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Leaders' perspectives on technology

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Executive conversations with...

DAVID KNOTT
CHIEF TECHNOLOGY OFFICER

UK Government

TECHNOLOGY AND THE PUBLIC SECTOR

David is a technology leader, strategist and architect with over 35 years experience across a range of industries, including banking, insurance, transportation, utilities and media. David holds a PhD in Philosophy, specialising in Ethics. In recent years, he has applied this expertise in the fields of AI and data ethics, helping HSBC define its first set of ethical principles for the use of AI and data, and working as part of the Responsible AI teams at HSBC, Google and BCG.

Can you tell us about your current role and responsibilities as the UK Government's CTO?

David Knott: My job is to make sure that we do technology well. By that, I mean delivering better outcomes for citizens through improved systems, data, and infrastructure.

I sit within the **Government Digital Service (GDS)**, which is part of the **Department for Science, Innovation and Technology (DSIT)**. My role cuts across four main areas. First, there's **architecture:** how to steer departments toward better technology choices. Second, we lead on **engineering standards** and best practices. Third is **security and resilience**, making sure our digital services are robust and secure against external threats. Finally, we contribute to **commercial strategy,** looking at how we engage suppliers and stimulate innovation in the digital marketplace.

We focus a lot on transformation, not just in terms of new services, but also by modernizing existing systems. Technology isn't background noise, it's foundational.

David Knott,
Chief Technology Officer of the UK Government

Where do you see technology making the biggest impact in the public sector?

David Knott: There are **four major areas** where technology is making a difference.

First is **citizen services**. The public expects services that are digital, convenient, and reliable. Technology is how we meet those expectations at scale.

Second is **productivity**. We want to help public servants concentrate on value-adding work. If we can automate the routine stuff, then teachers, police officers, nurses, and civil servants can focus on what really matters.

Third, there's **specialist capability**. AI and digital tools are helping in areas such as criminal justice, healthcare, and education. For instance, they can identify patterns in data or diagnose medical conditions earlier than humans, in some cases.

The fourth area is what I call **"language in, language out."** A lot of interactions with government involve people describing their situations in everyday language and then expecting a clear response. Think of applying for a benefit or registering a complaint. Historically, computers have struggled with natural language. But with the advent of large language models [LLMs] and generative AI, we can now start meeting citizens on their terms. For me, this is genuinely exciting. Instead of forcing people to work in "machine-friendly" ways, we're teaching machines to work in people-friendly ways.

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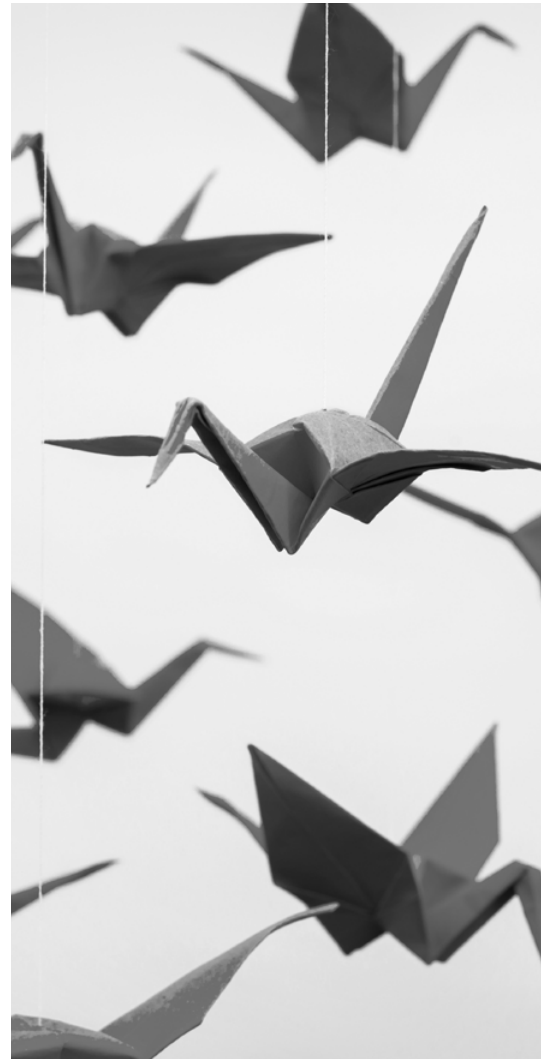
What do you think the public sector can learn from the private sector – and vice versa – when it comes to digital transformation?

