
TECHNOLOGY MODERNIZATION FUND:

Learning from Tech Investment Funds

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EXECUTIVE SUMMARY

Congress authorized the Technology Modernization Fund (TMF) as part of the Modernizing Government Technology Act of 2017 in order to fund agencies' information technology (IT) modernization projects. A board of senior federal subject matter experts oversees the fund and evaluates TMF projects to ensure that approved projects are likely to succeed. When the board approves a project, the agency receives funds with the agreement that once the project is complete, they will repay the dollars along with an administrative fee. Since the projects were designed to save money, this reimbursement was often a wash, but the repayment requirement deterred applicants. The TMF first operated in fiscal year 2018 with a \$100 million appropriation followed by \$25 million in FY 2019, 2020 and 2021. During its first four years, the TMF funded 11 small and midsized IT projects across seven agencies.

These first four years focused on funding for incremental changes with minimal risk. The American Rescue Plan (ARP) is expected to change that mindset in FY 2022. It includes an unprecedented \$1 billion appropriation for the TMF. Another change: relaxed repayment guidelines for projects related to cybersecurity and modernization.

This funding demonstrates that Congress and the president believe the TMF is an important mechanism for government modernization. However, expectations and scrutiny have increased with the additional funding, making it necessary for the TMF to evolve its processes and approach to address its expanding mission.

This white paper:

- Details TMF's history and its current state of operations;
- Identifies lessons from conventional tech investment funds that could help the TMF reach its potential;
- Recommends improvements to the TMF management and execution that would align with accepted best practices, achieve the administration's IT modernization priorities, and empower agencies to drive digital transformation across technology portfolios.

“Congress established the TMF ... to help agencies kick-start IT modernization efforts, including the replacement of legacy systems.”

Democratic members of House Committee on Oversight and Reform

“[T]he TMF ... used responsibly, is a vital tool for the federal government's task of keeping our nation's critical IT infrastructure efficient and secure.”

Senator Jerry Moran (R-KS)

A MOMENT IN TIME

The Technology Modernization Fund Basics

The TMF launched after a breach at the Office of Personnel Management (OPM) between 2014 and 2015, which compromised data from more than 20 million people, including millions of security clearance background records. The breach followed nearly a decade of warnings from OPM's inspector general about security vulnerabilities, many of which went unaddressed for years. These contributed to a growing consensus around the dangers of outdated and ineffective IT systems.

During discussions about how to fix the problem, advocates cited 10x, a program at the General Services Administration (GSA) that funded early-stage prototypes for improving government services. 10x allowed GSA to validate initial concepts before requesting appropriations from Congress. This led to a question: What if a similar working fund could be established to support transformative IT projects across the government?

The Obama administration agreed, and proposed a \$3.1 billion Information Technology Modernization Fund that could be allocated to tech projects related to modernization and system optimization beyond simple maintenance. The concept garnered bipartisan support — a 2016 Republican Majority Staff Report on the OPM breach included a recommendation to consider “incentives for agencies to achieve savings through modernization and innovative financing options to promote modernization.” Congress was hesitant, however, to provide too much funding or discretion to the White House around how funds would be dispersed, but embraced the idea that investments in system optimization could produce savings through retirement and replacement of legacy systems with modern commercial capabilities.

The resulting compromise is the Technology Modernization Fund included in the FY 2018 National Defense Authorization Act. The TMF is governed by the Technology Modernization Board chaired by the federal chief information officer (CIO) and includes senior technical leaders from federal agencies: the GSA, the Cybersecurity and Infrastructure Security Agency (CISA), the United States Department of Agriculture, the National Geospatial-Intelligence Agency and the Veterans' Affairs Administration (VA). The only permanent members of the TMF Board are GSA, CISA and the federal CIO as chair.

TMF review and funding started immediately, but with recent high-profile hacks like SolarWinds exposing vulnerabilities in federal IT systems, there is a sharply growing recognition of the need for effective services. Key tech modernization projects must ramp up quickly, effectively and at scale.

GETTING FUNDING FROM THE TMF

A Primer

The TMF uses a two-step process to review submissions. During the first four years, agencies submitted initial project proposals (IPPs) using a simple form. The initial proposals included a short summary of the IT problem agencies intended to solve, why TMF funding was needed, and how the funds would meet goals outlined by the board. If the board was interested, it requested a full project proposal (FPP) with a more rigorous submission and evaluation. This included an in-depth pitch with detailed financials, execution strategies, and a “Shark Tank”-style pitch for how the project enabled agency mission priorities. The TMF selected projects based on agency mission impact, feasibility, opportunity enablement, and support of common solutions. While the reviews were often quick, some agency CIOs indicated that the feedback from IPPs was lengthy and often took a long time to receive.

