

# Library Working through Agile Delivery Method Challenges for Copyright IT Modernization Project

PUBLIC RELEASE

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INSPECTOR GENERAL  
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# MEMO

**Date** August 5, 2019  
**To** Dr. Carla Hayden  
Librarian of Congress  
**From** Kurt W. Hyde   
Inspector General  
**Subject** Final Audit Report – *Library Working through Agile Delivery Method  
Challenges for Copyright IT Modernization Project*, Report No. 2018-IT-107

This transmits the final report for the Office of the Inspector General's (OIG) audit of the Library of Congress' Copyright Information Technology (IT) Modernization Recordation Project. OIG engaged Cotton & Company LLP (Cotton) to conduct a performance audit of the Library's IT modernization project for the Copyright Recordation system. The executive summary begins on page *i*, and the full text of Cotton's report begins in Appendix A.

Based on written comments to the draft report, we consider all of the recommendations resolved. Please provide, within 30 calendar days, an action plan addressing implementation of the recommendations, including implementation dates, in accordance with LCR 9-160, *Rights and Responsibilities of Employees to the Inspector General*, §6.A. The final report will be made publicly available.

We appreciate the cooperation and courtesies extended by the Office of the Chief Information Officer, Chief Operating Officer, and the Copyright Office during this review.

**cc** Principal Deputy Librarian of Congress  
Chief Information Officer  
Chief Operating Officer  
Register of Copyright  
General Counsel

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## Summary

The U.S. Copyright Office (USCO) is a directorate of the Library of Congress (Library) responsible for administering copyright law within the United States. The Register of Copyrights heads the USCO and is designated by law to maintain official records pertaining to copyrights, such as assignments, licenses, and grants of security interests.

In fiscal year (FY) 2018 the Library's Office of the Chief Information Officer (OCIO) and USCO initiated a joint effort to develop the future-state version of USCO's Copyright Recordation (Recordation) system as part of the larger Copyright information technology (IT) modernization plan. With Recordation system software development beginning in FY 2018, USCO and OCIO plan to complete the system design and framework and then implement the system in the cloud. According to USCO's *Modified USCO Provisional IT Modernization Plan: Analysis of Shared Services, Support Requirements, and Modernization Efforts (Modified USCO Provisional IT Modernization Plan)*, the timeframe for piloting the modernized Recordation System and completing the transition to the new system will take approximately two years, subject to resource availability.

USCO requested that the Office of the Inspector General (OIG) review the Recordation application development effort. OIG engaged Cotton & Company LLP (Cotton) to conduct a performance audit of USCO's IT modernization project for the Copyright Recordation system.

## What the Audit Found

**Generally, the development teams demonstrated competence in its efforts**—USCO adequately developed the business requirements via necessary stakeholder involvement, and communicated them clearly to the developer. USCO and OCIO assigned the development effort roles appropriately, all of whom had the necessary qualifications—the product owner is skilled in the development methodology and is part of USCO's business unit, and the OCIO is adequately performing its contract oversight roles and responsibilities. The USCO and OCIO

appropriately established user acceptance criteria and sufficiently tracks points of failure for follow-up. Finally, OCIO's system architecture, training, and security documentation were consistent with National Institute of Standards and Technology criteria.

### **Fundamental Gaps Need To Be Addressed—**

Fundamental gaps in planning created issues that may affect the success of the Recordation application development effort, and will need to be addressed both for this as well as future efforts. Underlying Cotton's findings and recommendations, gaps included inadequate stakeholder engagement plans and the failure to establish a common lexicon for use among all project participants—the former should be part of project management planning and affects strategies and actions required to promote stakeholder involvement in decision-making and project execution, and the latter inhibits useful project status reporting and basic understanding of project activities.

Cotton's findings focused on the following areas:

- 1) **Project Status Tracking and Risk Mitigation Needs to Be Immediately Redesigned**—Cotton was not able to determine whether the Recordation project is on schedule and within budget. OCIO, in conjunction with Financial Services Directorate (FSD) and Contracts and Grants Directorate (CGD), has not fully developed guidance for tracking project completion or project health.<sup>1</sup> Management has not identified any ongoing budget or schedule variances for the Recordation development project; however, because management does not have sufficient information regarding progress on the project, management is not able to accurately determine whether variances exist. Additionally, OCIO did not develop contingency plans for the identified risks, thus the project team may not be prepared to timely address risks if they are realized at some point during the project.
- 2) **Upfront Suitability Assessment of System Development Life Cycle (SDLC) Method Is Critical**—The suitability of various SDLC methodologies were not assessed before

<sup>1</sup> The OIG identified this issue in its report titled *Report for Design of Library-wide Internal Controls for Tracking Information Technology Investments*, dated March 2015, in which the OIG stated that it had

identified Library practices that were inconsistent with Government Accountability Office (GAO)-prescribed methods for tracking and reporting costs related to IT expenditures, such as earned value.

beginning system development, which created confusion surrounding the approach, processes, and practices to employ. A Library of Congress Directive<sup>2</sup> provides guidance on which SDLC methodology to use based on characteristics of the development effort, such as the stability of the requirements, customer availability, and whether the team can dedicate to the full-time effort. Such an assessment is a critical internal control—it is not necessary to use a single approach for an entire project; projects often combine approaches in order to achieve certain goals. The approach utilized dictates the level of planning and how critical steps will be executed. The Library directive needs to be expanded to include guidance for using hybrid or alternative development methods.

Both USCO and OCIO expressed a desire to use an “agile” development methodology<sup>3</sup> on its Copyright IT modernization efforts. If an appropriate suitability assessment deems agile to be the prudent course, the USCO and OCIO will need to take certain additional steps to take advantage of the benefits associated with an agile methodology. Those steps include:

- 3) **Product Requirements and Project Responsibilities Will Need to be Adjusted to Meet Best Practices**—The Minimum Viable Product (MVP, an agile term of art)<sup>4</sup> was over-defined for a pure agile development project per best practices. Cotton also noted that Library management (i.e., OCIO, USCO, and CGO) needs to define project roles, responsibilities, and accountability in a manner consistent with agile best practices.

<sup>2</sup> Library of Congress Directive (LCD) 5-310.2, *Systems Development Life Cycle (SDLC)*.

<sup>3</sup> Agile is a term used to describe approaches to software development emphasizing incremental delivery, team collaboration, continual planning, and continual learning, instead of trying to deliver it all at once near the end.

Agile focuses on keeping the process lean and creating minimum viable products (MVPs) that go through a number of iterations before anything is final. Feedback is gathered and implemented continually and in all, it is a much more dynamic process where everyone is working together towards one goal. Visual Paradigm Online, <https://www.visual-paradigm.com/scrum/what-is-agile-software-development/>

<sup>4</sup> MVP: That version of a new product which allows a team to collect the maximum amount of validated

Specifically, they should sufficiently empower the product owner with responsibility for managing the product roadmap, and thus the direction of the product development, rather than assigning it to the contractor performing the development work. Because those conducting the development work were contractually assigned ownership of the product roadmap, the key agile benefit of rapidly delivering beneficial products to the customer could be at risk.

- 4) **“Scrum”<sup>5</sup> Events Should Follow Best Practices**—The Library uses the Scrum framework for its agile development projects, including on this Recordation project. However, the auditors observed several key departures from best practices as it related to “sprints.”<sup>6</sup> Notably, the tasks of collaborating on items to be completed in the next sprint; revising product backlog at the end of a sprint review; reviewing how potential use of the product may have changed; and, reviewing the timeline, budget, and potential capabilities for the next anticipated release of the product did not occur.

## Recommendations

Cotton made twelve recommendations to the Library to address its findings.

## Management Comments

In response to the draft report (see Appendix B), the Library’s senior leadership agreed with all the recommendations.

learning about customers with the least effort. (Ries, Eric. *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses*. New York: Crown Business, 2011.)

<sup>5</sup> Scrum: A process framework used to manage product development and other knowledge work. Scrum is empirical in that it provides a means for teams to establish a hypothesis of how they think something works, try it out, reflect on the experience, and make the appropriate adjustments. (Definition per Agile Alliance)

<sup>6</sup> In product development, a sprint is a set period of time during which specific work has to be completed and made ready for review.

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Appendix A: Cotton & Company LLP's Report:  
*U.S. Library of Congress Copyright  
Recordation IT Modernization Audit Received  
by the Office of the Inspector General*

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Cotton &  
Company

*Answers Questioned*

**U.S. LIBRARY OF CONGRESS  
COPYRIGHT RECORDATION IT MODERNIZATION AUDIT  
RECEIVED BY THE OFFICE OF THE INSPECTOR GENERAL**

**FINAL REPORT**

July 26, 2019

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Mr. Kurt W. Hyde  
Inspector General  
Office of Inspector General  
U.S. Library of Congress

Dear Mr. Hyde,

Cotton & Company LLP is pleased to submit the attached audit report detailing the results of our performance audit of the Library of Congress's (Library's) Information Technology (IT) modernization project for the Copyright Recordation system. The Library Office of Inspector General (OIG) engaged Cotton & Company to conduct this performance audit pursuant to Contract Number LCOIG17F0008. Cotton & Company performed the work from October 2018 through March 2019.

We conducted this performance audit in accordance with Generally Accepted Government Auditing Standards (GAGAS) promulgated by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence that provides a reasonable basis for our findings and conclusions based on our audit objective. We believe that the evidence we obtained provides a reasonable basis for our findings and conclusions based on our audit objective.

This audit report is intended solely for the information and use of Library personnel and federal government entities assigned oversight responsibilities for the Library, including:

- House Committee on Appropriations
- Senate Committee on Appropriations
- Committee on House Administration
- Committee on Rules and Administration
- House Committee on the Judiciary
- Senate Committee on the Judiciary

This audit report is not intended to be, and should not be, used by anyone other than these specified parties.

Sincerely,  
Cotton & Company LLP



Loren Schwartz, CPA, CISSP, CISA  
Partner



## Summary

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The U.S. Copyright Office (USCO) is a service unit of the Library of Congress (Library) that is responsible for administering copyright law within the United States. The USCO is headed by the Register of Copyrights and is designated by law to maintain official records pertaining to copyrights, such as assignments, licenses, and grants of security interests. In Fiscal Year (FY) 2018, the Library Office of the Chief Information Officer (OCIO) and the USCO initiated a joint effort to develop the future-state version of the USCO's Copyright Recordation (Recordation) system. Software development for this effort began in FY 2018; the USCO and the OCIO plan to complete the system framework and design and then implement the system in the cloud. According to the USCO's *Modified USCO Provisional IT Modernization Plan: Analysis of Shared Services, Support Requirements, and Modernization Efforts, September 1, 2017* (Modified USCO Provisional Information Technology (IT) Modernization Plan), the timeframe for piloting the modernized Recordation system and completing the transition to the new system will be approximately two years, subject to resource availability.

The purpose of this audit report is to deliver the results of our audit testing of the OCIO and USCO's compliance with the Library's systems development life cycle (SDLC) and project management life cycle (PMLC) policies and directives and to determine if the USCO's Recordation IT system modernization project is currently on schedule and within budget. Our audit also included a review and analysis of the Contracting Officer's Representative's (COR's) function on the Library's IT modernization efforts. Our testing primarily focused on the ongoing Recordation Modernization Initiative (RMI) Minimum Viable Product (MVP) development effort.

Most significantly, based on the results of our testing, we found that Library management has not developed adequate mechanisms for tracking the status of project completion or project health issues on the RMI MVP project. The OIG initially identified this issue in its report titled *Report for Design of Library-wide Internal Controls for Tracking Information Technology Investments*, dated March 2015, in which the OIG stated that it had identified Library practices that were inconsistent with Government Accountability Office (GAO)-prescribed methods for tracking and reporting costs related to IT expenditures, such as earned value. In response to this report, the Library stated that it would consider using the Office of Management and Budget (OMB) reporting elements when developing costs and variance reports, and that it would obtain assistance from the Financial Services Directorate (FSD) in collecting and generating costs and related data for reporting.

