

University of Montana

## ScholarWorks at University of Montana

---

Mansfield Library Faculty Publications

Mansfield Library

---

Winter 2018

### Building strategic alliances to support advocacy and planning for digital preservation

Erin Baucom

*University of Montana, Missoula*

Tammy Troup

*Montana State Historical Society*

Conor Cote

*Montana Tech*

Sara Mannheimer

*Montana State University-Bozeman*

Follow this and additional works at: [https://scholarworks.umt.edu/ml\\_pubs](https://scholarworks.umt.edu/ml_pubs)



Part of the [Library and Information Science Commons](#)

### Let us know how access to this document benefits you.

---

#### Recommended Citation

Baucom, E., Troup, T., Cote, C. & Mannheimer, S. (Winter 2017-18). Building strategic alliances to support advocacy and planning for digital preservation. *Journal of Digital Media Management*, 6(2), 182-194.

This Article is brought to you for free and open access by the Mansfield Library at ScholarWorks at University of Montana. It has been accepted for inclusion in Mansfield Library Faculty Publications by an authorized administrator of ScholarWorks at University of Montana. For more information, please contact [scholarworks@mso.umt.edu](mailto:scholarworks@mso.umt.edu).

# Building strategic alliances to support advocacy and planning for digital preservation

## Abstract

While the business benefits of digital asset management are well-documented, the benefits and importance of digital preservation are not. Digital preservation is a sustained commitment to maintenance activities which require a system of plans, policies, and implementation workflows. Coordination across departments is helpful for digital asset management, but it is mandatory for digital preservation. The Montana Digital Preservation Working Group (DPWG) operated under a five-point plan for collaboration between organizations. The plan consisted of cultivating shared knowledge, assessing the current digital preservation landscape at each institution, advocating for the value of digital preservation, implementing digital preservation practices, and sustaining the partnership by developing structures for ongoing projects and mutual support. In this article, the five-point plan for collaboration used by DPWG is adapted to build alliances in four key areas of an organization: the Project and Process Team, the Management Team, the Executive Team, and the Information Technology Team. By building strategic alliances that support digital preservation advocacy and planning, information managers extend their reach and resources, ultimately leading to more robust preservation of valuable digital assets.

**Keywords:** digital preservation, strategic alliances, external partnerships, internal collaboration, communication, advocacy

## Introduction

Digital preservation goes beyond saving the bits and bytes. It is a process of creating plans and policies, and then implementing workflows that ensure the authenticity and accessibility of digital objects. Without digital preservation a digital object might survive into the future, but absent any guarantee that a user will be able to access that digital object or know that the current instance of the object is authentic and trustworthy. Building a digital preservation program requires planning and advocacy in order to be successful. Collaboration, whether internal to the organization or by partnering with external organizations, can ease the burden of developing a digital preservation program. In

Montana, four libraries and cultural institutions created the Digital Preservation Working Group (DPWG) to facilitate digital preservation in the state.

To support its collaboration, DPWG developed a five-point plan for building cross-institutional partnerships. This paper shows how the five-point plan can also be adapted to build internal alliances to support digital preservation advocacy and planning. Using the experiences of DPWG, this article will provide justification to organizations for the need for comprehensive digital preservation strategies and how collaboration can ease some of the burden on individual organizations when it comes time to implement their newly developed systems.

## **Background**

In the library, archives, and museum sectors, digital preservation is understood to be more than just the upkeep of the digital objects in their original form. According to Becker and Rauber, “the mission of digital preservation is to overcome the obsolescence threats that digital materials are facing... and to provide continued, authentic long-term access to digital objects in usable form...”<sup>1</sup>[p1009] For this mission to succeed, policies and plans need to be in place for the continual ingest and maintenance of these irreplaceable digital objects.

Digital objects are either born digital, i.e. created in a digital environment, or digitized, i.e. scanned or photographed from an analog original. In the case of born digital objects there is no analog surrogate, there is too much information embedded in these objects for a printed copy to serve the same purpose as the digital original. Digital objects that were created from a scan or photo of an analog original can be irreplaceable as well if the original analog copy is too fragile to go through the digitization process a second time.

