



Center for Open Science

Strategic Plan

2022-2024

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Executive Summary

The [Center for Open Science](#) (COS) has a mission to increase openness, integrity, and reproducibility of research in the service of accelerating acquisition of knowledge, solutions, and treatments. COS takes a systems-level approach using infrastructure, norms, training, incentives, and policies to transform the academic research culture. In its almost 9 years of existence, COS has made substantial progress in providing open infrastructure through the [Open Science Framework](#) (OSF) to make it possible and easy to increase rigor, transparency, and sharing of research, and in fostering grassroots and stakeholder activity to enact new policies, incentives, and norms that align scholarly values with scholarly practices.

With contributions by COS and many other change agents, the open scholarship landscape is maturing from an early focus on accessibility of research outputs (open access, preprints, open data) to an appreciation of the need to improve research practices across the entire research lifecycle. For COS, open scholarship is an imperative for improving multiple interrelated aims for research: access, transparency, rigor, integrity, inclusion, and reproducibility. Increasing engagement by funders, policymakers, societies, publishers, and institutions sets the conditions for anticipating accelerated progress on the mission.

This strategic plan is the culmination of a year-long review process that engaged many internal and external stakeholders to shape COS's priorities for the next three years. From this work emerged three strategic imperatives to advance its mission.

First, COS will mature organization-wide partner and stakeholder coordination and engagement that is mission advancing and sustainability enhancing. Culture change requires collaboration, particularly in a decentralized and distributed system like science. COS's theory of change presumes that piecemeal efforts will be insufficient to catalyze sustainable change. To advance the mission, COS must solve the coordination problem by aligning, connecting, and collaborating with multiple stakeholders and change agents across communities of practice.

Second, science is a big community and COS is a small organization. In addition to partnering with mission-aligned organizations to strengthen the network of change agents, COS must advance scalable culture change strategies. COS can be more effective in collecting and using data to identify readiness for change and make good decisions about deployment of resources. COS can continuously improve inclusion of contributors to culture reform to ensure that strategies address the diversity of needs across the research community. COS can improve community engagement to ensure that everyone feels ownership of the reforms and tools supporting their community and practice. And, COS must continuously evaluate its interventions to capitalize on their strengths and address their weaknesses.

Third, COS provides infrastructure to make it possible for researchers to be more rigorous and transparent with their research. Adoption of new behaviors will be facilitated by improving the ease with which the supporting infrastructure integrates with researchers existing workflows. Supporting education and training will provide researchers with the capacity to make the most of

the new behaviors. And, effective data management and user interface improvements will foster discovery, evaluation, and reuse by the rest of the research community to support assessment of credibility and accumulation of knowledge.

As part of a strong collaborative network, COS is well-positioned to enter its second decade with a strong foundation of infrastructure, community engagement, policy and practice frameworks, and research evidence to advance a sustainable, values-aligned research culture.

Origins of This Plan

This document was generated during a year-long review and planning process that engaged internal and external stakeholders. Anchored by the organization mission, with the entire staff and with the Board, we first reviewed progress on the previous business plan and conducted a series of exploratory conversations to identify areas of strength, weakness, opportunity, and challenge. Based on those discussions, we identified a list of areas to explore with external stakeholders and recruited an independent consulting service, [MoreBrains Cooperative](#), to conduct stakeholder focus groups and interviews. In parallel, each department conducted a review and planning process based on preliminary areas of prioritization. The external stakeholder interviews and internal background research formed the basis for a Leadership Team retreat to review, revise, and preliminarily confirm the strategic imperatives and priority initiatives. The plan was drafted based on those outcomes and circulated for review and discussion to the staff and Board. Following a team retreat and Annual Board Meeting, the plan was finalized and adopted on December 6, 2021.

Mission and History

The Center for Open Science (COS) exists to increase openness, integrity, and reproducibility of research. The academic research enterprise is beset by culture, systems, markets, and institutional structures that create a gap between scholarly values and the policies, incentives, and norms that shape behavior. This creates friction in the pace of discovery to advance knowledge, solutions, and cures. COS is a culture change organization that aims to align scholarly values with scholarly practices. It does so by developing and advancing a systems-level strategy for changing culture and behavior toward greater rigor, transparency, and sharing of research process, outputs, and outcomes.

Founded in 2013, COS has made progress in:

- *Clarifying the problem:* With theoretical and empirical research contributions, COS provided insight about the cultural challenges that create friction in the research process and their consequences, particularly on negatively impacting the credibility and replicability of the published literature (Button et al., 2013; Camerer et al., 2018; Ebersole et al., 2016, 2020; Errington, Denis, et al., 2021; Errington, Mathur, et al., 2021; Klein et al., 2014, 2018; Open Science Collaboration, 2015).
- *Outlining idealized solutions:* COS articulated a vision of the impact of a culture change that embraces greater transparency, sharing, and inclusivity across the entire research

lifecycle (Ioannidis et al., 2014; McKiernan et al., 2016; Miguel et al., 2014; Munafò et al., 2017; Nosek et al., 2012, 2015; Nosek & Bar-Anan, 2012; Uhlmann et al., 2020), has identified key behaviors that are the priority for its culture change mission (preregistration, open data, open materials, transparent review), and provided theoretical arguments for the role of the solutions in promoting rigor and reproducibility such as replication (Nosek & Errington, 2017, 2020a, 2020b) and preregistration (Bakker et al., 2018; Mellor & Nosek, 2018; Nosek et al., 2018, 2019).

- *Implementing technology to make behavior change possible:* COS built the open-source [Open Science Framework](#) (OSF) a collaborative management service supporting the entire research lifecycle to make it possible for researchers to preregister their work and share their data and materials alongside supporting the documentation and management of their research as it occurs. Since its inception, OSF has had non-linear growth. As of November 2021, more than 375,000 research producers have accounts and have created over 140,000 public projects, registered 79,000 studies, and posted over 14 Million files, over 6.5 Million of them openly. Also, more than 21 Million research consumers visited OSF in 2021 so far, downloading files over 30 Million times.
- *Improving technology to make behavior change easier:* COS improves OSF to integrate more easily into researchers' daily workflow, to connect to the services that they use, and to provide more paths for research consumers to discover and use shared content. A key contribution is the creation of interfaces on OSF including [preprints](#), [collections](#), [institutions](#), [meetings](#), and [registries](#) that can be branded and operated by stakeholder groups for their communities. These interfaces provide easy onboarding of researchers for a specific open scholarship behavior and a discovery layer for consumers and formation of community around open practices.
- *Fostering open scholarship norms:* COS developed the [Open Scholarship Survey](#) for communities to assess their readiness for change and progress, promoted [badges](#) to acknowledge open practices to make the new behaviors visible within communities, and advanced awareness and education about open scholarship with internally developed training and supporting community-led education and knowledge sharing via the [Open Scholarship Knowledge Base](#). COS supports independent grassroots networks for changing the research culture and provides a coordinating and communication role across many networks otherwise separated by disciplinary, stakeholder domain, area of focus, or geographical boundaries. COS has developed a robust partnership network across stakeholder communities to tackle the coordination problem of making culture change start and stick.
- *Advancing values-aligned incentives:* COS supported the articulation, proof-of-concept, and adoption of [Registered Reports](#) to refocus publishing incentives on importance of questions and quality of methodology rather than newsworthiness of results. COS advocated and coordinated with stakeholders, particularly funders and journals, to test new incentive drivers, particularly [Reproducibility and Transparency Initiatives](#) (RTIs) to demonstrate commitment to shifting incentives and promoting engagement in their communities.
- *Expanding a policy framework for openness and transparency:* COS supported creation of the Transparency and Openness Promotion (TOP) [Guidelines](#) as a policy framework

to help address the coordination problem across stakeholder groups and disciplines. COS also led efforts for adoption of TOP by thousands of journals. COS initiated adoption by funders and other stakeholders, and launched a normative intervention called [TOP Factor](#) to foster further adoption among stakeholders.

- *Assessing whether the interventions are working*: COS conducted research to evaluate and improve its interventions including naturalistic investigations of badges (Kidwell et al., 2016) and Registered Reports (Hummer et al., 2017; Soderberg et al., 2021), and internal investigations of OSF use to inform product development. COS created systems of data sharing of COS activities itself to promote the advancement of a metascience community to independently evaluate progress.

COS began in Charlottesville, Virginia in the United States, but evolved to be a more distributed workforce with Charlottesville remaining its headquarters. COS is committed to openness and treating scholarly research and the infrastructure supporting it as public goods. All COS produced data, materials, code, and reports are openly licensed and publicly accessible to the maximum extent possible. COS made its progress with a dedicated, diverse, and skilled core staff, and, critically, thousands of individual researchers and stakeholders who provided time, energy, and action as a service because of their shared vision for improving the research culture. COS's contributions outstrip its staff size and resources because of the collaborative partnerships with so many groups across the research landscape.

Vision of Success

We envision a future scholarly community in which:

- The process, content, and outcomes of research are openly accessible by default;
- All scholarly content is preserved and discoverable, and openness, interoperability, and transparency are normative for scholarly services;
- All stakeholders are included and respected in the research lifecycle; and
- All stakeholders share pursuit of truth as the primary incentive and motivation for scholarship.

Achieving the mission requires culture change in the incentives that drive researchers' behavior, the infrastructure that supports research, and the business models that dominate scholarly communication.

Strategy

To scale sustainable adoption of open behaviors by researchers, COS

- [1] provides open infrastructure that makes it possible to do the behaviors,
- [2] conducts user-centered product development to make it easy to do the behaviors,
- [3] supports grassroots organizing to activate and train adopters and make their behavior visible to shift community norms toward the behaviors,
- [4] offers solutions to journals, funders, and institutions to nudge incentives to make it desirable to do the behaviors, and

[5] provides and promotes a policy framework for stakeholders to make the behaviors required.



Effective policy implementation requires effective infrastructure for doing the behaviors, and community buy-in to treat the behaviors as good practice rather than administrative burdens. These five levels of intervention are highly interdependent, each necessary, none sufficient, and collectively comprise a systems-level approach to improving the research culture.

COS conducts this work as a mission-driven, non-profit, culture change organization. COS retains a fundamental commitment to the principle that academic scientific research is a public good. The papers, data, materials, registrations, and infrastructure hosting research should be open to the maximum extent possible, guided by [FAIR principles](#) and preserved for long-term access and reuse.

COS enacts its theory of change with mutually reinforcing activities: technology, norms, incentives, policy, and research. Building and maintaining technology make open scholarship behaviors possible and easy. Changing norms builds community support for open scholarship and increases capacity through education and training. Changing incentives aligns what is good for science with what is good for scientists. Changing policies, fosters a stakeholder framework for requiring and maintaining open scholarship. Research provides evidence about the state of the research culture and evaluates the effectiveness of technology, normative, incentive, and policy interventions. These activities, supported by operational excellence and dedication to sustainability, advance a behavior change strategy that emphasizes the interaction between individuals and the systems in which they exist as both an opportunity and a constraint for researchers to behave in line with their intentions and values.

COS is one actor in a global movement to improve the research culture and accelerate discovery. Some groups have a regional focus (Africa, University of Melbourne), some have a topical focus (preprints, metadata), some have a stakeholder focus (publishers, societies), some have a research community focus (early career researchers, team science), and some have a disciplinary focus (biology, economics). COS's unique role is its emphasis on the open scholarship movement as a systems challenge and tackling the coordination problem that cuts

across these focus areas. To achieve sustainable success, partnership and collaboration is essential:

- COS is a connector between communities and a provider and maintainer of shared technology, solutions, and policy frameworks.
- COS articulates a shared vision for open scholarship at a meta-level of translating scholarly values into scholarly practices, and collaborates with domain experts to determine how those general principles translate into practice and, conversely, unique elements of practice can shape articulation of inclusive, shared principles.
- COS provides tools, services, knowledge, and project management support for communities to change themselves.
- COS monitors and documents change in research practices and evaluates implementation and impact to identify areas for improvement

Figure S1 provides a simplified framework of the culture change model with the interconnected components of the systems-level intervention in the columns and the target behaviors in the rows. COS seeks to identify and connect actors and services supporting one or more cells of this matrix, and fill gaps so that all components of the theory of change are active and working in concert to advance sustainable culture change.

Figure S1: The Theory of Change Matrix

	Tools ¹	Integrations	Norms ²	Incentives	Policies
Preregistration					
Sharing Materials, Data, and Code					
Reporting Outcomes ³					
Evaluation ⁴					

¹ The matrix slightly repositions the *infrastructure* and *user experience* components of the theory of change to *tools* and *integrations* because for landscape, strategy, and evaluation, the matrix is used for a systems-level analysis to identify the relevant tools and services, and improve ease and quality of use with integration and interoperability across use cases and phases of the lifecycle. Individual tools and services must still aspire to high quality user experience to be effective.

² Norms include promoting visibility of the desired behaviors, stakeholders and grassroots networks promoting and supporting behavior change, and training services to support the community doing the new behaviors well.

³ An important behavior of interest in reporting outcomes is ensuring that all outcomes of planned research are reported and that planned versus unplanned analyses are clearly distinguished. Another behavior of interest in reporting outcomes is sharing preprints and postprints open access to accelerate communication, improve transparency of versions of reports over time, and to improve access to all.

⁴ Evaluation is inclusive of behaviors that facilitate evaluation of credibility of research findings and self-corrective processes including reproducibility, robustness, and replication testing, transparency and innovation in peer review, and verification and credibility assessments by humans and machines.

COS employs classic and contemporary models of diffusion of innovation for advancing behavior change at a cultural and individual level. COS establishes beachheads in research communities with clusters of idealists who are intrinsically motivated by the vision of open scholarship. COS promotes visibility of those innovators and early adopters to extend engagement with the mainstream of that community. COS incrementally expands from areas of strength into the mainstream and neighboring communities with bottom-up grassroots community activism and top-down stakeholder engagement. COS makes the behavior changes sustainable by providing reliable infrastructure to support the behaviors, by ensuring strong alignment between policies and supporting infrastructure, and by visibly documenting the spread of the behaviors and commitments of stakeholders.

COS enacts mission-aligned business models to sustain the mission and its technology and services. The business models preserve the commitment that, as public goods, all COS services should be open and liberally licensed for reuse. COS generates sustaining revenue by providing stakeholders with hosted solutions and expert consulting and service support for advancing open scholarship. Business models embody the commitment to sustaining the mission, not the organization.

Strategic Imperatives for 2022 - 2024

What must COS focus on in the next three years to advance its mission and sustain its ability to deliver?

- 1) Mature organization-wide, systematic partner and stakeholder coordination and engagement that is mission advancing and sustainability enhancing
- 2) Advance scalable and sustainable culture change strategies through effective use of data insights, commitment to diversity and inclusion, communication and community engagement, and evaluation of effectiveness
- 3) Streamline documentation, sharing, discovery, and evaluation of the whole research lifecycle

Summary of Priority Initiatives for 2022-2024

To address our strategic imperatives, accelerate the momentum that is continuing to build across the open scholarship system, and leverage the strengths and core competencies of the COS team and growing community infrastructure, we will focus on the following priority initiatives to advance our mission and vision.

- *Relationship management*: Improve internal and external collaboration and management processes to engage partners and communities on the theory of change strategy
- *Research lifecycle*: Mature OSF support for the whole research lifecycle with enhanced workflows to encourage comprehensive open, rigorous behavior by research producers, facilitate reporting to stakeholders, and improve discovery and reuse by consumers;

galvanize collaborative governance, roadmap development, and sustainability for shared infrastructure with stakeholder communities

- *Scaling stakeholder change*: Establish scalable approach to monitor and promote policy changes by funders and journals
- *Catalyzing community*: Create and foster self-sustaining metascience and open scholarship/reform communities
- *Theory testing*: Evaluate culture change interventions and investigate whether the behaviors we advocate actually increase replicability, increase credibility, and accelerate discovery
- *Maturing financial sustainability*: Advance current sustainability models (philanthropic funding and product earned revenue) and add earned revenue services model/s
- *Institutional change*: Explore assessment, intervention, and evaluation opportunities to improve institutional research cultures
- *Globalization*: Extend support of the global research community to improve adaptability and relevance of our products, services, and engagement with diverse regional needs

Detail of Priority Initiatives for 2022-2024

Relationship Management Initiative

Improve internal and external collaboration and management processes to engage partners and communities on the theory of change strategy

Description

Most of COS's work involves cultivating and managing relationships with other systems-level and community stakeholders to improve the research culture toward greater open scholarship and rigor. Some of these relationships may be more contained, involving only a single point of contact in the organization for a single activity. Many of these relationships are complex and involve engagement across multiple teams for managing ongoing activities and cultivating additional activities. Our goal with this initiative is to mature our relationship management framework for internal coordination and partnership collaboration processes. The focus is on partners who will be engaging with us via specific service deliverables, whether related to OSF products and services, training and consulting services, larger-scale intervention, community engagement and culture change efforts, or philanthropic support.

Further context regarding the guiding principles we use in developing and nurturing relationships can be found in our [Partnership Framework](#).

Objectives

- Improved cross-organizational process for partnership discovery and exploration, development, and engagement
- Values alignment across the collaborations we manage through consistent application of our Partnership Framework

- Material transition from opportunistic relationship development to a strategic, proactive, and coordinated approach
- Greater internal alignment and coordination to use the strengths and domain expertise of our teams while providing a cohesive experience for our partners
- Scalability and sustainability of change strategies through the maturation of explicit, shared accountability mechanisms among partners
- Productive feedback loop, evaluation, and improvement cycles
- An increase in the number and diversity of relationships that enact several elements of COS's Theory of Change.

Metrics to Evaluate Progress

Target outcomes established annually.

- # and diversity of qualified partner leads and growth over time, broken down by stakeholder, region, discipline, or other demographics
- # of proposals for culture change interventions drafted and shared
- Rates of prospective partners moving to use of products, services, or community engagement plans
- # of partners engaging in more than 1 activity relative to the COS theory of change
- # of communities for which COS has coverage of partners and services supporting every component of the theory of change for a target behavior
- # of renewals or long-term engagements in intervention and change strategies
- Length of active partnership engagement
- # of qualified philanthropic leads
- Conversion rates of qualified philanthropic leads
- NPS scores
- Partner engagement survey results
- # of tracked referrals
- Results of impact and evaluation reporting

Research Lifecycle Initiative

Mature OSF support for the whole research lifecycle with enhanced workflows to encourage comprehensive open, rigorous behavior by research producers, facilitate reporting to stakeholders, and improve discovery and reuse by consumers; galvanize collaborative governance, roadmap development, and sustainability for shared infrastructure with stakeholder communities.



Description

COS built and maintains the OSF, open-source infrastructure that supports the research lifecycle, as part of its theory of change. The OSF makes it possible to conduct open scholarship behaviors, and makes it easy with efficient workflows and by integrating services that researchers use. The research lifecycle includes planning and designing research and data management, conducting the research, collecting and analyzing data, reporting outcomes and sharing outputs, and fostering preservation, discovery, and reuse of the outputs and outcomes. By connecting the research lifecycle, OSF supports increasing rigor, transparency, and sharing of research. Successful adoption of OSF requires meeting a variety of use cases, connecting the services that are important to communities of users, and meeting the regional requirements and regulations for data management services.

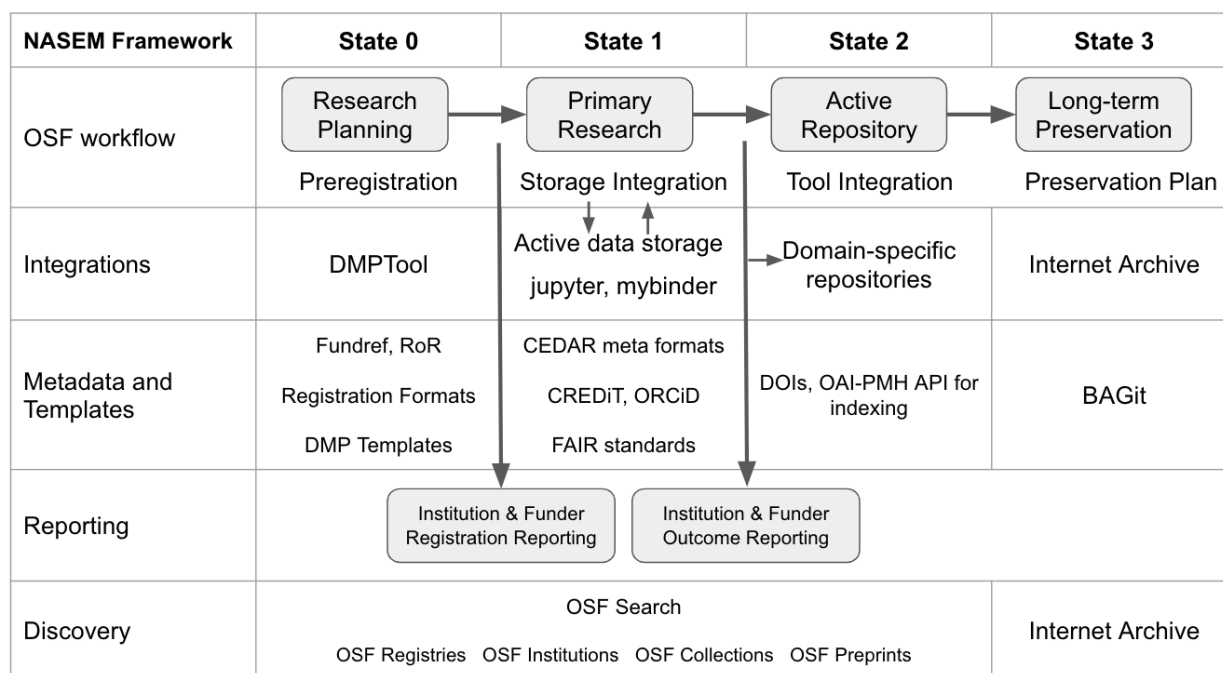
The need for sustainable and interoperable open science infrastructure is increasing with greater attention by stakeholders to improving rigor and transparency, and an evolving policy and incentives landscape. For example, more funders are increasing expectations of grantees for rigor and transparency with data management plans, preregistration, and sharing data and materials. An optimized infrastructure can align stakeholder and researcher interests so that funders and institutions can adopt strong policies promoting rigor and transparency with confidence that researchers can enact them, and so that researchers can report on their adherence to the policies without disruption or extra burden to their research workflow.