Our testing found that the OCIO Project Management Office (PMO) develops status dashboards that contain project status and health information; however, the dashboards do not effectively convey this information. This issue occurred because management did not reach agreement on key performance indicators to describe the earned value of the project relative to project costs before initiating the project. Without effective project management in place, including adequate project status reporting, Library management will not be aware of issues that may cause the project to fall behind schedule or require additional resources. More significantly, Library management will not know whether the project is on schedule and/or over budget. Because the OCIO was not able to provide adequate status metrics, our team was not able to determine whether the project is on schedule and within budget.

In addition, we found that the Library did not assess the suitability of various SDLC methodologies before beginning to develop the RMI MVP. Specifically, the Library is using an agile SDLC methodology to carry out the Recordation project, even though the agile methodology does not appear to align with the objectives and constraints of the project. The granular scope of the feature requirements included in the RMI MVP task order indicate that the task order has a fixed scope; however, a pure agile methodology and approach is primarily suited for objectives that do not have a fixed scope, as entities are expected to frequently modify requirements and priorities based on findings identified during the development process.



In total, this audit report contains 6 findings and 12 associated recommendations, as follows:

1. Project Status Tracking Lacks Sufficient Detail (three recommendations)
2. Suitability of System Development Life Cycle Methodologies Is Not Assessed Before Beginning System Development (three recommendations)
3. Minimum Viable Product Is Over-Defined (one recommendation)
4. Project Responsibilities Do Not Follow Agile Best Practices (one recommendation)
5. Scrum Events Depart from Best Practices (two recommendations)
6. Risk Register Missing Contingency Plans for Project Risks (two recommendations)



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## 1. Background

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The Library of Congress (Library) is an agency under the legislative branch of the U.S. government and is the world's largest and most comprehensive library, maintaining a collection of more than 164 million items – many of them unique and irreplaceable – in more than 470 languages. The Library's mission is to support Congress in fulfilling its constitutional duties and to further the progress of knowledge and creativity for the benefit of the American people.

The U.S. Copyright Office (USCO) is a service unit of the Library that is responsible for administering copyright law within the United States. The USCO is headed by the Register of Copyrights and is responsible for the registration and recordation of works and licenses, a number of statutory licensing provisions, and other aspects of Title 17 of the United States Code.

By statute, the Register of Copyrights is the principal advisor to Congress on national and international copyright matters, testifying upon request and providing ongoing leadership and impartial expertise on copyright law and policy.

At the direction of Congress, the Government Accountability Office (GAO) conducted reviews of the Library's overall information technology (IT) environment and the IT infrastructure directly serving Library directorates, including the USCO. In November 2016, partly in response to a March 2015 GAO review, the head of the Library, the Librarian of Congress, issued a policy memorandum mandating centralization of all IT functions under the Library's Office of the Chief Information Officer (OCIO).

### Modernization Program

The USCO presented its initial outline for the modernization of its IT environment in the USCO 2016-2020 Strategic Plan, which called for a robust and flexible technology enterprise dedicated to the current and future needs of a modern copyright agency. The plan states:

*A robust, responsive, and highly secure enterprise architecture will be the backbone of a modern Copyright Office. Systems should inspire confidence and encourage participation in day-to-day services and transactions. Custom search tools should yield quick, authoritative results. In short, technology should support all aspects of the Copyright Office's mission and adapt to evolving needs.*

The USCO presented its initial blueprint for this IT modernization effort in the *Provisional Information Technology Modernization Plan and Cost Analysis* (Provisional IT Modernization Plan), which it delivered to the House of Representatives on February 29, 2016, as required by the Consolidated Appropriations Act of 2016. The Provisional IT Modernization Plan states that, if implemented, this plan would change a number of existing paradigms. For example, copyright registration would transition from a large proprietary software product managed by the USCO to a model that enables third parties to build a variety of products on an open-source technology platform that would seamlessly interoperate with USCO systems. Through the implementation of the Provisional IT Modernization Plan, the USCO intends to minimize data center and other infrastructure needs, instead using a variety of cloud strategies.

The Provisional IT Modernization Plan further states that, if implemented, the USCO would transition the Copyright Recordation (Recordation) system from a paper-based intake system to an automated system in which recording parties may enter their own information using metadata standards established or adopted by the USCO. The system would also incorporate digital search capabilities that would provide users with dynamic access to the USCO's recordation data. Moreover, the USCO plans to integrate Registration and Recordation data and databases



into a comprehensive system of records to provide a more seamless chain of title from registration to licenses to transfers and the public domain. The Provisional IT Modernization Plan also prioritizes strong IT security standards to protect the integrity of, and access to, nonpublic data and materials.

In May 2017, the House Committee on Appropriations requested that the Library modify the Provisional IT Modernization Plan to include potential opportunities for shared efficiencies and cost savings, as well as to include support from the Library's OCIO in the USCO's overall modernization efforts. In response, the Library developed the *Modified USCO Provisional IT Modernization Plan: Analysis of Shared Services, Support Requirements, and Modernization Efforts* (Modified USCO Provisional IT Modernization Plan), which supplements and should be read in conjunction with the Provisional IT Modernization Plan. The Modified USCO Provisional IT Modernization Plan states that the modernization program will focus on developing the following services:

1. Recordation of Copyright Documents
2. Copyright Registration
3. Public Records Catalog
4. Statutory Licensing

The Modified USCO Provisional IT Modernization Plan estimates that the timeframe for piloting the modernized Recordation IT system and completing the transition to the new system will be less than two years from the start of the development process, which began in Fiscal Year (FY) 2018. The USCO intends to implement modernized Registration, Public Records Catalog, and Statutory Licensing systems thereafter. Pending the approval of further funding, the Library began performing requirements-gathering for the new Registration system in FY 2018. The Library expects funding of approximately \$75 million for the modernization project, including nearly \$4 million spent on development during FY 2018 and \$12 million to be spent during FY 2019.

The Modified USCO Provisional IT Modernization Plan also states that the USCO will require strong program and project management to successfully complete the IT modernization effort. The USCO Modernization Governance Board (Governance Board) was appointed to act as a steering committee for this effort. Its members include the Library CIO and the Register of Copyrights. The Governance Board is responsible for giving direction and making decisions for business operations executed as part of this program, as well as facilitating the necessary collaboration between the OCIO and the USCO. Under the Modified USCO Provisional IT Modernization Plan, the Governance Board provides strategic direction to the Copyright Modernization Office (CMO), which is responsible for coordinating modernization on behalf of the USCO to ensure that the modernization effort remains continuously aligned with the USCO's strategic goals. The CMO also works closely with the OCIO Program Management Office (PMO), which is responsible for leading technology projects related to the modernization effort.

According to the Modified USCO Provisional IT Modernization Plan, the USCO is still responsible for ensuring that the IT modernization activities focus on its mission and organizational priorities, while the OCIO is responsible for delivering technological solutions and identifying technological efficiencies that the USCO can gain through economies of scale. Under the Modified USCO Provisional IT Modernization Plan, each project will have a charter that clearly defines the USCO and OCIO's roles, responsibilities, and ultimate ownership for the project.

The OCIO currently provides the USCO with the USCO's commodity IT needs, including network infrastructure, file storage, database services, desktop computers, IT Service Desk, and standard software licenses. In addition, the OCIO has previously managed certain software development projects on behalf of the USCO; under the Library's new IT centralization model, it will be standard practice for the OCIO to manage software development projects. The USCO was previously responsible for much of its own overall IT planning and day-to-day management and



maintenance of mission-specific IT systems; however, under the more recently implemented IT centralization model, the OCIO performs these technology functions instead.

The Modified USCO Provisional IT Modernization Plan states that the USCO and the OCIO have reached agreement on basic principles regarding financial responsibility in the centralized IT environment going forward, as follows:

- The USCO will request funding for USCO-related development, modernization, and enhancement (DME) cost elements; however, the OCIO will provide the actual system development capabilities required to achieve the funded business objectives.
- The OCIO will maintain responsibility for any enterprise IT services, including any operations and maintenance (O&M) costs associated with USCO systems.
- The USCO will be responsible for securing funding for procuring new technologies or services required to enhance or modify an existing OCIO service in cases in which the enhancement is specific to the USCO's mission and would not benefit other OCIO customers.
- The OCIO will be responsible for securing funding for DME and O&M activities in cases in which the enhancement may benefit other OCIO customers.

With the bulk of all IT functions centrally managed within the OCIO, the USCO and the OCIO entered into an intra-agency agreement (IAA) under which the USCO transferred a significant portion of the FY 2019 modernization funding to the OCIO. The IAA states that the OCIO will provide all technical support, IT technical project management, and IT technical reporting for the USCO IT modernization project. The IAA also states that the OCIO, in coordination with the Contracts and Grants Directorate (CGD), will pursue a Request for Proposal for future USCO modernization development.

### Recordation Project

The USCO is designated by law to maintain official records pertaining to copyrights, such as assignments, licenses, and grants of security interests. Authors, heirs, copyright owners, and other parties submit thousands of documents to the USCO each year for public recordation, including copyright assignments, licenses, and other records relating to the chain of title for copyrighted works. The Modified USCO Provisional IT Modernization Plan states that the USCO has an important interest in ensuring that the public record of copyright transactions is as timely, complete, and accurate as possible.

In FY 2018, the OCIO began to develop the future-state version of the Recordation system. The development is a joint effort between the USCO and the OCIO and follows the collaborative model described in the Modified USCO Provisional IT Modernization Plan. The Library began software development for the system in FY 2018 using funds received through an earlier program increase, and it plans to complete the system framework and design and then implement the system in the cloud. The Modified USCO Provisional IT Modernization Plan states that, subject to resource availability, the timeframe for piloting the modernized Recordation IT system and completing the transition to the new system will be approximately two years. The USCO continues to perform stakeholder outreach while deploying the modernized Recordation system. In addition, as part of the transition process, the USCO must update its business processes, train its staff, and finalize the necessary regulatory updates.

### Development Process

The Project Management Institute's (PMI's) publication *Pulse of the Profession 2017* indicates that a larger number of its sampled projects are meeting their original goals and business intent and are being completed within budget than were in prior years. However, projects continue to suffer from scope creep, budget overruns, and missed deadlines, as illustrated below:

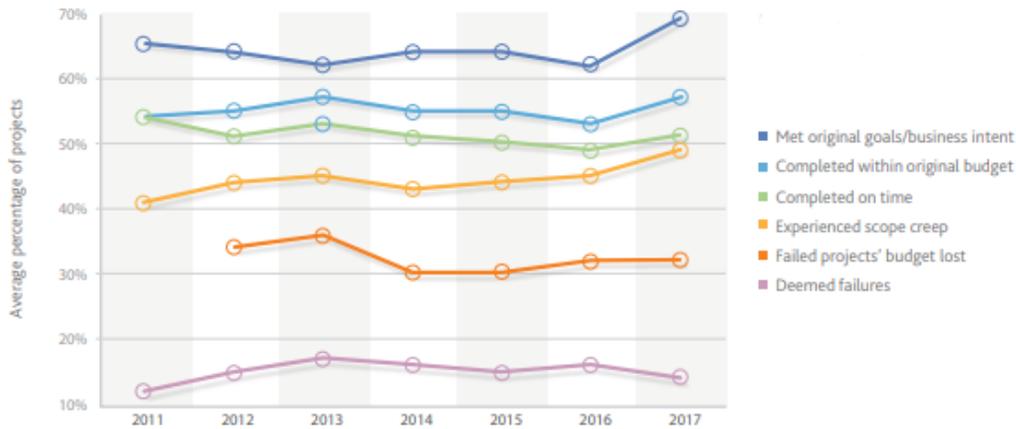


Figure 1: Project Performance Metrics (from [Pulse of the Profession 2017](#))

Further, PMI noted significant differences between the Champions<sup>1</sup> and Underperformers<sup>2</sup> included in the study:

	 CHAMPIONS	 UNDER-PERFORMERS
Average percentage of projects completed on time	88%	24%
Average percentage of projects completed within budget	90%	25%
Average percentage of projects that meet original goals/business intent	92%	33%
Average percentage of projects experiencing scope creep	28%	68%
Average percentage of projects deemed failures	6%	24%
Average percentage of budget lost when a project fails	14%	46%

Figure 2: Project Performance Averages of Champions vs Underperformers (from [Pulse of the Profession 2017](#))

Figure 2 illustrates the significant differences between Champions and Underperformers in project outcomes, particularly with regard to finishing on time (88 percent for Champions, compared to 24 percent for Underperformers), within budget (90 percent for Champions, compared to 25 percent for Underperformers), and meeting goals (92 percent for Champions, compared to 33 percent for Underperformers). The PMI *Pulse of the Profession 2017* highlights the differences in approaches taken to projects by Champions and Underperformers:

*Agile is a topic of growing importance in project management, with 71 percent of organizations now reporting they use agile approaches to their projects sometimes or more frequently than in the past. In fact, over the past 12 months, one in five projects has used agile approaches, whereas another one in five*

<sup>1</sup> PMI defines “Champions” as organizations at which 80 percent or more of projects are completed on time and on budget and meet original goals and business intent; these organizations also have high benefits-realization maturity.