Digital preservation is not an inexpensive proposition. In an effort to combat the amount of personnel time and money devoted to digital preservation, many libraries, archives, and museums collaboratively pool their resources. In some cases these collaborations are networks of librarians, archivists, and museum curators sharing knowledge developed through trial and error, research, and training. Other collaborations involve institutions partnering together to create and maintain an entire digital preservation system. One such collaboration led to the creation of the Digital Preservation Alliance for the Social Sciences (DATA-PASS). DATA-PASS collects, preserves, and provides access to Social Science research data. The DATA-Pass founders (The Inter-university Consortium for Political and Social Research, the Roper Center for Public Opinion Research, the Howard W. Odum Institute for Research in Social Science, the Electronic Records Custodial Division of the National Archives and Records Administration and the Henry A. Murray Research Archive),

agreed to a set of best practices, continually communicate with each other to maintain consistent policies, and share the burden of the creation and maintenance of the hardware and software infrastructure needed to maintain data.<sup>2</sup>

The MetaArchive Cooperative is another example of organizations coordinating their preservation efforts. The MetaArchive is an independent international cooperative with the majority of the membership being university libraries and archives. MetaArchive members share storage costs through a distributed network of storage hubs. This partnership covers a critical part of digital preservation implementation where multiple copies of each digital object are kept in different geographic storage locations on different types of hardware. Each member of the MetaArchive, however, creates and maintains their own internal digital preservation policies and workflows. The members can and do share expertise but unlike DATA-PASS, where every institution has to ingest and maintain the data in the same way, the MetaArchive institutions have the freedom to scale up or down the intensity of their digital preservation efforts as the members are able.<sup>3</sup>

The UK-based digital preservation non-profit Digital Preservation Coalition (DPC) is a third example of collaboration.<sup>4</sup> DPC was created to help members during the planning phase of digital preservation. DPC developed high-level "Step-by-Step" guidelines which provide organizations with broad steps and questions for analysis. These guidelines establish a framework for the detached internal scrutiny critical for understanding the current culture of an organization and identifying areas where growth is possible.

These examples of digital preservation and collaboration come from the cultural heritage sector - primarily comprised of libraries, archives and museums. A key element of the missions of these cultural heritage institutions is preservation of cultural objects. Beyond the cultural heritage sector very little literature concerning digital preservation exists. There is an understanding for the need for digital asset management practices and much has been written about how to make a case to implement digital asset management systems.<sup>5,6</sup> However, there is a very distinct difference between digital asset management and digital preservation.

A digital asset management system is an "infrastructure [which] can ingest digital assets, store and index assets for easy searching, retrieve assets for use in many environments, and manage the rights associated with those assets."<sup>7[p1]</sup> Digital asset management is conceptually related to media management with its focus on rights and usage, although as Clifford Lynch notes, "digital asset management is an overarching term" which does not adequately describe "records of scholarly achievement [or]... the intellectual and cultural life."<sup>8[p52]</sup> Digital files generated in the course of contemporary business practice, digitized surrogates of physical holdings, and born-digital scholarly and creative ventures are

examples of digital assets collected by cultural heritage institutions. Digital asset management includes a significant emphasis on storage of the digital objects. These storage systems, while sophisticated, do not take into account the need for active maintenance of the digital objects as described by the Open Archival Reference System (OAIS) model which is the gold standard for digital preservation when supported by policy and preservation workflows specific to the needs of the institution implementing the OAIS model.<sup>9</sup> Passive maintenance of digital assets does not guarantee that the records will be accessible in the future, nor does it guarantee that the records will be authentic.

There is evidence that some businesses are starting to understand the precarious position of their records. Information scientists have conducted multiple studies investigating how businesses manage and preserve their digital resources.<sup>10</sup> Computer scientists remind their colleagues that digital objects are dependent upon the software and hardware used in their creation. These authors use the example of a digital photograph and the “need to replace the original representation with entirely different representations of the original content to ensure that a future client can experience the original photograph’s picture”<sup>11</sup>[p1051] to illustrate that file formats become obsolete, these digital photographs must be migrated into new file formats as older ones are no longer sustainable so that future users may still view the original image. Another strategy for preservation is to emulate the original software systems to be able to experience the digital objects in their original environment.