The OSF roadmap is informed by needs identified by stakeholders, researchers, and user data that are aligned with COS's mission to increase openness, integrity, and reproducibility of research. We will open more pathways for communities to give input on the product development roadmap and create a metadata framework to implement community-standard metadata schemas. We will address technical debt to lower maintenance costs and the barrier to entry for community contributions to extend and improve OSF features and functionality.

Many governmental, provincial, jurisdictional, and tribal entities have requirements for data location to protect data producers, consumers, and participants. We will extend OSF regional storage to include metadata of files and users, and we will incrementally increase capacity for OSF to support distributed hosting of its components and connectivity of services. Meeting regional requirements and increasing shared governance will foster adoption and further democratize OSF as public goods infrastructure for all.

Advancing metadata and incorporating community-developed metadata standards will ensure OSF connected content is findable, accessible, interoperable, and reusable. OSF will enable connecting research outputs through verified ORCID IDs to help reduce spam and improve credibility of outputs, CREDiT to support contributor attribution, FundRef, and ROR IDs to connect research with the organizations and stakeholders supporting it. And, to ensure long-term access, we will expand the preservation pipeline to support additional content types like preprints, projects, and files.

Figure I1. A conceptual visualization of the evolution of OSF



Barriers to open scholarship policy adoption by stakeholders include an inability to monitor compliance and a reluctance to add substantial reporting burden to researchers. We can eliminate these barriers by making output and outcome reporting easy and a natural part of the lifecycle. We will collaborate with stakeholders and researchers to develop efficient reporting workflows to streamline compliance with open scholarship policies. We will further enable open scholarship behaviors at each stage of the lifecycle by guiding researchers to take the next action. Finally, we will extend workflows and custom interfaces (registries, collections, preprints, institutions) that empower communities to set their own standards, moderate and curate content, and promote norms for open and rigorous research.

These infrastructure goals are visualized in Figure I1 to illustrate the evolution of OSF and its integration with other services supporting open scholarship.

Objectives

- OSF provides robust workflows for research producers, consumers, and stakeholders for all stages of the research lifecycle: planning, conducting, reporting, and discovery
- The stages of the research lifecycle on OSF are connected and fluid, provide guidance and encouragement for taking the next open behavior action, and open behaviors accumulate through use of the workflows.
- As research stakeholders increase implementation of open policies, OSF is used to enable research producers to meet policies and track policy outcomes.
- Research producers are able to deposit or connect outputs of their studies on OSF and provide FAIR metadata enabling discovery and reuse.

- Communities are empowered to develop domain, discipline, or methodology specific metadata schemas and apply them to their files on OSF.
- OSF producers can easily provide detailed metadata to their profiles (ORCID, discipline) and content to connect their work to collaborators (CREDiT), organizations (RoR, GRID), funders (FundRef), and related works (DOIs, DMPs).
- Research producers and stakeholders are connected by a reporting workflow, where research results and shared outputs are easily reported to stakeholders with minimal burden for the researcher.
- Jurisdictional, governmental, and other regional boundaries are not a barrier for deposit and access to OSF for research data management through a distributed configuration of metadata, files storage, and hosting.
- The community is able to develop integrations, workflows and features for OSF and contribute code that can be made available to the broader user community.
- Communities and stakeholders are invested in the long term sustainability of the OSF as shared infrastructure and participate in governance and roadmap development.

Metrics to Evaluate Progress

Target outcomes established annually.

- # of users doing open behaviors
- # of users doing multiple open behaviors and which ones
- # of open behavior outputs, preregistrations, registered reports, reported outcomes, shared outputs (by type), preprints
- # of stakeholder reports shared
- # of files with metadata schema completed
- # of users with ORCIDs
- Disciplinary metrics for new users, projects, registrations, data, and preprints.
- # of community or stakeholder provided feature, improvement, or workflow requests
- Monthly tracking of infrastructure projects to enable community development toward percentage complete: # of total projects to enable community contributions, # projects completed, # projects remaining, target date of completion for all or phases.
- Tracking of Community-contributed projects: # new contributions, # reviewed contributions, # approved and integrated contributions.
- # of regions/nations adopting OSF services following enhancements to meet local requirements

Scaling Stakeholder Change Initiative

Establish scalable approach to monitoring and promoting policy changes by funders and journals

Description

Three critical elements of COS's theory of change are setting new norms in communities, altering incentives, and changing policies all in the service of increasing transparency, sharing, and rigor. Among COS's most impactful contributions to date is the creation and maintenance of

services that stakeholders can adopt for each of these elements. Badges to acknowledge open practices is a norm shifting intervention for journals to increase the visibility of open behaviors by other researchers in one's community. Registered Reports is an incentive changing intervention for journals (and funder partners) to shift the rewards of publication away from the outcomes of the research (positive, novel, tidy results) and toward the importance of the research questions and rigor of the methodologies to evaluate those questions. The Transparency and Openness Promotion (TOP) Guidelines is a policy framework for journals, funders, and institutions to articulate their expectations for open practices for their authors, grantees, and staff.

Each of these services has had successful adoption by journals, particularly Registered Reports and TOP Guidelines. Evidence to date supports their effectiveness in changing behavior and increasing rigor, sharing, and transparency. In concert with continuing evaluation of effectiveness, COS will invest in creating scalable strategies to advance monitoring and adoption of these services by stakeholder groups.

Most of this work will be conducted through the [TOP Factor initiative](#)--a rating of stakeholder policies against the TOP Guidelines and adoption of Registered Reports and badges. COS's TOP Factor service includes an open database documenting publicly available policies of stakeholders, and a visualization of TOP Factor ratings (<https://topfactor.org/>) for easy search and discovery. By rating, aggregating, and visualizing stakeholder policies, we can bring greater transparency and awareness of the current state of transparency-related policies, the change in those policies over time, variation in policies across stakeholder communities, detailed information about policies of individual stakeholders, and comparative information of policies between stakeholders. For researchers, this provides information about journals, funders, and institutions with whom they might interact. For reformers, this provides insight about where progress is being made and where efforts need to be increased. For stakeholders, this provides insight on the status of their present policies and comparative data for how they are doing relative to their peers. For COS, the data provide a mechanism for normative interventions with outreach to decision makers to show how their policies compare with their more progressive peers and what they can do to promote more open practices in their community. As such, the TOP Factor database is a central service for advancing COS's theory of change.

Monitoring and advocating for policy change is mission advancing but not currently associated with a revenue model for COS.

Objectives

- The TOP Factor database offers a comprehensive accounting of journal policies, funder policies, and eventually, institutional policies
- Through normative influence campaigns within communities, progressive peers receive credit for their advancement of open practices, and slower acting agents receive encouragement to pursue similar policy actions.

- The TOP Factor database is more accessible and visible in scholarly services and in relation with other databases recording other open scholarship features of policy and practice such as open access, preprint, and peer review policies.
- Stakeholder adoption support is enhanced through the development of robust toolkits and practical training, social networks, and support services to improve the quality of the policy implementation.
- Increased community maintenance, promotion, and governance of TOP Guidelines, badges, and Registered Reports
- A system and established set of partnerships for community contribution to journal coding and updating of the TOP Factor database.
- Sustained internal and independent evaluation of norm, incentive, and policy interventions with particular attention to potential heterogeneity in their effectiveness across disciplinary and methodological boundaries that informs refinement and improvement of the services to have maximum positive impact and avoid negative unintended consequences.

Metrics to Evaluate Progress

Target outcomes established annually.

- # of journals scored in TOP Factor
- # of funders scored in TOP Factor
- # of journals reaching >4, >9, >14 on overall TOP Factor rating
- Proportion of journals increasing TOP Factor rating following normative intervention compared with control journals
- Amount that journals increased TOP Factor rating following normative intervention compared with control journals
- # of journals offering Registered Reports
- # of Registered Reports articles published
- # of journals offering badges
- # of badges awarded
- # of metascience projects evaluating TOP, RR, badge interventions
- # of metascience projects using TOP Factor database
- Mentions of TOP Factor on journal websites
- Mentions of TOP Factor in social media
- Evidence that TOP Factor is perceived and use as an alternative to Journal Impact Factor to rate journals based on policies and operations rather than citation count

Catalyzing Community Initiative

Create and foster self-sustaining metascience and open scholarship/reform communities

Description

COS's mission advancement is driven more by the actions of external people and organizations than by COS itself. COS plays a catalytic and supporting role in helping communities change their culture toward greater rigor, transparency, and research integrity. Beyond the major

stakeholders -- societies, publishers, funders, institutions, researchers -- there are two key communities that COS relies on for mission advancement: metascience researchers and open scholarship reformers.

Metascience. Metascience researchers investigate the current state of research practice and evaluate the effectiveness of reform efforts. This evidence is essential for COS to prioritize areas for improvement, to develop intervention strategies, to evaluate intervention effectiveness, to improve the theory of change, and to inform strategic planning. A thriving metascience community is essential for COS's mission. That community will be inclusive of all roles, identities, and groups with an interest in science and will include both disciplinary insiders and observers, both researchers and stakeholders, both descriptivists trying to understand how science works and prescriptivists advancing a point of view about how science should change, both lumpers trying to understand what is common across research domains and splitters trying to understand uniquenesses of particular domains, and both basic and applied research objectives.

For COS-specific initiatives, a thriving metascience community will provide [1] independent evidence related to COS's mission, theory of change, and products, services, and practices; [2] a community of collaborators and experts to conduct, review, and improve the evidence base to advance COS's mission; and [3] research insight and inspiration unencumbered by COS's own biases, assumptions, and blinders.

COS will help catalyze and grow a self-sustaining metascience research community by being a connector, convener, and supporter of metascience research across disciplines and methodologies. COS will also lead by example in conducting its own metascience research openly, collaboratively, and attentive to rigor and reproducibility. Activities will include: launching the Institute for Metascience to consolidate, organize, and promote COS's internal and collaborative research activities; Advancing a collaborative network of metascience groups and laboratories for knowledge exchange and to stimulate collaboration and definition of a collective roadmap for metascience research; Increasing accessibility of COS generated data for metascientific investigations including public OSF activity, research outputs, and policy databases; Organizing events including conferences, webinars, workshops, and small group meetings to foster metascience research; Providing administrative, leadership, and project management support to support the operations of a metascience community and incrementally increase capacity of the community to administer, lead, and manage itself; and, expanding the inclusion of communities involved in metascience.

Open Scholarship. Open scholarship⁵ reformers are researchers and other stakeholders who are trying to change the research culture to improve one or more of the following: open access; sharing data, materials, or code; preregistration and study planning; peer review practices and transparency; metadata and research identifiers; publishing standards; preprints or outcome reporting; open innovation and patent reform; collaboration; metrics and reward systems; inclusion and diversity; open source infrastructure; funding, hiring, and promotion criteria; and, other changes to research practice and assessment that might increase openness, transparency, rigor, sharing, or reproducibility.

Open scholarship reformers may be interested in a single or variety of reforms, may dedicate their efforts to a specific domain or methodology or a variety of domains and methodologies, may focus on a particular region or group or a variety of regions and groups, and may pursue efforts via grassroots organizing or as leaders in organizations or stakeholder groups. COS supports the diversity of reform efforts by being a convener and connector to foster communication, coordination, and collaboration on areas of shared interest.

COS's activities for helping catalyze and grow the open scholarship community will be similar to those for the metascience community and, in some cases, there is substantial overlap between these communities allowing for coordination of activities. The focus of support for the open scholarship community is an emphasis on grassroots organizing with resources, knowledge sharing, coordination and collaboration on influence campaigns, and defining a collective roadmap for advancing open scholarship. There is no consensus in the open scholarship community about the desired solutions, and that diversity can be a strength for testing a variety of approaches. COS does have a point of view on how open scholarship should evolve, but the purpose of catalyzing community is to help surface all points of view and facilitate dialogue, amplify convergence, and respect distinctiveness to maximize impact of improvements to the research culture.

Building and sustaining metascience and open science communities is not a revenue generating activity. COS focuses on philanthropy and grants to support this work.

Objectives

In late 2020/early 2021, COS submitted two grant proposals to NSF that outlined the vision and implementation plan for engaging, growing, and sustaining these research communities. One was to establish an [Institute for Metascience](#) that would create a collaborative network among about two dozen of the leading metascience research laboratories. The other was to establish a Community of Open Scholarship Grassroots Networks ([COSGN](#)) that would foster inclusion,

⁵ Open Science is a widely recognized term for this community, but it is also limiting for involvement of all interested communities across academic disciplines. An alternative of Open Scholarship could be more inclusive and effective for strengthening this community of reformers. This likewise has implications for COS branding of the organization name and the OSF, both of which adopted "open science" rather than "open scholarship" at the outset. COS will conduct a review of its branding and approach to inclusion for this community. It is likely that new initiatives and communications will evolve toward greater use of "open scholarship" terminology and there are a variety of tradeoffs to consider for maintaining or updating historical branding.

communication, coordination, and community building for open scholarship advocate groups and networks across areas of interest, disciplines, geographies, and communities being served. Both proposals had some favorable reviews, but neither was funded. A starter collaborative community was formed to create each proposal, and the proposed strategy and work for each is directly aligned with this priority initiative. As such, we will adapt these proposals, prioritize activities within each of them, and pursue them incrementally with the availability of resources.

- Stimulate interdisciplinary metascience research and open scholarship activities
- Aggregate and share datasets, code, and other research content to stimulate data-intensive Metascience research and open scholarship activities
- Promote norms of rigor, transparency, sharing, and reproducibility so that Metascience and open scholarship activities serve as exemplars of good practices for the rest of the research community
- Expand the Metascience and open scholarship communities by including groups, communities, regions, and disciplines underrepresented these communities and STEM more broadly
- Collaborate with stakeholders to disseminate Metascience and open scholarship outcomes and improve the research process and culture

Metrics to Evaluate Progress

Target outcomes established annually.

- Attendance at metascience meetings
- # of active research collaborations among multiple groups associated with the Institute for Metascience
- # of scholarly metascientific uses of COS shared data including public OSF data, shared research data, and shared policy databases
- # of registered studies on the [Metascience registry](#)
- # of projects shared in the [Metascience collection](#)
- # of papers shared in the BITSS-operated [Metascience preprint service](#)
- Attendance at open scholarship network meetings
- # of active reform-related collaborations among multiple groups in COSGN network
- Diversity of contributors to metascience and open scholarship collaborative networks by region, discipline, career stage, topical interest, and social identities
- Coverage of contributors to metascience and open scholarship collaborative networks by region, discipline, career stage, topical interest, and social identities

Theory Testing Initiative

Evaluate culture change interventions and investigate whether the behaviors we advocate actually increase replicability, increase credibility, and accelerate discovery

Description

COS exists to accelerate advancement of knowledge, solutions, and cures. COS's products, services, and practices are designed to support its theory of change. And, that theory of change

is premised on the notion that changing the research culture toward practicing greater transparency, openness, sharing, and rigor will lead to accelerated discovery by improving the credibility of reported research and more effective self-correction processes. If there are mistaken assumptions in COS's theory of change, weaknesses in conception or implementation of products and services to support that theory, unintended consequences that conflict with the mission and goals, or variation in the applicability of the theory and interventions in different areas of practice, then COS needs to identify those as quickly as possible to revise its strategy for advancing the mission.

COS evaluates its theory of change with research projects that: evaluate the current state of research practices such as large scale replication projects; survey research communities about their attitudes, perceived norms, and self-reported rigor and transparency enhancing behaviors with the Open Scholarship Survey; evaluate the effectiveness of interventions to improve research practices such as preregistration, Registered Reports, and sharing data, materials, or code; evaluate the state of stakeholder behaviors promoting new norms, incentives, and policies such as evaluation of TOP Factor ratings by community and over time; and, investigate OSF user behavior for adoption of practices, alignment between user behavior and product design intentions, evidence of network spread of behavior, and connection between demonstrated behaviors and assessed credibility.

COS also collaborates with other researchers, particularly domain experts, to investigate these questions. And, COS makes available as much data as possible from its research and products and services so that independent researchers can investigate similar questions or new directions that we would not otherwise have considered.

We will develop a business strategy for administering, improving/expanding, analyzing, and reporting on outcomes from the [Open Scholarship Survey](#) for stakeholders that seek to understand the attitudes and behaviors of their scholarly communities and receive comparative insight on their community relative to peers. This could become an earned revenue service to support sustaining research and the organization. Other research activities are either grant funded or bespoke contracts with stakeholders on research projects of mutual interest.

Objectives

- Human and algorithm teams within the SCORE program finalize approaches to generate confidence scores of claims and empirical evidence is used to evaluate the scores.
- Engage the community with the impact of the SCORE program through research papers and open outputs to understand, reuse, and extend the effort.
- Obtain funding support to gather evidence about the effectiveness of Registered Reports as a randomized controlled trial that also provides an opportunity for journals, editors, reviewers, and researchers to gain introductory experience with the format and inspire more interest for regular submissions.
- Gather researcher attitudes, perceived norms, and behaviors related to open scholarship - particularly, preregistration, data sharing, null results, replication, and perceived

replicability and credibility of one's research field - in different research communities longitudinally.

- Support organizational access to data - particularly OSF data - to enable evaluation of our products and services, to shape our organizational priorities, and to enable evaluation of our theory of change.
- Define the next phase of research strategy for evaluating success of theory of change and interventions to increase replicability, credibility, and pace of discovery.

Metrics to Evaluate Progress

Target outcomes established annually.

- Usage, 'impact' of SCORE papers
- # of scholarly works reusing SCORE outputs
- # of journals participating in Registered Report RCT
- # of communities conducting the OSS
- # of communities with longitudinal data using OSS
- Total participants completing OSS
- Funding earned to conduct evaluations of COS interventions
- Proportion of COS staff who access OSF data themselves for analysis via Data Science pipelines
- Proportion of COS-led research projects with a summary report shared as a preprint or published

Maturing Financial Sustainability Initiative

Advance current sustainability models (philanthropic funding and product earned revenue) and add an earned revenue consulting model

Description

COS has been successful obtaining foundation and federal grant awards to test or enact components of the theory of change. With maturation of its products, services, and community engagement, COS is at an inflection point that requires a shift away from a high percentage of restricted funding (up to 96%) to a more diversified and sustainable funding portfolio. COS needs greater flexibility to drive a strategically aligned set of service roadmaps for the OSF, policy, community engagement, and research activities without the inherent limitations that restricted grant projects can create. Furthermore, COS needs to ensure sustainability of the core infrastructure and solutions that are now relied upon by the research community.

We will focus on diversifying the COS funding portfolio across [1] restricted (but mission- and business-aligned) and unrestricted philanthropic and federal grants, [2] earned revenue through OSF-related services and new consulting and training services, and [3] philanthropic support (from individuals and corporations). The objectives below describe the path toward this desired diversification.

Objectives

- Diversification of sustained funding streams across earned revenue, philanthropy, and grants, with greater international reach and contribution
- Disciplined pursuit of grant awards that advance key elements of our priority initiatives and goals across infrastructure, policy, community building, education and training, research, and general operations where appropriate
- Maintenance of a healthy pipeline of grant opportunities to cover baseline operating expenses
- Growth in earned revenue from the intentional investment in product and service development and related marketing and business development efforts
- Growth in philanthropic support with benefactors, major gifts, and corporate support from a multi-pronged development strategy
- A sustained surplus from earned revenue and philanthropic support to help reduce negative impacts of uncertainty and variability in funding year over year.
- Maturation of a more systematic suite of intervention strategies, including the launch of consulting services that support culture change and open science practices
- Future-forward cost containment and management of technical debt
- Greater community contribution to infrastructure, policy, and research activities

Metrics to Evaluate Progress

Target outcomes established annually.

