



2024 Edition

Emerging Tech Unpacked



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Introduction

Technology is the spark that creates revolutionary business advancements that change the way companies operate, compete and thrive. The pace of technological progress has reached unprecedented levels where fads quickly rise in popularity and shrink to irrelevance just as quickly. Faced with this reality, it's critical for organisations to determine what ideas have transformative properties and what is just a flash in the pan.

Inaction is not an option – businesses are constantly operating at junctures where they must embrace new models and ideas or risk falling behind competitors. From artificial intelligence and composability to augmented reality and quantum computing, the toolkit of emerging technologies is expanding, creating a complex set of opportunities and challenges for businesses.

The following Endava data shows which ideas generate optimism, which are not yet on the radar and which businesses may never adopt. This report dives into the realm of emerging technology and unpacks its implications on the business world.

Executive report

Endava's 2024 edition of the Emerging Tech Unpacked report shows that business leaders are focused on technology that offers near-term benefits and are more hesitant to invest in projects involving more speculative technology. Companies are putting resources into artificial intelligence, particularly generative AI, as many see it as striking a balance between immediate benefit and potential to be expanded down the line.

While the pandemic was a big hurdle to overcome, the global economy has not snapped back to the pre-2020 environment, meaning organisations must thoroughly vet potential projects for practical applications to their business. Many respondents in this study still list budget as one of their biggest challenges in pursuing new technology. But companies are still willing to pursue modernisation efforts because of stiff competition from their peers.

A VP of IT at a company in the study summarised the overall mood, saying:

It's an essential stance to make. Most of our competition is doing it so we must as well, or we lose. It gives us an upper hand in many aspects of business. The move to digitalisation is a must since the Covid-19 pandemic. It's moved a lot of selling and advertising to online. It increases revenue, streamlines processes and makes most things much more efficient.

Key insights

#1 All eyes on AI

Unsurprisingly, **artificial intelligence technologies are top priorities for organisations** included in the study. Just 1% of respondents are unfamiliar with AI and generative AI, and less than 3% say it's irrelevant to their business.

#2 Virtual reality check

Just as in last year's study, **organisations are aware of metaverse technology but continue being sceptical** of its application to their business. With Apple releasing one of the biggest products in the space in years, it remains to be seen whether the technology will ever meet the massive hype it received just a few years ago. Could the Apple Vision Pro be the lifeline this technology needs?

#3 Data dominance

Many of the 16 ideas are reliant on having quality data and insight into the future. Because of this and a plethora of other benefits, **big data and predictive analytics** were the third and fourth most important priorities among respondent organisations.

#4 IoT interest

Internet of things (IoT), one of the topics added to the 13 from last year's report, was the fifth-highest priority for the study's participants. Though the technology has been around for a while and is not as buzzy as other topics, organisations still see its appeal and application to their business. **Forty percent of respondents already use IoT in some capacity**, making it the most implemented technology in this year's study.

Data summary

The data included in this report is the result of a late 2023 survey of almost 700 organisations across the globe and builds on a similar report and [corresponding research done last year](#). Organisations of all sizes and industries participated in the study.

Respondents had to affirm knowledge of their organisational technology strategy, operations and processes, be in a department directly involved in and affected by major organisational technology decisions and have significant influence over those decisions.

Who should read this?

The intended audience for this report is organisational leaders looking to familiarise themselves with the latest technology topics. The report covers high-level trends and industry-specific observations from Endava subject matter experts who regularly interact with leading companies in their fields.

Emerging **technologies** and impacts on business

This section defines 16 technology topics Endava believes will significantly impact the business landscape and lays out how organisations around the world understand them and where they are in implementing them into their processes. The list of technologies, concepts and initiatives was put together by Endava experts who interact with and strategise around them on a regular basis.

Artificial intelligence and generative AI

Definition

AI: The ability to mimic the human capacity to think and use logic.

Generative AI: A subset of AI used to create new images, audio, data sets, designs, text and other media.



Market awareness and current state

The market is acutely aware of AI, especially given the highly publicised rise of ChatGPT and the pervasive news stories surrounding its triumphs (such as speeding up disease diagnosis¹) and tribulations (such as AI-generated lewd images²). Arguably, it is the technology most 'in vogue' right now due to its high media profile, and AI and generative AI placed as the first- and second-highest priorities for respondents.

When asked to rank each of the 16 topics, nearly 50% of respondents placed AI as one of their top three initiatives and 43% did the same for generative AI. Both topics have some of the highest levels of familiarity among respondent organisations (**Figure 1**) and most have implemented or are currently implementing strategies surrounding these technologies. Companies in the study were motivated to implement AI and generative AI in order to increase productivity and efficiency and to gain a competitive advantage.

AI, particularly generative AI, has made great strides throughout 2023, with generative AI tools being embedded in a vast array of applications. But headwinds lie ahead, most notably regarding regulation and litigation, alongside questions over the potential costs associated with AI creation, implementation and ongoing operations.

Opportunities

- AI enhances human potential and makes workers more productive. With the breakthrough of generative AI and, in particular, their broad availability through co-pilots, the technology helps all workers perform their roles better and giving more time to them to perform higher value work.
- Practical (generative) AI applications achieving breakthroughs in fields such as medical science and astronomy, delivering tangible results where humans have struggled.
- Massive influxes of capital are being distributed to companies operating in AI.

Challenges

- Concerns over security, IP protection and inaccuracies abound, with 2024 likely to be another year for AI controversies.
- Societal fear of AI will likely remain and potentially be entrenched in certain areas.

¹ AI-based diagnosis system transforms sepsis detection in children (openaccessgovernment.org)

² AI Gone Wrong: A List of AI Errors, Mistakes and Failures (tech.co)

Expert insight

“AI is enabling the creation of leaner, smarter businesses, able to have more relevant and engaging customer conversations. Beyond AI, recent hype around generative AI has driven significant interest and investment, but the nature (and pace of change) of the capabilities has made it difficult to realise measurable returns.

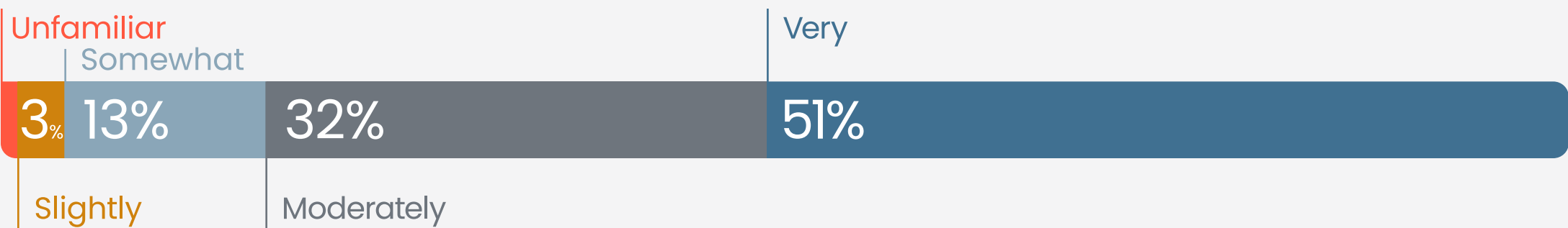
In 2024, we’re expecting emerging ‘autonomous agent’ capabilities to be the key enabler of the potential of generative AI, particularly to empower the automation of complex processes, perhaps with an initial focus on back-office workflows.”

Richard Pugh

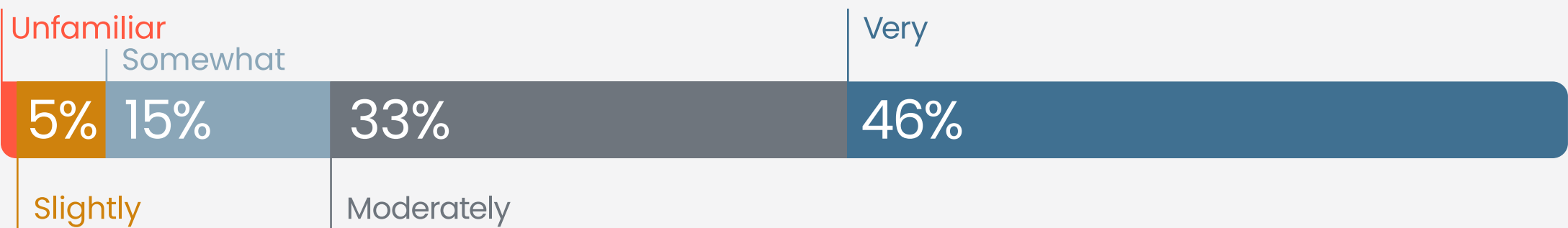
SVP, Head of Data and AI Strategy, Endava



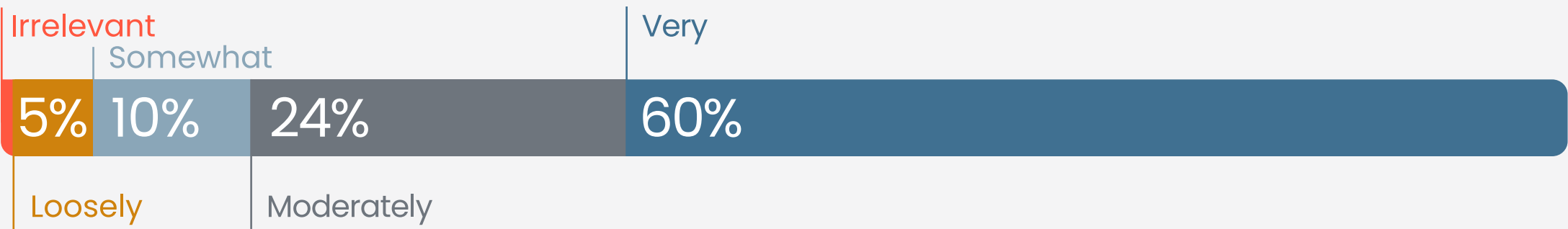
Familiarity with AI



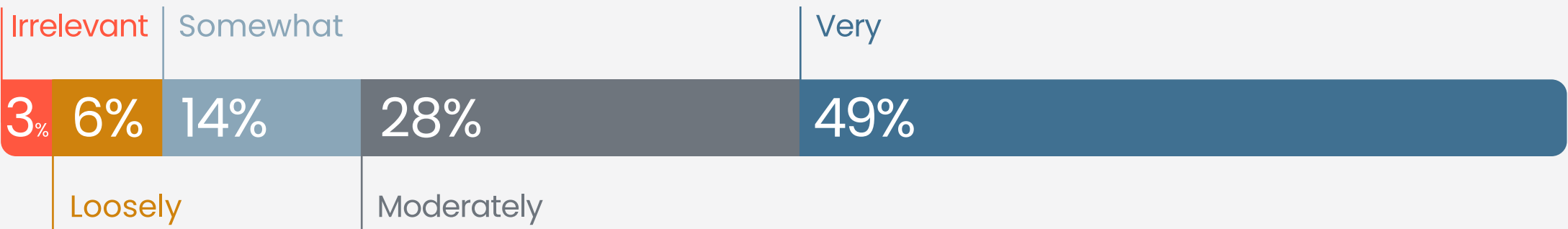
Familiarity with generative AI



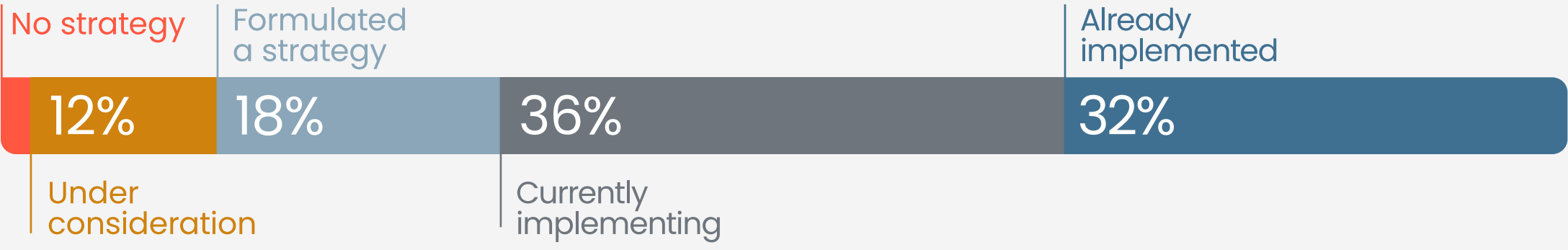
Relevance of AI



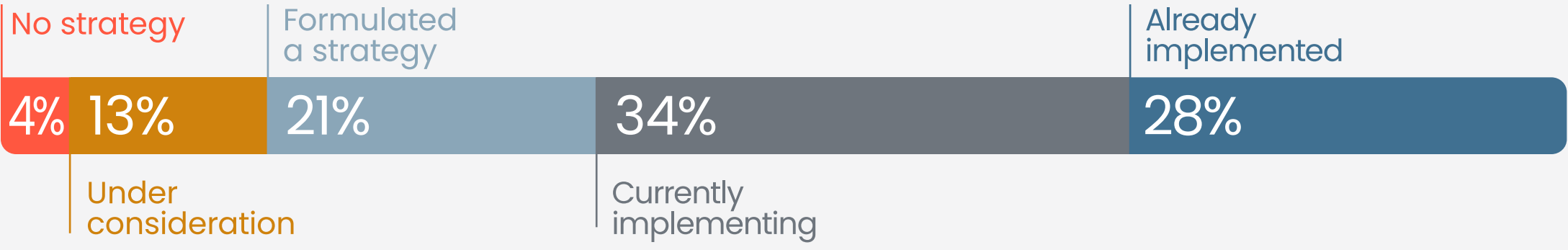
Relevance of generative AI



Current state of AI



Current state of generative AI

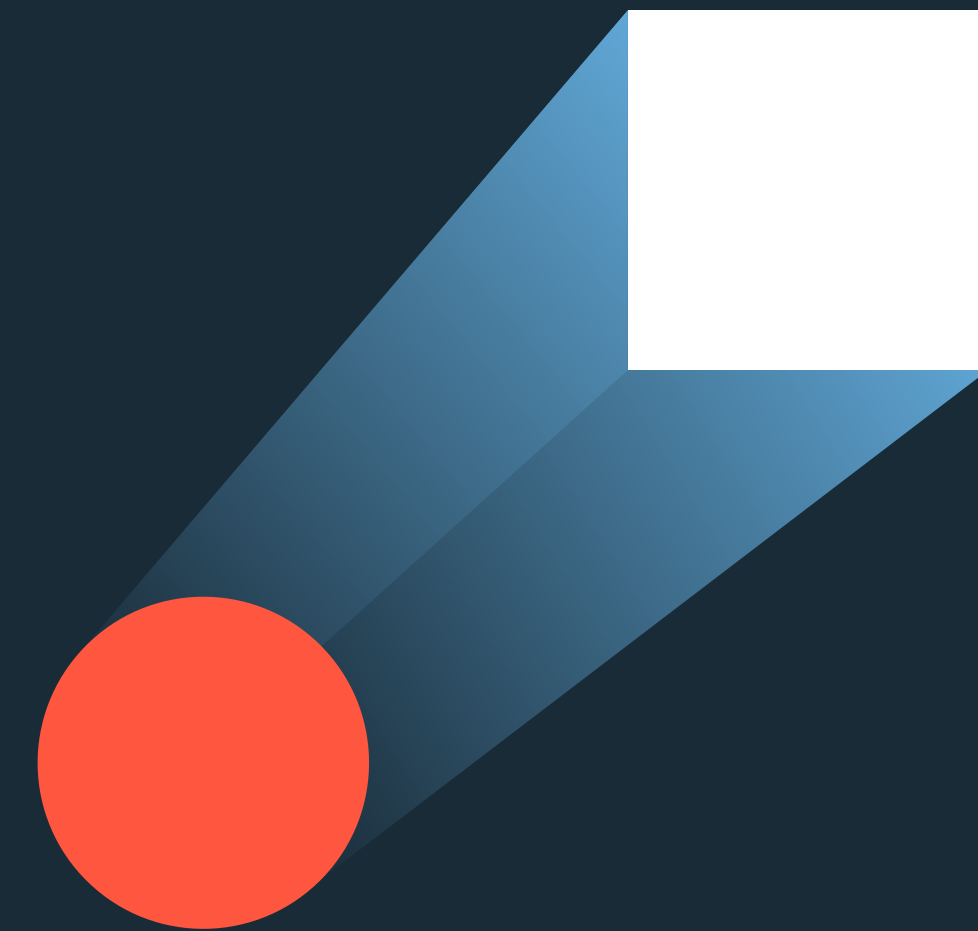


API ecosystems and digital ecosystems

Definition

API ecosystem: An architectural and organisational approach to software development where software is composed of independent services that communicate via application programming interfaces (APIs).

Digital ecosystem: The unification of all business elements in a digital environment.



Market awareness and current state

APIs are an integral component of modern software development. They facilitate interoperability between programs, bridging systems so they're able to exchange data. **Leveraging APIs can knock down silos and ensure consistency across platforms, as well as allow applications to share data more easily.**

Of all the topics considered in the study, awareness of API ecosystems among respondents sits in top half of the middle of the pack **(Figure 2)**.