<sup>2</sup> PMI defines “Underperformers” as organizations at which 60 percent or fewer of projects are completed on time and on budget and meet original goals and business intent; these organizations also have low benefits-realization maturity.

has used hybrid or blended approaches. And, perhaps as significant, is the percentage of projects that used something other than agile, hybrid, or plan-driven approaches, which could be a further blend or customization of other approaches (23%). Champions have a keen focus on using agile approaches to projects—55 percent versus 24 percent of underperformers.

**Library Progress**

In developing its Modified USCO Provisional IT Modernization Plan, the OCIO (in conjunction with the USCO) favored an agile development methodology to maximize the flexibility and efficiency of its technology modernization efforts. The agile methodology focuses on delivering multiple smaller-scale releases, rather than delivering a smaller number of major releases, as described in Figure 3:

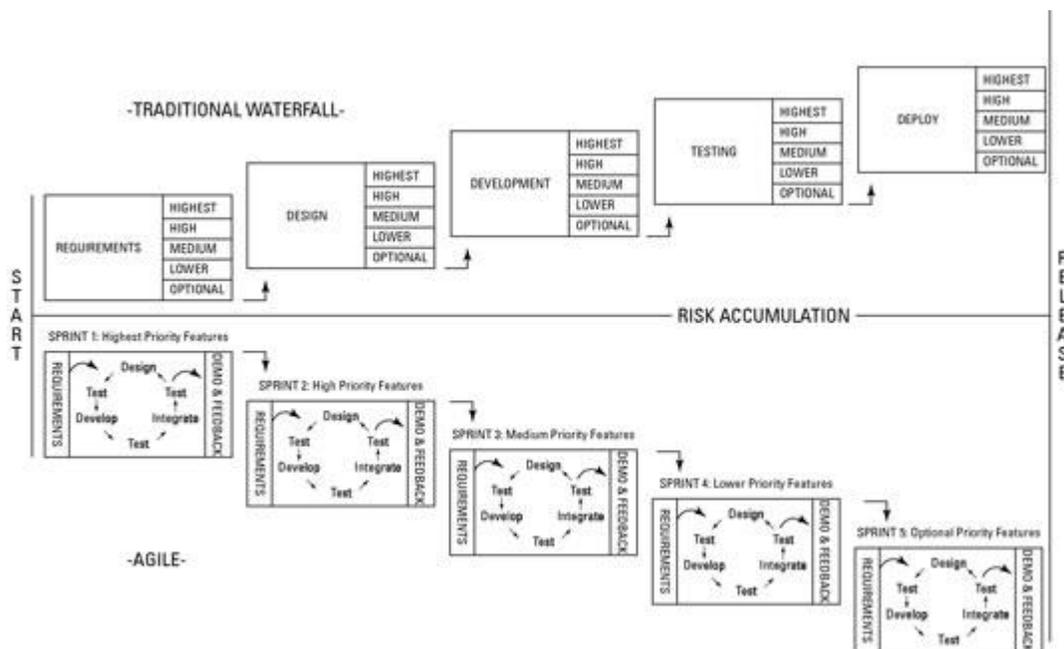


Figure 3: Comparing Agile and Waterfall Development Methods (from Wiley)

Based on this plan, the CGD required the contractor responsible for developing the modernized Recodation system to perform the order as part of a team using the Scrum agile framework<sup>3</sup> in a series of three-week sprints<sup>4</sup> throughout the period of performance to develop the Minimum Viable Product (MVP)<sup>5</sup> identified in the task order. Specifically, the Recodation Modernization Initiative (RMI) MVP contract states that the contractor must use

<sup>3</sup> Scrum: A process framework used to manage product development and other knowledge work. Scrum is empirical in that it provides a means for teams to establish a hypothesis of how they think something works, try it out, reflect on the experience, and make the appropriate adjustments. (Definition per [Agile Alliance](#))

<sup>4</sup> Sprint: A timebox of one month or less during which the team produces a potentially shippable product Increment. (Definition per [Agile Alliance](#))

<sup>5</sup> MVP: That version of a new product which allows a team to collect the maximum amount of validated learning about customers with the least effort. (Ries, Eric. *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses*. New York: Crown Business, 2011.)

standard agile practices as defined by the Scrum Alliance,<sup>6</sup> including sprint planning, daily scrums,<sup>7</sup> user story-based development,<sup>8</sup> continuous integration, automated testing, and the use of agile tools and methodologies such as velocity and burn-down and burn-up charts to measure project progress and value. The contract further states that the team will work on all layers of the system, including integration, user interface, business logic, and persistence, for both the public-facing and administrative back-end components running under the copyright.gov domain. The members of the agile team are required to participate in user-story grooming sessions, daily scrum meetings, sprint planning, sprint review, and sprint retrospective meetings.

The figure below illustrates the Scrum agile framework. Please see Appendix B: Scrum Description for additional information regarding the Scrum framework.

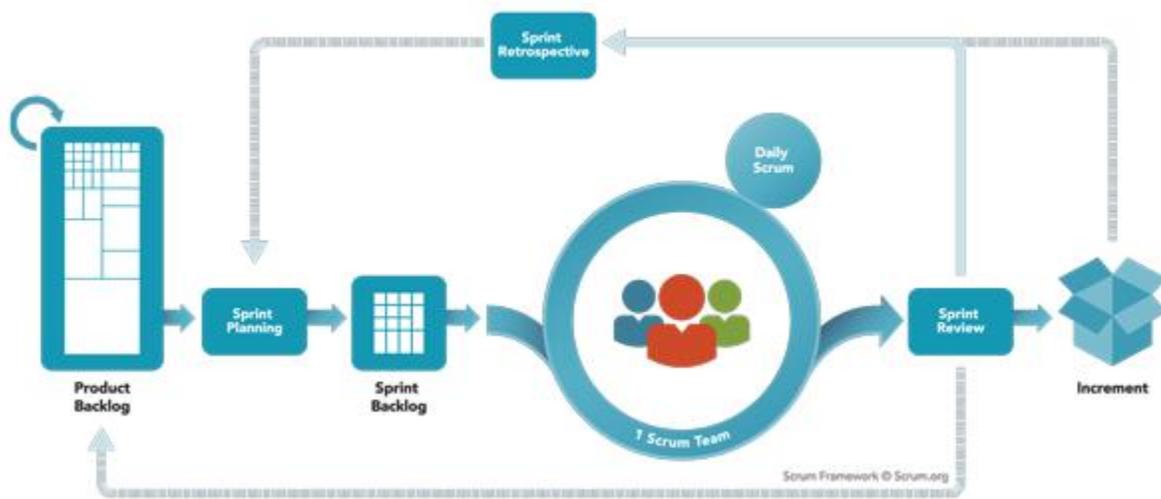


Figure 4: The Scrum Process (image from [Scrum.org](https://www.scrum.org))

## 2. Findings and Recommendations

The scope of the engagement encompassed the USCO and OCIO’s efforts to develop the new USCO IT environment and business applications, as described in the Modified USCO Provisional IT Modernization Plan. The engagement also included a review and analysis of the COR function on the IT modernization effort. Our testing primarily focused on the ongoing RMI MVP development effort. We determined that the USCO and OCIO are generally in compliance with the Library’s systems development life cycle (SDLC) and project management life cycle (PMLC) policies and directives. However, these directives were not all consistent with agile best practices, and we were unable to determine if the USCO IT modernization project is currently on schedule and within budget.

<sup>6</sup> Scrum Alliance: The largest, most established, and influential professional Agile membership and certification organization with more than 450,000 practitioners. (Definition per [Scrum Alliance](https://www.scrumalliance.org))

<sup>7</sup> Daily Scrums: A short (usually limited to 15 minutes) discussion where the team coordinates their activities for the following day. (Definition per [Agile Alliance](https://www.agilealliance.com))

<sup>8</sup> User Story: In consultation with the customer or product owner, the team divides up the work to be done into functional increments called "user stories." Each user story is expected to yield, once implemented, a contribution to the value of the overall product. (Definition per [Agile Alliance](https://www.agilealliance.com))



We performed testing in several areas relating to the Library's modernization efforts in which we did not identify any exceptions. We assessed the appropriateness and capabilities of the leadership team and noted that the Library had assigned the roles appropriately, as the project sponsor is the Register of Copyright, the product owner is part of the Office of Public Records and Recordation (i.e., the RMI MVP customer), and the Scrum Master is an employee of the contractor developing the system. The Scrum Master holds a Certified Scrum Master (CSM) certification from the Scrum Alliance and has more than 10 years of experience managing development teams for government projects. The product owner holds both the Certified Scrum Product Owner (CSPO) and the Advanced Certified Product Owner (ACPO) certifications from the Scrum Alliance.

We determined that the USCO adequately communicated its business requirements to the developer and involved the necessary stakeholders in the process, as the USCO communicated the business requirements to the contractor upon awarding the initial base-year contract. We also determined that the USCO used the business requirements from the base-year contract to develop the MVP attached to the follow-on contract. The USCO then used the MVP to develop the product roadmap, which serves as the primary mechanism for tracking business requirements for the RMI MVP project.

We further noted that the development team lead demonstrated all closed user stories to the product owner using the live Recordation web app. The product owner used the acceptance criteria for each user story to determine whether the user story was ready to move to the user acceptance testing (UAT) stage. We confirmed that the USCO either had accepted or was actively tracking all failed user stories in the ongoing issues section of Jira, the Library's project management tool for software development. The development team appears to work on issues and story points across sprints in a reasonable manner.

We reviewed documentation that the Library had produced to support the software and systems developed to determine if the documentation was adequate. We noted that the documentation included system architecture, training, and security documentation as described by National Institute of Standards and Technology (NIST) Special Publication (SP) 800-64, Rev. 2, *Security Considerations in the System Development Life Cycle*. We inspected the RMI MVP Security Authorization & Accreditation (SA&A) milestones spreadsheet and determined that management has defined a plan to ensure that the RMI system goes through all six steps of the Risk Management Framework (RMF), including authorizing the system in accordance with Library policies.

We determined that the COR is performing the required roles and responsibilities as set forth in the contract, as well as those stipulated by the CGD. We also determined that, based on the Library's decision to centralize all IT development contracts under the OCIO, it is logical that the COR for the Recordation project is located in the OCIO. The OCIO COR assigned to the Recordation contract has sufficient experience and training to perform the duties required of a COR on this project.

