

Embracing Emerging Technology:

How do we
overcome the
legacy challenge?

Start >





Emerging technologies - like artificial intelligence, quantum computing and digital twins - are continuing to evolve at breakneck speed, generating significant interest in the opportunities they present. But realising their potential to improve customer and citizen experiences, generate additional revenue and stimulate productivity comes with challenges, not least the need to integrate new solutions with legacy systems.

Despite recent economic uncertainty, investment in emerging technologies continues to grow. A recent study¹ conducted by Fujitsu shows that UK executives are allocating almost a quarter of their capital and R&D budgets to innovation, as they try to capitalise on emerging technologies' potential to enable transformation and meet heightened user expectations.

But an innate fear of failure means many innovation projects never get off the ground - **36%** of the leaders we surveyed cited this apprehension as the reason for not running initiatives involving emerging technologies. Undoubtedly, one of the biggest challenges facing organisations is integrating emerging technology with existing data, and legacy infrastructure, along with restrictions from current computing power.

So, if you want to unlock the benefits of emerging technology, what must you do to overcome these challenges?

1. Fujitsu commissioned independent third-party research company Vitreous World to survey 300 C-level executives and Director-level employees across multiple UK public and private sector organisations with >1,000 employees. The survey took place between November and December 2022.

Integrating data – and using it to inform decisions

Data has become the lifeblood of today's digital enterprises, informing decision-making like never before. But as the size of datasets continues to swell, organisations everywhere are struggling to understand and manage the information they collect.

Faced with political, legal, financial and security restrictions, along with the limitations of legacy technology systems, the process of bringing this data together in a meaningful way is extremely challenging. It's expensive, time-consuming and resource intensive, and as time moves on, the value of the data is greatly diminished.

Access to – and retention of – the highly trained technology skills required to optimise this data is also a significant issue.

The shortage of requisite skills across different sectors can ultimately lead to significant project delays, especially where multi-discipline expertise is required, in areas such as ultrasound image scanning. The assessment and labelling of these images is a time-consuming and resource intensive process, given the level of accuracy demanded in training AI models.

As the technology evolves, so too does the legislation required to protect users. The EU AI Act and AI Liability Directive are intended to ensure that people enjoy the same level of protection as in cases that don't involve AI systems. So, it's critical that organisations that use data to inform AI-related decision-making do so in a way that does not negatively impact the people affected. Regulations also require an explanation to be provided if the process is automated by AI. An everyday example is the justification for a mortgage application.



