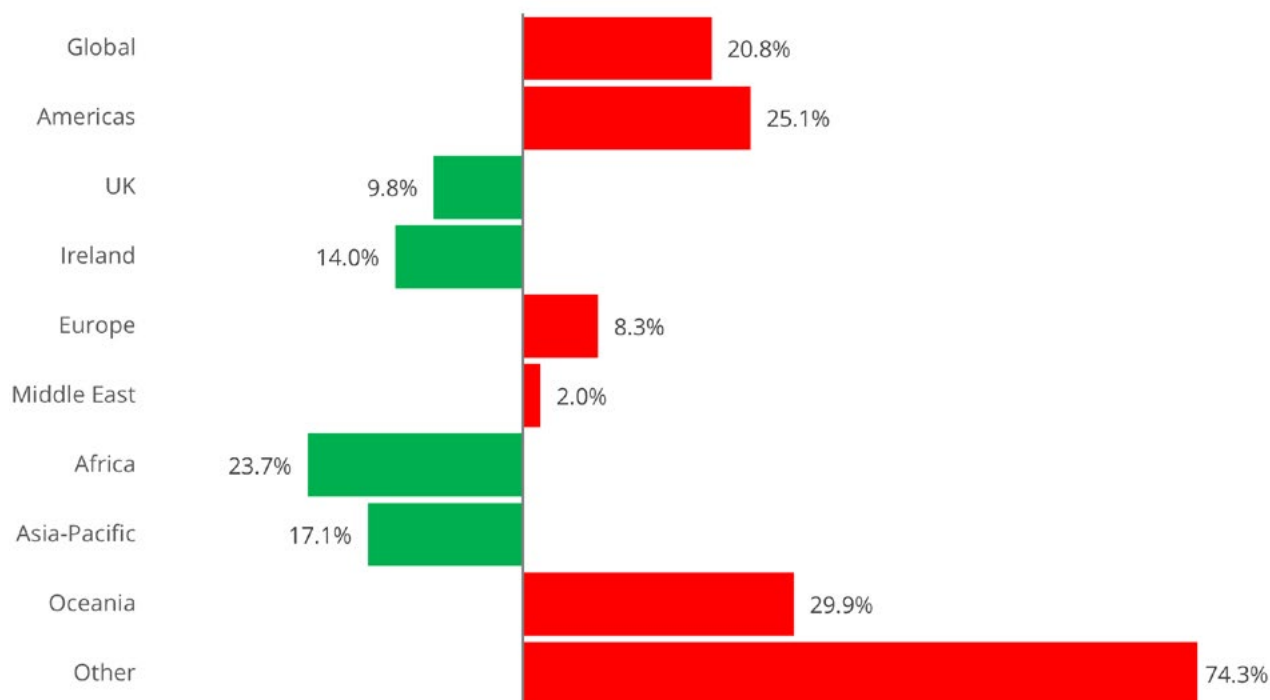


Figure 8: Active markets year-on-year percentage change

The comparison to last year again highlights shifts in market activity. The global market has seen a significant increase, possibly reflecting the changing set of respondents. The Americas and Europe have gained more market share, while the UK and Ireland have experienced declines. The Middle East has seen a slight uptick, whereas Africa and Asia-Pacific have faced decreases. Oceania, on the other hand, has seen a significant rise, and there has also been an increase in activity in 'other' markets.

3.5 Start-ups

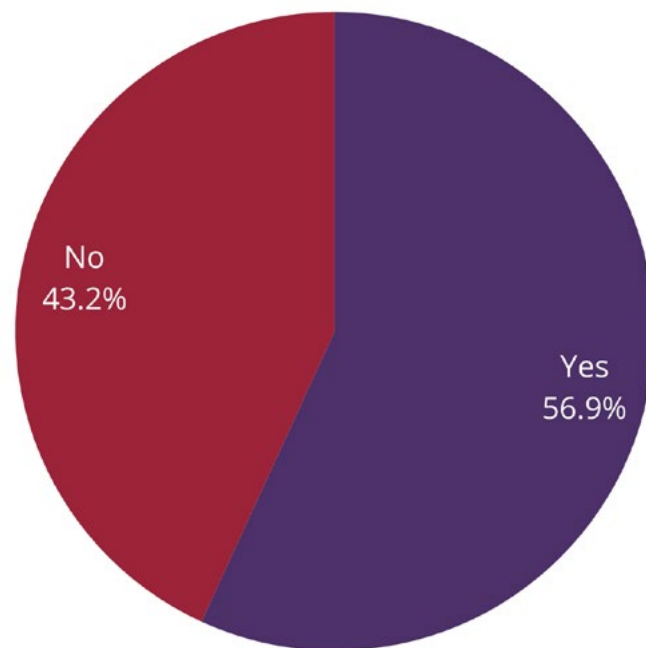


Figure 9: Are you a start-up?

While most people relate PropTech to start-ups, over 40% of respondent firms are established market participants, many with decades of experience in providing mature and proven solutions.

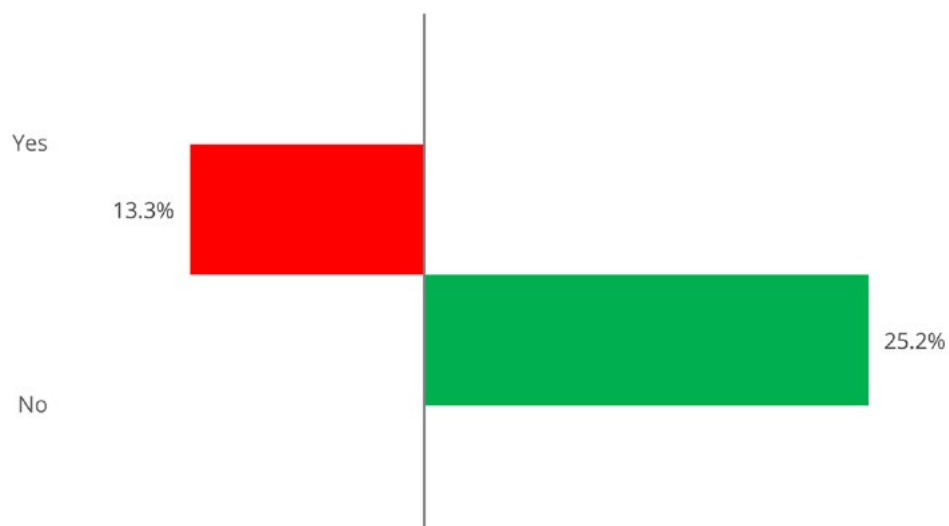


Figure 10: Year-on-year change in the percentage of respondents who are/are not start-up businesses

The comparison between last year's survey and this year's survey shows that start-ups still play a big role in the PropTech sector, making up over half of the firms surveyed. However, their share has decreased slightly while there has been an increase in the presence of established companies, even though they are still less than half. This mix of new and old players adds depth to the PropTech sector, combining fresh ideas with tried-and-tested solutions.