- # and contribution of grants awarded
- Diversity and proportion of revenue streams
- Size and growth of surplus and reserves
- Revenue growth and attainment of annual targets for earned revenue, by product and service line (p&Is)
- Earned revenue pipeline growth and diversification (by region, by stakeholder, and by discipline or community)
- Growth and diversification of philanthropic support and pipeline of opportunities (major gifts pipeline growth, benefactors pipeline growth, diversification of support from wider range of disciplines, and gifts secured from all sources)
- Total spend as a % of earned revenue
- # and impact (use) of community contributions to infrastructure

Institutional Change Initiative

Explore assessment, intervention, and evaluation opportunities to improve institutional research cultures

Description

We identify three key incentives that are direct mechanisms for sustaining a dysfunctional research culture or changing the system to a more functional, values-aligned culture: publication, funding, and hiring/promotion. With or without COS's involvement, the culture change movement is most advanced on publication incentives with publisher stakeholders

participating in interventions to positively evolve that reward structure. Most funders are aware and motivated to improve the reward systems for funding, but interventions are still in their early stages. And, among institutions, awareness and motivation is mixed, and interventions to improve reward systems are still areas for innovation and proof-of-concept.

Historically, and in the present strategic plan, COS resources roughly mirror the progress and engagement of these key stakeholder groups. Effort is dedicated heavily to altering publishing incentives, substantially to altering funding incentives, and lightly to early stage exploration for altering institutional incentives. This ordering is not indicative of importance; it is a reflection of prioritization based on readiness for change, clarity and tractability of change strategy, and allocation of limited resources for maximizing impact. Nevertheless, if we ignore hiring and promotion practices, we will not achieve sustainable culture change. As a consequence, COS will seek opportunities for exploratory investments in institutional change to develop strategy, establish proof-of-concept evidence for interventions, and to stimulate community engagement. These efforts will set the stage for increasing investment in institutional change by COS or others and effective deployment of resources.

Objectives

- Identify willing institutional partners to conduct self-assessment and opportunities to conduct proof-of-concept tests
- Identify funders interested in investing in institutional interventions
- Develop an evaluation strategy to determine if institutional interventions are effective

Metrics to Evaluate Progress

Target outcomes established annually.

- Number of institutional partners
- Number of institutional self-assessments via Open Scholarship Survey or related assessment measure
- Initiation of proof-of-concept or pilot tests at institutions
- Funder proposals for institutional interventions

Globalization Initiative

Extend support of the global research community to improve adaptability and relevance of our products, services, and engagement with diverse regional needs

Description

A systems approach to culture change requires engagement globally. Every part of COS's theory of change -- infrastructure, grassroots community building, and stakeholder engagement on shifting policies and incentives -- will benefit from more effective global collaboration. Moreover, COS's operations, development, and earned revenue strategies for sustainability can be improved by expanding the pool of potential staff, donors, funders, and service partners beyond the U.S.

As of 2021, COS has made some progress engaging the global research community including:

- Research projects such as SCORE engage collaborators from many regions, especially Canada, Europe, and Australia. However, there is room to improve research engagement into more collaborative community activism.
- There is substantial alignment and positive engagement between COS and grassroots, community building groups globally such as UKRN, Open Science communities, AfricArxiv, and SORTEE. However, there is room to improve positive relationships into more coordinated, collaborative projects and interventions.
- OSF is used by researchers worldwide. However, there is room to improve connections with services used by researchers regionally, provision of language services beyond English, and meeting regional rules and regulations for data storage and management.
- COS has positive relationships with open science service providers outside the U.S., but there is room to increase the strength of those partnerships for service delivery in those regions.
- COS has good relationships with policy and incentive driving stakeholders outside the U.S., but progress on culture change could be accelerated with greater attention and resourcing with expertise on staff about the regional challenges and opportunities.

There are also specific opportunities that would be enhanced by establishing a presence in places outside of the U.S. For example, opening an office in the E.U. would

- Expand the pool for hiring staff, particularly for hard to recruit roles like senior developers and to enable recruiting of regional expertise for business development, funding, and partnerships.
- Expand the opportunities to pursue grants that cannot be given to organizations outside the region, and increase the ease of partnering with regional groups for grant applications.
- Expand the insight and engagement with policy, institutional, and organizational stakeholders to inform COS's strategy, customize its services, and strengthen the network of partnerships regionally

It is conceivable that opening offices in other regions will confer similar benefits, but we will evaluate those opportunities incrementally and accumulate some experience with the costs of globalization on operational overhead, and internal management, coordination, and culture challenges so that expansion can anticipate and mitigate challenges.

Objectives

- Define strategic plan for stakeholder partnerships in the UK and E.U. including determination of potential funding and staffing implications. Use this plan to guide fundraising with grants, philanthropic giving, and deployment of unrestricted assets.
- Define, review and confirm business development strategy in the E.U. and UK, potentially including a first E.U. based staff member having primarily business development responsibilities
- Define a strategy for potential hiring, HR, and organizational management changes with an E.U. office

- Define, review and confirm community, grassroots partnership strategy in UK and E.U.
- Conduct internal retrospective on experience with opening an international office and implications for organizational management and practice.
- Evaluate potential expansion opportunities in other regions via service partnership, opening offices, or both. If additional opportunities are deemed of strategic interest, conduct the same planning process as for the E.U., updated by experience.
- Conduct a full product evaluation for regional needs and prioritize improvements to meet most critical market needs.

Metrics to Evaluate Progress

Target outcomes established annually.

- Number of non-U.S. OSF Institutions subscribers
- Number of non-U.S. based preprint, collection, registry interface subscribers
- Proportion of the components of the theory of change model and matrix (Figure S1) with defined organizational partnerships in the UK and E.U.
- # of grants submitted to E.U. funders and total Euros of submitted proposals
- # of grants awarded from E.U. funders and total Euros of awarded proposals
- Staff survey of organizational climate comparing pre-expansion to post-expansion (avoiding decline in organizational climate is better)
- Operations overhead rate change over time comparing pre-expansion to post-expansion (less increase is better)
- Change in proportion and number of non-U.S. OSF users over time
- Proportion of identified product needs for regional expansion implemented
- Stakeholder responses during 2025-2027 strategic planning about extent to which COS succeeded in globalizing its products and services
- Representation on Board and Advisory Committees of non-U.S. members and evaluation of regional coverage worldwide

Organizational Structure and Staffing

The current organizational structure is a functional design, which enables the development of depth of expertise and service delivery across specialized areas of technology and infrastructure, products and services, policy, and research, all core elements with interrelated activities supporting COS's Theory of Change. Other functional areas, including development, marketing and communications, and operations, extend and support the work of these teams, including community engagement, efficiency and effectiveness of operations, and sustainability of infrastructure and culture change.

We anticipate continuing with a functional design, though some elements of a matrix or virtual design may be employed when it makes sense. For example, highly coordinated, cross-team program work will benefit from the application of matrix design principles. Furthermore, we will continue to develop cross-functional teams and team processes to coordinate and drive projects that benefit from the collective yet varied expertise derived from team-based approaches. Virtual

design may be employed when a formal partnership with another organization is deemed more efficient or effective than COS's direct management of that component of the theory of change.

We are targeting the following key objectives and development efforts related to organizational structure and staffing to enable the realization of our strategic imperatives and priority initiatives:

Develop and Recruit New Skills and Expertise: To advance our priority initiatives, we will design new or enhanced roles in **training and education, data science, evaluation, product management, marketing and communications, and community inclusion**, among other areas related to sales support and operations. With our goal of improving the culture across **biomedical research**, we will also be seeking experience and expertise within that domain and its subdisciplines.

Design for Greater Community Involvement: Given the principles of open source infrastructure; our goal of scaling culture change among communities; and the goal of building a sustainable future, we will be actively seeking to develop more formalized mechanisms for community involvement and contribution to catalyze and sustain activities across technology, policy, intervention, community building, and research. The use of advisory boards and more formal methods for informing roadmaps will be an integral part of our next three years.

Explore Internationalization: Our current full-time staff is U.S.-based. With the exploration of international expansion and the need to more fully understand the needs of our international users and partners, we will investigate opportunities to expand our staff and develop more formalized international partnerships when the mutual benefit is clear.

Support Distributed Teams: Like many organizations, COS experienced the unexpected benefits and challenges of remote work during the pandemic. That disruption has accelerated building a more distributed team and recruiting remote-enabled positions. We anticipate more roles being available as a remote option, with one clear benefit being a wider pool of candidates; another being designing a more diverse team.

Continue to Invest in Professional Development: The nature of COS's activities affords professional development opportunities related to open source technology, community development, metascience, research, user research, data science, product development, communications, and more. We will invest in our current team's development through various formal training mechanisms, job shadowing, peer learning, mentoring, and other opportunities.

Board Development

The Board is well-positioned to support the onset of this strategic plan, and there are some key areas for continuing maturation of the Board to support the organizational mission and strategy. At present, all Board members are based in the United States. To meet the globalization priority, the Board will need to consider how best to evolve its representation and operation for the global community. For maturing sustainability, the Board can become more involved, particularly in fostering philanthropic support. The initial step of establishing a Development committee has already initiated this evolution. And, for advancing community, policy, and products and services, the Board can expand its strategic support to open doors with stakeholders that are aligned with the mission and positioned to partner.

Finances: Current Status and Forecasting Revenues and Expenses

2019-2021 Review

COS was formed in 2013 through a foundational gift from Arnold Ventures (formerly the Laura and John Arnold Foundation). From 2013 to 2019, contributed revenue continued to be the organization's principal source with respectable growth in federal revenue. In 2018, with support from Arnold Ventures, COS created a three year business plan (2019-2021). A key priority was creating a path toward sustainability through diversification of revenue streams. Earned revenue opportunities were explored and deemed a realistic source along with a goal of increasing philanthropic revenue. COS introduced fee-for-service models beginning with preprints at the end of 2019 and expanded to institutions, collections, and registries by late 2020.

Table F1 compares projected expenses and revenues from the 2019 business plan with the 2019 and 2020 actuals and the 2021 forecast based on the first two quarters of the year. Earned revenue from products met projection expectations and has demonstrated market viability. Philanthropic giving has fallen short of expectations and is not yet contributing substantially to sustainability.

Table F1. Business Plan Projections versus Actuals

	2019	2020	2021
Expenses			
2019 Business Plan Projections	\$7,077,000	\$7,085,000	\$7,235,000
2019, 2020 Actuals; 2021 Forecast	\$5,147,687	\$6,478,699	\$6,238,981

Revenues			
<u>2019 Business Plan Projections</u>			
Grants (Private and Federal)	\$7,384,000	\$6,323,000	\$6,370,000
Philanthropic Giving	\$220,000	\$317,000	\$367,000
Earned Revenue (Products)	\$10,000	\$125,000	\$183,000
Earned Revenue (Other)	\$180,000	\$320,000	\$315,000
Total Projected Revenue	\$7,794,000	\$7,085,000	\$7,235,000
<u>2019, 2020 Actuals; 2021 Forecast</u>			
Grants	\$5,198,276	\$6,336,265	\$6,142,551
Philanthropic Giving	\$109,289	\$155,382	\$118,411
Earned Revenue (Products)	\$4,035	\$166,691	\$278,426
Earned Revenue (Other)	\$165,373	\$236,409	\$105,429
Total Actual/Forecasted Revenue	\$5,476,973	\$6,894,747	\$6,644,817

An organizational goal was to establish earned revenue and philanthropic giving models in the pursuit of a more distributed, stable, and predictable support to complement high variability in earned grant awards. Table F2 below compares the projected percentage of revenues from grants versus other revenue versus the actuals for 2019 and 2020 and forecasted for 2021.

Table F2. Proportion of Revenue from Grants versus Philanthropy and Earned Revenue

	2019	2020	2021
<u>2019 Business Plan Projections</u>			
Grants	94.7%	89.2%	88.0%
Giving and Earned Revenue	5.3%	10.8%	12.0%
<u>2019, 2020 Actuals; 2021 Forecast</u>			
Grants	94.9%	91.9%	92.4%
Giving and Earned Revenue	5.1%	8.1%	7.6%

2022-2024 Projections

The primary goal for organizational finance from 2022-2024 is to advance mission-aligned earned revenue and philanthropic giving models toward sustainability for maintenance costs of products and services. In the 2019-2021 business plan, we anticipated these sources would increase yearly to comprise 12% of the total operating budget, which averaged \$6M per year over the three-year period.

We anticipate continued growth in these sustainability enhancing revenue sources from 2022-2024. Additionally, in September 2021, COS received a large unrestricted grant from Flu Lab for \$3.6M per year for 5 years to scale-up mission advancement, particularly in biomedical research. This infusion immediately increases the current operating budget by >50% and puts additional pressure on philanthropy and earned revenue for supporting sustainability after the award period. As such, our financial strategy: [1] retains the organizational expectation to expand earned revenue and philanthropic giving to provide sustainability for an increasing portion of baseline operating expenses, and [2] retains the expectation to pursue and earn grant awards (excluding Flu Lab) at the same level as COS has achieved the last 3 years. The historical data suggests that COS has the capacity to earn up to \$6M in grant awards annually. Achieving both these aspirational objectives would:

- Ensure that Flu Lab support is dedicated to scaling up COS mission advancement in biomedical research;
- Build a robust and diverse revenue model so that COS is prepared for sustaining its products and services when the Flu Lab award ends;
- Accumulate cash reserves from earned revenue as an investment in long-term sustainability to reduce reliance on grant awards for baseline operating expenses due to internal or external factors affecting the availability or desirability of grants.

Table F3 presents the ideal revenue scenario based on these factors. The top section highlights secured grant revenue from Flu Lab and other contributed and government sources that we can anticipate with high confidence. The middle section summarizes projected revenue including the following assumptions:

- Maintaining \$6M in grant awards combined across contributed and government sources (excluding Flu Lab award);
- Growth in philanthropic revenue based on internal research and projections;
- Growth in earned revenue based on internal research and projections.

The bottom section summarizes planned personnel and non-personnel expenses based on the budgeted personnel for 2022 and planned and projected non-personnel costs for current activities. An unallocated expenses line is included for anticipated actions in line with the Flu Lab award for scaling up activities in line with the priorities in this strategic plan.

Should we fail to meet projected revenue assumptions, the initial impact would be on reserving earned revenue for sustainability, and a large gap could also reduce as-yet unallocated expenses.

Table F3	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>Total</u>
SECURED REVENUE:				
Contributed Revenue	\$6,860,906	\$5,731,692	\$5,472,257	\$18,064,855
Government Revenue	\$2,424,852	\$466,358	\$180,128	\$3,071,338
Earned Revenue (Products)	\$32,741	\$0	\$0	\$32,741
<i>Subtotal</i>	<i>\$9,318,499</i>	<i>\$6,198,050</i>	<i>\$5,652,385</i>	<i>\$21,168,934</i>
PROJECTED REVENUE:				
Contributed + Govt Revenue	\$0	\$3,401,950	\$3,947,615	\$7,349,565
Philanthropic Revenue	\$454,000	\$530,000	\$597,700	\$1,581,700
Earned Revenue (Products)	\$541,636	\$717,457	\$875,694	\$2,134,787
Earned Revenue (Other)	\$170,272	\$130,000	\$150,000	\$450,272
Other Revenue	\$15,000	\$16,500	\$18,150	\$49,650
<i>Subtotal</i>	<i>\$1,180,908</i>	<i>\$4,795,907</i>	<i>\$5,589,159</i>	<i>\$11,565,974</i>
TOTAL REVENUES:	\$10,499,407	\$10,993,957	\$11,241,544	\$32,734,907
EXPENSES:				
Personnel Expenses	\$5,446,661	\$5,603,798	\$5,795,862	\$16,846,321
Non-personnel Expenses	\$3,557,588	\$1,595,689	\$1,382,619	\$6,535,896
Unallocated Expenses	\$0	\$2,000,000	\$2,000,000	\$4,000,000
TOTAL EXPENSES:	\$9,004,249	\$9,199,487	\$9,178,481	\$27,382,217
Reserve for Sustainability	\$1,213,650	\$1,393,957	\$1,641,544	\$4,249,151
NET	\$281,508	\$400,513	\$421,519	\$1,103,540

Risks

Risks identified by internal and external stakeholders during this strategic planning process largely fall into one of five categories: [1] competitive and market risks; [2] financial risks; [3] operational risks; [4] developmental risks; and [5] reputational risks. We describe below the strategy-level risks within each of these categories, their potential impact on realizing the goals of this plan, and opportunities for mitigating these risks as we operationalize and execute our priority initiatives.

Competitive and Market Risks

OSF continues to operate within a highly dynamic and crowded open (and closed) infrastructure market with a variety of platforms, tools, and applications that supports various aspects of the research lifecycle. Publishers and related technology vendors continue to move “upstream” in their support of the research lifecycle by offering author-researcher services that address the demands for quality research outputs and greater sharing and dissemination of outputs throughout the lifecycle. We reinforce that COS’s mission is to drive openness and transparency, not to gain market share through our infrastructure solutions. Therefore, we remain vigilant and open to evaluating whether other integrated infrastructure solutions are meeting some of the goals of the OSF, so that we can continue to focus our infrastructure product strategy on mission-aligned needs that remain unmet. For example, preregistration, branded registries, and OSF Institutions appear to serve distinct needs that are, as of yet, not fully met by other service providers or solutions but are critical to opening up the research lifecycle.

As we commit to advancing OSF’s support of the entire research lifecycle of planning, conducting, reporting, and discovery, it may become increasingly challenging to meet the wide variety of use cases and needs across disciplines, locales, regulatory environments (e.g., for data management), and specific stakeholder communities. As such, we will continue to monitor the infrastructure landscape to determine where and how to prioritize key integrations that meet the needs of researchers and stakeholders, with a focus on greater interoperability and long-term utility. In this plan, we also prioritize community involvement and community contributions to increase our product development capacity and the speed at which we can effectively deliver on a wider range of community needs. We will invest in our product, partnership development, and engineering teams to ensure that we are remaining informed about market dynamics, user and community needs, and community engagement.

Financial Risks

Whereas the significant unrestricted grant from the Flu Lab affords us the opportunity to accelerate efforts to sustain our mission-aligned products and services, it does not eliminate the risks with our financial strategy. Specifically, we have limited historical insights for forecasting earned revenue and philanthropic giving, as we are in the earlier stages of those programs. Success with our fee-for-service models will depend on the budget stability and investment choices of institutional customers, including universities, funders, and societies, who have their own financial challenges. A core element of our fee-for-service strategy will be to focus on renewable services, so that we can develop predictive insights with greater confidence.

Our goal of securing the same level of grant funding for the next three years comes with a couple of known risks. Although COS has demonstrated consistency in pursuing and winning grants, the precise win-rate in the coming years is unknown, so we must prepare for variability in funding in any given year, which may affect our ability to execute key roadmap initiatives. Likewise, if we have a greater-than-average win-rate, we must effectively balance the need to execute on what are frequently multi-year projects alongside more rapid, agile, and fluid

opportunities that we will prioritize across our product and service roadmaps. The mitigation strategy for this second scenario is to be disciplined in aligning our grant proposal pipeline with our product, service, and community-influenced roadmaps with wide attention to private and public funding sources to identify well-aligned opportunities.

Operational Risks

The risks for operations relate to technology investment, the OSF and related products' growth trajectory, and staffing. With regard to technology investment, known risks include:

- the pervasive challenge for any technology organization to address technical debt and design for less technical debt in the future; a commitment to supporting the entire research lifecycle through infrastructure solutions requires modularized solutions and highly effective management of future community contributions;
- increasing security challenges, especially for open infrastructures, which will require greater collaboration with open communities for effective solutions to minimize risks;
- competition with commercial organizations who may be able to leverage resources on a different time horizon.

The OSF has experienced non-linear growth in adoption since its inception. We also have to plan for greater usage and growth in adoption than anticipated and understand the impact on our cost structure and capacity to support otherwise welcomed success.

Lastly, the global demand for engineering and technical talent remains high. COS competes with national and international companies for its technical staff, with recruitment sometimes lagging as a result of this competitive market. We will benchmark compensation, provide career growth and professional development opportunities in support of our teams, and engage with other open source communities to strengthen our collective expertise.

Developmental Risks

Two key developmental risks relate to our commitment to greater community involvement and to our ongoing commitment to take an inclusive, systems approach to culture change. We recognize the need to establish shared expectations among our community of stakeholders around matters of increasing community ownership and direct contributions across technology, norms, incentives, policy, and research. The next couple of years will require thoughtful planning and organization to establish active and effective community engagement.

Our systems approach to culture change frequently reveals that, while there are a number of systemic barriers to open scholarship, there also exists idiosyncratic needs within communities that can make it challenging to prioritize or enact impactful intervention strategies. We will be conducting more landscape analyses and community assessments to better understand the challenges and opportunities for any given stakeholder or community. Alongside ongoing evaluation of our theory of change and greater community involvement, we will seek a balance between systemic solutions and community-specific ones.

Reputational Risks

Based on the external research conducted by the MoreBrains Cooperative, COS is recognized among a range of stakeholders across the open scholarship landscape as a respected, collaborative organization that has been effective in coordinating agents toward a shared vision. The primary reputational risk to anticipate and address involves any perceived conflict between scaling our earned revenue activities alongside our policy advocacy efforts. We will strive to be transparent with our business models, so that prospective and existing partners and stakeholders can evaluate the congruity of our goals for mission advancement and sustainability.