Over half of respondent organisations are at least moderately familiar with the idea and most organisations believe it is relevant to their line of business. It ranked as the sixth-highest priority of the topics included in the study. The organisations that utilise API ecosystems did so to make IT systems more reliable and to increase efficiency and productivity.

Building a digital ecosystem constructs a network of all the technologies and elements that comprise an organisation, enabling seamless exchange of data, services and information. The topic is closely linked with APIs, which are crucial to enabling the connection of systems and software.

Nearly 70% of organisations are very or moderately familiar with the concept of forming digital ecosystems, an increase from last year's data, though adoption and relevance of the topic is stagnant. In last year's study, digital ecosystem was the fifth-highest priority of the 13 topics, while this year it was eighth of 16, suggesting the idea may be diminishing in importance.

Of the organisations that have not sought the construction of digital ecosystems, the top barriers to adoption are budget constraints and a lack of comprehension, followed by prioritisation of other technology initiatives.

Opportunities

- APIs are crucial to modern technology, particularly to interoperability and integrating new systems.
- Digitising business elements has the potential to diminish organisational siloes typically created by different functions, departments, etc.
- Businesses operating digital ecosystems can easily integrate new elements, offerings and technologies, increasing organisational scalability.
- APIs and Digital ecosystems reduce time and cost in rolling out new applications and products.
- APIs allow applications using different technology stacks to easily communicate and share data.

Challenges

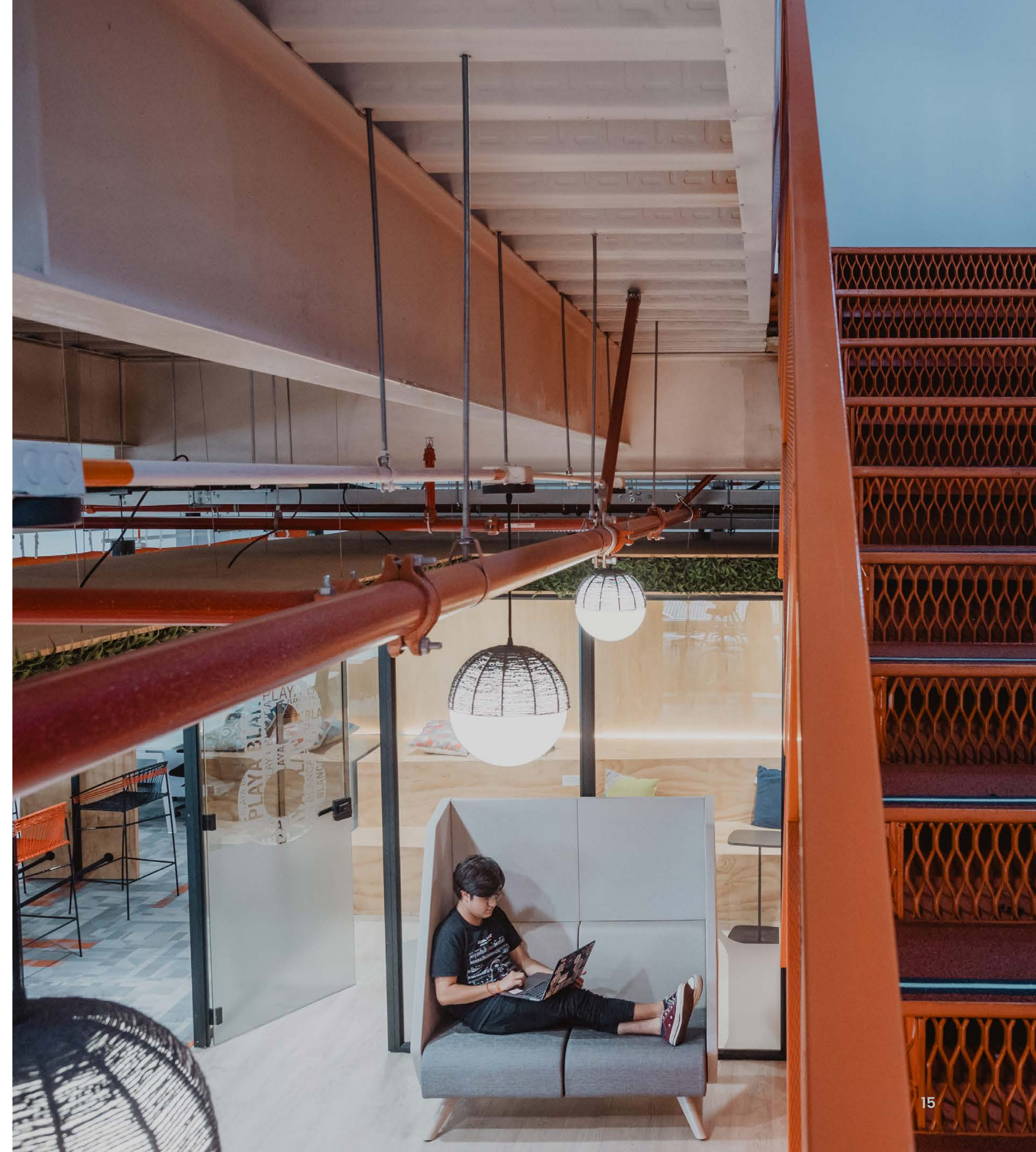
- If poorly managed, APIs and digital ecosystems may expose organisations to security risks and data privacy concerns.
- Businesses relying on external APIs may become overly dependent on third-party vendors.

Expert insight

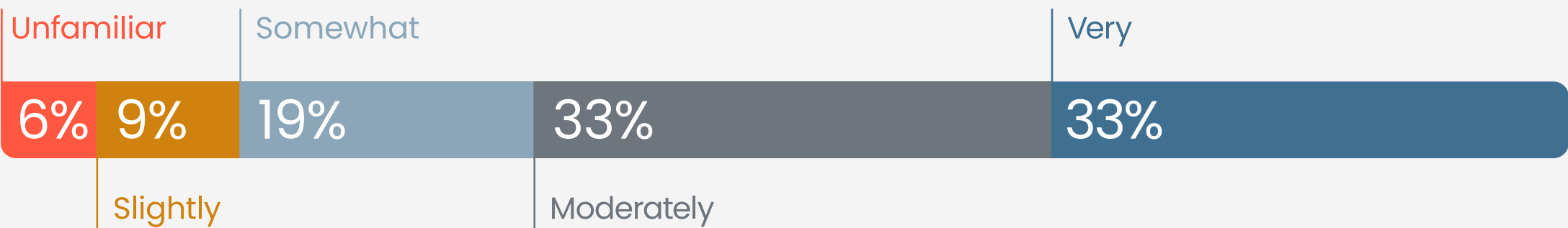
“Digital ecosystems are, amongst others, enablers for innovation and value creation. In a strategic play following the idea to production cycle, innovation and value creation comes from novel use of existing and 3rd-party assets and draws from the way systems, people, organisations and data interact with each other to create, deliver and consume digital products, services and information.”

Lorand Gabos-Szoverdi

Global SVP Delivery Acceleration, Endava



Familiarity with API ecosystems



Familiarity with digital ecosystems



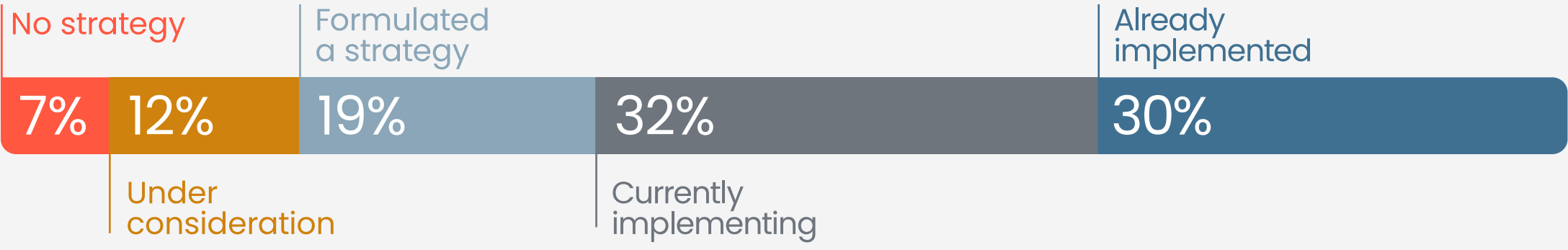
Relevance of API ecosystems



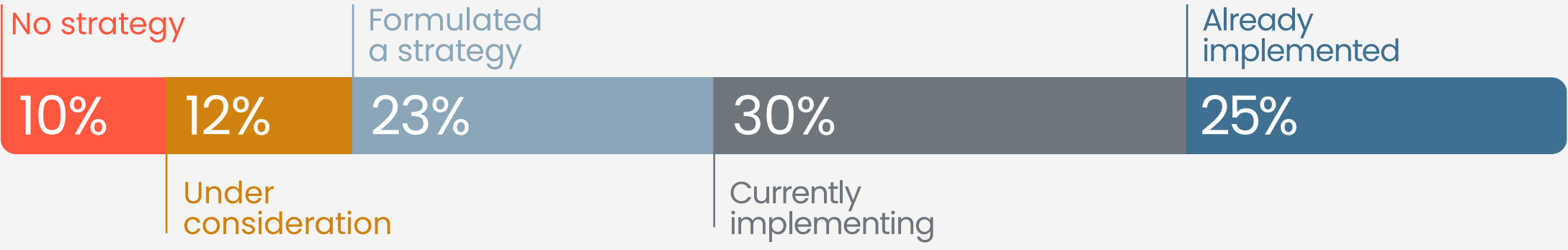
Relevance of digital ecosystems



Current state of API ecosystems



Current state of digital ecosystems



Big data and predictive analytics

Definition

Big data: Big data is usually referenced in the context of 'big data analytics'. Big data refers to data sets too large and complex to extract conclusions from. Big data analytics apply AI and machine learning to these data sets to analyse trends, assess organisational performance and efficiency, scorecard suppliers and identify areas for improvement.

Predictive analytics: The use of past data and statistical models to infer future outcomes and performance.



Market awareness and current state

Big data and predictive analytics rank as two of the topics organisations are most familiar with, and feel are relevant to them **(Figure 3)** – just as they did in last year's study. Today, these two topics placed as third- and fourth-highest priorities among respondent organisations. **Both will likely only increase in adoption in the future, as they're tied to AI and are given the role of large language models in the training of generative AI.**

There's also an increase in data sources and diversity generated by consumer devices. Edge computing and distributed processing will also improve the ability to analyse big data.

Opportunities

- Storing data sets and managing data infrastructure can have high environmental and fiscal costs.
- It can be difficult to navigate the complex landscape of legislation regarding compliance and privacy for data storage.
- Data comes in multiple formats and is constantly being created/updated, making management and analysis a difficult task.

Challenges

- Regulatory improvements/changes are on the horizon (such as the EU Data Act), improving the availability of data from consumer devices.
- Increasing maturity of data governance addresses many of the challenges presented below and clarifies ambiguities around data ownership, security and compliance.
- The intersection of big data and AI increases the accuracy of predictive analytics and data-driven decision-making.

Expert insight

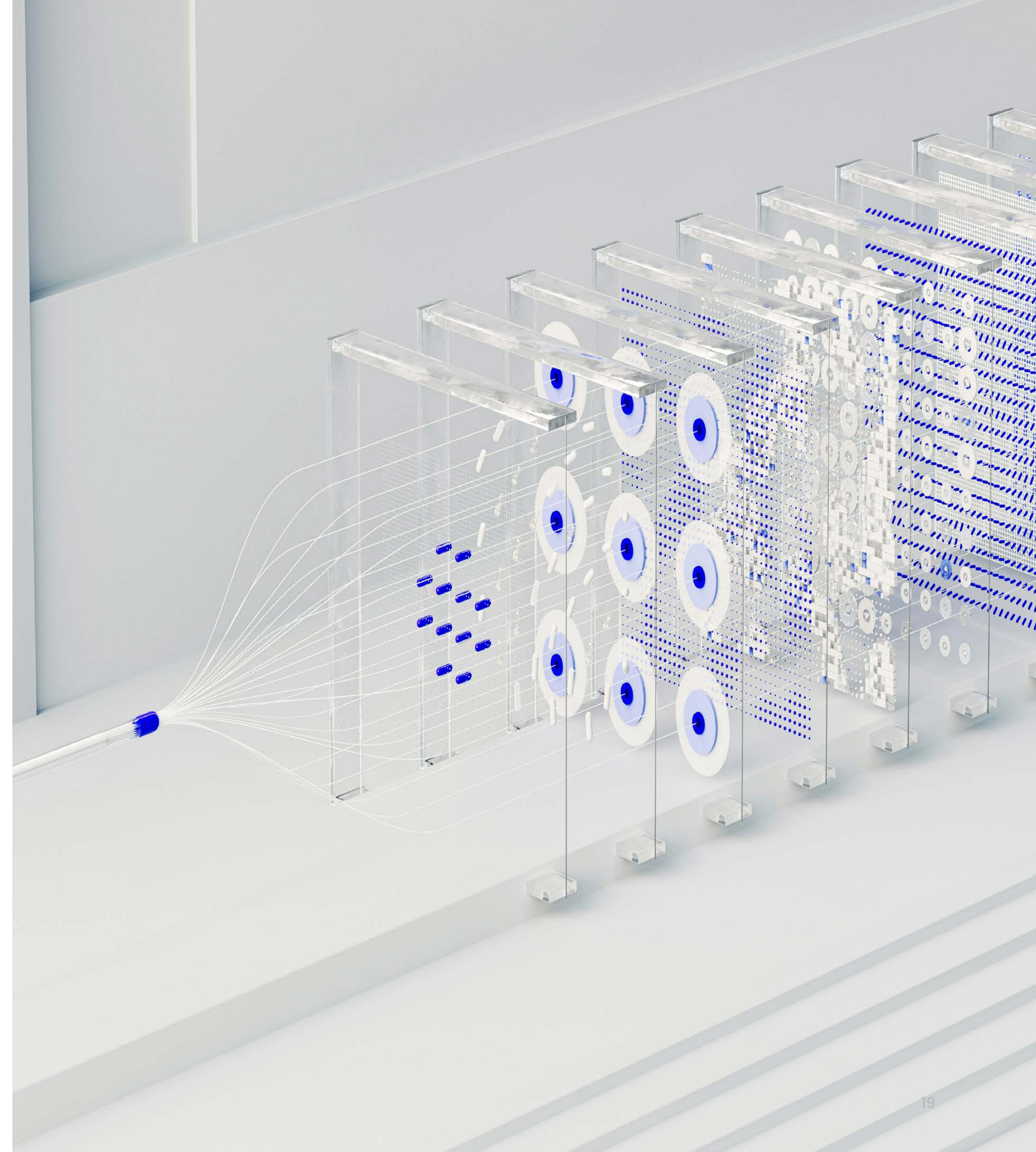
“Firstly, data-as-a-product is maturing, enhancing data quality and trust and consequently requiring the adoption of advanced data modelling technologies and expertise.

Secondly, data democratisation and data governance are becoming even more important for business leaders. With the support of AI assistants, business users will interact with data intuitively, fostering the establishment of a data-driven organisational culture.

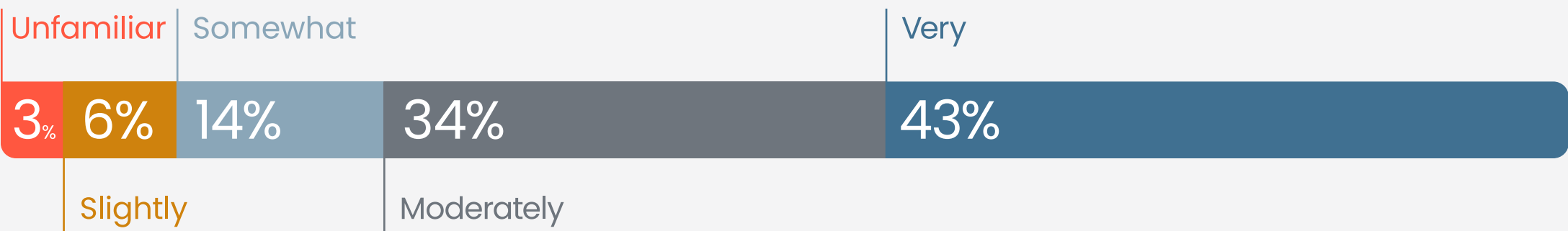
Undoubtedly, AI remains a leading force in big data innovation. Integrating AI with predictive analysis revolutionises the generation and utilisation and analytical insights, enabling businesses to achieve more value efficiently and at scale.”