3.6 Stage of fundraising

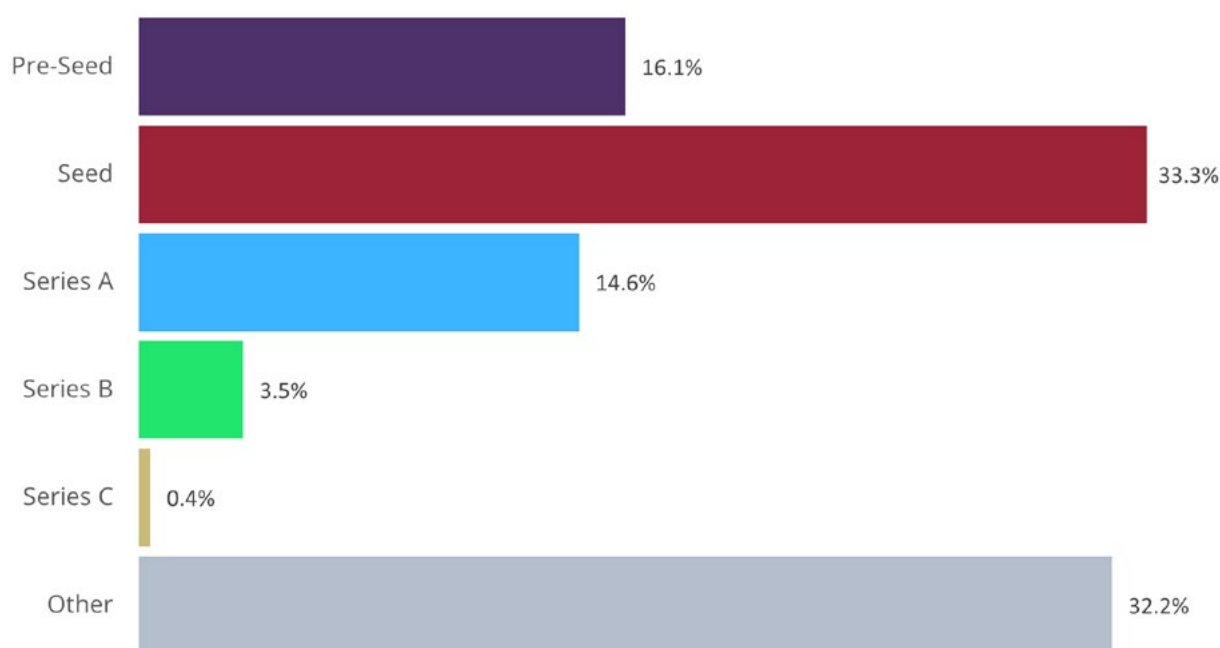


Figure 11: What stage of fundraising are you at, if any?

If we consider those start-up firms that are still seeking finance to support initial solution development, recruitment, marketing and other growth plans, half are still in the early pre-seed and seed stages prior to the various funding rounds, where the levels of investment raised are typically measured in millions.

Pre-seed funding often comes from the founders themselves, family, friends and other supporters, and is used to get the operation started. The seed stage, which many of the start-up Tech Partners are currently at, is the first official equity funding stage. Finance here will again look to the founders, family, friends and other supporters for funds, but will then extend to incubator funds, venture capital and other 'angel investors'.

Once firms are looking for Series A funding and beyond, simply 'having a good idea' is unlikely to support investment; instead, a strong strategy for turning a good idea into a successful, profitable company is needed.

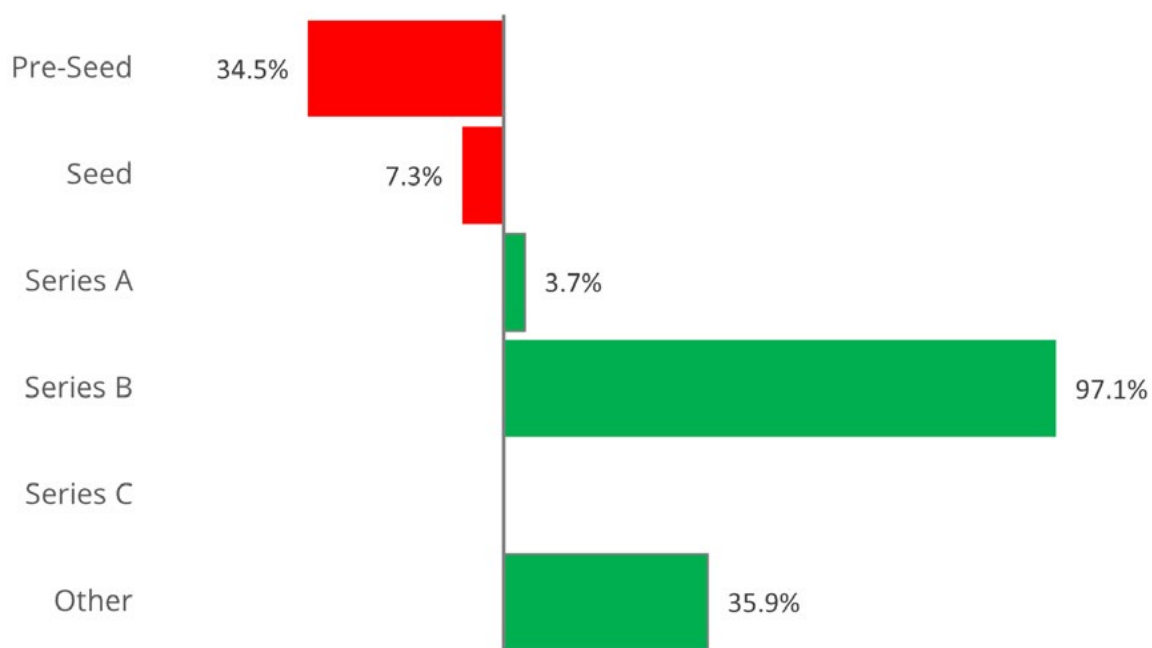


Figure 12: Stage of fundraising year-on-year percentage change

Comparing the fundraising stages from last year's survey with this year's survey, several shifts are evident. Most start-ups seeking finance are still in the early pre-seed and seed stages, where initial capital is crucial for developing solutions, hiring and marketing. Notably, there has been a decrease in the share of firms at the pre-seed stage and a slight decline in the seed stage. However, there has been an increase in firms at the Series B stage, indicating growth and potential scalability. This suggests that while many start-ups are still in their early stages of development, there is a growing number moving towards more advanced funding rounds, reflecting a maturing landscape where a strong strategy for profitability becomes increasingly important.