In the design industry, Heutelbeck and Grabarske warn that “[l]egal regulations and contractual requirements often make the preservation of product data mandatory for decades.”<sup>12</sup>[p24] Heutelbeck and Grabarske’s article is a cautionary tale about the software used to create these product designs and the need to have a plan to preserve the design at critical periods during the product life cycle. Heutelbeck and Grabarske emphasize that preservation actions should include the maintenance of these design snapshots so that they are accessible to future users.<sup>13</sup>

Often organizations build business cases for maintenance without a “discussion of whether the organization is in a position to implement the proposed solution successfully.”<sup>14</sup>[p36] Those businesses that have acknowledged the need for digital preservation can leverage the power of collaboration to research and implement digital preservation strategies. Muthusamy and White argue that strategic alliances in business are an essential component of entering into a new and uncharted territory because “...business alliances quicken the speed of innovation, overcome budgetary constraints, and gain access to resources not otherwise available...”<sup>15</sup>[p415]

Strategic alliances can start through interorganizational learning. Interorganizational collaboration involves knowledge creation and sharing between organizations.<sup>16</sup> Barriers

to interorganizational learning include lack of trust, risk of loss of autonomy, and cost in time and effort, but on the other hand, potential advantages include increased knowledge creation, productivity, and efficiency.<sup>17</sup> Successful partnerships will minimize the risks and highlight the benefits associated with interorganizational collaboration. While there are many examples of these digital preservation partnerships among cultural heritage institutions,<sup>18-20</sup> a model for such a collaboration is demonstrated in the case study of DPWG. Lessons learned from these partnerships can be used as a template for businesses to build strategic alliances.

### **Digital Preservation Working Group**

The Digital Preservation Working Group (DPWG) was formed in Montana by librarians and archivists from four institutions in the western part of the state: The University of Montana (UM), Montana Tech of the University of Montana (Montana Tech), Montana State University (MSU) and The Montana Historical Society (MHS). The purpose of DPWG is to share knowledge and resources in an effort to increase digital preservation efforts in the state, starting at the home institution of each member. Each of the four member institutions has unique digital assets that need to be preserved and maintained for future generations to access. Without digital preservation these priceless cultural heritage resources will be lost.

Although the DPC prepared the “Step-by-Step Guidelines to Building a Business Case”<sup>21</sup> the year prior, DPWG prioritized an internal audit in order to assess the digital assets of each organization. In the early stages of collaboration, the working group completed a digital preservation program assessment report adapted from the Survey of Institutional Readiness used in the online workshop *Digital Preservation Management: Implementing Short-Term Strategies for Long-Term Solutions*.<sup>22</sup> This survey provided DPWG with an awareness of the assets held by each institution and a familiarity with the vocabulary and concepts necessary to begin active planning for digital preservation. The results of the self-assessment surveys showed that all four institutions lacked long-term access policies and procedures, technological infrastructure for long-term preservation, and internal documentation vetted by senior administration.<sup>23</sup> DPWG chose to collaboratively identify and test technological infrastructures which could support digital preservation.

Each member advocated for policies, procedures, and technology to support digital preservation at their institution. DPWG continued to share best practices, organized resources supporting key arguments and developed a shared understanding of the business benefits of digital preservation.

## Building and Sustaining External Collaborations

DPWG members Mannheimer and Cote<sup>24</sup> synthesized the efforts of DPWG into a five-point plan to facilitate digital preservation partnerships in libraries and cultural institutions—Cultivate, Assess, Advocate, Implement, and Sustain (see Figure 1). Below, this five-point workflow will be adapted to emphasize the importance of both external and internal alliances when researching and building a case for digital preservation.

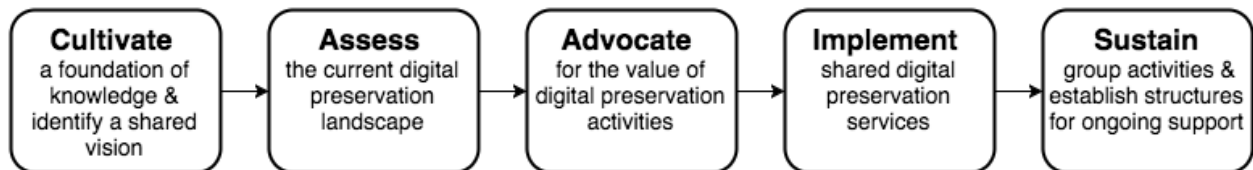


Figure 1: Five-point plan for digital preservation collaboration

### Cultivate

First, like-minded organizations should be identified as possible partners. Larsson et al.<sup>25</sup> present a framework for evaluating collaboration using the organizational culture of potential strategic allies, concluding that "organizations are likely to learn most together when all choose collaborative learning strategies of high transparency and receptivity."<sup>26</sup> [p300] DPWG built its partnership based on geographical proximity and common digital preservation needs. The group nurtured an environment of transparency in two key ways. First, the group conducted a review of the literature and built a shared library of resources. By facilitating mutual research and learning, the group established a common foundation of knowledge, and each organization saved individual time and effort. Second, the group drafted a one-page project charter. The charter identified the purpose of the group: to share knowledge and coordinate digital preservation activities across Montana. It also articulated the group's primary goal: to produce a set of recommendations for a collaborative digital preservation service amongst the participating institutions. In order to cultivate strong digital preservation collaboration, shared communication, knowledge, and purpose must to be established.