David Knott: There's a lot to learn in both directions.
From the **private sector**, we can learn about **joined-up strategy and execution.** In large corporations, leadership can make decisions that hundreds of teams act upon. In government, we're more fragmented. Every department, school, and NHS trust has its own remit. That autonomy is valuable, but it makes it harder to share things such as infrastructure or platforms.

Private companies also often move faster when it comes to **shared services** and cloud adoption. They invest in **engineering maturity** and modern tooling that the public sector is still catching up on.

That said, there's something deeply admirable in the public sector: **purpose.** People in government are **mission-driven.** They care deeply about the impact of their work.

FROM THE PRIVATE SECTOR, WE CAN LEARN ABOUT JOINED-UP STRATEGY AND EXECUTION

What are some unique challenges you face in leading technology for government?

David Knott: There are a few that stand out.
The first is **public visibility**. When something fails in government, it fails in public. That raises the stakes and makes people more risk-averse. This is understandable but can delay progress.

The second is **structural complexity**. Unlike a single organization, government is a constellation of institutions, each with its own priorities and tech stacks. Achieving alignment takes a lot of listening and a lot of collaboration. The third challenge is **talent.** We're in a competitive market and we still can't always match private-sector salaries. So, we rely heavily on our ability to offer meaningful work. And honestly, that works. I've seen some of the best engineers choose to work here because they believe in the mission. Lastly, the **scale and scope** of what we do is massive. No private company engages with such a wide range of domains, from agriculture, to justice, to education, to counterterrorism.

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Are there any major opportunities for value creation you see on the horizon?

David Knott: Definitely. Our **State of Digital Government report** estimates that we could **unlock £45 billion of value** through better digital and data practices. That breaks down into three main areas:

1. **Productivity and efficiency** – automating processes and freeing people from routine tasks.

2. **Channel shift** – encouraging citizens to use digital channels instead of phone or face-to-face, cutting cost and employee time.

> **We could unlock £45 billion of value through better digital and data practices"**

3. **R**educing fraud and error** – saving money and building trust.

A lot of this comes down to modernizing systems, improving data quality, and building digital services that people want to use.

How is your team tackling long-term transformation and digital maturity?

David Knott: We've published a blueprint called A Modern Digital Government, which lays out six key priorities:

1. **Joined-up public services –** so users can navigate government without needing to know how it's organized internally

2. **Responsible adoption of AI –** making sure we use emerging technologies ethically and effectively

3. **Strengthening core infrastructure –** tackling legacy systems and investing in resilience

4. **Driving value from procurement –** aligning our supplier spend with national outcomes

5. **Investing in people –** both in terms of digital skills and leadership

6. **Transparency and accountability –** being open about what we're doing and how well we're doing it

AI AND PUBLIC SERVICES

How is the UK government implementing AI in public services?

David Knott: There are four strands, all designed to move us from early experimentation to scalable, responsible deployment.

First, we've built what we call an **AI Incubator** or **i.AI**, which is a team of deep-tech specialists who work alongside departments to apply AI in practical, impactful ways. This helps overcome one of the biggest challenges in government: limited in-house expertise.

Second, we're embedding **AI into transformation planning**. So, instead of AI being a side project, it becomes a key enabler of wider operational and service improvements. That means funding AI where it makes real-world impact – in health, education, justice, etc.

Third, we're working on **skills and confidence building.** A lot of public servants are still unfamiliar with how AI works, what it can do, and the risks it entails. So, we're rolling out training programs across the civil service to help everyone from frontline staff to policy leads build digital confidence.