Series B funding differs from Series A in that it focuses on scaling the business rather than just optimising the product and establishing market fit. While Series A funds are used to refine the product and grow the user base, Series B involves a significant infusion of capital to expand market reach, increase production and enhance operational infrastructure, indicating a transition to growth and scalability. Series B usually represents funding for firms that are already quite successful and often focused on scaling the firm through acquisitions, etc.

3.7 Main drivers of adoption of data and technology in 2023



Figure 13: What have been the main drivers of adoption of data and technology across the built and natural environment sector during 2023?

‘The need for greater sustainability and the ongoing effects of climate change drove adoption of digital twins and investment in renewable energy technologies.’

In 2023, efficiency was the biggest driver of adoption, highlighting the requirement for streamlined processes. Sustainability followed closely, indicating a growing emphasis on environmentally responsible practices. Cost savings and improved decision-making also contributed to adoption, reflecting a pragmatic approach. The prominence of AI highlights the increasing integration of advanced technologies into innovation and automation.

When comparing the drivers of adoption with last year’s survey, the results have remained fairly consistent. Efficiency remains the main priority, reflecting emphasis on optimising processes and resources. Encouragingly, the mention of words relating to sustainability has increased, suggesting a growing awareness and commitment to meeting environmental goals. Other persistent drivers include cost savings and AI integration for improved decision-making.

These drivers highlight the multifaceted approach organisations are taking to leveraging AI, data and technology effectively in the sector, aligning with evolving needs and priorities.

From buying and selling property to smart buildings, RICS Tech Partners have proven their ability to streamline processes and improve efficiency across the built environment. Whether it's through innovative platforms for property tokenisation like [ScanSan](#) or advanced systems for smart workplace integration like [NCG](#), RICS Tech Partners exemplify the transformative potential of technology adoption in the real estate sector. Their approaches not only address the immediate needs of clients, but also contribute to long-term sustainability and resilience in the built and natural environment.

3.8 Main barriers to adoption of data and technology in 2023



Figure 14: What have been the main barriers to adoption of data and technology across the built and natural environment sector during 2023?

'Inertia in the industry with some resistance to adoption and integration into existing workflows.'

The adoption of AI, data and technology across the built and natural environment sector during 2023 has been hindered by several key barriers. Issues around data emerged as the most common concern, with data quality, transparency, collaboration and standardisation all impacting adoption. Another common barrier is cost, as the significant financial investment required for implementation acts as a deterrent for many organisations. Resistance to change also emerged as a prominent obstacle, with entrenched practices and cultural inertia impeding the uptake of new technologies. Additionally, limited education and understanding about the potential benefits of AI, data and technology hinder adoption efforts, emphasising the need for comprehensive training and awareness initiatives. Regulatory constraints

further complicate matters, as organisations grapple with compliance requirements and legal considerations.

To address these challenges, it is essential for stakeholders to prioritise education efforts, foster a culture of innovation and adaptability, and advocate for supportive regulatory frameworks that encourage technological advancement while also considering data privacy and security.

When comparing the responses on the barriers to adopting AI, data and technology across the built and natural environment sector from last year's survey with this year's survey, we can observe some interesting trends. While financial concerns have remained consistently prominent throughout, there appears to be a shifting focus towards cultural and leadership factors in recent years. Terms like culture, leadership and inertia are more prevalent in this year's survey, indicating an increasing recognition of the role of organisational culture and leadership attitudes in driving technological adoption. Regulatory challenges continue to be significant, suggesting ongoing complexities in compliance efforts. The appearance of terms related to the COVID-19 pandemic has decreased; however, it remains important to understand the impact of external factors on adoption dynamics. Overall, while financial barriers persist, there is a growing awareness of the importance of addressing cultural, leadership and regulatory factors to facilitate technology adoption across the built and natural environment sector.

Data standardisation, accessibility and sharing mechanisms continue to be significant hurdles, affecting collaboration and innovation in the industry. Solutions provided by RICS Tech Partners address these challenges in various sectors.

- [Building Passport](#) offers centralised platforms for storing and sharing building information, improving safety and efficiency throughout the building life cycle.
- [PIPP.AI](#) integrates with existing tools to standardise and centralise data, promoting collaboration and improving decision-making in commercial real estate.
- [BIMData](#) provides innovative tools and solutions for BIM projects, facilitating seamless collaboration and maximising project potential. Its platform empowers users to streamline workflows and optimise project outcomes with features like an integrated viewer, open BIM support and an application programming interface (API) for visualising models.

3.9 New technologies in 2023

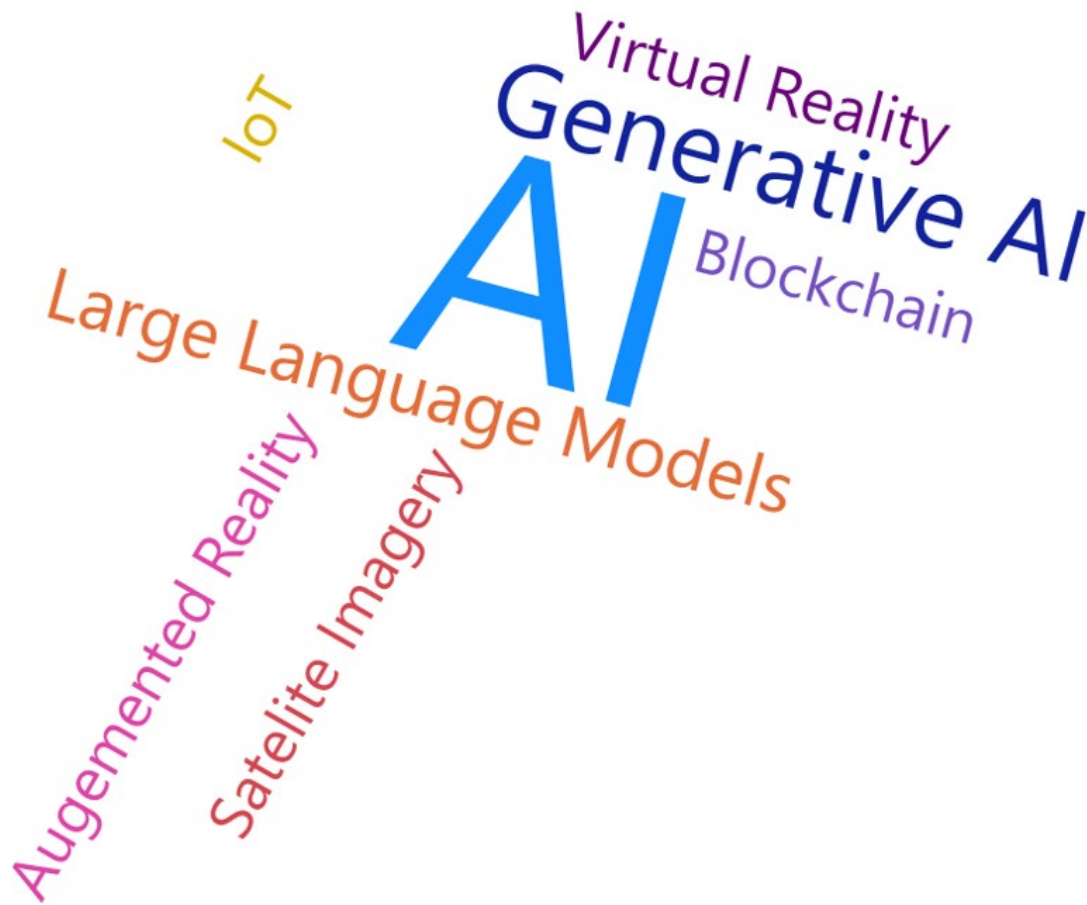


Figure 15: What new technologies have emerged during 2023?

