Pilots to Production: Integrated Findings and Case Studies

IT Management and Modernization Community of Interest

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Synopsis

This white paper, "Pilots to Production: Integrated Findings and Case Studies," by the ACT-IAC IT Management and Modernization Community of Interest, explores the challenges and success factors in transitioning technology pilot projects to full-scale production within government agencies. Many pilots fail not due to technical issues, but rather insufficient governance, security, stakeholder commitment, and well-defined change management processes.

The paper highlights common challenges such as scope creep, procurement complexity, security bottlenecks, and resource volatility. It emphasizes the importance of strong executive sponsorship, clear objectives and key metrics, human-centered solutions, and effective risk management as critical success factors. Key lessons learned include the necessity of strong Minimum Viable Products (MVPs), prioritizing user experience, minimizing workforce readiness gaps through training and knowledge transfer, and managing unanticipated setbacks. The paper concludes with best practice recommendations for standardized governance, embedded cybersecurity, product-centric teams and robust change management to ensure scalable solutions and sustainable positive impact on operations and areas for future research.

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1.0 Introduction and Executive Summary

1.1 Introduction

Government agencies rely on pilot projects to test new technologies and reduce risk before committing to large-scale deployments. Yet many pilots, despite encouraging early results, stall before reaching production. These failures often arise not from technical deficiencies but from gaps in governance, security alignment, organizational readiness, and procurement. Successful transitions require synchronizing people, processes, and technology within the specific constraints of federal environments.

Across all case studies reviewed, one conclusion is consistent: technical capability alone is insufficient. Pilot success depends on cross-functional coordination, early and continuous stakeholder engagement, and disciplined scope management. Agencies that pair technical readiness with operational planning are better equipped to scale solutions that deliver measurable mission impact.

1.2 Theoretical Framework and Design

1.2.1 Research Framework

To provide structure and direction for this investigation, this research is grounded in established theoretical concepts, the Contingency Theory Framework, which informs the analytical process. A theoretical framework "*is derived from a deductive approach – concepts or theories, sometimes more than one, which are used to direct the research process (Fain 2017)*", (Lynch et al., 2020, p.25). The Contingency Theoretical Framework is the most applicable for the Pilots to Production (P2P) case studies because it provides the structure through which the analysis will be shaped and lessons learned derived. It assumes there is no single organization/leadership structure that is effective in all situations and is best suited to guide research in investigating ways for organizations to be effective by designing an organizational structure that is compatible with conditions (Cankaya, et al., 2022). Among the case studies assessed, organizational structure and related contingency factors that affect pilot scalability such as processes, ways of working and technology, reveal how effective organizations are in bringing pilots to production. In Figure 1, the Contingency Theory Framework for P2P is represented and displays considerations that need to be balanced when assessing which combination of strategies should be implemented.

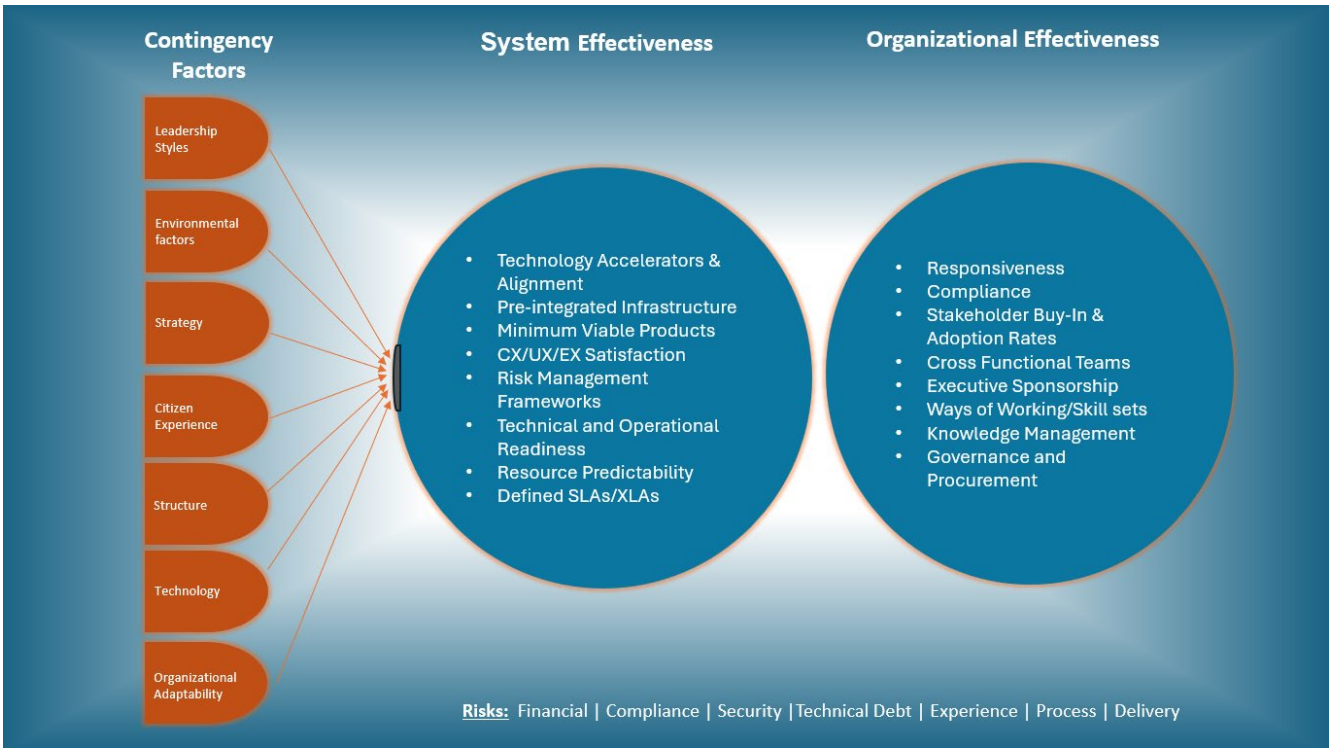

Figure 1: Pilots to Production Contingency Theory Framework

1.2.2 Research Questions

This white paper synthesizes insights from practitioner interviews and academic research articles to construct a coherent guide for navigating P2P transitions and answers the following questions:

1. Which operational and organizational challenges most frequently impede P2P transitions, and which proactive strategies can reduce negative impact?
2. How do governance frameworks, integrated risk management, and embedded cybersecurity practices influence the safe and timely scaling of pilot initiatives?
3. In which ways do product-team configurations, training programs, and change-management strategies affect sustained user adoption and the total experience of P2P transitions?
4. How does the integrated use of Objectives and Key Results (OKRs), Key Performance Indicators (KPIs), Service Level Agreements (SLAs), and Experience Level Agreements (XLAs) influence the successful adoption, scalability, and operational impact of pilot initiatives in government agencies?
5. What is the impact of human-centered design and stakeholder engagement on adoption and operational efficiency?

