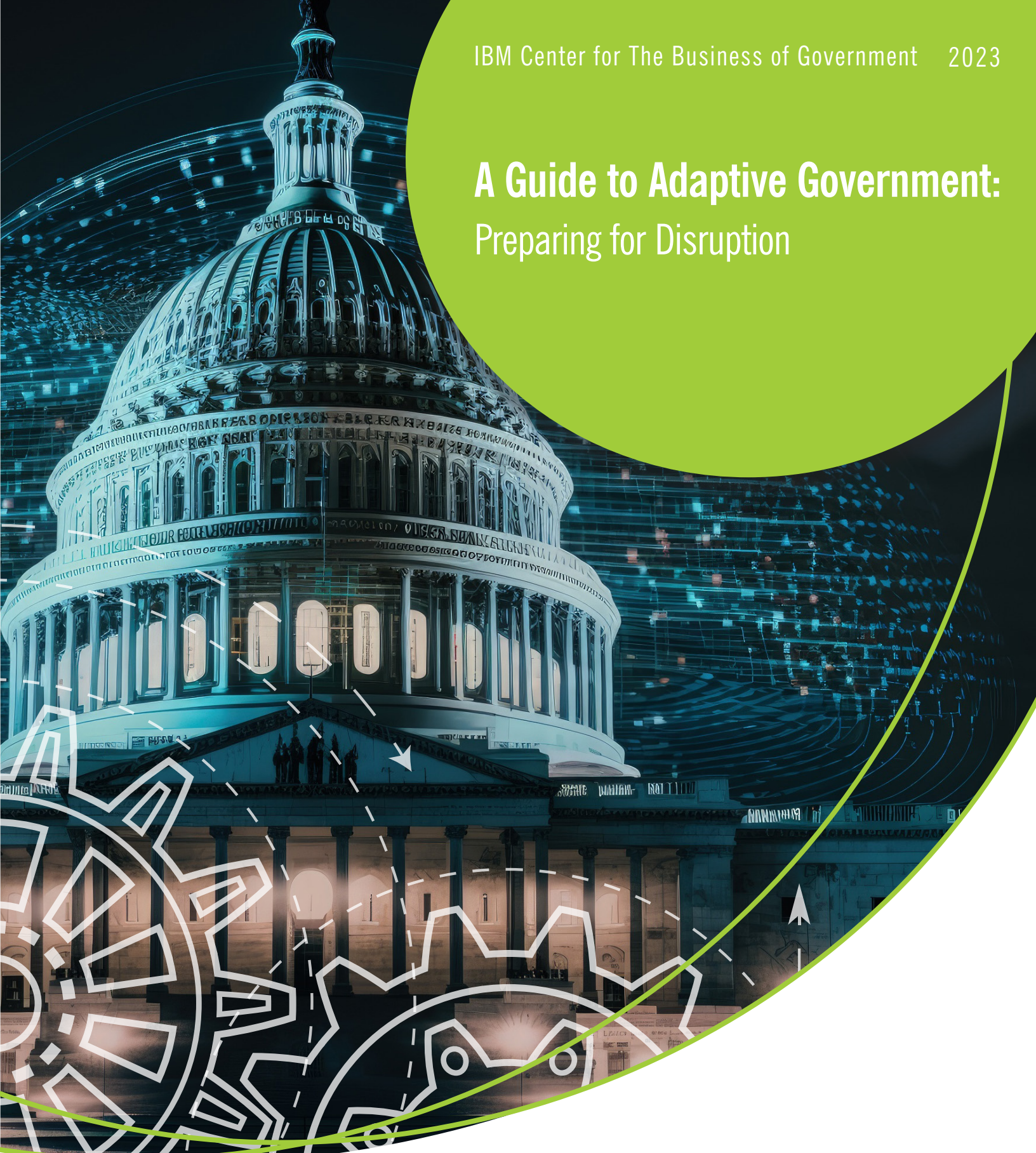


A Guide to Adaptive Government: Preparing for Disruption



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**IBM Center for
The Business
of Government**

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FOREWORD

On behalf of the IBM Center for The Business of Government, we are pleased to present *A Guide to Adaptive Government: Preparing for Disruption* by Nicholas Evans.

With disruption now the norm rather than the exception, governments need to rethink business as usual and prepare for business as disrupted. Government executives and managers should plan for continuous disruption and for how their agencies and departments will operate under continuous turbulence and change. In 2022 alone, the world witnessed war in Ukraine, the continuing effects of the COVID-19 pandemic, and natural disasters such as Hurricane Ian—not to mention energy scarcity, supply chain shortages, the start of a global recession, record highs for inflation, and rising interest rates.

Traditional business continuity and disaster recovery playbooks and many other such earlier approaches—born when disruption was the exception—are no longer sufficient. Rather than operating “business as usual,” government agencies and departments now must plan and operate for “business as disrupted.” One other major pivot point: when these disruptions happen, such as COVID, they bring an opportunity to drive a long awaited or postponed transformation. It is about leveraging that opportunity for change and not simply returning to the status quo. The impact to supply chains during the COVID-19 pandemic and recovery illustrates this insight.¹

According to author Nick Evans, governments therefore need to not only transform their business models, processes, and services. They also need to create an “adaptive government” at their core, such that support for change and intrinsic agility is engineered into current and future operations. The author describes adaptive government as having the ability to respond rapidly to change—including challenges and opportunities—with agility across both digital and physical aspects of its mission and operating model to continuously maximize stakeholder benefit. This planning requires not a once per year reset or recalibration, and not just building a digitally transformed organization. Rather, it requires an adaptive government, with intrinsic agility encoded in its digital operating model and digital processes for responding to continuous disruption in real time.

Evans recognizes the importance of pursuing agile principles as foundational in realizing the vision of adaptive government described in this report. Agile government principles serve as a powerful foundation for building “intrinsic agility,” since they encourage key cultural, behavioral, and growth mindset approaches to embed agility and adaptability into organizational norms and processes. Many of the insights, guidance, and recommendations offered in this report complement work pursued by the Agile Government Center (AGC), led by the National Academy of Public Administration in collaboration with our Center, and spearheaded by NAPA Fellow and Center Executive Fellow Ed DeSeve.



DANIEL J. CHENOK



MARK D. FISK

1. <https://www.businessofgovernment.org/blog/supply-chain-resiliency-within-federal-government-%e2%80%93-enabling-covid-19-recovery>.



This report illustrates the strategic significance of adaptability to government organizations today. The author offers new strategies, techniques, and tools to accelerate digital transformation, and better position government agencies to respond to the next wave of both opportunities and disruptive threats—similar to what our Center, NAPA, and partner organizations refer to as “future shocks.” Adaptability as a core competency can support both innovation and risk management, helping governments to optimize for ever-changing mission needs and ambient conditions. Adaptability represents a powerful enabler for modern government and enterprise organizations.

We hope that this report helps government leaders, academic experts, and other stakeholders to infuse adaptive thinking throughout the public sector, leading to more effective operations, better outcomes, and improved performance in a world where the only constant seems to be the inevitability of change and disruption.

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EXECUTIVE SUMMARY

Now the rule rather than the exception, disruption—both digital and physical—is a continuous force affecting governments, businesses, and society on a daily basis due to ever-increasing waves of new technologies, climate change, societal upheaval, pandemics, and natural disasters.

This report provides government executives and managers with new strategies, techniques, and tools to accelerate their digital transformation and prepare for the future in light of continuous disruption.

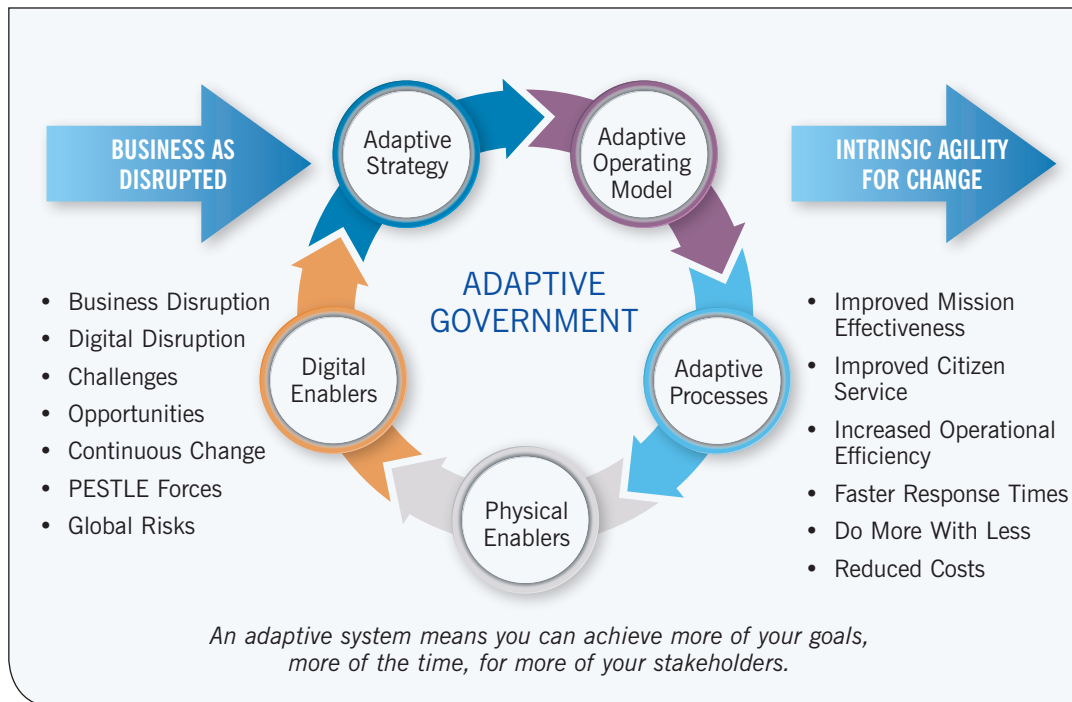
Rather than operating “**business as usual**,” government agencies and departments now have to plan and operate for “**business as disrupted**.” Governments therefore need to not only transform their business models, processes, and services, but to create an **adaptive government**, like an **adaptive enterprise**, at their core.

An “adaptive government” is able to rapidly respond to change—including challenges and opportunities—with intrinsic agility across both digital and physical aspects of its mission and operating model to continuously maximize its benefit for stakeholders.

Much like the U.S. military’s defense readiness condition (DEFCON) system—which prescribes five levels of readiness in terms of states of alert—this **intrinsic ability** to change makes it far easier, and faster, to react to dynamically changing and unpredictable conditions.

As societal goals and corresponding government services evolve over time, intrinsic agility, built into the way governments operate and deliver services to citizens, will enable even faster response to the changing needs of the population (see Figure 1).

Figure 1 – Adaptive Government



Sample modern enablers of intrinsic agility include:

- **Platform business models** allow permission-less innovation where new services can be continuously added to the platform. Much like the Apple App Store, these technology-enabled platforms allow others to innovate on top.
- **Modern techniques**, such as Agile and DevOps, allow rapid iteration in terms of experimenting with new features and then quickly placing them into production driving incremental value and business results versus a delayed “Big Bang” approach to transformative capability
- **Operating models**, like the U.S. military’s DEFCON system which quickly respond to change, with predefined “go-to” operating conditions, enable government organizations to continuously maximize uptime and benefit for citizens.
- **Gig economy labor models**, which allow for human capital to be dynamically and flexibly sourced as needed, can complement the workforce.
- **Approaches that enable physical adaptability** include modular design and construction, multifunctional design, moveable systems, robotics, and drones.
- **Dynamic technological frameworks**, such as blockchain and smart contracts, allow for business contracts to be composed and executed on the fly.
- **Emerging technologies**, such as cloud computing, artificial intelligence and machine learning, robotic process automation, and software-defined networks, provide highly flexible services with the ability to scale up and down as needed as well as advanced analytics, intelligent automation, and dynamic provisioning.

By embracing strategic enablers such as platform business models, combinations of emerging and disruptive technology, and digital services, all underpinned by the latest techniques in innovation management, government executives and managers can accelerate digital transformation while building a new, more agile platform and foundation for the future.

Digital approaches, including strategic technology trends, will be key ingredients as government executives and managers prepare future visions and purposefully architect and design operating models and portfolios of citizen services. This can support common goals such as economic growth, quality of life, health and wellness, diversity, equity and inclusion, safety and security, mobility, efficiency and resilience, and sustainability.