‘Artificial intelligence has dominated almost every sector.’

Many new technologies have been highlighted as emerging during 2023, with a notable focus on advancements in AI. Generative AI is highlighted as one of the new developments, showcasing advancements in AI capabilities beyond well-established approaches such as machine learning. Responses also reference the rise of large language models, reinforcing the emergence of generative AI. Other technologies include virtual reality, augmented reality, the Internet of Things (IoT), satellite imagery and blockchain, reflecting a diverse landscape of technological innovation across various domains. The increase in emerging technologies highlights the continued pace of evolution and the expansion of the technological toolkit available to address challenges across the built and natural environment sector.

When comparing the responses on emerging technologies in the built and natural environment sector from last year’s survey with this year’s survey, there is a notable continuity in the mention of several key technologies, such as AI, virtual reality, augmented reality, blockchain and the IOT. However, there are also some differences in the technologies mentioned. Last year, there was more emphasis on specific technologies like digital twins,

data interoperability, big data and sensors, indicating a focus on data management and integration. Additionally, terms like digital leasing, digital renting, fractional ownership and building management systems were more prevalent in last year's survey, suggesting a greater emphasis on innovations in property management and real estate operations.

From drone services to building maintenance, AI is being utilised by our Tech Partners to revolutionise various aspects of the built and natural environment sector. [LAIER](#) employs AI for leak detection in buildings and industrial equipment, providing precise and adaptable solutions to mitigate costly damages and safeguard assets. These examples highlight the pervasive influence of AI in driving innovation and efficiency across sectors, further expanding the technological toolkit available for addressing challenges in the rapidly evolving landscape of today's built and natural environment sector.

3.10 Expected main drivers of adoption of data and technology in 2024



Figure 16: What will be the main drivers of adoption of data and technology across the built and natural environment sector in 2024?

‘Continued efforts to streamline and increase efficiency, with added focus on ROI and data to prove value.’

The primary drivers of adoption of AI, data and technology across the built and natural environment sector in 2024 include efficiency, AI, sustainability, compliance and speed. Organisations are increasingly prioritising efficiency in processes and resource utilisation, leveraging AI for data analysis and decision-making, and integrating sustainable practices into their operations. Compliance with regulations and standards remains crucial, alongside the need for agility and speed in responding to challenges. These drivers collectively reflect a landscape where innovation, sustainability and regulatory compliance are paramount, driving organisations towards digital transformation and operational excellence.

When comparing responses regarding drivers of adoption of data and technology in the built and natural environment sector from last year’s survey with this year’s survey, the results highlight an emphasis on sustainability. Both surveys underscored the importance of efficiency in processes and resource management, alongside a commitment to meeting regulatory standards and incorporating sustainable practices. However, while the responses from last year’s survey frequently mention ESG considerations such as wellbeing, building performance and awareness, the responses for this year feature a stronger focus on AI, speed and competition, suggesting a shift towards technological innovation and market dynamics. This indicates a nuanced evolution in priorities, where environmental and social concerns remain significant alongside emerging trends in technology adoption and the sector’s response to competitive pressures.

In addition to overall sustainability and ESG factors, the explicit compliance with net-zero goals also plays a significant role in driving the adoption of AI, data and technology across the built and natural environment sector. Net-zero goals aim to achieve a balance between greenhouse gas emissions produced and the emissions removed from the atmosphere, ultimately mitigating climate change impacts. As governments, organisations and industries commit to achieving net-zero emissions targets, there is increased pressure on the built and natural environment sector to transition to more sustainable practices and technologies. This includes adopting data-driven solutions to monitor, measure and reduce carbon emissions, as well as implementing technologies that facilitate energy efficiency and renewable energy integration. Compliance with net-zero goals not only ensures regulatory adherence, but also fosters innovation and resilience in the face of climate-related challenges, positioning organisations for long-term success in a decarbonised economy.

Firstplanit and InForecast, both RICS Tech Partners, contribute to this landscape by offering comprehensive solutions tailored to ESG strategy development, implementation, monitoring and reporting for real estate projects.

Powered by AI, [Firstplanit](#) simplifies complex product decisions for decarbonisation, health, resource efficiency and futureproofing.

[InForecast](#) provides end-to-end tools for ESG certification, benchmarking, collaboration, progress reviews and recommendations, ensuring efficient and cost-effective achievement of ESG goals. InForecast streamlines ESG requirements for real estate projects, employing

AI-powered tools to develop strategies, obtain certifications, monitor progress and generate reports across industry standards such as BREEAM, LEED and WELL.

3.11 Expected main barriers to adoption of data and technology in 2024



Figure 17: What will be the main barriers to adoption of data and technology across the built and natural environment sector in 2024?

‘Fear of making the wrong decision, particularly as a result of failed adoptions previously. Perceived cost of implementation vs ROI’

The main barriers to adoption of AI, data and technology across the built and natural environment sector in 2024 encompass a variety of key themes. These include financial constraints such as cost and budget, which can hinder adoption due to the high initial investments required for infrastructure, software and training. Organisational challenges like resistance to change and slow decision-making often stem from ingrained cultures and processes, making it difficult to implement new technologies effectively. Technological complexities, such as security concerns and interoperability, present significant hurdles as risk of data breaches and compatibility issues can compromise the integrity and effectiveness of technology solutions. Regulatory issues, including regulations and governance, add layers of complexity as compliance with various laws and standards may require additional resources and expertise. Sociopolitical factors like politics and uncertainty can disrupt implementation plans, with changing government priorities and economic conditions influencing project timelines and funding allocations.

Considerations related to human capital, such as education, are crucial as the successful adoption of technology depends on the skills and knowledge of personnel. Sustainability concerns further complicate matters, as organisations must balance the environmental impact of technology adoption with the potential benefits it offers. Addressing these challenges will require comprehensive strategies that navigate financial, organisational, technological, regulatory and societal dimensions to facilitate successful adoption of AI, data and technology.