The research focused on actionable strategies within leaders' control, including defining scope and success criteria, cybersecurity activities, structuring cross-functional teams, feedback loops, and instituting data-informed decision gates. The P2P Contingency Theory Framework is relevant for smaller or matrixed organizations, where cross-functional coordination and role clarity determine

velocity. By maturing the P2P process, agencies can reduce risk, increase transparency, and shorten time-to-value for mission services.

1.2.3 Methodology

This study adopts a structured, multidisciplinary methodology to examine the factors influencing P2P transitions. Research questions are designed to capture both operational and organizational dimensions, including challenges, governance, risk management, stakeholder engagement, training, and measurement best practices. To operationalize these questions, a combination of qualitative and quantitative approaches was employed, drawing from case studies, interviews with subject-matter experts, organizational documentation, and relevant peer-reviewed literature within the last five years.

Each research question is mapped to specific sections of the study, enabling transparency in how insights were derived and ensuring that findings are actionable. Themes were extracted from pilot implementations, lessons learned, and adoption outcomes, while metrics such as Objectives and Key Results (OKRs), Key Performance Indicators (KPIs), Service Level Agreements (SLAs), and Experience Level Agreements (XLAs), were analyzed to quantify progress and effectiveness. Mapping research questions to data sources, analysis approaches, and relevant sections of the paper (Table 1) is intended to demonstrate a rigorous and systematic approach to understanding what drives successful scaling of pilot initiatives across both technical and human dimensions.

Table 1: P2P Research Methodology

Research Question	Data Sources	Analysis Approach	Paper Sections Addressed
Which operational and organizational challenges most frequently impede P2P transitions, and what proactive strategies can reduce their impact?	Case studies, interviews, project documentation	Thematic analysis, cross-case comparison	Sections 2.3.1, 2.5, 3.1.3, 4.0, 5.0
How do governance frameworks, integrated risk management, and embedded cybersecurity practices influence the safe and timely scaling of pilot initiatives?	Expert interviews, agency policies, literature review	Qualitative coding, pattern matching	Sections 2.4, 3.1.1, 3.2.2, 5.0
In what ways do product-team configurations, training programs, and change-management strategies affect sustained user adoption and the total experience of pilot-to-production transitions?	Pilot reports, industry best practices	Mixed-method analysis (quantitative metrics + qualitative insights)	Sections 3.3, 3.3.1, 3.3.2, 5.0

Research Question	Data Sources	Analysis Approach	Paper Sections Addressed
How does the integrated use of OKRs, KPIs, SLAs, and XLAs influence the successful adoption, scalability, and operational impact of pilot initiatives in government agencies?	Performance dashboards, reporting metrics	Statistical correlation, trend analysis	Sections 2.2.2, 3.1.1, 3.1.5, 5.0
What is the impact of human-centered design and stakeholder engagement on adoption and operational efficiency?	Observations, user feedback, pilot documentation	Thematic analysis, impact assessment	Sections 3.1.2, 4.2, 5.0

2.0 Common Challenges

Transitioning IT pilots into full-scale production environments presents a complex set of challenges that go beyond technical feasibility. Visible barriers before deploying an IT pilot, such as unfocused objectives, unrealistic expectations, unbalanced teams, lack of skills, and high dependency on key individuals, are precursors to scope creep (Berndtsson et al., 2020). Anh Campbell, Project Manager at the Federal Communications Commission (FCC), underscores this by stating, "*One of the key lessons learned was the importance of having a detailed project schedule. This helps in planning and executing migration phases effectively.*" Delayed security approvals frequently emerge late in the process, creating avoidable bottlenecks with earlier coordination. Moreover, procurement and governance complexities, such as rigid contract models and fragmented accountability, can hinder collaboration and slow execution. Addressing these challenges head-on is essential to ensure pilots are not only technically sound but also organizationally viable and scalable.

2.1 Containing Scope Creep

Scope creep is a persistent threat to pilot success, occurring when additional requirements are introduced before the original core goals are met, often without proper review or stakeholder alignment. Rushing to expand a pilot's scope can undermine its maturation. Pilots are meant to validate feasibility and cost-effectiveness; they often become entangled in premature expansion due to a failure to define a clear Minimum Viable Product (MVP) that incorporates user adoption, Organizational Change Management (OCM), total experience, and decision-making protocols.

An MVP is technically sound only if end-users adopt it. Embedding OCM strategies, such as stakeholder engagement, communication plans, and training, alongside a holistic total experience approach ensures the MVP validates real-world viability and sustainable adoption. This integrated approach de-risks implementation and builds the organizational readiness necessary for scaling. The MVP framework mitigates scope creep by maintaining disciplined focus on core functionality and user needs,

while OCM and total experience principles ensure the delivery of meaningful adoption and organizational value

2.2 Cracking the Code: Key Hurdles in Pilots to Production

Federal organizations face intense pressure to modernize, gather actionable insights, and achieve missions efficiently. Challenges include complicated procurement, stringent security demands, and fragmented AI infrastructures. Lengthy, multi-vendor procurement cycles stifle innovation and increase costs. Integrating diverse systems adds to this complexity, making acquisitions time-consuming. A clear need exists for streamlined, turnkey solutions. Appendix A provides a summary of these challenges and suggested metrics.

2.2.1 Unclear Minimum Viable Product (MVP)

Failure to properly identify the MVP is a common and costly pitfall. The MVP is designed to validate core functionality with minimal investment, serving as a focused testbed for feasibility and performance. A good MVP is a "…well-defined roadmap for the transition process that outlines the necessary steps, timelines, and resources required to move from your prototype to production", (Russell, 2025, p. 107). However, development teams may prematurely add features due to stakeholder pressure. As one strategy executive aptly warned, "*Big-bang scope creep-Early expansion of MVP guarantees delay.*" This simple observation highlights the critical need for disciplined scoping. Expanding the MVP too early introduces complexity that undermines the pilot's ability to deliver clear, actionable insights, increasing the risk of technical debt and misaligned expectations.