When applied in combination, these technologies will create a digital infrastructure enabling the adaptability needed for government agencies and departments, as well as cities and communities, to respond to continuous waves of digital and physical disruption.

By designing for intrinsic agility, leaders will have a strategic guide for the next wave of digital transformation. This will help agencies develop and execute digital strategies using advanced approaches to innovation and adapting disruptive technologies such that the sum is far greater than the parts. Of course, the agile movement itself serves as a powerful foundation for building intrinsic agility, since agile encourages cultural, behavioral, and growth mindset approaches to embed adaptability into the culture and day-to-day processes of the organization.

Agile Government Principles as a Foundation for Adaptability

The tenets of agile have moved beyond their origins in technology—they are now being used to reshape non-tech business processes and to redefine how governments operate. In the recent IBM Center report *The Road to Agile Government*,² author Ed DeSeve illustrates how the agile principles so familiar to software development have been used to shape and inform ten principles of agile government.

Agile government is defined as a mission-centric, customer-focused, communication- and collaboration-enabled, and continually provides value to customers and the public. Agile government involves public and customer participation with small teams that are empowered by leaders to take rapid action to deliver timely, transparent results. The agile principles point to specific steps government leaders and stakeholders can take to achieve the benefits of agile government.

Similarly, the Boston Consulting Group notes that the transition to broader applications of agile techniques in government follows a path like that of its software antecedent:

*In short, agile has arrived in the public sector. To keep making progress in adopting agile as its primary way of working, agencies should move beyond practices such as the “daily stand-up” status check-ins as well as put in place enablers such as senior leadership support, new funding models, and training. Patience and flexibility are key. Agile is a change in mindset, and changing mindsets isn’t easy. There is also no cookie-cutter approach to adopting agile. In rolling out agile, organizations need to be experimental and responsive to what is working and what isn’t. The longer that an organization nurtures agile, the bigger the benefits.*³

In a follow-up report, *The Future of Agile Government*,⁴ DeSeve shows how agile principles can apply to the development and implementation of government policies, regulations, and programs. DeSeve also introduces the “Integrated Agile Framework for Action,” to guide government leaders and stakeholders in implementing agile strategies in their work to provide services to the public in a way that fosters public trust.

2. DeSeve, Edward G., *The Road to Agile Government—Driving Change to Achieve Success*, IBM Center for The Business of Government, 2020, <https://bit.ly/3XVkiVl>.

3. <https://www.bcg.com/en-us/publications/2020/getting-to-agile-at-scale-public-sector>.

4. DeSeve, Edward G., *The Future of Agile Government*, IBM Center for The Business of Government, 2022, <https://bit.ly/3EwkMRO>.



This report complements the existing IBM Center's work advancing agile principles in government by providing practical insights and actionable recommendations to help improve the operation and management of government specifically related to accelerating digital transformation, to prepare for "business as disrupted." Not just building a digitally transformed organization, but an adaptive government with intrinsic agility encoded in its digital operating model and digital processes for responding to continuous disruption.

With this approach, government departments and agencies can prepare for what's next, react more quickly, and achieve far more with few resources.

Disruption— Now the Rule Rather Than the Exception



It's Time to Discard the New Normal (as well as the Old)

During the COVID-19 pandemic, we heard a lot of talk about the “new normal.” The sense was that things had changed profoundly and that the new normal—whatever that was going to be—was going to be vastly different from the old normal. But even in the midst of the pandemic, as well as coming out of the pandemic, the focus was on restoring or resetting to some kind of “normal”—a new normal, not an old normal—but a normal just the same.⁵

As human beings, we like normality because it gives us a sense of continuity, certainty, and dependability, but as the saying goes, “the only constant is change.” In today’s world, even the nature of change itself is changing and the techniques we relied upon as leaders and managers over the past ten years, will not deliver the same results over the next ten years as we head towards 2030.

Our Hypothesis: Disruption is now the rule rather than the exception.

One of the key questions we address in this research is whether planning for any kind of “normal”—new or old—is sufficient in today’s environment. It may be necessary, but is it sufficient? Our hypothesis is that disruption is now the rule rather than the exception, so government executives and managers need new strategies, techniques, and tools to accelerate their digital transformation and prepare for the future in light of continuous disruption.

Government executives and managers need to plan for this continuous disruption and for how their agencies and departments will operate under continuous turbulence and change. This planning requires not a once per decade reset or recalibration, or even once per year, and not just building a digitally transformed organization, but one which is an adaptive government with intrinsic agility encoded in its digital operating model and digital processes so it can respond to continuous disruption in real time.



Example: Achieving an adaptive government isn’t necessarily about maximizing absolute values, such as the absolute number of hospital beds available in New York or elsewhere, but more being able to respond to change swiftly and dynamically and to support changing demands in real time.

This was the case when the U.S. Navy’s hospital ship came to New York Pier 90 and the Army Corps of Engineers converted the Javits Center to a field hospital to alleviate the burden on local hospitals during the COVID-19 pandemic. The more these types of responses can be predefined or preconfigured, and even embedded into the way of doing business or serving citizens—the faster cities, for example, can react and can optimize the business goals and corresponding uptime and metrics they care about.

5. Changes made in response to the pandemic have continued to drive the direction of agencies (i.e., they used the work done to further broaden the transformation that had been envisioned) but often that was restricted to existing programs, platforms, capabilities that were in place or could be easily expanded vs. truly transformative approaches.

“Business as Disrupted” Versus “Business as Usual”

For decades, businesses and governments have run upon the assumption of stable operating conditions. Business as usual (BAU) is defined as the “normal execution of standard functional operations within an organization” and the maintenance of BAU is the primary goal of business continuity planning.

In fact, even most digital transformation initiatives assume BAU as well. They aim to digitize steady-state manual processes to make them better, faster, and cheaper to operate. By digitizing and automating in this manner, Gartner estimates that most enterprise organizations will be able to achieve up to 30 percent cost savings by 2025 through hyperautomation. This hyperautomation is essentially the application of all automation enablers—in the form of multiple technologies, tools, or platforms such as scripts, bots, robotic process automation (RPA), and even artificial intelligence (AI) and machine learning (ML)—across all enterprise operations.

Gartner’s Definition of Hyperautomation⁶

Hyperautomation is a business-driven, disciplined approach that organizations use to rapidly identify, vet, and automate as many business and IT processes as possible. Hyperautomation involves the orchestrated use of multiple technologies, tools, or platforms, including:

- Artificial intelligence (AI)
- Machine learning
- Event-driven software architecture
- Robotic process automation (RPA)
- Business process management (BPM) and intelligent business process management suites (iBPMS)
- Integration platform as a service (iPaaS)
- Low-code/no-code tools
- Packaged software
- Other types of decision, process, and task automation tools

Digitizing and automating enterprise operations is a great way to optimize business as usual and make it as efficient as possible as part of the organization’s digital transformation—but is it sufficient?

Even when processes are redesigned or reengineered, they are still often redesigned and reimagined while thinking of the “steady state.” This approach leaves many questions remaining:

- How well will these new processes support dynamic changes to business rules or the impacts from various forms of disruption?
- What cost savings, efficiencies or revenues are lost if the digitally transformed processes operate throughout the duration of any disruption assuming business as usual?

6. Gartner.com, Gartner Glossary, <https://www.gartner.com/en/information-technology/glossary/hyperautomation>.

- When faced with disruption, will the digitally-transformed organization be able to adapt and continually maximize business operations—looking for the optimal, most workable solution and operating parameters in real time—or will it simply shut down until a new solution is found?
- What is the life expectancy of these digitally transformed processes before they need to be transformed again?

Due to the increasing waves of technological, social and environment change, disruption—both digital and physical—is now a continuous force affecting governments, businesses, and society.



Example: When the winter storm hit Texas in February 2021, it crippled the power grid for days and left millions without power. When state regulators later met to develop guidelines to prepare the grid for more extreme weather, one of the challenges was exactly which extremes to plan for. Simply looking at old historical data was not going to be sufficient to support future planning for the unknown and even more extremes in the weather.⁷



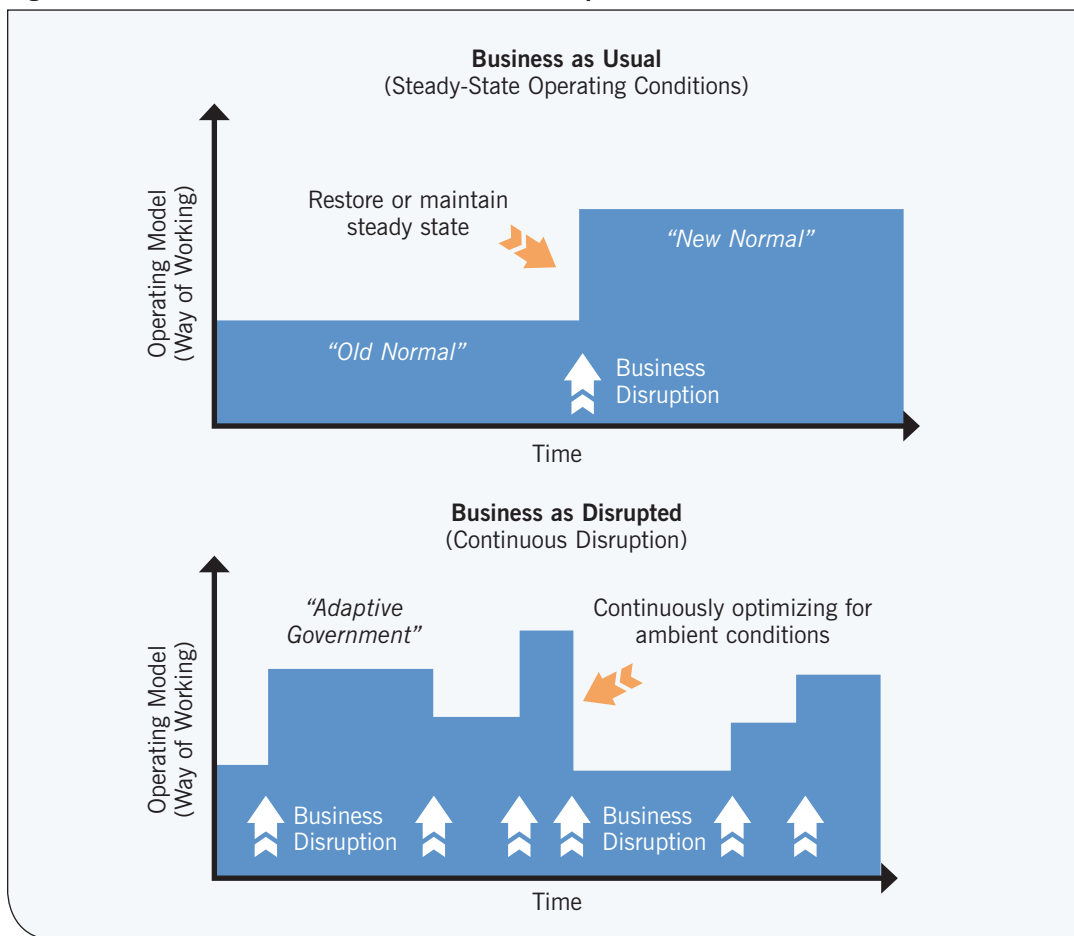
A digital government or enterprise only gets an organization halfway; an adaptive government or enterprise is the real endgame.



When pursuing future initiatives, whether we label them as “digital transformation” projects or not, we need to consider all the disruptive forces and events that may arise and incorporate not only support for these extremes in operating conditions, but also the intrinsic agility to be able to respond to these disruptions in as close to real time as possible. A digital government or enterprise only gets an organization halfway, an adaptive government or enterprise is the real end game (see Figure 2). Doing this rests on leveraging an ecosystem/network approach by asking: what information do I need? how do I trust it? and how is it shared? Then after posing and answering such questions, the next step is taking that insight and driving value to address the disruption. It is important to pivot off an existing capability versus building something new in the middle of a crisis.

7. Texas Tribune, Texas regulators want to prepare the state’s electricity grid for extreme weather. But that’s a moving target in a warming world, <https://www.texastribune.org/2021/08/16/texas-electricity-grid-extreme-weather-preparation/>.

Figure 2—Business as Usual vs. Business as Disrupted



The Rising Costs and Frequency of Disruption

Our earlier hypothesis stated that disruption is becoming more the rule rather than the exception. A skeptic might ask, “Is this really true or has disruption always been around and nothing has really changed?” To answer this question, let’s explore both the rising costs and frequency of disruption across a number of aspects ranging from technological change to environmental change, to societal upheaval, to pandemics, and natural disasters.