In comparing the responses on the barriers to adoption of data and technology across the built and natural environment sector in the previous survey with those foreseen for 2024, there are some notable differences. While both years highlight financial constraints as a significant barrier, last year's responses frequently mention skills, culture and economy as prominent challenges. ROI, inertia and data standards also featured prominently, suggesting concerns around return on investment, resistance to change and data quality standards. Cybersecurity also emerged as a key concern, reflecting growing apprehensions around data security and privacy.

This year's responses focus more on specific organisational and societal challenges, such as resistance to change, security concerns, and regulatory issues. While financial constraints remain a common theme, there is a shift towards addressing broader sociopolitical and technological complexities in the current discourse.

Cost considerations play a pivotal role in shaping the adoption of AI, data and technology across the built and natural environment sector. The high initial costs of implementation often serve as a deterrent to many organisations, particularly smaller ones with limited budgets. Investments in infrastructure, software licences, staff training and ongoing maintenance can strain financial resources, leading decision-makers to hesitate or opt for cheaper, less effective solutions. However, it is essential to recognise that while the upfront costs may seem prohibitive, the long-term benefits often outweigh them. Over time, efficiencies gained through streamlined processes, improved productivity and better decision-making can result in significant cost savings. As technology advances and becomes more accessible, economies of scale and competition can also drive down prices, making adoption more feasible for a broader range of organisations.

Taking construction as an example, where material costs are relatively affordable but not sustainable, since [11% of carbon emissions come from materials and construction](#). Methods like [self-healing concrete](#) can not only reduce carbon emissions, but also lower costs in the long term. By incorporating self-healing agents into concrete, cracks can be repaired automatically, reducing the need for costly maintenance and extending the lifespan of structures. This not only enhances the sustainability of construction projects but also offers significant cost savings over time. Moreover, advancements in material science, exemplified by innovations such as self-healing concrete and the work of organisations like [Concrete4Change](#), an RICS Tech Partner, demonstrate the potential for technology to drive down costs and promote sustainability in the built and natural environment. Concrete4Change is a developing new technology for CO₂ mineralisation into concrete, helping manufacturers achieve net-zero emissions while reducing the costs associated with traditional concrete production.

3.12 Emerging technologies in 2024

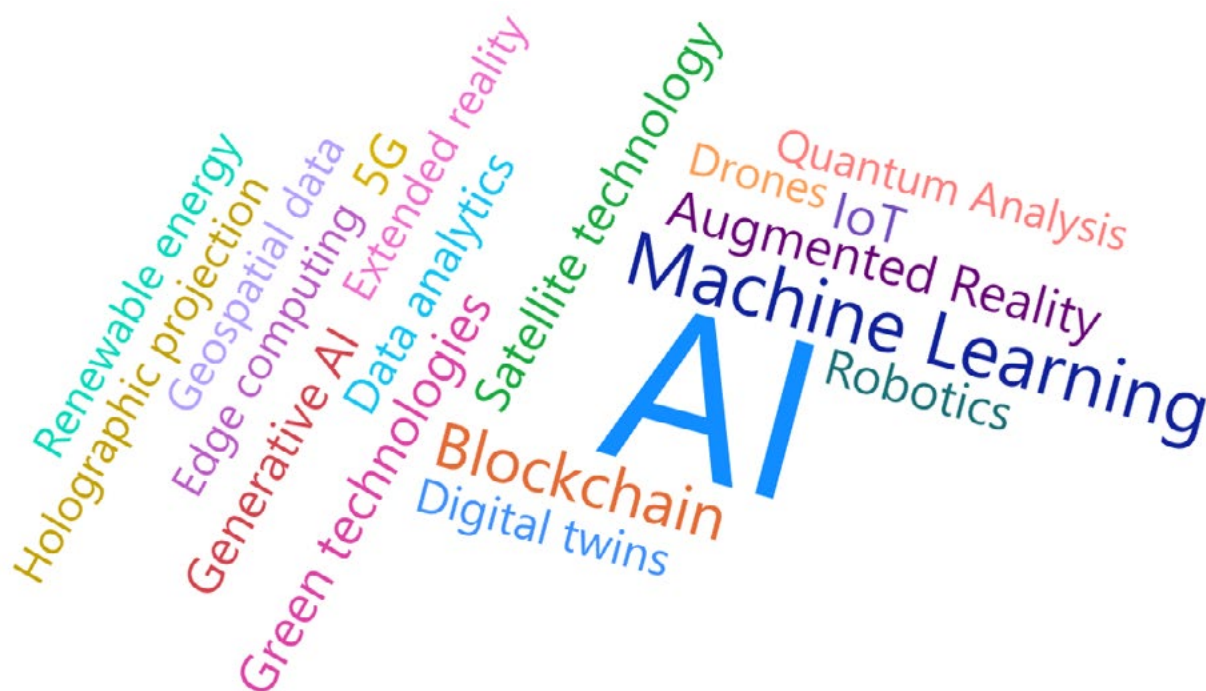


Figure 18: What new technologies will emerge in 2024?

‘There will be continuous development and adoption and integration of AI analytical tools to automate processes.’

The abundance of mentions of AI in the responses suggests that it will continue to dominate the landscape of emerging technologies in 2024. It is likely that AI is destined to advance across the sector, driving innovation and efficiency through its capabilities in data analysis, automation and decision-making. The integration of AI with other emerging technologies such as blockchain, augmented and virtual reality, the IoT and edge computing indicates a trend towards interconnected and intelligent systems. This new wave of AI is expected to revolutionise industries ranging from healthcare and finance to manufacturing and transportation, unlocking new opportunities for businesses and societies alike. Mentions of green technologies and renewable energy also highlight a growing emphasis on sustainability and environmental responsibility, suggesting a shift towards eco-friendly and resource-efficient technologies powered by AI. As AI continues to evolve and permeate different aspects of our lives, its impact on society, the economy and the environment will be profound, reshaping the way we work, live and interact with the world around us.

In comparing responses on emerging technologies in the previous survey with those foreseen for 2024, we can observe a shift in the focus of emerging technologies. In the previous survey there was notable anticipation around advancements in areas such as data sharing, IoT, predictive analytics, AI, virtual reality, augmented reality, blockchain and robotics. Concepts like the metaverse, ClimateTech, indoor geospatial, generative AI, LiDAR

and digital twins were mentioned, indicating a diverse range of technological developments on the horizon. This year, survey responses seem to delve deeper into the practical applications and integration of established technologies like AI, machine learning, blockchain and the IoT, alongside mentions of green technologies and renewable energy. While last year's predictions were more speculative and exploratory, this year's insights reflect a greater emphasis on the implementation and impact of these technologies in various industries, indicating a maturation and consolidation of emerging tech trends.

In 2024, AI is set to remain a dominant force, driving innovation and efficiency across industries through its data analysis and automation capabilities. Its integration with other emerging technologies signals a trend towards interconnected systems, reshaping the way we work and interact.