This audit report contains 6 findings and 12 associated recommendations, as follows:

1. Project Status Tracking Lacks Sufficient Detail (three recommendations)
2. Suitability of System Development Life Cycle Methodologies Is Not Assessed Before Beginning System Development (three recommendations)
3. Minimum Viable Product Is Over-Defined (one recommendation)
4. Project Responsibilities Do Not Follow Agile Best Practices (one recommendation)
5. Scrum Events Depart from Best Practices (two recommendations)
6. Risk Register Missing Contingency Plans for Project Risks (two recommendations)



### Project Status Tracking Lacks Sufficient Detail

OCIO executive management has not developed adequate mechanisms for tracking the status of order completion or order health issues for the RMI MVP project. Without these mechanisms, the Library cannot accurately track overall project completion or project health, as a project may encompass multiple contracts. OCIO executives (as well as Financial Services Directorate (FSD) and CGD executives for project health issues relating to cost management and contract management, respectively) should have implemented this critical mechanism and obtained a clear understanding of internal stakeholders and their information needs before beginning the project, particularly given the high profile and costs of the project.

The OIG initially identified this issue in its report titled *Report for Design of Library-wide Internal Controls for Tracking Information Technology Investments*, dated March 2015, in which the OIG stated that it had identified Library practices that were inconsistent with Government Accountability Office (GAO)-prescribed methods for tracking and reporting costs related to IT expenditures, such as earned value. In response to this report, the Library stated that it would consider using the Office of Management and Budget (OMB) reporting elements when developing costs and variance reports, and that it would obtain assistance from the FSD in collecting and generating costs and related data for reporting.

The project manager (PM) produces status dashboards with project status and health information and makes these dashboards available to executive stakeholders; however, the dashboards do not effectively convey this information. This issue occurred because management did not reach agreement on key performance indicators to describe the earned value of the project relative to project costs before initiating the project.

The Federal Acquisition Regulation (FAR) Subpart 34.201, *Earned Value Management System Policy*, states:

- a) *An Earned Value Management System (EVMS) is required for major acquisitions for development, in accordance with OMB Circular A-11. The Government may also require an EVMS for other acquisitions, in accordance with agency procedures.*
- b) *If the offeror proposes to use a system that has not been determined to be in compliance with the Electronic Industries Alliance Standard 748 (EIA-748), the offeror shall submit a comprehensive plan for compliance with these EVMS standards. Offerors shall not be eliminated from consideration for contract award because they do not have an EVMS that complies with these standards.*

RMI MVP Contract Section C.4.10.2, *Project Management Documents*, states:

*To supplement the MVP, there should be continuous updates and buildout of living documents that are drawn from the Library SDLC, to include training guides/modules. The contractor shall provide the following:*

- ...
- iv. *A strategy for reviewing and reporting progress.*

The RMI PM, a member of the OCIO, is responsible for producing weekly project status reports that include the overall status of the project, the PMLC phase, the percentage of project completion, accomplishments, and any upcoming milestones. However, the Library reports the percentage of project completion based on the percentage of sprints completed, rather than the percentage of work completed. Management has not identified any ongoing budget or schedule variances for the RMI MVP project; however, because management does not have accurate information regarding progress on the project, management is not able to accurately determine whether variances exist.

Pure agile development projects generally do not track progress to completion, as the total amount of work is unknown; instead, they may track the number of features completed, remaining, and total, as follows:

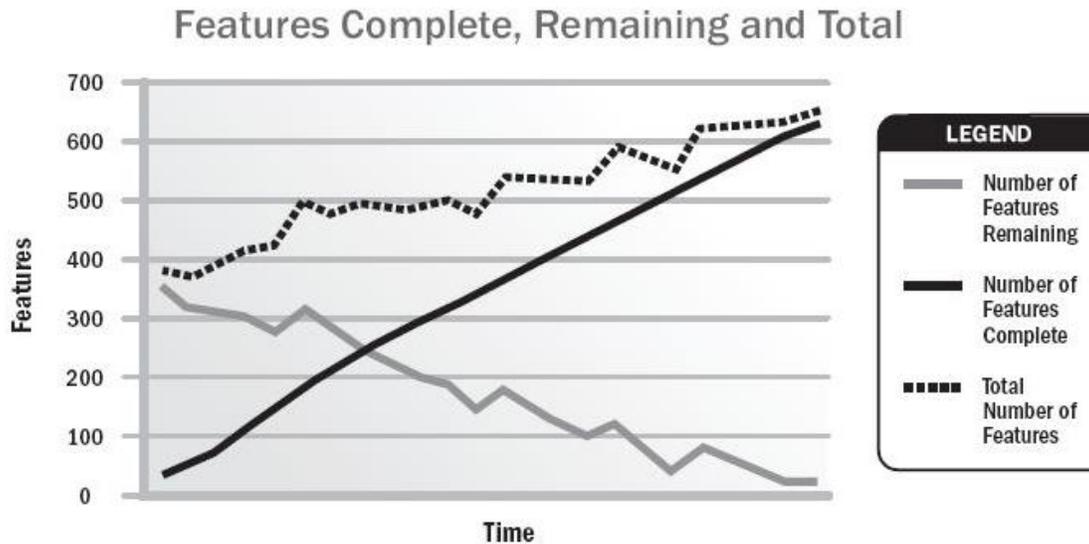


Figure 5: Feature Burnup/Burndown Chart<sup>9</sup> Example (from PMI's [Agile Practice Guide](#))

However, this effort does not follow a pure agile approach; the RMI MVP contract includes a fixed scope of work, and the Library should therefore be able to track progress toward project completion based on the scope, using earned value management as a metric. According to PMI, earned value analysis (EVA) compares the performance measurement baseline to the actual schedule and cost performance. This includes calculating and comparing the planned value (PV), earned value (EV), and actual cost (AC) to identify when a project is deviating from its planned baseline, and forecasting to compare the budget at completion (BAC) to the estimate at completion (EAC), as follows:

<sup>9</sup> Feature Burnup/Burndown Chart: The features complete line shows that the team completes features at a regular pace. The total features line shows how the project's total features changed over time. The features remaining burndown line shows that the rate of feature completion varies. Every time features are added to the project, the burndown line changes. (Definition per PMI's *Agile Practice Guide*)

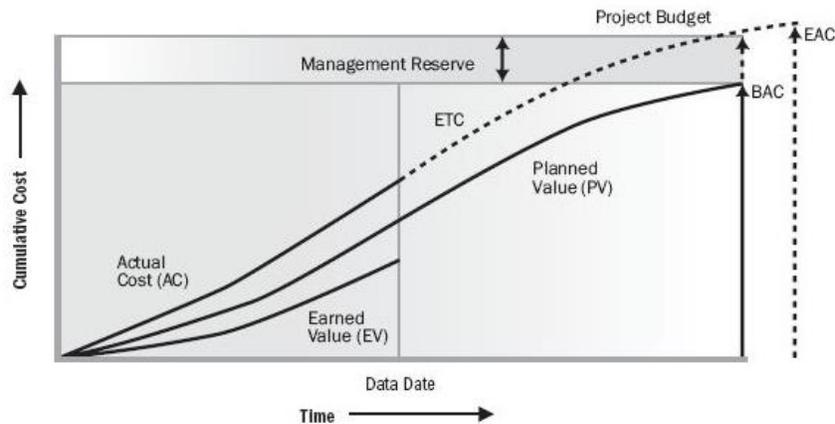


Figure 6: EV, PV, and AC for a project that is behind schedule (from PMBOK 6th Edition)

Finally, executive management does not adequately track project health issues and mitigation steps, nor has it developed adequate guidance in this area. Project health issues are problems that have occurred and that are negatively impacting the project schedule, scope, or cost, as well as problems that have not yet occurred but that may negatively impact the project if they do occur. Risk identification and mitigation is a critical tool for executives, and it is imperative that the executives are able to clearly determine the frequency, detail, communication, and accountability for these risks.

Specifically, we reviewed project status reports from October and November 2018 and noted that the project health category of the reports did not reflect that the Library had not fully resolved certain project health issues, even though remediation efforts were still ongoing. Further, the remediation description was generic and did not provide additional information or links to other resources to provide management with more details if needed.

This issue occurred because management has not fully developed guidance for tracking project completion or project health. We inspected the project status reporting guidance found on the OCIO PMO Confluence webpage and found that, although the guidance contains a draft section on tracking project completion, the OCIO PMO had not completed the guidance as of January 31, 2019, four months after the project began. In response to our findings, OCIO project executives stated that going forward, the OCIO will ensure that it finalizes guidance before the start date for projects. The OCIO should ensure that its guidance complies with PMI standard reporting practices, OMB memoranda and circulars, and publications by other relevant best-practice-setting bodies to ensure that all executives are fully informed. In addition, the OCIO should establish a quality control function to ensure that it completes all guidance, agreements, and requisite documents (e.g., agile suitability scorecards) before initiating the development process.

We also inspected the project health reporting guidance found on the OCIO PMO Confluence page and determined that the guidance only defines the various health levels, without providing instructions for reporting on resolved project health issues in the status reports.

In addition, the OCIO did not develop a stakeholder engagement plan as part of its project management plan. The stakeholder engagement plan is a component of the project management plan that identifies the strategies and actions required to promote productive stakeholder involvement in decision-making and execution. Stakeholders on the RMI MVP project include not only the development team, the customer, and the project sponsor, but also Library senior executives. We also found that the structure of and participation in project governance meetings may not have been effective and efficient and did not conform to the agile methodology, as the number of



participants in these meetings was unwieldy and the meetings did not provide sufficient information for the executives to properly assess the status and health of the project.

Stakeholder management includes the processes required to identify the people, groups, or organizations that could impact or be impacted by the project, analyze stakeholder expectations and their impact on the project, and develop appropriate management strategies for effectively engaging stakeholders in support of project decisions and execution. To increase the chances of success, organizations should begin identifying stakeholders and developing stakeholder engagement strategies as soon as possible after receiving approval for the project charter, and the project objectives should include identifying and managing stakeholder satisfaction. The keys to effective stakeholder engagement are focusing on continuous communication with all stakeholders to understand their needs and expectations, addressing issues as they occur, managing conflicting interests, and fostering appropriate stakeholder engagement in project decisions and activities.

Without effective project management, including accurate status reporting, Library management will not be aware of issues that may cause the project to fall behind schedule or require additional resources. In addition, management may not have insight into the resolution process for project health issues. Finally, without an accurate understanding of the work completed, the Library may reach the end of the development stage period of performance without completing all portions of the MVP, even though the contractor has completed the tasks assigned by the Library.

As a result, we recommend that, as part of the USCO IT modernization effort, the OCIO, in coordination with the USCO and the FSD:

1. Develop and implement guidance on tracking and resolving project health issues, on development projects that follow an agile, hybrid, or other similar methodology. This guidance should follow the guidelines included in publications by PMI, OMB, and/or other risk management standard setting bodies. The guidance should also identify critical characteristics of the EVA method for measuring the project budget and progress toward completion in coordination with FSD, including establishing the project costing methodologies. In addition, the OCIO should update its status dashboards to effectively convey project progress.

For future software development efforts that follow the agile methodology or another similar methodology, we recommend that the OCIO:

2. Ensure that all relevant stakeholders understand the development methodology used, implement a stakeholder engagement plan, assess the risks associated with the project before beginning the project, and document best practices for governance and status meetings, including best practices relating to the size and content of the meetings.
3. Work with and obtain concurrence from project owners and, where applicable, development governance boards regarding the format and content of program and project reports. Ensure that such content follows the guidelines published by PMI or other risk management standard-setting bodies.

### **Suitability of System Development Life Cycle Methodologies Is Not Assessed Before Beginning System Development**

The Library did not assess the suitability of various SDLC methodologies before it began developing the RMI MVP. Because the RMI MVP contract states that the contractor must use standard agile practices for this project, we



reviewed the criteria and best practices for the agile methodology. However, we noted that the RMI MVP project does not meet the criteria to be best suited for a pure agile approach and may benefit from a hybrid approach.