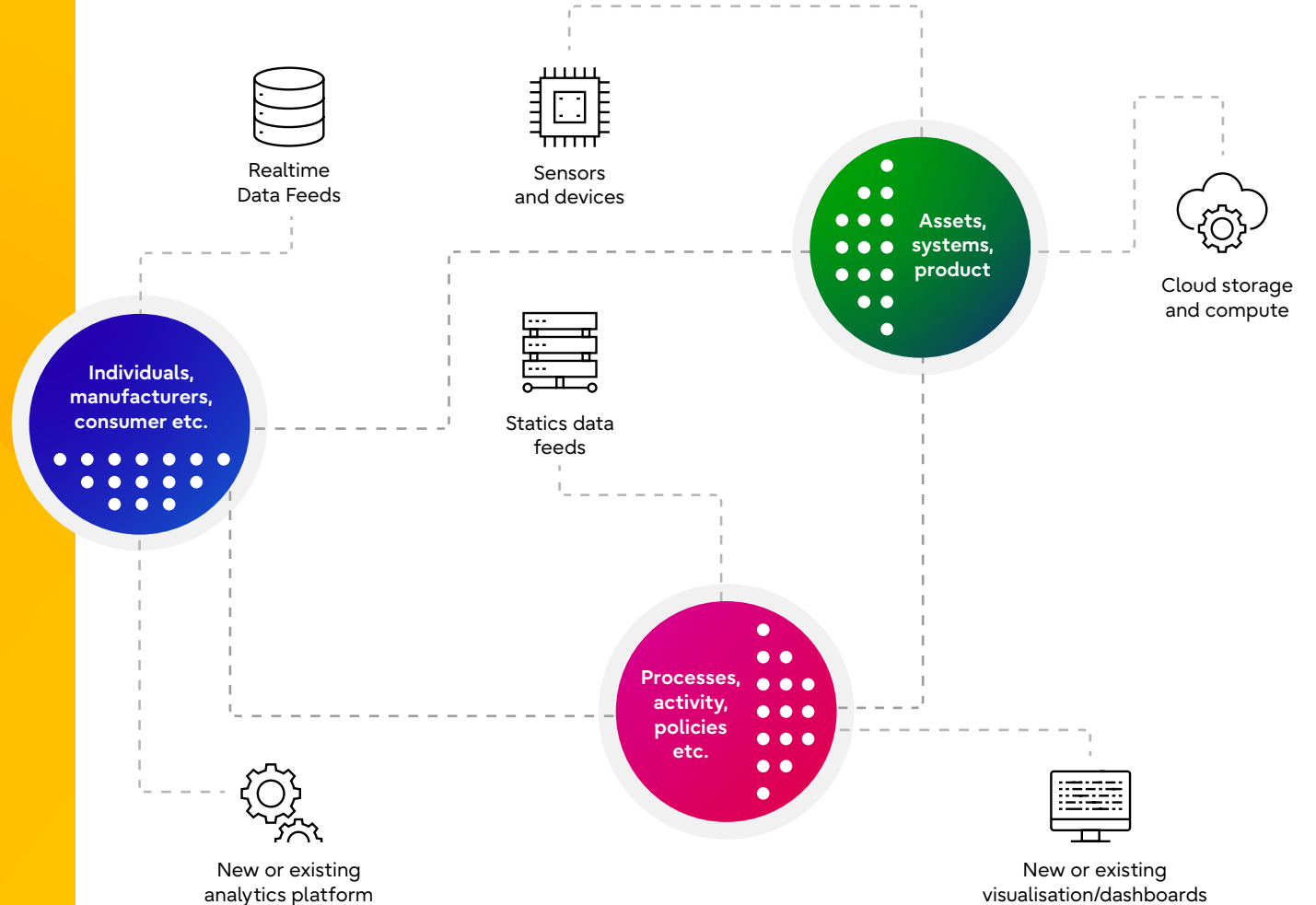
Rules-based, or explainable AI, can provide this, but unfortunately it is not scalable, as all the rules need to be coded. In contrast, data-driven AI uses machine learning with deep neural networks (DNN) to train an AI model based on the datasets: without coding this is a very scalable solution. Neuro-symbolic AI is one approach to leverage the best of both worlds.

Finally, any dataset needs to be carefully maintained and managed over its lifetime, in order to retain accuracy, prevent data drift and ensure compliance. And once the AI model is deployed in operation it is essential to keep it regularly updated by retraining it with the very latest data. Any AI model is only as good as the dataset on which it is informed.

One potential solution to solving this data interoperability problem is a semantic data fabric, a completely technology agnostic architecture for modern data management that acknowledges the need to connect data across the enterprise, regardless of its source.

You can find out more about the potential of a semantic data fabric, by reading our digital twins whitepaper: [insert link here](#)

Interoperability is facilitated through a web of data sources, handing them semantic capabilities to provide answers to complex queries.



How the UK government is dealing with data & AI challenges

In his recent Budget Statement, Chancellor Jeremy Hunt announced the UK government's ambitions for the country to become a scientific and technological superpower, part of which will include the regulation of emerging digital technologies.

This forms part of the government's plans to develop the gold-standard for regulation in the technologies of tomorrow, providing a template capable of being adopted around the world.

The Department for Science, Innovation and Technology is to play an essential role in helping deliver these commitments made by the government, and its recently published AI White Paper will guide the use of artificial intelligence in the UK. Instead of giving responsibility for AI governance to a new single regulator,

the government will empower existing regulators - such as the Health and Safety Executive, Equality and Human Rights Commission and Competition and Markets Authority - to come up with tailored, context-specific approaches that suit the way AI is actually being used in their sectors.