Adriana Calomfirescu

Group Head of Data Delivery, Endava



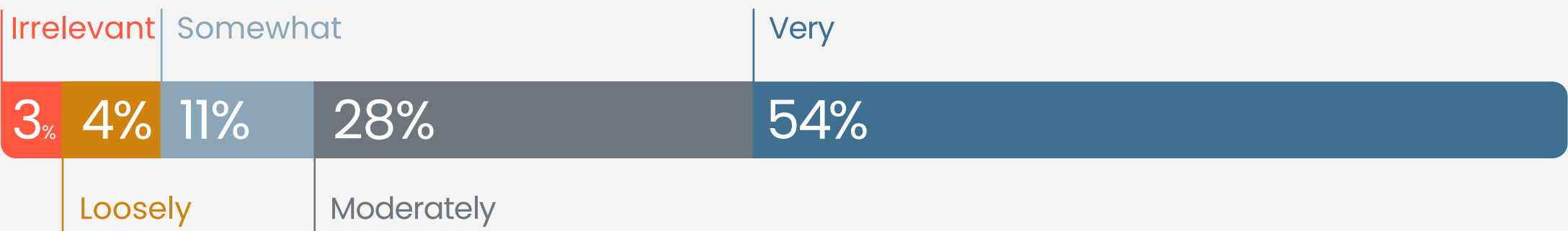
Familiarity with big data



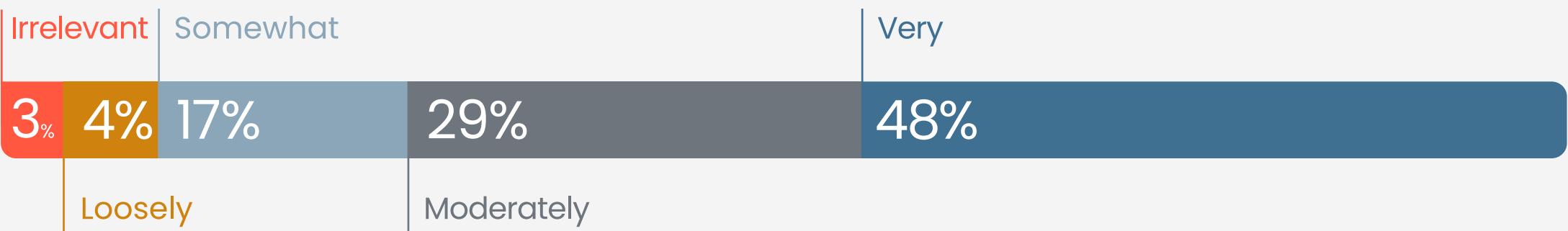
Familiarity with predictive analytics



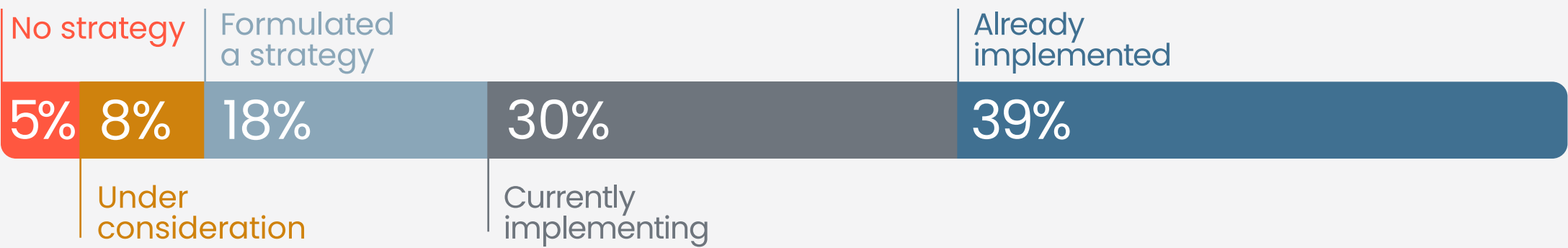
Relevance of big data



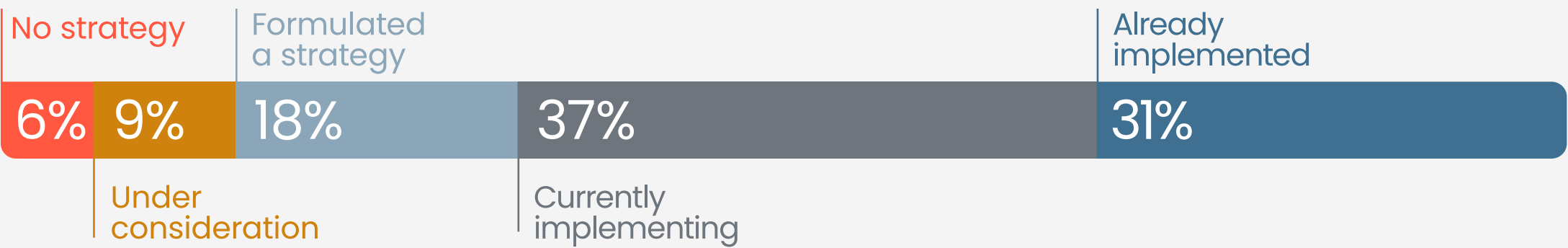
Relevance of predictive analytics



Current state of big data



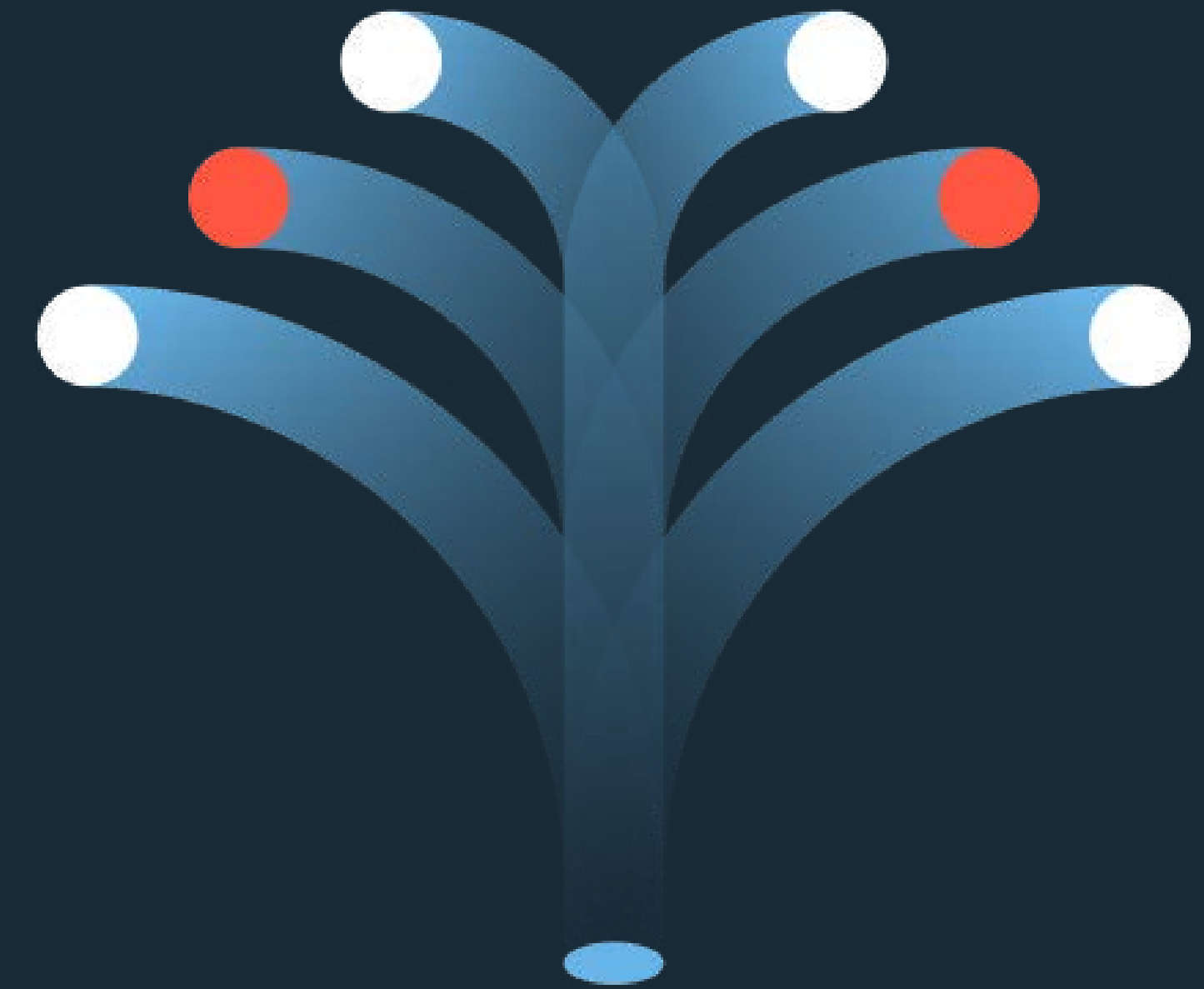
Current state of predictive analytics



Composable enterprise

Definition

Utilising the power of modularity as a way for organisations to respond to changing regulations and environments in an agile and flexible manner.



Market awareness and current state

The composable enterprise is not a new concept. It is a blend of best practices that stretches back over twenty years. As such, in some form, it is very much present in most modern organisations, although rarely as a composite whole nor known by this terminology. In some major organisations, it has been wholeheartedly embraced, but as of early 2024, mass-market penetration is still elusive (**Figure 4**).

The 'popularity' of the term 'composable enterprise' appears to have diminished, with fewer mentions from analysts and across the general zeitgeist. However, **the fundamental elements of composability are becoming increasingly common even in enterprise-grade software**. Additionally, [previous Endava research](#) shows that integrating concepts of composability is a priority for many organisations.

Opportunities

- Composability breaks key functions into modular components that operate as building blocks that can be built and maintained independently. With this approach, changes to one don't necessarily impact another.
- Composable components can be reused so new offerings don't have to be developed from scratch, reducing time and cost.

Challenges

- The widespread change in mentality and business models of both developers and end-users can be difficult for some parties to adapt to easily or willingly in some cases.

Expert insight

“There is no doubt about it: today’s companies have to be flexible. They need to quickly adapt to changing contexts, shifting market demands and emerging opportunities. To achieve that, the foundation of the enterprises has to follow a modular, loosely coupled approach for its business capabilities, processes and technologies.

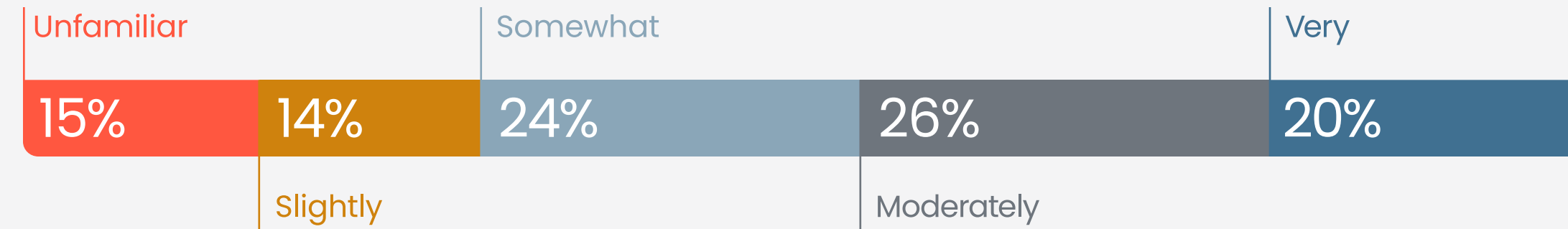
By adopting this approach, supported by APIs and digital ecosystems, a truly composable enterprise can be created, providing above par adaptability, flexibility and competitive advantage.”

Lorand Gabos-Szoverdi

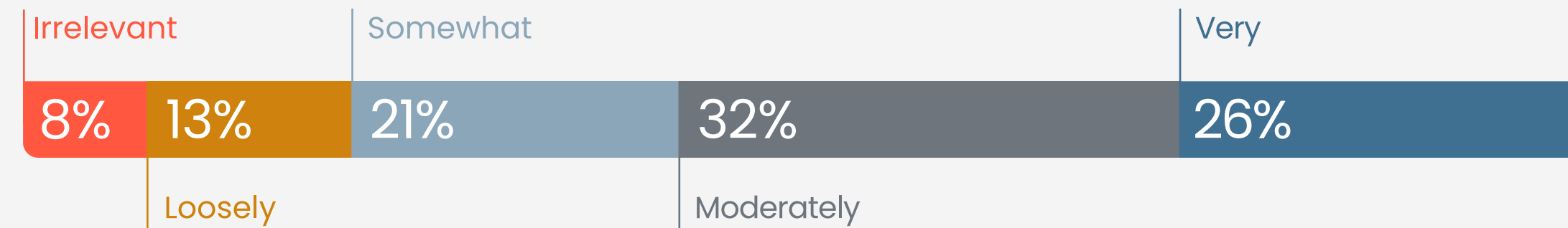
Global SVP Delivery Acceleration, Endava



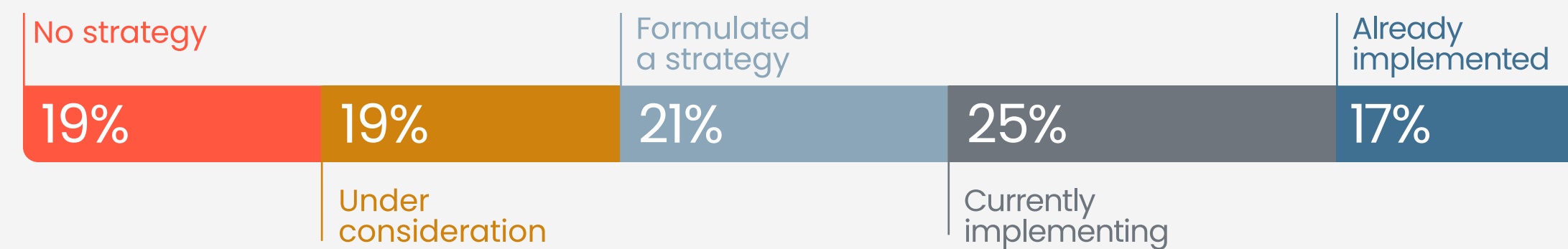
Familiarity with composable enterprises



Relevance of composable enterprises



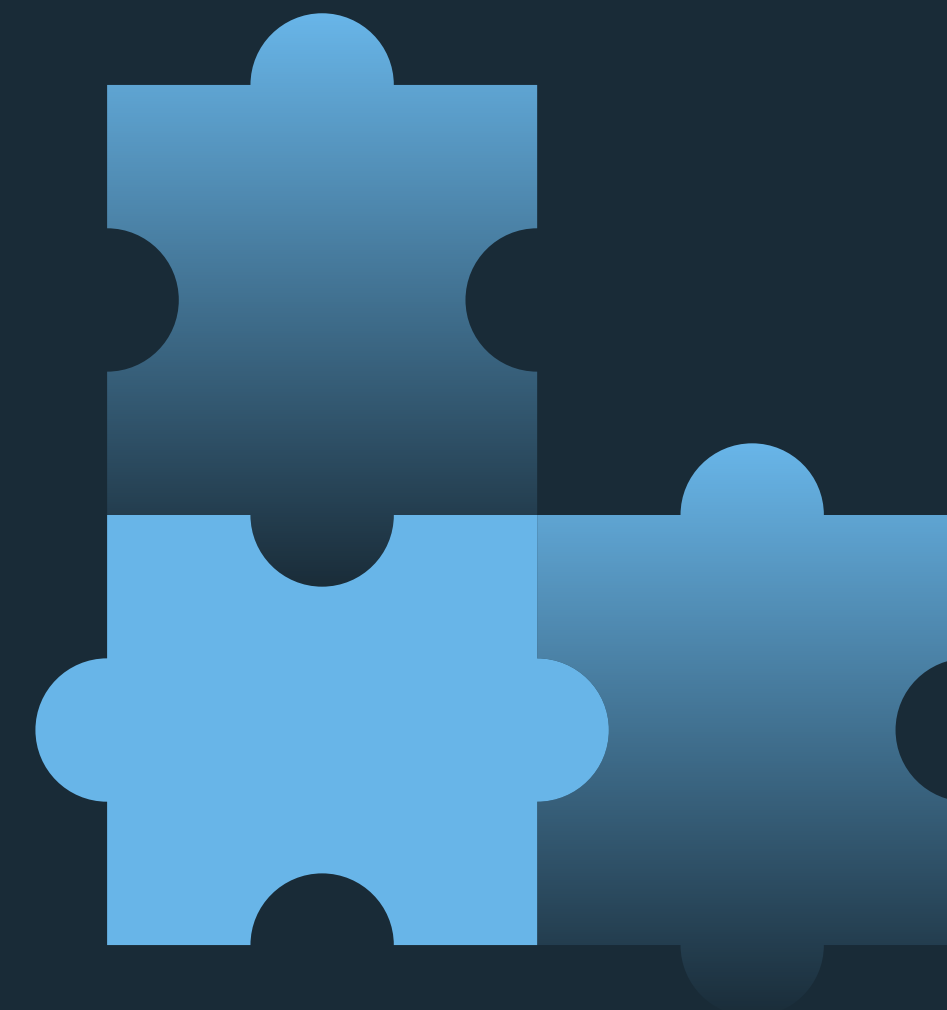
Current state of composable enterprises



Environmental, social and governance (ESG)

Definition

Organisations considering their business' effect on the world around them, with particular attention to diversity, their employees, the environment and local communities.



Market awareness and current state

Data indicates that ESG has very high market awareness (**Figure 5**) – to the extent that it has been embedded in the strategies of some of the world’s largest organisations. It has also been enshrined in legal codes across the world to varying levels, although it has become a controversial and divisive issue in global politics.