As of December 6, 2018, the product roadmap contained 64 themes made up of 216 requirements that were included in Appendix J of the RMI MVP contract (Contract Number LCLOC17D0002), which map to 431 product requirements that translate to one or more user stories. The Library defined the timeframes for completing each theme at the beginning of the project as part of a sprint plan. The CGD stated that the MVP (Attachment J of the contract) could not be changed without a contract modification. The COR, product owner, and contractor can refine which stories the contractor must complete for each section in the MVP; however, they cannot add or remove sections from the MVP without a contract modification. The COR cannot authorize the addition of user stories that do not address a section of the MVP in the contract. If the COR, product owner, and contractor determine that the USCO does not require sections of the MVP that are included in the contract, the COR cannot authorize the contractor to not complete those sections of the MVP. This approach does not align with the agile SDLC methodology; it is more characteristic of a blend of predictive and iterative approaches, as described in more detail below.

The OCIO PMO provides guidance on which SDLC methodology to use in Library of Congress Directive (LCD) 5-310.2, *Systems Development Life Cycle*. This guidance states that personnel should base the determination on characteristics of the development effort, such as the stability of the requirements; characteristics of the stakeholders for the effort, such as customer availability; and characteristics of the development team, such as whether the team can be dedicated to the effort full-time. However, the Library did not complete an agile suitability scorecard before beginning development to determine which methodology would be more appropriate.

In addition, the agile framework used in the development process does not align with the *Agile at the Library* guidance, which states:

*Use Scrum when requirements are not fully known at the beginning of product lifecycle. Use KANBAN when you know the existing system and the requirement or changes for the system.*

Based on the Library's guidance, the RMI MVP may have followed a Kanban methodology,<sup>10</sup> rather than a Scrum methodology or a hybrid of the Scrum and Kanban methodologies, such as Scrumban.<sup>11</sup>

The PMI's *Agile Practice Guide* Section 3, *Life Cycle Selection*, states:

*Projects come in many shapes and there are a variety of ways to undertake them. Project teams need awareness of the characteristics and options available to select the approach most likely to be successful for the situation. This practice guide refers to four types of life cycles, defined as follows:*

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<sup>10</sup> The Kanban method is derived from lean-thinking principles and is a framework for incremental, evolutionary process and systems change for organizations. The method uses a "pull system" to move the work through the process. When the team completes an item, the team can pull an item from the backlog into the development phase. In the Kanban method, it is more important to complete work than it is to start new work, as there is no value derived from work that is not completed. The team therefore works together to implement and adhere to the work in progress (WIP) limits and move each piece of work through the system toward completion.

<sup>11</sup> Scrumban: The original concept behind Scrumban, as developed by Corey Ladas, was a transitional state for Scrum teams moving to Kanban. But the term has evolved and no agreed-upon definition of Scrumban is dominant today. It is generally taken to mean a software delivery framework that integrates elements of Scrum and Kanban. (definition from [Excella.com](http://Excella.com))

- **Predictive life cycle.**<sup>12</sup> A more traditional approach, with the bulk of planning occurring upfront, then executing in a single pass; a sequential process.
- **Iterative life cycle.** An approach that allows feedback for unfinished work to improve and modify that work.
- **Incremental life cycle.** An approach that provides finished deliverables that the customer may be able to use immediately.
- **Agile life cycle.** An approach that is both iterative and incremental to refine work items and deliver frequently.

It is not necessary to use a single approach for an entire project. Projects often combine elements of different life cycles in order to achieve certain goals. A combination of predictive, iterative, incremental, and/or agile approaches is a hybrid approach.

What differentiates a life cycle is not whether planning is done, **but rather how much planning is done and when.** Incremental initiatives plan to deliver successive subsets of the overall project. Teams may plan several successive deliveries in advance, or only one at a time. Agile projects also plan. The key difference is that the team plans and re-plans as more information becomes available from review of frequent deliveries.

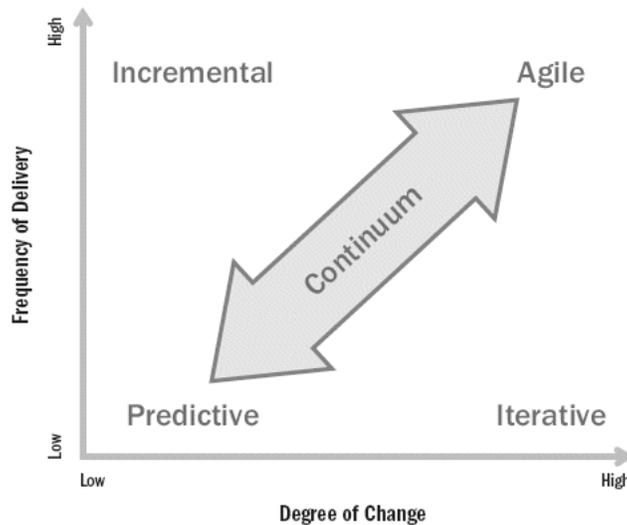


Figure 7: The Continuum of Life Cycles (from PMI's [Agile Practice Guide](#))

The LCD that discusses the SDLC only recognizes two of the four approaches described above. LCD 5-310.2, *Systems Development Life Cycle (SDLC)*, Section 3.2, *SDLC Development Methodologies*, limits development teams to one of two SDLC methodologies:

- **Waterfall [Predictive] SDLC:** The waterfall SDLC methodology is a sequential development approach, in which development flows steadily downwards (like a waterfall) through several phases. This means that any activity in the SDLC begins only after the previous activity in the lifecycle is completed. For

<sup>12</sup> The *Agile Practice Guide* indicates that the elements of a predictive approach are the same as those of a waterfall approach.

example, the development of the IT system can only be performed after the system design has been put together in detail. Waterfall development is typically appropriate when developing new IT systems with well-defined requirements.

- Agile SDLC:** The Agile SDLC methodology is an iterative and incremental development approach, in which requirements and solutions evolve through iterations and continuous feedback. As a result, SDLC activities are conducted iteratively and often in parallel. Agile development is most appropriate when requirements are evolving, the customer is highly engaged and multiple minimally viable versions of the product can be released throughout development.

This directive restricts Library project teams by requiring them to select one of the approaches defined above without offering them an opportunity to use a hybrid approach based on individual project specifications.

We inquired with the OCIO regarding the decision to use the agile methodology for the IT modernization project. The OCIO stated that the Library did not complete an agile suitability scorecard as required per OCIO Directive 2017-02 because:

*The Agile Suitability Scorecard is an optional document created when the PM is undecided on whether their project methodology should be agile. Since the Recordation project is [an] all new application development, there was no question about the decision to deliver the project using agile framework.*

The figure below is a model that uses several suitability filters to assist organizations in assessing and discussing whether projects should use a predictive, hybrid, or agile approach:

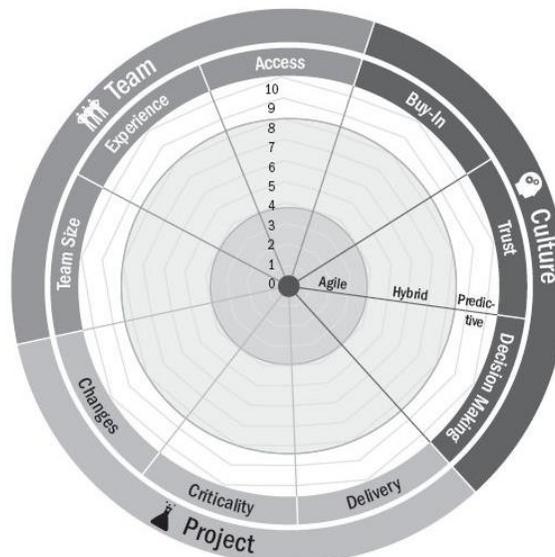


Figure 8: Model for Suitability of Agile Approach (from PMI's [Agile Practice Guide](#))

We determined that the OCIO's explanation was not in keeping with its policy. Further, even if the Library had used an agile suitability scorecard, the scorecard does not include an evaluation to assist the PM in determining which agile framework to use. There are a variety of agile frameworks available, such as Scrum, Feature-Driven Development, and Kanban, and each of these frameworks provides a different level of guidance and life cycle coverage. In response to our findings, the OCIO stated that the agile suitability scorecard is an important internal

control and that it will implement the scorecard as part of its development projects going forward. The OCIO also stated that it will allow the use of hybrid methodologies.

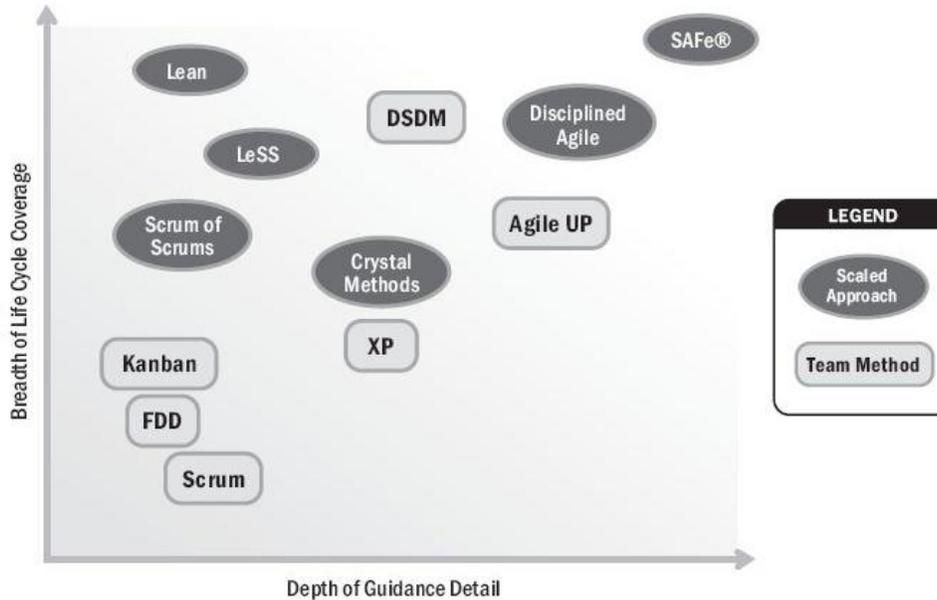


Figure 9: Agile Approaches Plotted by Breadth and Detail (from PMI's [Agile Practice Guide](#))

The Library is using an agile SDLC methodology to execute the Recordation project, even though the pure agile methodology does not appear to align with the objectives and constraints of the project. This issue may hamper development efforts and prevent the Library from satisfying its customers' needs. For example, the Library may spend time both developing the features within its fixed scope, which is not usually part of an agile project, and learning about additional potential features. If the Library develops additional features that it discovers as part of the agile process, rather than solely focusing on those features already within its scope, the project may miss deadlines and incur additional costs.

As a result, we recommend that:

4. The OCIO develop and implement guidance (i.e., directives) for blending all SDLC approaches based on the characteristics of individual projects, and that such directives include obtaining the business owners' concurrence regarding the SDLC approach at the start of each project. The OCIO should also obtain the FSD's concurrence regarding the SDLC approach as it relates to cost management.
5. The OCIO prepare a checklist of all required elements for starting a project before beginning system development for the project, including such items as obtaining approval of the SDLC methodology and completing an agile suitability scorecard, and then obtaining the CIO or Deputy CIO's approval of the completed checklist before beginning the project.
6. The OCIO map the current methodology used in developing the RMI MVP to the methodology required in LCD 5-310.2, ensure that it identifies and implements appropriate risk mitigation steps for any substantive deviation from the required methodology, and obtain the FSD and Register of Copyright's concurrence with regard to the mapping and any mitigation steps.



### Minimum Viable Product Is Over-Defined

The scope of the Library's RMI MVP development does not align with industry best practices.