And fourth, we published the **AI Playbook for Government,** on which I led. It's a practical guide that connects the technical, legal, and ethical aspects of AI use. We wanted a practical aid to help teams safely deploy AI while complying with laws and upholding key principles such as fairness, transparency, and privacy.

WE'RE EMBEDDING AI INTO TRANSFORMATION PLANNING
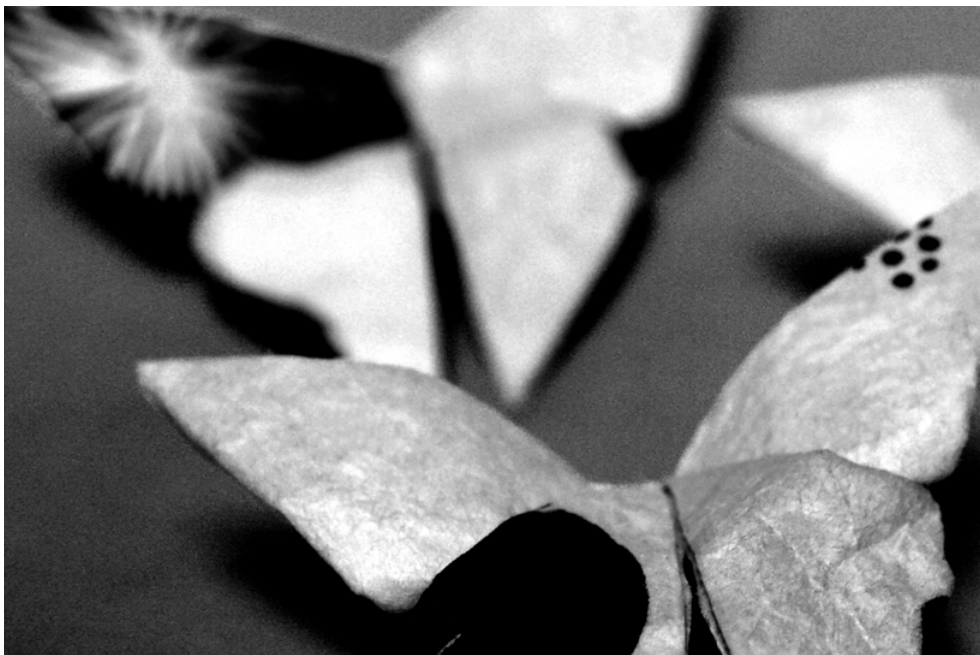
What excites you most about the current AI landscape in government?

David Knott: What's exciting is that we're seeing real, applied use cases, not just hype. We're at a point where AI can genuinely **change how work gets done** on the front line of public services.

Let's take a simple example. If an AI assistant can save someone half an hour a day by drafting emails or summarizing documents, that's significant. It's not just saving money, it's giving a teacher 30 more minutes to work with students, or a police officer more time to investigate a case. That's a productivity gain with purpose.

The paradigm shift in how computers operate is also incredibly exciting to me. Traditionally, we programmed systems using logic: "if X, then Y." But machine learning [ML] does things computers previously couldn't, like make judgments or interpret language. That opens up all kinds of new possibilities for government.

How is AI being applied inside government?

David Knott: I think it helps to break it into **four categories**, each with different challenges and benefits.

First, there's **embedded AI**. Features like smart suggestions or predictive text are built into everyday tools. For most users, this will be the most common experience. The tools change subtly, and the way we work has to shift with them. It's more about change management than system development.

Second, we're seeing AI **used within custom-built solutions.** Instead of

> "We're at a point where AI can genuinely change how work gets done on the front line of public services"

traditional coding, teams are embedding AI models into software. For example, using ML rather than a hard-coded rules engine to decide eligibility for a service. This requires careful engineering, testing, and ongoing maintenance.

Third, AI is transforming **how we build software itself.** Tools such as GitHub Copilot help developers write code faster and better. But they also raise new questions: How do we test AI-generated code? How do we maintain it? These are challenges we're actively exploring.