2.2.2 Metrics that Matter: Avoiding the Watermelon Effect on Scaling

When scaling pilots to production, establishing clear, measurable success criteria is paramount. Metrics provide a structured way to measure performance and user satisfaction. Baseline measurements are essential benchmarks to evaluate progress at critical touchpoints and offer the best practice to determine if the solution performs as expected. Without well-defined metrics from the start, agencies risk project delays, unanticipated costs, and stakeholder dissatisfaction. Poorly defined criteria can lead to a disconnect between technical performance and user experience, resulting in the "Watermelon Effect," where the exterior technical success masks user dissatisfaction found once engaging with the product or service. Developing robust performance and experience measures guide the project, provide clear criteria for success, and offers pivotal insights into when pivoting may be necessary, ensuring the final product aligns closely with mission objectives and user needs

By developing robust KPIs, SLAs, and XLAs, federal agencies can navigate potential pitfalls and significantly increase the likelihood of achieving successful, scalable solutions. These agreements serve as a roadmap, guiding the project and providing clear criteria for success. They also provide pivotal insights into when pivoting or adapting the MVP may be necessary, ensuring the final product aligns closely with the mission objectives and user needs. Such well-designed performance and experience

metrics lead to a more adaptive, efficient, and impactful deployment process, ultimately fostering greater innovation and technological advancement within federal agencies (Appendix B).

The importance of establishing KPIs, SLAs, and XLAs early on cannot be underestimated in terms of the challenges that arise when not implemented and the benefits they bring to a project, ensuring a balanced and successful scaling from P2P. Such meticulous planning and measurement are crucial in addressing scope creep.

2.2.3 Pilot Onboarding Assumptions

Expanding scope without ensuring user readiness and adequate support leads to wasted effort, stalled rollouts, and diminished trust. Ensuring all organizational and user readiness factors are considered alongside technical consideration is crucial for a successful transition. At the U.S. Bureau of Economic Analysis (BEA), an authentication pilot succeeded because the solution was simple, intuitive, and aligned with existing user habits, integrating OCM efforts as a continuous deliverable. In contrast, a technically sound data platform proof-of-concept failed because users resisted changing their reporting workflows; the pilot suffered from under-resourced training and a lack of OCM. This reveals a critical insight: a targeted rate of user adoption must be a primary success metric for pilot onboarding. Teams frequently assume users will naturally adapt to new systems and workflows, leading to the underestimation or omission of structured training and support. Critical pilot onboarding activities should include OCM, total experience and customer journey protocols. Luis Coronado, former CIO Bureau of Consular Affairs, reflects, "*The success for us was ensuring that everybody was on board and working toward the goal of launching online passport renewal. It was about building a product team that took ownership from inception to retirement*." By embedding onboarding activities in P2P lifecycles, teams create lasting ownership and commitment to the pilot's long-term success.

2.2.4 Shadow Governance: The Hidden Threat to Pilot Integrity

Shadow governance is a subtle yet damaging form of scope creep where key decisions are made informally, outside of documented channels, and without proper visibility. While sometimes intended to expedite progress, undocumented decisions can lead to an outdated risk register and unchecked scope expansion, compromising project integrity. Shadow governance reduces the risk register to a mere symbolic artifact rather than a functional tool. This lack of visibility erodes accountability, allowing scope changes to accumulate without justification or alignment with the pilot's original MVP objectives. As Guy Cavallo, the CIO at Planet Technologies, put it, "*Pilots must have definitive start and end dates, clear, measurable success criteria, and should provide critical learning opportunities before full-scale implementation. These aren't just symbolic artifacts; they are essential components to ensure that pilots effectively transition into production."* The risk register is vital to guide mitigation strategies, inform stakeholders, and support governance transparency from initiation. When decisions are made off-record and not reflected in formal documentation, the risk register loses its importance as a living artifact. Rushing to expand scope through shadow governance hinders the necessary maturation process.

Beyond robust risk management, success demands cohesive and well-coordinated cross-functional teams. Param Soni, U.S. BEA, underscores the importance of this synergy, stating, "*Understanding the mission and end-product is crucial. Clear goals, comprehensive project proposals, and a collaborative approach ensure that IT initiatives are driven successfully to production.*" Understanding the mission and product/service is crucial for driving IT initiatives successfully to production through clear goals, comprehensive project proposals and a collaborative approach.

2.3 Cultivating Cohesive Collaboration for Pilot Success

Transitioning P2P succeeds when cross-functional teams are effectively formed, aligned, and empowered. Success depends not only on technical execution but also on the collaboration of technical experts, business owners, operational leads, and executive sponsors. Misaligning these groups can result in delays, scope creep, and poor adoption outcomes. External disruptions, such as staff turnover or budget cuts, can erode momentum and lead to the loss of critical tacit knowledge. Without a cohesive team structure and sustained engagement, even well-designed pilots risk falling short. Strong partnerships across these groups accelerate progress, reduce risk, and enable smoother adoption. However, realizing these gains requires executive leadership to establish strategic coherence (Rumelt, 2011) and overcome the cognitive biases that lead to misaligned expectations and resistance to adaptive change (Blettner et al., 2023).

2.3.1 Executive Sponsorship

Weak executive sponsorship significantly undermines decision-making authority and initiative success. When senior leaders are not visibly engaged, pilots lack the strategic support needed for decision-making and momentum. This is compounded by the fact that strategic failure often originates not from a lack of data, but from systemic flaws in human processing, specifically, individual cognitive resistance. For instance, leaders in complex organizational systems tend to default to habitual responses when cognitive load is high, relying on past practices and experiences even when those practices mismatch current conditions (Hallo et al., 2020). Moreover, job experience, while often assumed to improve decision quality, is in fact associated with increased overconfidence and can lead experienced managers to resist adaptive responses following low performance (Blettner et al., 2023). Strong, visible executive sponsorship is challenged when stakeholders are dispersed across different bureaus and functional roles. This fragmentation leads to inconsistent communication, misaligned expectations, and delays in critical decisions. Without a unified vision, pilots risk being deprioritized or sidelined amid competing demands.