Despite many articles lamenting the fall of ESG, the study indicates that it remains an important issue to businesses. ESG is behind only big data and IoT/5G for topics that organisations have already implemented a strategy for. While cynics believe that ESG is often wielded in a performative capacity, Endava data shows that organisations see these as efforts to attract customers, gain a competitive advantage, increase operational efficiency and boost employee satisfaction.

Technology is central to an ESG strategy. Once an organisation starts measuring its environmental impact, it can begin digitalisation efforts to improve its sustainability. Such efforts include migrating operations from on-premises data centres to the cloud and using digital services that demand shift to run cloud-based applications in data centres located in low-carbon regions, or when grid electricity is ‘green’.

Opportunities

- There is increasing evidence that diversity, equity and inclusion positively impacts the bottom line.
- Following sustainable practices to eliminate waste increases cost savings.
- Diverse workforces and sustainable solutions can present companies with wider opportunities to facilitate non-traditional, outside-the-box innovation.

Challenges

- ESG efforts can subject organisations to ideological pushback from dissenting lawmakers and government officials
- Companies can be seen as greenwashing or using ESG as a marketing effort rather than a serious initiative.
- Any changes in economic circumstances tend to lead to ESG de-prioritisation.

Expert insight

“The path to sustainability starts with thorough measurement, using technology as a key enabler. Managing data is essential for sustainability, whether for compliance or understanding the scale of the challenge.

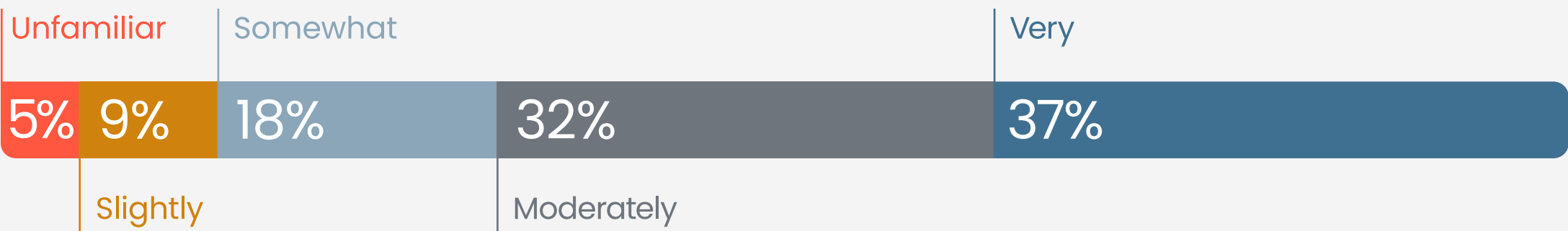
Centralising environmental data and using digital twins facilitate visualisation and problem-solving. Once supply chain metrics are established, the focus should turn to decarbonisation strategies. Digital solutions can accelerate progress; for instance, shifting from on-premise to cloud data centres can reduce IT carbon emissions by up to 98%.

By adopting digital-first approaches, companies can extend carbon reduction efforts to their supply chains, making significant impacts.”

Usman Suhail and James Costerton
Sustainability Leads, Endava



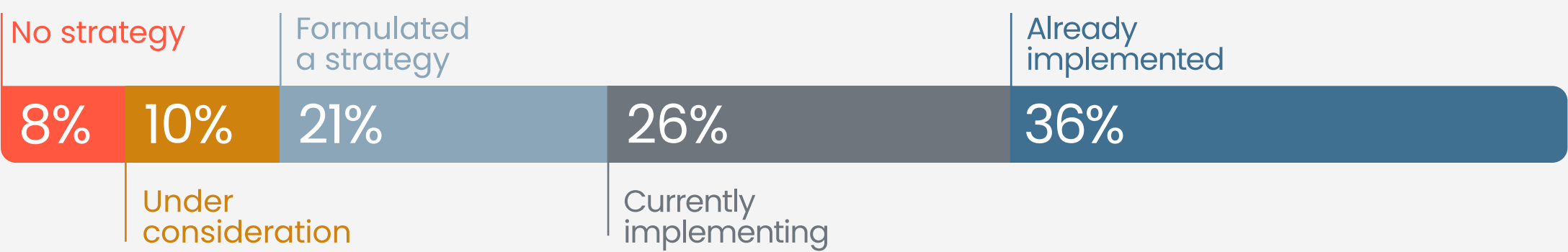
Familiarity with ESG



Relevance of ESG



Current state of ESG

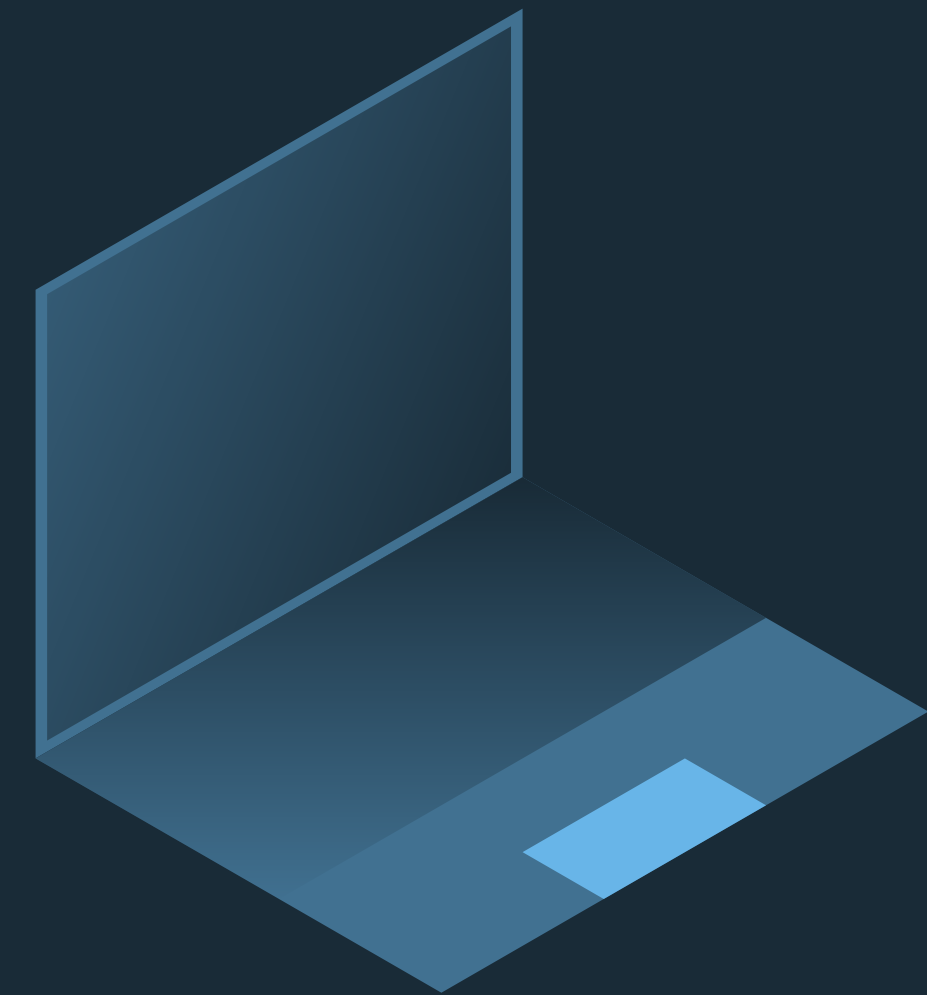


Internet of things/5G and telematics

Definition

IoT/5G: A network of physical objects that utilises sensors, software and technology to connect and communicate with each other to exchange status information. 5G, the fifth generation of mobile networks, is one of the backbones of this technology.

Telematics: The combination of telecommunication and computer science.



Market awareness and current state

With numerous applications across retail, manufacturing and healthcare, IoT is **incredibly important to modern businesses**. The sensors IoT relies on create supply chain visibility, help gauge the condition of equipment and generate massive amounts of data to improve processes and standards.

This technology is feasible due to 5G's faster, more reliable connectivity and creates a network of smart devices that can exchange vital information. It is highly familiar and relevant to organisations in the study (**Figure 6**), and the technology is the most implemented of the 16 included.

Conversely, telematics, a specific use case of IoT, scores low in both metrics. **While familiarity with telematics has increased slightly among businesses, its relevance has not**. Telematics is used primarily in vehicles for tracking, data collection and communication, which lends it to a smaller subset of industries than IoT. This is likely a reason the concept isn't as well-known or relevant to organisations in the study.

Opportunities

- Both technologies enable data collection for processes and systems that previously relied on guesswork, expertise and conjecture.
- By analysing behaviour and connecting different devices, the technologies create safer working environments.
- Enabling 'smart devices' can save organisations money, automate processes and allow for remote monitoring.
- New pricing models based on actual usage can be more beneficial than a one-size-fits-all pricing model.
- Tracking and visibility of goods and assets can be improved.
- Waste can be eliminated by ensuring more efficient energy use.

Challenges

- The use cases for telematics are somewhat limited.
- Smart devices consume more power than traditional ones.
- Managing the networks of connected devices presents a new task.
- Telematics are a crucial part of autonomous vehicles, but excitement surrounding this technology seems to have somewhat subsided.

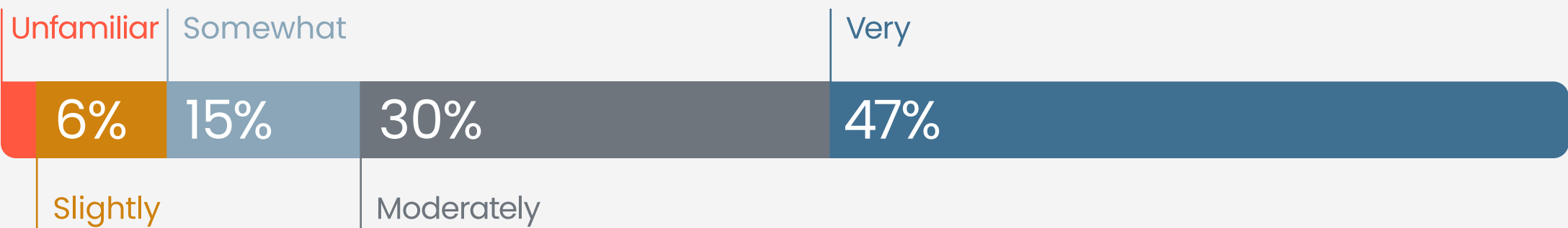
Expert insight

“For 2024, these technologies are poised to become pivotal to many businesses, transforming them, and potentially their entire industries through unparalleled connectivity and real-time analytics, driving operational efficiencies, and fostering new business models that leverage smart, interconnected technologies for innovative solutions.”

