



How will the power of emerging technology help reframe your future?

Find out more about emerging technology governance
ReframeYourFuture | ey.com/reframeyourfuture



The better the question.
The better the answer.
The better the world works.




Executive summary

State chief information officers (CIOs) are under increasing pressure to deliver a seamless, digital experience to citizens while providing key IT infrastructure support for state agencies. And they will likely be asked to do more with less as state governments face ongoing budget pressure, especially in light of revenue shortfalls related to the COVID-19 pandemic.

In addition, as emerging technologies such as artificial intelligence (AI), robotic process automation (RPA), augmented analytics, low code/no code, blockchain, and autonomous vehicles become more prevalent environments, state CIOs face the added challenge of trying to integrate them into their IT infrastructure in ways that align with their overarching digital transformation. Several state IT departments are following commonly accepted governance practices to minimize risk, lower costs and reduce exposure to cybersecurity risks.

The answer is mixed for other states according to the first NASCIO/EY survey on emerging technologies. While nearly half the states said that they either have an effective governance model in place or were developing one, the rest did not have a mechanism for monitoring the review, adoption and deployment of emerging technologies. In addition, nearly two-thirds did not have policies or procedures in place regarding the use of emerging technology within their organization. There is no one-size-fits-all approach to governance.

This creates a level of risk for many organizations, as well as a lost opportunity. In the survey we found that states that have a sound governance model for emerging technology are driving true innovation by aligning new technologies with the broader goals of their state's digital transformation. Conversely, states that lack effective governance models run the risk of higher costs from rogue IT deployments that fail to mesh with overall goals.



The definition of what constitutes emerging technology has changed significantly in just five years. In 2015, 53% of state governments were still exploring internet of things (IoT) and now that technology has largely entered the mainstream. The pandemic pushed emerging technology into mainstream and now AI, RPA and virtual assistants or chatbots are preparing to take center stage. In five years, emerging technologies such as augmented reality (AR)/virtual reality (VR), autonomous vehicles, blockchain and quantum computing could emerge while others cycle and enter the mainstream.

In this report, we will discuss survey results and detail how forward-looking state CIOs are advising their state governments on ways to integrate new technologies into the digital services they deliver to citizens. We will also focus on the other issues they must address in harnessing emerging technology as they seek to reframe the future of government as a digital enterprise.

Disruption can be a time of opportunity for public entities as well as multinational companies. State governments that build more resilient enterprises - and successfully optimize emerging technology - will be poised to move forward in the post-COVID-19 environment and reimagine their future and deliver higher levels of service to all citizens.

There's no one-size-fits-all approach to governance

State CIOs employ a variety of methods for determining where to allocate scarce resources for new IT deployment. It is the same discipline and process needed when deciding on approving new, emerging technology projects.

A state's procedure for adopting an emerging technology often depends on its IT operating model. Most states run a shared services model for other agencies offering networking, computing, storage and telecommunications services. In past years, as these operations aligned, states would enjoy synergy and cost savings while consolidating on common technologies. Now, these same benefits are being realized as states adopt cloud services and consider emerging technologies like edge computing, 5G and software defined networks.

States that follow enterprise IT organizations work directly with the business units to identify potential opportunities or use cases. In this case, they are often more directly aligned with digital workplace initiatives to embrace new advances like the recent use of chatbots in many state labor and workforce agencies.

Working with business units in the early stages encourages faster adoption as state agencies look for innovative new approaches to either cut costs or deliver digital services more efficiently. Ultimately, as an emerging technology enters the mainstream, this

reduces the risk in the state as a common group of approved enterprise vendors builds more synergy and leverages lower prices.

"It's challenging when you find out that people have moved something to the cloud without telling us," Georgia Chief Technology Officer Steve Nichols adds.

The key is to find ways to let those groups experiment with new technologies, but then rein them in before they make long-term commitments. The leeway to let business units experiment with emerging technology in advance of an enterprise solution can prove critical in establishing early buy-in for new technologies.

In the emerging technology survey, nearly half the states reported that they did not have a governance model in place to oversee emerging technology initiatives. Some 31% already had a model in place, while 20% were either considering or developing a governance model.

No matter where states were along the governance model continuum, many said they were moving forward with plans to address and deploy new emerging technology in response to citizen demands and taking steps to understand the implications.

In Texas, where they have a robust governance structure in place, the state is training procurement professionals to become more adept when they assess emerging technology so they can score



“

When we think of emerging technology, we think of it as an innovation function. Our business units show up with innovative ideas. They show up with something from a pilot project and it's brilliant and we need to jump on it and assist them.

Steve Nichols, CTO for state of Georgia

48%

of the states reported that they did not have a governance model in place to oversee emerging technology initiatives

competitive RFPs. For instance, many of the emerging technologies are more subscription based, which makes them very different than a traditional hardware purchase. Subscription models need to be counted as an operating expense, which means they are recurring expenses compared to a one-time capital expense.

Several states have implemented detailed plans to oversee IT purchases and by extension emerging technology. Ohio, for instance, has established a technology review panel that encompasses 32 boards

that focus on different lines of business such as health and human services. This tech board makes decisions for the entire enterprise – from emerging tech, tele-platform options, VoIP and cybersecurity, among other core activities. They leverage this group as a think tank, giving them additional headlights into what's happening on the ground.