2.3.2 Empowered and Well-Trained Teams

Continuous learning and balanced skill development are critical enablers of pilot success. However, training is frequently deferred until late in the pilot lifecycle, leaving teams underprepared. Many pilot teams are unbalanced, dominated by technical experts with few or no business representatives. As Berndtsson et al. (2020) observed, such a configuration is criticized by the business side as "…yet

another technical project, one that does not understand how business value is created." Cross-functional teams require tailored training that addresses both the technical intricacies of a solution and the underlying business processes. This disconnect can lead to miscommunication, resistance to adoption, and operational inefficiencies. When teams are intentionally balanced and supported through targeted upskilling, pilots are far more likely to achieve their objectives and deliver lasting organizational value.

2.3.3 Insufficient Knowledge Transfers

Knowledge sharing is essential for sustaining momentum and preserving organizational learning. Gaps in staff training and effective knowledge transfer present a significant hurdle. Lean organizational structures create a fragile dependency on key individuals who hold critical institutional knowledge. When these individuals are unavailable, continuity suffers, and momentum stalls. A government executive reinforced this concern, noting that: "*Poor knowledge management and lack of knowledge transfer often led to pilots being deployed but rarely used, or only partially utilized*." Conversely, when agencies embed structured knowledge transfer into pilot execution, they strengthen continuity, accelerate adoption, and enable smoother transitions to production.

2.4 Building Resilience Amid Resource and Infrastructure Constraints

Resource volatility, particularly staff turnover and budget fluctuations, is a persistent and under-appreciated risk. These challenges can disrupt continuity, extend timelines, and test scalability. Technical infrastructure and budgetary limitations influence pilot scalability. While legacy system constraints, limited tooling, and tight departmental budgets complicate deployment, they also drive creative problem-solving. During the FCC cloud migration, the team confronted technology stack incompatibilities but identified alternative solutions and retrofitted components, enhancing system interoperability and informing future efforts. Rather than halt progress, they identified alternative solutions and retrofitted components to ensure seamless operation within the modern infrastructure, an approach that ultimately enhanced system interoperability and informed future migration efforts. When agencies embrace constraints as opportunities for innovation and learning, they cultivate resilience, adaptability, and continuous improvement, strengthening the foundation for long-term modernization.

Among the most persistent and under-appreciated risks to pilot success is resource volatility, particularly when teams face the dual pressures of staff turnover and budget fluctuations. These challenges can disrupt continuity, extend timelines, and test scalability, even when the technical vision remains strong. Yet, they also highlight the importance of resilient planning, proactive workforce strategies, and adaptive resource management. The CIO of BEA shared a firsthand account of navigating this dynamic during the development of a new module for an existing application. Despite encountering budget cuts and a wave of staff departures, "*…over 25% of our team left, resulting in a 50% staffing reduction…*," the project team was able to leverage lessons learned to strengthen future workforce planning and knowledge retention strategies. This experience reinforces not only how

resource volatility can challenge pilot continuity but also how agencies can use such moments to refine risk mitigation and strengthen institutional agility.

Pilots are frequently expected to demonstrate transformative outcomes within constrained environments. When agencies embrace these constraints as opportunities for innovation and learning, they cultivate resilience, adaptability, and continuous improvement, ensuring that pilots not only deliver immediate value, but also strengthen the foundation for long-term modernization.

2.5 Integrating Security and Compliance for Pilot Success

Delayed security approvals can pose a significant risk to a pilot's deployment, particularly within government agencies that must complete Authority to Operate (ATO) documentation, implement Multi-Factor Authentication (MFA), and maintain Zero Trust compliance. When security requirements are introduced late or without clearly defined testing and validation pathways, pilots may encounter friction during scaling, slowing progress and requiring rework. However, these challenges also highlight the value of proactive engagement and early alignment with cybersecurity teams, which can transform potential bottlenecks into opportunities for smoother, more predictable deployment.

The Department of State's (DOS) Overseas Missions initiative illustrates this dynamic. Early engagement with security teams and the use of preliminary testing authorities enabled validation of components ahead of formal ATO approval. By defining security requirements within the MVP upfront, the team reduced late-stage friction and ensured a smoother transition to production. The lesson is clear: integrating security planning from the outset and establishing clear test authority pathways enhances compliance while maintaining delivery momentum.

A second example comes from the BEA's eFile Modernization pilot which used a FedRAMP-approved version of ChatGPT. While initial approvals were granted, the team discovered critical gaps in features required to meet operational needs. Rather than halting progress, the team leveraged flexibility in governance and a clear understanding of data boundaries to continue delivering value under constrained conditions. This demonstrates that structured security planning combined with adaptive governance enables pilots to move forward decisively, even when challenges arise.

2.6 Navigating Procurement Complexities

Procurement and governance processes frequently present risks to IT pilot initiatives, potentially slowing execution, fragmenting accountability, and limiting flexibility. Traditional contract models often focus narrowly on deliverables rather than outcomes, which can inadvertently constrain innovation or hinder collaboration across vendors.

Yet these complexities also present opportunities: by aligning governance forums, clarifying responsibilities, and emphasizing outcome-oriented contracts, agencies can turn potential friction points into enablers of innovation. Pilot teams that establish these structures early can more effectively share resources, coordinate across stakeholders, and adapt to evolving requirements. As one strategy executive noted, thoughtful procurement alignment is not merely a compliance exercise; it is a

strategic tool to accelerate execution, foster collaboration, and support scalable pilot success. Having explored the common risks and challenges that can impact pilot execution, it is equally important to highlight the key factors that drive successful outcomes and enable pilots to transition smoothly to production.

3.0 Success Factors

Transitioning from pilot to full-scale production requires a deliberate blend of strategic vision, technical readiness, and operational discipline. Success hinges on strong executive sponsorship and visible leadership to champion the pilot and generate early momentum. Engaging stakeholders effectively is critical, not only for adoption, but to ensure the pilot aligns with mission priorities and operational realities. As Jamie Holcombe, former CIO of the U.S. Patent and Trade Office (USPTO), now national security mission at USAI.IO notes: *"Stakeholders need to have skin in the game so that their success depends on the success of the technology pilot project."* Pairing stakeholder accountability with technical preparedness and a clear understanding of delivery constraints ensures that deployment strategies, anchored by a well-defined definition of done, supports scalability, sustainability, and alignment across teams. Phased deployments provide a structured path forward, enabling iterative refinement and proactive risk management, while streamlined vendor procurement ensures external partners are equipped to meet production-level demands. Appendix C highlights a strategic pathway that aligns key challenges with targeted success factors, illustrating how these practices collectively strengthen outcomes and mitigate risks. Together, these pillars form a resilient framework for converting innovative pilots into enduring, mission-aligned capabilities that deliver measurable impact.