If the board approved the FPP, the agency made a written agreement with GSA, the executor of the TMF funds. It included:

- Incremental milestones to receive incremental funding;
- Terms for repayment of funds via the cost savings received through the project.

The TMF Board reviews these projects quarterly. The Program Management Office (PMO) helps conduct much of the preparatory work for reviewing both project proposals and project progress. Congress also has a notification period on projects. If members of Congress express dissatisfaction with a potential project, it is unlikely to continue.

However, following the \$1 billion ARP investment, TMF entered a new phase critical to this moment. TMF guidance changed to allow agency applicants to propose projects that do not need to be completely repaid and ideally projects that promote modern principles and practices. Agencies can submit applications that require full, partial (75%, 50%, 25%) or minimal repayment. In addition, agency funds can come from most agency accounts that support IT activities. Repayment begins within 12 months of receiving funds or six months after project completion, whichever comes first. All projects require approval of repayment terms from GSA and OMB. This change in guidance, along with the \$1 billion from the ARP, led to a dramatic increase in proposal submissions. More than \$2 billion in projects have been submitted since the ARP funds and new guidance were launched.

One expert, U.S. CIO Clare Martorana, praised the 2.0 phase. She was quoted at a July congressional hearing as saying, “I am so bullish on the Technology Modernization Fund. Now that we’re in a 2.0 phase with the \$1 billion in the American Rescue Plan funding, I see enormous possibility.”

Priority investment areas in the 2.0 phase include:

- Modernizing high-priority systems;
- Cybersecurity;
- Public-facing digital services;
- Cross-government collaboration projects.

LEARNING FROM PRIVATE AND PUBLIC SECTOR BEST PRACTICES

What Government Should Know

Technology investment funds exist in the public and private sectors. While there are differences across these settings, and not all practices in either sector are necessarily relevant or transferable to the TMF, we have found some foundational assumptions that are applicable. Based on conversations with tech experts in the public and private sectors, we identified the following as best practices of investment funds and noted where they are applicable and can lead to better outcomes for the TMF. Below, find two sets of best practices that can bring success — one for building and evaluating the approach of an investment fund like TMF, and one for evaluating and supporting projects for an investment fund — and how they relate directly to the TMF.

Best practices for building and evaluating the approach of an investment fund

BEST PRACTICE 1

DEVELOP CLEAR, CONCRETE, MISSION-DRIVEN GOALS (AND MODERNIZATION ALONE DOESN'T COUNT)

The best private and public sector funds have clear, concrete, mission-driven goals. Private sector investment funds may come in the form of growth, venture or corporate funds. The goal is improved profit, which differentiates private sector from public sector goals. However, smart investments with clear, concrete and measurable goals are applicable to all sectors.

Some examples of public sector goals might be to increase customer retention or to speed the delivery of a product. A state unemployment system might set a goal of safely increasing the number of unemployment insurance (UI) claims processed automatically and accurately while reducing the number of false fraud flags raised and fraudulent claims being paid. All of these goals could be clearly tied to the mission of a UI agency: delivering financial relief to eligible Americans in a timely manner at scale.

A fund or project is unlikely to succeed when its goals are unclear, intangible or unmeasurable. Too often, projects are greenlit with the stated goal of “modernization” without articulating clear, tangible and measurable mission-related goals. These projects do not tend to succeed. And unfortunately, government projects such as UI system overhauls fail far more often than they succeed. A [2016 report](#) by Boston Consulting Group (BCG) estimates that “70% to 80% of public-sector core-system modernizations either fail outright or are disappointments.” BCG adds that these projects are often over budget and over deadline, and fail to produce their intended outcome. There are many reasons for this result. We interviewed public and private sector experts to uncover what goes wrong and to identify best practices that could eliminate these issues.

BEST PRACTICE 2

FOCUS ON MAXIMIZING OUTCOMES, NOT MINIMIZING LOSS

A 2021 [BCG article](#) pointed out that IT is often treated as overhead. “When planners view IT as a cost center, they focus on cost minimization rather than value creation. Goals of delivering better services, such as improved mental health or access to justice, become secondary.”

Private sector investments tolerate risk in support of critical outcomes. Too often, public sector investments seek only to minimize financial risk. One civic tech executive noted that public sector IT leaders should avoid the temptation to take the lowest risk projects, and another private investor [noted](#) that stakeholders should work to mitigate risk across the fund, such as by spreading out investments over time, stage and sector. Some projects will inevitably fail regardless of your risk tolerance. The goal is to get strong returns on enough investments so that the portfolio as a whole has meaningful outcomes to point to over time.