The fourth category is the most forward-looking: **agentic AI**. These are AI systems that can act on behalf of a user – for example, by booking appointments or submitting forms. That brings up important questions around **identity, trust, and authorization.** If an AI claims to be acting on someone's behalf, how do you know it's legitimate? And what limits do you place on its authority? We'll need new protocols for that.

> **"**
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How important is data in making AI work within government?

David Knott: Data is **foundational,** and it's also one of our toughest challenges. Government has a vast amount of data, but it's fragmented across systems and formats. Some of it is highly sensitive. Some of it is underused. We've tried every model: data warehouses, data lakes, data meshes. And while we've learned a lot, we haven't cracked the problem.

The emerging concept of **data fabrics** is promising. It allows data to stay where it is, while making it discoverable and usable through common governance and metadata. That's the direction we're leaning into.

We've also launched the **National Data Library**, which is about making data available for training and research, while ensuring we meet standards around consent, privacy, and transparency. Getting this balance right between utility and ethics is crucial to developing responsible AI.

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Many systems in government are still legacy-based. How are you tackling modernization?

David Knott: Modernization is essential to stability, security, and progress. Legacy systems are a major barrier. In fact, our recent *State of Digital Government* report showed that the number of critical legacy systems has gone up, not down. That's worrying, and it's a call to action.

We're working hard to **make the case for investment.** It's not just about cost savings. It's also about reducing service outages and risks to the public. If a citizen can't access their benefit because of a system failure, that's not just a technical issue, it's also a human one.

We're also focused on **designing secure systems.** That's why we've published our Secure by Design standard. Security needs to be baked in from day one. This is part of our broader push for digital maturity across departments.

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BUILDING RESPONSIBLE AI

### How do you think about ethics in technology?

David Knott: I have a PhD in Philosophy, so ethics has always been part of my thinking. But for a long time, I kept that separate from my work in technology. That's no longer possible.

AI raises real ethical questions. It affects real people. When we're building models or deploying systems, we need to remember this isn't abstract. The data we use represents human lives. The decisions we make have consequences.
My advice is: don't overcomplicate it, but don't ignore it either. You don't need a philosophy degree to know what's right and wrong. But you do need to **ask the questions**, involve diverse voices, and build governance structures that support good decision-making.

We also need to move beyond **tick-box compliance.** Ethics isn't a checklist. It's a conversation, a discipline of constantly asking: "Is this the right thing to do?"

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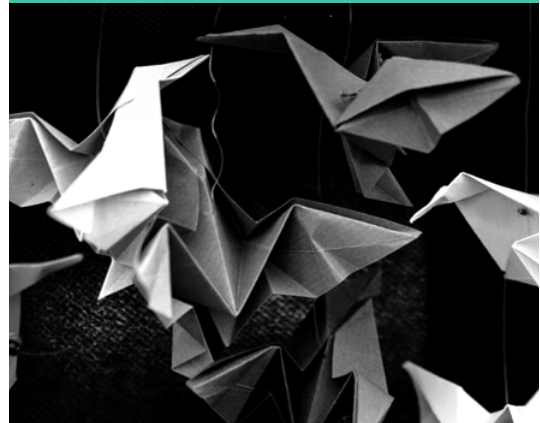
SECURING PUBLIC DATA

How is the UK government strengthening digital resilience in the face of growing cyber threats?

David Knott: We're making progress, but digital resilience remains a big challenge. That's not just my view. It's backed by data from the *State of Digital Government* report and the National Audit Office.

The Government Security Group has developed and rolled out a framework called **GovAssure**. It's essentially a structured approach that allows departments to self-assess and be assessed independently against core standards for cybersecurity and operational resilience. It brings **visibility and accountability.** It helps us understand where the gaps are and where we need to act.

But resilience doesn't come just from undergoing assessments. That's why we also developed our **Secure by Design** standard. It means engineers and developers, not just security specialists, receive clear guidance on how to build resilient systems.

We also have the huge advantage of working closely with the **National Cyber Security Centre (NCSC).** They give us world-class research, early warnings on threats, and deep expertise. That partnership lets us stay ahead of risks in ways that many private-sector organizations can't.