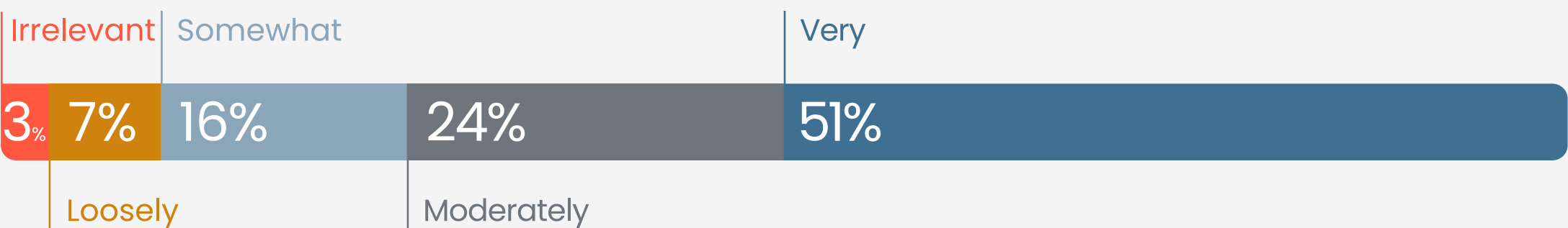
Vince Francis
Regional SVP, Endava



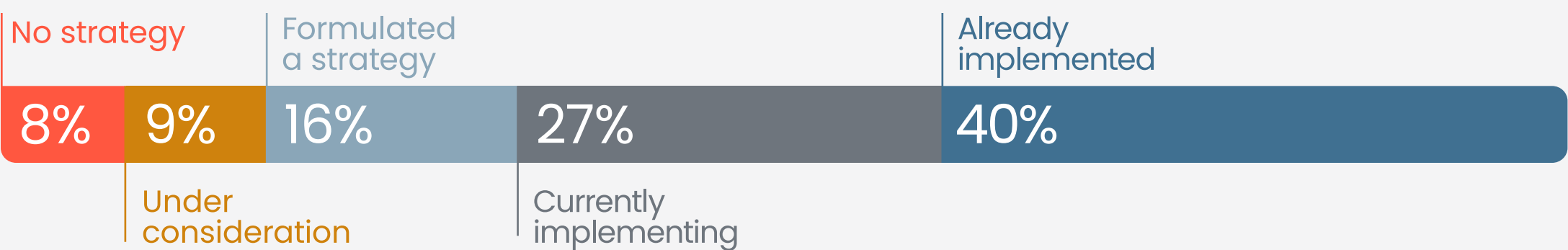
Familiarity with IoT/5G



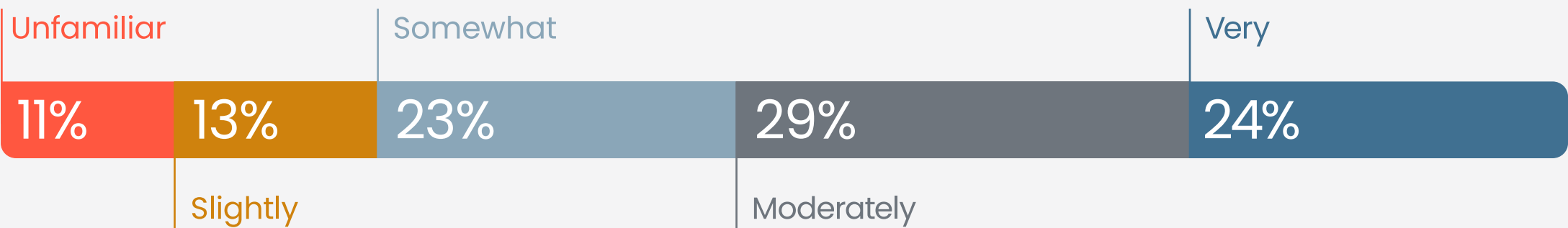
Relevance of IoT/5G



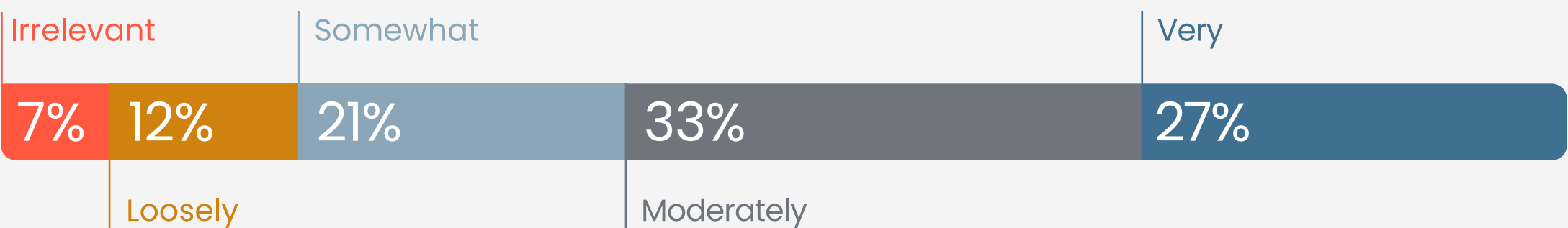
Current state of IoT/5G



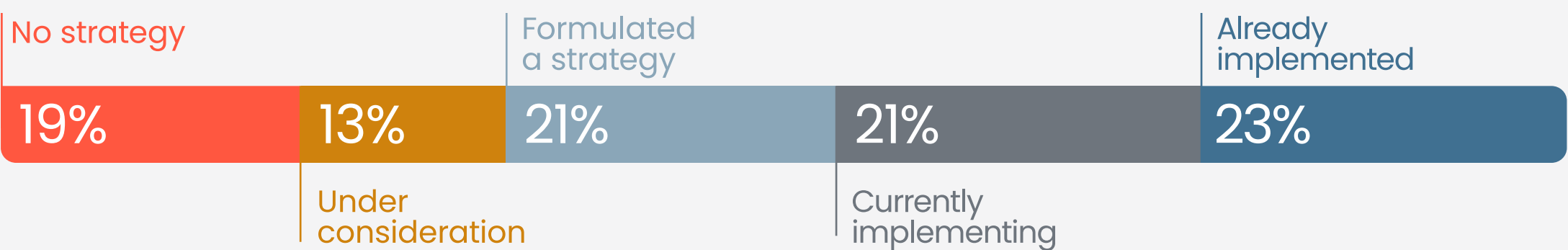
Familiarity with telematics



Relevance of telematics



Current state of telematics



Phygital, digital twin, metaverse and omnichannel

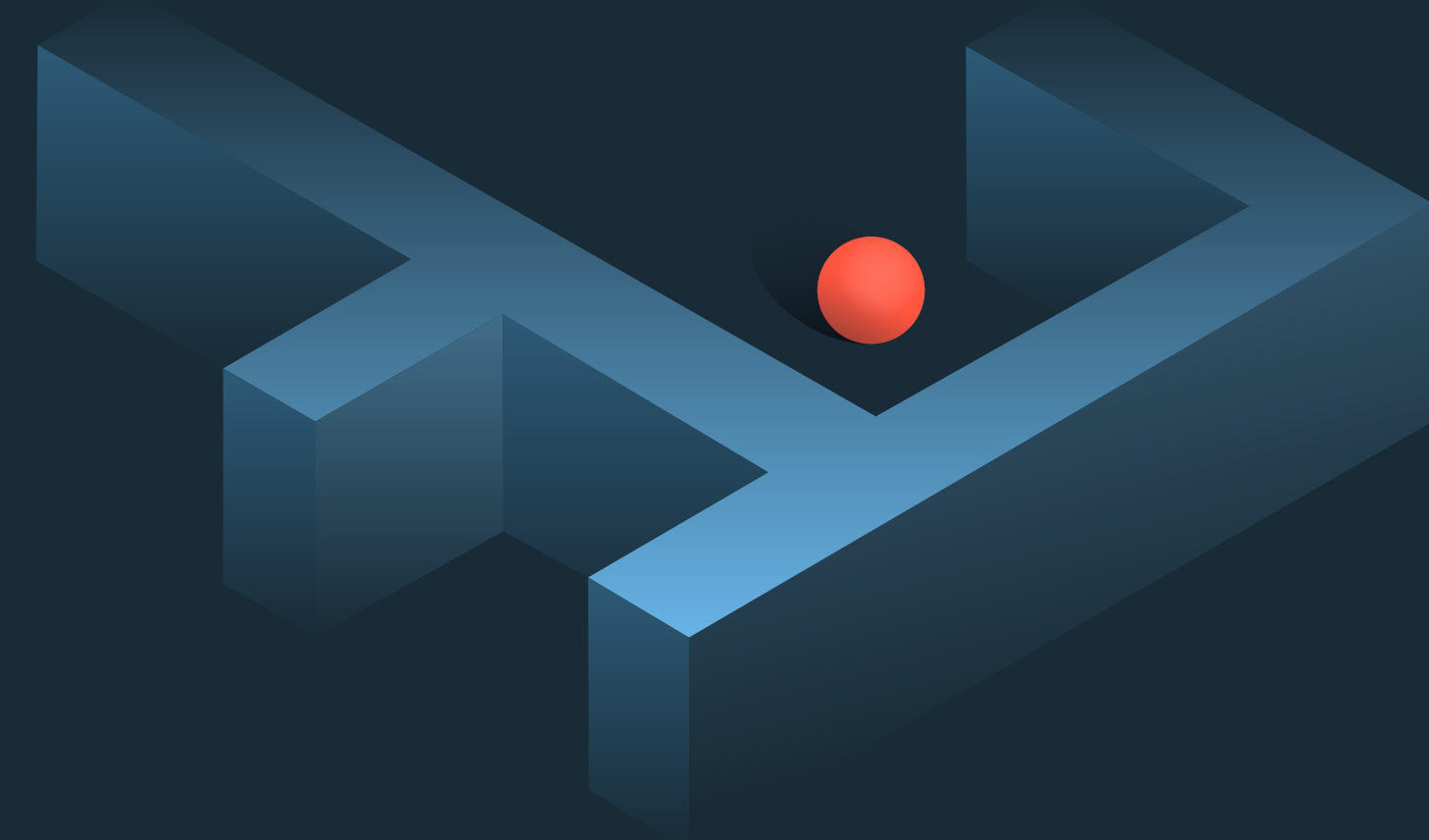
Definition

Phygital: The blend of physical and digital experiences.

Digital twin: The creation of a digital replica of a real-world product or experience.

Omnichannel: Providing customers with a seamless, consistent experience across all sales channels.

Metaverse: A virtual-reality space where users can interact with a computer-generated environment and other users.



Market awareness and current state

Though distinct, these topics all deal with the integrating digital environments into the real world.

While phygital as a term may be known by a relative few (**Figure 7**), the desire to bring digital and physical experiences together only continues to grow, whether it is a ‘virtual concert’, blending physical and digital elements (such as Abba’s Voyage), or the mixed-reality experience offered by the Apple Vision Pro.

Phygital has some of the lowest familiarity and relevance among respondent organisations. It’s closely linked with the metaverse, a much better-known concept.

Despite respondents’ high familiarity with the metaverse, it, too, has some of the least perceived relevance to organisations. Both topics are stagnant in implementation and perceived relevance from last year’s study. This may change due to Apple’s rollout of Vision Pro, but it seems that organisations offering products marketed using such terms could have an uphill battle, especially as many organisations have deprioritised and cut investments in the area.

Digital twins are a mainstream element of technology across many verticals, with manufacturing (in a wide array of fields) embracing the concept due to the associated time and cost savings and improved safety. Many Endava subject matter experts are excited about digital twin use cases, and familiarity among respondent organisations has risen since last year. This suggests that while the technology isn’t mainstream today, it could be down the line.

In the future, digital twin technology will create actionable control towers where users can go beyond real-time monitoring and insights, with the ability to make changes and adjustments from the system. Organisations will also be able to run simulations on processes, objects and systems to see what the effects of courses of action will be. But it seems that actual implementation of the technology may be further down the line, as just 15% of organisations have actually launched a digital twin.

Though it’s an important concept for many industries, and is often mentioned in banking and retail, omnichannel has just middling familiarity and perceived relevance to the companies in the study. Companies that lack an omnichannel strategy tend not to understand the topic and feel it is irrelevant to their industry.

Opportunities

Phygital

- Investments in the arts and entertainment continue to show how complete phygital environments can attract people and encourage them to pay more for 'live' experiences.
- New consumer technology, such as the Apple Vision Pro and spatial computing (if it achieves mass market adoption), will speed the take-up of phygital environments.

Digital twin

- Digital twins are increasingly understood across all verticals, with a relative consensus that the benefits of using them outweigh any hypothetical risk, most notably in fields involving prototyping and simulation.

Omnichannel

- It remains a key demand of customers to have a unified experience across platforms.
- Better tools (such as generative AI) can make building a unified picture of a customer easier to achieve.

Metaverse

- Technology like Apple's Vision Pro will ensure it lives on in some fashion, but likely under a different name.

Challenges

Phygital

- To what extent phygital experiences are a novelty or have long-term staying power is unclear.
- New consumer technologies like the Apple Vision Pro could drive adoption, but they could also become the next 'Google Glasses'.

Digital twin

- The use case for digital twins can be limited in some verticals, as there is limited need for a digital twin, or the financial cost of creating one outweighs any benefit.
- There is a hypothetical risk regarding digital twins, in the event that something potentially disastrous occurs that a digital twin did not (or could not) predict or predicted would not happen.

Omnichannel

- It is very difficult to create a seamless experience as customer devices/endpoints continue to change and evolve.
- Data privacy and the decline of cookies makes building a unified picture of a customer harder to achieve.

Metaverse

- The name will continue to have a negative connotation to many.
- The technology is not mature enough for widespread adoption and the final shape of the metaverse is still not defined.

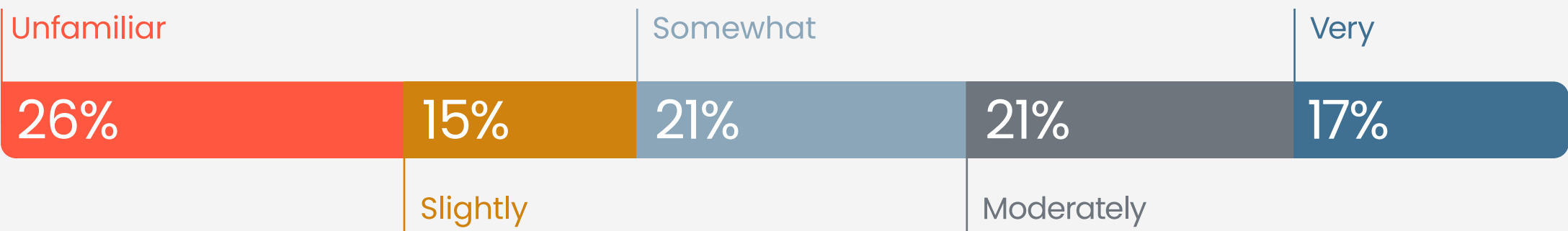
Expert insight

“Finally, in 2024, we have the technology mastered to enable true virtual representations of physical counterparts in the real world, and with that these virtual twins and the different ways they can be used are reshaping business, merging physical and digital realms to enhance user experiences, optimise operations and create immersive, integrated platforms for innovation and growth.”