### Assess

Next, a method for assessing current digital preservation practices at each institution should be determined. Members of DPWG each agreed to complete a readiness assessment at their institutions. DPWG compiled a cross-institutional summary of these responses, noting specific problem areas in common. By using a joint method for initial assessment of digital preservation policies and workflows, collaborating organizations may determine where needs overlap, and target these areas as starting points for collaboration. Based on the readiness assessments, DPWG identified a lack of geographically distributed storage as a shared need. DPWG decided to focus on this problem first, and investigate the feasibility of a collaborative approach to addressing this need. However, collaborative preservation

projects can take many different forms and focuses, including developing policies, installing infrastructure, developing workflows, or simply sharing best practices.

#### Advocate

Once collective readiness has been assessed, organizations can assist one another by collaboratively advocating for the value of digital preservation. This approach is recommended within the digital preservation community. In fact, Skinner and Halbert note “most experts recommend that *only* through cooperative efforts can we effectively address the enormous challenges of digital preservation.”<sup>27</sup>[p373] But for a collaboration to be successful, stakeholders at each organization will need to be convinced of its benefits. DPWG worked together to write a recommendation report for a shared storage environment. The group helped one another to respond to questions raised as this report was distributed internally. Organizations have different administrative channels that must be navigated to increase buy-in for preservation practices. Examples of these channels, and how digital preservation requirements are communicated internally will be discussed in detail below.

#### Implement

Once a digital preservation proposal is approved by stakeholders, partners must work together to ensure that the project is successfully implemented. DPWG's next step was to initiate a joint-implementation of a cloud preservation service. The group drafted a memorandum of understanding (MOU) to set a firm foundation for project implementation. The MOU outlined the group's agreed-upon project outcomes and documented expectations for each participant. DPWG then participated in joint training and created a workflow for shared administration of the tool.

Knowledge and resource sharing can be additional benefits to working together to implement a digital preservation project. DPWG's project benefited from a broader pool of expertise, and leveraged the different skills and resources available at each institution. For example, Tammy Troup of the Montana Historical Society used her metadata expertise to build system-independent digital objects as she uploaded her test objects to the cloud-based preservation system. Troup shared her workflow documentation with the rest of the group, which strengthened the workflows across the partnership.

#### Sustain

In order to sustain digital preservation partnerships, organizations should ensure continued communication, build shared documentation, and continually evaluate progress. DPWG established a schedule of monthly conference calls and a system of rolling membership that ensures at least one member from each institution will participate. The group also established a cloud-based folder to facilitate collaborative writing and editing,



and to preserve a record of DPWG's activities, thus facilitating collaborative interorganizational memory.

Another key strategy for sustaining external digital preservation collaborations is to evaluate progress and adapt as necessary. After conducting its year-long pilot project of a cloud-based digital preservation tool, DPWG worked together to evaluate the usefulness of the tool at each institution. The group ultimately determined that the shared use environment of DuraCloud as it was developed and implemented at the time of testing did not help us meet our digital preservation goals. Although the tool could be used for its sophisticated storage and monitoring tools, a digital preservation system still relies on administrative policies and procedures which needed to be adopted by our respective institutions. Additional concerns about the software included the following:

- Shared use relied on administrator compliance with an honor system to manage access,
- The software does not provide users with the ability to harvest and use existing metadata,
- The software does not integrate with screen readers,
- The software does not generate a log of deduping actions upon ingest,
- The software does not allow users to record events and administrator information or to edit a METS record within the interface (which would allow users to use the software's time/date stamping and administrator record information), and
- The software's multiple consoles proved inefficient.

As we consider the policies, procedures, and technology which can meet our digital preservation needs, the group will embark on another round of assessment, advocacy, and implementation. Ultimately, collaboration for digital preservation should be an iterative process, allowing the strategic alliance to continually expand, adapt, and reevaluate activities in order to continue to meet the needs of each partner institution.