Is the government preparing for the era of quantum computing and post-quantum cryptography?

David Knott: Yes, very much so. We're now looking at a **10-year horizon** for post-quantum readiness, and we know that the cryptographic methods we use today may not survive that transition.

We recently co-published an **international position paper** that lays out our strategic posture for post-quantum security. It's about building **algorithmic agility** into our systems, so, unlike most legacy systems, we can respond to evolving threats.

It's not just a technical shift. It's a **capability-building challenge.** We need systems that can evolve and people who can manage that evolution

WE'RE NOW LOOKING AT A 10-YEAR HORIZON FOR POST-QUANTUM READINESS

Being part of the **DSIT** gives us another edge. We're aligned with the UK's national quantum strategy, which includes some of the most ambitious quantum research programs in the world, such as the **National Quantum Computing Centre [NQCC]**. Through those partnerships, we're connecting policymakers and digital leaders across government with the front lines of quantum innovation.

Quantum won't solve every problem, but there are many areas of government services where it can help.

How do you see generative AI [Gen AI] reshaping the cybersecurity landscape?

David Knott: AI and cybersecurity are a natural match. At its core, cybersecurity is about **detecting patterns –anomalies**, changes in behavior, indicators of compromise. That's exactly where AI thrives.

We've used ML for anomaly detection for a while now. But **Gen AI brings new capabilities**, especially in language-based analysis. For example, it can help us identify **prompt injection attacks,** where someone tries to manipulate an AI system by feeding it malicious input. It can also enhance phishing detection, which is important as AI is making phishing emails more sophisticated.

Gen AI lets attackers **scale and personalize** their attacks. So, we must use the same tech to **identify subtle threats and understand intent.**

It's a bit of an arms race. But I'm confident that, with the right governance, and with the partnerships we have, we can stay ahead.

Looking back on your career, which leadership lessons have you learned?

David Knott: First, **technologists belong in the boardroom.** Early in my career, I saw how much better decisions were when technology leaders had a seat at the table. Technology isn't a support function anymore, it drives the mission. So, my advice to fellow tech leaders is: don't wait to be invited into the room. Be bold. Bring your voice.

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Technologists belong in theboardroom"

Second, **delivery is, by nature, unpredictable.** If you're doing something meaningful, it usually means you're doing something new. That means there will be unknowns. Agile, DevOps, and Site Reliability Engineering (SRE) aren't just buzzwords, they're toolsets to navigate that unpredictability. The idea that you can plan out every detail in a five-year waterfall strategy is fiction. We need to embrace uncertainty and learn to "feel" our way forward by learning in real time.

Third – and this one's increasingly important – **business leaders must understand how tech works**. It's no longer safe to just rely on what vendors say or what a glossy demo shows. You don't need to be a developer, but you do need a working understanding of the tech. My role is often to "demystify the magic," to help leaders make informed decisions based on what these systems can and can't do.

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Business leaders must understand how tech works"

What do you think will define the next decade of technology in government?

David Knott: Three trends come to mind.

First, **AI will keep growing but the focus will shift to application.** The research arms race for the biggest models will continue, but what will matter most is how those models are applied. We're already seeing the rise of agentic AI – systems that don't just respond but act with initiative. That's where questions of trust, identity, and authorization will become central.

Second, **quantum readiness**. It won't be a dramatic arrival, but it's coming. We'll need to build new skillsets in quantum engineering and designing quantum algorithms. We'll need development tools to make that accessible. It reminds me of the early days of computing, when the barrier to entry was high. That will change, but we must start investing in it now.

And third, **a deep rethinking of digital trust.** We're realizing that the internet, as it was originally designed, didn't build in enough trust, security, or identity controls, such as **verifiable credentials, user-controlled identity,** and **transparent authorization**. We're trying to retrofit those now. Web3 hasn't delivered on all its promises, but it has introduced useful ideas.

David Knott
Chief Technology Officer
UK Government

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