The overall costs of disruption are often factored in the millions, billions, or even trillions of dollars per year as shown by these examples from various recent “disruptions”:

- **Climate Change**—Deloitte’s analysis shows that insufficient action on climate change could cost the U.S. economy \$14.5 trillion in the next 50 years.⁸
- **Natural Disasters**—Hurricane Katrina cost \$250 billion in estimated damage and economic impact in 2005, displacing 770,000 residents and damaging 19 percent of U.S. oil production.⁹
- **Pandemics**—By October 2020, response to the COVID-19 pandemic had already cost \$11 trillion, with a future loss of \$10 trillion in earnings according to the Global Preparedness

8. Deloitte, Deloitte Report: Inaction on Climate Change Could Cost the U.S. Economy \$14.5 Trillion by 2070, <https://www2.deloitte.com/us/en/pages/about-deloitte/articles/press-releases/deloitte-report-inaction-on-climate-change-could-cost-the-us-economy-trillions-by-2070>.

9. StudyClerk.com, Hurricane Katrina: Facts, Damage, and Costs, [Hurricane Katrina: Facts, Damage, and Costs—Studyclerk.com](https://www.studycerk.com/hurricane-katrina-facts-damage-and-costs).

Monitoring Board (GPMB).¹⁰ Healthcare systems were losing an average of \$1.4 billion in revenue each day during the COVID-19 pandemic.¹¹

- **Geopolitics**—After six months, the destruction due to the Russia-Ukraine war had already cost Ukraine at least \$113.5 billion, and it may need more than \$200 billion to rebuild.¹²
- **Technological Disruption**—As many as 30 percent of jobs will be replaced by automation, especially the boring and repetitive ones and we're at risk of losing 375 million jobs worldwide by 2030.¹³

In addition to rising costs, the frequency of disruption is on the rise as well as shown by these examples:

- **Climate Change**—Earth's temperature has risen by 0.14° Fahrenheit (0.08° Celsius) per decade since 1880, but the rate of warming since 1981 is more than twice that: 0.32° F (0.18° C) per decade.¹⁴
- **Natural Disasters**—According to the National Science Foundation, since 1990, the number of category 4 and 5 hurricanes has almost doubled, averaging 18 per year globally.¹⁵
- **Pandemics**—Research conducted on the intensity and frequency of extreme novel epidemics suggests a high probability of observing pandemics similar to COVID-19 (probability of experiencing it in one's lifetime currently about 38 percent), which may double in coming decades.¹⁶
- **Geopolitics**—The Geopolitical Risk Index, developed by the U.S. Federal Reserve, is at its highest point since the invasion of Iraq in 2003.¹⁷
- **Technological Disruption**—70 percent of the 1,400 business leaders surveyed by Bain say they're experiencing "significant digital disruption, and 85 percent of them believe this disruption will either maintain its pace, or accelerate."¹⁸

Unlike these other disruptions, technological disruption is often both a challenge *and* an opportunity. For example, while job losses due to automation are staggering, there's plenty of evidence to suggest it often creates as many new jobs as it destroys. In its "Future of Jobs Report 2020," the World Economic Forum estimates that 85 million jobs will be displaced while 97 million new jobs will be created across 26 countries in 2025.¹⁹

However, as we return our focus to these business disruptions, in addition to the obvious human tragedies, all this disruption creates tremendous loss to global and national economies in terms of loss of business revenues and customers as well as loss or degradation of critical services to citizens.

10. World Economic Forum, 5 urgent actions to stop future pandemics crushing the global economy, Report: COVID-19 has cost \$11 trillion so far, but it could have been avoided | World Economic Forum, [weforum.org](https://www.weforum.org).

11. BenefitsPro.com, The cost of disruption, <https://www.benefitspro.com/2020/07/08/the-cost-of-disruption/?sreturn=20220812170440>.

12. *New York Times*, "Calculating the Costs of the Russia-Ukraine War after 6 Months," <https://www.nytimes.com/2022/08/24/world/europe/russia-ukraine-war-toll.html>.

13. Techjury.net, 19 Statistics About Jobs Lost to Automation and The Future of Employment in 2022, <https://www.techjury.net/blog/jobs-lost-to-automation-statistics/>.

14. Climate.gov, Climate Change: Global Temperature, <https://www.climate.gov/news-features/understanding-climate/climate-change-global-temperature>.

15. National Science Foundation, Number of Category 4 and 5 Hurricanes Has Doubled Over the Past 35 Years, https://www.nsf.gov/news/news_summ.jsp?cntn_id=104428.

16. PNAS.org, Intensity and frequency of extreme novel epidemics, <https://www.pnas.org/doi/10.1073/pnas.2105482118>.

17. EDC.ca, Why rising geopolitical risk matters, <https://www.edc.ca/en/weekly-commentary/rising-geopolitical-risks.html>.

18. Bain & Company, Digital disruption will maintain pace and/or accelerate over next 5 years, according to survey, <https://www.prnewswire.com/news-releases/bain--company-digital-disruption-will-maintain-pace-and-or-accelerate-over-next-5-years-according-to-survey-301636048.html>.

19. World Economic Forum, The Future of Jobs Report 2020, <https://www.weforum.org/reports/the-future-of-jobs-report-2020/>.



Example: When COVID-19 hit, airline reservation systems, which were fine-tuned to maximize seating revenues under business as usual, were simply unable to cope with the new requirements of increased social distancing between filled seats. Airlines, therefore, had to manually experiment with new seating configurations—such as blocked middle seats or reversed middle seats—to safely balance lives with livelihoods. Overall, the COVID-19 impact on world scheduled passenger traffic for 2020 compared to 2019 included:²⁰

- Overall reduction of 50 percent of seats offered by airlines
- Overall reduction of 2,703 million passengers (-60 percent)
- Approximately \$372 billion loss of gross passenger operating revenues of airlines

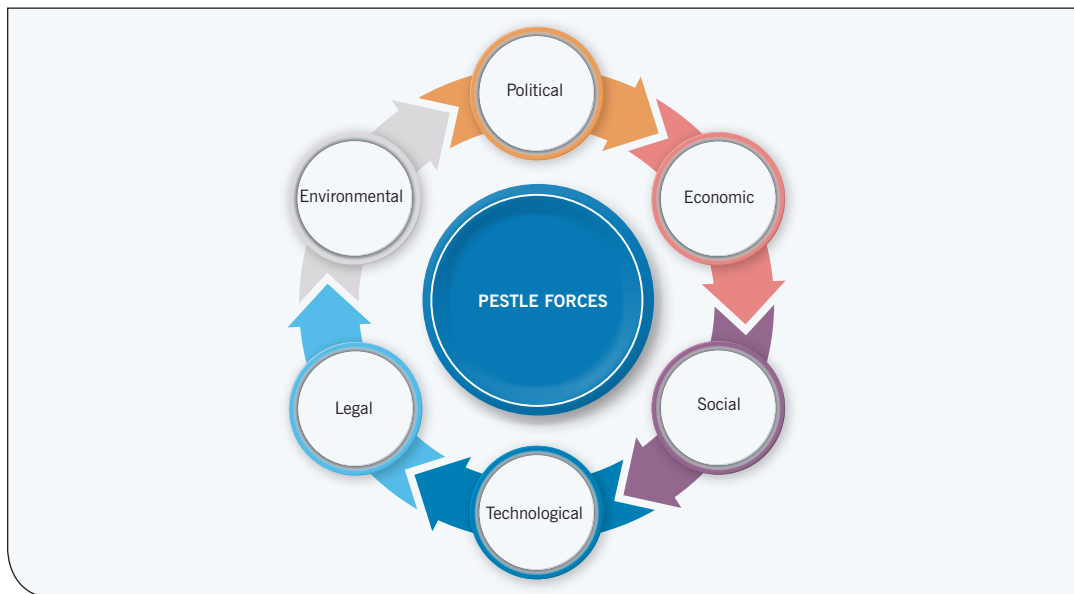
The rising costs and frequency of disruption are clear, and we now need to find new and better ways to operate continuously in a far more turbulent environment.

Prioritizing the Next Set of Global Threats

We’ve looked back to explore the rising costs and frequency of disruption, but what about the future? What are the next set of global threats that we need to prepare for and how can we classify them?

PESTLE is a business analysis framework which categorizes external forces into Political, Economic, Social, Technological, Legal and Environmental (see Figure 3). When we explore the most severe risks facing businesses as well as governments on a global scale over the next ten years, we find that most of these categories are represented in the top ten.

Figure 3—PESTLE Forces



The 2022 Global Risks Report from the World Economic Forum identified the following most severe risks on a global scale over the next ten years:

20. ICAO.int, Effects of Novel Coronavirus (COVID-19) on Civil Aviation: Economic Impact Analysis, https://www.icao.int/sustainability/Documents/Covid-19/ICAO_coronavirus_Econ_Impact.pdf.

1. Climate action failure (Environmental)
2. Extreme weather (Environmental)
3. Biodiversity loss (Environmental)
4. Social cohesion erosion (Social)
5. Livelihood crises (Social)
6. Infectious diseases (Social)
7. Human environmental damage (Environmental)
8. Natural resource crises (Environmental)
9. Debt crises (Economic)
10. Geoeconomic confrontation (Political, Economic)

As we learned with the COVID-19 pandemic, these global scale risks aren't just someone else's problem. They're felt at the local, state, and federal levels as well as among citizens and across small and large businesses. It's therefore critical for public and private sector organizations of all sizes to plan for disruptions arising from these types of risk, and as mentioned earlier, move to an adaptive government or enterprise with intrinsic agility encoded in its digital operating model and digital processes so it can respond to continuous disruption in real time.

Disruption, in all its forms, is here to stay and how we as a society anticipate and react to it will have vast implications **for our future**.

Future Shocks Series: Partnering to Build Resiliency

Government leaders increasingly agree that “rare, unexpected events” are now neither rare nor unexpected. Indeed, they are shocks—more frequent and more destabilizing. One now follows closely on the heels of another, and multiple events occur at the same time. While governments were exposed to a host of mostly unforeseen challenges from the global pandemic, they have captured valuable lessons. Leaders understand where they need to concentrate their readiness efforts for “future shocks,” carrying the momentum from rapid, pandemic-driven innovation into their preparation.

The IBM Center for The Business of Government and the IBM Institute for Business Value, and in partnership with the National Academy of Public Administration (the Academy) and a range of other partners, launched the “Future Shocks” initiative to help government leaders further identify core capabilities critical to building resiliency. As part of this effort, a series of international roundtable discussions with global leaders from across the public, private, academic, and nonprofit sectors to capture lessons across six key domain areas will be convened. The six domains are:

- Emergency preparedness and response
- Cybersecurity
- Supply chain
- Sustainability
- Workforce skills
- International cooperation

In each of these domains, insights from the roundtables will be used to identify strategies and solutions for governments to address the challenges that lie ahead. We plan to leverage previous work that captures wisdom from past experiences and then we will critically apply this knowledge to the future by identifying a set of practical and specific recommendations for near-term implementation. The first report from this initiative is [Partnering for Resilience: An Actionable Approach to Emergency Preparedness](#).

Beyond Resilience— The Case for Adaptability



Given that disruption is now the rule versus the exception, the next question becomes how to plan for it and deal with it proactively. Should public and private sector organizations simply plan for disruption using traditional business continuity and disaster recovery (BC/DR) approaches or is something more required? Do we simply need resilient systems or something more such as adaptive systems?

Adaptability Versus Resilience

Adaptive systems and resilient systems are often confused and thought of as interchangeable, but there's a vast difference between the two concepts.

Resilient System—A resilient system has the ability to recover or regain to its authentic form or situation after exposure.²¹

Adaptive System—An adaptive system has intrinsic agility to continuously maximize value by rapidly reconfiguring its processes in response to major changes in the internal or external environment.

Whereas an adaptive system restructures or reconfigures itself to best operate in and optimize for the ambient conditions, a resilient system often simply has to restore or maintain an existing steady state.

The term resilience originates from “resilio,” which is a Latin word alluding to an object’s ability to recover or regain to its authentic form or situation after exposure.²² As such, the resilient system is not continuously optimizing for ambient conditions, but simply maintaining a “one-size fits all” approach regardless of changing conditions. It typically needs to be brittle, not flexible.