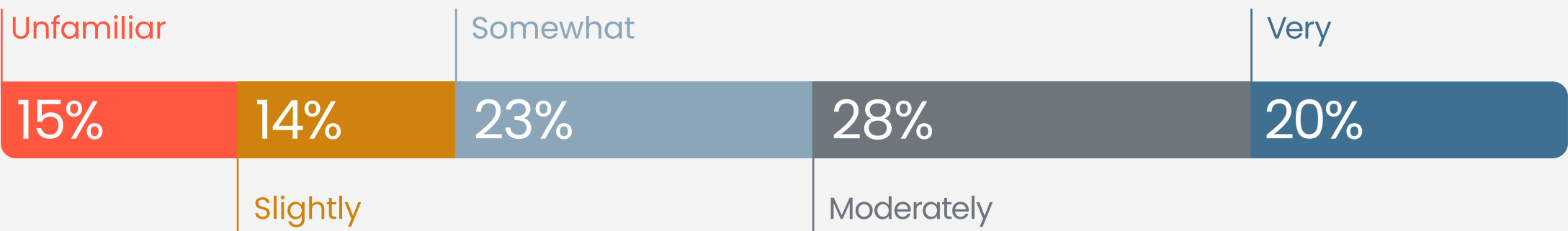
Vince Francis
Regional SVP, Endava



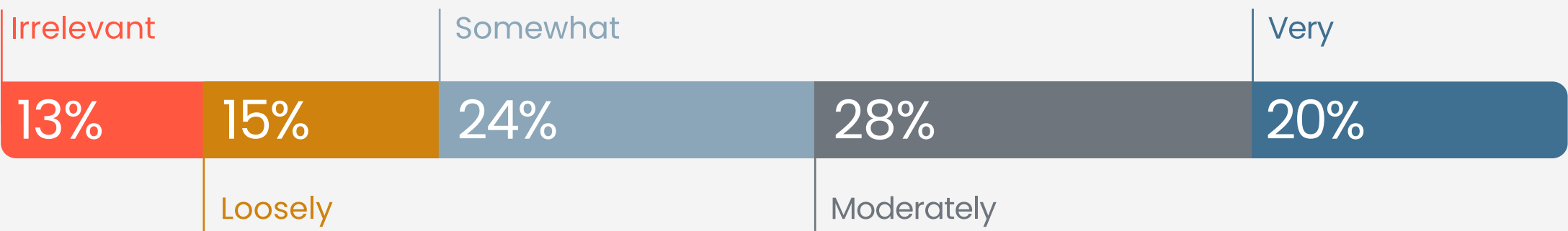
Familiarity with phygital



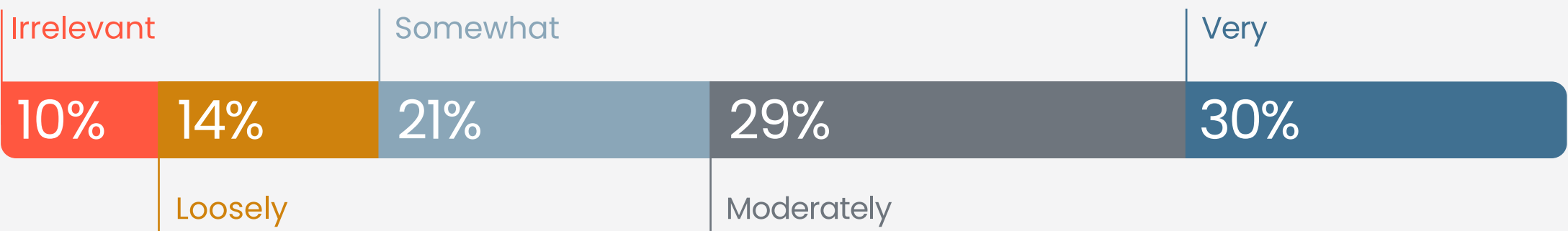
Familiarity with digital twin



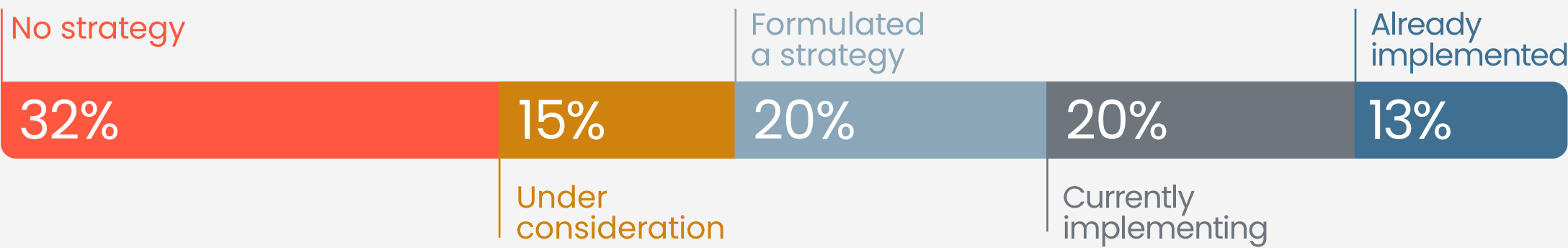
Relevance of phygital



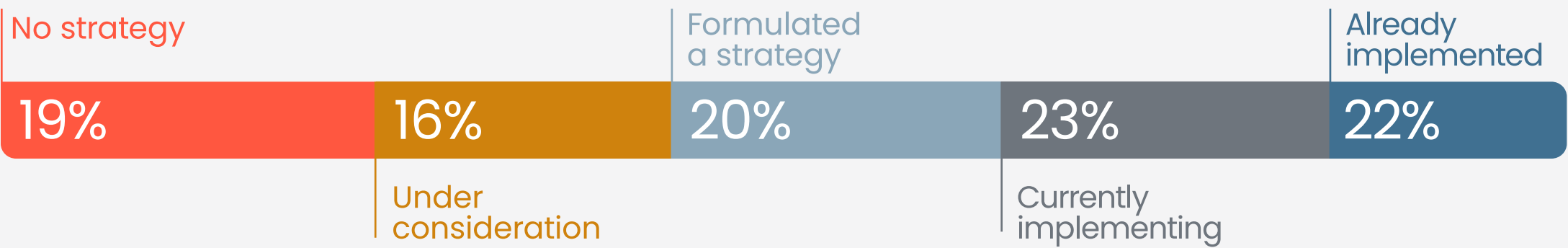
Relevance of digital twin



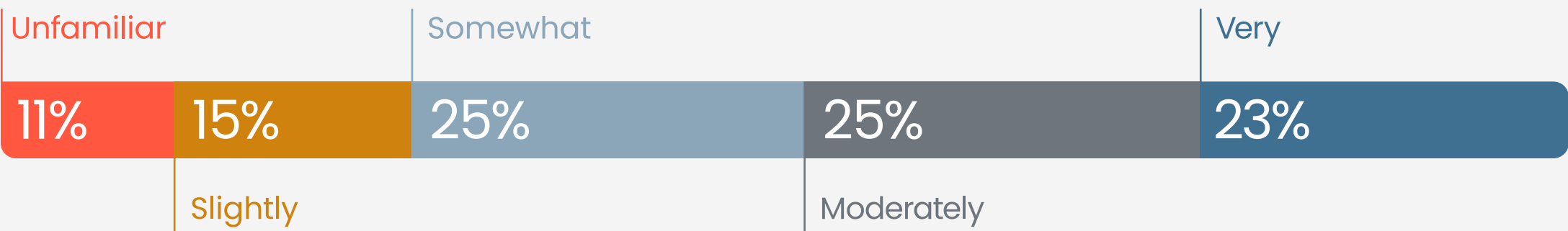
Current state of phygital



Current state of digital twin



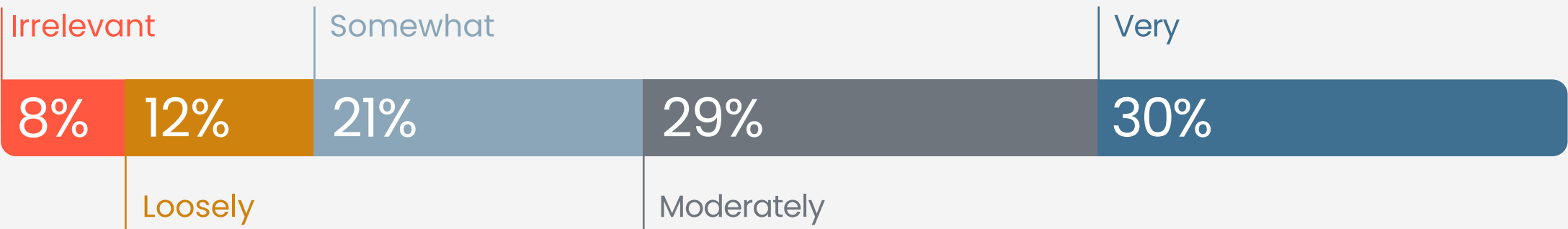
Familiarity with omnichannel



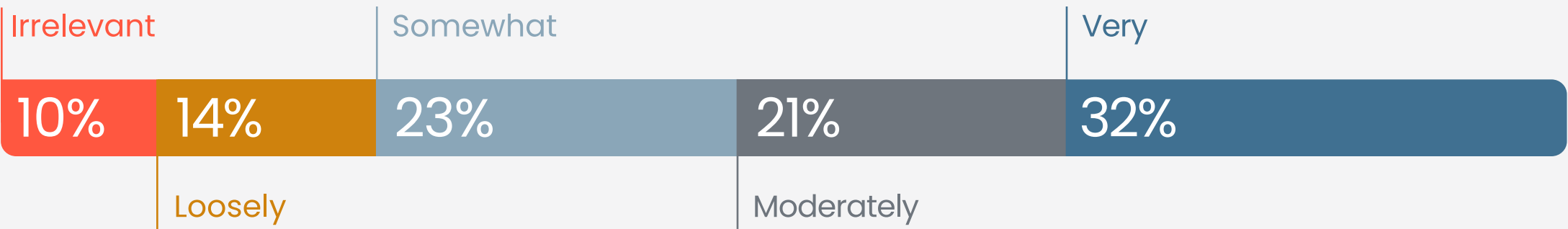
Familiarity with the metaverse



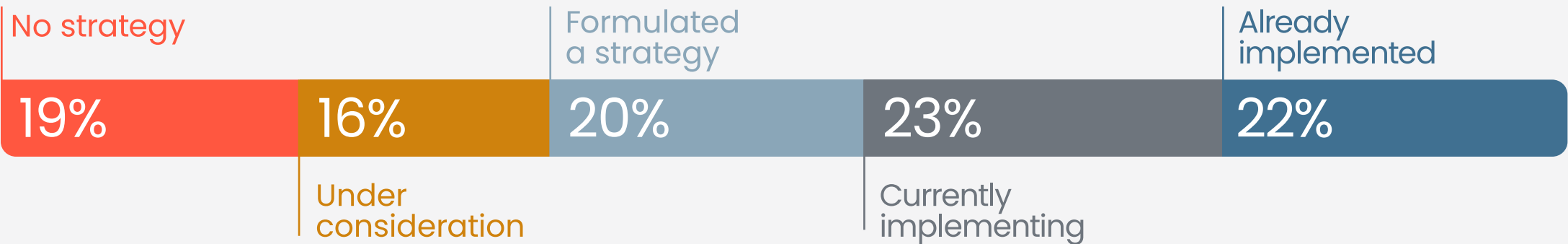
Relevance of omnichannel



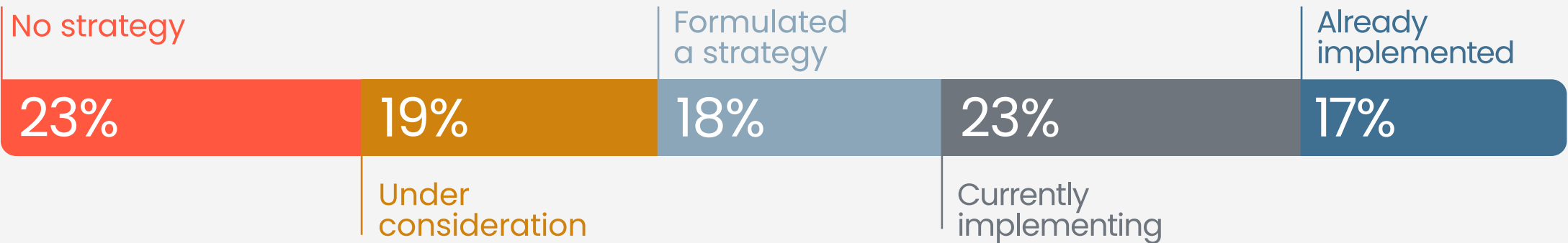
Relevance of the metaverse



Current state of omnichannel



Current state of the metaverse



Web3

Definition

The next generation of the internet that focuses on decentralisation and shifting control from a small group of companies to individuals.



Market awareness and current state

Web1 refers to the early internet era, where the experience and information was primarily dictated to the user. Web2 is the current internet era, and involves more user-generated content, such as social media, blogs and collaborative pages. Web3, which was coined in 2014 by co-founder of Ethereum Gavin Wood, is the next step into an even more decentralised and user-focused internet.

The key distinction of Web3 is control of the internet shifting away from a small number of companies to individual users. This is mainly achieved through blockchain technology for secure, transparent and public record-keeping and distributed computing.

While there is some excitement about Web3 in tech and finance, in the Endava study the term was in the middle of the pack as far as familiarity, relevance and implementation are concerns (**Figure 8**).

Despite this, related terms and components have higher name identification and maturity. Blockchain technology is already mature, as are crypto currencies, NFTs, smart contracts and crypto wallets. The earlier stages of development include decentralised applications (dApps) and decentralised autonomous organisations (DAOs), which are set up and operated transparent on blockchains.

Opportunities

- Web3 creates interesting new business models and revenue opportunities.
- Web3 improves security and traceability of events and transactions.
- Financial services providers can offer hybrid solutions that integrate traditional banking with secure decentralised finance elements and provide custody services for digital assets.
- Government organisations can explore blockchain for secure, transparent record-keeping or identity management.

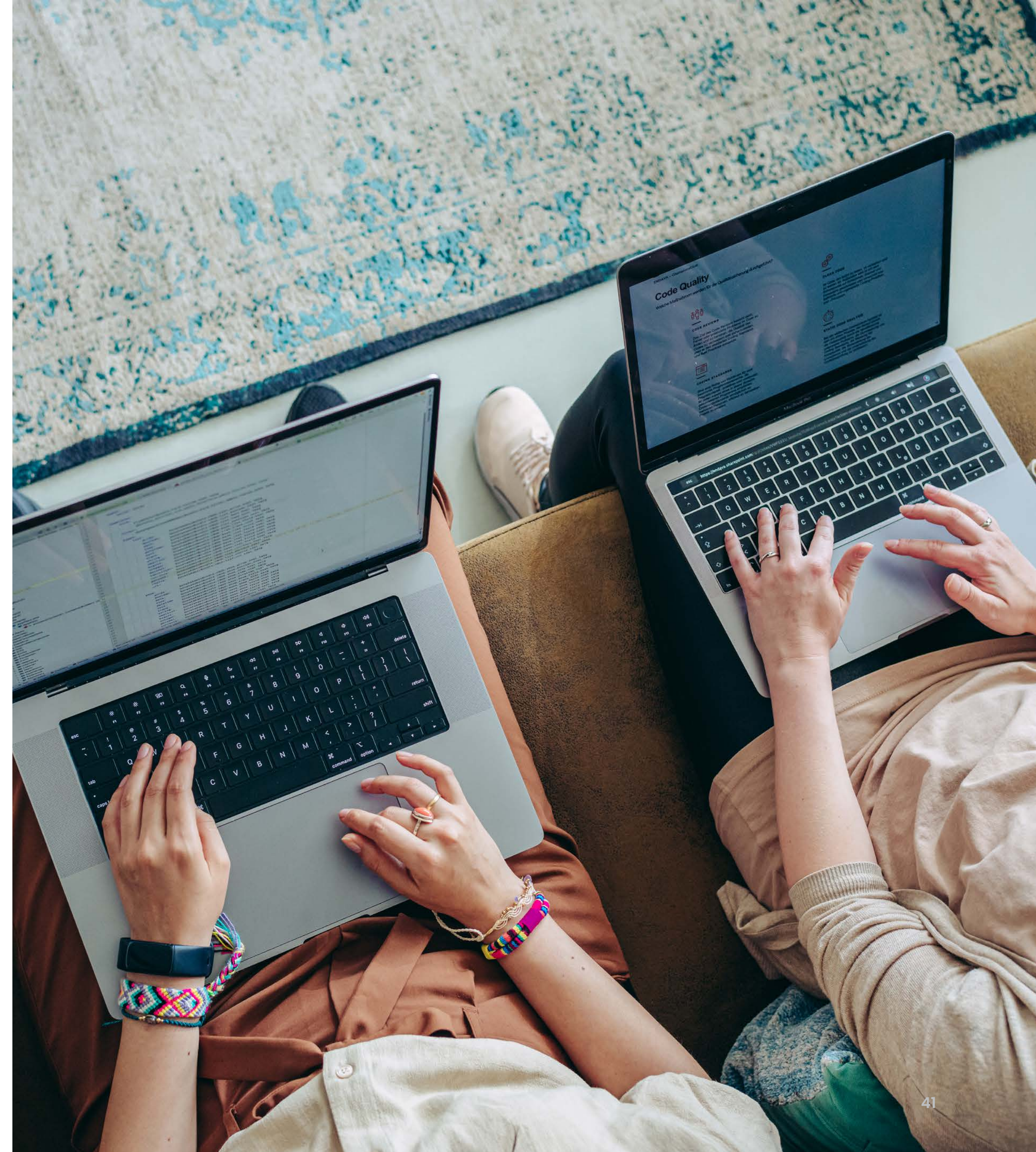
Challenges

- Robust security measures are crucial to Web3. Blockchain hacks, scams and smart contract vulnerabilities jeopardise trust and lead to financial losses.
- The current focus is on short-term speculative investment in crypto and NFT, which overshadows the development of valuable applications to real-world problems.
- Web3 is predicated on shifting control of the internet away from businesses and toward individuals.
- Scalability needs to be resolved, as the current experience has slow transaction speeds and high fees.
- NFTs are potentially a quick flash in the pan.
- There is often bad press involving cryptocurrency-focused businesses.

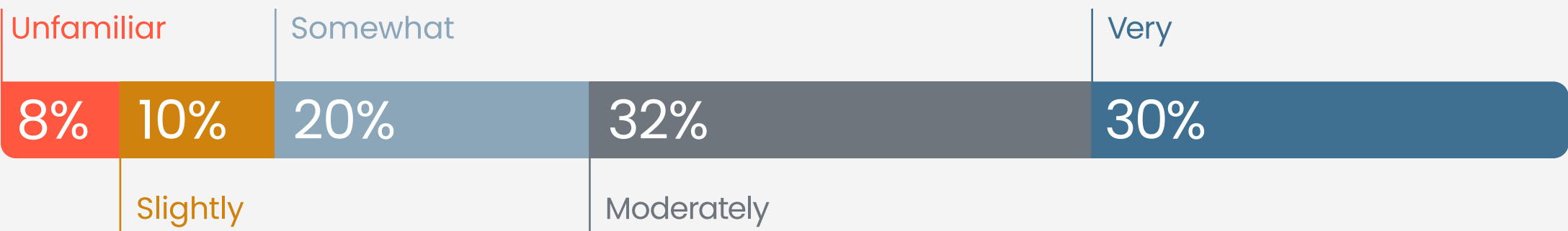
Expert insight

“Web3 has significant potential but needs to overcome technical and user experience hurdles, establish clearer regulations and move beyond a purely speculative market to gain wider adoption.”

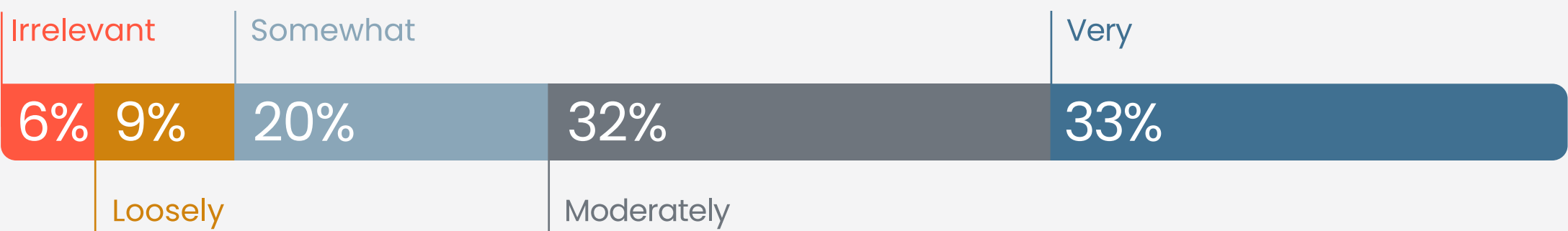
Alexander Tomenendal
Principal Industry Consultant, Endava



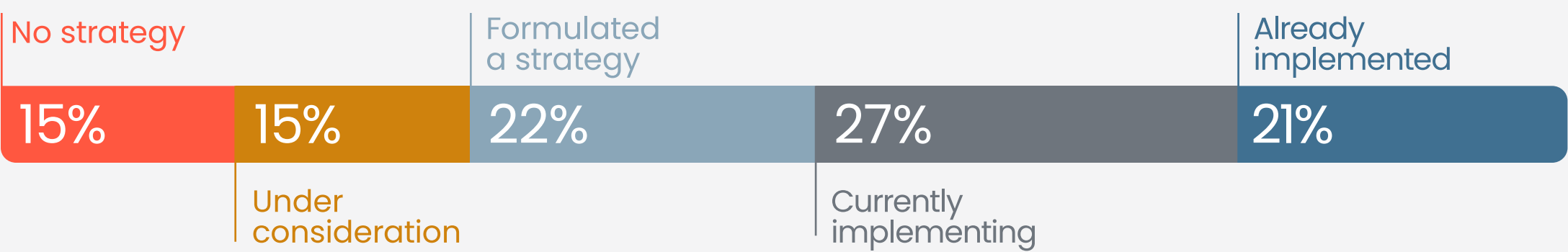
Familiarity with Web3



Relevance of Web3



Current state of Web3



Quantum computing

Definition

A field centred around utilising the principles of quantum mechanics to perform actions and solve problems faster than classical computers.



Market awareness and current state

Quantum computing could be one of the most disruptive technologies on this list. It will be leveraged to solve very complex questions in the sciences domain and will lead to massive breakthroughs. However, it seems organisations are unsure of what its exact application will be to their individual needs and are uncertain about the timeline, which appears to be longer term based on the current technology available.

Quantum computing was toward the bottom of the topics in the study in terms of relevance and familiarity. It ranked tenth out of the 16 top priorities among respondent organisations (**Figure 9**).

Opportunities

- Additional computing power stands to accelerate research and discovery.
- Quantum computing has the potential to optimise complex processes, particularly in industries such as financial services and healthcare/life sciences.

Challenges

- The technology is not yet mature enough.
- Quantum computing has massive power requirements.
- The large hardware costs are a major barrier to entry, so most companies will rely on the major cloud providers to have access to the technology.

Expert insight

“In 2024 and ahead, quantum computing might redefine technology and business landscapes. Its unique computational power can revolutionise industries, climate modelling, drug discovery and optimisation tasks. It might support resolving complex problems, increasing innovation and making business more efficient.

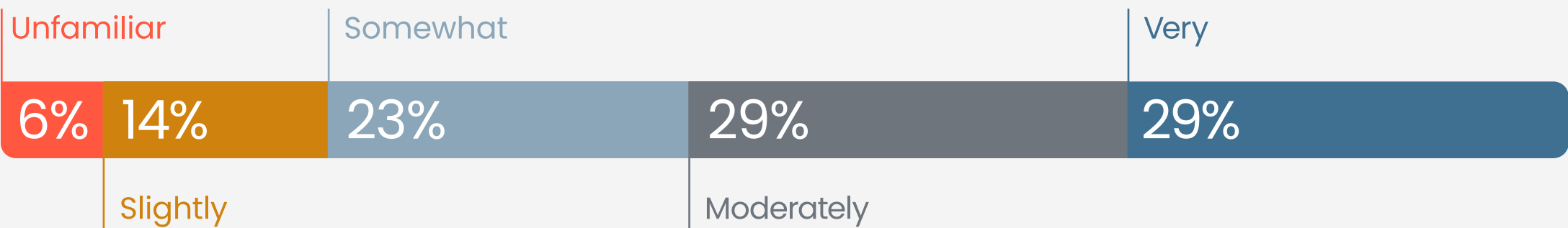
The shift will be challenging, requiring proactive involvement and skills in building quantum infrastructure. There are hardware and software challenges that need to be addressed before reaching commercial viability. The formidable progress in speed, cost and learning capabilities of AI combined with quantum computing will reshape how we innovate and run businesses.”

