

EMERGING TECH INDEX

Seeds of Change

Federal agencies face a rapidly evolving technology landscape, one where new technologies and novel uses of those technologies are shaping their missions and workforces. But questions remain about how federal agencies perceive, adapt, and implement emerging technologies. How do they define emerging technology and its impact to the mission? What hurdles do they face across civilian, defense, and intelligence sectors, and how prepared are they to overcome those challenges?

This inaugural, annual research study on emerging technology in government delves into a cross-section of perspectives from 425 government leaders, presenting a panoramic view of the current state and future direction of technology adoption.

Foreword

As we navigate through this era of technological transformation, it's imperative for federal agencies to adapt, evolve, and pioneer the new digital frontier. Many advancements on the horizon hold enormous potential to redefine the very fabric of their operations, workflow, and mission outcomes. It is within these technologies that the "seeds of change" are sown, growing into robust frameworks and paradigm shifts that empower agencies to excel in their goals and objectives.

This report provides an insightful index of emerging technologies within government agencies: the pace and extent of adoption, the impact on mission objectives and the challenges met along the path of implementation. As agencies continue to explore, adapt, and integrate these groundbreaking technologies, this report serves as a compass, guiding through the field of transformation and highlighting key milestones achieved and challenges overcome.

Our research shows that a majority of respondents see emerging technologies having a critical impact on their agencies' mission objectives over the next five years. This report casts a spotlight on the advancements made so far and encapsulates tangible benefits agencies have gained through their technological progressions.

The journey toward full-fledged adoption of emerging technologies is complex but rewarding, and we hope that the insights presented in this report will serve as an enriching guide, unlocking even more opportunities for innovation. Together, let's continue to build on the solid foundation of excellence in government technology and advancing our shared commitment to progress and transformation.

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Executive Summary

The pace of technological change is accelerating faster than ever before, with unprecedented implications for our economy, daily lives, and government. This surge is not just the new norm but a sign of even more rapid advancements yet to come. Across diverse fields such as artificial intelligence, machine learning, data science, augmented and virtual reality, additive manufacturing, biotech, blockchain, and quantum computing, the collective investments of both governments and industries in research and development are driving an exponential pace of progress.

The intersection of these evolving technologies is fueling a surge in growth and is setting the stage for transformative breakthroughs. Public agencies are reaching critical junctures, where they must make IT decisions more swiftly, embrace the potential of disruption, and recalibrate their strategies to better facilitate rapid innovation and technology adoption.

By doing so, they can automate processes, manage more complex systems, and keep pace with the ever-expanding landscape of cybersecurity threats.

Agencies recognize the profound impact of these trends. They are not only making significant investments in these technologies, but are also actively partnering with the industry to harness their potential in fulfilling the government’s mission. These are indeed exciting times, full of promise and potential.

Nonetheless, the path to harnessing these technologies isn’t without its hurdles: budget constraints, compatibility issues with existing software and infrastructure, wariness of unproven technologies, and concerns over data privacy. Advanced technologies promise significant benefits but must be approached with diligence.

The data presented in this report offers a foundational understanding

The pace of change will never be this slow again.

of these issues, analyzing evolving trends, adoption rates of emerging technologies, and the challenges these agencies anticipate. These insights, while diverse, consistently emphasize the importance of advanced technologies such as artificial intelligence and machine learning to advance decision making, operational efficiency, and overall mission effectiveness.

1 EMERGING TECH ADOPTION IS INCREASING

In the swiftly evolving technology landscape, a majority of agencies report widespread adoption of key emerging tech. 40% of respondents say they have broad adoption of 5G networks, Internet of Things, big data, and cloud services. One-third of respondents expect to implement machine learning and predictive analytics within the next two years.

2 TECH-DRIVEN TRANSFORMATION

Agencies forecast impactful change. Over 70% predict emerging tech will have a significant impact on achieving their objectives.

3 SECURITY FUELS TECH ADOPTION

The pursuit of robust security – a leading driver for 34% of all agencies – is catalyzing the widespread integration of emerging technology across government.