This works well for use cases such as extreme weather hardening, for example, where the resilient system simply needs to stand up to a wide range of weather conditions such as wind strengths, continuous erosion, tidal changes, storm surges and so on. But even resilient systems, such as levees and floodwalls, can sometimes fail due to incorrect planning or design as evidenced during Hurricane Katrina when some of the levees collapsed even at water levels far below their design capacity.²³

The difference between adaptive systems and resilient systems also goes back to the philosophy behind their design. In the traditional risk management world, systems are designed for business-as-usual and steady-state operation. The risk management handbook is there to assist in the one or two days per year where the system goes down and needs to be restarted. An example might be the business continuity and disaster recovery (BC/DR) plan for a data center. If the data center gets flooded, the plan provides a rapid guide to restore the data center to its normal operating conditions.


21. Researchgate.net, Proactive Resilience of Power Systems Against Natural Disasters: *A Literature Review*, https://www.researchgate.net/publication/337117158_Proactive_Resilience_of_Power_Systems_Against_Natural_Disasters_A_Literature_Review.

22. Researchgate.net, Proactive Resilience of Power Systems Against Natural Disasters: *A Literature Review*, https://www.researchgate.net/publication/337117158_Proactive_Resilience_of_Power_Systems_Against_Natural_Disasters_A_Literature_Review.

23. IWAPOnline.com, Interaction between the US Army Corps of Engineers and the Orleans Levee Board preceding the drainage canal wall failures and catastrophic flooding of New Orleans in 2005, <https://iwaponline.com/wp/article/17/4/707/20452/Interaction-between-the-US-Army-Corps-of-Engineers>.



The philosophy behind adaptive systems is more about innovation than risk management. It assumes from the start, that there are no steady state conditions to operate within, but that the external environment is constantly changing.



The philosophy behind adaptive systems turns this on its head. Its philosophy is more about innovation than risk management. It assumes from the start, that there are no steady state conditions to operate within, but that the external environment is constantly changing. Disruption is the “norm” rather than the exception. In these conditions, the BC/DR plan is still needed, since even an adaptive system can fail, but the system also needs its own mechanisms to continuously optimize for ambient conditions (see Table 1). It’s not about taking what can to do done today driven by specific “as-is” requirements and expand on that, but rather about what can address future requirements and then drive transformation (for example: data fabric/data mesh, automation platform, predictive analytics, etc.)

Table 1—Comparison of Resilient versus Adaptive Systems

Resilient Systems	Adaptive Systems
Disruption is the exception	Disruption is the norm
Business as usual	Business as disrupted
Restore or maintain steady state	Continuously optimizing for ambient conditions
Brittle	Flexible
One-size fits all	Multiple configurations
Risk management philosophy	Innovation philosophy

Responding to Business Disruption

Responding to business disruption is really a question about dealing with change:

- How often is change occurring and what is the impact of this change?
- How quickly does the organization need to respond?
- Does it need to simply restore operations, or does it need to adjust and adapt operations?
- How long will this new changed state last?
- It is permanent, semipermanent or transitory?
- What are the financial or other impacts that accrue while the organization is attempting to respond and achieve best fit operating conditions in the new ambient environment?
- We learned many of these questions the hard way during the COVID-19 pandemic:
- How long will the pandemic last?
- How should we respond?
- How quickly can we respond?

- When can we restore normal operations?
- Do we need to adjust or adapt operations in the interim?
- What is the best way to operate in the new environment?
- Will we ever be able to go back to normal? The list goes on.

As we think about disruption in general there's many other questions as follows:

What is the nature of the disruption? Is it different each time or is there some pattern to the types of disruption the organization is facing? If we can classify the types of disruption that are facing the organization then we can often codify the response. This codified response can be in the form of written manual procedures or even software-defined responses codified in relevant applications and operating systems.



It's valuable to innovate on the fly when faced with new circumstances, but it's even better to have a playbook in advance for some of the more common situations.



Example: Going back to our example, during COVID-19, these responses were often thought up on the fly as organizations developed their own operating procedures for going back to business while managing and observing required safety protocols. It's valuable to innovate on the fly when faced with new circumstances, but it's even better to have a playbook in advance for some of the more common situations. This speeds reaction time and keeps the business operating more efficiently more of the time.



In terms of the spectrum of responses to business disruption, we can think of resilient systems on one end of the spectrum and adaptive systems at the other end. In between these two extremes lie a variety of responses ranging all the way from manually adaptive systems, to partially automated, and then to fully automated and intelligent adaptive systems (See Table 2).

Table 2—Maturity Level for Adaptive Systems

Maturity Level	Description
<p>Level 1 Resilient systems</p>	<p>The typical range of operating conditions have been accounted for in one original design—e.g., levees and floodwalls.</p> <p>This is an efficient, low-cost solution for the majority of cases, especially in business-as-usual situations with minimal disruption or disruption within known boundary conditions.</p>
<p>Level 2 Manually adaptive systems</p>	<p>The design allows for manual changes to be made to the system to support different operating conditions—e.g., physically moveable bridges such as those in the City of Fort Worth which span an 80-foot-wide creek.</p> <p>This approach provides more flexibility to support varying requirements and use cases but is typically time-consuming to react and requires human intervention.</p>
<p>Level 3 Partially automated adaptive systems</p>	<p>The design has partially automated the system to support different operating conditions.</p> <p>This approach provides more flexibility to support varying requirements and use cases and is faster to react (due to automation) and requires less human involvement.</p>
<p>Level 4 Fully automated adaptive systems</p>	<p>The design has fully automated the system to support different operating conditions.</p> <p>This approach provides the fastest response to disruptive events (due to complete automation) but may lack intelligence to fine-tune the response beyond a few pre-set, coarse-grained operating modes.</p>
<p>Level 5 Fully autonomous and intelligent adaptive systems</p>	<p>All operating conditions have been accounted for and the adaptive system is fully autonomous, using intelligent sensors and software-defined rules to adapt in real-time.</p> <p>This is a highly efficient solution for the majority of cases, especially in situations with frequent disruption, or disruption causing a wide range of conditions that require frequent changes and fine-tuning to operating parameters.</p>

For one-time or infrequent disruptions, levels 1 and 2 are often quite adequate. As the frequency of change increases, then adaptive systems really come into their own. They often incorporate predefined operating rules for each situation. This can speed response times whether done manually or in an automated manner compared to teams having to figure out their response on the fly each time.

Optimizing Business Goals

The goal of any adaptive system is to continuously optimize for ambient conditions, ensuring the best possible uptime and business outcomes. This means maximizing output, however defined and measured (e.g., number of citizens served per hour, power grid uptime, quality of service rating, average emergency response time), in a constantly changing environment.

For a business, this might mean maximizing revenues during disruptions such as the COVID-19 pandemic, and balancing lives and livelihoods to remain open and productive as long and as often as possible while still ensuring health and safety and appropriate social distancing.

For a city, this might mean maximizing the business goals of the city such as economic growth; diversity, equity, and inclusion; quality of life; health and wellness; safety and security; efficiency and resilience; mobility and sustainability.

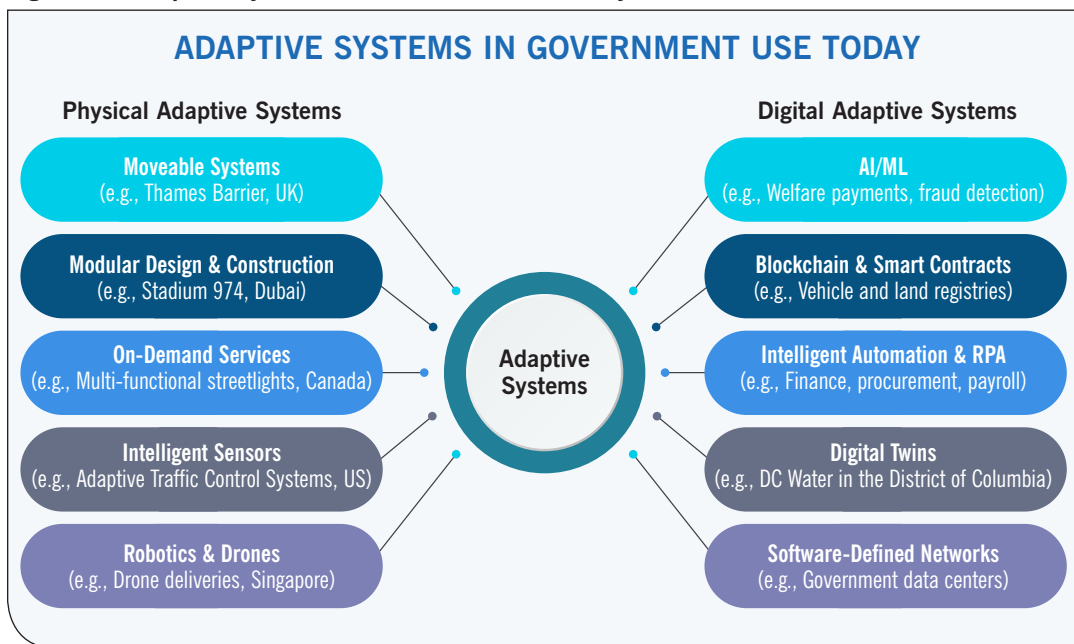
The benefit of having an adaptive system is that an organization can achieve more of its goals, more of the time, for more of its stakeholders.

Of course, some goals may be mutually exclusive or in some form of mutual tension with one another. A city’s mobility goals, for example, to ensure the best possible mobility for all citizens and vehicles, may impact their sustainability goals in terms of achieving lower CO2 emissions. An adaptive city may therefore need to implement adaptive systems to support each individual business goal, but also an overall adaptive system—or orchestrator—to ensure the best possible balance is proactively achieved across all business goals hour-by-hour or even minute-by-minute.

Adaptive Systems in Use Today

Here are some examples of adaptive systems already in use today (see Figure 4):

Figure 4—Adaptive Systems in Government Use Today



Physical Adaptive Systems

- **Moveable Systems**—The Thames Barrier is one of the largest moveable flood barriers in the world. It is operated once a month for maintenance and test purposes and protects 125 square kilometers of central London from flooding caused by tidal surges. It has 10 steel gates which can be raised into position across the River Thames and has been operated over 200 times since it became operational in 1982.²⁴ As another example, the trend of “plug and play urbanism” takes items such as pedestrian bridges and makes them moveable as needed. The City of Fort Worth improved the streetscape with a moveable bridge across an 80-foot-wide creek.²⁵
- **Modular Design and Construction**—Qatar built a football stadium out of shipping containers for the 2022 FIFA World Cup which can be taken apart and reassembled after matches.²⁶ Stadium 974, as it’s called, is made of 974 shipping containers and the design aims to reduce waste by using prefabricated and repurposable materials. It will be entirely deconstructed and recycled after the tournament is over.²⁷
- **On-Demand Services**—The New Haven planned development community in Ontario, California, has implemented multifunctional streetlights which are equipped with USB charging ports, environmental sensors, Wi-Fi, wayfinding, and more.²⁸ These ENE HUB (pronounced “any-hub”) Smart Nodes also measure data for energy and transportation efficiency. According to ENE HUB, the city chose to have the following services installed: Wi-Fi, 4G/5G, CCTV, Air Quality, Climate Monitoring, Environmental Noise, PA system, USB Charging, GPO, Event Fibre, Pedestrian, Bike, Scooter & Vehicle Counting, Banner & Outreach Arms, and LED street lighting.²⁹
- **Intelligent Sensors**—Intelligent sensors form the basis of most smart city solutions and help provide the real-time sense and respond capability that empowers solutions such as Adaptive Traffic Control Systems (ATCS). These systems adapt to real-time traffic patterns to optimize traffic flow (often via the use of camera detectors with built-in advanced AI and machine learning algorithms) and can reduce travel times by 20 percent, waiting time by 40 percent, and the number of stops in a travel corridor by 30 percent. They are also 20 percent more friendly to the environment.³⁰
- **Robotics and Drones**—In Singapore, drones are being used to make deliveries to ships anchored off the island. This is an adaptive system for last mile delivery since it is a greener and faster way of transferring supplies in busy ports. Each drone can take up to 5kg of supplies and travel up to 5km offshore. Trip time is typically less than 15 minutes on average compared to more than two hours by boat.³¹

24. Gov.uk, The Thames Barrier, <https://www.gov.uk/guidance/the-thames-barrier>.

25. Fast Company, This stunning bridge can be picked up and moved as needed, <https://www.fastcompany.com/90656583/this-stunning-bridge-can-be-picked-up-and-moved-as-needed>.