3.1 Executive Sponsorship and Promotion

Executive sponsorship is the cornerstone of successfully transitioning a pilot into a production-ready, widely adopted solution. When senior leaders visibly champion an initiative, they signal strategic priority, reinforce mission alignment, and build organizational momentum. This engagement provides the authority and resources necessary to scale, ensures consistent communication across bureaus, time zones, and functional areas, and fosters trust among stakeholder groups. By setting a unified vision, executives synchronize expectations, accelerate decision-making, and actively promote the pilot's value and future impact. Strong, sustained sponsorship not only drives adoption but also positions the solution for long-term enterprise success, transforming pilots from experimental initiatives into enduring, mission-aligned capabilities.

3.1.1 Strategy Alignment

Strategy alignment ensures a pilot is an integrated step, not an isolated experiment, by synchronizing technology development with mission priorities and operational mandates. Following Rumelt's notion of a strategic kernel (2011), this alignment starts with a clear diagnosis of the challenge and the articulation of a guiding policy that frames the pilot's purpose. Scaling is achieved through coherent

actions that coordinate resources and amplify effort, ensuring every technical milestone contributes to mission outcomes. This process converts high-level intent into concrete, accountable actions guided by clear, measurable goals. Strategic clarity is vital for translating strategy into performance criteria, driven by a coordinated system of metrics: OKRs define ambitious, high-level transformation goals; KPIs track day-to-day operational performance; SLAs formalize reliability and accountability expectations; and XLAs capture the human experience, measuring how users perceive value. When aligned, these frameworks connect vision to execution, performance to promise, and delivery to impact, creating a measurable and meaningful business rhythm. This alignment fosters a culture of purpose-driven execution, empowering teams to innovate within a shared framework, knowing their efforts directly contribute to broader strategic goals. It also enables leadership to monitor progress, course-correct in real time, and celebrate milestones that reflect collective impact.

Dashboard reporting integrates quantitative outcomes and qualitative insights, visualizations, and stakeholder feedback. This unified view enables leaders to make data-informed decisions, assess system performance, and quickly identify areas needing adjustment, transforming raw data into actionable intelligence. While metrics and strategic alignment provide the structure for success, achieving meaningful impact also requires designing solutions around the needs, behaviors, and experiences of the people who will use them.

3.1.2 Human-Centered Solutions

Human-Centered design (HCD) ensures a pilot is delivering solutions aligned with user needs and operational realities, guided by empathy, usability, and real-world feedback. Insights from the pilot phase inform streamlined workflows, tailored training, and adaptive features. By designing around the human experience, friction is reduced, trust is fostered, and adoption is accelerated. HCD begins with empathy, immersing teams in users' environments to uncover needs and constraints. Prototypes enable rapid testing and refinement, aligning solutions with user expectations. Post-deployment, continuous feedback and usage monitoring sustain usability and long-term resilience. This approach reduces risk, accelerates learning, and ensures lasting impact.

3.1.3 Identified Operational Constraints and Definition of Done

Managing operational constraints begins with an assessment of the environment in which the solution must be scaled. This includes mapping dependencies and identifying any limitations in infrastructure, staffing, or policies. Early engagement with cross-functional stakeholders helps to uncover hidden bottlenecks. Management strategies must evolve to support the transition, including phased rollouts, resource reallocation, and process redesign. Tai Truong, Senior Vice President, Strategy at Securence, notes, *"It's critical to have a 'fail fast and fail early' approach. Transparently identifying non-starters builds trust with clients, as it shows the team is genuinely listening and willing to pivot or abandon a project if it doesn't meet specific needs."*

Defining when a project is 'done' requires more than checking off technical milestones. A completed project requires alignment across operational readiness, user adoption, and sustained value delivery. A

project is not truly complete until the solution is integrated into daily workflows, is adopted by users, and is supported by the necessary infrastructure for long-term success. The final handover includes comprehensive documentation, ensuring long-term resilience and usability. On the other hand, Jamie Holcombe advises, *"Move with urgency but prepare for setbacks and adjust along the way. Re-evaluate if the pilot isn't clearly showing tangible success within 90 days. Be prepared to pull the plug at that point.*" Operational constraints should be treated as design inputs rather than obstacles, enabling smarter, more resilient implementations.

The following design lessons for future pilots emerged from the expert interviews:

1. Incorporate offline or low-bandwidth capabilities for mission-critical tasks;
2. Develop streamlined "handover capsules" that new team members can quickly absorb within 30–60 minutes; and
3. Steer clear of introducing parallel processes that intensify workloads during seasonal peaks.

Organizations should evolve their management strategies and embrace phased rollouts, resource reallocation, process redesign, and targeted automation to sustain momentum and reduce risk until the project is done and handed over to the production team.

3.1.4 Effective Risk Management

Effective risk management anticipates friction, builds resilience, and maintains momentum without compromising mission integrity. A risk assessment identifies potential technical, operational, and organizational vulnerabilities. This requires prioritizing every risk based on its impact and likelihood, then matching it with mitigation strategies such as phased rollouts, fallback procedures, and targeted training. Guy Cavallo emphasized that risk registers are crucial for tracking risk owners, review dates, triggers, leading indicators, and pre-approved mitigation measures to ensure that each risk is properly addressed, whether reduced, accepted, transferred, or escalated. Equally important is proactive communication to keep stakeholders informed, which promotes transparency and trust. Ultimately, risk management is an ongoing process integrated throughout the project lifecycle, turning uncertainty into informed action.

3.2 Technical and Operational Readiness

When preparing for a P2P transition, the focus is on ensuring that both the technical infrastructure and the operational ecosystem are primed to be scalable, resilient, and sustainable. Once the pilot phase has validated core capabilities, surfaced integration challenges, and provided critical user feedback, the shift from experimentation to execution begins. Successful integration into production includes a mature, scalable technical landscape; comprehensive risk management and contingency planning; intentional readiness to enable operational sustainment; and aligned, trained stakeholders who are engaged and prepared for the move to production.