4 GRAPPLING WITH TECH COSTS

With nearly 40% of agencies citing cost as the main obstacle, budget constraints significantly impact the integration of emerging technology in mission-critical operations.

5 TECH PUSH AMPLIFIES CYBERSECURITY

As 39% of all agencies highlight the transformative potential of AI, the need to re-evaluate cybersecurity postures in tandem with technological adoption has become paramount.

6 UPSKILLING IS IMPERATIVE

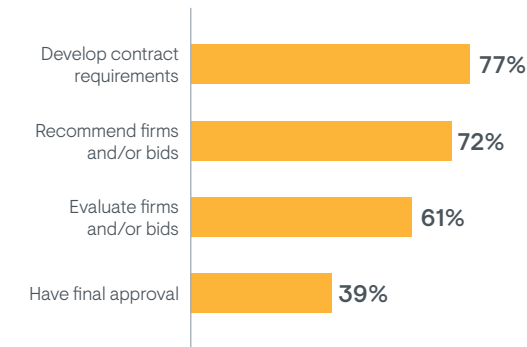
Amid technological integration, 56% of agencies have signaled the importance of comprehensive education and training programs in embracing emerging technologies.

Who We Surveyed

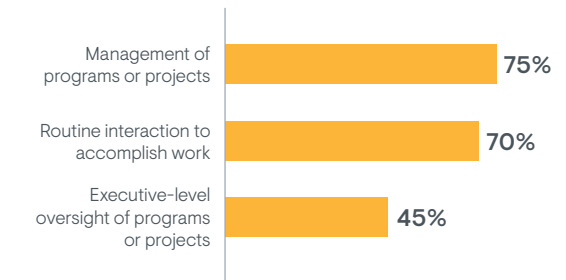
GDIT’s Digital Consulting Practice partnered with an independent research firm to design an online survey of 425 federal government employees – 150 at defense agencies, 200 at civilian agencies, and 75 at intelligence and homeland security agencies. Respondents were GS-12 and above and involved in either the selection or management of firms that provide enterprise IT or digital modernization services. These respondents represent a cross section of individuals who are responsible for driving their agencies’ technology and mission decisions.



Role in Selection



Role in Management



Defining “Emerging Technologies”

	CIVILIAN	DEFENSE	INTEL
Reports from industry	43%	33%	27%
Newness in market	28%	31%	43%
Uniqueness of solution	38%	40%	43%
Newness in government	26%	28%	31%
Identified as emerging in white papers	32%	26%	29%
Identified as emerging in press	27%	23%	15%

The concept of “emerging technologies” within agencies is marked by a shared emphasis on practicality and innovation rather than novelty alone. The focus on unique solutions highlights the priority agencies place on addressing specific challenges and enhancing operations. The notable influence of industry research firms points to the value of external expertise in navigating the rapidly evolving tech landscape.

The Impact on Agency Missions

Amid the dynamic landscape of emerging technologies, government agencies are decisively envisioning a brighter, more secure future. Asked to rank their top reasons for embracing emerging technologies, overall agencies cited enhanced security (34%). But opportunities to leverage data also made a strong showing, including through increased productivity (32%), improved decision-making (32%), and access to real-time data (30%).

- #1
INCREASED SECURITY
- #2
INCREASED PRODUCTIVITY
- #3
ENHANCED DECISION-MAKING
- #4
ACCESS TO MORE UPDATED AND REAL-TIME DATA
- #5
EASIER COLLABORATION ACROSS THE ORGANIZATION
- #6
ACCESS TO MORE ROBUST DATA