26. Dezeen.com, Qatar’s shipping-container football stadium can be taken apart and reassembled after the match, <https://www.dezeen.com/2017/12/07/qatar-2022-fifa-world-cup-shipping-container-stadium-football-fenwick-iribarren-architects-doha/>.

27. Wilson Center, A Stadium Made of Shipping Containers, <https://www.wilsoncenter.org/blog-post/stadium-made-shipping-containers>, May 3, 2022.

28. Govtech.com, Smart City Tech Is Being Built Into Planned Communities, <https://www.govtech.com/fs/smart-city-tech-is-being-built-into-planned-communities>.

29. ENE Hub, City of Ontario, California, <https://ene-hub.com/united-states/sites/city-of-ontario/>.

30. Efftronics, Adaptive Traffic Control System (ATCS), <https://www.efftronics.com/adaptive-traffic-control-system>.

31. EDB Singapore, Singapore’s first drone delivery service takes flight, <https://www.edb.gov.sg/en/business-insights/insights/singapore-s-first-drone-delivery-service-takes-flight.html>, May 11, 2020.

Digital Adaptive Systems driven by Trusted and Actionable Data³²

- **Artificial Intelligence and Machine Learning (AI/ML)**—As noted in, *The Future Has Begun: Using Artificial Intelligence to Transform Government*, “AI has enormous potential for government. It can improve agencies’ effectiveness, make data more understandable and easier to use, and help citizens navigate government services. And it could save government up to 1.2 billion work hours and \$41.1 billion annually.”³³ As an adaptability example, in the education technology (EdTech) field, organizations are using AI and learning analytics to deliver a one-on-one education experience that adapts in real time to the needs and abilities of each learner.
- **Blockchain and Smart Contracts**—Smart contracts are much like traditional contracts but are software programs based on blockchain which automatically execute when certain preprogrammed parameters are met. While they have a number of benefits including decentralization, transparency, and autonomy, one of their key benefits from an adaptability perspective is that of instant operation. They get executed as soon as certain IF-THEN or WHEN-THEN conditions are met. Government use cases include areas such as identity management, vehicle and land registries, payment services, taxation, and vaccine tracking. Beyond merely executing code based on business events, these smart contracts also incorporate legal aspects to ensure a legally enforceable foundation.³⁴
- **Intelligent Automation and Robotic Process Automation (RPA)**—RPA technologies, which automate repetitive, rules-based tasks, already have proven benefits within government including increased efficiency (freeing up humans to take on more interesting work), reduced errors, increased data quality, and an improved citizen experience by way of more rapid processing compared to manual techniques. The range of use cases include process automation within finance, procurement, payroll, HR, IT help desk and contact center functions and much more. According to *The State of Federal RPA* report, the federal RPA community has reduced over 1.4 million hours (and counting) of low-value work across government to date. Thirty-two percent of these RPA programs have also incorporated intelligence automation features such as AI/ML, image recognition, chat bots, and natural language processing (NLP).³⁵
- **Digital Twins**—Digital twins are defined as realistic and dynamic digital representations of a physical asset. The asset can be anything ranging from infrastructure assets such as buildings, bridges, parking lots and roadways, to organizations, to even entire cities. The benefit of the digital twin is that it provides a single source of truth and a 4D model of the physical asset in terms of the 3D geometric model plus the IT, operating and engineering data relating to its past, present, and future operation. From this model, organizations can see live operating conditions for situational awareness and for operations and maintenance. They can also run simulations and predictive analytics to see how the asset may perform given future conditions. As an example, D.C. Water in the District of Columbia implemented a digital twin to enhance its readiness and resilience for distributing drinking water and collecting and treating wastewater for its over 670,000 residents and 17.8 million annual visitors. The goal was “to mitigate service disruptions, reduce nonrevenue water losses, leverage data to reduce operational and capital expenditures, and improve the overall level of customer service.”³⁶

32. Without trusted and actionable data tied to the process (manual or automated) that is needed to address disruption—then modern technologies cannot fully meet the needs of a digital adaptive system.

33. <http://www.businessofgovernment.org/report/using-artificial-intelligence-transform-government>.

34. SCAND, *The Role of Smart Contracts in the Government Sector*, <https://scand.com/company/blog/the-role-of-smart-contracts-in-the-government-sector>, January 27, 2022.

35. Digital.Gov, *The State of Federal RPA*, <https://digital.gov/pdf/state-of-federal-rpa-report-12-2021.pdf>, December 2021.

36. Bentley, *DC Water’s Digital Twin Solution*, <https://www.bentley.com/wp-content/uploads/AR-DC-Waters-DigitalTwin-Journey-LTR-EN-LR.pdf>.

- **Software-Defined Networks**—Software defined networks help to reduce the physical footprint of the data center by virtualizing the network and not requiring physical networking devices. This virtualization enables government agencies to do more with less and have a flexible solution that can react in real-time to irregularities on the network or for varying use cases. As an example, during the day it can enable a data center to serve citizens and end users, and then at night it can reconfigure itself to process data. This enables agencies to optimize their use of existing equipment and avoid unnecessary purchases.³⁷

Both physical and digital adaptive systems often work together as in the example of Adaptive Traffic Control Systems (ATCS), which combine the use of physical cameras with built-in advanced AI and machine learning algorithms.

The principle of modular design is a common theme across both physical and digital adaptive systems. For example, digital adaptive systems are often underpinned by a modular and composable design approach to the enterprise IT architecture.

According to Gartner, “By 2024, more than 25 percent of government RFPs for mission-critical IT systems will require solutions architecture and variable licensing that support a composable design approach. This is compounded by our prediction that by 2025, eight of the top 10 application vendors will structure their application suite products as collections of composable business capabilities.”³⁸

It’s clear that these digital adaptive systems, which are all enablers of adaptability, each play a slightly different yet important role. Software-defined networks, for example, as well as smart contracts tend to provide the switching mechanisms so that new digital processes and workloads can be activated and executed when certain events or trigger conditions are met. Intelligent automation and RPA help to speed execution time of the resulting processes and workloads compared to human efforts while AI/ML provides a way to learn and continuously improve and optimize these processes. The “digital twin” acts as an immersive 3D visualization tool, often using AR/VR, so that humans can model and visualize specific assets and then make intelligent decisions about their future operation.

Of course, many of these technologies can be integrated so that the digital twin, for example, can not only help visualize data from intelligent sensors, but can also automatically trigger changes to how these systems operate in real time.



Just like the so-called “abilities” that CIOs typically look for in IT solutions such as scalability, reliability, and availability, the new attribute to place into all evaluation criteria lists is now adaptability.



To prepare for business as disrupted, it’s therefore key to look for physical and digital solutions that have this built-in flexibility whether it’s a manually adaptive system such as a moveable bridge or a fully autonomous adaptive system such as a software-defined network.

37. FedTech, Take a Measured Approach to Software-Defined Networking, <https://fedtechmagazine.com/article/2022/06/take-measured-approach-software-defined-networking>.

38. Gartner, What Technology Trends Enable Government CIOs to Meet Stakeholder Needs?, <https://www.gartner.com/en/topics/technology-government>.

Just like the so-called “abilities” that CIOs typically look for in IT solutions such as scalability, reliability, and availability, the new attribute to place into all evaluation criteria lists is now adaptability.

Measuring the ROI for Adaptability

We discussed earlier that responding to business disruption is really a question of responding to change. Having an adaptive system, regardless of its maturity level typically lends the following benefits:

- **Built for Change**—Builds on the concept of adaptive enterprise and enables intrinsic agility
- **Disruption Agnostic**—Supports all forces of change such as PESTLE, not just pandemics
- **Prepares for the Unknown**—Better plans for and operationally supports uncertainty about the future and unpredictable levels of impact and risk
- **Optimizes Business Value**—Enables a real-time balance so organizations can seamlessly navigate between risk and opportunity in the fastest possible manner
- **Maximizes Productivity**—Is designed at each level to maximize growth and value capture within the external operating conditions
- **Rapid Response to Change**—Provides prebuilt/preconfigured operating models and processes which speed response time and continually maximize value capture
- **Holistic Approach**—Is implementable across all aspects of business model and operating model
- **Process Agnostic**—Can be specific to a single process or a broader set of enterprise processes
- **Flexibility**—Is dynamically adjustable based on observed conditions and/or government mandates
- **No Time Limits**—Offers a workable solution for the near term and longer term
- **Provides Competitive Differentiation**—The intrinsic ability to change rapidly within a single solution versus requiring multiple solutions, iterations, or enhancements

Each of these items provides quantitative or qualitative business value and most adaptive systems deliver across many aspects.

The caveat, of course, is that despite the many benefits of adaptive systems, they are certainly not one-size-fits-all or appropriate for every single situation. In cases where a highly resilience solution is needed, such as a seawall, the solution might just be a solid concrete structure. An adaptive system in this case might be less resilient than the fixed structure.



Example: As an example, at more than 10 miles long and 17 feet high, Galveston's seawall, named Seawall Boulevard, is the longest continuous sidewalk in the United States. It's fit-for-purpose and is primarily a resilient as opposed to an adaptive solution.

Preparing for Business as Disrupted



Digital Transformation is Not Enough

For the past decade or more, businesses and governments have thought of digital transformation as the panacea for dealing with digital disruption. As the years have gone by, however, there's been a growing realization that this kind of transformation never ends, the results are often less than anticipated, and it's now becoming more table stakes—a necessity of doing business—than a competitive differentiator.

According to Michael Gale, author of *The Digital Helix*, “Digital transformation isn't a choice, it's an imperative that only 28 percent of leaders are succeeding at.”

We've been on this journey before. During the dot-com era of the late nineties, organizations were told to “innovate or die.” The race to web-enable and later to e-business enable became priority number one. Over time, however, there was no need to mention “e” this and “e” that. It was a given, just like a business having electricity or telephones or, most recently, cloud computing.

We've now reached the same point with digital transformation. It's a given. Organizations know that they need to embrace technology and innovation to become more digital and it's a journey not a destination. As each new emerging and/or disruptive technology appears on the market, there's a new set of opportunities for creating new business models, processes, products, and services as well as for improving efficiencies, reducing costs, and delighting customers and citizens.

Every business or technology trend has a shelf-life and digital transformation is no exception. Just like the adoption of emerging technology and disruptive trends, it starts as a competitive advantage for early adopters, but later becomes table-stakes and organizations may even become laggards if they are too slow to adopt (see Exhibit 1).

Exhibit 1—The Three Waves of Disruptive Trends³⁹

As organizations adopt disruptive technologies and trends, there are typically three waves in terms of the timing around each trend they can catch—each with different types of benefits:

The Emerging Wave—The emerging wave relates to disruptive technologies and trends that are in the pioneer and early adopter stages in the well-known technology adoption lifecycle. Trends such as blockchain/NFTs, digital twins, wearable devices, augmented/virtual reality, and Web 3/meta-verse are good examples in this wave since they're still in the initial stages of government investigation and adoption. Since they're still maturing, there's strong potential for organizations to use them in unique ways to create new business models, deliver new digital products and services, and explore transformational changes within their industries.

At this stage, business models can be transformational, competitive advantage can be high in the specific areas of implementation, and the long-term ROI of an initiative, if successful, can be outstanding. Outside of the pioneers, however, the business value of the technology is often not clearly understood and there are limited use cases for others to follow.

39. Evans, Nicholas D., CIO.com, “The Three Waves of Disruptive Trends,” <https://www.cio.com/article/250379/it-management-the-three-waves-of-disruptive-trends.html>, October, 2013.

Exhibit 1—The Three Waves of Disruptive Trends cont.

The Differentiating Wave—The differentiating wave relates to disruptive technologies and trends that are past the pioneer stage and squarely in the early adopter stage. Trends such as artificial intelligence/machine learning and robotic process automation are currently in this wave since they're still in relatively early adoption when an organization looks at how the technologies are being utilized across the typical organization.

At this stage, there's still ample time for organizations to achieve competitive advantage and differentiation through these technologies by exploring untapped use cases and scenarios that others have yet to exploit. In this wave, there's also several commonly known ROI examples for fast followers to pursue.

The Business Value Wave—The business value wave relates to disruptive technologies and trends that are further along in the technology adoption lifecycle in the early and late majority stages. Trends such as cloud and mobile computing are clearly in this wave since the typical scenarios for implementation are well defined, and the typical business value and ROI is well recognized. Examples include use of SaaS for cost reduction and flexibility/agility, and use of mobile applications for workforce productivity.