BEST PRACTICE 3

BUILD CLEAR DECISION-MAKING PROCESSES TO MEET FUND GOALS

Many private sector funds prepare data-driven [investment memos](#) for each specific project. The TMF should require that agencies develop an overarching thesis, identify specific metrics for investments, and build a governance structure that enables a group to vet projects in accordance with that thesis. For example, a government executive suggested that in addition to the TMF board’s bottom-up call for initial project proposals, the fund’s board might explicitly nurture and select projects that maximize scale and impact in the most critical areas.

An IPP for the TMF should provide enough relevant data so that TMF can rigorously analyze a project’s alignment with its agency’s thesis and metrics for success akin to an investment memo. Such a deep analysis could also help ensure that the fund considers the possible ways the investment might fail.

Finally, there should be processes to consider contrasting opinions on an investment. A straightforward majority vote among all board members — or agency stakeholders — is not necessarily the best approach. For example, one private investor we spoke to is part of a firm where investments require the support of just two partners (rather than a majority), though every partner has the ability to veto an investment.

BEST PRACTICE 4

PROVIDE SUPPORT, NOT JUST MONEY

Venture capital partners and other private sector investors don’t just write a check and cross their fingers. They identify strong leaders and teams, invest in them, and then provide guidance, advice, third-party coaching, connections and a supportive sounding board when things go wrong. Key to this support is the ability to be honest when inevitable wrinkles, or even failures, appear. Investors can best support through crises when they know what’s going on and have established sufficient trust with the investee to keep lines of communication open and dialogue frank.

This same trust and communication from the Program Management Office would benefit TMF projects, ensure that all funded projects have strong leaders and teams, and provide the support

to help project teams strategically and operationally. This might include regular meetings that include details about hiring, technical roadblocks, communications strategy and more. Crucially, by keeping a line of communication open, it is easier for project teams to share challenges. A product manager and a civic tech executive we spoke to explicitly named this as a best practice. Openness builds trust between the fund and project team, and can encourage the fund to support increasingly effective project teams even when their initially funded proposal doesn't work.

Direct support could include engaging United States Digital Service (USDS), Technology Transformation Services (TTS) or other such teams to help clarify goals, test assumptions, build capabilities (e.g., product management, user research, and blameless postmortem practices) and help agency leaders establish a trusting and high-functioning culture. Ultimately, the TMF itself should have digital services teams and technical experts that can think through prototypes, write procurements, sit alongside contractors and ensure the right products are built for the right needs.

BEST PRACTICE 5

INVEST IN ROUNDS WITH INCREMENTAL DELIVERY BENCHMARKS

Projects in the private sector are typically funded incrementally, with clearly defined stages of the project or “gates” and specific outcomes that must be delivered in order to move forward to the next funding stage. Those we interviewed universally stressed this incremental funding. The practice allows investors to honestly and accurately assess whether the project is likely to succeed, and creates opportunities for discussion about whether changes may be needed in the plan. Public sector stakeholders should be held to the same standard, with specific, outcomes-focused benchmarks set to unlock each subsequent round of funding. The TMF currently uses a paradigm of rounds. However, the TMF could improve their approach by tying rounds to specific metrics as noted above. Code for America, a public service organization, uses this best practice, which ties its investments to specific metrics using the framework below.

LEARNING		LEVERAGE		LASTING CHANGE
Identify the user need through discovery .	Prototype towards a solution that addresses the user need.	Pilot the solution to validate that it has the desired impact.	Scale our impact to grow influence within the system.	Use our leverage to change the system .
Investment < 6 weeks < \$100k 2–3 person team Revenue No expectations Impact Vision for systems change Early partner relationships Helping a handful of people Outputs Systems change vision Market research User research Peer review	Investment 6–12 weeks \$150–300k 3–4 person team Revenue No expectations Impact Vision for systems change Early partner relationships Helping hundreds of people Outputs Working prototype(s) Product vision North Star Proxy outcomes Peer review	Investment 6–18 months \$600k–3M 4–6 person team Revenue No expectations Impact Vision for systems change Strong partner relationships Operational wins Helping thousands of people Outputs Production quality service Security & infra reviews Proven outcomes Promising growth channels Partnership strategy Evidence of influenced change Revenue plan Peer review	Investment 12–24 months \$2.5M–6M 6–10 person team Revenue Business model implemented Revenue starting to come in Impact Big systems change goals Indispensable to partners Growing group of advocates Growing number of ops wins Helping most eligible people Outputs Stable & repeatable operations Proven growth channels Proven partnerships strategy Sustainability vision Systems change plan Flat operating costs Stable recurring revenue	Investment Indefinite time \$3–4M a year 10–14 person team Revenue Business model mature Consistent revenue on target Impact Achieving systems change goals Helping most eligible people Outputs Achieved systems change goals Sustainability plan