Utah follows a similar approach, relying on an architecture review board that meets regularly with all IT directors in the state and voting members. They assess the challenges of deploying new technology and then conduct a security review. Utah CIO Mike Hussey adds that this has proven to be a “good opportunity to vet these ideas and explore opportunities on the ground.”

The review boards help to create synergies in enterprise IT, which provides relief to an already stretched state budget by reducing one-off expenditures and ultimately reducing shadow IT expenditures and the hidden costs that often result from legacy/outdated services.

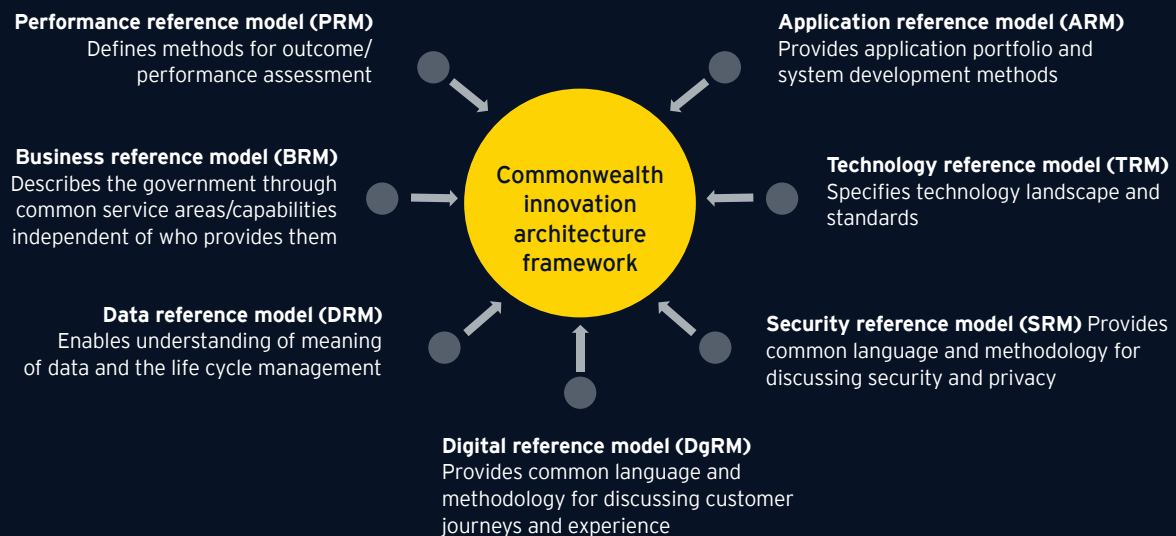
PA enterprise architect model

“

In 2017 the Commonwealth of Pennsylvania adopted a shared services model to balance the demand for resources, people, and money and establish a clear set of guiding principles for better decision making. With the FEAF (Federal Enterprise Architecture Framework) as the guiding industry standard, they use a customized version to look for all demand for IT resources.

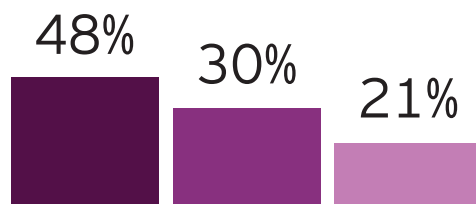
John MacMillan, Deputy Secretary for Information Technology and CIO, Commonwealth of Pennsylvania

Commonwealth innovation architecture framework



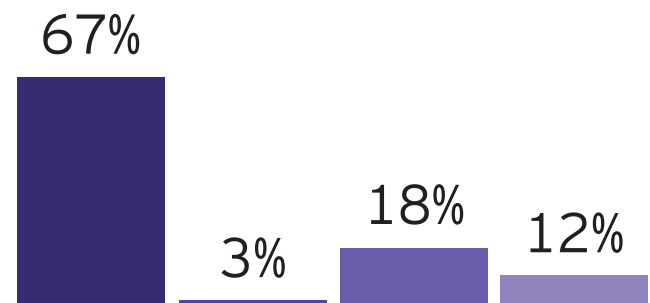


Does your state have a formal governance structure for emerging technologies?



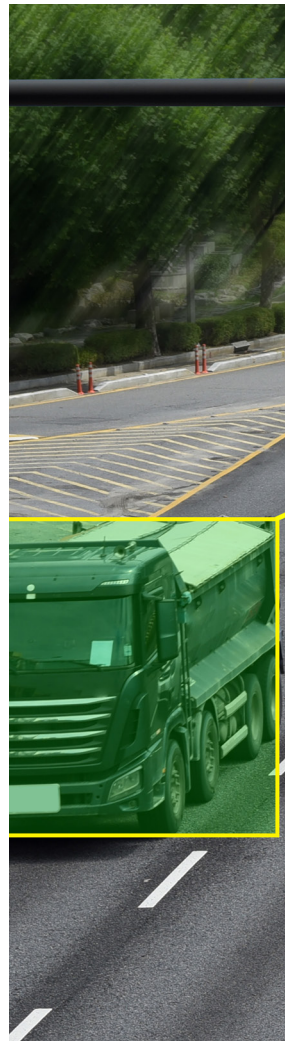
No
Yes
Considering/in development

Does your state or agency have policies/laws regarding the use of emerging technology?