At this stage, the technologies in this wave are generally mature, well understood, and are delivering value on a day-to-day basis. In essence, they've become table stakes and a staple for business and IT.

While digital transformation remains an imperative, despite now being table stakes, endlessly pursuing digital transformation is not enough. It's becoming an outdated and inefficient response to change since it often has limited intrinsic agility as we explored earlier.

Digital Adaptability is the Next Wave of Business Transformation

By moving to digital adaptability as the next step beyond digital transformation, we can better prepare for change in the years ahead and reduce effort and expense. So digital adaptability is a more efficient way to pursue digital transformation, by embedding an intrinsic ability to change into the actual solution, but it also better supports all the changes occurring in the external environment.

We discussed business and digital disruption earlier, but another change that's occurring is that of the customer or citizen experience. The customer and citizen experience in terms of what they expect from business and government from digitally enabled products and services continues to shift dramatically.

From Product and Service Centric CX to Societal CX

For the past ten years or more, customers and citizens have had a very product- or service-centric set of expectations and demands. They wanted products and services that provided the best price, selection, and availability. Amazon famously focused on this extensively, calling it the "holy triad" and offering the best of all three to the detriment of their competition.

Customers and citizens were also focused on convenience, ease of use, and quality of service. So much so, in fact, that myriads of startups became successful by offering services where customers didn't have to "lift a finger" or move a muscle. Uber put on-demand taxi services at passengers' fingertips. Robotic lawn mowers cut your garden. Gas refueling services delivered

fuel directly to your car wherever you were. Bicycle repair vans came directly to you. Even dog-walking services became a \$1-billion industry in the U.S. alone.

Beyond last mile delivery, this focus on “convenience” became that of “hyperconvenience.” It became an issue of the last few yards and inches. Walmart trialed fridge delivery for customers, going the extra few yards beyond door delivery and inside-the-door delivery to actually stocking the customers’ fridge. There was even a patent issued for a drone that could bring coffee to you at your desk if you were looking tired.⁴⁰

There was also a dark side to this era as tech companies invested millions in increasing the “moments of delight” of their users to make applications as sticky and as psychologically addictive as possible. For example, on the social media side, we saw the addictive nature of the “endless scroll.”

Over the next ten years, however, the customer experience is continuing to evolve, and the aperture of the customer experience is widening to encompass not just products and services, and hyperconvenience, but an increasingly holistic focus. This focus now includes not only the actual product or service being delivered, but how each organization treats their stakeholders in addition to their shareholders, and how each organization supports a broader mission to society and the environment (see Figure 5).

The aperture of the customer and citizen experience has therefore evolved and expanded to encompass purpose, sustainability, corporate social responsibility (CSR), environmental, social and governance (ESG), diversity, equity, and inclusion (DEI), safety and security, and digital ethics (figure 3). While some of the acronyms continue to evolve, such as CSR morphing into ESG, the fact is that consumers and citizens want to feel confident their purchases are doing good in the world.

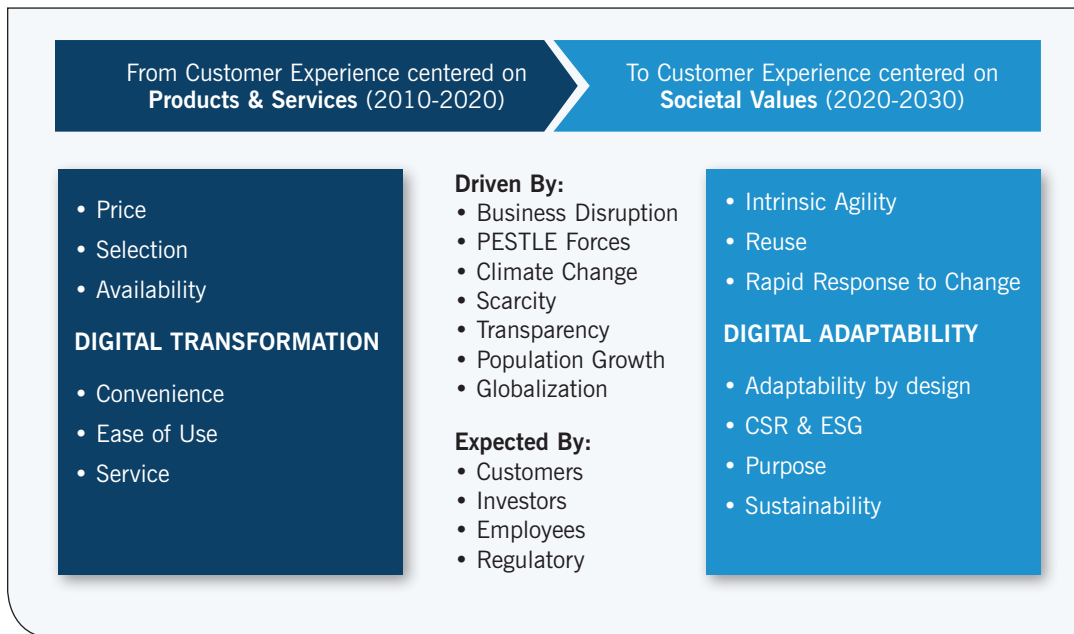
We’re also seeing early signs that the financials support these business practices. A study by Northwestern University and George Washington University found that portfolios of stocks with high ratings in both employee satisfaction and ESG practices were outperforming those with lower ratings in either or both categories by as much as 5.61 percent per year.⁴¹

With increased expectations around the customer or citizen experience, it’s even more critical to design for adaptability in future products and services. Done correctly, this digital adaptability built into business and governmental services will help to ensure more people gain more value more of the time.

40. Evans, Nicholas D., Introducing the “lazy economy” business model and implications for CIOs, <https://www.cio.com/article/219703/introducing-the-lazy-economy-business-model-and-implications-for-cios.html>, January, 2019.

41. NorthWestern.edu, Some Companies Actually Do See Financial Returns on Their Social Investments. Here’s What They Have in Common, Some Companies Actually Do See Financial Returns on Their Social Investments. Here’s What They Have in Common. (northwestern.edu).

Figure 5—The Next Wave of Business Transformation



Building Intrinsic Agility to Prepare for Business as Disrupted

We’ve explored how disruption, first digital disruption, and now increasingly business disruption, has become the rule rather than the exception, making this a critical time for organizations to reassess their digital transformation strategies as well as core competencies and capabilities.

Organizations with intrinsic agility will respond faster to change, already possessing the adaptability to move quickly towards the next hurdle or the next finishing line. They will be able to do more with less and make the most out of their existing assets and investments.

While transformation is often thought of as a one-time change, the journey is never truly finished, and organizations need to build capabilities that will allow them to continuously transform. Organizations with this intrinsic agility will respond faster to change, already possessing the adaptability to move quickly towards the next hurdle or the next finishing line. They will also be able to do more with less and make the most out of their existing assets and investments.

Mastering government adaptability can not only accelerate digital transformation journeys but accelerate many other new journeys as well. Thus, government adaptability should not be considered just a subset of a digital transformation strategy, but an overarching business strategy by itself.

As digital transformation becomes a worn-out theme, after over a decade of so-called transformation, the new vision of incorporating and achieving adaptability for future transformations—i.e., to achieve intrinsic agility—may be just what’s needed.

Intrinsic Agility in Action

Organizational agility is not achieved just by cloud-first strategies or flexible workforce strategies, but via a well-planned, holistic approach across an organization's business and operating model, processes, products, and services. Here are some examples:

- **Adaptive business models**—Platform business models⁴² are intrinsically agile because they enable rapid growth and changes to the ecosystem by relying on external producers and consumers to provide the actual—physical or digital—products, services, and social currency. As an example, Apple doesn't have to do any heavy lifting when operating the app store. New app providers simply add their apps, and the platform experiences a virtuous cycle of growth—more apps attract more buyers, and vice versa. This “permissionless innovation” enables friction to be minimized, with participants free to innovate on top of the platform, thereby expanding the platform's value proposition and longevity. It is made continually relevant by way of the innovations in the form of new apps being added on a daily basis.
- **Adaptive operating models**—Operating models are intrinsically agile when they can sense and respond to external stimuli and rapidly reconfigure operating procedures. Just like the U.S. military's DEFCON, an enterprise- or government-specific PANDCON⁴³ (i.e., a DEFCON for pandemics) can help organizations determine a set of preconfigured operating procedures to jump to, as needed, through the ebbs and flows of pandemic health waves. More than just a risk advisory system helping to minimize risk, this approach provides an opportunity advisory system, allowing businesses and governments to maximize revenue capture and opportunities to better serve citizens at every stage, whether the business disruption is in full force or increasing or decreasing.
- **Adaptive processes**—Processes gain agility when they can be software-mined (i.e., software discovered) and software-defined. Techniques such as process mining improve process monitoring and optimization, and help organizations understand how things are working and where shifts are possible. Key process performance indicators (KPPIs) show exactly where processes can be improved and optimized. For example, process mining helped Lufthansa reduce delays in airline maintenance work by 15 percent.⁴⁴
- **Adaptive transactions and commerce**—Transactions gain agility when an organization can dynamically price and personalize its services based on each and every situation. In the private sector, AI is playing an increasing role here, acting as the embedded intelligence to help guide commerce offers and decisions with personalized, dynamic price calculations. For example, a Fortune 50 tech company gained \$400 million in incremental revenue via a more efficient quoting process and intelligent, data-driven pricing. On the customer service side, agility comes in the form of dynamic handoffs from intelligent virtual agents to human customer service agents as well as improved sales conversion rates via chat. In both the private and public sectors, smart contracts, enabled via blockchain, open up even more possibilities for intelligent transactions.

42. Evans, Nicholas D., CIO.com, Platform business models: 4 key steps for implementation, <https://www.cio.com/article/230913/platform-business-models-4-key-steps-for-implementation.html>, October, 2017.

43. Evans, Nicholas D., CIO.com, 3 steps to developing a risk response advisory system, <https://www.cio.com/article/193616/3-steps-to-developing-a-risk-response-advisory-system.html>, June, 2020.

44. White, Sarah, CIO.com, <https://www.cio.com/article/3562428/what-is-process-mining-refining-business-processes-with-data-analytics.html>, June, 2020.

- **Adaptive products and services**—Digital services are intrinsically agile when they can scale up or down based on demand and can be designed, deployed, managed, and maintained on the fly. Essential ingredients are approaches such as cloud and DevOps, but organizations can also explore innovative techniques to incorporate flexibility and/or resilience to change. Netflix, for example, is well-known for its chaos testing,⁴⁵ which ensures that developers “are constantly operating in an environment of unreliable services and unexpected outages.” Physical products are intrinsically agile when they incorporate elements such as modular design. Examples are plentiful and include everything from modular phones, to data centers, to autonomous vehicles.

While these examples are compelling on their own merit, when viewed collectively an organization’s leader can start to see the power and possibilities of the adaptive government and the benefits of building intrinsic agility and adaptability throughout the organization.

Technology, of course, plays a large role in much of this intrinsic agility, which is another key reason why CIOs should work closely with their C-Suite peers to envision the art of the possible for the organization. More than just providing technology underpinnings for digital transformation initiatives, it is now critically important for CIOs to bring this enabling technology to unlock the wealth of possibilities for the adaptive government and adaptive enterprise. It’s time to stop transforming and build in adaptability by design.

45. DevOps Case Study, Netflix and the Chaos Monkey, <https://insights.sei.cmu.edu/devops/2015/04/devops-case-study-netflix-and-the-chaos-monkey.html>, April, 2015.

Action Plan for the Adaptive Government



It’s Time to Stop Transforming and Build in Adaptability

To put the adaptive government into action, departments and agencies should take a three-phased, iterative approach starting with establishing their strategy and vision for adaptability, designing, and building for adaptability, and then operating with continuous innovation. This creates a flywheel effect where lessons learned from one phase are fed into the next phase and the whole cycle is repeated.

Figure 6—Three-Phased Approach for the Adaptive Government



While adaptive systems can respond far better to future shocks, often with preconfigured business rules and operating models planned for and implemented well in advance, and built into the way these systems operate, it is really continuous innovation that helps to solve for any outliers that may be unknown or unexpected.

Establish the Strategy and Vision

Developing the strategy and vision for adaptability within your agency or department requires an in-depth analysis of your current state (i.e., how disruption is affecting your organization and which processes are affected), your future vision (i.e., how disruption may change in the future and which broader processes may be affected), and then your gap analysis and implementation roadmap.