The work of DPWG serves as a model of a process for successful collaboration for digital preservation. However, external strategic partnerships also come with risks,<sup>28</sup> and may not be feasible for all types of organizations. While external collaboration is not a solution for every organization, a similar model of inter-departmental research collaboration can be a strategic method to build the culture necessary for implementation of digital preservation. Collaborative relationships across organizations or departments develop trust, establish networks of shared knowledge, introduce transparency and accountability, and can ensure the adoption of standards which comply with best practices for a given industry. The lessons learned from DPWG's collaboration can be applied to this type of internal alliance.

## **Building Internal Alliances to Support Digital Preservation**

Digital preservation crosses multiple lines of authority and administration, and stakeholders across an organization must become collaborators to build a successful program. DPWG's experience provides a model to turn stakeholders into collaborators, since external research collaboration develops resources that facilitate the cultivation of internal knowledge. DPWG research determined both financial and non-financial business benefits are met with a robust digital preservation system, and these benefits formed the basis of conversations with internal stakeholders. Benefits include the following:

- Digital preservation allows staff to move non-active digital objects to different storage tiers (including low cost tiers) while information continues to be actively managed.
- Active management of records about stored digital objects expedites search and discovery which avoids the costs of e-discovery or forensics services.
- Identification and management of assets within a digital preservation system prevents duplication of assets and mismanagement of records.
- System independent information packages ease the burden of data migration and ensure preservation of metadata.
- A digital preservation system secures evidentiary value of assets by maintaining records of events or change (e.g., access, metadata record update, transfer, migration, etc.).
- A digital preservation system assists knowledge management by preserving institutional memory related to digital objects.
- An established digital preservation system supports recruitment and retention of trained digital archivists.
- Digital preservation is important to funders who may require proof of a reliable system as part of grant planning.

### Internal Collaboration

Communicating these benefits with stakeholders meant identifying levels influence across multiple channels of administrative and executive authority. As DPWG built the foundations necessary for digital preservation, each member had to collaborate with various stakeholders. These stakeholders can be categorized by responsibility and authority: Project and Process Teams, Management Teams, Executive Teams, and Information Technology Teams. Figure 2 below maps DPWG's five-point plan to the steps needed to turn stakeholders into collaborators. Although these stages are clear retrospectively, in practice, new lines of authority may be identified, communication will be iterative, and ideas may need to be revisited and supplemented with new knowledge.

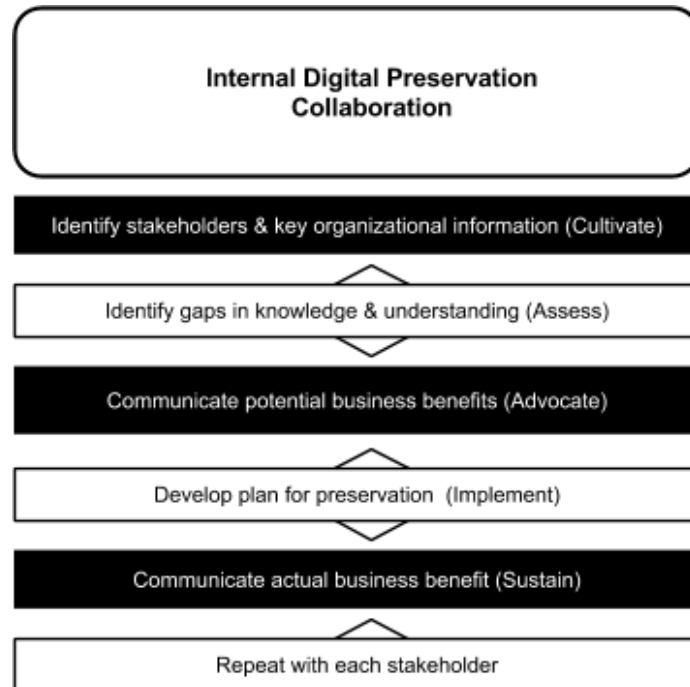


Figure 2: Steps for turning stakeholders into collaborators using the five-point plan of digital preservation.

The *Cultivate* stage required “an ‘informed’ scan of the regulatory, legal, operational, and cultural memory environment that identifies laws and regulations, standards, best practices, and benchmarks that bear upon long-term access...”<sup>29(p9)</sup> Digital preservation crosses domains of knowledge even within traditional libraries and archives (copyright, acquisitions, collections, retention, information governance, etc.), and trust is critical in order to identify information and develop strategic alliances.

During the *Assess* stage, each member of DPWG identified specialized lexicons and understandings of business processes for potential internal collaborators, and created customized discussions and documentation for each one. This need for customization is documented within the library and information science industry: “the opening sections of a digital preservation business case should focus on issues and risks that are compelling to the audience.”<sup>30(p9)</sup> Discussions at this stage included explanations, clarification of understanding, and discussions of organizational impact.