No
Don't know
In development
Yes

Pandemic pushed emerging technology into mainstream

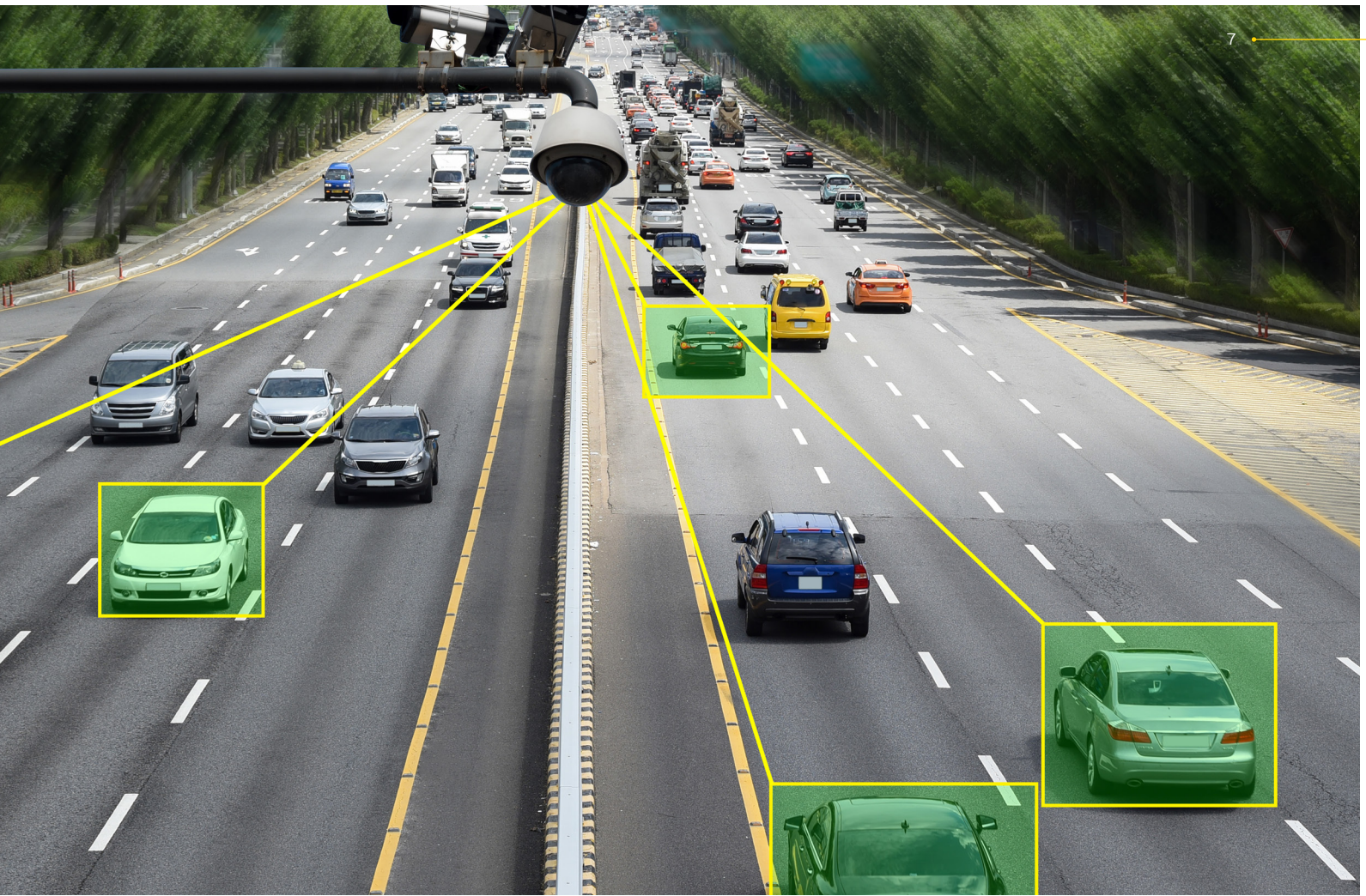


CIOs cited the use of chatbots and virtual assistants as the most likely emerging technology they would adopt.

Just as the lockdowns related to the COVID-19 pandemic accelerated the digital transformation of many private companies, the pandemic also forced many state governments to rapidly deploy IT solutions that would address the need to provide online access to state services.

Until the pandemic, for example, there was a limited need for some states to rapidly adopt chatbots. But when many states closed their physical offices, citizens were forced to go online and make phone calls to conduct a wide range of business.

In Georgia, for example, the Department of Health was swamped with citizen phone calls. This prompted the director of the health department to ask IT to come up with a solution as fast as possible. They talked to the vendor on Friday, had a testing environment in place the following Monday and then were in production with two agencies the following Monday.