More than simply having a strategy for adaptability, it's an opportunity to make adaptability part of your broader strategy as well. Adaptability is a mission enabler for government and a competitive advantage for business. It's not just about efficiencies, uptime and keeping the lights on, but can be a core competency and strategic enabler when dealing with both challenges *and* opportunities. Adaptability is a mission enabler for government and a competitive advantage for business. It's not just about efficiencies, uptime and keeping the lights on, but is a core competency and strategic enabler when dealing with both challenges and opportunities.

This is perhaps one of the fundamental differences between adaptability and resilience. Whereas resilience is all about risk management, adaptability is a core competency that can support both innovation *and* risk management.

When preparing your strategy, some of the key questions to consider include:

- How is disruption currently affecting your organization?
- Which organizational processes are currently affected?
- How does the organization currently address requirements for adaptability?
- How is disruption likely to change in the future in terms of type, scale, and frequency?
- Which organizational processes are likely to be impacted in the future?
- How can the adaptability strategy support innovation *and* risk management?
- How can the adaptability strategy address both challenges *and* opportunities?

Once the strategy is developed, it's also important to ensure it gets embedded into existing business and IT strategies so that it becomes a strategic initiative and core competency that permeates strategic planning and the organization's vision of the future.

To further this goal of deeply embedding across the business and IT strategy, elevating the topic of adaptability to the level of resilience and sustainability can help to ensure it's a strategic theme as well as a strategic initiative and core competency the organization is placing emphasis and resources around.

As an organization operationalizes its strategy and vision, its leaders can establish an adaptive government council, community of practice, or center of excellence. This helps to share priorities, resources, use cases, case studies, and best practices across your agency or department, or even cross-agency. It can also help to reinforce the strategy by providing governance and education.

Identifying Opportunity Areas with a Project Prioritization Matrix

As you prepare your strategy for adaptability, you'll want to identify opportunity areas for both the near-term and longer-term implementation roadmap. To identify and prioritize these opportunity areas across the organization, where adaptability can lend mission or business value, take the following steps:

- Inventory your current state projects and initiatives as well as ideas and opportunities for your future vision where adaptability can lend mission or business value.
- Mark each project or initiative as presenting either a disruptive risk and/or a mission or business opportunity that can benefit from adaptability.
- If both of these apply, mark the primary focus where adaptability can lend the most business value—i.e., either mitigating a disruptive risk or enhancing a business opportunity.
- Next, rate each project or initiative on the business benefit of an adaptability solution or enhancement—i.e., as mitigating a disruptive risk (low, medium, or high) and/or a enhancing a business opportunity (low, medium, or high).
- Some adaptability solutions or enhancements may be both—i.e., providing high business value and the opportunity to serve citizens more flexibly, as well as a mitigating a medium-level disruption risk due to physical location where services are provided.
- Finally, rate each project or initiative in terms of the time and cost to implement and maintain the adaptive solution or enhancement as well as the project risk and complexity.

By creating a quad chart with business benefit (“minimize disruptive risk” score plus “enhance business value” score) versus ease of implementation (“time and cost to implement and maintain” score plus “project risk and complexity” score), an organization’s leader will be able to create a project prioritization matrix to identify the “quick wins” and “must haves” for adaptability solutions and enhancements (see Figure 7).

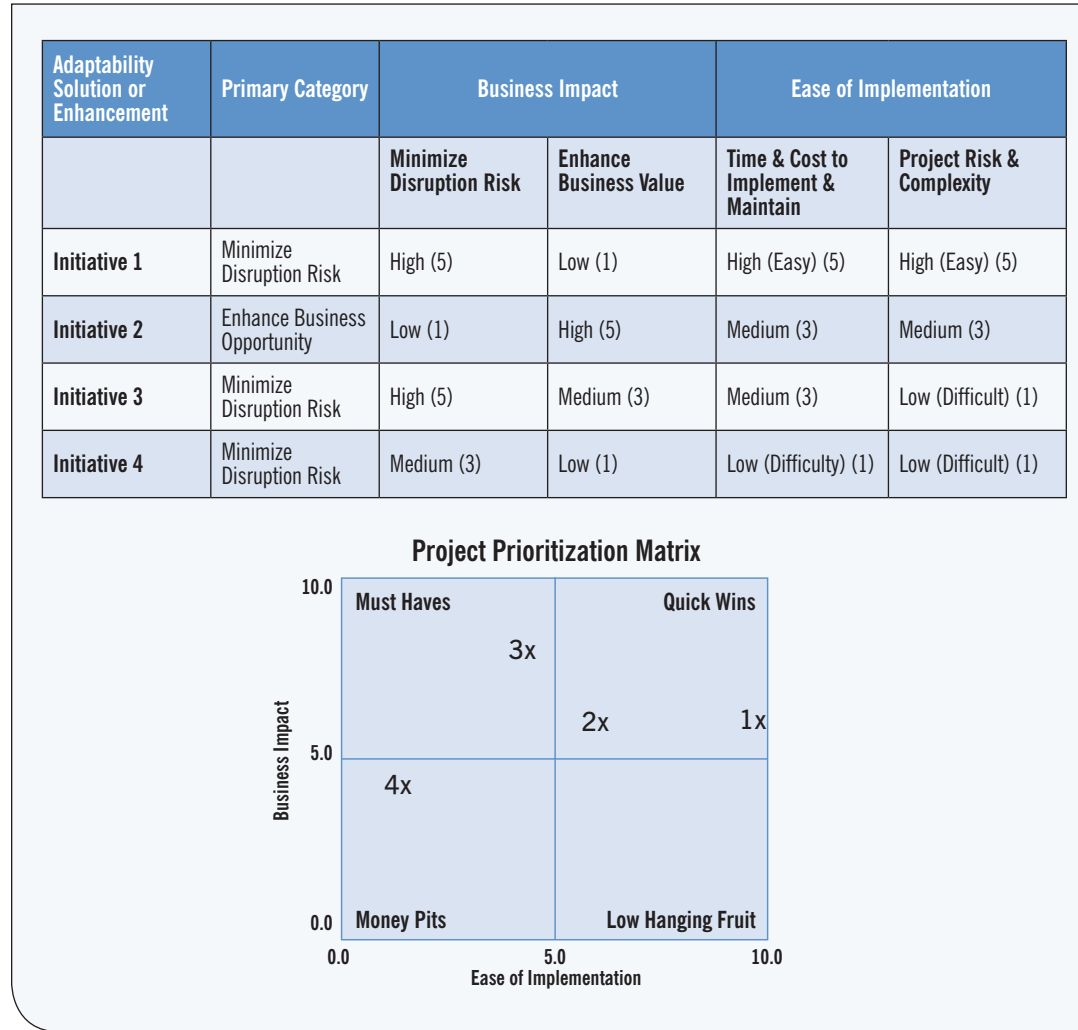
Business Benefit = “Minimize Disruptive Risk” score + “Enhance Mission Value / Business Value” score

Ease of Implementation = “Time & Cost to Implement/Maintain” score + “Project Risk & Complexity” score

In terms of scoring, if an organization applies a 1-3-5 scale for low-medium-high ratings of each criteria quad chart (i.e., project prioritization matrix) will have a maximum value of 10 for each axis. It’s typical to plot the business benefit on the y-axis and the ease of implementation on the x-axis as shown in Figure 7.

The “quick wins” are typically high business value and easy to implement (i.e., placing in the top-right quadrant) and the “must haves” are typically high business value, but harder to implement due to their cost, risk, and complexity (i.e., placing in the top-left quadrant). Hence, the “quick wins” can often be part of the near-term implementation roadmap and the “must haves” part of the longer-term roadmap.

Figure 7—Project Prioritization Matrix for Adaptability Opportunities

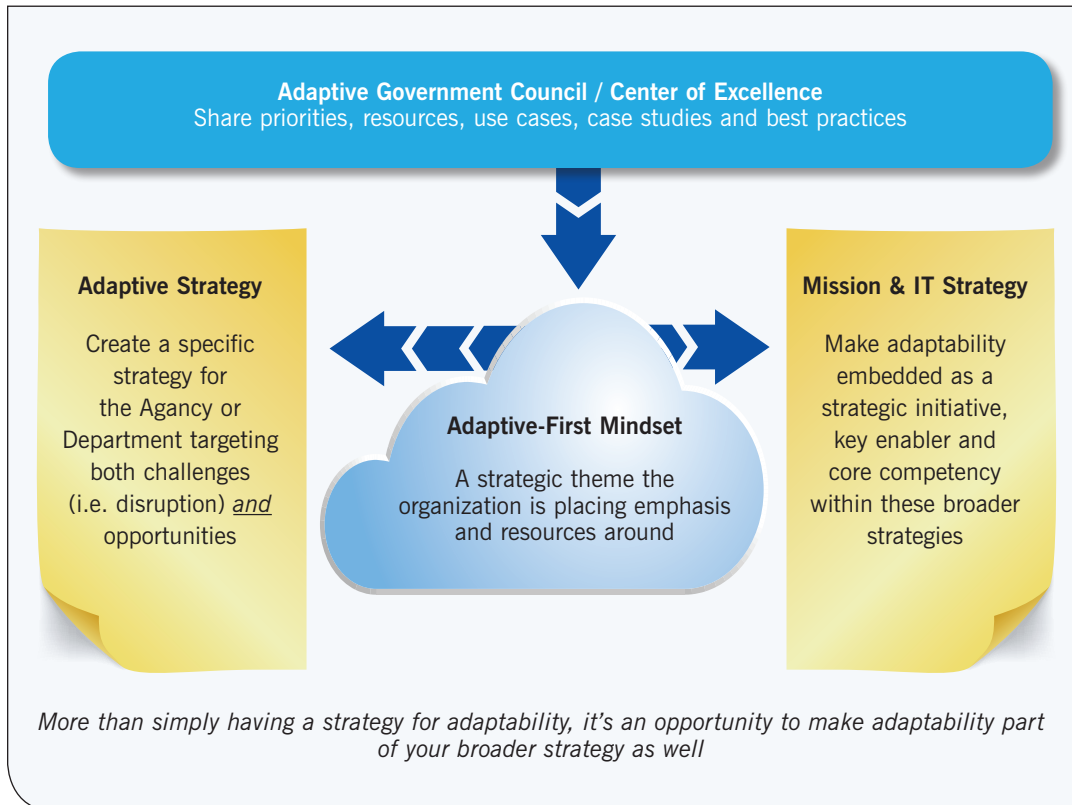


“Low Hanging Fruit” place in the lower-right corner of the quadrant and are also viable candidates for implementation. “Money Pits” place in the lower-left corner of the quadrant and should be avoided since they are of low business impact, but harder to implement.