Once the requirements of digital preservation were identified, each member *Advocated* for digital preservation with a clear outline of potential business benefits. With the exception of the University of Montana not all DPWG organizations *Implemented* a complete digital preservation system; however, each drew on internal collaborations and *Sustained* support by communicating the actual business benefits of digital preservation.

This experience demonstrates that digital preservation program building is supported by strong collaboration, specifically in the areas of research and advocacy. A research collaboration as modeled by DPWG is important for building knowledge about industry standards and best practices. Internal collaborators are critical for digital preservation program building. The term “team” is used to practically to identify different units, but a team may be an individual, a department, or an agency. In the next section, these teams are outlined, along with the recommended benefits and communication channels that engaged each team effectively (Figure 3).

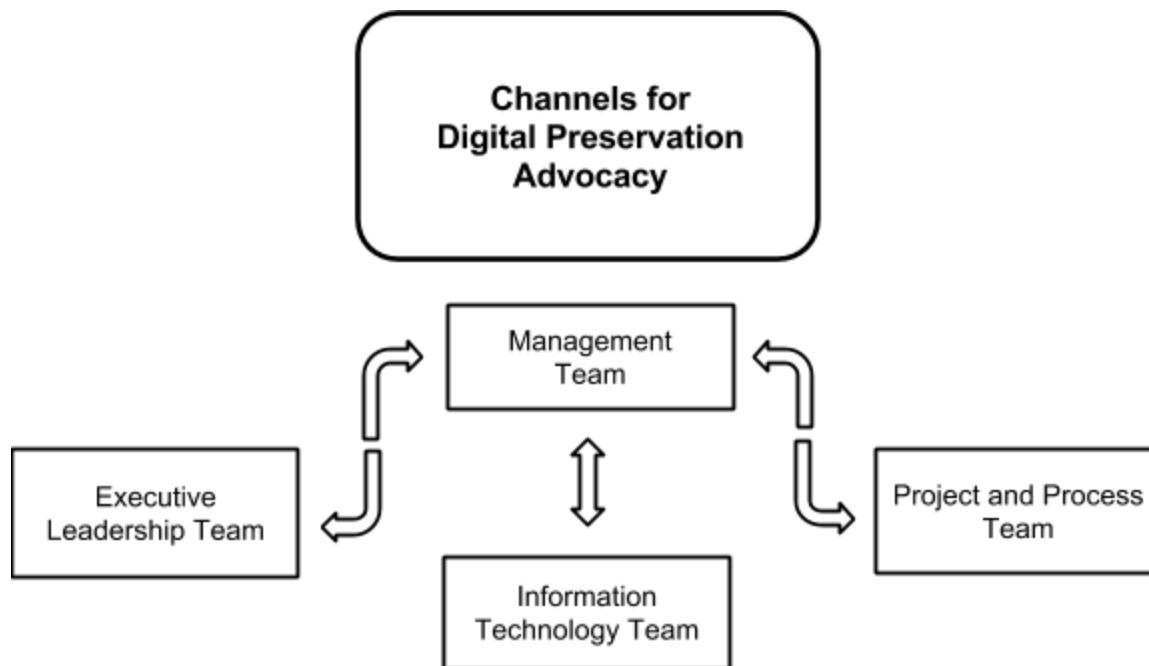


Figure 3: Channels for digital preservation advocacy

Internal Collaborators

Project and Process Team

Project and Process Teams include staff members responsible for digitization and metadata development and digital processing.

DPWG members used digital preservation assessment reports to discuss current process “pain points” with staff members responsible for digital projects and processes and listened carefully to conversations about their difficulties complying with best practice using current technologies, skillsets, and procedural knowledge. Successful digital preservation advocacy included the benefits of automated capture of information, access control, and software-supported knowledge capture and process management.

## Management Team

The Management Team included senior information managers with institutional knowledge, knowledge of business procedures, and authority to lead change.

Cultivation with the Management Team involved group learning activities, webinars, and presentations. Successful advocacy efforts included discussions related to time saving activities of automatic capture of metadata, authentication supported through digital preservation, and knowledge management assistance.

The Management Team needs to own the message that digital preservation is a necessity and influence the other parties involved to join in the shared vision. The influence of the Management Team goes beyond facilitating communication between the Information Technology Team, the Project and Process Team and the person responsible for coordinating the digital preservation program. The Management Team must advocate with the Executive Team to guarantee sustained commitment to the digital preservation.