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Appendix: Department-Level Vision, Strategy, and Priorities for 2022 - 2024

This section is organized by department to summarize the research these teams conducted in preparation of the strategic plan and to articulate the department-level vision, strategy, and priorities.

Development

Description of key activities and review of major achievements

Since 2019, the Development Team has expanded philanthropic revenue to bolster unrestricted funds (introduction of Benefactors group) and laid the groundwork to build a robust major gifts program to engage HNWI to invest in our mission to improve the research culture.

- Initiated in 2019 and led cross-organizational adoption in 2020 of the new instance of Salesforce (SFDC) CRM supporting philanthropic revenue growth and other organizational goals.
- Launched Benefactors annual leadership giving group in 2019
 - Increased Benefactors giving by 136% (\$29,506) in 2020
- Launched a major gifts initiative in 2020 and obtained a \$25,000 unrestricted gift
- Initiated and coordinated with the Communications and Outreach Manager to develop the inaugural 2020 Impact Report (strengthening of COS brand)
- Managed a very active grant pipeline throughout 2020 (over \$25MM) with successful renewal of the core Templeton funding (\$4.5 million)
- Ongoing efforts to refine and strengthen the COS case for support led to:
 - TED Audacious award process - advancement to Round Two (semi-finals) of TED Audacious aware process (from original cohort of 1,000 applicants)
 - Flu Lab investment of a five-year, \$18 million unrestricted grant in support of scaling theory of change to the biomedical research community.

Vision, strategy, and priorities for 2022-2024

Vision

Over the next three years, COS will focus on diversifying philanthropic revenue from individuals, foundations, and corporations aligned with our mission. A significant focus will also be on diversifying our sources of individual giving (expansion of the Benefactors leadership giving group and major gifts). Sustainability will be well-defined internally and externally (philanthropic support and earned revenue). By the end of this strategic plan, our philanthropic funding sources will be more evenly allocated across grants (philanthropic and federal), individual giving, and corporate support. In addition, we will continue to expand unrestricted funding to provide more flexibility for COS as an organization.

Priorities

We will invest resources to expand our reach into the philanthropic community, identify new donors, funders, and partners (in the U.S. and abroad, in line with our globalization efforts) who may exist outside the traditional research ecosystem but who demonstrate interest, capacity, and an inclination for supporting our work (particularly in biomedical research). This work will be dependent upon COS investing in more robust marketing and communications resources, including dedicated resources to support the Development team strategy and action plan. We will also expand donor stewardship efforts to engage COS staff and Board in the process, while developing new ways to demonstrate the impact of philanthropic investments in our mission.

Strategies

Annual Giving

- Explore potential re-engagement of individual OSF users to support COS with philanthropic giving
 - Contingent upon internal alignment around messaging
 - *Strength from Multiple Revenue Models Means Strength for Your Mission* - see [article](#).
 - OSF user data/annual giving
- Expand donor stewardship efforts to increase donor retention rates (leveraging power of SFDC)
 - 2020 donor retention rate: 28.5%. National average: 48%
- In partnership with new Marketing and Communications Director, develop new donor acquisition digital campaigns around biomedical research (disease-specific)
 - Paid social media campaigns, Google Grants/ads

Benefactors

- Continue to expand new group members outside of psychology
- Focus renewals on multi-year pledges
- Engage group to provide referrals and introductions to other possible members
- Expand donor stewardship engagement opportunities in alignment with other COS teams to leverage expertise of the group

Major Gifts

- Build a dynamic and active major gifts funnel
 - Identify, qualify, and cultivate current prospects
 - Leverage RP:CB final papers and Flu Lab investment to identify, qualify, and solicit new high net worth individuals (HNWI) capable of making 6-, 7-, or 8- figure gifts to COS.
 - Move prospects through an active pipeline with tailored engagement plans
- Continue to expand and leverage Board Development Committee (in coordination with Nominating and Governance Committee)
- Focus on biomedical research, disease specific related to cancer and Alzheimer's/Dementia

- Develop personalized stewardship plans in SFDC for each donor

Grants

- Implement new strategy (based on relationship framework) model to vet infrastructure funding opportunities
- Align grant opportunities with strategic initiatives as outline in strategic plan
- Develop metrics to determine ROI on grants (small vs. large)

Corporate Engagement

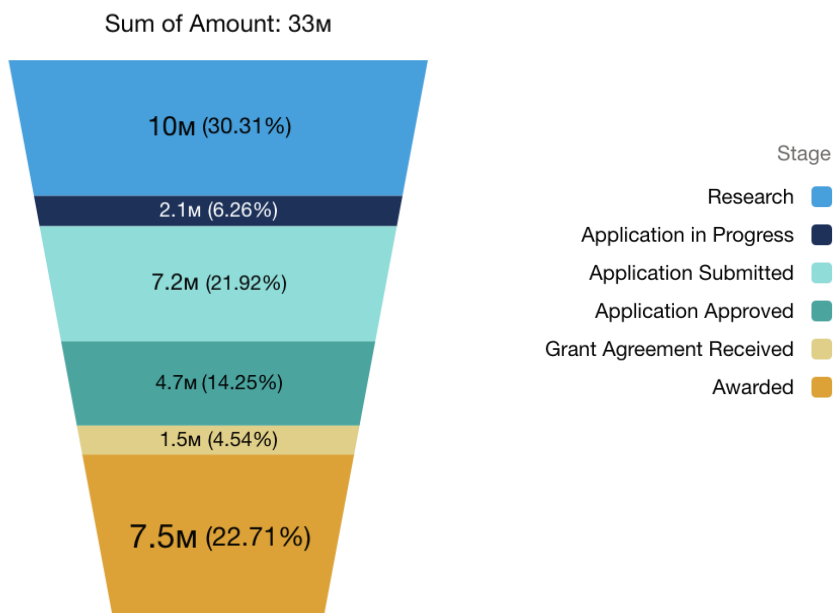
- Launch corporate engagement opportunity
 - Corporate sponsorship for key COS assets
 - Annual corporate support

Department-specific revenue projections for 2022-2024

	2022	2023	2024	Assumptions
Major Gifts	\$250,000	\$275,000	\$300,000	Early stage. Final strategy re: Flu Lab positioning will impact.
Benefactor Gifts	\$84,000	\$103,000	\$113,000	Expansion into other disciplines. Focus on multi-year pledges.
Annual Gifts	\$70,000	\$77,000	\$84,700	Focus on Newsletter subscribers only (no OSF), maintain current donor pool, and minimal expansion via donor acquisition work (2022- 2023)
Corporate Giving	\$25,000	\$50,000	\$75,000	Exploration stage. Sponsorship model for core COS assets or annual corporate support in alignment with partnerships framework.
Totals	\$ 446,803	\$ 524,164	\$ 600,188	

Grants Pipeline

<input type="checkbox"/> Stage ↑	Sum of Probability (%)	Sum of Amount	Sum of Expected Revenue	Record Count	<i>f_x</i> Avg. Amt. ↓
<input type="checkbox"/> Research	50%	\$10,000,000.00	\$1,000,000.00	5	2,000,000.00
<input type="checkbox"/> Application in Progress	60%	\$2,065,140.00	\$619,542.00	2	1,032,570.00
<input type="checkbox"/> Application Submitted	120%	\$7,231,120.00	\$2,892,448.00	3	2,410,373.33
<input type="checkbox"/> Application Approved	400%	\$4,702,056.00	\$3,761,644.80	5	940,411.20
<input type="checkbox"/> Grant Agreement Received	95%	\$1,499,173.00	\$1,424,214.35	1	1,499,173.00
<input type="checkbox"/> Awarded	800%	\$7,491,577.00	\$7,491,577.00	8	936,447.13
Total	525%	\$32,989,066.00	\$17,189,426.15	24	1,374,544.42



Department-specific expense projections for 2022-2024

- Expand Development team to support a growing philanthropic pipeline identified via individual gifts (Benefactors and Major gifts) and potentially, corporate engagement.
 - New position: Development Assistant/Manager (Donor stewardship and gift processing)
- Targeted Digital Marketing Campaigns
 - Collaborate with the new Director of Marketing and Communications to invest in external donor acquisition support
 - Extend and raise awareness about COS outside of the research ecosystem
 - Increase donor pipeline and lead generation
 - Focus on biomedical research (disease-specific)

Milestones for 2022-2024

2022

- Identify 2 new Board member prospects with relevant fundraising experience (Development Committee)
- Launch new donor stewardship program for annual donors (leveraging SFDC)
- In collaboration with the new Director of Marketing and Communications, develop and launch a donor acquisition campaign focused on biomedical research.
- Collaborate with Marketing and Communications to develop the annual Impact Report
- Identify 30 new Benefactors prospects with diversity in disciplines.

- Hold a minimum of 2 donor cultivation events (virtual and/or in person) with a focus on west coast and Charlottesville
- Finalize a COS menu of giving opportunities
- Develop personalized donor cultivation plans in SFDC for top 10 major donor prospects
- Identify two new grant opportunities (in line with organizational priorities)
- identify 5 prospective corporate partners
- In collaboration with LT, organize a corporate roundtable on open science to engage with prospective corporate partners.
- Identify two new philanthropic grant opportunities (in line with organizational priorities)
- Other Major Gift milestones (TBD once projections are finalized)

2023

- Develop and launch a 10-year anniversary campaign to highlight the impact of COS and future growth (engagement opportunity for current and prospective donors).
- Hold a minimum of 2 donor cultivation events (virtual and/or in person) targeting the west coast and possibly abroad (EU)
- Develop personalized donor cultivation plans in SFDC for top 20 major donor prospects
- Collaborate with Marketing and Communications to develop the annual Impact Report
- Identify 40 new Benefactors prospects with diversity in disciplines.
- Send two quarterly updates to Benefactors
- Identify two new philanthropic grant opportunities (in line with organizational priorities)
- Other Major Gift milestones (TBD once projections are finalized)

2024

- Hold a minimum of 2 donor cultivation events (virtual and/or in person) in the U.S. and abroad.
- Identify 50 new Benefactors prospects with diversity in disciplines.
- Send two quarterly updates to Benefactors.
- Develop personalized donor cultivation plans in SFDC for top 30 major donor prospects
- Collaborate with Marketing and Communications to develop the annual Impact Report
- Identify two new philanthropic grant opportunities (in line with organizational priorities)
- Other Major Gift milestones (TBD once projections are finalized)

Metrics for 2022-2024

Individual Gifts

Annual

- Donor retention rate %
- Breakdown of individual support by program area or project
- Average donation amount
- Number of donors
- YOY increase/decrease

Benefactors

- Total number of prospects

- Total number solicited
- Total number of new donors
- Donor retention rate %

Major Gifts

- Number of potential donors added to pipeline
- # prospects rated with medium - high inclination
- # qualified
- # meaningful connections (defined as emails, zoom meetings, invitations, and general outreach)
- # of solicitations
- # gifts closed
- Total Giving

Grants

- Win rate
 - Overall
 - By funder
 - By funder type
- Number of funders
 - Overall
 - New in FY
- New funding awarded in FY
- New funding committed in FY
- Number applications submitted in FY
 - Overall
 - By funder
 - By funder type
- Proposal ROI
 - Team time required for proposal development
 - ROI for funded proposals, but tracked for all
 - *Overall staff time ideal, but beyond scope*
- Proposal Development Time
 - Qualification to submitted proposal
- Number of new opportunities researched
- Pipeline
 - Number in stage v. target
 - % advancing to next stage
- US/International mix overlay on above
- NSF Awards
 - Panel Review Competitive Rating (over time)

Corporate

- Total number of prospects

- Total number solicited
- Total giving

Infrastructure

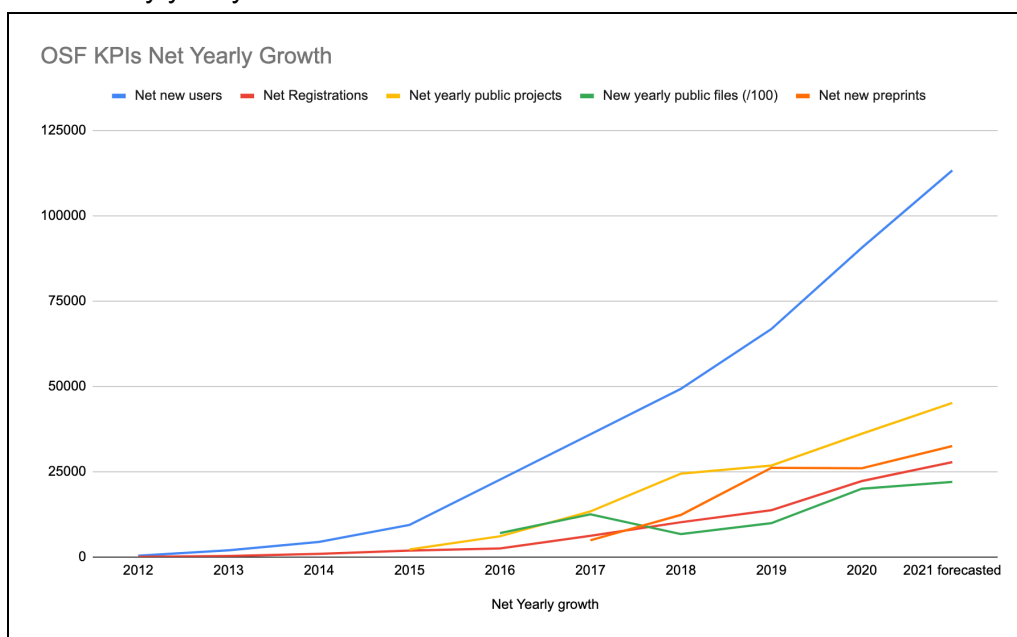
Description of key activities and review of major achievements

COS enacts its theory of change with three mutually reinforcing activities: infrastructure, policy, and research. The product and engineering teams build and maintain infrastructure to make open scholarship behaviors possible and easy through user-centered design. The infrastructure to enable open practices is designed by empathizing with the research community to lower the barrier of entry and bridge the chasm between their goal to do science well and the practical barriers that make open practices difficult to adopt.

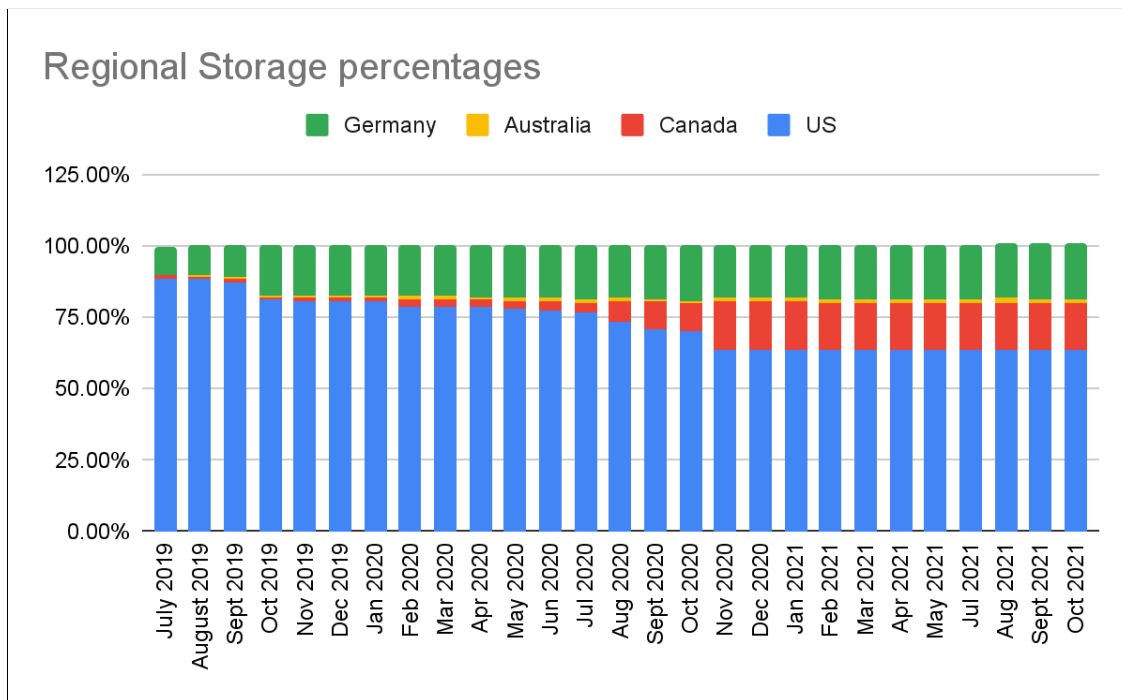
OSF is an open and freely available service that provides planning, documentation, storage, reporting, and archiving workflows and integrations across the research lifecycle. OSF interfaces are customizable, community-run services to empower communities to change themselves and shift norms toward more open and rigorous research. OSF made many advancements during the prior strategic plan period (2019-2021):

Initiative #4: Drive Growth of OSF through customer segmentation, better target marketing, promotion, and improved user interface and user experience.

1. Continued growth of the actions within the OSF that indicate adoption of open practices, indicated by yearly net totals.

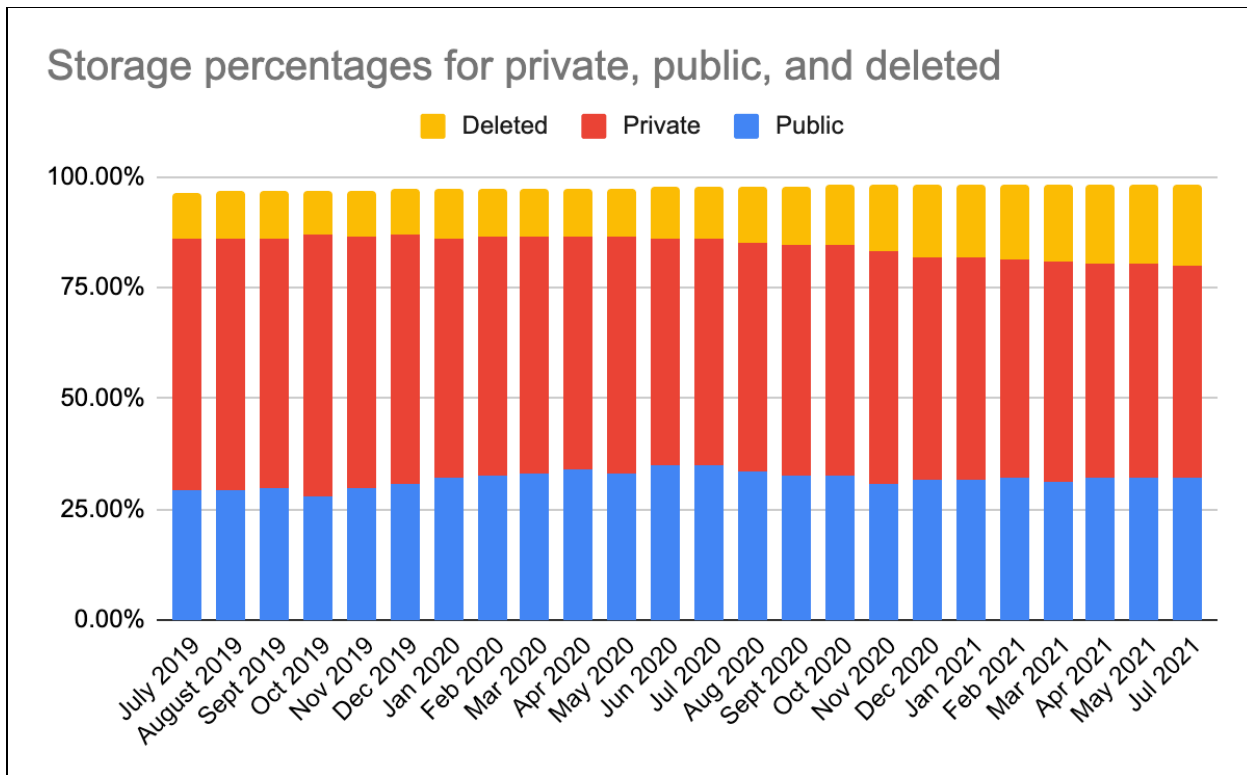


2. Increased storage across geographic regions indicates increased usage of OSF across the available regions.

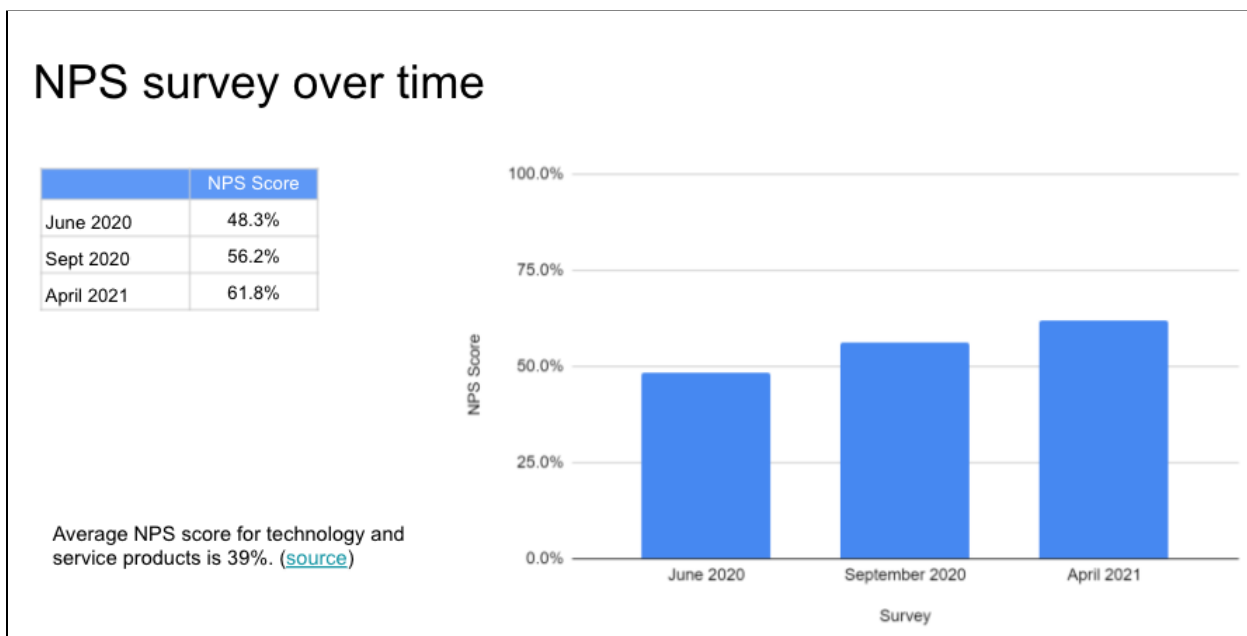


The US region currently (July 2021) accounts for 63% of the total OSF storage, down from 80% in January 2020. While the Canada region currently accounts for 16% of the total OSF storage, increasing from 1.5% in January 2020. Germany currently accounts for 19% of the total OSF storage, and holding steady at this percentage since October 2019. The Australia region accounts for 1.4% of the total OSF storage, increasing slightly from 0.9% in January 2020 with minimal growth.