3.13 Opinions on consolidation in 2024

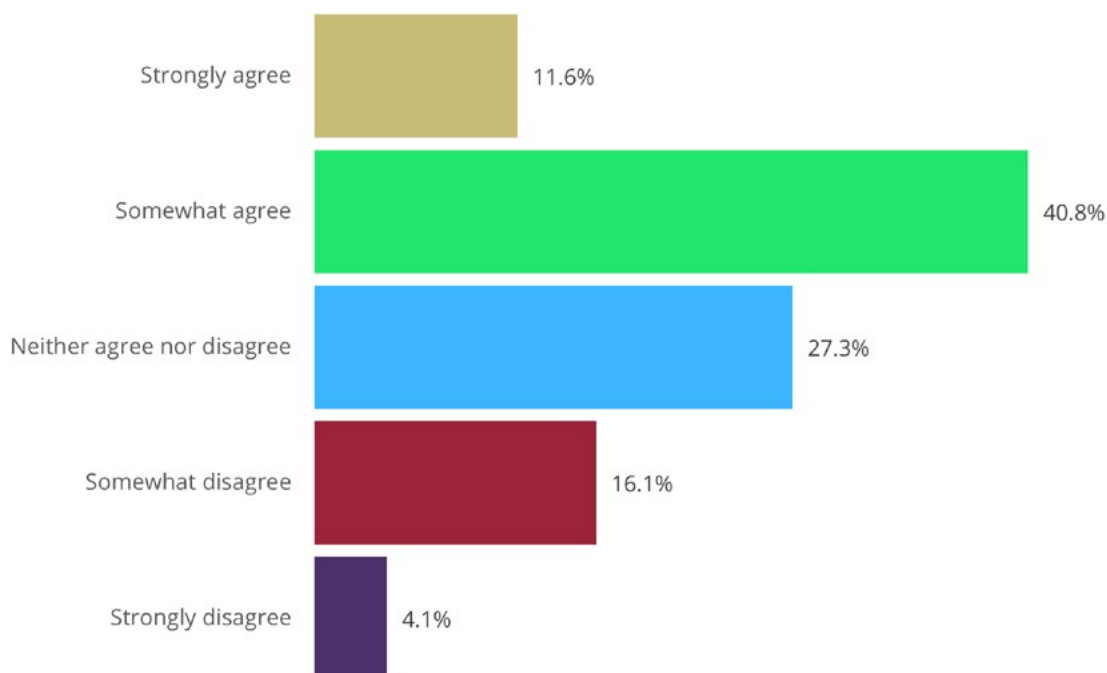


Figure 19: There will be significant consolidation across the data and technology sector in 2024 (strongly agree to strongly disagree)

Opinions on the likelihood of significant consolidation across the data and technology sector in 2024 varied widely. While a notable percentage leaned towards agreement, with a significant portion somewhat agreeing, there was also a substantial minority who either somewhat or strongly disagreed. The issue appears to be divisive, with a significant portion unsure or neutral about the prospect. This indicates a complex landscape where various factors may influence the trajectory of consolidation in the industry, leaving room for differing perspectives and potential shifts in market dynamics.

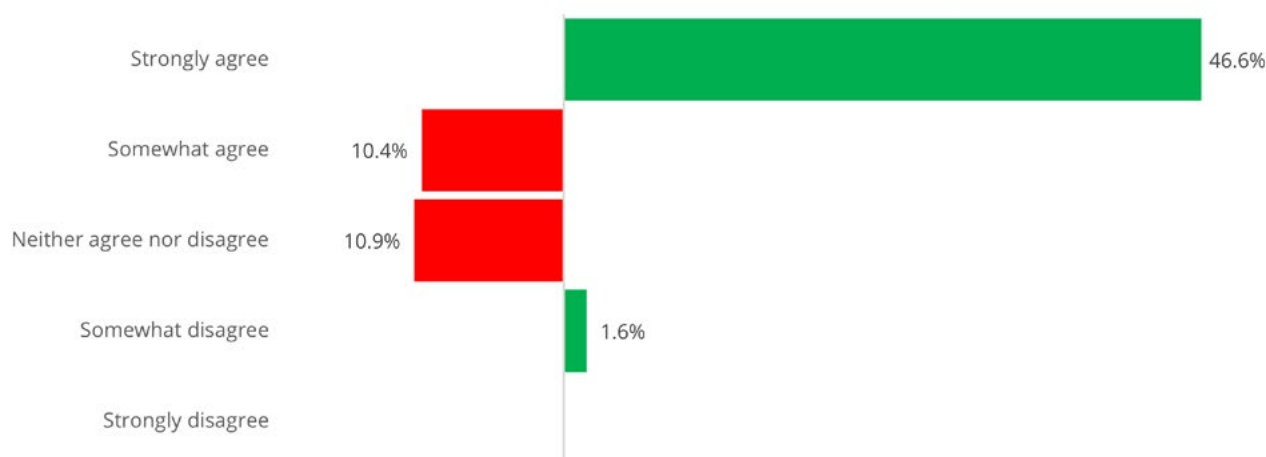


Figure 20: Opinions on whether there will be significant consolidation across the data and technology sector, year-on-year percentage change (strongly agree to strongly disagree; note the 'strongly disagree' category didn't receive any votes last year)

When comparing responses on whether there will be significant consolidation across the AI, data and technology sector, we notice a discernible difference in sentiment. Last year, a substantial portion of respondents expressed some level of agreement with the idea of consolidation, with nearly half somewhat agreeing and a smaller percentage strongly agreeing. However, this year's responses show a slightly more polarised view, with more leaning towards both strongly agree and strongly disagree. This shift suggests a potential change in perceptions regarding consolidation in the data and technology sector between the two years.

The strongly disagree category showed no change, as it had no responses last year.