WHAT THIS MEANS

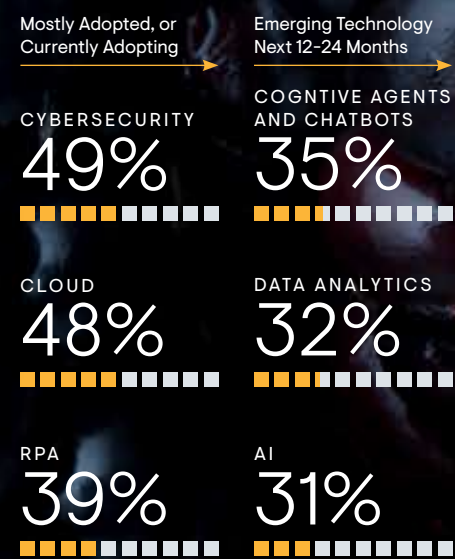
The echoes of security concerns reverberate in the corridors of every government agency, setting a clear indication of the paramount importance of information security. The survey results suggest increased demand for technologies that can heighten security, boost productivity, and enhance decision-making across government agencies.

Adoption and Implementation

Overall, the technologies that organizations have mostly adopted or are currently implementing are cloud (48%), cybersecurity (49%), and robotic process automation (39%). In contrast, the top three technologies that agencies see emerging in the next 12 to 24 months are cognitive agents and chatbots (35%), data analytics (32%), and AI, ML, and deep learning (31%).

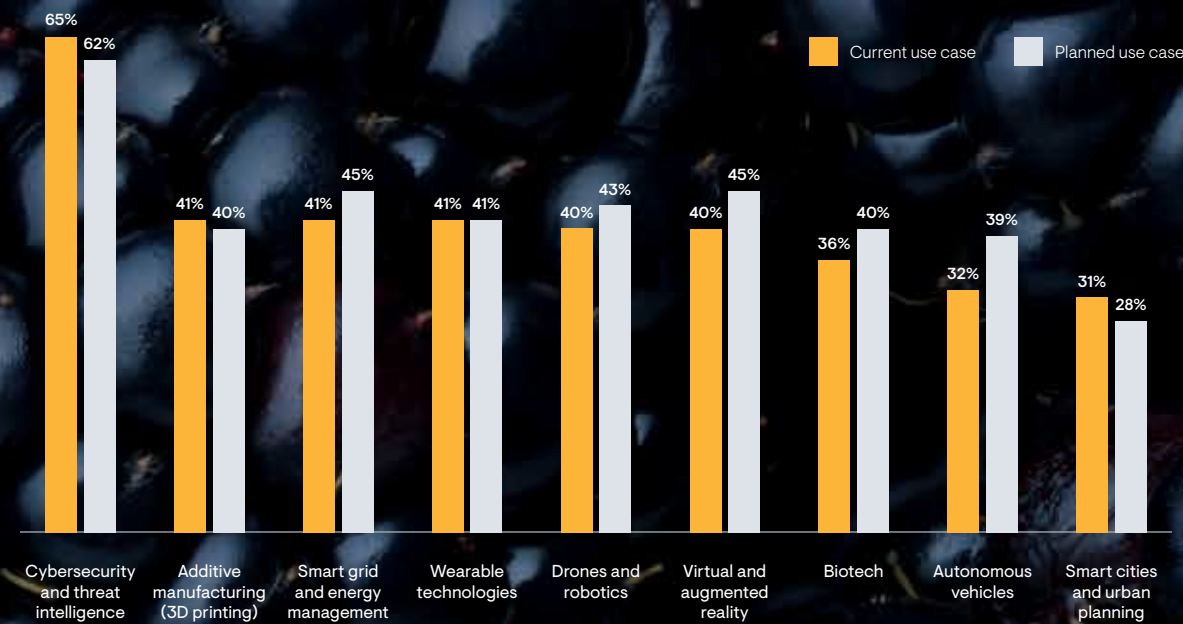
The high adoption of cloud and cybersecurity across all agency types signifies a universal requirement for secure, scalable, and accessible digital infrastructure, but are also driven by government policies requiring agencies to evaluate the cloud for their future investments and implement zero trust architectures to enhance security.

The vision in the next 12 to 24 months for agencies is to accelerate the adoption of artificial intelligence, data analytics, and generative AI across all agency types. This suggests an impending shift towards more intelligent, predictive, and personalized solutions.