Deleting permanently deleted files saves on overall total and ongoing costs for accessing files which are no longer needed. We observed a proportional increase of public storage volume and reduction of private storage, an indication of relatively more open research.



- Net Promoter Score (NPS) surveys conducted in 2020 and 2021 show an increased NPS score over time.



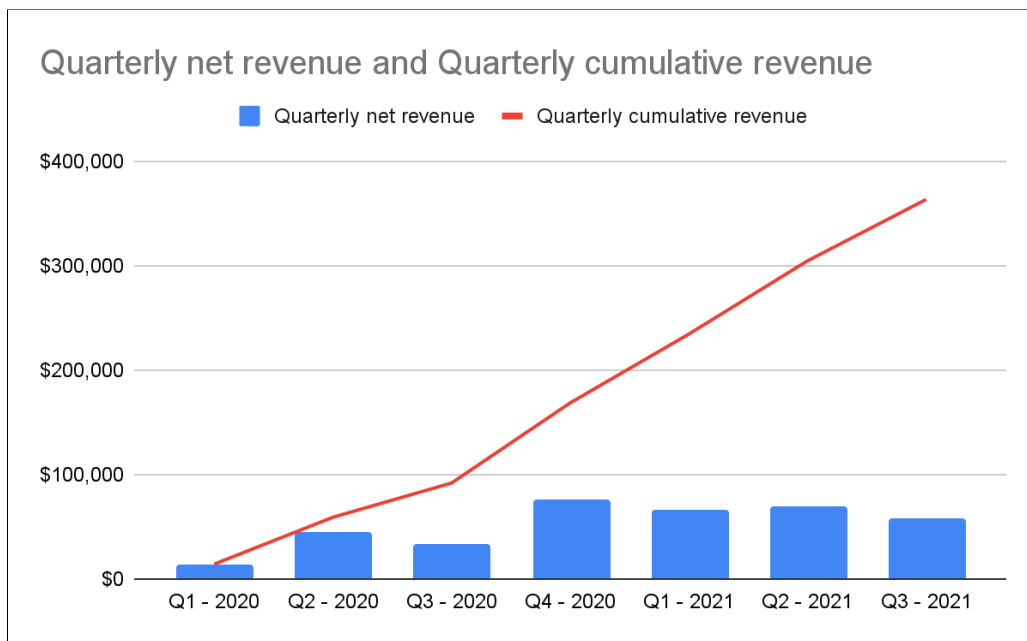
Many users of OSF report positively about their experience and promotion of the OSF to others, and there is consistent feedback about potential improvements of features and user experience.

4. OSF has been [listed as an NIH Generalist repository](#), and [recommended as a Generalist Repository on FAIRsharing](#)

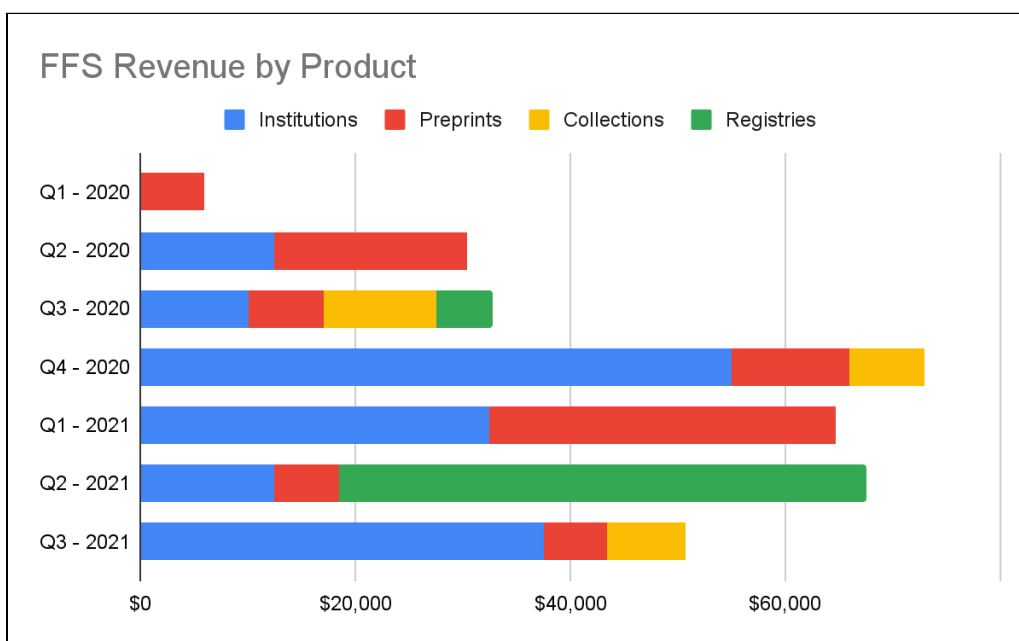
As open data becomes a requirement by funders and researchers seek to upload data to repositories to make it available openly, there is a need for infrastructure to support the workflows for data deposit, metadata annotation, access compliance, discovery of open data, and reuse of open data. OSF is an established repository for open data, with a specific solution for data that lacks a domain-specific repository.

5. Incremental improvements to the OSF workflows, features, and issues to make open practices possible and easy. Since the start of the 3 year strategic planning period (2019 to present) there have been 206 releases of new code across 8 OSF applications repositories; 85 in 2019, 71 in 2020, and 50 so far in 2021. Key releases include:
 - API for file metadata, API for group contributor management, OSF Storage caps for private and public storage, keeping up to date with Python (now on v3) and Ember (now on v5), deleting of deleted files from permanent storage to reduce storage costs, an upgrade of the CAS system to ensure secure and scalable authentication and access to OSF, and the creation of a preservation pipeline for OSF content on Internet Archive with registrations now being preserved, and SHARE reengineering to remove unnecessary components and dependency for OSF and interface discovery.
 - Registrations had many enhancements to the workflow: new view, editable metadata, streamlined submission workflow, branded registries, branded registry moderation, 'Add new' page for starting new registrations, a workflow for creating new registrations without an existing project, 'My Registrations' page, branded registry customized metadata, plus new templates for qualitative data and secondary data preregistration. New product launch with Community Operated Registries with a fee for service revenue model to ensure sustainability.
 - Preprints became integrated with Chronos to enable submission directly to journals, an updated submission workflow where authors assert any conflict of interest, available data and preregistrations, and a new workflow to allow for withdrawal of preprints through moderated and unmoderated services with tombstone metadata remaining. New provider model launch with a fee for service revenue model to ensure sustainability.
 - A new product released; Collections, allowing branded aggregation of OSF projects with customizable metadata to enable research organizations, societies, funders, and journals to make discoverable their research outputs for setting standards, enabling reuse, and tracking compliance with open policies.
 - Institutional dashboard to allow administrators insights into researcher activity on OSF, support for researchers that create accounts through SSO to bridge to login with email and password, institutional provider deactivation with preservation of affiliations to OSF content, and extension of the current One Drive integration to support OD for Business to meet institutional OSF user needs. New membership model launched with a fee for service revenue model to ensure sustainability.

6. The launch of four new revenue models occurred in the previous strategic plan. With only 6 quarters of revenue data, it is difficult to model the growth and forecast with limited data points to analyze. What we can see is that the testing of the new models has been successful, and the next step is to market and scale the product offering. For the 4 quarters in 2020 and the first 2 quarters in 2021 a total revenue of \$304,497 was generated across the four products.

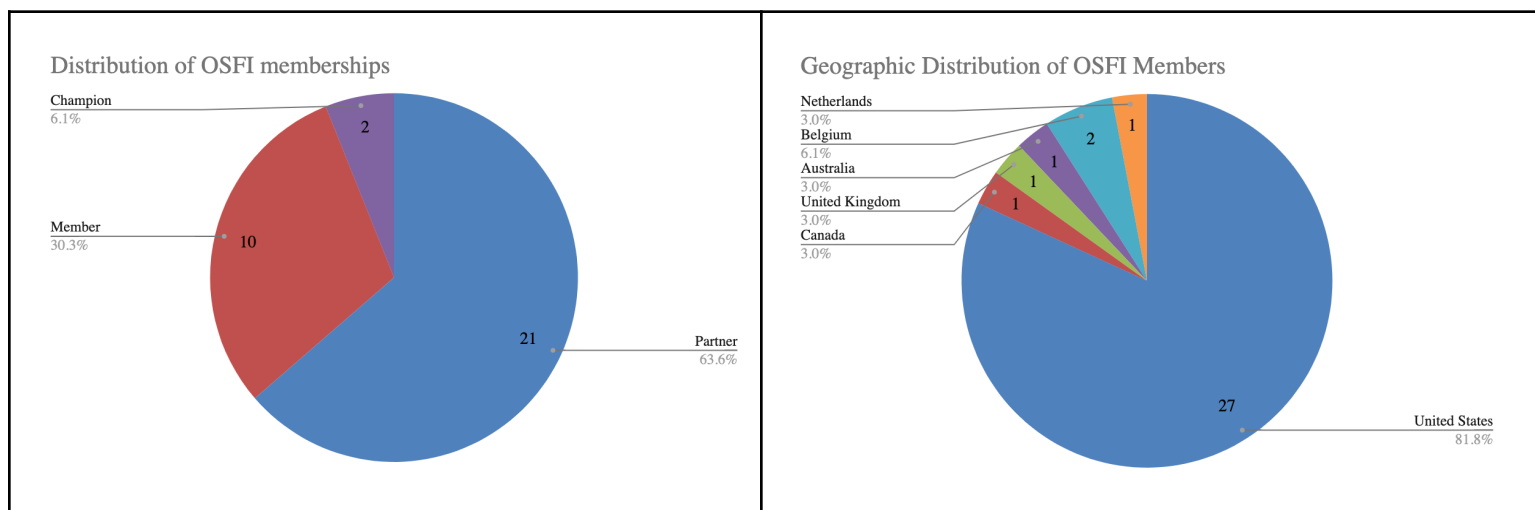


A quarterly breakdown of the FFS revenue by product:

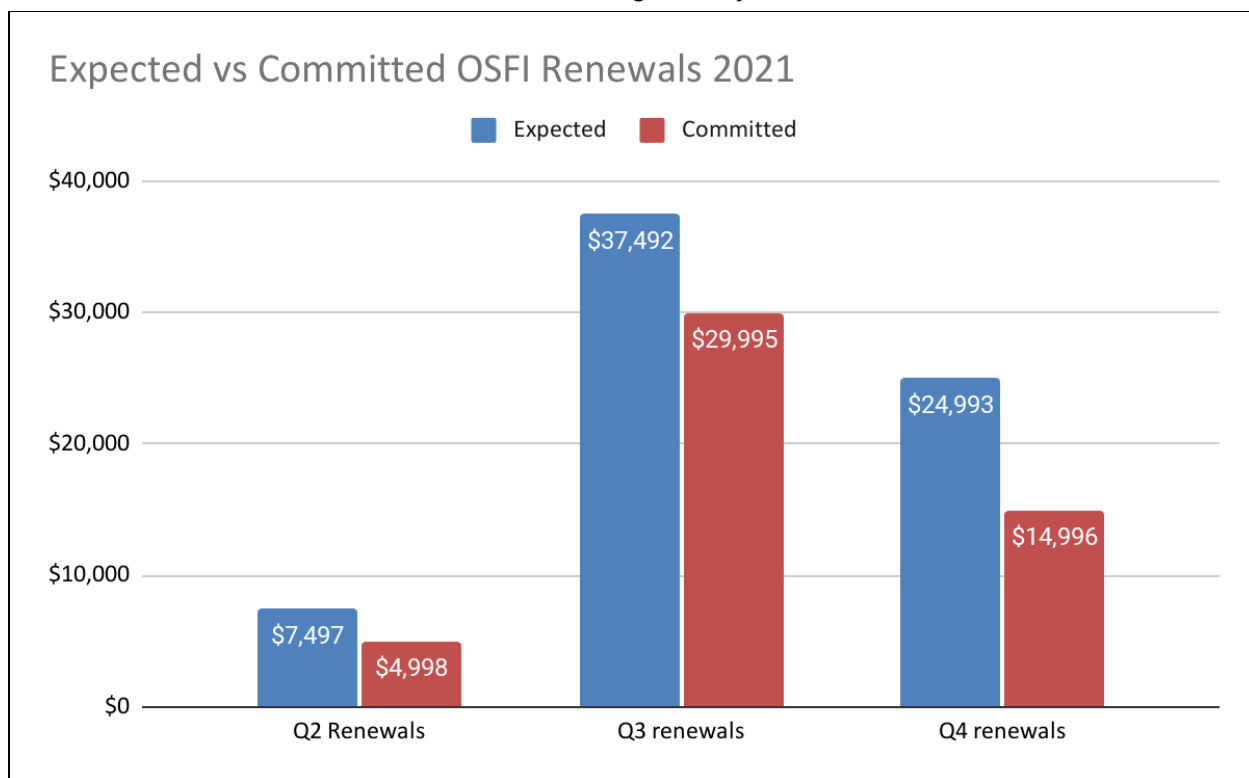


Initiative #5: Develop stronger partnerships with research universities, introducing fees for OSF Institutions

1. OSF Institutions provides an interface to institutions that connects researchers with collaborators and resources to amplify sharing, reuse, and discoverability. The business model is premised around partnering with research institutions to enable open science practices for their researchers and activity insights for their administrators. Typically that partnership is forged with the institution's library staff aimed at supporting the research data management and preservation of research outputs. COS is uniquely positioned to partner with institutions to promote adoption of open science practices via OSF and as a resource for training and building capacity for researchers on open practices. OSF Institutions was initially offered in 2015 as a free service with 63 institutions signed up by 2019. We converted to a fee-for-service model in April 2020 and 29 of those original 63 have become paying members, 12 are discontinuing their services, and 8 new institutions have become members (the delta are committed but in the paperwork process, held up with legal or security concerns, or have moved to a different OSF product).
 - a. Additionally, we identified the need for consortium memberships so that multiple institutions could sign on together at a discounted rate. We launched a consortium model in October 2020 to streamline managing agreements and invoicing for our benefit and structured discount pricing based on the number of members in the consortium for their benefit. (Note: No consortium memberships have been purchased to date, but there have been several interested.)
2. OSF Institutions (OSFI) is a tool for academic institutions. International and US institutions with moderate to high research activity are the primary segment aligned with the value proposition. Within this market, the customer audiences are the research or data librarian roles, research administrator or VP of research roles, and the academic researcher producing research within an academic institution.
 - a. Product positioning for OSF Institutions is typically to the institution's library charged with managing the digital assets of the institution's research outputs. Libraries are regularly seeking open source solutions like OSF to meet demands for transparency and simultaneously securing freedom from proprietary solutions and vendor rights to research data and outcomes. Frequently the researcher community at an institution grows and gains attention from librarian staff prompting discussion about OSFI, or direct engagement from researchers advocating for open science tools to support their workflows and finding value in using OSF and seeking OSFI membership.
 - b. The pricing structure is designed to meet institutions where they have the greatest needs to best support open practices for their researchers.
3. Since launching in Q2 of 2020, OSFI has generated \$152,463 in revenue with a total of 33 members. Members are distributed across the United States and five other countries.



- Two of the current members committed to three years upfront. Seventeen members are up for renewal between Q2-Q4 in 2021, with 76% committed to renewing their memberships for all quarters and 89% renewal for Q2 and Q3. Those renewing in Q4 have additional time, so the total renewing is likely to increase.



Initiative #6: Realign Engineering and Product Management

1. Product management is aligned within the product team, and no longer distributed across teams. The team has implemented a cohesive framework for building and marketing our product to the research community.
 - a. Our market is made up of individual researchers that identify with a discipline, research methodology, geographic region, and community and their stakeholders of funders, publishers, institutional research offices, government, and society. To better understand their barriers and obstacles, mandates and requirements, and limited resources or skills the team continuously conducts market analysis through NPS surveys and user research studies. We invite collaborative discussions with policy and research team staff with the product and engineering team as new priorities emerge and begin to be shaped into solutions.
 - b. Our user support is essential to respond to questions or issues OSF users face when working to implement open practices across their research lifecycle, but also provides useful data back into the product and engineering teams on the challenges users face. Additional resources such as help guides, instructions, videos and webinars are also leveraged to provide support to users and provide opportunities for internal teams to interface with users to better understand them to improve development of solutions.
2. The product and engineering teams have embraced and are successfully using Agile software development processes to realize increased productivity and efficiencies.
 - a. Engineering Teams have all undergone internal training on Agile Engineering and traditional project management tools that can be leveraged in Agile.
 - b. Teams have continued to iterate on engineering processes to meet individual team needs while ensuring that cross team dependencies are supported
 - c. In 2021, we have moved towards self-directed cross-functional project teams that include members from FE, BE, Services, DevOps, QA, and Product. In the future, we will continue this approach and train staff in multiple disciplines to promote interoperability.
3. Ownership- Another area where Infrastructure underwent training in the past year was ownership.
 - a. We realized that we had previously emphasised the importance of ownership without really explaining what that meant and how to do it effectively. As a result, we brought in a local coaching organization to train Infrastructure leaders on the basics and then brought a coach back to facilitate internal Infrastructure discussions for all staff on what ownership means at COS and in Infrastructure.
 - b. When moving to project teams, we took care to discuss important roles and deliverables on the team which must be owned by an individual and ensured that those roles were filled.
 - c. We will continue to emphasise the importance of ownership in the organization while ensuring that individuals are empowered to effectively own these projects.
4. Release dates, timelines- A huge amount of effort in the last three years has gone into better estimating project durations and timelines, and a significant amount of progress

has been made. The days where Infrastructure would be months late on delivery of promised/funded functionality are gone. Now, if we are late, it is a matter of days to a few weeks.

- a. Teams are now discussing tradeoffs when considering inserted requirements
- b. Analysis is being taken much more seriously to ensure that estimates are fact based and not gut feelings
- c. Project Status meetings are held at least weekly and risk mitigation is regularly discussed to identify potential risks and to deal with them wif/when they arise.
- d. In the next three years, we will maintain a focus on delivering by promised dates but will also work on improving estimated efforts to ensure that efficiency also becomes a focus.

Vision, strategy, and priorities for 2022-2024

Vision: OSF is the infrastructure for the research lifecycle that enables adoption of open and rigorous practices.

The key aspect of the vision is OSF as a tool to support research across the lifecycle. The OSF supports the steps in the process: planning, conducting, reporting, and discovery. OSF is unique among related infrastructure services by [1] being open source and maintained by a non-profit organization, [2] having a public API and a modular design that affords flexibility to integrate other tools rather than promote redundancy and lock-in to specific services, [3] maintaining an engaged community that supports development of additional tools and integrations and provides feedback to shape the roadmap, and [4] promoting transparency and sharing and also increasing research rigor and integrity.

Strategy: We enact our theory of change by providing products and services to research producers, consumers, and stakeholders to enable them to change their own community norms and individual behaviors toward greater rigor, openness, integrity, and reproducibility of research.