The Agile Alliance states:

*A minimum viable product (MVP) is a concept from Lean Startup that stresses the impact of learning in new product development. Eric Ries<sup>13</sup> defined an MVP as that version of a new product which allows a team to collect the maximum amount of validated learning about customers with the least effort. A team effectively uses MVP as the core piece of a strategy of experimentation. They hypothesize that their customers have a need and that the product the team is working on satisfies that need. The team then delivers something to those customers in order to find out if in fact the customers will use the product to satisfy those needs. Based on the information gained from this experiment, the team continues, changes, or cancels work on the product.*

Further, the PMI's Agile Practice Guide section 3.1.4, *Characteristics of Agile Life Cycles*, states:

*In an agile environment, the team expects requirements to change. The iterative and incremental approaches provide feedback to better plan the next part of the project. However, in agile projects, incremental delivery uncovers hidden or misunderstood requirements.*

In 2017, the USCO contracted with a vendor to develop the initial system design documents for a modernized Recordation system (Contract Number LCLOC17D0015/COP17T0023); the USCO then used these system design documents to create the initial product roadmap and the associated requirements for the RMI MVP. Because the system design documents pre-date the RMI MVP project and the USCO derived the current RMI MVP roadmap on the system design documents, these items do not use an agile model. Instead, they contain specific details regarding the functionality that the vendor must include in the final delivered product. This level of detail is inconsistent with the definition of an MVP as accepted by the Agile Alliance. According to the Agile Alliance, entities should use an MVP to test assumptions regarding how customers will use the product and whether product development is following the best path to meet customer needs, rather than assuming that the organization already knows its customers' needs.

As described above, several attributes of the RMI MVP development are not consistent with a pure agile approach, such as the inclusion of detailed requirements in the contract. The Library stated that it is using agile development processes; however, the Library is constraining the project in ways that do not allow it to take advantage of the benefits associated with an agile methodology. We recognize that these constraints may be driven not only by internal demands, but also by external factors, such as statutory requirements that the USCO must follow and public feedback that the USCO obtained during its requirements-gathering for the Recordation project.

An MVP's primary value is that it enables teams to gain an understanding of their customers' needs before they fully develop the product. If a team is using an MVP to its fullest potential, the team may significantly change their product or abandon the product altogether based on feedback received from their customers. MVPs encourage teams to do the least amount of work needed to obtain useful feedback, enabling the organization to avoid investing effort and funding in unsuccessful products. This approach means that an agile methodology should reduce the need for extensive up-front requirements analysis and planning such as that performed by the Library, as the sponsor and project owner enter into the project with the understanding that the product requirements will evolve over the course of the development process.

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<sup>13</sup> Eric Ries is the author of *The Lean Startup*, in which he coined the concept of the MVP.



If the USCO were using a true MVP, which is less detailed and provides greater nimbleness with regard to functionality requirements, the USCO would need to employ a different approach to communicating with its stakeholders and customers regarding the rollout of releases and expectations surrounding the product's functionality and future changes. A true MVP approach should enable the USCO to gain feedback on the current product and make necessary changes based on that feedback.

The Library's RMI MVP development order is fixed-scope, as the current contract requires the contractor to develop all of the requirements identified in Attachment J1 of the contract (Contract No. LCLOC17D0002/ CIO18T0066). Specifically, RMI MVP contract section C.4.9., *Minimum Viable Product (MVP)*, states:

*The MVP must meet the specific business functionalities listed in attachment J1 of this task order, as refined through the agile development process.*

*As part of the agile process, the contractor developed MVP must also address defects based on user and stakeholder feedback (prioritized by the USCO product owner).*

Further, the development team pre-mapped the requirements in Attachment J1 to a product roadmap, which defines the requirements to be included in each release for the entirety of the contract period of performance. In November 2018, CGD informed the RMI MVP COR that the MVP is the baseline, fixed requirement that the vendor must deliver at the end of the order. CGD also stated that it expects the team to make tradeoffs of backlog items, and that these tradeoffs do not require a contract modification as long as the vendor does not exceed the MVP and completes the project within the contract price and period of performance. Agile life cycle approaches do not have a fixed scope, and the entity should frequently modify its requirements and priorities based on findings identified during the development process.

Because the RMI MVP order has a fixed scope, the project may not realize one of the primary benefits of an agile approach. An agile approach allows the development team to not only bring a working product to the customer rapidly, but also to shift priorities based on customer feedback. MVP development should incorporate customer feedback to enable the entity to test assumptions about customer needs. When used effectively, an MVP will enable the developer to gain a clearer understanding of customer needs before developing the full product, enabling the entity to expend more resources on meeting those needs.

We acknowledge that the FAR may not yet have adapted its contracting requirements to accommodate a pure agile approach. The Library may have attempted to fill the gaps to meet the pure agile approach in its contract; however, without clarifying how it will manage and mitigate certain risks, both from a contractual standpoint and from other standpoints, the Library may jeopardize or fail to maximize the project's success.

As a result, we recommend that:

7. The OCIO clearly define the purpose of an MVP in the Library's instance of agile development and develop a process for ensuring that the Library incorporates the agreed-upon definition into its SDLC processes. The OCIO should coordinate with CGD for issues related to contract management and with FSD for issues related to cost management. The Library should then codify the process in its policies.



### Project Responsibilities Do Not Follow Agile Best Practices

The RMI MVP product owner, who resides in the USCO, is not properly or sufficiently empowered according to agile best practices. The Library contractually required the contractor serving as the RMI MVP developer to set the direction of the project, rather than empowering the product owner to do so.<sup>14</sup>

The PMI's *Agile Practice Guide* Table 4-2, *Agile Team Roles*, states:

*The product owner is responsible for guiding the direction of the product. Product owners rank the work based on its business value. Product owners work with their teams daily by providing product feedback and setting direction on the next piece of functionality to be developed/delivered.*

*A critical success factor for agile teams is strong product ownership. Without attention to the highest value for the customer, the agile team may create features that are not appreciated, or otherwise insufficiently valuable, therefore wasting effort.*

The *Agile at the Library* Confluence site echoes the *Agile Practice Guide*. Specifically, it states:

*Product owners must be empowered. An empowered Product Owner must be free to make the necessary decisions which guide the lifespan of the project he/she is working on. The team takes direction from its Product Owner having full confidence and trust in the Product Owner's ability.*

Under *Agile at the Library*, it is not clear whether the Library empowers the product owner in accordance with agile best practices. The contractor developing the RMI MVP is responsible for ensuring that the RMI MVP meets the requirements outlined in Appendix J of the RMI MVP contract by the end of the period of performance. The Library pre-mapped these requirements to a product roadmap, which defines the requirements to be included in each release for the entirety of the contract period of performance. The contractor is contractually responsible for maintaining the product roadmap, which drives the sprint plan and ultimately serves as the basis for determining which items the contractor should complete in each sprint. This is inconsistent with agile best practices, in which the product owner should be responsible for identifying the items to complete in each sprint.

We confirmed that the MVP can only be changed through a contract modification. The COR, product owner, and contractor are able to refine the MVP but cannot add or remove sections without a contract modification. For example, the product owner cannot authorize the addition of user stories to the MVP that do not address an existing section of the MVP, nor can they authorize the removal of unnecessary sections of the MVP from the order. A primary benefit of an agile approach is that it enables the product owner to direct the project as their requirements evolve. By limiting the product owner's ability to shift priorities in a way that does not lend itself to quick changes, the Library is unable to realize the agile methodology's benefits.

The Library currently requires the RMI MVP contractor development team to perform certain responsibilities that should be assigned to the product owner in agile projects. Specifically, RMI MVP contract section C.4.2., *Product Roadmap*, states:

*The contractor shall create, update, and maintain a Product Roadmap that clearly identifies the milestones and deliverables needed to achieve the MVP, which serves as the baseline requirement for this task order.*

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<sup>14</sup> The [Agile Alliance](#) defines the product owner as a role on a product development team responsible for managing the product backlog in order to achieve the desired outcome that a product development team seeks to accomplish.



We reviewed the RMI MVP project's roles, responsibilities, and accountability and noted that the USCO did not define these efforts in a manner that was consistent with agile best practices. The OCIO should have assigned the product owner responsibility for managing the product roadmap, and thus the direction of the product, rather than assigning it to the contractor performing the development work. We observed the sprint planning meetings and noted that the product owner did consent to the stories assigned to each sprint, and we determined that the product owner had developed the product roadmap that the contractor was using. However, CGD indicated that the contractor is ultimately responsible for maintaining the roadmap and is accountable for completing all of the requirements laid out in the contract.

As stated above, the RMI MVP includes several factors that do not make it suitable for agile development; however, the Library continued to try to apply a pure agile approach to the project, even though the project may have benefited more from a hybrid approach. The current contract limits the Library's risk in that the contractor must deliver all of the requirements defined in the MVP. However, by limiting this risk, the Library has increased its vulnerability to another risk that an agile approach is designed to mitigate—the risk that identifying all requirements up front will cause the Library to develop unwanted features and fail to develop features for new requirements discovered during the development process. As a result, the USCO may develop a product that is aligned with the requirements identified at project initiation but that is not aligned with its actual requirements as identified during product development.

Because the Library requires the RMI MVP development team to set the direction of the project, rather than empowering the product owner to do so, the RMI MVP order may not realize one of the primary benefits of an agile approach. An agile approach allows the development team to not only bring a working product to the customer rapidly, but also to continue updating the backlog<sup>15</sup> as current requirements change or are discovered, thereby empowering the customer to direct the project as its requirements evolve. The need to negotiate a modification or issue a change order to bring the additional backlog item into the scope of the order may hinder the ability to quickly react to newly identified requirements.

In response to our findings, the OCIO acknowledged that the Library must develop better risk management strategies for projects using agile and hybrid methodologies, including strategies related to contract management. The OCIO further stated that its imperative will be to establish these strategies before beginning development. The OCIO noted that, because it does not have a full complement of expertise in setting risk management strategies for projects using agile and hybrid methodologies, it will require the Office of General Counsel and CGD to provide assistance and to inform and educate the USCO regarding the strategies that the OCIO will employ on USCO projects.

As a result, we recommend that:

8. The OCIO, in conjunction with the Office of the General Counsel and CGD, develop guidance to align key activities and responsibilities defined in application development contracts with PMI's *Agile Practice Guide*, or develop risk mitigation strategies for instances in which the Library chooses to deviate from agile best practices. These key activities and responsibilities may include items such as maintenance of the product roadmap.

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<sup>15</sup> Product Backlog: A list of the new features, changes to existing features, bug fixes, infrastructure changes or other activities that a team may deliver in order to achieve a specific outcome. (Definition per [Agile Alliance](#))



### Scrum Events Depart from Best Practices

The Library uses the Scrum framework for its agile development projects, including the RMI MVP project; however, we observed several key departures from *The Scrum Guide* as it related to sprint reviews.

Ken Schwaber and Jeff Sutherland, the originators of Scrum, define Scrum in the book *The Scrum Guide*. *The Scrum Guide* states:

*A Sprint Review is held at the end of the Sprint to inspect the Increment and adapt the Product Backlog if needed. During the Sprint Review, the Scrum Team and stakeholders collaborate about what was done in the Sprint. Based on that and any changes to the Product Backlog during the Sprint, attendees collaborate on the next things that could be done to optimize value. This is an informal meeting, not a status meeting, and the presentation of the Increment is intended to elicit feedback and foster collaboration.*

The *Agile at the Library* site, which is part of an OCIO intranet site that houses procedure documents, states that the following activities should occur during the sprint review meeting:

- The business members that are attending the review should determine if the work performed during the sprint meets their business needs and was performed in accordance with the user story.
- The review should only focus on the stories that were assigned during that sprint.
- Business representatives should send an approval email for deliverables within 3 business days.
- Business representatives should test and review the deliverable to reach their approval decision.

