A Guide to Digital-First Resiliency for Infrastructure Leaders

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Contents

Introduction

Digital transformation permeates almost every aspect of infrastructure management.

Through Geographic Information Systems (GIS), infrastructure assets once stored in hard copy files now exist as a living, digital inventory with location and major attributes used for applications such as modeling, purpose-built mapping, and dashboards.

The Computerized Maintenance Management System or CMMS was once limited to specific industries and organizations with major computing power. But through maturity, these systems now serve as full-on cloud-based Enterprise Asset Management (EAM) systems for the masses, opening the door for an array of industries to leverage for operations and maintenance. Supervisory control and data acquisition or SCADA started in power plant control rooms and now provides real-time data collection through smart meters installed across city water systems.

These technological advancements help infrastructure organizations stay resilient.

Why Resiliency Matters

Resiliency highlights the ability for an organization to "...recover from or adjust easily to adversity or change," as defined by Merriam Webster. While many organizations progress through the digital transformation timeline at varying paces, digital-first resiliency introduces a new approach focused on taking on infrastructure resilience head on using technology and digital solutions as the main driver for sustained change.

The difference between digital transformation and digital-first resiliency

Digital transformation and digital-first resiliency share similarities such as making organization-wide changes by gauging the appetite for innovation and committing to using technology to enhance processes or operations. But some differences do exist.

Digital transformation

According to TechTarget, digital transformation can be defined as "...the incorporation of computer-based technologies into an organization's products, processes and strategies."

Some additional characteristics suggest digital transformation:

- Is inevitable and driven mostly by the industry adapting to changes
- Infers that you must digitize everything to achieve transformation
- Is long-term, you might not achieve full transformation for a long time

For example, the adoption of remote monitoring capabilities became essential during COVID-19 but this type of technology was seldom applied in water 5-10 years ago despite existing since the early 2000s. The municipal transition from manual meter reading to Automated Meter Reading (AMR) and Advanced Metering Infrastructure (AMI) serve as great examples of digital transformation that takes time to adopt.

These technologies have been applied to individual account water meters throughout the country. AMR simplifies the collection of meter readings by allowing municipal employees to get close to a meter and easily collect a meter reading through a wireless signal. Conversely, AMI provides a higher-end two-way communication, facilitating much more fluid data exchange between a service provider and their meters.

Digital-first resiliency

Trinnex defines Digital-first resiliency as connecting existing data investments and internal knowledge with digital solutions to enable smarter infrastructure decisions today for a more efficient, sustainable, and equitable tomorrow.

Some additional characteristics of digital-first resiliency include:

- It's proactive, future-thinking and action-taking
- Your organization's strengths determine how you can reimagine the status quo using emerging technologies and processes, or even creating tools that don't yet exist
- It's about generating quick wins, identifying where data deficits exist today and using that information to guide you on your digital journey

For example, digital twin technology enables sewer system overflow programs such as the Hartford Clean Water Project to pivot project activities quickly by using real-time simulations to monitor large-scale rain events, a task once only completed through time-consuming manual analysis.

This guide focuses on the steps necessary to implement a digital-first program foundation today and the strategy required to support smarter infrastructure decision-making for tomorrow.

How to implement a digital-first resiliency strategy

Implementing a digital-first resiliency strategy requires meeting potential roadblocks head on. Many infrastructure leaders face several challenges including:

- Understanding, managing, and mitigating risks (including asset failure, compliance issues, etc.)
- Responding to disruptions such as new tech, regulations, climate change, political change
- Meeting targets that are increasingly visible (e.g., financial, environmental, etc.), with the ability to report on and defend decisions
- Lacking a business model for digital projects—i.e., who pays for the new technologies and systems (whether it's federal, state, the private sector, or rate payers)
- Managing complex, siloed, or fragmented information from internal systems and working off the same, reliable, up-to-date information
- Maintaining service levels at minimum cost, by optimizing processes and use of your assets
- Capturing valuable institutional knowledge to support operational decision-making
- Understanding the benefits/impacts of Digital Transformation and how to develop a digital strategy/roadmap
- Move away from outdated business processes and work off the same, reliable, up-to-date information

Understanding your own challenges sets the stage for understanding whether it's the right time to kick off your digital journey.