3.14 Opinions on investment in 2024

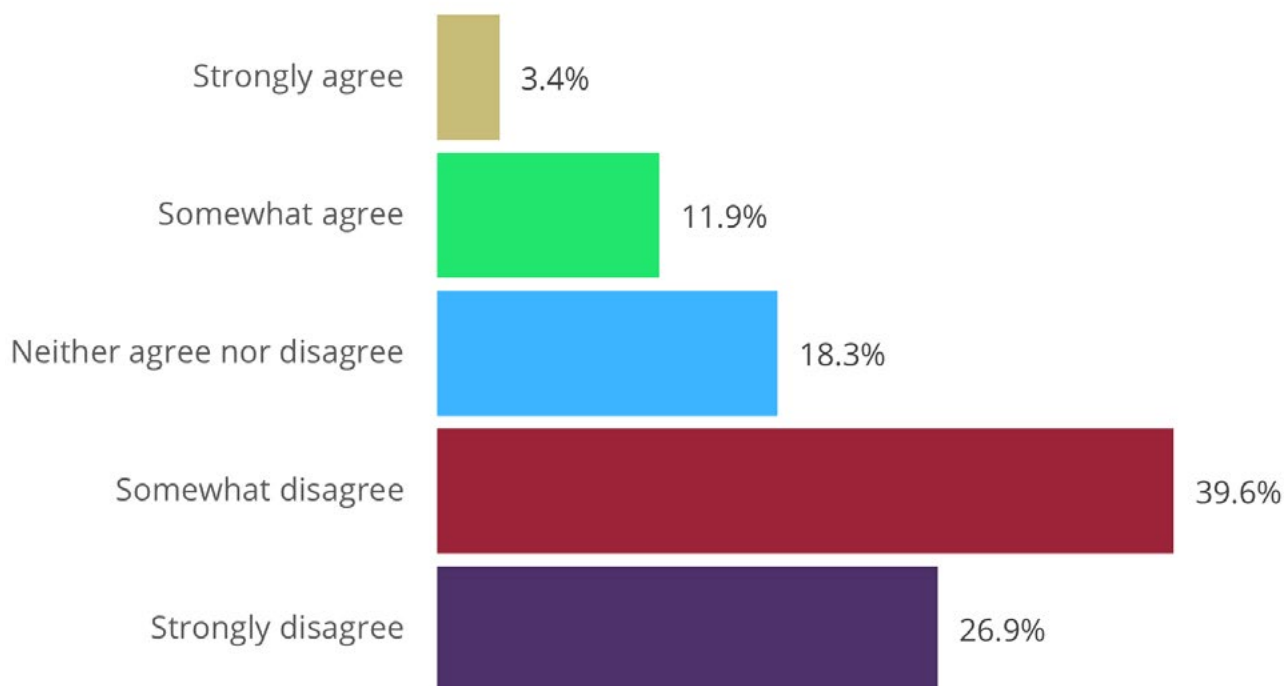


Figure 21: There will be a significant reduction in investment in the data and technology sector in 2024 (strongly agree to strongly disagree)

Opinions on the potential for a significant reduction in investment were predominantly sceptical, with a majority either strongly disagreeing or somewhat disagreeing with the notion. A significant proportion of respondents expressed firm opposition to this idea, suggesting confidence in ongoing investment levels or even potential increases. However, a notable minority did express some level of agreement, indicating a degree of concern or uncertainty regarding future investment trends. Overall, the prevailing sentiment leaned towards disbelief in the likelihood of a substantial reduction in investment, underscoring a prevailing optimism on this issue in the industry.

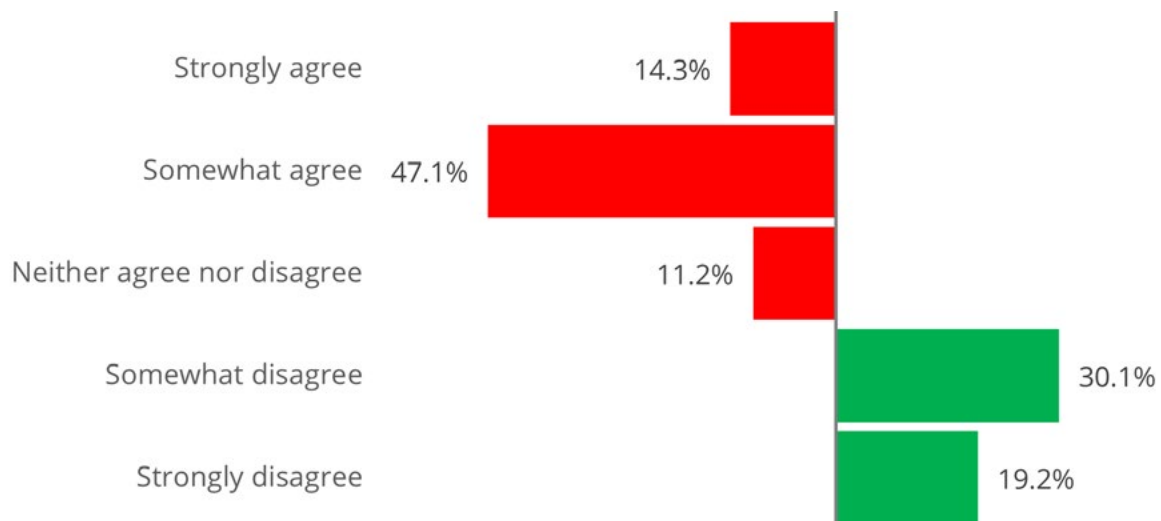


Figure 22: Opinions on whether there will be a significant reduction in investment in the data and technology sector year-on-year percentage change (strongly agree to strongly disagree;

When comparing responses on whether there will be a significant reduction in investment in the data and technology sector from last year's survey with this year's survey, there are notable shifts in perceptions. In last year's survey, while there was still a significant percentage expressing disagreement, the overall sentiment leaned more towards uncertainty, with a considerable number neither agreeing nor disagreeing. This year's data suggests a shift towards greater confidence – or at least less concern – regarding investment trends in the sector. This evolution in sentiment may reflect changing market conditions, industry developments or shifts in investor confidence over the course of the past two years.

3.15 Using AI

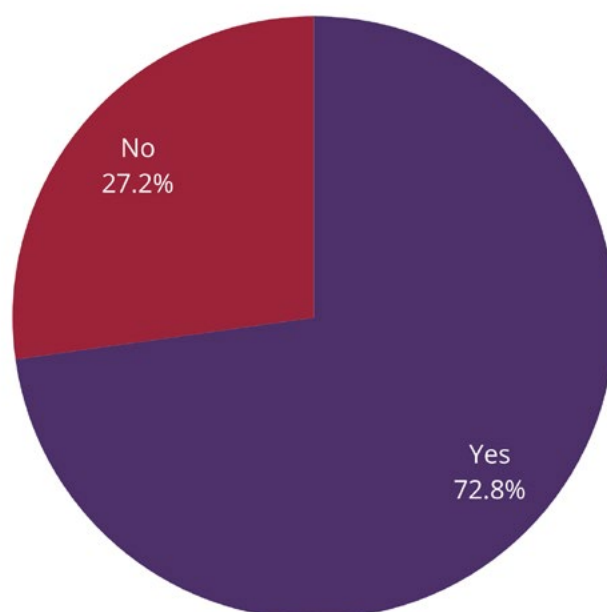


Figure 23: Does your solution use AI in one or more ways?

This new question in this year's survey indicates a strong inclination towards utilising AI in solutions, with most respondents reporting the use of AI-driven approaches. This suggests a widespread recognition of the value and effectiveness of AI in addressing various challenges and fulfilling needs across different use cases. While a substantial majority of respondents favoured AI solutions, there was also a notable minority who did not, indicating a degree of diversity in perspectives, or perhaps differing levels of familiarity or comfort with AI technologies. Overall, the data highlights the prominent role that AI plays in contemporary problem-solving and innovation, reflecting a trend towards embracing AI-driven solutions across the sector.