Code for America

BEST PRACTICE 6

SPREAD INFORMATION TECHNOLOGY INVESTMENTS ACROSS AGENCIES, E.G., INCENTIVIZE SHARED SERVICES

Ask any private sector CIO for a great way to improve productivity and end-user experience and they will probably say: remove silos and boost collaboration. Public or private, good shared services can improve user experience and increase security. The approach is not a silver bullet, as any project would need to go through deep due diligence. However, carefully thought-through, user-focused, well scoped and appropriately resourced shared services can make working with the government easier.

The public sector can benefit from this by encouraging cross-agency digital service organizations such as 18F, the USDS and others to work with agency CIOs to submit applications to build shared services at multiple agencies. For example, Login.gov had a USDS lead working out of the GSA office. They worked side by side with VA for a first use case and DHS for a second use case. The current TMF funding process makes it difficult for agencies to apply together for this purpose.

BEST PRACTICE 7

CREATE A GROWING FLOW OF HIGH-QUALITY PROJECTS INTO THE FUND PIPELINE

Funds are overall more effective when they source high-quality project proposals from a large number of places, according to private investors. For government stakeholders, this means that funds such as TMF should proactively identify strong leaders and projects in order to increase the sources of applicants, as well as to ensure that the fund is truly sourcing the best possible projects across the entire ecosystem. In addition to actively seeking out strong leaders and projects, the PMO must collect the metrics. It should capture which agencies are applying and the level of support it provides to each. For example, someone might be in charge of increasing the number of agencies that submit high-quality projects and the overall number of high-quality submissions. Their goal should be specific and measurable — e.g., secure at least three quality proposals per agency from 20 different agencies. This incentivizes the PMO to determine why certain agencies are not applying.

For this best practice to work, projects that are likely to fail would need to be rejected. Otherwise, an effort to increase the number of quality projects would distract from the ability to support existing high-quality projects.

BEST PRACTICE 8

COMMUNICATE WITH INVESTORS REGULARLY AND EFFECTIVELY

In the private sector, venture capitalists are accountable to their initial investors. In the federal government, IT capital funds are accountable to Congress, which allocates capital for the fund, and to taxpayers. In both cases, transparency is necessary to ensure the sponsors of the fund are properly involved in the fund's decision-making. This can include: regular meetings, quarterly reports and updates, shared databases that track investments and impact, or publicly publishing the data regarding how much has been invested in projects and their outcomes. 10x at GSA shares outcomes publicly.

Using this as a baseline, the TMF should regularly communicate successes and challenges with Congress, agencies and the public and include what it has done and why it focuses on strong decision-making and outcomes. The deputy director of management at OMB might highlight the TMF projects report as a standing part of Presidential Management Council meetings. The OMB budget director should be briefed quarterly, in advance of congressional briefings, on the status of the TMF portfolio and specific projects. Generally, the TMF needs to make visible the significant impact of its funded work, and illustrate how projects lead to improved services and quality of life — and how challenges are identified, addressed and learned from.

Best practices for evaluating and supporting projects for an investment fund

BEST PRACTICE 9

CONDUCT DUE DILIGENCE AND START WITH DISCOVERY SPRINT

The private and public sector individuals engaged for this paper shared the view that an investor cannot take a project proposal at face value. They must conduct due diligence to ensure the team and technology have the capabilities the project claims, all finances are in order, the project can deliver the proposed returns — that the technology and systems assumptions are correct — and that all laws are being followed. Every private sector investor we spoke to said that successful investments require a strong project leader, engineering team and product manager.

Before a single dollar is allocated, the TMF PMO should engage qualified teams, such as USDS or 18F, to conduct a discovery sprint, spending a short period of time to quickly identify the root causes of the problems, determine technical capability, and identify any opportunities that a new system or project can bring. Due diligence must include an estimate of the technical talent required to properly verify and validate a project. This team should grapple with the proposed technical ideas, and also look closely at the technology that already exists in and outside of government. This investment up front can dramatically increase the likelihood that the project will solve the right problems and benefit users. An added bonus: The qualified teams running the sprint might provide ongoing, critical support to successful project teams.