Cybersecurity is Driving Investments

As cyberthreats continue to grow, federal agencies will increasingly rely on emerging tech for cybersecurity and threat intelligence, with 65% currently deploying them and another 62% planning to adopt or expand their use. Among the myriad other applications, additive manufacturing, wearable devices, drones, and augmented and virtual reality follow suit.

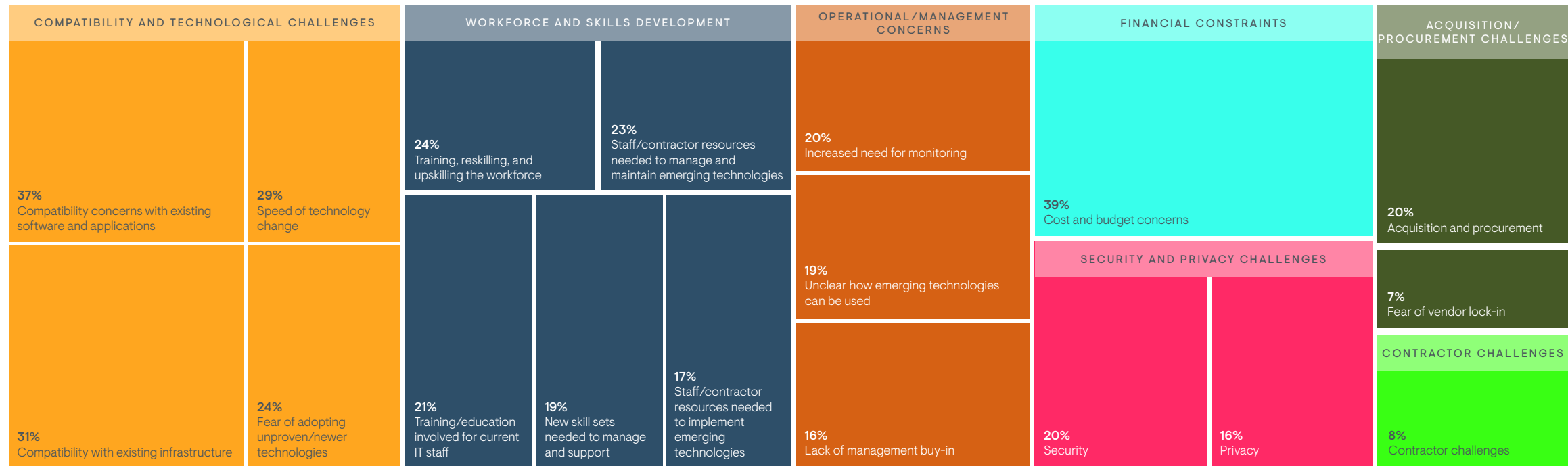


WHAT THIS MEANS

Government agencies are taking an active and future-oriented stance towards emerging technologies, with cybersecurity and threat intelligence standing out in both current and planned usage. They are making investments in advanced AI and ML algorithms for threat detection and quantum computing for its potential to create unbreakable encryptions. However, there's equally strong interest of defense, intelligence, and homeland security agencies in additive manufacturing, also known as 3D printing. This technology, by enabling on-demand production of key components, offers a solution to supply chain constraints and challenges of maintaining older equipment. Currently, civilian agencies have not implemented these technologies as broadly as their federal counterparts, but that will change; they are planning for many of these use cases in the future.

Overcoming Obstacles

The biggest obstacle to adopting emerging technologies across all agencies is cost or budget concerns, with 39% of respondents identifying this as a key issue. Compatibility concerns with existing software and infrastructure are also a significant factor, noted by 37% and 31% of agencies respectively. The speed of technology change, workforce implications such as training, reskilling and upskilling, and fear of adopting unproven and newer technologies all hovered around 24-29%.