The Library's sprint reviews consisted of the product owner reviewing each user story, and the team concluded each sprint without performing the following tasks described in *The Scrum Guide*:

- Collaborating on items to complete in the next sprint to ensure that the sprint review provides valuable input for planning subsequent sprints.
- Revising the product backlog at the end of the sprint review to define the probable backlog.
- Reviewing how the marketplace or potential use of the product might have changed and determining what would be the most valuable next steps.
- Reviewing the timeline, budget, potential capabilities, and marketplace for the next anticipated releases of functionality or capability of the product.

We noted that the Library does partially perform some of the above activities as part of its sprint review meetings and user-story grooming sessions. According to *The Scrum Guide*, sprint planning answers the following:

- What can be delivered in the increment resulting from the upcoming sprint?
- How will the work needed to deliver the increment be achieved?

The sprint planning activities are designed to identify which of the highest-priority items the team can accomplish during the sprint, rather than to determine the direction of the project. However, as noted above, the RMI MVP project has a fixed scope based on the requirements defined in the product roadmap. The product roadmap identifies the features that the contractor must complete in each release of the product and does not allow the product owner to alter the course of the final product. The sprint review should be designed not only to ensure that the team completes the work, but also to adjust the backlog to meet new opportunities that the team identifies during the development process.



Under the Library's guidance, agile teams do not follow industry best practices for sprint reviews. These best practices have been developed and refined by working professionals to maximize the value gained from development projects. By deviating from these best practices, the Library may not maximize its value on projects using the Scrum framework.

As a result, we recommend that the OCIO:

9. Update the *Agile at the Library* Confluence site and any other relevant guidance to be consistent with *The Scrum Guide* and PMI guidance.
10. Develop a checklist and supervisory controls to ensure that it uses updated guidance from the *Agile at the Library* Confluence site and the appropriate implementation methodologies on development projects.

### **Risk Register Missing Contingency Plans for Project Risks**

It is imperative that the CIO and Register of Copyrights have sufficient information to properly mitigate project risks. The risk register for the RMI MVP, which was developed by the OCIO's PM team and is dated October 5, 2018, departs from both the Library's PMLC policy and the risk register template provided by the OCIO PMO.

LCD 5-310.1, *Project Management Life Cycle*, effective August 2017, requires that the PM create and update a risk register during the execution and control phase of a project. The risk register provides a record of risks, with an assessment of impact and probability, a mitigation strategy, a contingency plan, and a resolution for each risk.

Risk register template v1.2, last modified January 3, 2018, is an Excel workbook provided by the OCIO PMO. The register includes a column for the PM to describe the contingency plan for each risk identified in the register. According to the Instructions tab of the workbook, a contingency plan:

*Details actions that team members will implement in case a given risk occurs. Contingency plans are applied to reduce the impact of realized risks (i.e. issues). They identify an action or product that becomes part of the team or area working plans, and which are monitored and reported as part of the regular progress reporting of the project.*

The risk register for the RMI MVP does not include the contingency plan column, and management confirmed that it does not have a separate contingency plan for the RMI MVP project in another location.

The PM for the RMI MVP project used the risk register for the original RMI contract (Contract Number LCLOC17D0002)<sup>16</sup> as a template for the risk register on the RMI MVP project. The risk register for the base contract did not include a contingency plan column, as the base contract PM had used an earlier template that had been created before the OCIO began requiring the contingency plan column.

Without contingency plans in place, the RMI MVP project team may not be prepared to address risks that the Library realizes during the course of the project. As a result, the project will be more adversely impacted than it would have been if management had developed a plan to react to the risk in advance.

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<sup>16</sup> This contract related to the original RMI development work and took place in the year preceding the RMI MVP contract.



As a result, we recommend that:

11. The OCIO develop quality control mechanisms for ensuring that it updates templates for project management deliverables, such as the risk register, in a timely manner during ongoing projects, as well as for ensuring that project teams keep project management deliverables current throughout the project.
12. The OCIO develop contingency plans for each of the risks identified in the risk register and obtain appropriate management approval for the plans.



## Appendix A: Objectives, Scope, and Methodology

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The Library awarded Cotton & Company LLP a contract to audit the USCO and OCIO's compliance with the Library's SDLC and PMLC policies and directives to determine if the USCO IT modernization project is currently on schedule and within budget. The scope of the engagement encompassed the USCO and OCIO's efforts to develop the new USCO IT environment and business applications, as described in the Modified USCO Provisional IT Modernization Plan. The engagement also included a review and analysis of the COR function on the IT modernization effort. Our testing primarily focused on the ongoing RMI MVP development effort.

We conducted this performance audit in accordance with Generally Accepted Government Auditing Standards promulgated by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence that provides a reasonable basis for our findings and conclusions based on our audit objective. We believe that the evidence we obtained provides a reasonable basis for our findings and conclusions based on our audit objective.

Audit methodologies for the completion of the audit included document analysis, data analysis, and in-person interviews, including, but not limited to:

1. Interviews with members of the Governance Board, the product owner, CMO personnel, Office of Contracts and Grants personnel, and engineers.
2. Reviews of project documentation such as the contract, the project charter, the project plan, and the product roadmap.
3. Analysis of the user stories that comprise the project backlog, which are contained in Jira.

Our approach was designed to obtain sufficient qualitative and quantitative information on the SDLC and PMLC policies, procedures, and practices to assess and draw conclusions on the adequacy and effectiveness of related processes.

## Appendix B: Scrum Description

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The *Scrum Guide*, dated November 2017, describes the Scrum software development methodology as follows:

*Scrum is a process framework that has been used to manage work on complex products since the early 1990s. The Scrum framework consists of Scrum Teams and their associated roles, events, artifacts, and rules. Each component within the framework serves a specific purpose and is essential to Scrum's success and usage.*

*The Scrum Team consists of a Product Owner, the Development Team, and a Scrum Master. Scrum Teams are self-organizing and cross-functional. Self-organizing teams choose how best to accomplish their work, rather than being directed by others outside the team. The Product Owner is responsible for maximizing the value of the product resulting from work of the Development Team. The Development Team consists of professionals who do the work of delivering a potentially releasable Increment of "Done" product at the end of each Sprint. The Scrum Master is responsible for promoting and supporting Scrum as defined in the Scrum Guide.*

*Prescribed events are used in Scrum to create regularity and to minimize the need for meetings not defined in Scrum. All events are time-boxed events, such that every event has a maximum duration. The heart of Scrum is a Sprint, a time-box of one month or less during which a "Done", useable, and potentially releasable product Increment is created. Sprints have consistent durations throughout a development effort. A new Sprint starts immediately after the conclusion of the previous Sprint. Sprints contain and consist of the Sprint Planning, Daily Scrums, the development work, the Sprint Review, and the Sprint Retrospective.*

*The work to be performed in the Sprint is planned at the Sprint Planning. The Development Team works to forecast the functionality that will be developed during the Sprint. The Product Owner discusses the objective that the Sprint should achieve and the Product Backlog items that, if completed in the Sprint, would achieve the Sprint Goal. The input to this meeting is the Product Backlog, the latest product Increment, projected capacity of the Development Team during the Sprint, and past performance of the Development Team.*

*The Product Backlog is an ordered list of everything that is known to be needed in the product. It is the single source of requirements for any changes to be made to the product. The Product Owner is responsible for the Product Backlog, including its content, availability, and ordering. A Product Backlog is never complete. The earliest development of it lays out the initially known and best-understood requirements. The Product Backlog evolves as the product and the environment in which it will be used evolves. The Product Backlog is dynamic; it constantly changes to identify what the product needs to be appropriate, competitive, and useful. If a product exists, its Product Backlog also exists.*

*A Sprint Review is held at the end of the Sprint to inspect the Increment and adapt the Product Backlog if needed. During the Sprint Review, the Scrum Team and stakeholders collaborate about what was done in the Sprint. Based on that and any changes to the Product Backlog during the Sprint, attendees collaborate on the next things that could be done to optimize value.*



## Appendix C: Management Response

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We provided Library management with our draft version of this report, and they provided the following responses. We have not audited management's responses and therefore do not express an opinion on them.



Office of the Librarian

### MEMORANDUM

**DATE** July 9, 2019  
**TO** Kurt Hyde, Inspector General  
**FROM** J. Mark Sweeney, Principal Deputy Librarian of Congress   
**SUBJECT** Management Response to OIG report 2017-IT-107, Library Working Through Agile Delivery Method Challenges for Copyright IT Modernization Project

The Library of Congress (Library) has reviewed the report regarding the performance audit of the information technology modernization project for the U.S. Copyright Office's (USCO) recordation system. We appreciate your observations and recommendations on the USCO recordation contract and how to refine the Library's approach to agile IT development projects generally.

The attached chart provides details regarding the Library's approach and schedule to resolve the recommendations in your report.

#### Attachment

cc: Bernard Barton, Chief Information Officer  
Karyn Temple, Register of Copyrights  
Edward Jablonski, Chief Operating Officer  
Mary Klutts, Chief Financial Officer  
Elizabeth Pugh, General Counsel



Management Comments on Draft OIG Report No. 2018-IT-107  
Library Working Through Agile Delivery Method Challenges for Copyright IT Modernization Project

Recommendation	Comments	Target completion
<p>1 Develop and implement guidance on tracking and resolving project health issues, on development projects that follow an agile, hybrid, or other similar methodology. This guidance should follow the guidelines included in publications by PMI, OMB, and/or other risk management standard setting bodies. The guidance should also identify critical characteristics of the EVA method for measuring the project budget and progress toward completion in coordination with FSD, including establishing the project costing methodologies. In addition, the OCIO should update its status dashboards to effectively convey project progress.</p>	<p>Agree with comment.</p> <p><b>Library Approach:</b> OCIO will update applicable policies and procedures to include hybrid SDLC approaches and an EVM/EVA cost materiality threshold. OCIO will update guidance to include tracking the progress of and resolving project health issues on IT development projects that follow agile, hybrid, or waterfall methodologies. If EVM/EVA is used to monitor project health on selected projects, OCIO will identify critical characteristics of the EVA method for measuring the project budget and progress towards completion. OCIO will update project quad charts to document and communicate project progress to key stakeholders.</p> <p>Currently, Momentum can track contract commitments, obligations, and invoice payments (i.e. contract project costs), but not Library labor costs due to limitations in the WebTA timekeeping system. FSD and OCIO are working with HCD to explore alternatives for capturing Library labor cost data. FSD will review the existing contract costing data capture issues and develop guidelines and procedures for obtaining cost data from Momentum.</p>	<p>Measurements of budget and progress completed May 2019</p> <p>Policy updates to be completed by Q4 FY2019</p> <p>Implementation including any necessary Momentum codes by Q1 FY2021</p>
<p>2 Ensure that all relevant stakeholders understand the development methodology used, implement a stakeholder engagement plan, assess the risks associated with the project before beginning the project, and document best practices for governance and status meetings, including best practices relating to the size and content of the meetings.</p>	<p>Agree.</p> <p><b>Library Approach:</b> OCIO will ensure that stakeholders understand the development methodology used, provide the necessary training, implement a stakeholder engagement plan, assess the risks associated with the project before beginning the project, and document best practices for governance and status meetings.</p>	<p>Q4 FY2019</p>



Management Comments on Draft OIG Report No. 2018-IT-107  
Library Working Through Agile Delivery Method Challenges for Copyright IT Modernization Project