The White Paper outlines five clear principles that these regulators should consider to best facilitate the safe and innovative use of AI in the industries they monitor:



1

Safety, security and robustness: applications of AI should function in a secure, safe and robust way where risks are carefully managed

2

Transparency and explainability: organisations developing and deploying AI should be able to communicate when and how it is used and explain a system's decision-making process in an appropriate level of detail that matches the risks posed by the use of AI

3

Fairness: AI should be used in a way which complies with the UK's existing laws, for example the Equality Act 2010 or UK GDPR, and must not discriminate against individuals or create unfair commercial outcomes

4

Accountability and governance: measures are needed to ensure there is appropriate oversight of the way AI is being used and clear accountability for the outcomes

5

Contestability and redress: people need to have clear routes to dispute harmful outcomes or decisions generated by AI

“To succeed, companies are going to need to both upskill and outsource: it isn’t either/or. If the UK is to achieve its science superpower aims, commercialising new technologies at scale is essential.”

Keith Dear
Managing Director, Fujitsu Centre
for Cognitive and Advanced Technologies

Infrastructure and Computing Power

Today’s consumers demand instant responses. The infrastructure required to satisfy such expectations requires both fixed and mobile networks, storage, computing power, cloud datacentres, on-premise client servers, edge devices, and much more.

This infrastructure is based on international protocol standards that lay the basis for data to flow seamlessly across systems and borders. The Internet’s connected grid provides 24/7/365 resilience to deliver uninterrupted network capability. When nodes in the grid are down - for scheduled maintenance or upgrade, for instance - the data is automatically rerouted to get to where it is intended.

The exponential growth in data that we have witnessed in recent times - which has led to processing big data and the training of AI models - requires computing infrastructure that dwarfs the computing power of recent years. It is this High Performance Computing (HPC) that

has made processing massive volumes of data possible. Big data, data-driven AI, modelling and simulation would not have been possible without these advances in processing power.

Inevitably, this level of computing power comes at a cost, so this high upfront capital expenditure is a serious barrier for organisations seeking to leverage HPC. But as well as the hardware, software and infrastructure investment, the associated requisite skills are also an essential component. Unfortunately, the demand for such technical skills is currently exceeding supply, contributing to project delays.



Data security is another key challenge tied to legacy infrastructure. Stakeholders need to be considering the following questions in ensuring data is protected securely:

- **where does the data reside?**
- **what is the degree of encryption used, either storage and/or transmission?**
- **what are the physical levels of security employed?**

Mitigating these security risks will require investment by any organisation looking to implement AI solutions, for example, within their existing IT environment.

Infrastructure-as-a-Service, like [Fujitsu uSCALE](#), is a potential solution to help overcome all of these infrastructure-related barriers. uSCALE enables organisations to benefit from cloud-like 'as-a-service' advantages by renting servers, storage systems or integrated systems for their own data centres, with capacities tailored precisely to their operational needs, including an intelligently calculated scaling reserve for peak loads. In this way organisations can enjoy all the benefits of a cloud model, with their data remaining completely under their control.