This experience was replicated across a few states as states automated more services in a drive to reduce foot traffic. CIOs across the board cited the use of chatbots and virtual assistants as the most likely emerging technologies they would adopt over the next two years. AI and RPA were second on the list, even though they will undoubtedly play a critical role in driving more effective use of chatbots.

Interestingly, IoT now ranked fifth on the list of emerging technologies. That doesn't reflect a lack of interest, but rather the reality that this emerging technology has entered the mainstream. Many states have deployed sensors in smart buildings, traffic intersections and along roads.

In Utah, for example, the state highway department recently completed the first phase of a five-year project in which it installed roadside devices along accident-prone corridors on the state's highway system. The devices collect data from fleet vehicles outfitted with radios that report metrics like

windshield wiper speeds, tire traction levels and acceleration and braking rates. The data from these devices alerts the department to traffic emergencies and to emerging weather conditions.

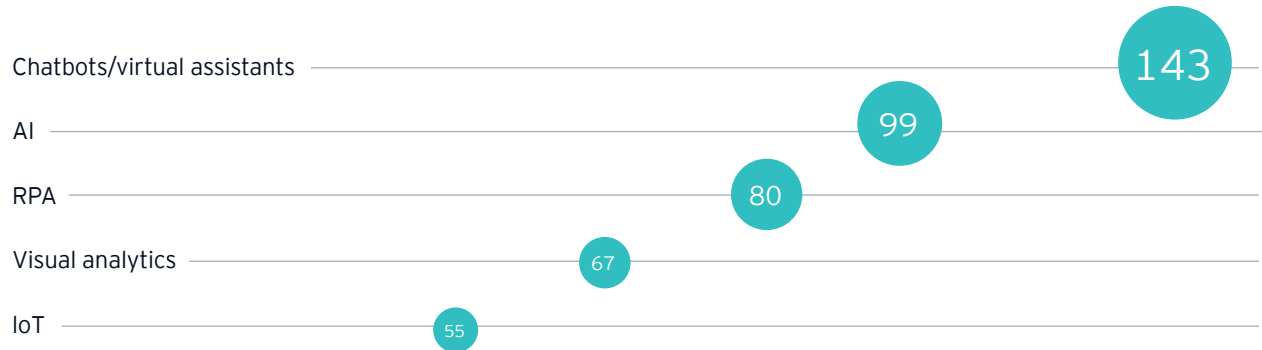
Blockchain is another emerging technology that has yet to find a business case for many state CIOs. However, the pandemic has demonstrated to state CIOs that blockchain could have a more immediate role.

In Utah, the state may consider blockchain as an option for tracking vehicle titles to reduce traffic into DMV lobbies. When they surveyed people waiting in drive-through lines, many said they were waiting for vehicle titles. By using blockchain, they could track the transfer of vehicle titles online, reducing the need for people to wait on-premise for this relatively simple transaction.

Rhode Island is another state that is working on a proof of concept to determine the long-term viability of blockchain for certain state operations.

Survey results

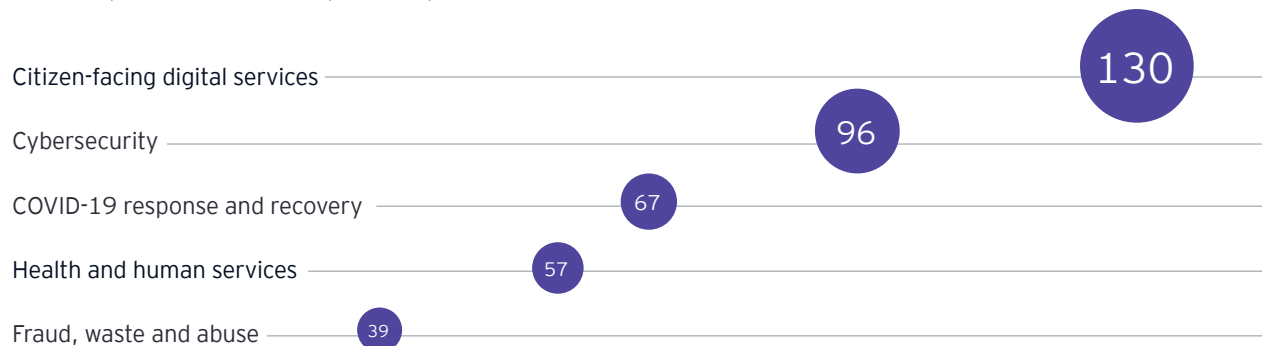
Rank the likeliness of your state using the following emerging technologies over the next two years.
Top answers with scores:



How would you describe your state's adoption of emerging technology? (Select all that apply)
Numbers refer to states:



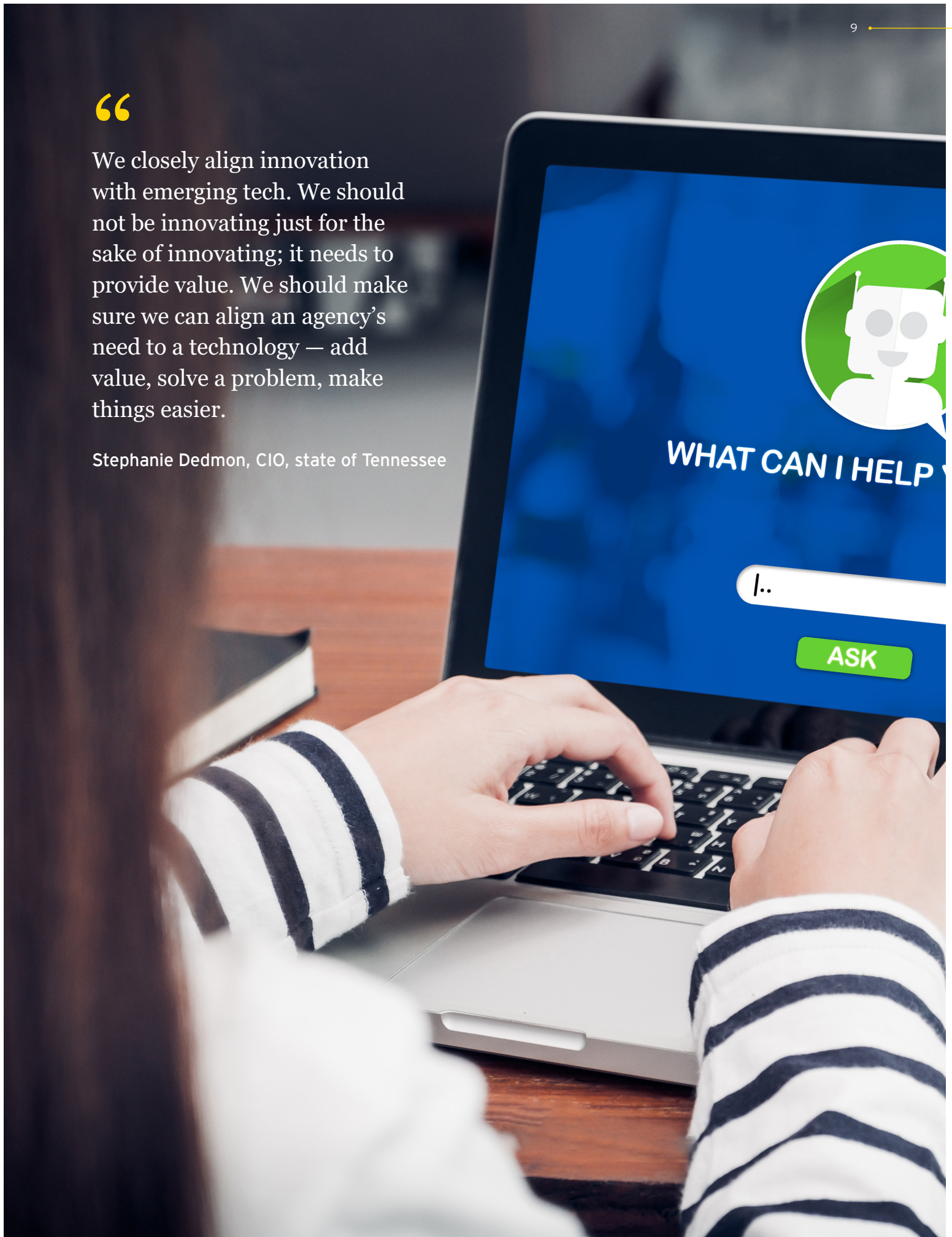
Where will emerging technology make the most measurable improvement and impact in your state? (Rank top 5, one is most impact). Top answers with scores:



“

We closely align innovation with emerging tech. We should not be innovating just for the sake of innovating; it needs to provide value. We should make sure we can align an agency's need to a technology — add value, solve a problem, make things easier.

Stephanie Dedmon, CIO, state of Tennessee

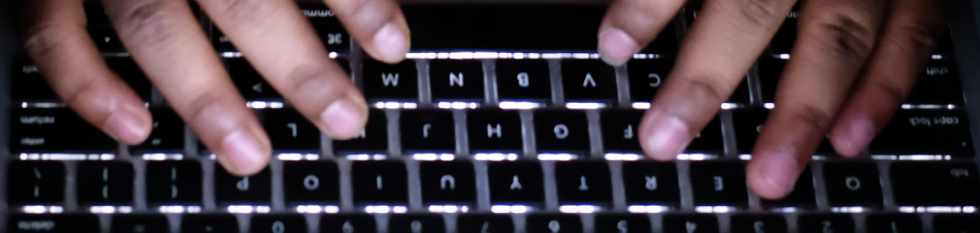


Barriers to adoption

“

The budget challenge is consuming a lot of our thoughts and emerging tech can help, if we can justify it. We are looking at cost cutting and cost optimization. We need to be looking at innovation to see how we can make things more efficient and get an ROI quickly.

John Hoffman, Interim State CIO for Texas
Department of Information Resources



Not surprisingly budgetary concerns ranked high as a significant barrier to adoption. This will not get easier in the years ahead as states try to recoup revenue shortfalls caused by the pandemic in addition to ongoing cost pressure. Other issues ranked as obstacles include aligning use cases to technology, legacy IT infrastructure, a lack of necessary staff skills and organizational silos.