Radu Vunvulea

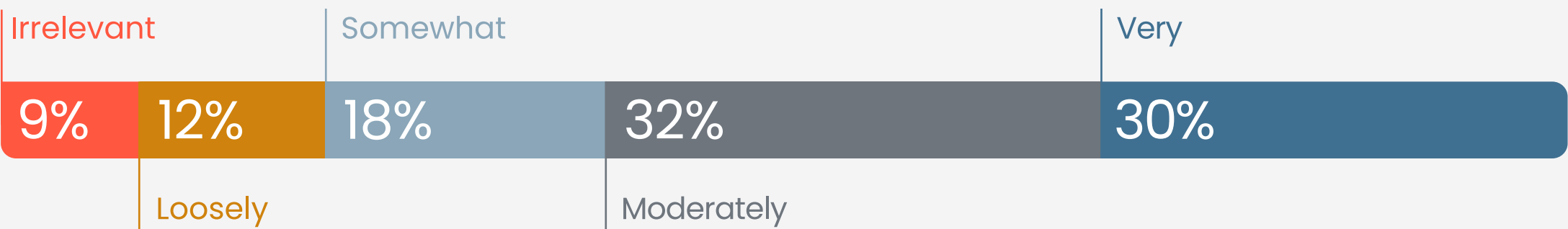
Group Head of Cloud Delivery, Endava



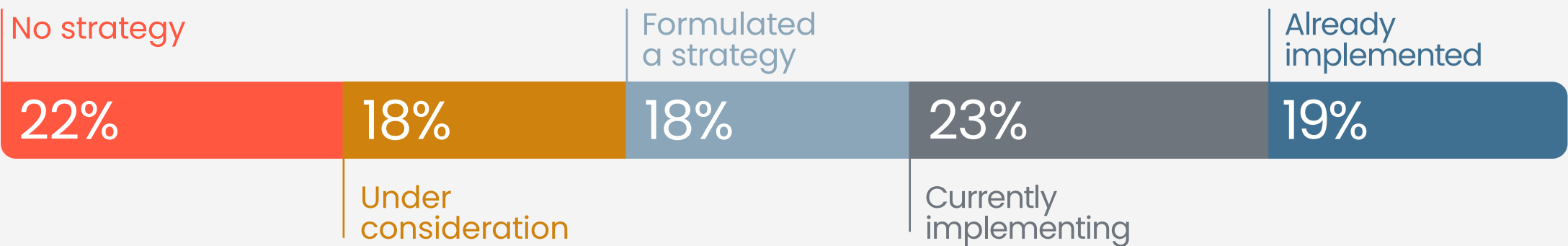
Familiarity with quantum computing



Relevance of quantum computing



Current state of quantum computing



Industry impacts

The following section focuses on how emerging tech is shaping the strategies of specific industries. It's been created in collaboration with Endava's industry experts, who are in regular conversation with organisational leaders about how they plan to incorporate innovation into their business. Here, the report moves beyond the popularity or feasibility of the topics and into the future of what technology can create.



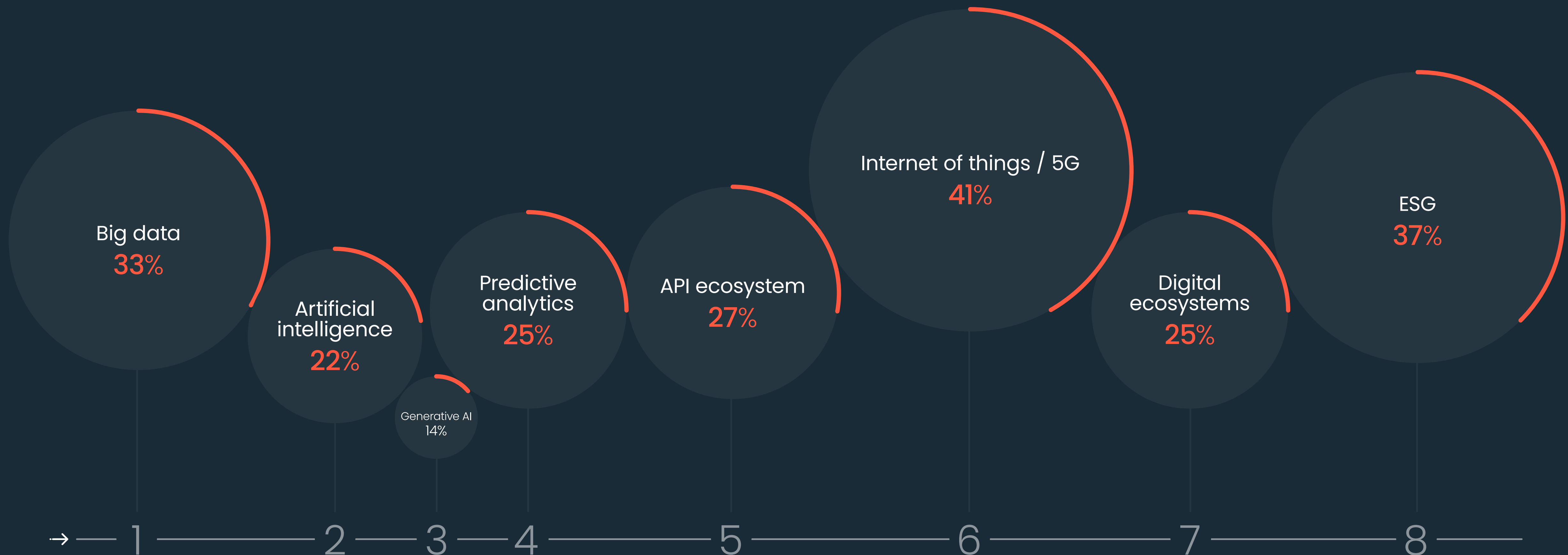
Banking

→ 8 top priorities¹ vs most-implemented technologies

Contributing subject matter experts:

Tammy Pollock
Senior Industry Consultant

Negin Hearne
Principal Digital Acceleration Strategist



¹ Top industry priorities based on Endava research

The technological landscape of banking is defined by tight government regulation and possession of sensitive customer data. Though there are numerous applications of emerging technology to the industry, financial institutions (FIs) must be diligent and thorough in vetting new ideas and bringing them to market.

Despite its potential handicaps, banking is a highly competitive field where organisations compete for market share, profitability and customers, and one of the differentiators among industry leaders is technology. And according to both Endava experts and respondent organisations, **the technology exciting FIs the most right now is the addition of generative AI to machine learning and big data/ predictive analytics applications**, all of which make up the top four priorities among banks included in the study.

The initial surge in unrestricted ChatGPT usage by the public caused many to ban the tool's use among employees (due to privacy and regulatory concerns), but banks are now exploring the underlying technology's application to their business. The utilisation of generative AI in the industry is in early days, with leading institutions deploying it to low-value tasks like automating email authoring.

AI-powered automation.

Senior Industry Consultant Tammy Pollock believes banks have not yet fully grasped the capabilities generative AI presents and outlined several transformative use cases the technology could be used for in the future. Such applications include the loan approval, content management and dispute resolution processes.

For organisations just beginning to explore generative AI, Pollock recommends a 'crawl, walk, run' approach. Following this, the system would begin as an assistant offering useful data and recommendations on cases. Then, in the 'walk' stage, they would start making decisions, but get approval and input from humans.

The final stage would be 'autonomous agents' that can communicate with other systems, make more informed decisions and prioritise cases. The agent could handle tasks like relaying the need for additional information to a customer and then alerting an employee to the case so they can intervene more quickly. Rather than eliminating the role of humans, generative AI would shift employees' primary duties to handling exceptions and managing processes to ensure automated agents follow protocol and best courses of action.

Data-driven process improvement

In the context of enterprise content management, Principal Digital Acceleration Strategist Negin Hearne envisions incorporating generative AI to extract relevant information from the stockpiles of documents FIs have on hand to generate data. This capability would help bankers make more informed decisions in shorter timeframes.

On the customer-facing side, Hearne anticipates the technology will be used to improve chatbots, enabling them to handle more complex customer asks and learn from and improve upon past cases. **Consumers will also see products resulting from hyper-personalisation**, which will give banks the ability to better understand spending habits, interests and preferences. The resulting products and messaging will be hyper-specific to each individual, increasing loyalty among account holders.

Ethical banking

ESG was rightly identified as a major priority and extensively implemented technology by respondent organisations in the banking sector. With pressure from core stakeholders and regulatory bodies across the world, it is understandable why it is of such importance. However, the politicisation of ESG (most notably in North America) and increasing interest rates have weighed on its importance in recent times. Regardless, we see ESG manifesting in two primary ways.

Firstly, financial institutions have sought to factor ESG into their everyday operations, such as reducing their carbon footprint, and leverage IT to do this, such as replacing energy-hungry legacy infrastructure with less energy-intensive technology solutions. Additionally, there has been a rise in sustainable lending, whereby ESG factors are considered, alongside purely financial considerations, when determining whether to extend credit to an individual or organisation.

Secondly, with ESG becoming more critical for regulators worldwide (although to differing degrees), there has been increasing pressure on financial services to better quantify and report on it. In many jurisdictions, these laws continue to be expanded and tightened. **Financial institutions must remain ahead of these regulations by having the appropriate technologies and strategies in place.**

APIs and open banking

API ecosystems were also identified as a significant priority and highly implemented technology by respondent organisations in the banking sector. Open banking is the primary expression of this, growing rapidly across the globe, both in more mature markets, such as the UK, through the increased number and variety of partners and data transacted and in more developing markets (such as the US and Canada), where open banking is being solidified and expanded through new frameworks and regulations.

The growth of these open banking API ecosystems in the banking sector creates opportunities for banks and fintech partners to develop new models and services to better meet their customers' needs. However, compliance and cybersecurity issues necessitate that these ecosystems be underpinned by resilient data infrastructure and vigilant data control.

It is also briefly worth mentioning the role of digital ledger technologies (DLT). We did not cover it extensively in our survey due to 2022/2023 acting as annus horribilis for DLT in the wake of the collapse of FTX. This technology has received a recent bump, with the arrival of crypto spot EFTs validated by the Securities and Exchange Commission (SEC) in early 2024, alongside continued interest in and the development of central bank digital currencies, which DLT may underpin. Additionally, regulations such as the EU's Markets in Crypto-Assets (MiCA) framework, alongside others coming into force in 2024, will shape banks' interest and offerings underpinned by this technology.

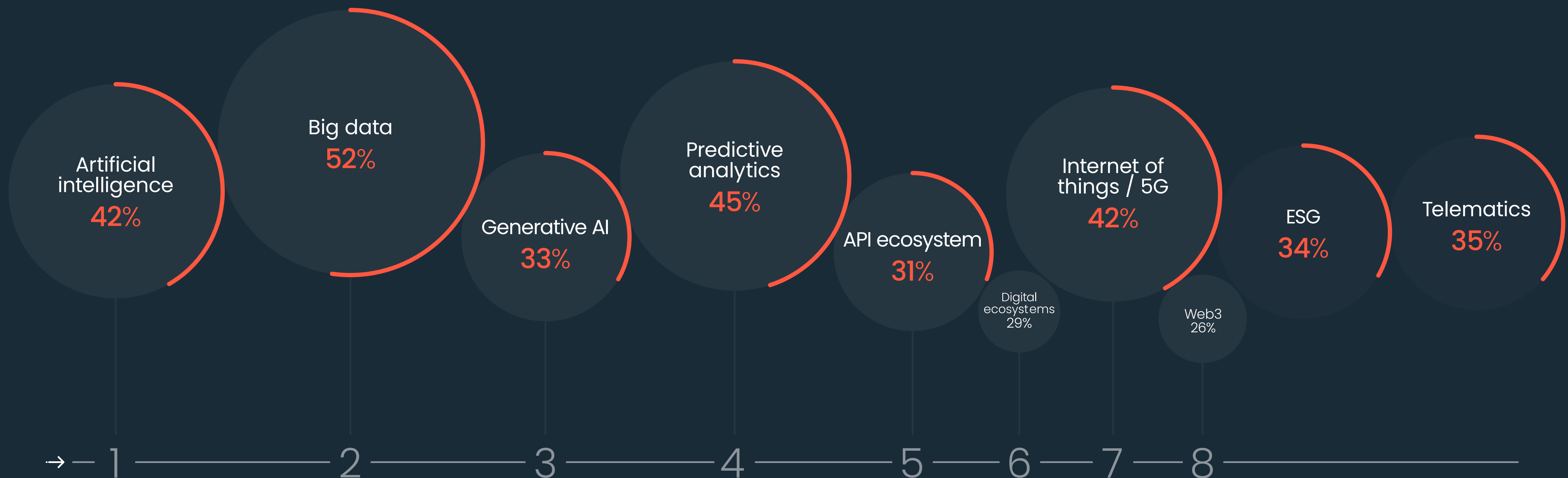
Healthcare & life sciences

Contributing subject matter experts:

Jessica Rengstorf
Director, US Healthcare Strategy

Adrian Sutherland
Strategy Director, Global Healthcare

→ 8 top priorities¹ vs most-implemented technologies



¹ Top industry priorities based on Endava research

Healthcare is a field in which everyone on earth has a stake. People want to live longer, healthier lives and expect that humanity's advances in harnessing science and technology are the key. Small steps to refine processes, personalise care and gain deeper understanding foster significant change that increases the overall quality and accessibility of healthcare.

There are a multitude of interesting technologies and ideas in healthcare and life sciences that are paving the way to improved health outcomes. They are categorised into two main functions: data retention and accuracy and process improvement and patient well-being/engagement.

Data retention and accuracy

Data plays a critical role in healthcare and life sciences. During appointments, clinicians take note of the patient's experiences, creating a comprehensive picture of individual health history. The data is then used to inform future decisions and combined with other cases to analyse trends.

In the realm of major digital transformation, many providers have replaced paper with electronic health records (EHRs) to increase security, improve accessibility and reduce errors in medical files.

These electronic records are intricate, populated with various codes that represent the patient's health status – including diseases, conditions and treatments. While these codes aim to unify documentation practices and aid in data analysis and research, the existence of multiple systems increases complexity.

Generative AI, large language models (LLMs) and natural language processing (NLP) may offer the next step forward: software harnessing this technology allows healthcare professionals to notate using common vernacular that is then translated and structured by the tools. This functionality makes the practitioner's job easier, as they can communicate with the patient and take notes in terms they understand. It also facilitates continuity of care among subsequent providers, as it eliminates the need to interpret notes that may be structured differently among practices.

Another application of NLP is to emergency calls. Due to the volume of cases, emergency calls are traditionally monitored for quality assessment at random, a process that is expensive, time-consuming and only captures a small percentage of calls. With advancements in technology, all calls can automatically be transcribed and then assessed without direct human intervention. The ability to automate emergency call audits makes the process more accurate and efficient, providing significant value to an industry facing challenges of burnout and high turnover.

Process improvement and patient well-being/engagement

The integration of technology in healthcare has led to improved patient outcomes by creating more visibility over diagnostics, more personalised care plans and more transparency between providers and patients. Endava subject matter experts have identified digital twin and AI technology as two keys to further transforming the industry.

Though nearly 25% of healthcare organisations lack a strategy regarding digital twins, the technologically advanced providers are ready to utilise it to disrupt patient care and operations. Digital twins have many different applications to the industry. Strategy Director of Global Healthcare Adrian Sutherland notes that the technology can be used at multiple levels, from models of entire healthcare systems and hospitals to individual patients, all the way down to viruses.

At the highest level, healthcare systems (and government entities) could build replicas of populations to analyse the health needs of groups from a geographic viewpoint. With this capability, decision-makers could evaluate the efficacy of altering the number or type of healthcare facilities to better serve an area's constituents.

If providers build digital twins of hospitals, they will gain the ability to analyse and tweak the organisation and structure of facilities to reduce waiting times and better meet patient demand. The resulting decisions could include small changes like reorganising an emergency department or buying new equipment, as well as large ones like opening new departments or expanding building footprints.

Narrowing the focus of digital twins can apply to patients, organs, viruses and even cells. Building replicas of patients combines AI, predictive analytics, IoT and ML, technologies that healthcare organisations are adopting at significant rates, reflecting the sector's commitment to leveraging advanced tools for improved care delivery.

Fusing these technologies to create a digital twin improves healthcare professionals training, aiding in determining the most effective course of treatment. Using this approach gives patients custom treatment plans catered to their specific needs. Digital twins also aid in stratifying patients into different groups, such as high-risk, prone to readmission and suitable for home monitoring.

Hospitals are exploring AI for many different functions, including patient diagnosis and remote monitoring. Remote patient monitoring, which relies on IoT sensors, wearables and AI, is a benefit for all parties involved, reducing costs for hospitals, payers and patients, allows for better, more comfortable recovery and shifts clinician workload to more emergent cases.

It's early for widespread adoption of generative AI, but Endava Director of US Healthcare Strategy Jessica Rengstorf is optimistic about its incorporation into kiosks that will triage patients based on acuity levels.

An especially compelling application would be in the emergency department, where certain patients would interact with generative AI kiosks upon entry. Using symptoms, vital signs and medical history, the system triages the patients and keeps them updated on their wait time. This integration alleviates extra work for medical professionals, keeps patients better informed and improves department efficiency.

In the context of healthcare, digital ecosystems are networks of interconnected digital tools and platforms that collectively enhance the delivery and management of medical care. **Digital ecosystems extend care beyond the traditional settings and foster a more integrated approach.** These innovations allow patients to actively engage in their healthcare journey, as seen with technologies like continuous glucose monitors (CGMs) that offer real-time health data.