For an effective transition, the intended solution and/or system(s) must be production-ready, having successfully completed load testing and performance optimization to ensure scalability, low latency,

and fault tolerance under real-world conditions. This can mean that Application Programming Interfaces (APIs) and data exchange protocols have been standardized for seamless interoperability with existing enterprise platforms, minimizing integration overhead. All security and compliance measures are in place and fully aligned with regulatory frameworks such as NIST, FedRAMP, and ISO. For products and solutions with recurring enhancements and development, the DevOps pipelines are fully operational, enabling automated deployments, regression testing, and version control to support continuous delivery across environments.

3.2.1 Phased Deployments

Phased deployments are the strategic, low-risk bridge to full-scale production, allowing organizations to scale with precision and maintain agility. Instead of an organization-wide launch, solutions are introduced incrementally to targeted environments or user groups, serving as controlled testbeds to validate performance, usability, and integration under real-world conditions. This approach minimizes disruption and enables continuous refinement. For example, the DOS Overseas Missions project revealed that operating across dispersed missions introduced time-zone and bandwidth variability, necessitating a phased rollout supported by robust channels. Similarly, on the FCC Cloud Modernization project, a strong communications cadence kept leadership and users informed, alongside maintaining robust backup/rollback plans and sequencing migrations to address the riskiest elements with learning in hand. This disciplined approach resulted in steady progress, including the incremental verification of performance and stability when moving a legacy Sybase application into a managed cloud environment. Interviews with experts reveal that environment-specific testing, (across sandbox, staging, and production), helps simulate real-world conditions and uncover edge cases and deployments that are adaptively configured to reflect unique constraints, such as limited bandwidth or rotational staffing, support adoption and resilience. Transparent governance enables successful phased deployments through structured decision-making, real-time visibility, and clear accountability. Kaleen Cameron, Senior Manager at Acuity, Inc., explains, "*Governance and planning, including predefined decision gates, play a crucial role in ensuring pilot success and making subsequent transitions smooth*." Formalizing roles, escalation paths, and tracking mechanisms for risks, assumptions, issues, and decisions, provides an integrated approach to building trust and drive scalable, user-centered implementations.

3.2.2 Identify Security and Compliance Requirements

Security and compliance must be embedded throughout the development lifecycle to ensure systems are functional, resilient, and aligned with regulatory expectations. Rather than treating these elements as final-stage validations, this approach integrates them from the outset, making them active contributors to delivery success. Structured reviews, validations, and testing should be conducted iteratively to confirm all system and regulatory requirements are met, mitigating downstream risks.

Security engagement begins at project inception, guided by cyber-by-design principles. Chief Information Security Officers (CISO) and other cybersecurity stakeholders must be involved early and

oversee a process with rolling reviews aligned to development milestones, ensuring continuous feedback and shared accountability. To streamline compliance validation, evidence formats and review criteria must be predefined to reduce ambiguity and support consistent documentation. By embedding security and compliance into every phase, teams shift from reactive checkpoints into strategic enablers that support trust, performance, and mission alignment.

3.3 Organizational Readiness Strategy and Plan

The P2P process requires a comprehensive readiness strategy that aligns people, processes, and technology to deliver a successful solution. Organizational readiness begins with executive sponsorship that drives the vision, goals, and anticipated outcomes by prioritizing and allocating resources to meet the organizational and operational needs.

3.3.1 Stakeholder Buy-In and Adoption

Stakeholder buy-in and adoption are critical drivers of successful solution integration. Moving from a pilot into a deployed solution requires the commitment of stakeholders and end-users to integrate and adopt new processes and technical changes. Buy-in begins with engaging key decision-makers and champions early, aligning the solution with leadership's priorities, and building trust through transparent communication. According to Jamie Holcombe, "*Changing your culture is key. Build stakeholder buy-in through systemic incentivization and by delivering early wins.*" Effective adoption hinges on demonstrating clear value, providing tailored training, and creating feedback loops that reinforce usability and impact. Buy-in and adoption transform strategic intent into operational reality.

3.3.2 Training

Training is a strategic lever for operational readiness, stakeholder adoption, and sustained performance. High-performing pilot teams integrate both technical and business perspectives, ensuring solutions are operationally sound and strategically relevant. Balanced teams bridge the gap between innovation and value creation. Targeted training across roles enhances communication, fosters shared understanding, and promotes ownership. By equipping team members with the right technical and business knowledge, training accelerates adoption, reduces resistance, and creates the conditions for a smooth, sustainable transition.

Training must be tailored to diverse roles and fluency levels, emphasizing intuitive workflows, mission alignment, and scenario-based learning. It should include modular onboarding for rotating personnel, just-in-time refreshers, and embedded support resources that reduce reliance on external help. Effective training embeds protocols, escalation paths, and accountability structures that ensure secure, compliant operations. Continuous feedback mechanisms promote learning and improvement, reinforcing adoption. End users need training that contextualizes the solution within daily workflows and builds confidence with hands-on experience. Clear, concise documentation and embedded support minimize disruption and accelerate time-to-productivity which in turn reinforces and sustains new ways of working.

3.4 Clear Vendor Procurement

To improve clarity and effectiveness, agencies must begin by redefining how they communicate their needs to vendors. Rather than simply requesting products, agencies should articulate the mission challenge or operational gap the technology is intended to address. This reframing shifts the focus from transactional acquisition to strategic problem-solving. Misalignment between procurement structures and pilot goals often leads to friction, complicating cross-vendor coordination, repository management, and adaptation to evolving requirements. These breakdowns delay onboarding and stall the deployment of critical resources. In addition, agencies should modernize procurement workflows through digital platforms to standardize documentation and enhance transparency. For example, digital platforms enhance collaboration between technical, budget, and procurement teams and help shape intentional requests for quotes or proposals. Establishing governance forums that support cross-functional decision-making helps procurement evolve from a compliance exercise into a strategic enabler. Embedding governance and procurement alignment into the pilot's foundation ensures support for strategic intent, reduces administrative overhead, and accelerates the path to production. Inevitably, when procurement is grounded in mission intent, it becomes a tool for innovation.

4.0 Lessons Learned

The P2P transitions rely on disciplined scope management, proactive operational readiness, and intentional user engagement. Strong MVPs, early change enablement, structured training, and strategies to manage resource volatility combined with performance and experience metrics provide a practical blueprint for scaling innovative pilots without compromising stability.