Still, CIOs also listed a lack of skills as another area of concern. This is made even more acute by the “talent tsunami.” The aging workforce in state governments has and will create significant challenges for IT organizations over the next several years. Many states report that more than 20% of their workforce is eligible for retirement in the next several years and many of these older employees are the ones most familiar with the infrastructure on which many systems are built.

However, adopting emerging technology may help to attract a new workforce, particularly millennials. As Ervan Rodgers, CIO of Ohio said, “People don’t come to work for the state to get rich, they come to make a difference.” Working with emerging technology and helping to improve the citizen experience may appeal to many millennials.

Given their concern about the lack of necessary staff skills as an issue, it might seem surprising that CIOs expressed confidence in their ability to move forward and manage risk in deploying emerging technology. A range of factors could account for this, including

Many states report that 20% of their workforce is eligible for retirement in the next several years.

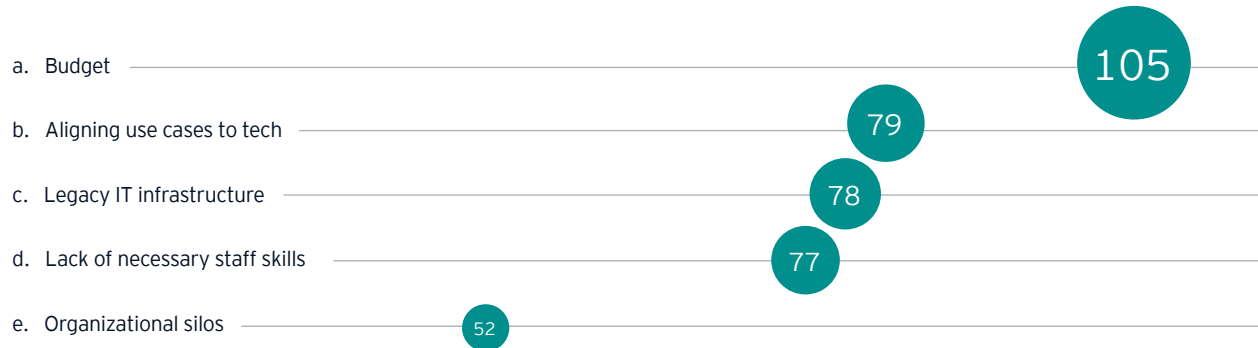
the fact that many enterprise CIOs are confident in their ability to manage new projects.

Of course, this is not to say that deploying emerging technology is an easy task. For example, when the Commonwealth of Pennsylvania moved to deploy a virtual voice assistant, they realized that it would take much longer than they expected. “AI has to be taught and sustained,” says Commonwealth of Pennsylvania CIO John MacMillan. “It took several weeks to teach the system answers to 15 FAQs. Not all questions are worded the same way, for example. A question, whether it’s five or 15 words, needs to have one answer.”

The issue of cybersecurity also continues to be the top priority of state CIOs. Organizations that deploy a technology from a new vendor may introduce security risks unless it’s been properly vetted. All new emerging technologies need to be considered carefully as organizations deploy them as part of their overall digital transformation.

Survey results

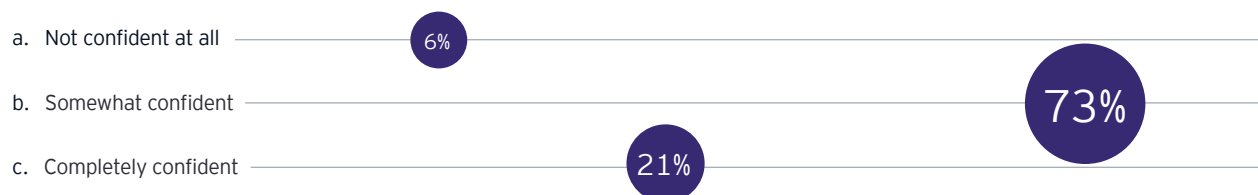
What are the most significant challenges or barriers to adoption? (Rank the top 5, 1 most challenging). Top answers with scores:



What are your key concerns with the adoption of emerging technology (Rank the top 5, 1 is key concern). Top answers with scores:



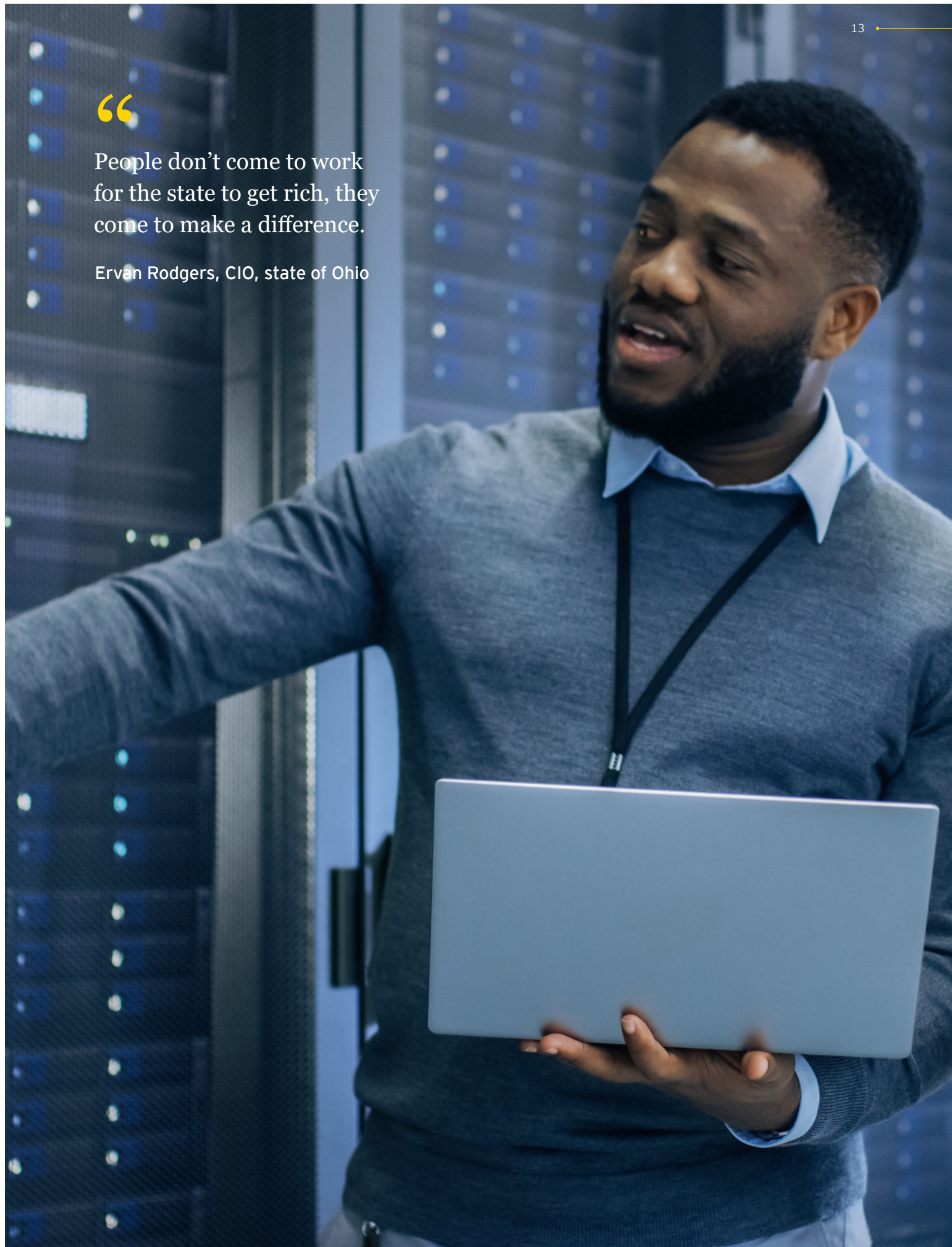
What is your level of confidence to engage emerging technology projects and manage risk?



“

People don't come to work
for the state to get rich, they
come to make a difference.

Ervan Rodgers, CIO, state of Ohio



The way forward: CIO as broker of IT services

Across the board, we found that most CIOs are eager to embrace emerging technology, provided they can align the technology to projects that advance the state's overarching digital transformation. In many ways, emerging technologies represent the natural evolution of the state CIO's role from caretaker of the IT infrastructure to an overall broker of services, in this case one who takes a holistic approach to managing the state's digital transformation.

That's not to say that CIOs no longer need to care about keeping the lights on and ensure that core IT functions such as storage and network operations, among others, run smoothly. As CIOs integrate emerging technology into their organizations, they will need to consider a number of actions that will optimize their digital transformation and minimize risk to their organization.

- ▶ **Adopt emerging technology by design, not by default.** Be intentional with enterprise decision-making by hosting a cross-agency forum for information sharing and discussions on new technology developments.
- ▶ **Include emerging technology in the enterprise architecture.** Document the state's intended direction in each domain section of the enterprise architecture with examples of trending emerging technology.
- ▶ **Fund emerging technology through an innovation fund.** Consider recasting emerging technology acquisition as an operating expense rather than a

capital expenditure. Allocate a small percentage of the charge-back budget to an innovation fund for emerging technology. Also, seek a general fund appropriation to create a grant funding model where agencies can apply for assistance to pilot emerging technology without the financial risk.

- ▶ **Seek procurement waivers for emerging technology.** Working with state procurement, develop language to enable research, demonstrations and pilots without the requirement for competitive bids during proof of concept or pilot projects to document requirements for future competitive RFPs.
- ▶ **Organize vendor demonstrations of emerging technology.** Team with vendor partners to establish an innovation center to showcase how emerging technologies can solve agency business challenges and modernize digital services.
- ▶ **Facilitate emerging technology cross-agency pilot projects.** Look across common business functions and encourage information sharing to standardize on common emerging technology platforms and capabilities.
- ▶ **Avoid the top-down approach to emerging technology.** Emerging technologies enjoy greater acceptance and success when front-line departments identify business needs and then work with enterprise IT to pilot and deploy the solutions within the enterprise architecture.

Emerging technologies represent the natural evolution of the state CIO's role from caretaker to an overall broker of services.