WHAT THIS MEANS

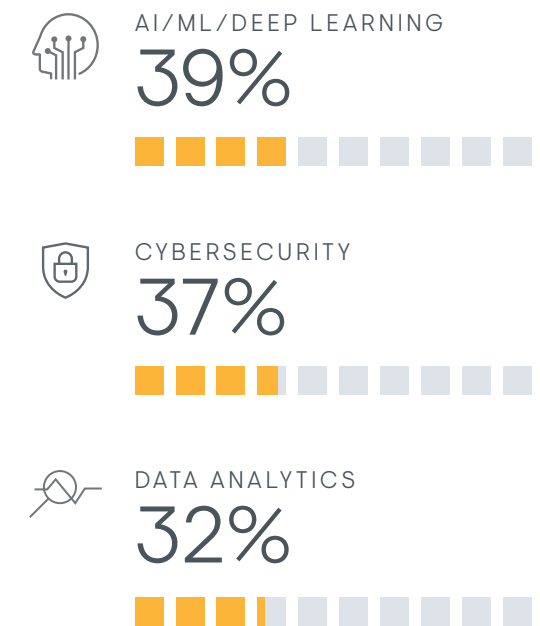
Overall, these results call attention to the multi-faceted challenges faced by agencies in their journey toward digital transformation, emphasizing the need for a comprehensive approach that addresses financial, operational, and human capital considerations in equal measure.

Cost and compatibility issues dominate as primary barriers to adopting emerging technologies across agencies, reflecting concerns about financial feasibility and operational integration. The prominence of these challenges underscores the need for cost-effective solutions and technologies that align seamlessly with existing systems.

The speed of technology change and workforce implications highlight the struggle to keep pace with rapid innovation and ensure staff readiness. This points to the importance of an agile approach to implementation, allowing for continuous learning, flexible and adaptable policies, and shorter efforts.

New Tech, New Cyber Challenges

Artificial intelligence, machine learning, and deep learning took center stage as the most likely technologies to force agencies to re-evaluate their cybersecurity postures, garnering 39% of the overall responses. Cybersecurity capabilities themselves were a close second at 37% and unsurprisingly the top concern for defense agencies at 47%. Data analytics and cloud technologies also secured notable mentions across agencies.



Advanced technologies, while advancing operations, also introduce a new landscape of cyberthreats that require vigorous protection strategies. The artificial intelligence and machine learning ranking reflects a recognition of their transformative potential and the consequential need for stringent protection against malicious attacks and assuring they are performing as intended.

While agencies are acutely aware of the cybersecurity implications of high-profile, high-impact technologies such as AI, machine learning, and data analytics, it is important to note that several technologies are increasing in maturity and adoption, like edge computing, quantum computing, and even autonomous systems. Government leaders will be looking at those capabilities and the critical need to secure them as their adoption continues.

Adapting for New Tech

The results demonstrate that an overwhelming majority of agencies are embracing the integration of emerging technologies through incremental adoption. Adopted by 78% of agencies overall, this reflects a strategic approach of introducing new technologies in a controlled, manageable way. Pilot projects and full-scale deployments are also popular strategies, with roughly half of all surveyed agencies employing these approaches.

Prioritizing Tech in Budgets

The majority of agencies indicate that they are investing anywhere from 50% to 90% of their budgets in emerging technologies. This commitment underscores the understanding that emerging technologies are no longer optional, but essential investments that will catalyze advancements across the board in operational efficiency, data-handling capabilities, and mission outcomes.