4.1 Strong MVPs, Strong Outcomes

The pilot's MVP must establish a clear operational baseline and a jointly endorsed set of deliverables to mitigate scope creep. Any deviation must trigger a formal review and documented decision. Guy Cavallo emphasizes "*consumption cost literacy,"* which teaches program offices to understand cost drivers and setting red-line alerts to trigger engineering reviews. Deferring enhancements with explicit revisit dates reinforces cost discipline and the pilot's role as a learning mechanism. This disciplined approach validates essentials first, building confidence for future investments. The DOS' Online Passport Renewal effort initially failed due to an overly complex scope that overwhelmed back-end processes. The successful reboot narrowed the scope to a front-end intake with minimal back-end disruption, anchoring the project to a strong MVP and clearer accountability under a business-led, cross-functional product team.

4.2 Prioritize User Experience

Successful pilots are adopted, not just built. Pilot teams must prioritize user experience (UX), stakeholder engagement, and change enablement as core components of the baselined MVP. This requires early business involvement, clear articulation of user value, and proactive investment in support. Treating adoption as a KPI is essential to managing behavioral scope creep. The risk

management framework must include evaluating new risks for their potential to disrupt the MVP baseline, documenting mitigation, and timely communication. Tai Truong, Senior Vice President of Strategy at Recurrence, said, "*The importance of risk management, acknowledging the difficulty of identifying all potential unknowns but stressing the need for a risk register and weekly communication with clients is imperative to mitigating issues*." Using a living risk register as a shared document provides a visible log of decisions and risk disposition, which reinforces accountability. As Russell (2025, p.108) notes, *"Early and frequent communication with all stakeholders is paramount to fostering a sense of ownership and ensuring that everyone is on the same page."* A living risk register supports transparent decision-making by ensuring scope evolution is deliberate, and not simply the result of undocumented compromises.

4.3 Minimize Workforce Readiness Gaps

Structured, role-specific training and ongoing skill development are essential to support the transition to stable, scalable production environments. As Russell (2025, p. 109) emphasizes, "Providing additional support, training, and skill-development opportunities will equip your team with the knowledge and capabilities required to manage the production environment effectively." As a case in point, the DOS Online Passport Renewal team trained staff to understand the new business workflows, preparing them to operate, maintain, and evolve the solution. Agencies must prioritize structured documentation, cross-training, and centralized knowledge repositories from the outset. Embedding knowledge transfer as a best practice ensures operational resilience, reducing reliance on individual contributors and institutionalizing knowledge regardless of staffing fluctuations.

4.4 Manage Resource Volatility

Managing resource volatility requires creating a Proof of Concept (PoC) before the full pilot to validate assumptions, test interoperability, and surface risks early. This front-loaded exploration better aligns pilots with current environments while charting a path for modernization. The BEA's eFile Modernization pilot, faced with a short-staffed team, successfully scaled the scope (converting PDF forms to web-based, migrating ColdFusion to .NET, and integrating MFA) by setting realistic expectations and leveraging APIs to reduce manual effort. This example demonstrates that resilience depends on flexible design, collaborative problem-solving, and managing volatility through proactive risk mitigation, not just technology choices.

4.5 Require a Pilot Project Management Plan

Government agencies should require a formal Pilot Project Management Plan (PPMP) that outlines goals, scope, deliverables, limitations, quality controls, and a clear risk management strategy. This structure sets clear expectations, fosters shared ownership, and enables agile decision-making. Essential components include goals and expected results, a project roadmap, a list of pilot tasks, defined limitations, a quality control plan, the organizational structure, and a risk management strategy. These elements provide a foundation for accountability and enable teams to track progress,

identify deviations early, and make informed adjustments throughout the pilot lifecycle. This PPMP should be integrated as a distinct phase within the overall Project Management Plan (PMP), ensuring alignment with broader project governance and objectives.

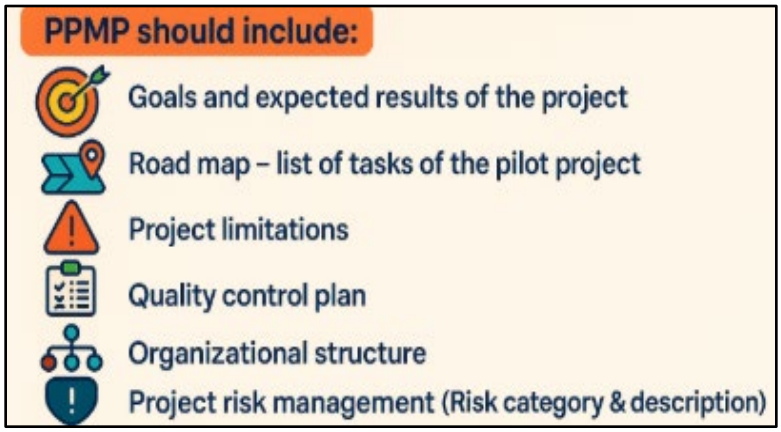

Figure 2: Pilot Project Management Plan (Bolsunovskaya et al., 2019, p.5)

5.0 Recommendations

Based on integrated findings, organizations seeking to mature their P2P capabilities should adopt the following recommendations:

1. **Establish a Standardized P2P Governance Model:** Define clear decision goals, objectives, and success criteria for every phase of the transition.
2. **Embed Security and Compliance:** Integrate cybersecurity and regulatory reviews at project inception (cyber-by-design) rather than treating them as final-stage sign-offs.
3. **Prioritize Human-Centric Design:** Require dedicated OCM and UX resources in every pilot project scope to drive adoption and satisfaction.
4. **Adopt Outcome-Oriented Metrics:** Define and track a balanced set of performance and experience measures to ensure technical success aligns with mission value and user needs.
5. **Mandate Cross-Functional Teams:** Structure teams with a balance of technical experts, business owners, and operational leads to ensure shared ownership and a seamless transition.
6. **Refine Procurement for Agility:** Shift procurement strategies to emphasize mission outcomes and utilize contract language that supports rapid iteration and partnership.

These recommendations form the foundation of a repeatable playbook for leaders seeking to translate pilot success into sustained, scalable impact across government programs.