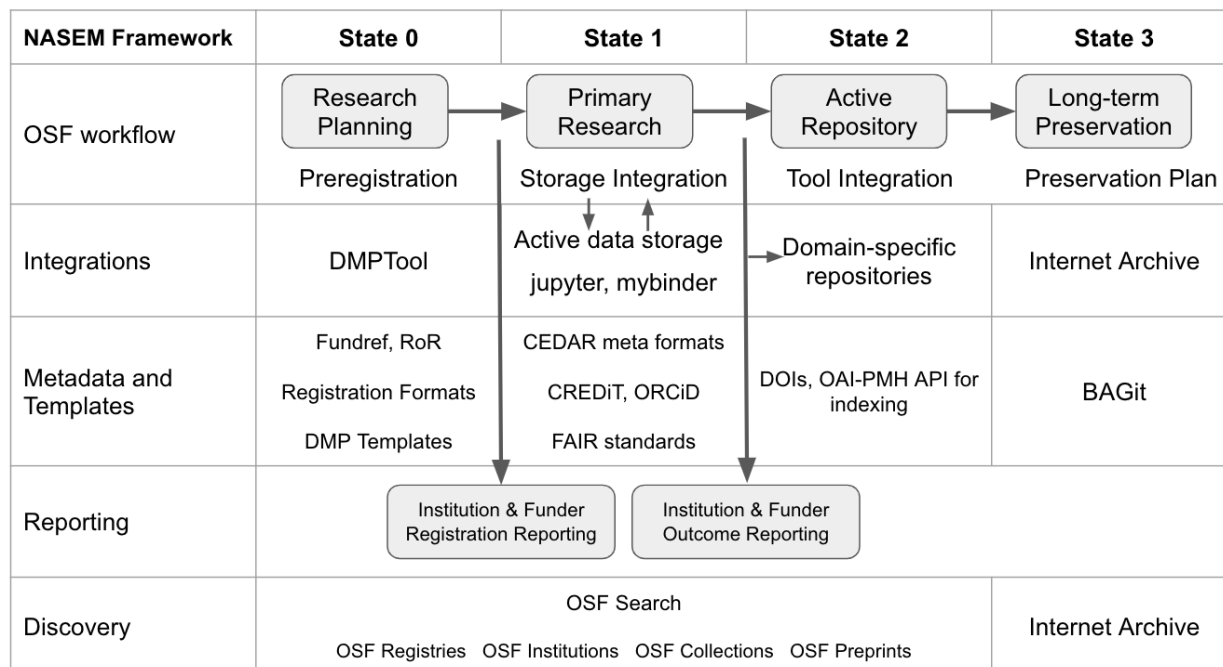
The application of our Theory of Change remains the primary strategy, with the infrastructure, through its products and services, providing the foundation of making it possible and easy for research producers to conduct more open, transparent, rigorous, and reproducible research. And, effective infrastructure should make it possible and easy for research consumers to discover, evaluate, and reuse the research outputs and outcomes produced by others.

To advance this strategy, we will focus on two parallel priority sets, one set focused on how to continue to grow and scale OSF to meet our goals for sustainability and adoption, and a second set as the roadmap for OSF to continue to advance the infrastructure to enable researchers and stakeholders to do open and rigorous behaviors.

<p>1. Reinforce the OSF as the research lifecycle in our Theory of Change, marketing to external communities and stakeholders, and communications with new users to understand the value proposition of OSF.</p>
<p>2. Increase research rigor and FAIR documentation through persuasive design. We will improve workflows for preregistration and outcome reporting and workflows for making content transparent and open. We will implement metadata standards and make them easy for researchers to use to improve FAIRness of the content shared via OSF.</p> <p>Advance rigor across all aspects of the OSF. In the workflows we implement for scholarship through preregistration and transparency, but also in the metadata required for all users and research objects on OSF. Embracing the educational and community aspects needed to richly implement metadata standards and workflows to improve rigor of OSF content.</p>
<p>3. Reduce friction in the pathways for community development. It is possible but not easy to build integrations with the OSF infrastructure. For a fully inclusive and community-driven infrastructure, we must make it easy for communities to integrate other tools supporting the research lifecycle and leverage external skills and expertise to contribute to the open codebase.</p>
<p>4. Relationship management is critical to increase sustainability. We have reached a significant threshold of partners, members, donors, partners, supporters, and users. To advance a sales and community advancement approach that puts the partner at the center, we must be efficient and effective at distributing knowledge of partner profiles, goals, activities, and needs across the organization. A coordinated web of domain experts, policy analysts, product owners, and engagement managers will be deployed creating a critical need for shared knowledge and asynchronous alignment.</p>
<p>5. COS is introducing new behaviors to the research marketplace. Training is critical to ensure that researchers know what to do, why they should do it, and how they can do it well. We will create and support a modular curriculum and collaboration with domain experts to provide training to librarians, funders, editors, reviews, and researchers. We will also improve guidance within OSF to reduce hurdles and confusion with just-in-time user support.</p>
<p>6. We will use Data Science to improve insight on user behavior and evaluate our theory of change. We will focus on the strategic questions to inform ongoing strategy and implementation decisions. We will democratize access to OSF data across the organization so that teams can ask and answer their own questions to inform their priorities, make faster data-driven decisions, and eliminate bottlenecks.</p>

The OSF priorities are articulated in our proposal to NSF Mid-scale, and summarized as:

1. Enhanced data models to support innovation. This will allow us to open pathways for community developed integrations, as well as development of priority integrations with data management and data access tools (like DMPtool, DMP Assistant, Rymedi), dynamic metadata and registration schema tools like CEDAR, and additional file storage providers to take on future storage for OSF users.
2. Distributed data and metadata to enable democratized deposit and access to OSF. Governmental, provincial, jurisdictional, and tribal requirements require boundaries on data location to protect data producers, consumers, and data participants. Furthering the current regional storage of OSF files to include metadata of files and users will enable workflows to ensure requirements and protections of data can be met.
3. Advanced metadata on OSF objects to bring FAIR principles to the research outputs to ensure it is findable, accessible, interoperable, and reusable within the scholarly ecosystem. Adding verified ORCIDiDs to help reduce spam and improve credibility of output, CREDIT to support contributor attribution, Fundref, GRID, and ROR IDs to connect research with the organizations and stakeholders supporting.
4. Computation and analysis tools and improved search and discovery. Computation and analysis of data is part of the research lifecycle, therefore should be more integrated with the other aspects of planning and reporting to share with collaborators and consumers the transparent and reproducible code, containers, models, notebooks, etc to run and verify findings.
5. Streamlined reporting to institutions and funders is or will be required to show compliance with open policies, which is an additional burden for both researchers and stakeholders until the infrastructure exists to make it possible in an automated and easy way.
6. Preservation is essential to meet FAIR principles for access and reuse by others. Continuing to advance the current preservation pipeline to support additional content types like preprints, projects, and files will ensure that research is archived.
7. Lead researchers and stakeholders to take the next action in the OSF lifecycle to support adoption of openness and rigor. Guide them through transitions and questions.
8. Tools to empower communities to set standards, moderate and curate content meeting metadata and research methodology best practices, and to enforce aligned incentives for doing open and rigorous research.

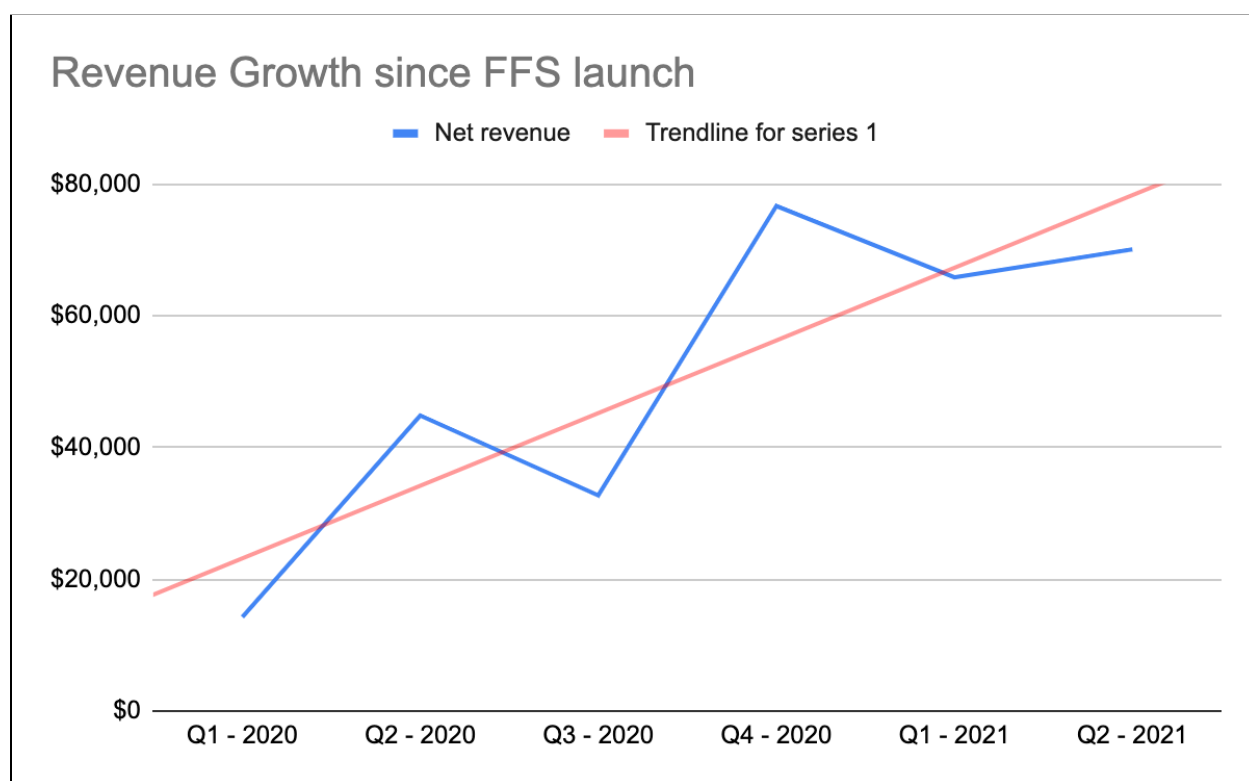


Department-specific revenue projections for 2022-2024

Product Fee for Service Revenue is driven by adoption and usage of the technology. The Key Performance Indicators (KPIs) currently tracked indicate continued growth of the actions within the OSF that indicate adoption of open practices in the yearly net increases.

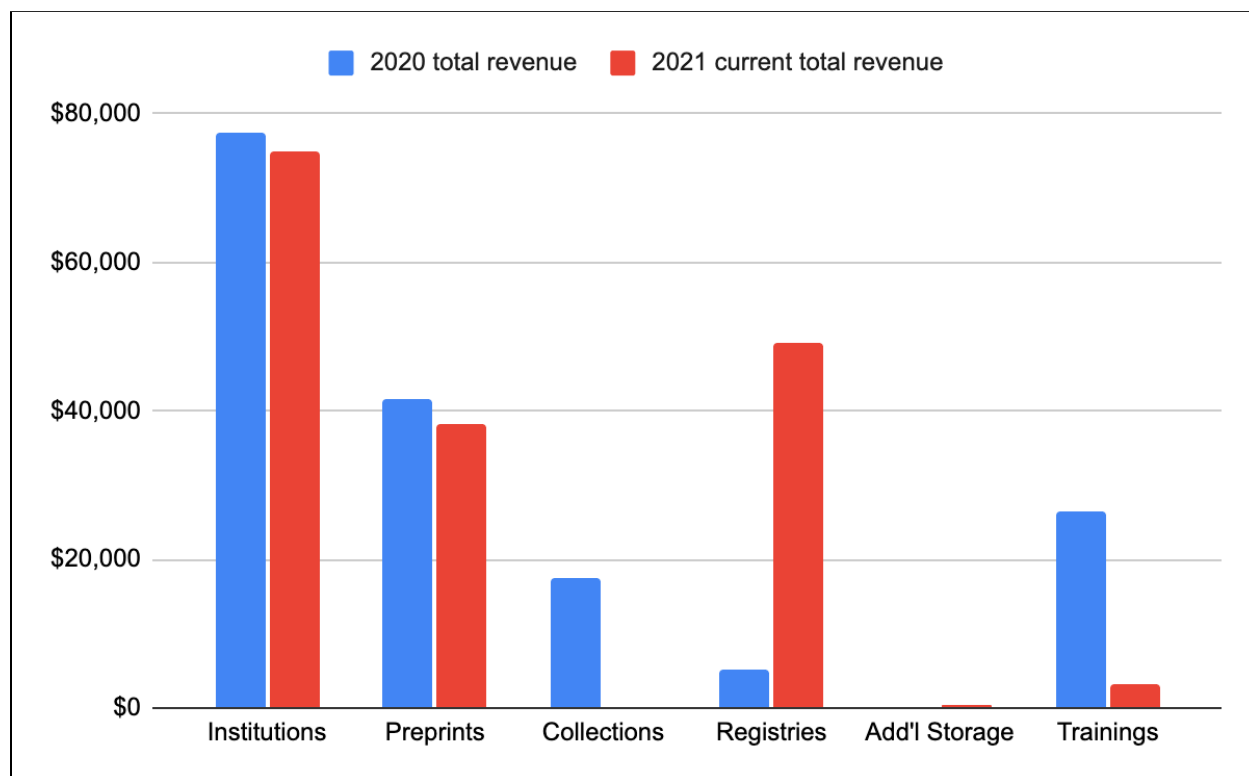
Some repositories are more transparent about their usage indicators than others. One approach to estimating usage and growth is to search Google Scholar for text that is uniquely present in the URL of links to the repositories. This gives a rough estimate of reported usage of each repository in research articles. In the table below, we searched Google Scholar constrained to one year intervals on “osf.io”, “figshare.com”, “m9.figshare”, “zenodo.org”, and “datadryad.org”. Using “figshare.com” undercounts compared with the “m9.figshare” tag that is present in the DOI and URL for much content stored on that service. The last row is the number of results returned for that search without any date constraints on the search. We presume that this differs from the summed total across years because of missing date information or other metadata idiosyncrasies. Across services, the estimates are highly correlated summing by year or searching over the entire database are highly correlated. The right columns show percentage increases over the prior year. Using this method, osf.io has grown at a much faster rate than other repositories. It is possible that other methods would reveal very different profiles about usage and impact.

Google Scholar searches	Raw Numbers					Year-on-year percentage growth				
	osf.io	figshare.com	m9.figshare	zenodo.org	datadryad.org	osf.io	figshare.com	m9.figshare	zenodo.org	datadryad.org
2012	62	45	404	18	232					
2013	87	217	1480	56	425	140%	482%	366%	311%	183%
2014	314	453	1810	163	555	361%	209%	122%	291%	131%
2015	635	753	2720	335	703	202%	166%	150%	206%	127%
2016	1830	1560	3860	652	631	288%	207%	142%	195%	90%
2017	5980	2120	6470	1140	609	327%	136%	168%	175%	97%
2018	12500	1800	7780	1930	570	209%	85%	120%	169%	94%
2019	31800	3470	10500	2950	770	254%	193%	135%	153%	135%
2020	59100	4100	13800	5410	949	186%	118%	131%	183%	123%
2021	41100	3840	11200	5120	1280	70%	94%	81%	95%	135%
sum total	112308	14518	60024	12654	5444	209%	166%	135%	183%	127%
google search total	133000	19500	67300	18400	7090	Median yearly growth				



2021 is currently on pace to generate more product revenue than 2020, with a forecasted increase of 176% (from \$182,702 of actual revenue in 2020 to \$505,606 forecasted in 2021)

and a current total in 2021 (after only 7 months) is even with all of 2020 revenue. With committed renewals, an updated forecast for 2021 anticipates \$294,669 in revenue or a 75% increase over 2020.



Setting a conservative increase of 25% for Institutions, Collections and Registries and 0% for preprints and training over the updated 2021 forecasted we get the following revenue projections for 2022-2024 with a 20% increase overall:

		2022		2023		2024
Revenue Projections	% Growth over prior year target	Target	% Growth over prior year target	Target	% Growth over prior year target	Target
Institutions	40%	\$203,062	25%	\$253,828	25%	\$317,285
Preprints	10%	\$50,269	0%	\$50,269	0%	\$50,269
Collections	40%	\$17,500	25%	\$21,875	25%	\$27,344
Registries	40%	\$67,938	25%	\$84,922	25%	\$106,152
	10%	\$13,100	0%	\$13,100	0%	\$13,100

Training						
Total Earned Revenue	20%	\$351,869	20%	\$423,994	21%	\$514,150

Setting a moderate increase of 40% for Institutions, Collections and Registries and 10% for preprints and training over the updated 2021 forecasted we get the following revenue projections for 2022-2024 with a 34% increase overall:

		2022		2023		2024
Revenue Projections	% Growth over prior year target	Target	% Growth over prior year target	Target	% Growth over prior year target	Target
Institutions	40%	\$227,430	40%	\$318,402	40%	\$445,763
Preprints	10%	\$55,296	10%	\$60,826	20%	\$72,991
Collections	40%	\$19,600	40%	\$27,440	40%	\$38,416
Registries	40%	\$76,090	40%	\$106,526	40%	\$149,136
Training	10%	\$14,410	10%	\$15,851	10%	\$17,436
Total Earned Revenue	34%	\$392,826	35%	\$529,045	37%	\$723,742

Setting an aggressive increase of 70% for Institutions, Collections and Registries and 25% for preprints and training over the updated 2021 forecasted we get the following revenue projections for 2022-2024 with a 60% increase overall:

		2022		2023		2024
Revenue Projections	% Growth over prior year target	Target	% Growth over prior year target	Target	% Growth over prior year target	Target
Institutions	70%	\$276,165	70%	\$469,480	70%	\$798,117
Preprints	25%	\$62,837	25%	\$78,546	25%	\$98,182
Collections	70%	\$23,800	70%	\$40,460	70%	\$68,782
Registries	70%	\$92,395	70%	\$157,072	70%	\$267,022

Training	25%	\$16,375	25%	\$20,469	25%	\$25,586
Total Earned Revenue	60%	\$471,572	62%	\$766,026	64%	\$1,257,688

The priorities that will impact these forecasts are:

- Development of a model for preprint to journal with additional earned revenue from journals and publishers to be in the list of available journals for preprint authors to select to submit their preprints to.
- A refocus of product and engineering effort on preprints could drive additional revenue with new preprint servers launching and continuation of those currently on the infrastructure.
- A Marketing Manager to support product campaign efforts to drive awareness, engage with customers to increase interest, and move them through the buyer journey.
- Repositioning of OSF as mentioned previously in the priorities to simplify the buyer journey and clarify the decision-making process.

Department-specific expense projections for 2022-2024

For projecting the ongoing maintenance and new development costs, 4 scenarios were considered: (1) As-is with projections based on normal growth with no changes to storage and hosting and external services, (1a) As-is with with projections based on accelerated growth and no changes to storage and hosting and external services, (2) Integrating Internet Archive as our primary storage provider to replace GCP services for OSF Storage for all current and future storage + a workflow change requiring user to select a storage provider upon project creation that will prioritize integrated options over native storage + a Keen replacement, and (3) Distributed storage and hosting + Keen replacement.

	Scenario	Assumptions
1	AS-IS with projections based on normal growth and no changes to storage and hosting and external services	* Continued effort on grant milestones at current level * Equal staffing means filling 2 BE devs, increased staffing means additional 2 dev roles
1a	AS-IS with projections based on accelerated growth and no changes to storage and hosting and external services	Continued effort on grant milestones at current level
2	IA Storage provider for all current and future storage + workflow change requiring storage provider selection prioritizing addons + keen replacement by 3/2022	* Continued effort on grant milestones at current level * Increased staffing means filling existing BE holes and additional 3 dev roles (1QA, 1BE, 1FE)
3	Distributed storage and hosting + Keen replacement	*Continued effort on grant milestones at current level Work in Y1, implementing in Y2 * Normal domestic storage and hosting growth but no future international growth in year 2

		1	1a	2	3
Year 1	Staffing	=	=	+	+
	Storage	+	+	+	+
	Hosting	+	+	=	+
	DOIs/Dues/Subs	+	+	=	=
	% Maint	=	+	=	=
	% new dev	=	-	+	+
Year 2	Staffing	=	+	=	=
	Storage	+	+	-	=
	Hosting	+	+	=	=
	DOIs/Dues/Subs	+	+	=	=
	% Maint	=	+	=	+
	% new dev	=	-	=	-
Year 3	Staffing	=	+	-	-
	Storage	+	+	-	=
	Hosting	+	+	=	=
	DOIs/Dues/Subs	+	+	=	=
	% Maint	=	+	+	=
	% new dev	=	-	=	=

Milestones for 2022-2024

OSF is the research lifecycle

- Focus our pitch and marketing efforts on the OSF research lifecycle to clarify and refocus the products from a multitude of siloed products to one core product that supports a lifecycle.
- Draw the connection between the products and the stages of the lifecycle to reduce the confusion of users and stakeholders as products that compete and overlap.
- Position OSF as a research lifecycle solution to discipline and geographic communities and partner to identify the places where adoption is aligned with standards and norms and where training and policy advocacy to publishers and stakeholders are needed.