Recommendations

To summarize the action plan for establishing the strategy and vision for adaptability, here are four recommendations (see Figure 8):

Figure 8—Establish the Strategy and Vision for Adaptability

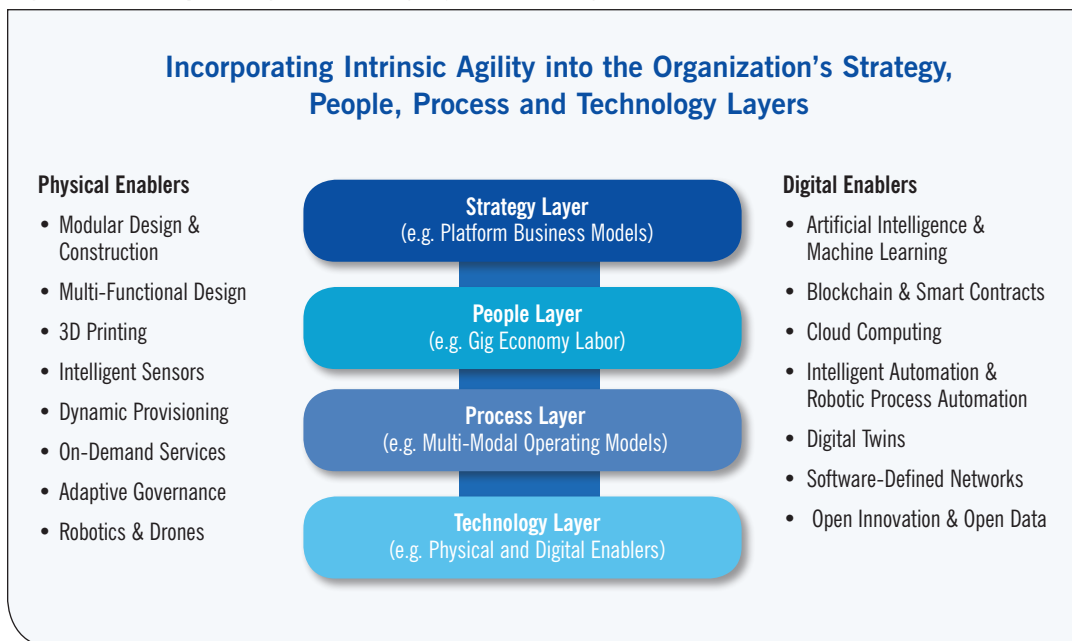
- **Develop an adaptability strategy**—Develop an adaptability strategy at the business level, across your entire agency or department, which details your current state, future vision, gap analysis and implementation roadmap. Identify and incorporate key opportunity areas across your organizations internal processes and citizen facing services for both near- and longer-term implementation. Use the project prioritization matrix described earlier to identify and prioritize adaptability opportunities which can either mitigate a disruptive risk or enhance a mission or business opportunity.
- **Evangelize an adaptive-first mindset**—Determine champions across the organization who can evangelize the importance of adaptability and who are willing to pilot initiatives within their agencies or departments and share results and case studies. Elevate adaptability to the level of resilience and sustainability so that it's a common theme the organization is placing emphasis and resources around. As part of an organization's adaptive-first mindset initiative, build out a suitable body of education and training materials so these champions can get quickly up to speed themselves and train others in a consistent manner.
- **Make adaptability part of your business and IT strategy**—In addition to having an agency or departmentwide strategy for adaptability (i.e., a specific strategy for adaptability), ensure adaptability is also embedded into existing business and IT strategies as a strategic initiative and core competency. This will help ensure adaptability initiatives include not only standalone adaptability projects, but also those where adaptability is an embedded requirement, core capability or mission enabler/competitive advantage within existing projects where applicable.

- **Establish an adaptive government council or center of excellence**—Much like other internal councils or centers of excellence, set up an adaptability council for cross-functional stakeholders, champions and end users that can share priorities, resources, use cases, case studies, and best practices. Once internal structures are in place consider cross-department/cross-agency councils much like the Federal RPA Community of Practice (CoP). To help foster an adaptive-first mindset across agencies and departments, this council can also be on point for developing and maintaining suitable education and training materials to share with the champions referenced earlier.

Design and Build for Adaptability

When it comes to implementation, we can think of the adaptive government in much the same way that we think of digital government. Like digital government, we have a set of enabling technologies which provide mission value and business benefit either individually or collectively. In this case, the enabling technologies for the adaptive government not only help us further digitize our processes, in many cases, but help us make them adaptive and more flexible and dynamic at the same time. These enablers extend to both physical and digital enablers as well as enablers at the strategy, people, and process layers (see Figure 9).

Figure 9—Incorporating Intrinsic Agility into the Organization



Whereas digital government relied on the web, ecommerce, and the so-called “SMAC” technologies of social, mobile, analytics and cloud, the adaptive government relies on more recent enablers such as artificial intelligence and machine learning (AI/ML); blockchain and smart contracts; intelligent automation and robotic process automation (RPA); digital twins; and software-defined networks.

Social, mobile, analytics and cloud computing remain table-stakes of course and are often foundational to these higher-level enablers. For example, digital twins are likely hosted in the cloud and accessible for visualization via mobile devices including smartphones, tablets, and AR/VR headsets.

While many IT departments within government departments and agencies are likely evaluating each of these more recent technologies—such as AI/ML, RPA, and digital twins, and implementing them as proof of concepts, pilots, minimal viable products (MVPs), or even in production—it's likely they're not yet viewing them holistically as enablers of the adaptive government.



While many IT departments within government departments and agencies are likely evaluating each of these more recent technologies . . . it's likely they're not yet viewing them holistically as enablers of the adaptive government.



When viewed from this adaptability lens, these technologies can be more purposefully utilized to benefit governmental business goals and to provide more intrinsic ability to change. Here are some of the key questions that IT departments should be asking:

- How can we take an adaptive-first approach much like earlier cloud-first approaches?
- What enabling technologies can support our adaptive government strategy?
- How can these technologies help to expand the dynamic range of operation of our systems and processes so they have more capability and capacity to deal with extremes and unknowns?
- How can the combination of these enabling technologies yield additional value and unlock additional use cases?
- How should we rethink our enterprise technology stack so we can leverage existing investments and reuse common components that support modular and flexible services?
- How can we update our procurement and vendor selection processes to specifically look for adaptability in vendor offerings and capabilities?



Example: Consultancies such as Bain and others are recognizing the importance of organizations investing in a modular and flexible enterprise technology stack. In fact, this is one of Bain's six priority areas for action, along with making agile the norm, in their recent fifth annual benchmarking survey of corporate digital transformation.⁴⁶

Beyond the technology layer and the digital and physical enablers of adaptability, it's important to also seek out enablers at the strategy, people, and process layers.

As we saw earlier, strategy can be made more adaptive by way of platform business models, for example, where customers, partners and collaborators can innovate on top of the platform much like the Apple App Store model. This enables the value of the platform to continually increase over time and the strategy can be updated on the fly by way of new additions. On the public sector side, Cloud.gov operates in a similar manner by helping federal agencies deliver the services the public needs in a faster, more user-centered way.⁴⁷ It provides the IT plumbing (i.e., infrastructure-as-a-service) so that development teams can focus on higher level application functionality.

46. Bain & Company, Digital Disruption: New Face, Same Brutal Pace, <https://www.bain.com/insights/digital-disruption-new-face-same-brutal-pace/>, September 28, 2022.

47. Cloud.gov, What is Cloud.gov?, <https://cloud.gov/docs/overview/what-is-cloudgov/>.

On the people side, gig economy labor can be used to augment the full-time workforce and help to adjust for seasonal highs and lows in workload or changing project needs. A powerful example is the use of seasonal workers each year to assist the Internal Revenue Service during tax season. It is estimated that by 2025, gig workers will account for 35-40 percent of the workforce, up from 15-25 percent in 2019.⁴⁸

By designing and building for adaptability across all these layers of strategy, people, process and technology, government agencies and departments will be able to maximize their agility in the years to come.



Recommendations

To summarize the action plan for designing and building for adaptability, here are four recommendations:

- **Determine the suite of enablers for your enterprise technology stack**—Based on these examples we've shared, compile your own list of physical and digital enablers of adaptability for your organization. Determine those to use right away for near-term implementation versus those to monitor on the radar for longer-term implementation.
- **Build internal expertise on the most important enablers for your organization**—Communicate this expertise with stakeholders and end users to help evangelize these technologies and how they can support dynamically changing requirements and even extremes where current systems and processes may fall short.
- **Look for existing applications and processes which can be modernized for adaptability**—Just like IT applications are modernized to be web- or mobile-enabled, review your application portfolio for opportunities to modernize for adaptability where it makes the most sense. This may generate quick wins that aid further resilience to your current portfolio.
- **Look for combinations of enablers that support adaptability even further**—Determine common combinations of enabling technologies that can yield additional value and unlock additional use cases. For example, the combination of drone-based bridge inspections together with digital twins for a 4D system of record (i.e., 3D models plus time-based analysis and prediction) and AI-based defect analysis may provide an agile new way to operate and maintain today's thousands of bridges located in each state of the United States and elsewhere.

Operate with Continuous Innovation

Since making adaptability a core competency can become a sizeable value lever in terms of a mission enabler for government, and competitive advantage for business, the best approach is to look for enablers of adaptability and to embed them across the full lifecycle from strategy to operations.

This means organization's make its strategy more adaptive as well as making its operations more adaptive.

48. Gartner, Gig Economy FAQs for Talent Analytics Leaders, <https://www.gartner.com/en/human-resources/research/talentneuron/gig-economy>, Q1 2019.



Overall, you're increasing the clock speed or cadence of both your strategic planning and also your operations and how quickly your organization can respond to change.



Adaptability should become embedded across the plan, design, build, operate and manage phases in the physical world and likewise across the design, develop, deploy, manage, and maintain phases in the IT environment.

Overall you're increasing the clock speed or cadence of both your strategic planning and also your operations and how quickly your organization can respond to change. It's about developing a powerful sense and respond mechanism throughout the organization.

This sense and respond mechanism should not only be monitoring for upcoming digital and physical enablers of adaptability—i.e., emerging technologies and trends—but should also be monitoring global risk factors and the various PESTLE forces we highlighted earlier.

Once you've detected opportunities and challenges on the radar, it's also important to prioritize as we discussed earlier when looking at the project prioritization matrix to help identify quick wins and must haves for the near-term and longer-term implementation roadmap.

While the radar operates continuously, you can also leverage event-based innovation workshops (i.e., ideation sessions) to pull together subject matter experts from across the organization to brainstorm ideas and opportunities where adaptability can benefit the organization. These work really well for groups of five to 25 individuals and can be run in as little as a couple of hours. The workshops typically generate 50 to 100 ideas from which an organization can short-list the most promising ideas by way of voting.

The organization should also accelerate innovation so that the signals from the sense and respond mechanism, often an emerging technology radar, can be quickly evaluated via pilots and proof of concepts and then moved into production. To accelerate innovation, study how quickly your current innovation program or initiative is able to move ideas from concept to value—i.e., from idea to implementation—through the innovation pipeline. What's the average time to implementation? For most organizations this is typically six to 12 months or similar for most initiatives.

To shorten your cycle times, explore where any procedural bottlenecks may be occurring and look for ways to bypass these bottlenecks especially for high-priority initiatives where response time is of the essence. This doesn't mean bypassing all the usual analysis and approvals but looking for ways to develop and implement a fast-track for high-priority adaptability initiatives.

Finally, it's important to look across your entire ecosystem since adaptability solutions are only as strong as the weakest link. Adaptability in one part of the system or value chain is of limited value if other parts of the system or value chain are brittle. Look to work with partners who understand the strategic significance and potential of adaptability in the years ahead and who are actively investing in these types of solutions across their own organizations and project and service portfolios.



Recommendations

To summarize the action plan for operating with continuous innovation, here are five recommendations:

- **Innovate for adaptability across strategy to operations**—Use continuous innovation to make your strategy more adaptive as well as making your operations more adaptive. Aim to increase the clock speed or cadence of both your strategic planning and also your operations and how quickly your organization can respond to change.
- **Establish an emerging technology and trend radar**—Go beyond the typical emerging technology radars to scout for global risk factors and the various PESTLE forces that may impact the organization. Forewarned is forearmed and use this information to guide your adaptive response.
- **Use Innovation Workshops to identify adaptability opportunities**—Identify opportunities where adaptability solutions or enhancements can help to either minimize disruptive risk and/or maximize mission or business value. The workshops should be in the form of half-day or one-day agile brainstorming sessions to identify a shortlist of opportunities for subsequent near-term or longer-term implementation.
- **Accelerate innovation to fast-track adaptability initiatives**—Be able to innovate quickly to solve for the unknowns. Review your current innovation program and how quickly you can move ideas from concept to value. Look for ways to develop and implement a fast-track for high-priority adaptability initiatives.
- **Involve an organization's entire ecosystem**—Like digital transformation, be sure to make adaptability a team sport. Involve all relevant stakeholders across your organization and look to work with partners who understand the strategic significance and potential of adaptability in the years ahead and who are actively investing in these types of solutions.

CONCLUSION

In summary, we hope that this report has helped to illustrate the strategic significance of adaptability to today's government organizations. With disruption now the norm rather than the exception, it's time to rethink business as usual and prepare for business as disrupted.

A digital government or enterprise only gets an organization halfway; an adaptive government or enterprise is the real end game. Adaptability is a mission enabler for government and a competitive advantage for business. It's not just about efficiencies, uptime, and keeping the lights on, but is a core competency and strategic enabler when dealing with any kind of change or disruption—including both challenges and opportunities. The benefit of having an adaptive system and ultimately an adaptive government is that organizations can meet and achieve more of their goals, more of the time, for more of their stakeholders.

Whereas resilience is often more about risk management and restoring a steady state, adaptability is a core competency that can support both innovation *and* risk management helping to optimize for ever-changing mission needs and ambient conditions. More than just a buzzword, or a 'nice to have,' adaptability is a powerful enabler for modern government and enterprise organizations to confront the next wave of business opportunities as well as the next wave of disruptive threats that land upon our coastlines, our citizens, and our societies.

It's time to ask: how adaptive is *your* organization?

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