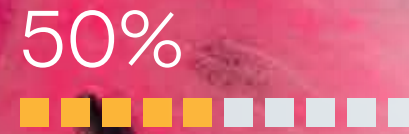
INCREMENTAL ADOPTIONS



FULL-SCALE DEPLOYMENTS



PILOT PROJECTS



WHAT THIS MEANS

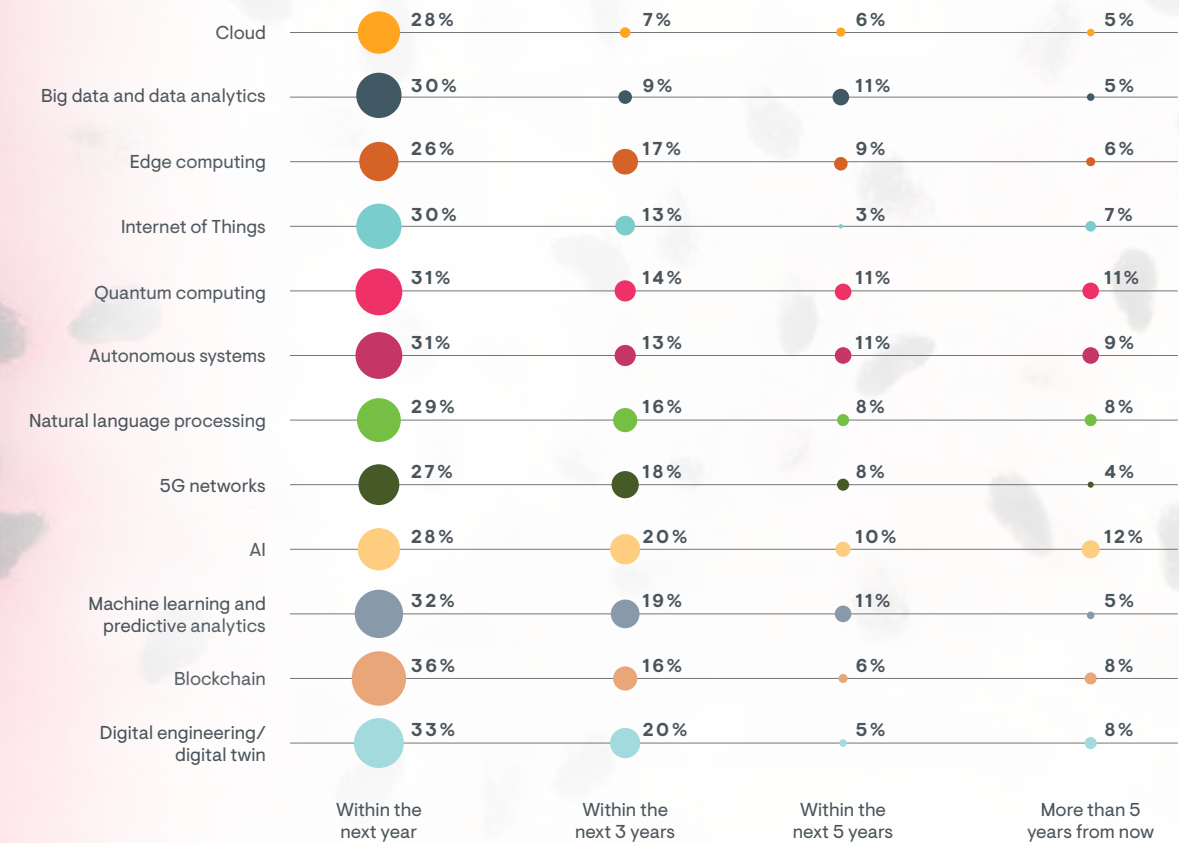
The preference for incremental adoption across all agencies suggests a recognition of the complexities and potential challenges associated with integrating emerging technologies into existing systems and processes. This approach offers the benefits of risk mitigation, allowing for continual learning and adjustments as new technologies are integrated over time.

The relative balance between pilot projects and full-scale deployments across agencies shows that while agencies are ready to invest in and test new technologies, they are also eager to implement them on a larger scale when proven successful. Defense, intelligence, and homeland security agencies show a particular affinity towards pilot projects, perhaps indicative of the high-risk, high-impact nature of their missions, which necessitates thorough testing and validation before wider deployment.

Plotting the Adoption Timeline

Respondents indicate that AI solutions are either already in use at 28% or will be within the next year at 28%. Comparable expectations surround the adoption of 5G networks, where 41% of all respondents indicate they are already using this technology and another 27% foresee its implementation in the next year. IoT and big data analytics reflect a similar trend with 42% and 41% of agencies respectively affirming their current use.