USDS received \$300 million in the ARP and the GSA received significant digital funding, so Congress clearly prioritized investing in building digital service capacity and better technology at a massive scale. OMB, USDS and GSA should work together to ensure the TMF program has the support of those who can enable the effective delivery of fund dollars.

BEST PRACTICE 10

FOCUS ON CLEARLY DEFINED AND MEASURABLE OUTCOMES, NOT ADHERENCE TO PLANS

First proposals, even with support, cannot foresee all challenges or opportunities. Therefore, teams should have the ability to pivot as they learn more about how to tackle an identified problem. Often a different strategy, developed while doing the work will provide a better outcome; as long as the new thesis is well-supported and there is still a clear and substantive goal. The public and private investors we spoke to insisted on the importance of this agility.

In focusing on outcomes, the outcomes must be clearly defined. What specific measurable outcomes for users of the system (including users and beneficiaries) is this modernization supposed to drive? How do you release funds in a way that maps progress toward those outcomes? Specifying these outcomes can help to quickly identify a lot of untested assumptions. It is important to note that a project that does not articulate these outcomes may still be able to reach the outcomes. Many projects are not familiar with how to articulate specific measurable outcomes, and an effective fund will work with projects to explore and clearly state goals.

BEST PRACTICE 11

BUILD CAPACITY WITHIN AGENCIES

Language in the TMF prioritizes the use of commercial products and services. While commercial software should certainly be used to meet commodity needs, one government executive experienced with TMF posits that prioritizing commercial products and services limits TMF's ability to take on critical projects and to build the internal tech capacity CIOs and agency teams often need to effectively deliver on mission goals. It is crucial that TMF dollars build internal tech capacity and leadership in chosen projects. TMF should make sure it uses all of its authorities to avoid unnecessarily prioritizing commercial products and services over building internal capacity to deliver on the most critical technical projects in government.

BEST PRACTICE 12

TEST A PROJECT'S RISKIEST ASSUMPTIONS EARLY

In addition to managing risk at the portfolio level, smart investors seek to understand each project's riskiest assumptions and work with the team to test those assumptions as soon as practically possible. It may be a novel technology, it may be a wary stakeholder or partner, or it may be an assumed distribution channel, but any element of the project's success that creates a big enough question mark down the road will threaten to make all or most prior investment irrelevant. Many teams working in low-trust environments put off the riskiest elements of the project for fear that these difficult elements will make the team and the project look bad, and reduce investment. (A classic and evergreen risk is whether users will find software usable, which is why successful projects conduct user testing much earlier than in projects that fail.) In a high-trust environment,

project teams and investors embrace these risky elements, find out as much as possible about them, and make plans to either overcome them or pivot the project accordingly. As they say, “Bad news early is good news.”

If the project team needs help assessing which elements of its plan are riskiest, and how to address these risks, a technical team within the PMO or teams from USDS or TTS could support, per above.

BEST PRACTICE 13

DESIGN AN APPLICATION PROCESS USEFUL TO ALL PROJECTS

In the private sector, very few projects are funded. There are far more companies that apply for investments than there is funding or staff to provide feedback. However, civic tech executives engaged for this paper identified the TMF application as a lever for change. The application process can be an opportunity for technical coaching and improvement. One civic tech executive noted that the result of the application process should feel like a “compass, not a grade.” Projects should have a better direction to pursue after applying, even if they don’t end up getting funded.

This starts with strong tactical communication with projects:

- The fund should clearly communicate its timelines, expectations and decision schedule;
- Applicants should know where they are in the application process, and rejected teams should be informed of the rejection quickly;
- The fund should ask only for information that is necessary to make a decision;
- The TMF might also maintain a progress dashboard that shows applicants their status, shares other projects and highlights opportunities for collaboration.

In addition to tactical communication, the TMF could give useful feedback to the most promising applicants so that their proposed projects might succeed, even without TMF funding. If the TMF encourages discovery sprints as part of the application process, the results of those sprints can be useful immediately.

Yet, useful communication and feedback requires a significant investment of time and capacity. The American Rescue Plan timeline is short and TMF’s capacity to provide thoughtful responses to every application may simply not exist right now. At the same time, every communication that the TMF has with an agency is an opportunity to incentivize effective approaches that make government work for families, workers and businesses. There will be tough tradeoffs, but there is a north star. As the recently appointed GSA administrator Robin Carnahan once said, “We can’t implement government policy if we can’t make the damn websites work.”

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