The need to deliver more innovative services with emerging technology will become increasingly important as citizens seek greater access to digital services. As emerging technologies enter the mainstream, state CIOs will be pressed to incorporate the technology into their enterprise architecture, leverage new ecosystem partnerships and deliver innovative solutions that differentiate the citizen experience while creating a leading class, commercial like, citizen experience. This is often easier to

accomplish in unified or federated state IT models as compared to the states that operate with one that is decentralized.

This expansion of scope requires sharpening the focus on emerging technology solutions that can be deployed rapidly to address new agency or citizen requirements and innovation opportunities. They will also need to continue developing a change competency within their organization and create a learning environment that will focus on experimenting, exploring and collaboration.

This will allow the team to fail quickly and establish lessons learned, a critical step in deploying new emerging technology. In this rapidly changing environment, well-established governance measures are critical to minimize risk, protect privacy and establish a baseline moving forward that will harness emerging technologies that can help the state elevate the services delivered to citizens and reframe its future as a digital enterprise.

A close-up photograph of a hand holding a smartphone. The background is dark with out-of-focus, colorful bokeh lights in shades of orange, red, and blue, creating a modern, tech-oriented aesthetic.

“

There's no way government can NOT leverage emerging technology for better serving our residents. Residents should be able to do everything from home. The scalability and sustainability of the solutions we put in is important. I like to take an approach and say, what's my longer term vision and what is my short/medium term strategy including immediate steps, to realize the vision.

Bijay Kumar, Chief Digital Officer and Chief Information Officer, state of Rhode Island

Contributions

Sincere appreciation to all the state CIOs and IT department staff that took the time to complete the NASCIO/EY Emerging technology survey. In particular, we want to thank those that we interviewed for additional insights on emerging technology within their state. Thank you for your service and dedication to the mission of helping your state provide essential services to their citizens.



Calvin Rhodes, Executive Director and Chief Information Officer, State of Georgia



Stephanie Dedmon, Chief Information Officer, State of Tennessee



Steve Nichols, Chief Technology Officer, State of Georgia



John Hoffman, Chief Technology Officer, Interim State Chief Information Officer, Texas Department of Information Resources



Curtis Wood, Secretary, Executive Office of Technology Services and Security, Commonwealth of Massachusetts



Mike Hussey, Chief Information Officer, State of Utah



Ervan Rodgers, Chief Information Officer for the State of Ohio and Assistant Department of Administrative Services Director



Dave Fletcher, Chief Technology Officer, State of Utah



John MacMillan, Deputy Secretary for Information Technology and Chief Information Officer, Commonwealth of Pennsylvania



Terrence Woods, Chief Information Officer, State of Oregon



Bijay Kumar, Chief Information Officer and Chief Digital Officer, State of Rhode Island



Amy Hille Glasscock, Senior Policy Analyst, National Association of State Chief Information Officers

“

Emerging technology has great potential. We have recently leveraged chatbots and several AI products in partnership with our vendor community and agencies in support of our business and IT operations. I think that we are mature enough as an organization that we can start dedicating some resources to emerging technology.

Curtis Wood, Cabinet Secretary, Chief Information Officer, Executive Office of Technology Services and Security, Commonwealth of Massachusetts

“

Having the enterprise IT governance committee has really allowed us to make sure folks are moving architecturally in the direction we want them to go. It helps us see things that may be duplicative in nature and lets us circle back and suggest that there doesn't need to be two different platforms or efforts.

Terrence Woods, Chief Information Officer, State of Oregon

About NASCIO

Founded in 1969, the National Association of State Chief Information Officers (NASCIO) represents state chief information officers (CIOs) and information technology (IT) executives and managers from the states, territories and District of Columbia. NASCIO's mission is to foster government excellence through quality business practices, information management and technology policy. NASCIO provides state CIOs and state members with products and services designed to support the challenging role of the state CIO, stimulate the exchange of information and promote the adoption of IT best practices and innovations. From national conferences to peer networking, research and publications, briefings and government affairs, NASCIO is the premier network and resource for state CIOs. For more information, visit www.NASCIO.org

Password...

Contact us



Chris Estes
US State & Local Technology
Leader, Ernst & Young LLP
chris.c.estes@ey.com

EY | Assurance | Tax | Strategy and Transactions | Consulting

About EY

EY is a global leader in assurance, tax, strategy, transaction and consulting services. The insights and quality services we deliver help build trust and confidence in the capital markets and in economies the world over. We develop outstanding leaders who team to deliver on our promises to all of our stakeholders. In so doing, we play a critical role in building a better working world for our people, for our clients and for our communities.

EY refers to the global organization, and may refer to one or more, of the member firms of Ernst & Young Global Limited, each of which is a separate legal entity. Ernst & Young Global Limited, a UK company limited by guarantee, does not provide services to clients. Information about how EY collects and uses personal data and a description of the rights individuals have under data protection legislation are available via ey.com/privacy. For more information about our organization, please visit ey.com.

Ernst & Young LLP is a client-serving member firm of Ernst & Young Global Limited operating in the US.

© 2020 Ernst & Young LLP.
All Rights Reserved.

US SCORE no. 10650-201US
2008-3576099
ED None

This material has been prepared for general informational purposes only and is not intended to be relied upon as accounting, tax, or other professional advice. Please refer to your advisors for specific advice.

ey.com