From construction simulation to smart city planning, in recent years AI has become a cornerstone of enhancing and streamlining existing practices across various sectors, especially in the built and natural environment sector. One notable example is [ALICE Technologies](#), which offers an AI-powered construction simulation platform. By leveraging AI, ALICE enables users to upload project models and input parameters related to labour, materials, equipment and construction methodology. This allows for the generation of multiple scheduling options and the forecasting of potential risks, enabling project managers to proactively address challenges and make informed decisions. ALICE's solution exemplifies how AI can revolutionise construction project management, optimising efficiency and minimising revenue implications associated with delays.

Platforms like [VU.CITY](#) demonstrate how AI can facilitate smart city planning by providing 3D visualisations of proposed designs and data, enabling stakeholders to better understand the impacts of changes on the environment and the community. This trend towards AI-driven

solutions reflects a broader recognition of the value and effectiveness of AI in addressing challenges and enhancing practices across the sector, highlighting its role in contemporary problem-solving and innovation.

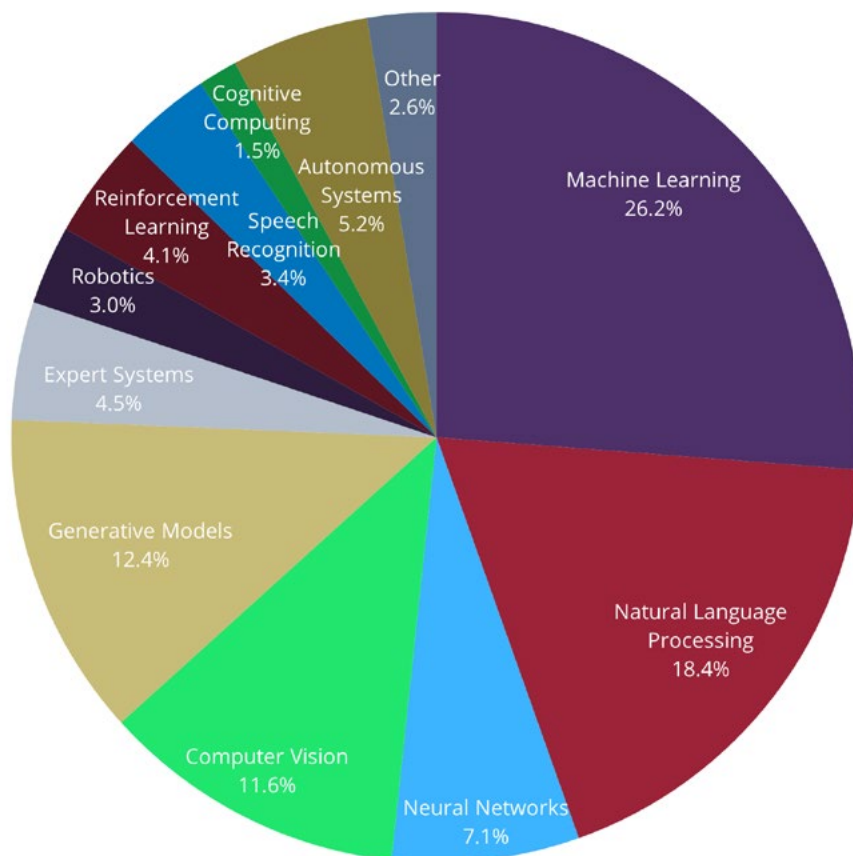


Figure 24: What AI is your firm using?

The survey results for this new question reflect a diverse landscape of AI adoption in firms operating across the built and natural environment sector. Machine learning emerged as the most widely embraced AI technology, indicating its versatile application across various aspects of these industries. Natural language processing and computer vision also stand out as prominent areas of investment, reflecting the importance of understanding and processing textual and visual data in this context, as well as the use of neural networks. The emergence of generative models signifies a new wave of AI innovation, suggesting a shift towards leveraging AI for creative and generative tasks. Other AI technologies such as robotics and cognitive computing are also mentioned.

In this landscape, RICS Tech Partners like BuildPrompt, CatSurveys and Stonal showcase great examples of AI utilisation.

[BuildPrompt](#) incorporates AI into their platforms to address real-time data challenges and streamline processes such as inspection and risk assessment in the built and natural environment sector. Its utilisation of AI enables users to gain valuable insights into the property life cycle, as well as manage and effectively mitigate risks.

[CatSurveys](#) revolutionises surveying processes by leveraging AI-driven feature recognition, image analysis and data processing. This allows it to provide clients with accurate and actionable insights for decision-making and project optimisation, contributing to enhanced efficiency and innovation in the industry.

[Stonal](#), another RICS Tech Partner, stands out for its use of machine learning in metadata management. Stonal has developed a platform that automates the extraction of information from documents and plans, utilising machine learning algorithms to address real-time data challenges and streamline processes in the built and natural environment sector. Through its machine learning-driven approach, Stonal empowers clients to collect data more effectively and at a lower cost, contributing to enhanced efficiency, sustainability and innovation in the industry.

This diverse adoption of AI technologies underscores the multifaceted approach that firms in the built and natural environment sector are taking to leverage AI for enhancing efficiency, sustainability and innovation.

4 Implications for the profession

The increasing use of AI and the broader digitalisation of the built and natural environment sector has profound implications for RICS and the profession we represent.

With the sector continuing to digitalise and adopt new technologies such as generative AI, the issues of cybersecurity, data governance and data ethics must be understood and managed by the profession. With data on all sector stakeholders, and their land and property assets, increasingly being held digitally and used by AI or other forms of automation to drive decisions that affect them, these datasets will need to be protected from misuse and issues around commercial sensitivity and privacy, and be managed responsibly.

RICS' continued focus on sustainability will depend on the use of AI, data and technology to predict, measure, analyse and manage the impact of the use of land and property on the environment. By implementing the RICS professional standard [Whole life carbon assessment for the built and natural environment](#), we can embed consistent calculations of the impact of greenhouse gas emissions across the whole life cycle of an asset, in order to minimise its environmental impact.

New and existing members of RICS will need to develop new skills and knowledge through training and CPD. The [Assessment of Professional Competence \(APC\)](#) pathway must continue to evolve to reflect the changing role of the profession. While the increasingly digital nature of the profession will provide an opportunity for it to broaden its demographic profile and increase interest from the next generation through RICS' early engagement activities, RICS must also make sure the profession embraces technologies such as AI, retains the key role of trusted adviser to its clients, and continues to possess and demonstrate its fundamental skills and knowledge.

Delivering confidence

We are RICS. As a member-led chartered professional body working in the public interest, we uphold the highest technical and ethical standards.

We inspire professionalism, advance knowledge and support our members across global markets to make an effective contribution for the benefit of society. We independently regulate our members in the management of land, real estate, construction and infrastructure. Our work with others supports their professional practice and pioneers a natural and built and natural environment that is sustainable, resilient and inclusive for all.

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