- Conduct a market analysis to develop a model for launching the preprint to journal service (leverage current Chronos integration) across preprint providers with a forecasted revenue model.
 - Develop a plan for leveraging the new revenue to support sustainability of the preprint infrastructure. Review the current fee model and develop alternatives that put the expense where there is financial capacity with collaboration of the preprint server and stakeholder communities.
- Development and implementation of campaigns with a refocused pitch on OSF for the research lifecycle to drive adoption of OSF and promote increased growth on product earned revenues.
- Identify and implement a storage provider with lower and sustainable storage and hosting costs (INFS, Internet Archive, distributed to Institutions, etc) to reduce the COS burden to cover ongoing storage and hosting costs.
- Continue user research when implementing new features and workflows to ensure empathy with the research community and stakeholders for the infrastructure we build and maintain.
 - Represent new disciplines in each user research study
- Collaborate with policy and research teams to conduct market analysis on the priority disciplines to support new projects and improvements to OSF to enable adoption by disciplinary communities.
- Complete the current work to implement an outcome reporting workflow, and tie the lifecycle together clearly and concisely on OSF to support adoption

Advance rigor

- Develop an incremental project roadmap for combating spam with new interventions, industry standards for platform security, vulnerability controls, and system architecture.
- Increase the credibility and trustworthiness of content on OSF by implementing new measures that increase the information required for creating a new account, going beyond name, email, and password to recommending SSO or ORCID, asking for discipline, and organization (RoR ID)
- Improve the rigor of metadata on projects before they can be made public by requiring a long enough title, description/abstract, license, consent to post publicly and indexing, discipline, funder and award id (Fundref/RoR)
- Establish diverse working groups to support development of new registration templates to enable adoption of preregistration practices
- Establish a review process for new registration templates for OSF or CORs to set and ensure registration template standards

Community development

- We will enable community development by gaining a better understanding of our community's infrastructure needs and learn from our evolving and diverse user and stakeholder ecosystem to build a vision inclusive open-source infrastructure.
- In parallel we will analyze our code from the outside looking in with little experience or primers. Simply put, we know the code is complex and difficult for those outside of our

engineering team to unpack and contribute to. We will document our code and build out a roadmap for how to iteratively improve on the codebase to facilitate external contributions that support the product vision, our mission, and long-term sustainability.

- Leveraging our engaged communities, partners, and stakeholders in the process of assessing our gaps, we can ensure alignment and support with shared goals.
- Similarly we will continually engage with our current partners, the wider community, and open science stakeholders to evaluate our fee for service models and offerings to support continued growth and success.
- Identify, prioritize, estimate, and develop a roadmap of improvements to the infrastructure to enable community development. Deliver incremental improvements.
- Establish a process for communicating with communities about the development framework, for receiving community-developed contributions, for reviewing and refining community contributions, and for integrating contributions into a public repository for use or the production codebase.
- Conduct regular outreach to promote opportunities, priorities, and collaborations with the developer community to establish and foster a developer community for OSF.

Data science

- Determine metrics and data science needs across the organization as part of the strategic planning process
- Gather details on the type of data analyses necessary to answer the priority questions, frequency for reporting, and visualization/reporting formats.
- Develop our data pipeline and model approach to support the priority data to collect to generate the most beneficial analyses and reports.
- Prioritize and determine our timeline and roadmap for making incremental progress on both the data pipeline and analysis/report roadmap.
- Identify a team and project lead for both the reporting/analysis and data pipeline streams who will ensure collaboration, regular status meetings with stakeholders, and facilitate discussions when alignment or decisions are needed.
- Organizational strategy for Data Science and metrics

Relationship Management

- A cohesive organizational approach and process to align all partner activities into a shared database to capture relationships and their ongoing management.
- A defined list of activities to be considered when developing an implementation plan with partners will reduce drift and misalignment across teams and with key priorities.
- A formalized Business development process will ensure a sufficient pipeline of partnerships to support growing earned revenue and sustainability.
- Organize roles across teams to support a business development pipeline for product and service earned revenue
- Organize roles across teams to support a business development pipeline for product and service earned revenue
- Map internal expertise to enable a partner cultivation and stewardship framework

Training and Guided workflows

- OSF research lifecycle is moving beyond making it possible, and for some disciplines making it easy, but for others there is an educational component that is required. Guidance and education for those that seek to do the practices, but lack knowledge of how to do it based on best practices or with emerging standards will reduce the barrier to implementing open practices.
- Once the research lifecycle is completed, implement a guided workflow experience on OSF to lead users to take the next action in the lifecycle (regardless of starting point)
- Continue the current work to refresh the training curriculum and develop a roadmap for upcoming curriculum modules
- Within OSF increasing links to resources to help users that are unsure of responses, workflows, metadata or reporting standards, hesitant to make open or share, and the value proposition for doing open practices.
- A refreshed, modular training curriculum fills gaps for many communities and remain an offering, with disciplinary use cases, examples, and expertise infused to bridge domain gaps.
- Develop a process for community involvement with development or updates to training curriculum, new modules requests, and a network of qualified trainers that can be deployed for training workshop requests
- Develop a process to build a network of trainers, qualify them and ensure they meet a minimum standard of training knowledge, and scheduling new training workshop requests with the network.
- Collaborate across the policy, research, and product teams to gather a prioritized list of resource material needs to support adoption of open practices, develop the priority materials, and deploy resource materials within our strategies, infrastructure, advocacy, community building, and thought leadership efforts across the organization.

Metrics for 2022-2024

Sustainability and Earned Revenue

- Monthly earned revenue totals by product, with quarterly roll ups
- Country and continent distribution of FFS product customers
- *Tentative: new journals connected to preprint servers, number of preprints submitted to journals, number of preprints accepted for publication, total annual revenue from journal connections*
- Monthly storage and hosting costs, storage usage by product, private/public, deleted, and by geographic region.

OSF adoption

- Key Performance Indicators (new users, active users, new public and private projects, new registrations, new private and public files, new preprints, views, downloads.
- Disciplinary metrics for new users, projects, registrations, data, and preprints.
- Users engaging across the research lifecycle
- User and content totals for each product
- Marketing metrics: campaign performance, total new qualified leads generated, conversion rates, bounce rates

Community-developed infrastructure

- Monthly tracking of infrastructure projects to enable community development toward percentage complete
- Tracking of Community-contributed projects: new contributions, reviewed contributions, approved and integrated contributions.

Training and guidance

- Training modules developed, new module requests, trainings requested, trainings delivered (by internal staff or external network), new trainers trained

Advance rigor

- Monthly new spam for users and projects
- [FAIR metrics](#): establish metrics of OSF FAIR-ness (there are 30, so would need to prioritize and increment)

Data Science

- Status and progress on organizational Master Metrics Priority list
- Progress on data pipeline and democratized access and usage

Research

Description of key activities and review of major achievements

The research team's signature achievements and activities are large-scale replication projects including the Reproducibility Project: Psychology (Open Science Collaboration, 2015), the Reproducibility Project: Cancer Biology (Errington, Denis, et al., 2021; Errington et al., 2014; Errington, Mathur, et al., 2021), and the ongoing SCORE project for the social-behavioral sciences (Alipourfard et al., 2021). These projects serve as catalysts for engagement with substantive researchers about the challenges and opportunities to improve rigor, transparency, and replicability in their work. This occurs both as inclusive, collaborative projects that involve dozens or hundreds of researchers, and as signature research reports that attract substantial interest in the research community. They have also engaged stakeholder groups, less on the substance of the research claims and more on their implications suggesting that change is needed in the research culture of incentives and policies.

We have contributed as a research collaborator to many similar replication projects that were led by others in the research community (Bruna et al., 2017; Camerer et al., 2018; Ebersole et al., 2016, 2020; Haven et al., 2020; Klein et al., 2014, 2018; Plemmons et al., 2020; Silberzahn et al., 2018). Participation in these projects has been a highly efficient way to contribute some of COS's expertise on substance and project design and management of these large projects.

In addition to research on the state of the field, the research team has contributed empirical research evaluating the effectiveness of interventions to improve research practice and evaluation of the communities readiness for change in adopting new practices. The research team has contributed to or led projects evaluating badges for open practices (Kidwell et al., 2016), Registered Reports (Hummer et al., 2019; Nosek & Lakens, 2014; Soderberg et al., 2021), preregistration forms (Bakker et al., 2020, Haven et al., 2020), credibility of preprints

(Soderberg et al., 2020), predicting credibility (Camerer et al., 2018; Dreber et al., 2015; Forsell et al., 2019), and a lab-based intervention to improve research ethics (Plemmons et al., 2020).

Finally, the research team has contributed theoretical reviews and advances to provide vision about the opportunities for culture change (Benjamin et al., 2018; Cook et al., n.d.; McKiernan et al., 2016; Munafò et al., 2017; Nosek et al., 2012, 2015; Nosek & Bar-Anan, 2012; Nosek & Errington, 2020b; Uhlmann et al., 2020), how to understand replication and preregistration (Mellor & Nosek, 2018; Nosek et al., 2018, 2019; Nosek & Errington, 2017; Nosek & Errington, 2020a), and the state of evidence in a discipline (Button et al., 2013; Ioannidis et al., 2014; Nosek et al., 2021).

Vision, strategy, and priorities for 2022-2024

Vision: Research provides evidence for developing, testing, and revising our theory of change. Research and practice are two components of a virtuous cycle in which research provides evidence of the current state of research to inform product and policy interventions that are then evaluated to enable improvement of these interventions. The research team can also expand its metascience thought leadership and community building, particularly by embracing disciplinary diversity and making inroads into new research communities through research projects and community engagement.

Strategy: Term-limited research projects (e.g., SCORE) provide a rich resource for building and supporting the metascience research community, training researchers on open science behaviors, and serving as an R&D test bed for new products and services. For example, SCORE is a test bed for expanding and improving preregistration practices, and research with the Open Scholarship Survey (OSS) is a test bed for developing OSS as a service. Long-term research investment is needed to build upon product, policy, and organizational priorities and directions such as data science to evaluate COS's Theory of Change. Thought leadership and community-building is required to expand and understand the large research landscape by, for example, studying disciplinary similarities and differences to inform product development.

Priority activities:

- 1) Testing researcher behavior and evaluating COS's Theory of Change
 - a) Establish and mature an integrated data science strategy for supporting product, policy, and mission advancement: Support and evaluate OSF user behavior and policy adoption
- 2) Research evaluation projects
 - a) Complete SCORE core activities, author papers about primary outcomes, and make artifacts of the project openly available for further investigation and reuse.
 - i) Define and implement post-SCORE follow-up for community engagement via marketing/communications and research engagement in data (TBD)
 - b) Evaluate whether RTIs shift researcher attitudes, perceptions, and behaviors towards open science practices.
- 3) Research consulting

- a) Investigate, articulate, and implement a value proposition for stakeholders to provide research evaluation services.
 - i) Need: Organizationally distinguish the lines between research, product, and policy consulting
- b) Create a repeatable, efficient, and scalable workflow for Open Scholarship Survey (OSS) design, data collection, analysis, and reporting.
 - i) Integrate the OSS workflow with policy (e.g., funder, society) and product (e.g., institution) team relationship management with external stakeholders.
 - ii) Establish research community engagement on evolving design standards for OSS, data management, and research on aggregate data
- c) Articulate and implement a training program (in collaboration with product/policy) to advance open, rigorous, and reproducible research
 - i) Value proposition of why open science practices are necessary - especially within communities that are a priority (e.g., biomedical)
 - ii) Delivery of open science practices (e.g., OSF)
- 4) Advancing metascience
 - a) Coalesce the metascience research community with a strong interdisciplinary and global partner network, regular conferences, shared road map for metascience research, shared framework for contributing to data, and collaborations on project-specific grant funding.
 - b) Increase partnerships, particularly cross-disciplinary, to help amplify our work and to disperse the effort among the community, especially among communities we are actively building relationships across all team efforts.
 - c) Advance thought-leadership
- 5) Articulate a vision for the research team and financial strategy to sustain.

Priority research interests

- Accumulating evidence related to our theory of change model
- Evidence about effectiveness and risks of preregistration on replicability and credibility, in general and accounting for heterogeneity by discipline and methodology
- Evidence about effectiveness of journal policies for improving rigor, transparency, sharing, and metrics of assessing credibility (evaluating TOP)
- State of open science and rigor enhancing practices (e.g., landscape analysis of preregistration, data sharing) to inform strategic priorities (e.g., disciplinary beachhead)
- Evidence of impact of training on adoption of open science behaviors
- State of credibility and replicability in disciplines that support our strategic objectives and do not yet have a strong evidence base yet (e.g., SCORE for social-behavioral sciences, other projects for biomedical research)
- Evidence about culture change progress: e.g., is replicability improving in areas where we have had the greatest impact on behavior and do we know if there is correlation to our products and services?
- Evidence about TOP Factor as a norm changing strategy

- Evidence about OSF features and usage promoting rigor, transparency, credibility [and how these map onto other measurable behaviors (e.g., data sharing in research papers, OSS responses) with disciplinary differences taken into account]
- Registered Reports RCT

Risk areas and mitigation:

- It is important that we embrace that researchers identify themselves as part of specific disciplinary communities. Metascience research can not be done in only one research discipline (e.g., social psychology) with the assumption that it will translate to other disciplines or that researchers and stakeholders in other disciplines will embrace the evidence. To mitigate this risk, it is important that similar projects are done in other disciplines to increase our understanding of whether the findings translate to other communities without revision or if modifications of the interventions are needed to overcome the challenges of specific disciplines. In addition to understanding disciplinary similarities and differences this will also help us advance our missions with disciplinary specific examples, evidence, and credibility.
- There is an inherent conflict of interest in evaluating our products and services and a risk to miss other possible solutions that we could champion that would advance our mission. This is important so COS can be skeptical of our own products and solutions to ensure we are maintaining focus on advancement of our mission. To mitigate this risk, we can state our COI, engage other researchers not at COS to participate in our projects (and vice versa), implement practices to minimize any potential biases (e.g., blinding, randomization, preregistration, and testing alternative solutions/hypotheses where possible), and fostering and enabling the metascience community to evaluate the breadth of challenges and solutions independent of us.

Department-specific revenue projections for 2022-2024

Four areas of activity, each with uncertainty:

- Grants for research projects
- Assessment consulting model with OSS
- Research Consulting model for investigating effectiveness of policies and other interventions
- Training on openness, rigor, and reproducibility (note: tied to Infrastructure planning as research personnel are 'deployed')

We can generate some projections with ranges based on assumptions that, especially for consulting models, still need to be investigated. Instead of forecasts, the numbers here are articulation of baseline goals for what we think makes it worthwhile to develop these services. If our market and product analysis suggests that we cannot meet these goals for OSS and research evaluation, then we should question whether to develop those as service offerings. For training, we do not yet have belief that it could be a solid revenue generating activity, so the starting presumption is that we would pursue training efforts as a term-limited activity that either winds down or that the maintenance costs get incorporated into baseline operating costs for the organization.

	2022	2023	2024
Research grants	\$1.28M	\$500,000	\$500,000
Assessment w/OSS	\$0	\$25,000	\$50,000
Research consulting	\$0	\$25,000	\$100,000
Training	\$0	\$2,000	\$5,000
Total Revenue	\$1.28M	\$550,000	\$650,000

An organization priority would be to do an actual forecasting for the consulting services and OSS as part of developing the offering, and then update these numbers for actual budget forecasting and goal setting. A possible outcome of that forecasting is a decision not to pursue that service offering if we cannot plausibly cover operating costs. An additional aspect of this is to measure the 'conversion' of these offerings to other services and mission advancing activities (e.g., OSS associated with RTI offerings).

Department-specific expense projections for 2022-2024

Proposed core staff of Director, Deputy Director (or some related title), Data Scientist, and Project Coordinator through 2024.

Investment opportunity in:

- An OSS lead that is not the Director or Deputy Director so that the latter can focus on grants and research evaluation. Decision on this would occur after market analysis and further forecasting of required expenses.
- Data Science team: Data Analytics Engineer and Data Analyst to develop a sustainable approach to providing other teams with necessary information to conduct analyses and gather insights (e.g., KPI's of products) and to advance theory of change testing.
- A training lead, with a focus on biomedical research, to advance training opportunities on open science, rigor, and reproducibility by forming a 'bridge' from domain specific content that are currently served through academic courses to OSF specific training modules (delivered as fee for service through COS).
 - This would be a short-term investment to identify and cultivate opportunities (e.g., through graduate training programs) that can increase the value proposition (i.e., the 'why') of COS fee-for-service (e.g., OSF specific training).
- To the extent that grants are available, invest in Research Scientist and Project Coordinator roles so that Director and Deputy Director can focus on thought leadership, department vision and strategy, and developing grants and research evaluation pipelines in coordination with the Development team.

Milestones for 2022-2024

- Submit 4 research grants per year with assumption of 25% rate of success
- Complete definition of OSS product offering (in collab with other teams)
- Complete definition of Research Consulting product offering
- Publish key papers for SCORE
- Make SCORE outputs publicly available (where possible)
- Establish Metascience Steering Committee

Metrics for 2022-2024

- Grants
 - Grants submitted
 - Grants awarded
 - Grant \$ submitted
 - Grant \$ awarded
- # of OSS data collections
- # of OSS reports delivered
- # of research evaluation contracts
- Downloads of SCORE data
- Citations of SCORE papers
- Citations of RP:CB papers
- Annual conference attendance
- Number of metascience partner groups
- Metascience registry, collection, and preprint submissions

Policy

Description of key activities and review of major achievements

The policy team established three products to facilitate changing norms, incentives, and policies for increasing rigor, transparency, and openness of research: Badges to acknowledge open practices, Registered Reports, and the Transparency and Openness Promotion (TOP) Guidelines.

Badges to acknowledge open practices is a signaling mechanism to help shift norms toward open practices. The 6x journals offering badges to their authors signal to authors that they support greater transparency, and the authors that earn badges for preregistration, open data, and open materials signal to journal readers that they did the behavior. Making these desired behaviors visible within research communities can stimulate others to recognize that the actions are possible, desirable, and perhaps ones that they should do too.

Registered Reports fundamentally change the incentives for how authors earn the reward of publication. Instead of being rewarded for exciting, innovative, groundbreaking results, researchers are rewarded for asking important research questions and designing rigorous

methodologies to test those questions. With strong documentation about implementing Registered Reports and a growing evidence base for their effectiveness, more than 300 journals have adopted the format and hundreds of papers have been published, with many more in the publication pipeline.

TOP Guidelines is the policy framework to help journals, funders, and eventually institutions define their policies and practices for promoting openness and transparency of research. Developed as a community project, most major publishers have signed on as signatories to the aims of TOP and about 1,000 journals have taken proactive steps to incorporate TOP into their policies.

We have advanced the next phase of TOP, TOP Factor, as a method to increase the visibility of journal policies, evaluate variation across communities and disciplines, and to promote normative pressure on slow acting journals to increase their standards. So far, 1,094 journals have been scored on the TOP Factor rating system and are searchable through an initial interface ([topfactor.org](https://osf.io/jn3we/) see summary stats here <https://osf.io/jn3we/>). This work sets the stage for scaling up TOP Factor as an intervention strategy for promoting policy change, and to maximize the visibility of policy change as part of the overall strategy for changing the research culture.

Since founding, the policy team has provided support to stakeholder groups on thought leadership, intervention, and implementation strategy for culture change efforts in their communities. These interventions often involve coordination or matchmaking between stakeholders such as linking journals and funders to coordinate a Registered Reports campaign together. These activities are ready to mature into a defined service offering for stakeholder groups to engage COS and plan a strategy for improving their community's research culture.

Finally, through years of outreach and engagement, the policy team has established trusted relationships with dozens of funders, publishers, and society leaders. This network of relationships is useful for COS's role as a convener of change agents, and for opportunities to collaborate and coordinate on change efforts. As COS develops formal consulting offerings, there are open doors to exploring, testing, and refining those for broader dissemination.

Vision, strategy, and priorities for 2022-2024

Three areas in which Policy work can advance in coming years roughly align with COS's dual priorities, which have arisen throughout the strategic planning process. Those two areas are:

1. **Thought leadership (TOP)**
 - a. Advocacy for improvement in scientific research, informed by lessons learned through metascientific efforts. This generally includes everything under the "TOP" banner.
2. **Mission-aligned Service Offerings (Consulting or RTIs)**

- a. Providing consultations, administrative support for policy implementation (up to and including RR-Funder-Journal partnerships), and services that can be lumped under the “Rigor and Transparency Initiative” suite of activities.
3. **Community Building, Mission-Aligned Initiatives (Possible Loss Leaders)**
 - a. “*Community*” NEEDS SOLUTIONS. Webinars, Community Manager, Unconferences.

Many of the above-mentioned key activities are the result of important “Thought Leadership” activities included in TOP. However, **there is risk of stagnation** in this area because it is difficult to prioritize given the number of activities that have to occur through closely related commitments (i.e. grant deliverables, or commitments made under the worthy but distracting banner of building community). Recognition of this risk has driven recent growth in the Policy team in order to build capacity to manage and deliver such commitments. (Side note, mentioned above through commenting, is the need to mature this team through project management and ownership training).