On the other end of the spectrum, quantum computing, autonomous systems, and blockchain have more measured adoption forecasts. For instance, only 29% of all agencies report current use of quantum computing, while 31% see its widespread implementation occurring within the next year. For autonomous systems, 30% of respondents already use the technology, with another 31% expecting to do so within a year.



WHAT THIS MEANS

The robust expectations around AI - with 56% of all agencies seeing widespread adoption within a year or are already using it - not only signals recognition of its transformative potential, but also suggests that necessary infrastructures and skillsets are increasingly in place.

Similarly high expectations surround cloud and big data. For instance, a 81% of all respondents have already adopted or anticipate adopting cloud technologies within the next year. These numbers illustrate their perceived critical role in streamlining government operations, particularly in data management and digital services.

In contrast, the timeline for the adoption of quantum computing, autonomous systems, and blockchain extends further, indicating the inherent complexity and challenges involved in their integrations.

CONCLUSION

Sowing the Seeds of Tomorrow

Throughout the vast landscapes of the U.S. government, the promise of emerging technologies is evident. The survey results underscore this, revealing that cybersecurity, education and training, and bolstering productivity stand as focal points in the journey of technological adoption.

However, the path to harnessing the full potential of emerging technologies is not without challenges. It's a journey strewn with potential hurdles: budgetary constraints, compatibility issues with existing systems, swift pace of technological changes, and the need for a skilled workforce are all factors that require concerted attention.

Yet, these challenges are not insurmountable. When addressed strategically, planned accordingly, and implemented appropriately, they provide the opportunity to improve how government acquires and adopts emerging technology.

Next Steps

1

DEVELOP A STRATEGIC PLAN

Cost and budgetary concerns are primary challenges, signaling the need for a comprehensive strategic plan. This isn't just about fiscal frugality; it's about redeploying investments and paving a well-charted course for embracing emerging technologies. This vision-driven roadmap will act as a compass, guiding investments toward value and innovation.

2

COMPATIBILITY AUDIT

Agencies must conduct a compatibility audit to alleviate the risk and internal concerns related to integrating new technologies with existing infrastructure. This can be considered an insightful excavation, unearthing insights about hidden interdependencies and potential bottlenecks. This preparatory exercise will provide the blueprint for seamless integration.

3

FORTIFY CYBERSECURITY DEFENSES

The integration of emerging technologies promises substantial benefits, but can also increase vulnerability to cyberthreats. By fortifying cybersecurity defenses, agencies can confidently harness the power of emerging technologies, without compromising security. This involves adopting advanced threat detection tools, enhancing incident response capabilities, and implementing security by design principles in every technology project. Regular penetration testing, coupled with training programs to raise employee awareness of cyberthreats, will solidify defenses and reduce the risk of a breach.

4

FOCUS ON WORKFORCE DEVELOPMENT

Workforce implications such as training, reskilling, and upskilling need to be carefully considered as part of the strategic planning process. Investing in employee readiness will enable agencies to execute successful emerging technology implementations and a culture that embraces the opportunities derived from innovative technology capabilities.

5

CULTIVATE A CULTURE OF INNOVATION

Fear is an innovation-killer. But by nurturing a culture that celebrates curiosity, experimentation, and daring, fear can be replaced with excitement. By turning obstacles into opportunities, organizations can foster a thriving environment where new technologies are seen as allies, not threats.

6

STREAMLINE ACQUISITION AND PROCUREMENT PROCESSES

Acquiring new technologies needn't be a bureaucratic process. Agile processes operate in short cycles, focusing on proving out a concept first. Applying that same model to acquisition will allow agencies to bring in new technologies for short cycles of testing and failing fast to reduce cost, increase adoption, and meet mission needs.

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About GDIT

General Dynamics is a global aerospace and defense company that offers a broad portfolio of products and services in business aviation; ship construction and repair; land combat vehicles, weapons systems and munitions; and technology products and services. General Dynamics employs more than 100,000 people worldwide and generated \$39.4 billion in revenue in 2022.

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