6.0 Suggestions for Future Research

Future research and ongoing evaluation will further refine P2P practices, enabling government organizations to scale innovative solutions efficiently while delivering measurable value to stakeholders and the mission they serve. Suggestions for future research include:

1. **Quantitative and qualitative analysis to predict pilot success**: Future studies should investigate correlations between performance frameworks and measurable outcomes, helping agencies develop predictive models for pilot viability and operational impact. Insights could inform more precise alignment of strategic goals, operational metrics, and user experience measures.
2. **Strategies for operational resilience under resource volatility:** Future studies should explore how organizations adapt workflows, training, and automation to sustain momentum despite staffing fluctuations, budget changes, or cyclical workload surges. This research could highlight best practices for maintaining performance and knowledge continuity under unpredictable conditions.
3. **Outcome-oriented procurement models and vendor collaboration:** Future studies should analyze how contracts emphasizing measurable outcomes, collaborative delivery, and flexible vendor engagement influence pilot execution, innovation, and speed to production. Insights could inform policies that align procurement with strategic objectives rather than transactional deliverables.

Successfully moving pilots into full-scale production depends on more than technical execution; it requires a holistic approach that balances strategy, human-centered design, operational readiness, and stakeholder alignment. Agencies that integrate these elements, proactively manage risk, and cultivate resilience, empower teams to create the conditions for sustainable adoption and mission impact. By applying these lessons and continuing to evaluate outcomes, government organizations can transform pilots into scalable, value-driven solutions that drive measurable results and strengthen operational excellence across the enterprise.

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Appendix A: P2P Challenges and Metrics Matrix

Challenge	Description	Solutions	Suggested SLAs	Suggested XLAs
Procurement Complexity	Lengthy multi-vendor cycles, complicated integration, need for turnkey solutions	Adopt streamlined procurement processes; utilize turnkey, integrated solutions to reduce friction.	< 90 days procurement cycle	Vendor satisfaction with procurement process
Security and Data Sovereignty	Strict compliance, secure infrastructure for CUI, support for sensitive data without compromising governance	Implement robust security protocols; invest in secure, compliant infrastructure tailored for federal needs.	99.99% data security uptime	Data handling satisfaction among stakeholders
Integration Barriers	Consolidating multiple vendor services, leading to delays and inefficiencies	Use unified platforms and pre-integrated solutions to simplify integration and reduce delays.	< 30 days for system integration	User satisfaction with integration process
Limited AI Expertise	Lack of in-house talent, difficulties in confidently prototyping and operationalizing AI	Invest in training and development programs; partner with AI experts and contractors as needed.	Quarterly AI training sessions	Employee competency and confidence in AI use
Speed-to-Impact	Pressure to deliver quickly, lengthy transitions from use case to pilot without pre-integrated infrastructure	Employ accelerators and pre-integrated infrastructure to speed up deployment and impact realization.	< 60 days from pilot to production	Stakeholder satisfaction with deployment speed
Budget Constraints	Prohibitive capital expenses, interest in operational expense models for better scalability	Shift to operational expense models to lower financial barriers; explore flexible financing options.	Annual budget adherence	Financial decision-maker satisfaction

Appendix B: P2P Success Matrix: KPIs, SLAs, XLAs and Key Insights

Aspect	Description	Importance	When to Measure	Challenges	Benefits
KPIs	Baseline measurements of key performance indicators for the project.	Provide benchmarks to evaluate progress and performance.	Initial setup and ongoing at critical touchpoints.	Misalignment of goals and expectations.	Clear criteria for success, guiding project milestones
SLAs	Service Level Agreements defining technical performance standards.	Set clear technical benchmarks to ensure system reliability and efficiency.	Throughout deployment; particularly at integration and performance assessment stages.	Technical misalignment, delays, and operational inefficiencies.	Reduced technical issues, faster integration, and more reliable systems
XLAs	Experience Level Agreements to ensure user satisfaction aligns with technical performance.	Measure user experience to avoid the "Watermelon Effect," where systems perform technically but fail user expectations.	Continuous user feedback and post-deployment evaluations.	Potential disconnect between technical success and user satisfaction leading to unsatisfactory experiences.	Higher user satisfaction, improved system usability, and enhanced overall impact
Solution Pairing (SLA/XLA)	Ensuring each technical SLA has a corresponding XLA to align technical performance with user satisfaction.	Avoids "Watermelon Effect," fostering balance between system performance and user experience.	Throughout the project lifecycle, from planning to post-deployment reviews.	Risk of delivering technically sound solutions that fail to meet user needs.	Holistic view of system success, ensuring both reliability and user satisfaction are maintained

Appendix C: P2P Success Factors

Problem Statement	Success Factors
An initiative is experiencing scope creep driven by a lack of clarity around the Minimum Viable Product (MVP), the absence of well-defined Key Performance Indicators (KPIs), invalid assumptions, and barriers.	To regain delivery focus and contain scope expansion, prioritize the following actions: ● Clarify the MVP and boundaries of success ● Establish KPS that reflect mission and operational value ● Validate assumptions before scaling ● Formalize governance and surface informal influence ● Enable cross-functional communications and buy-in
The program is facing delivery delays due to complex procurement processes and security bottlenecks. Fragmented approvals, evolving compliance requirements, and lack of coordination across teams are disrupting deployment readiness and slowing execution. These constraints are reducing agility and impeding mission progress.	To overcome procurement complexities and security bottlenecks, perform the following: ● Streamline acquisition pathways ● Align procurement planning with technical and delivery timelines ● Establish pre-approved vendor pools, vehicles, and agile contracting mechanisms ● Map security controls to identify security and compliance requirements early ● Embed security stakeholders into the procurement, design, and delivery team planning sessions ● Implement security readiness checkpoints

Problem Statement	Success Factors
The program is experiencing sustained delivery disruptions due to security constraints, and unstable resource availability. These issues are exacerbated by weak cross-functional team continuity, stemming from limited executive sponsorship, insufficient training, and poor knowledge transfer, resulting in fragmented collaboration, missed milestones, and reduced readiness to scale.	To reduce executional friction and strengthen delivery momentum, the following actions are essential: ● Develop a clear strategic communications plan tailored to stakeholder groups ● Secure executive sponsorship and stakeholder buy-in ● Deliver targeted training and establish knowledge transfer mechanisms ● Finalize scalable technical architecture and phased deployment strategy ● Institutionalize continuous learning, embed knowledge transfer, and prioritize structured documentation, cross-training, and robust knowledge repositories ● Identify and integrate security and compliance requirements early ● Execute deployments in controlled phases with feedback loops