3	<p>Work with and obtain concurrence from project owners and, where applicable, development governance boards regarding the format and content of program and project reports. Ensure that such content follows the guidelines published by PMI or other risk management standard-setting bodies.</p>	<p><b>Agree with comment.</b> OCIO will have standard templates and evaluation metrics for program and project reports.</p> <p><b>Library Approach:</b> OCIO and the development project/product owner will approve a project charter at the inception of each project that identifies the SDLC methodology to be used, the invested resources required by each party, and the estimated full life cycle costs of the project.</p> <p>OCIO has established three governance boards (CRS IRIS, Copyright IT Modernization, NLS IT Modernization) and will establish one additional governance board (LS IT Modernization). OCIO will coordinate with applicable governance bodies to enhance communication plans or reporting as necessary to address specific needs arising from unique external end user communities and stakeholder.</p>	Q2 FY2020
4	<p>The OCIO develop and implement guidance (i.e., directives) for blending all SDLC approaches based on the characteristics of individual projects, and that such directives include obtaining the business owners' concurrence regarding the SDLC approach at the start of each project. The OCIO should also obtain the FSD's concurrence regarding the SDLC approach as it relates to cost management.</p>	<p><b>Agree.</b></p> <p><b>Library Approach:</b> OCIO will update applicable policies and procedures to include hybrid SDLC approaches and an EVM/EVA cost materiality threshold. At the start of a project, OCIO and the product (or business) owner will agree via the project charter process to the applicable SDLC approach for the project. At the start of a project above the cost materiality threshold, OCIO will obtain concurrence from FSD.</p>	Q2 FY2020
5	<p>The OCIO prepare a checklist of all required elements for starting a project before beginning system development for the project, including such items as obtaining approval of the SDLC methodology and completing an agile suitability scorecard, and then obtaining the CIO or Deputy CIO's approval of the completed checklist before beginning the project.</p>	<p><b>Agree.</b></p> <p><b>Library Approach:</b> OCIO will develop a checklist documenting all required items before beginning development on a project. The checklist will be required for submittal as part of the project charter review and approval. The charter will include the SDLC methodology and the agile suitability score card. The project charter key stakeholders will approve and sign the project charter.</p>	Q1 FY2020



Management Comments on Draft OIG Report No. 2018-IT-107  
Library Working Through Agile Delivery Method Challenges for Copyright IT Modernization Project

6	The OCIO map the current methodology used in developing the RMI MVP to the methodology required in LCD 5 310.2, ensure that it identifies and implements appropriate risk mitigation steps for any substantive deviation from the required methodology, and obtain the FSD and Register of Copyright's concurrence with regard to the mapping and any mitigation steps.	<p>Agree with comment.</p> <p><b>Library Approach:</b> OCIO will update applicable policies and procedures to include hybrid SDLC approaches. OCIO then will map the methodology used in developing the RMI MVP to the methodology required in LCD 5 310.2 and ensure it identifies and implements appropriate risk mitigation steps for any deviation from the required methodology. OCIO will update the applicable project charter in collaboration with the product (or business) owner to reflect changes in the methodology used and deviations and will coordinate with FSD regarding any budgetary implications of such changes.</p>	Q3 FY2020
7	The OCIO clearly define the purpose of an MVP in the Library's instance of agile development and develop a process for ensuring that the Library incorporates the agreed upon definition into its SDLC processes. The OCIO should coordinate with CGD for issues related to contract management and with FSD for issues related to cost management. The Library should then codify the process in its policies.	<p>Agree with comment.</p> <p><b>Library Approach:</b> OCIO will update policies pertaining to the purpose and process for defining an MVP in the Library's instance of agile development and codify the process in its policies. OCIO will coordinate with CGD and OGC to ensure when MVPs are used in contracts that they adhere to legal requirements and Library policies.</p>	Q2 FY2020
8	The OCIO, in conjunction with the Office of the General Counsel and CGD, develop guidance to align key activities and responsibilities defined in application development contracts with PMI's <i>Agile Practice Guide</i> , or develop risk mitigation strategies for instances in which the Library chooses to deviate from agile best practices. These key activities and responsibilities may include items such as maintenance of the product roadmap.	<p>Agree.</p> <p><b>Library Approach:</b> OCIO, in conjunction with the OGC and CGD, will develop guidance to clarify and distinguish Library roles and responsibilities from contractor responsibilities in agile IT development contracts, align each with key activities and responsibilities defined in LCD 5-310.2., which currently leverages practices from PMI's Agile Practice Guide, and identify risk mitigation strategies for projects that deviate from established procedures. Also, CGD is hosting an Agile Development subcommittee of the Contracts Working Group to: understand and standardize agile contract processes; gather and publish lessons learned for contract planning and execution; and develop and publish guidance for agile contracts. The subcommittee's findings will be used to further refine terms for agile IT development contracts, such as potential metrics, quality standards, and deliverables to aid in measuring performance.</p>	Q2 FY2020



Management Comments on Draft OIG Report No. 2018-IT-107  
Library Working Through Agile Delivery Method Challenges for Copyright IT Modernization Project

9	Update the <i>Agile at the Library</i> Confluence site and any other relevant guidance to be consistent with <i>The Scrum Guide</i> and PMI guidance.	Agree.  <b>Library Approach:</b> OCIO will update LCD 5-310.2 and the agile documentation on the Library Confluence site to be consistent with our interpretation of the Scrum Guide and PMI guidance.	Q2 FY2020
10	Develop a checklist and supervisory controls to ensure that it uses updated guidance from the <i>Agile at the Library</i> Confluence site and the appropriate implementation methodologies on development projects.	Agree.  <b>Library Approach:</b> OCIO will develop a checklist and supervisory controls to ensure that IT projects use updated guidance from the updated LCD 5-310.2.	Q1 FY2020
11	The OCIO develop quality control mechanisms for ensuring that it updates templates for project management deliverables, such as the risk register, in a timely manner during ongoing projects, as well as for ensuring that project teams keep project management deliverables current throughout the project.	Agree.  <b>Library Approach:</b> OCIO will develop quality control mechanisms for ensuring templates are updated for project management deliverables in a timely manner. OCIO will ensure that appropriate project management deliverables are utilizing the current templates at the start of each project.	Q3 FY2020
12	The OCIO develop contingency plans for each of the risks identified in the risk register and obtain appropriate management approval for the plans.	Agree.  <b>Library Approach:</b> OCIO will develop contingency plans for each risk identified in the risk register and obtain appropriate management approval for the plans.	Q4 FY2019

## Appendix B: Management Response

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MEMORANDUM

**DATE** July 9, 2019  
**TO** Kurt Hyde, Inspector General  
**FROM** J. Mark Sweeney, Principal Deputy Librarian of Congress   
**SUBJECT** Management Response to OIG report 2017-IT-107, Library Working Through Agile Delivery Method Challenges for Copyright IT Modernization Project

The Library of Congress (Library) has reviewed the report regarding the performance audit of the information technology modernization project for the U.S. Copyright Office's (USCO) recordation system. We appreciate your observations and recommendations on the USCO recordation contract and how to refine the Library's approach to agile IT development projects generally.

The attached chart provides details regarding the Library's approach and schedule to resolve the recommendations in your report.

Attachment

cc: Bernard Barton, Chief Information Officer  
Karyn Temple, Register of Copyrights  
Edward Jablonski, Chief Operating Officer  
Mary Klutts, Chief Financial Officer  
Elizabeth Pugh, General Counsel

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**Management Comments on Draft OIG Report No. 2018-IT-107**

**Library Working Through Agile Delivery Method Challenges for Copyright IT Modernization Project**

<b>Recommendation</b>	<b>Comments</b>	<b>Target completion</b>
<p>1 Develop and implement guidance on tracking and resolving project health issues, on development projects that follow an agile, hybrid, or other similar methodology. This guidance should follow the guidelines included in publications by PMI, OMB, and/or other risk management standard setting bodies. The guidance should also identify critical characteristics of the EVA method for measuring the project budget and progress toward completion in coordination with FSD, including establishing the project costing methodologies. In addition, the OCIO should update its status dashboards to effectively convey project progress.</p>	<p><b>Agree with comment.</b></p> <p><b>Library Approach:</b> OCIO will update applicable policies and procedures to include hybrid SDLC approaches and an EVM/EVA cost materiality threshold. OCIO will update guidance to include tracking the progress of and resolving project health issues on IT development projects that follow agile, hybrid, or waterfall methodologies. If EVM/EVA is used to monitor project health on selected projects, OCIO will identify critical characteristics of the EVA method for measuring the project budget and progress towards completion. OCIO will update project quad charts to document and communicate project progress to key stakeholders.</p> <p>Currently, Momentum can track contract commitments, obligations, and invoice payments (i.e. contract project costs), but not Library labor costs due to limitations in the WebTA timekeeping system. FSD and OCIO are working with HCD to explore alternatives for capturing Library labor cost data. FSD will review the existing contract costing data capture issues and develop guidelines and procedures for obtaining cost data from Momentum.</p>	<p>Measurements of budget and progress completed May 2019</p> <p>Policy updates to be completed by Q4 FY2019</p> <p>Implementation including any necessary Momentum codes by Q1 FY2021</p>
<p>2 Ensure that all relevant stakeholders understand the development methodology used, implement a stakeholder engagement plan, assess the risks associated with the project before beginning the project, and document best practices for governance and status meetings, including best practices relating to the size and content of the meetings.</p>	<p><b>Agree.</b></p> <p><b>Library Approach:</b> OCIO will ensure that stakeholders understand the development methodology used, provide the necessary training, implement a stakeholder engagement plan, assess the risks associated with the project before beginning the project, and document best practices for governance and status meetings.</p>	<p>Q4 FY2019</p>

**Management Comments on Draft OIG Report No. 2018-IT-107**

**Library Working Through Agile Delivery Method Challenges for Copyright IT Modernization Project**

3	<p>Work with and obtain concurrence from project owners and, where applicable, development governance boards regarding the format and content of program and project reports. Ensure that such content follows the guidelines published by PMI or other risk management standard-setting bodies.</p>	<p><b>Agree with comment.</b>                  OCIO will have standard templates and evaluation metrics for program and project reports.</p> <p><b>Library Approach:</b> OCIO and the development project/product owner will approve a project charter at the inception of each project that identifies the SDLC methodology to be used, the invested resources required by each party, and the estimated full life cycle costs of the project.</p> <p>OCIO has established three governance boards (CRS IRIS, Copyright IT Modernization, NLS IT Modernization) and will establish one additional governance board (LS IT Modernization). OCIO will coordinate with applicable governance bodies to enhance communication plans or reporting as necessary to address specific needs arising from unique external end user communities and stakeholder.</p>	Q2 FY2020
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**Management Comments on Draft OIG Report No. 2018-IT-107**

**Library Working Through Agile Delivery Method Challenges for Copyright IT Modernization Project**

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**Management Comments on Draft OIG Report No. 2018-IT-107**

**Library Working Through Agile Delivery Method Challenges for Copyright IT Modernization Project**

9	Update the <i>Agile at the Library</i> Confluence site and any other relevant guidance to be consistent with <i>The Scrum Guide</i> and PMI guidance.	<p><b>Agree.</b></p> <p><b>Library Approach:</b> OCIO will update LCD 5-310.2 and the agile documentation on the Library Confluence site to be consistent with our interpretation of the Scrum Guide and PMI guidance.</p>	Q2 FY2020
10	Develop a checklist and supervisory controls to ensure that it uses updated guidance from the <i>Agile at the Library</i> Confluence site and the appropriate implementation methodologies on development projects.	<p><b>Agree.</b></p> <p><b>Library Approach:</b> OCIO will develop a checklist and supervisory controls to ensure that IT projects use updated guidance from the updated LCD 5-310.2.</p>	Q1 FY2020
11	The OCIO develop quality control mechanisms for ensuring that it updates templates for project management deliverables, such as the risk register, in a timely manner during ongoing projects, as well as for ensuring that project teams keep project management deliverables current throughout the project.	<p><b>Agree.</b></p> <p><b>Library Approach:</b> OCIO will develop quality control mechanisms for ensuring templates are updated for project management deliverables in a timely manner. OCIO will ensure that appropriate project management deliverables are utilizing the current templates at the start of each project.</p>	Q3 FY2020
12	The OCIO develop contingency plans for each of the risks identified in the risk register and obtain appropriate management approval for the plans.	<p><b>Agree.</b></p> <p><b>Library Approach:</b> OCIO will develop contingency plans for each risk identified in the risk register and obtain appropriate management approval for the plans.</p>	Q4 FY2019