## Executive Team

The Executive Team included directors, accountants, and any other administrator(s) responsible for strategic planning, organizational oversight, and financial administration. Ideally, the Management Team will facilitate this communication.

DPWG members constructed a case with the Executive Team built on statutory responsibilities and legal requirements to collect and preserve information resources regardless of format. Cultural heritage organizations possess a rich vocabulary and business understanding of the benefits of access and preservation. Since this understanding may not be shared by the administrative and technology departments that support these organizations, persuasive arguments should be evidence-based. At MSU, Sara Mannheimer presented an argument that noted the importance of compliance with international preservation standards, while the MHS Executive Team required more persuasion. The most persuasive discussions related to the growing trend toward digital preservation as a grant requirement, an argument which carries more weight than “arguments grounded in librarianship ideology, such as ensuring institutional memory or providing a public good.”<sup>31</sup>[p33]

With accountants, successful discussions included cost avoidance through the use of low-cost, long-term, access-controlled storage, as well as conversations about the value of digital assets and the audits and quantification studies necessary to identify the replacement value. Arguments for the importance of building a digital preservation program with solid institutional governance, financial commitments, and technological

infrastructure in order to attract and retain a well-trained digital archivist, also resonated with this group.

#### Information Technology Team

The Information Technology Team includes agencies and staff members responsible for providing system and infrastructure support and services.

Each DPWG member shared business requirements and recommendations with Information Technology Teams at multiple stages, documented existing infrastructure, and tested Enterprise solutions.

For example, in response to DPWG recommendations, MSU systems administrators shared information related to replacement cycles and provided recommendations for access control in order to ensure authenticity. The Montana State Information Technology Services Division (SITSD) provided MHS staff members with information about the use of WORM-lock (Write Once, Read Many) storage and discussed possible authentication solutions. SITSD also required MHS staff members to demonstrate that Enterprise-level records management solutions did not fulfill the requirements of digital asset management or digital preservation. As a result of DPWG recommendations, the Montana Tech Library systems administrators invested in a redundant storage server and staff members continue to investigate cloud storage solutions. Although DPWG recommendations led to better storage and monitoring systems, each organization continues to advocate for bit-level monitoring, and system independent information packages.

Conversations with Information Technology Teams illuminated the importance of communicating early and often with information technology systems professionals. Successful discussions centered on the use of systems in place that required documentation and shared a understanding of the application.

Fundamentally, forging internal collaborations for digital preservation must become instilled in organization leaders with the authority to make business decisions that affect staff, procedures, policies, and finances. The organizational change required to implement a digital preservation system can be managed with stages of collaboration and clear lines of communication. It is important to internalize the fact that digital preservation is change and “administrators need to ‘understand that digital preservation is not peripheral; it is a cultural change; an institutional activity’.”<sup>32[p33]</sup> The change management required to implement digital asset management and digital preservation systems requires knowledge of an organization’s past experience with diffusion of innovation, knowledge of the prevailing culture, as well as project initiation at a leadership level which is willing and able to exact change. Collaborative partnerships can help manage the complexities of digital

preservation. However, building and sustaining successful collaborative partnerships requires structure and communication.

## **Conclusion**

Digital objects are unstable and require preservation to maintain authenticity and accessibility. A well planned and consistently applied digital preservation program is necessary for the caretaking of these at-risk business assets. However, digital preservation requires a sustained commitment of resources. Collaborations that include shared knowledge, information systems, and advocacy lessen the burden any single organization or department might face when building a digital preservation program.

The five-point plan DPWG developed to cultivate a foundation of shared knowledge, assess the current digital preservation landscape, advocate for the value of digital preservation activities, implement digital preservation services, and sustain ongoing relationships and support—can function as a roadmap for facilitating internal organizational alliances. As this article demonstrates, building knowledge and coordinating with the different teams responsible for organizational decisions is essential. This is done through a process of internal collaboration.

Different channels of authority and administration are involved in the creation and maintenance of a sustainable digital preservation program, and many different teams must work together to support digital preservation. The teams involved in digital preservation are generally not formal committees. They are groups that already exist within the organization that provide the resources, expertise and influence required for a digital preservation program. A committed collaborative effort among all the teams is essential to the creation and implementation of a digital preservation program and is more likely to lead to a successful effort.