Step 1: Determine the right timing for your digital journey

Most infrastructure leaders aspire to stay ahead of the curve while keeping day-to-day operations running consistently and managing risks such as increasingly dynamic environmental factors and meeting regulatory requirements. It's a true balancing act. But many trends today indicate that now might be the right time to kick off a digital journey, including:

- **$1 Trillion:** The U.S. Infrastructure Investment and Jobs Act includes funds for projects supporting modernizing water infrastructure for distributing equitable clean water, removing lead pipes, and protecting communities against climate change and extreme weather events
- **$15M:** The cost of poor data quality to businesses per year, indicating an opportunity for more integrated information management
- **2024:** By October 2024, water utilities must comply with the Lead and Copper Rule Revisions, including providing a full pipeline inventory and public inventory map for community access
- **4 of Top 5:** Barriers to Smart Water innovation are issues of people and process – not technology
- **90%:** Utilities who reported in a study that their data is siloed or paper-based, providing an opportunity for integrating data streams for improved system operations and management
- **223%:** Increase in cybersecurity incidents at utilities from 2019 to 2020, showing the urgency for a strategic approach to digital adoption
- **8 Seconds:** The daily frequency of a baby boomer turning 65 presents a growing workforce gap especially with low retention rates from incoming generations. Digital generational knowledge transfer results in a perpetual return on investment made in legacy staff training and experience

Step 1: Determine the right timing for your digital journey

Economic and regulatory factors aside, driving your digital journey all comes down to the most important one of all: the human factor. This includes:

- **Employees:** they're the front lines, operating the systems, making critical decisions based on what's worked and hasn't worked in the past
- **Organization Stakeholders:** they expect to see positive results, progress on digital projects, and an action plan to resolve issues before they escalate
- **Community Members:** they trust that you'll deliver top quality services as cost-efficiently and reliably as possible, with instant communication when challenges arise

Step 2: Use the SEED Process to develop your digital strategy

The journey to real-time analysis, actionable insights, and data-enabled decision-making starts with the SEED process.

S ***Stakeholder Management***

Pinpoint where you are in your digital journey.

This step determines where you are in your digital journey. It identifies your current needs, the resources and systems you have available, and your organization's comfort level with new technology.

E ***Exploration***

Assess the best tools for your organization.

With so many software tools available today, you'll need to assess what's out there, how they fit into your current situation, and how they might integrate with each other and your existing systems.

E ***Evolution through Iteration***

Optimize and tweak until everything clicks.

Making the most of your digital tools sometimes involves tweaking until everything clicks. Your vendor should be guiding you and listening to you from set up and even as you become a power user.

D ***Date-Enabled Decision Making***

Make better infrastructure decisions.

At this point, you should have a suite of powerful tools to navigate significant infrastructure decisions by harnessing existing data and internal knowledge and transforming them into smart, defensible actions.

By following the SEED process, you'll be one step closer to reaching digital-first resiliency. The end result provides actionable insights for your organization through analytics and data intelligence, where you'll go from asking "what is happening" to "here's how we can gain an advantage".

Step 3: Find a sherpa to help you through the journey

Your organization is not one-size-fits-all and neither is your digital journey. While you have the option of taking the digital journey on your own, that doesn't mean you shouldn't look for guidance.

Think about the range of Himalayan climbers, from mountaineer enthusiasts to professional sherpas. With the advancements of technology such as Gore-Tex, GPS, and oxygen tanks, the demand for sherpa guides has not stopped regardless of a climber's level of experience. Sherpas reduce risk, help carry the load and provide comfort and confidence along the way. And the best sherpas have not only climbing experience, but also tech experience to make your journey smoother.

The approach to taking on your own digital summit is no different. Perhaps you already have some digital elements in place such as a CMMS or IoT sensors on your most important assets. Perhaps you're already working with a vendor on implementing some new tools. Ideally, your partner should know how to implement the tools and provide the services you need to feel fully confident in your most critical infrastructure decisions.

Make smarter infrastructure decisions today

Trinnex exists to serve clients with a suite of powerful software applications and in-house services for true digital solutions. Schedule a free consultation with the Trinnex team to support your digital-first resiliency strategy today!

About Trinnex

Trinnex, a subsidiary of CDM Smith, provides utilities and infrastructure owners an on-ramp to their digital journey through processes, software tools, and partnership. Trinnex offers the CAST platform, a suite of cloud-based software including pipeCAST, leadCAST, epiCAST, and precipiCAST, arming leaders with actionable insights to drive infrastructure objectives forward. Additional services include asset performance and capital planning, digital strategy and transformation, decision analytics and optimization, and digital twin design and development.