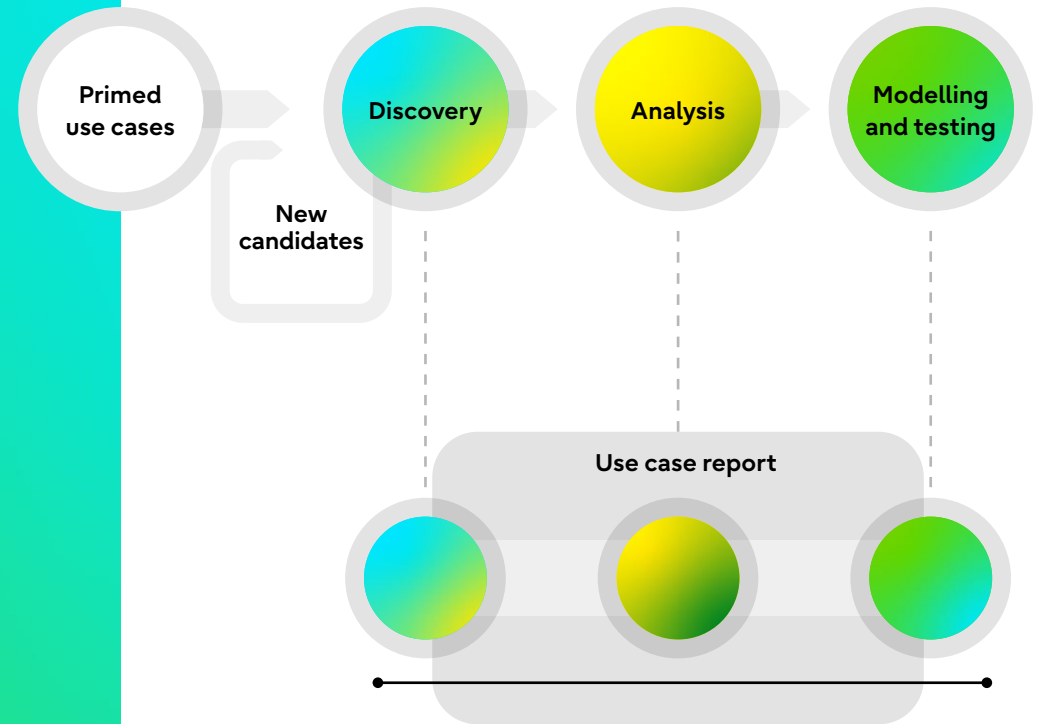
No silver bullet, so partnering is the key...

Whilst emerging technology is not a silver bullet for sustainable growth, it is a critical part of the innovation needed to boost both productivity and competitiveness, if the UK is to catch up with international leaders.

The challenges of integrating these emerging technologies with existing data and legacy infrastructure are complex and real, but not overcoming these obstacles is no longer an option for organisations seeking to transform. While no single organisation can do it all today, partnering with the right, best-in-class, trusted technology companies is the best way to overcome these barriers to adoption.

Fujitsu is working with a number of organisations to explore how to effectively adopt and integrate a range of new technologies.

We've partnered with [HSBC](#), specifically looking at how quantum computing can create business value via 'real world' applications, a process enabled by [Fujitsu's Quantum Value Assessment](#). And by developing an interface to extract and visualise unwieldy legacy data, we enabled [Network Rail to modernise the UK's rail infrastructure using AI models](#). The models were trained to automatically catalogue assets and identify faults, opening the door to proactive service scheduling and improved passenger experience.



Why Fujitsu

We are a global leader in technology and business solutions that transform organisations and the world around us. This is pivotal to our purpose: to make the world more sustainable by building trust in society through innovation.

It's a vision which is central to our presence in the UK and our support for the country's National Digital Twin (NDT) programme, designed to increase infrastructure resilience, optimise the UK's use of resources and boost quality of life for citizens.

The UK is also home to Fujitsu's Centre for Cognitive and Advanced Technologies. The Centre brings together innovation in areas including digital twin technology, quantum computing and artificial intelligence, as part of Fujitsu's commitment to developing a high-skills UK economy. Providing a direct link to our work in Japan, the Centre will provide a focal point for collaboration between industry, government and academia, as well as enhancing the UK's ability to draw on Japan's leadership in areas such as super computing.

The Centre forms part of Fujitsu's workforce across the country, driving digital innovation in both the public and private sectors. Our technology contributes to some of the UK's critical systems, from enabling online tax returns with HMRC and providing the Flood Warnings Direct service, to delivering secure communications to our Armed Forces.

Fujitsu is committed to investing in the UK and drawing from our global expertise to create a new model of innovation that helps realise the country's scientific superpower potential.

See how we're capitalising on the convergence of emerging technology to revolutionise decision-making:

Visit the website