## References

1. Becker C, Rauber A. Decision criteria in digital preservation: What to measure and how. *J Am Soc Inf Sci*. 2011 Jun 1;62(6):1009.
2. Altman M, Adams M, Crabtree J, Donakowski D, Maynard M, Pienta A, et al. Digital preservation through archival collaboration: The data preservation alliance for the social sciences. *Am Arch*. 2009;72(1):170–184.
3. Skinner K, Halbert M. The MetaArchive Cooperative: A collaborative approach to distributed digital preservation. *Libr Trends*. 2009 May 20;57(3):371–92.
4. Digital Preservation Coalition. Digital preservation handbook, 2nd edition [Internet]. 2015 [cited 2016 Mar 7]. Available from: <http://dpconline.org/handbook>
5. Gable J. Making a business case for the principles. *Inf Manag J*. 2015 Sep 1;49(5):34–8.
6. Haynes T. Qualifying cost savings of a DAM department [Internet]. Henry Stewart Publications. 2015 [cited 2017 Feb 24]. Available from: <http://www.ingentaconnect.com/content/hsp/jdmm/2013/00000001/00000004/art00010>
7. McCord A. Overview of digital asset management systems [Internet]. Educause Evolving Technologies Committee. 2002 [cited 2017 May 19]. Available from: <https://net.educause.edu/ir/library/pdf/DEC0203.pdf>
8. Hawkins B.L. Advancing scholarship and intellectual productivity: An interview with Clifford A. Lynch. *Educause Rev*. 2006;41(3):52.
9. Lavoie B. Meeting the challenges of digital preservation: The OAIS reference model. *OCLC Newsl*. 2000 Feb;243:26–30.
10. Burda D, Teuteberg F. Investigating the needs, capabilities and decision making mechanisms in digital preservation: insights from a multiple case study. *Inf Resour Manag J*. 2013 Jul 1;26(3):17–40.
11. Proença D, Tribolet J, Borbinha J. Modeling the value of digital preservation activities. *Procedia Comput Sci*. 2016;100:1051.
12. Heutelbeck D, Grabarske J. Preservation-awareness in collaborative engineering. *Comput Ind*. 2014 Jan;65(1):24.
13. Ibid
14. Gable, ref 5. above
15. Muthusamy SK, White MA. Learning and knowledge transfer in strategic alliances: A social exchange view. *Organ Stud*. 2005 Mar 1;26(3):415.
16. Mariotti F. Exploring interorganizational learning: a review of the literature and future directions. *Knowl Process Manag*. 2012 Oct 1;19(4):215-21.



17. Yang T-M, Maxwell TA. Information-sharing in public organizations: A literature review of interpersonal, intra-organizational and inter-organizational success factors. *Gov Inf Q*. 2011;28(2):164–75.
18. Besser H. Collaboration for electronic preservation. *Libr Trends*. 2007;56(1):216–29.
19. Day M. Toward distributed infrastructures for digital preservation: the roles of collaboration and trust. *Int J Digit Curat*. 2008 Feb 12;3(1):15-28.
20. Altman, ref 2. above
21. Digital Preservation Coalition, ref 4 above
22. Cornell University Library, ICPSR, MIT Libraries. Digital preservation management: Implementing short-term strategies for long-term solutions [Internet]. 2003–2006 [cited 2017 Mar 3]. Available from: <http://www.dpworkshop.org/>
23. Mannheimer S, Cote C. Cultivate, assess, advocate, implement, and sustain: a five-point plan for successful digital preservation collaborations. *Digit Libr Perspect*. 2017;33(2).
24. Ibid
25. Larsson R, Bengtsson L, Henriksson K, Sparks J. The interorganizational learning dilemma: Collective knowledge development in strategic alliances. *Organ Sci*. 1998 Jun;9(3):285-305.
26. Ibid
27. Skinner, ref 3. above
28. Yang, ref 14. above
29. Dollar CM, Ashley LJ, Mistic M. Building the business case for digital preservation using the Digital Preservation Capability Maturity Model [Internet]. 2014 [cited 2017 Feb 24]. Available from: <http://www.girona.cat/web/ica2014/ponents/textos/id195.pdf>
30. Ibid
31. Rinehart AK, Prud'homme P-A, Huot AR. Overwhelmed to action: digital preservation challenges at the under-resourced institution. *OCLC Syst & Serv* [Internet]. 2014 Jul 24 [cited 2016 Apr 5]; Available from: <http://www.emeraldinsight.com/doi/full/10.1108/OCLC-06-2013-0019>
32. Ibid