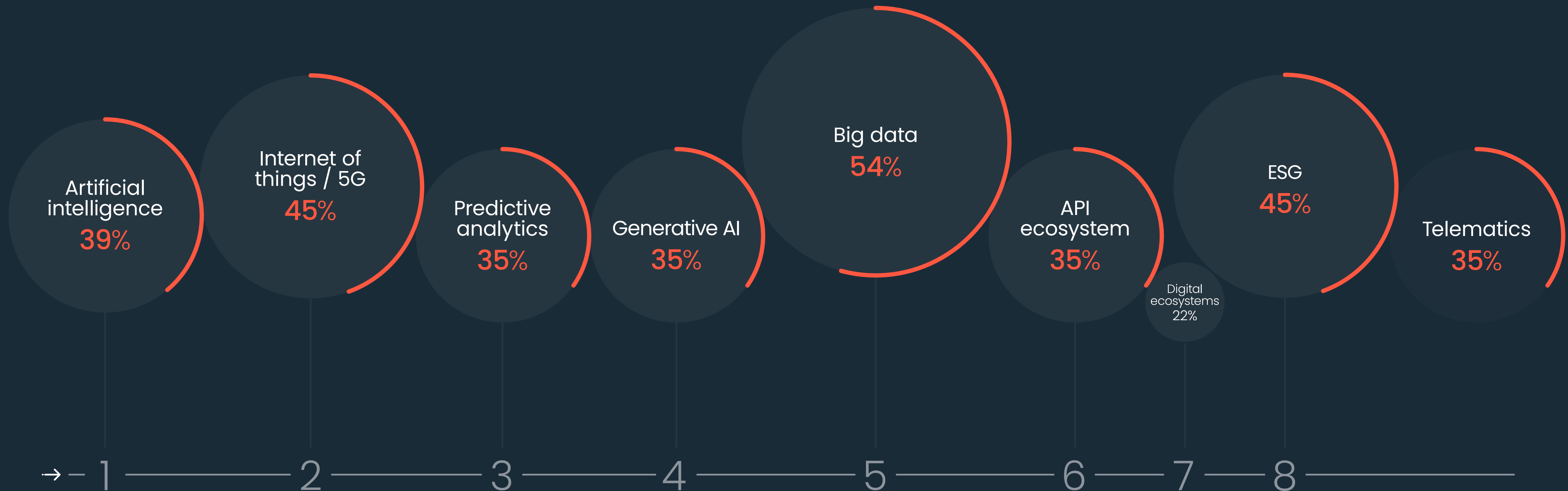
Another example, telehealth, further exemplifies how digital ecosystems enhance accessibility, bringing quality care to remote areas. This evolution not only improves the efficiency of healthcare delivery but also empowers healthcare professionals to make informed decisions, significantly impacting patient care. The shift toward digital health ecosystems is reshaping healthcare, prioritise patient involvement and streamlined care processes.

Retail

Contributing subject matter experts:

Paul Maguire
Head of Retail Delivery

→ 8 top priorities¹ vs most-implemented technologies



¹ Top industry priorities based on Endava research

Retail is all about ensuring the right people get the right products at the right price at the right time. The equation is simple, but the balancing act success requires means companies must invest in technology to form deep, enduring customer relationships and ensure operational efficiency.

The retail industry has also undergone significant change, as shopping habits have shifted online from brick-and-mortar, further complicating the formula for profitability. Because of this digital transformation, many retail titans have waned as new entrants step into their place. Often, the formula for such transitions is the same: the industry leaders underestimate the disruptive effects of new technology and more agile retailers use these new tools to usurp the leaders.

This phenomenon shows no signs of stopping, so retailers are constantly seeking ways to gain an upper hand over competitors. Today, the technologies creating those advantages are motivated by a need to digitise brick-and-mortar, a desire to personalise the shopping experience and the drive to make the industry more sustainable.

Digitising brick-and-mortar

The death of brick-and-mortar was massively overblown – there are still many advantages to shopping in-person when compared to ordering online, so physical stores haven't gone away as much as they've been adapted to the modern age. **A key element of digitising brick-and-mortar is adopting an omnichannel approach that combines the benefits of shopping online with those of shopping in-person to create a seamless, unified customer experience.**

Many of the topics and technologies involved in brick-and-mortar's refresh fit into the greater omnichannel strategy – which is a topic prioritised more highly and implemented by more retailers than other respondent organisations.

Though it's been around for years, RFID is a technology that is still creating new opportunities in retail. As the implementation cost has gone down, more use cases become apparent.

Through its incorporation into tags, RFID has made tracking inventory in warehouses and stores far easier for employees and it's beginning to be used in customer-facing functions; the technology can be used to create scannerless checkouts, where shoppers drop items into a basket that automatically tracks the goods placed in it and then gives the total.

Electronic shelf labelling (ESL) is another technology with the potential to revolutionise shopping. The average grocery store has upward of 40,000 items, and all of them have tags that must be updated regularly to reflect promotions, new item additions and price changes.

By replacing paper tags with digital ones, retailers automate one of their most manual processes, freeing up employees to focus on more valuable tasks. Electronic labels can be controlled remotely across multiple stores, updated in real time and even flash to indicate to shoppers and staff where a good is located. **Digitisation also means retailers can incorporate more dynamic pricing strategies like time-sensitive promotions and can react quickly to market or competitor adjustments.**

Retailers gain incredible insight into store operations when ESL and RFID are integrated with IoT. Combining these technologies enables real-time inventory tracking, which helps organisations optimise stock and make more accurate forecasts and predictions. When layered with sensors at store entrances and exits, the combination can also help with loss prevention by giving information on items that have left the store without being paid for, including which item was taken and when.

Digital twins aren't widely utilised in retail yet – just a third have implemented a strategy for it – however, its use cases are already apparent. The technology can be used for training and educating staff, but its most exciting application may lie in store and warehouse planning. By building digital replicas of their environments, organisations can optimise spaces, experimenting with different layouts and setups to create the most efficient arrangement possible. Retailers can use digital twin technology to test different strategies without taking on the risk of a complete overhaul.

Personalising the shopping experience

All the data created by new technology in-store and online means that retailers know their customers better than ever. **Leading companies in the industry use that data to create personalised shopping experiences for consumers.** Retailers are forced to answer: how personal should they be getting, and how do they create content that is relevant and engaging to their entire customer base?

In e-commerce, AI tools are used to quickly identify shoppers and place them into user personas based on where they came from, what they click on and how they interact with the brand.

According to Endava Delivery Partner Paul Maguire, this year will be all about businesses taking it a step further to utilise generative AI.

Among the 35% of retailers that have implemented the technology, advanced businesses are using it to quickly put together content to serve these personas, which can include messages, pictures and promotions tailored to each.

An important part of being able to build and analyse shopper profiles is big data and predictive analytics. Retailers have implemented these two technologies at higher rates than in other industries because of the importance of getting to know their customer.

It's pivotal for organisations to have the infrastructure and technology in place to capture and store the information shared by shoppers so that they can gain deep comprehension of what factors push people to their brand, what sort of individuals buy from them and why they use their products. By leveraging this knowledge and building upon it, retailers can utilise predictive analytics to meet their customers' needs in the future and build strategies to convert browsers to buyers.

Sustainability

Environmental stewardship has become crucial, driven by the public and the ecological necessity, prompting retailers to adopt ESG strategies at a 10% higher rate than other industries. This shift is largely fuelled by consumer pressure, with shoppers increasingly discouraging fast fashion practices and seeking durable goods and

transparency in manufacturing processes. Many consumers try to avoid manufacturers using harmful practices and greenwashing. **As an industry predisposed to waste, retail faces public expectations to become better stewards of the earth and internal pressure to use fewer resources, boosting the bottom line.**

Per Maguire, efforts for sustainability are plentiful, including reducing emission of harmful by-products, setting up second-hand marketplaces for re-sale of goods, creating (and modifying existing) goods to be more sustainably produced and increasing efficiency of processes, structures and supply chains. Technology is crucial in achieving these efforts and organisations use newly available methods to reduce their energy usage and make spaces more efficient.

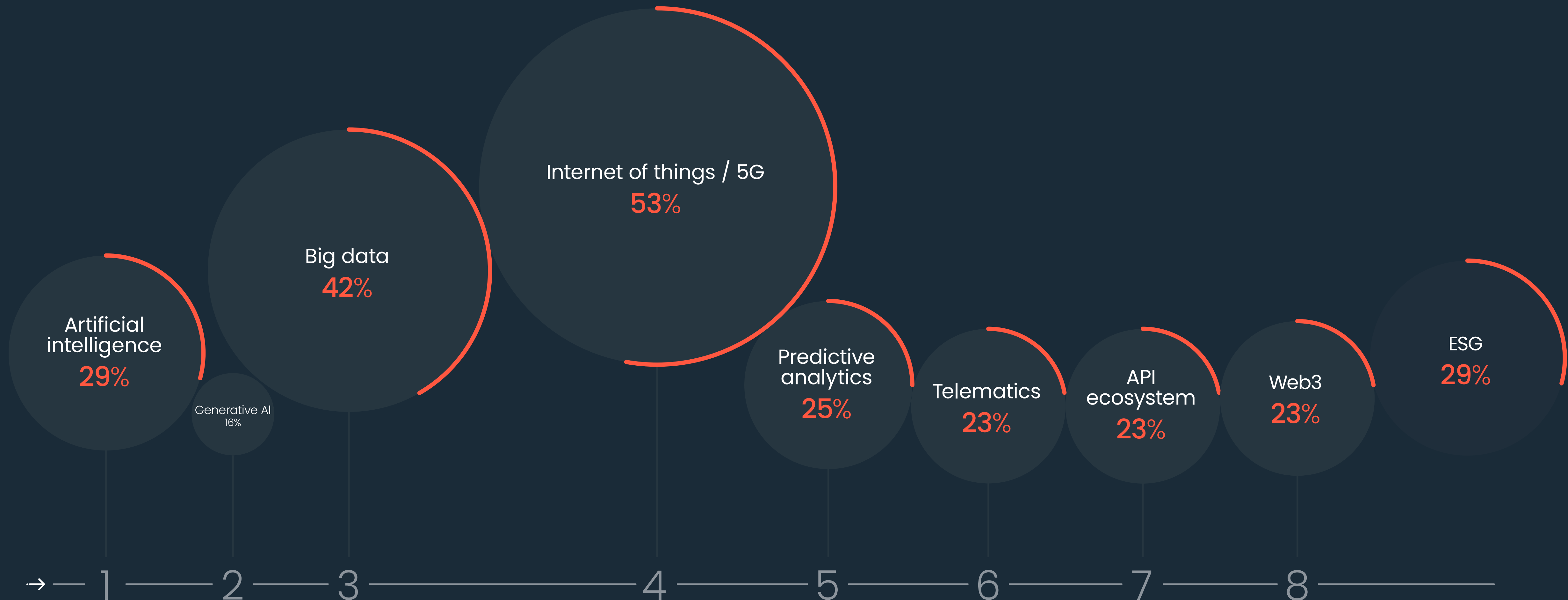
Retailers target easy wins, like replacing old lighting with more energy-efficient lighting. They also take on more complex opportunities, like using smart switches in stores and warehouses that only illuminate when people are in the area and track footfall and activity to reduce energy from heating and cooling. More advanced retailers use roof space for smart tech like solar panels and wind farms to decrease reliance on fossil fuels. Many companies are also auditing their software development and codebases for efficiency and prioritising suppliers who use sustainable practices, like putting data centres at the bottom of sea beds or underground, to reduce the need for cooling and maintenance.

Supply chain

Contributing subject matter experts:

James Brennan
Principal Industry Consultant

→ 8 top priorities¹ vs most-implemented technologies



¹ Top industry priorities based on Endava research

In supply chain, things are constantly on the move, with countless metrics and data points that indicate how well processes are operating. Every industry depends on reliable and transparent supply chains, and technology stands as the driving force transforming the field and elevating efficiency to ensure goods are precisely where the world needs them to be. Among today's technology topics, the industry's modernisation efforts are best broken into improving data quality and making workplaces safer and more efficient.

Data quality

Per Principal Industry Consultant James Brennan, data is the cornerstone to the supply chain. Among logistics organisations in the study, big data is the second-most implemented technology and the third-highest priority.

Every technology initiative comes back to how healthy the data backbone is, the trustworthiness of the information and it being interpreted correctly. These are the foundational elements an organisation must address before it can begin taking on large initiatives. Modernisation is a process, and companies can't decide to adopt the latest technology without taking on projects to set a good data foundation.

Once ensuring data quality is high, organisations can take on initiatives like predictive analytics. With this capability, organisations can get accurate insights and forecasts into where their inventory is and what the demand drivers in the market are, including factors like temperature and social media. By aggregating this data, organisations can better forecast supply and demand, gain visibility on operations and improve planning to meet future needs.

Data is also important at the warehouse level, where it can be leveraged to manage labour appropriately. With advanced software and high-quality data, managers can look at all open tasks and assign them to the employees that are best for each and optimise the amount of labour based on projections. Such software can also provide predictions of productivity based on available staff and their historical output.

Like labour, machine performance can also be managed. By measuring machine utilisation, uptime and throughput capacity, organisations can use AI tools to create task databases and understand how work flows through warehouses. These tools can then be used to optimise how work is released to the floor and identify areas that are bottlenecks and try to solve or work around them.

Because of these AI-related applications and others, AI ranks as the number-one priority among supply chain organisations in the study.

When a logistics provider has high enough data quality and insight into all their processes, they can create digital twins of the company's moving parts. These twins can be digital process engines or real, 3D representations of facilities like warehouses. Ideally, these are actionable models where managers can intervene and help adjust to keep goods moving. Further in the future, workers may be able to make such adjustments via conversational chatbots that enable them to control processes and facilities.

Unfortunately, many organisations are not able to utilise this technology, often because their data is siloed. Companies frequently have organisational siloes, where data doesn't flow across different facilities, departments or processes. They can also have legacy system siloes, where they're constrained by old technology, and data siloed from external sources, like time spent in customs and third-party facility weather conditions.

Safety and efficiency

One of the most important technologies in increasing safety and efficiency in logistics is machine vision, which draws on video streams to interpret and make actionable insights based on its observations. Machine vision, usually enabled by AI and machine learning, is used to assess the quality of items by identifying instances of possible damage and goods that fall outside of acceptable dimensions. It can also be used to assess workplace safety, by spotting cases where workers pick up items using dangerous form or go into areas that are off-limits/hazardous.

Once the software has collected enough information, it can recommend that staff be retrained on best practices, possibly by generative AI chatbots that both coach staff and alert management to these instances.

Operational automation, a key to improving efficiency, has been around for decades, but it's now more feasible than ever. Organisations no longer need to undertake prohibitively large projects and can now add more modular automation, with more flexible interfaces, at returns on investment of just one to three years. This would shift the workforce from one that handles more dangerous, labour-intensive tasks to one that supports and handles maintenance on the technology.

Conclusion

With so many different options for adopting technology, organisations face a daunting landscape littered with promising opportunities and difficult challenges. As businesses navigate these complexities, they'll have to consider how new offerings fit into their company's unique circumstances and the timeline for return on investment.

Though each industry has its own priorities, Endava research shows the importance of strong data practices in setting the groundwork for adopting advanced technology. This year's edition of Emerging Tech Unpacked highlights the excitement surrounding AI and generative AI, as well as other top priorities like predictive analytics and IoT.

It must be noted that all these technologies need quality, well-structured data to be successfully implemented. Data serves as the foundation: it's used in training AI models, is crucial for accurate predictive data and is exchanged among IoT devices to empower decision-making. While organisations have different choices for what to invest in, many efforts will start with prioritising data infrastructure and management.

Modernisation may start with data, but that's not where it ends: it's critical to embrace emerging technology, rather than standing idly by. As the toolkit for digitisation expands, businesses will need foresight, adaptability and creativity to use technology to problem solve. The organisations that think outside of the box will be the ones that succeed.

About the authors

Major Bottoms Jr

Senior Research Analyst

Major is a senior analyst with over six years of consulting experience. He leads projects combining industry knowledge and research to develop and inform business strategies.

Oliver Jackson

Research Analyst

Oliver is a research analyst with over eight years of market intelligence experience across the ICT sector. He leads Endava’s Market Intelligence unit.

Breanna Wright, PhD

Research Analyst

Breanna is a highly skilled analyst with over a decade of experience in research. She combines her background in political psychology with qualitative and quantitative approaches to provide data-driven strategy recommendations.

Contributing subject matter experts

James Brennan

Principal Industry Consultant

Adriana Calomfirescu

Group Head of Data Delivery

Matt Cloke

Chief Technology Officer

James Costerton

Sustainability Lead

Joe Dunleavy

Global Head of Innovation

Vince Francis

Regional SVP, Endava

Lorand Gabos-Szoverdi

Global SVP Delivery Acceleration

Negin Hearne

Principal Digital Acceleration Strategist

Paul Maguire

Head of Retail Delivery

Tammy Pollock

Senior Industry Consultant

Richard Pugh

SVP, Head of Data and AI Strategy

Jessica Rengstorf

Director, US Healthcare Strategy

Usman Suhail

Sustainability Lead

Adrian Sutherland

Strategy Director, Global Healthcare

Alexander Tomenendal

Principal Industry Consultant

Radu Vunvulea

Group Head of Cloud Delivery

About Endava



Technology is our how.
And **people** are our why.

For over two decades, we have been harnessing technology to drive meaningful change. By combining world-class engineering, industry expertise and a people-centric mindset, we consult and partner with our customers to create technological solutions that drive innovation and transform businesses.

Working side by side with leading brands, we build strategies, products and solutions tailored to unique needs, regardless of industry, region or scale. From ideation to production, we support our customers through every step of their digital transformation journey, creating dynamic platforms and intelligent digital experiences across various industries.

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