Sustainable, Mission-Aligned Initiatives

Rigor and Transparency Initiatives for Funders

RTIs are being implemented with TWCF and with Flu Lab based on two recent grants. The varied activities that are included for these will be developed into “off the shelf” activities that we implement as invoiced services as opposed to a-la-carte grant efforts. The purpose for this shift is purely driven by team capacity, which is increasing as new team members gain experience with these efforts and those gains are less likely to be wasted if we are able to repeat similar exercises in the future.

- Establish a Registered Report Journal-Funder partnership
- Measure a defined community’s self-reported perceptions, practices, and incentives for open science activities with the Open Scholarship Survey.

Infrastructure and Product Interventions

- OSF Collections, Institutions, or Registries supported as part of community-creation initiative
 - Retrospective needed from current examples, such as URE, DARPA ASIST, Business Psychology, ISPOR, and HESI
 - Dogfooding as part of our community building- eg Metascience and RP:CB Collections
 - This needs to be logic modeled within community strategy in order to avoid “if we build it they will come” trap

Advocate Consultants

- Support a policy change of a TOP-included standard

- Incorporate preregistration into grant evaluation process (review during funding or review of completed efforts as per TOP or examples from EEF and PCORI)

Community Building, Mission-Aligned Initiatives (Possible Loss Leaders)

- Create Generic OS Educational materials
- Community Generated Resource hub (w/ or w/o incentives)
- Webinar Series
- Community Manager to monitor and engage with OS discussions, symposia, initiatives
- Unconferences
- Unspecified community-building activities

Key Risk

There is a strong need for evaluation to avoid repetitive, ineffective efforts in the above RTI and community building activities. Furthermore, better understanding of the necessary and sufficient conditions that lead to psychology-style movement is needed if we are to be successful in replicating these efforts in education research or in preclinical disease research. This obviously needs to be balanced by the struggles that result from too-rapid changing of tactics- which mirror the challenges that accrue from high team turnover. Periodic evaluation and revision on a known cadence will help team members anticipate changes. A complicating factor could be irregular RTI cadence that is not aligned with these evaluations (imagine an RTI that runs July-June of a following year, whereas evaluation and improvements occur annually in January).

Another area of focused thought needs to be activities that are not on this list (“Unspecified community-building activities”). An inclusive, highly engaged community requires some of the following items:

- Authentic and sustained engagement
- A sense of belonging or identity
- Receiving something of value from the engagement, such as knowledge or camaraderie

These items occur organically in various areas, but we have a stated desire and need to replicate such communities in additional disciplines. We don't yet know what needs to be done to catalyze or sustain new communities. The most concerted effort in COS outside of psychology is in education research, but it is unclear if that strategy includes the necessary and sufficient ingredients for success. Given the support from Flu Lab for future years of engagement in the preclinical life sciences, there is a strong need to have a strategy that each team buys into.

Thought Leadership or External Motivators for Change

There is an urgent need to define how our major policy initiatives should relate to the above-mentioned sustainability initiatives (all of which are also mission aligned). These initiatives (essentially TOP, RRs, Badges) are important parts of our reputation and impact. Activities such as maintenance of the Guidelines, expansion and improvement into areas such

as TOP for Funders, Academic Institutions, Evidence Clearinghouses, require research, relationship management, administration of steering committee(s), facilitation of steering committee(s) and the (never ending) outreach process (eg conference participation). Such tasks are necessary for Policy to continue to provide the reputational benefits, advocacy, or influence in our target communities, but are not yet tied to a sustainable strategic plan. Money for that work is (less than) half of the problem- it is more about space to relate that work alongside the activities that have reasonable chances of bringing in money.

Considering these activities as “loss leaders” may be helpful if there is enough buy-in to support that position.

Department-specific revenue projections for 2022-2024

Income through Policy is most likely to come through two channels. Administrative support of RTIs and more basic consulting (“advocate consulting”) or training/speaking/engagement activities- all of which also occur under the RTI banner, which suggests the need for simplifying our “menu of options.”

Administering an RTI generates around \$50,000 per year (conservative estimate based on Flu Lab’s 2020 support, which consisted of \$87,000 of non-pass through money for researcher awards).

Administrative Support of Funder Rigor and Transparency Initiatives

Year	Number of RTIs administered	Total Revenue
2022	4	\$200,000
2023	6	\$300,000
2024	12	\$600,000

Department-specific expense projections for 2022-2024

The current Policy team carries out three distinct yet interconnected activities: Policy advocacy (through TOP and related activities); training and intervention efforts; and grassroots community engagement. We are proposing to invest prudently in the latter two, such that we build out a more structured and scalable mechanism for offering repeatable intervention strategies and self-sustaining community action and engagement. As such, proposed staff of a Director of Intervention, Manager or Director of Training, and a Manager or Director of Inclusion and Community-Building will be considered through 2024.

This investment will address the following existing opportunities:

- An Intervention lead to partner with the Program Manager and Partnership Development Manager to research and develop repeatable services that organize and implement one

or more elements of our theory of change with two or more key stakeholders (funders, publishers, societies, institutions). Given the existing number of RTI efforts and the presumed potential of organizing additional RTI-like interventions, this position should be filled sooner in the planning cycle.

- Training occurs across the organization for OSF-specific training, general open science practices training, more advanced research training, and community-building supports. As open scholarship continues to become a matter of compliance and authentic interest across key communities, there is an opportunity for COS to be a go-to resources for a broad swath of practices but also some signature elements such as preregistration, open scholarship workflows, and data, in particular. This prospective position could reside within the Research team or fit well with the Intervention and program management team. Either way, the need to formulate a more programmatic and cohesive approach to training across COS's efforts must be addressed.
- Training and Intervention efforts will focus specifically on identifying fee-for-service opportunities.
- Finally, greater investment in formulating a model for community inclusion and community capacity-building also supports otherwise piecemealed efforts across the organization. There will be a need for a specific focus on supporting the biomedical research community.

Milestones for 2022-2024

- Complete the definition of the RTI offering, with a focus on identifying the menu of intervention offerings and a logic model that integrates systems thinking (across infrastructure and open scholarship behaviors, policy levers, evaluation, and self-sustaining grassroots efforts)
- Establish a cohesive training approach across the organization, supporting other teams through partner diagnostics to assess training needs, curating and maintaining the centralized set of resources that support various training efforts, and conducting multi-component, large scale community, or long-term training initiatives.
- Realize greater efficiency and scale of tracking policy implementation through TOP Factor
- Map and track open scholarship community networks, guiding the organization on how to engage with and connect networks to ensure greater acceleration of progress and sustainability
- Establish Policy and Intervention Steering Committee (these may become two separate committees)

Metrics for 2022-2024

Targets will be established annually.

Funder Rigor and Transparency Initiatives

- Number of funders engaging in direct support of preregistered research practices, up to and including Journal-Funder Registered Report Partnerships

- 2022: 4
- 2023: 6
- 2024: 10
- Quantity of Journal-Funder Partnerships that are administered by COS
 - 2022: 2
 - 2023: 2
 - 2024: 4

TOP Policy Implementations

- Number of scored TF journals
 - 2022: 2000
 - 2023: 3000
 - 2024: 10000
- Summary KPIs in each bin:
 - 2022:
 - 0-4: 80%
 - 5-9: 15%
 - 10-14: 3%
 - 15+: 2%
 - 2023:
 - 0-4: 75%
 - 5-9: 17%
 - 10-14: 5%
 - 15+: 3%
 - 2024:
 - 0-4: 70%
 - 5-9: 18%
 - 10-14: 8%
 - 15+: 4%
- Number of journals that indicate their TF on their pages:
 - 2022: 10
 - 2023: 50
 - 2024: 200
- Number of publishers that implement, advocate, or indicate TF as an alternative metric for their journals
 - 2022: 2
 - 2023: 6
 - 2024: 10
- Number of policies changed after editorial or publisher outreach
 - 2022: 40
 - 2023: 80
 - 2024: 100

Finance and Operations

Description of key activities and review of major achievements

Key activities of Finance and Operations is building and maintaining systems and processes that support the mission of the organization collectively, and each team individually. This includes financial stewardship, grant budgeting and reporting, human resources, contracting process (including legal review), maintaining overhead and general business management.

Major Achievements during the last strategic plan:

- *Continued maturation of the financial reporting and budgeting processes* - The new financial reporting process involves reporting to the Leadership Team on a monthly basis with individual monthly grant meetings following in the two business days after. In addition, changes were made to the budgeting process to include involving the leadership team in requesting and reviewing their team's annual budget.
- *Annual Audit* - Over the last strategic plan period, the Finance Team has continued to have successful/clean annual financial statements and single audits. This signals that the accounting and internal controls in place are working effectively. In addition, two of the three audit periods had an overall surplus resulting from strong financial planning and strategy from the Leadership Team.
- *Institution of a Pro Forma Financial Report* - During this strategic plan, the Finance team instituted a 5 year pro forma budget. This budget allows leadership members to see forecast revenues and expenses by source as well as anticipated surpluses or deficits. Also, incorporated in this pro forma, is anticipated grant wins based on conversations with funders, etc.
- *Established a scalable, efficient, Salesforce-integrated earned revenue financial management pipeline* - With the accelerated revenue growth in fee for service revenues, Finance and Operations led the integration of Salesforce and Intacct. This allows key product team members to have insight into timing of invoices and payment status while the Finance and Operations team are easily able to deliver invoices and defer revenue. This reduced inefficiencies by automating much of the process.
- *Strategically redesigned the Human Resources role* - Early in 2021, the Human Resources Specialist resigned from the organization. The Leadership Team used this opportunity to assess the current needs and anticipated growth within the organization and redesign this role. Subsequently, COS hired its first Senior Human Resources Manager. The increase in expertise and experience in this new position has provided substantial value in the areas of employee engagement, compliance, policy and recruiting.
- *Navigated COVID-19 Uncertainties* - COVID-19 drastically changed the office environment in March 2020. COS first closed its offices on March 13 and that decision remained in effect until early 2021. With the introduction of vaccines, COS reopened their offices on a limited basis with recommendations in place from the Centers for Disease Control, Governor of Virginia and Virginia Department of Health. The Senior

Human Resources Manager and Senior Business Manager have led the charge in the adjusting office policies based on these sources.

- *Supported transition to All Hands Meeting* - On March 8, 2021, the Leadership Team elected to improve the organization's intentionality about meetings and how they are managed organization wide. A piece of this involved looking at our daily stand up meetings and bi-weekly lunch talks. The LT elected to cease daily stand-ups and moved to a required all hands meeting on Tuesdays and Thursdays at 11:30am EST. The Operations Team manages this meeting as well as the calendar of speakers.
- *Improved project management of the DARPA SCORE project* - During 2021, a decision was made to transition the DARPA SCORE project to carry more operational support by moving the Program Manager to the operations team. The Program Manager has been instrumental in guiding the project from sourcing to contracting to budget management.

Vision, strategy, and priorities for 2022-2024

The vision of the Finance and Operations team is to support the overall organization by providing accurate financial information, analysis, and forecasting, human resources support to staff, and operational support in an efficient and effective manner. Overall, COS envisions a future where process, content, and outcomes of research are openly accessible by default and our team's vision and strategy provide the operational foundation to support this.

To achieve this vision, our team is committed to continuous improvement. This means constantly evaluating our structure, systems and processes to identify opportunities. Through this process, we have identified the following areas as priorities for 2022-2024:

- *Maturing Financial Sustainability* - During the prior strategic plan, the Director of Finance and Operations focused on the maturation of the annual audit, internal controls, financial reporting and budgeting processes. While this will continue to be a focal point (ex include milestones in budget versus actual reporting), the team will add a focus on maturing financial sustainability. This will involve working with the Leadership Team in reviewing our current fee for service structure, considering a consulting financial sustainability design and diversifying revenue streams. These goals will all involve carving out more room for financial modeling and scenario planning. As a final sub priority to maturing financial sustainability, the Director of Finance and Operations will work to develop financial literacy and responsibility across the organization. This will involve working with the Leadership Team and other key managers to build and understand key financial metrics, strategy and reporting necessary for decision making, benchmarking and projecting.

(Maturing Financial Sustainability)

- *Human Resource Systems* - Currently, our applicant tracking, benefits, and payroll systems do not integrate with each other. In order to efficiently and effectively on and off board employees, update employee records, complete benefit renewals, run payroll, etc, we will look at switching to a comprehensive system. This system will also include the evaluation and updating of our performance management system. This priority will be completed by the Senior Human Resource Manager with support from the Director of Finance and Operations.

(Relationship Management, Globalization)

- *Diversity, Equity & Inclusion Initiative* - During 2021, COS invested in recruiting and hiring a Senior Human Resources Manager. This position carries much more experience compared to our previous Human Resources Specialist. With this experience, along with an increased focus on allocation of funds toward improving the diversity of COS's hiring pool for open positions, it is important to assign responsibilities and evaluate metrics in order to assess effectiveness of DEI. For this strategic plan, the Senior Human Resources Manager will work closely with the Director of Finance and Operations to complete the following:
 - Develop and establish a DE&I initiative which will include determining key metrics, identifying areas of concern, designing a strategy aligned with business objectives, update policies and processes to promote DE&I and creating a plan to support ongoing evaluation
 - Establish a Diversity Committee made up of other COS staff members to bring awareness to DE&I in the workplace and review and develop policies and procedures that will promote workplace DE&I alongside the broader organizational goals (externally focused) surrounding DE&I

(Relationship Management, Globalization, Scaling Stakeholder Change)

- *Contracting* - A key priority area for the current strategic plan is obtaining in house expertise over contracting. This is pertinent for our grant, fee for service and general business activities. Our current senior business manager is enrolled in the University of Virginia's Procurement & Contracting Management Graduate Certificate program and will be working with the Director of Finance and Operations to implement a new contracts review process.

(Relationship Management, Catalyzing Community, Maturing Financial Sustainability, Institutional Change)

- *Legal Review* - Alongside the Chief Operating Officer and Managing Director, the Director of Finance and Operations will put procedures in place regarding legal review and maintain the relationship with our legal counsel. Legal review will be considered for business management, human resources, contracting, etc.

(Relationship Management, Catalyzing Community, Maturing Financial Sustainability, Institutional Change)

- *Facilities Management* - The lease agreement for the current office space in the Omni expires in April 2022. Over the final 18 months of the previous strategic plan, the Finance and Operations team navigated the Covid-19 world through adjusting remote and in person policies as warranted. In addition, during this time, COS adapted to a more distributed team with employees across the country. As we prioritize globalization, the Finance and Operations team play a key role in assessing the necessary office size in Charlottesville.

(Relationship Management, Globalization, Maturing Financial Sustainability)

- *Globalization* - A key priority of the organization is to build a global reach for mission advancement and organizational impact. Opening one or more offices in other countries may help to address this need, but there are many open questions about the operational opportunities and risks of this move. The Director of Finance and Operations will work with the Executive Director and Chief Operating Officer to assess the following areas:
 - Establishing knowledge base for working in or with new countries (e.g. establishing work visas)
 - Operational overhead costs, personnel, and effort

- Financial and accounting
- Organizational communications and rituals
- Access to new sources of revenue
- Access to new sources of personnel
- Policy engagement and influence potential
- Increases to earned revenue potential
- Personnel management

(Relationship Management, Globalization, Maturing Financial Sustainability)

- *Comprehensive Review of Organizational Policies, Programs and Procedures* -There is not a current, central system for all of the organizational assets, including policies, procedures, processes, programs or plans. Establishing a central repository and templates can help eliminate rework, streamline communications, and increase efficiency and transparency in all processes.
 - Human Resources - Reviewing all current policies and procedures will ensure compliance with local, state and federal requirements. Changes will support COS staff and leadership by providing additional guidance and clarity as well as providing a foundation for the growth and maturation of COS.
 - Program Management - Collecting and assessing documents from past projects can aid future Project Managers and Directors in avoiding rework and risks, while quickly identifying key stakeholders and efficient tracking and management processes. Creating a centralized repository of primary documentation from past projects can lead to the development of project management templates such as project plans, scope management plans, communication plans, lessons learned, risk registers, and stakeholder registers will aid future Project Managers and Directors when preparing, planning and executing future projects. This work will be completed by the Program Manager with support from the Director of Finance and Operations and the Senior Business Manager.

(Relationship Management)

Department-specific revenue projections for 2022-2024

Revenues	2022	2023	2024	Assumptions
Conferences	\$2,000	\$2,200	\$2,420	Two conferences in 2022 (STEM Unconference and Metascience 2022) and two anticipated in each of 2023 and 2024
Merchandise	\$250	\$500	\$1,000	Uncertain potential given this is a startup stream - 15% of sales to COS
Totals	\$ 2,250	\$2,700	\$3,420	

Department-specific expense projections for 2022-2024

Expenses	2022	2023	2024	Assumptions
Core Maintenance:				
Personnel	\$359,470	\$370,254	\$381,362	Assumes 1 personnel change and 3% annual escalation
Accounting fees	\$41,000	\$43,050	\$45,203	Includes audit fees and Intacct costs, assumes 5% escalation each year
Charitable Registration Fees	\$8,500	\$8,925	\$9,371	Assumes 5% escalation each year
401k and HR Fees	\$27,810	\$28,644	\$29,503	Cost is based on current systems, additional cost for new HR system net of current costs is included below
Occupancy	\$148,086	\$152,529	\$157,105	Assumes we will be in Omni with a 40% reduction in space and 3% escalation
Supplies	\$4,000	\$5,000	\$6,000	Relatively immaterial
Equipment	\$40,000	\$45,000	\$50,000	We did replace a lot of computers over the last 18 months, however, increase in headcount is driving this figure
Business Insurance	\$7,500	\$7,725	\$7,957	Assumed 3% escalation. This can change greatly based on globalization
Core Maintenance Total:	\$636,366	\$661,127	\$686,501	
Expense Requests for Priorities:				
Personnel	\$95,000	\$97,850	\$100,786	Increase Accountant to Full Time and add HR Generalist
DEI Initiative	\$25,000	\$25,000	\$25,000	Consulting, Policy Change, Legal Review
HR Systems	\$0	\$50,000	\$50,000	Analysis of HR system
Professional Development	\$15,000	\$15,000	\$15,000	Professional development for team
Globalization	\$10,000	\$0	\$0	Potential expert fees, etc
Legal	\$25,000	\$25,000	\$25,000	Contracting, Policies/Procedures
Recruiting	\$10,000	\$10,000	\$10,000	Ongoing fee for recruiting firms
Total Priority Expenses:	\$180,000	\$222,850	\$225,786	

Milestones for 2022-2024

- Contracting
 - Fall 2022 - certificate completion
 - Evaluate current fee for service contracts and general business contracts to determine if any updates need to be made
 - 2023
 - Develop contract templates for each service highlighting key areas
 - Standardized the contract process- create a repository for addendums and historic information to maintain a complete and clear audit trail of all agreements
 - 2024
 - Work with the product team to finetune fee for service contracting year over year (ie. create a structure to support future engagement quickly and effectively)
- Human Resources Systems
 - 2022
 - Assess existing systems for integration capabilities and research other system options as well as obtaining pricing comparisons and determining ability to support global workforce.
 - Begin using Zenefits performance management platform which we already have access to while other options are being evaluated.
 - Present HR Steering Committee with options to get user input before selecting a solution.
 - 2023
 - Finalize decision on upgraded/new HRIS system
 - Implement HRIS system, including training for COS staff and leadership
 - Seek user feedback to identify areas of opportunity and implement continuous improvements
 - 2024
 - Continue to evaluate whether HRIS system is meeting our needs based on growth projections and business objectives
- DEI Initiatives
 - 2022
 - Determining key metrics, identifying areas of concern, begin designing a strategy aligned with business objectives
 - Research best practices around DE&I implementation, including whether to hire a DE&I expert to consult with HR on the project
 - 2023
 - Establish a Diversity Committee made up of other COS staff members to bring awareness to DE&I in the workplace and review and develop policies and procedures that will promote workplace DE&I
 - Finalize overall strategy and goals of DE&I initiative
 - Update policies and processes to promote DE&I and creating a plan to support ongoing evaluation

- 2024
 - Continue ongoing evaluation and work with Diversity Committee
- Globalization
 - 2022
 - Determine key internal team to consider this process
 - Create goals, outcomes, etc of globalization
 - Discuss external stakeholders that could provide information in navigating the initial steps of globalization
 - Present results of analysis to LT for consideration
- Financial Sustainability
 - 2022
 - Explore consulting models
 - Work with COO/Managing Director and CPO to construct models for consideration
- Comprehensive Review of Organizational Policies and Procedures
 - Human Resources
 - 2022
 - Review and update all current policies and procedures and identify a prioritized list
 - Create new policies and procedures as needed
 - Share recommended changes with HR Steering Committee for input
 - Submit any policies requiring immediate updates to legal for review (as needed)
 - 2023
 - Submit all updated policies and employee handbook to legal for review
 - Develop communication and rollout plan
 - Identify central location for all HR policies and procedures
 - 2024
 - Create standard procedure for the ongoing development and review of HR policies and procedures
 - Program Management
 - 2022
 - Assess existing project management documents and develop clear project summary documents that centralized and links key materials for each project
 - Develop key project management templates based on assessment
 - Establish policies that lead to formal project management methodologies to improve project execution and avoid wasting resources.
 - 2023

- Create a centralized repository for past project documentation (e.g. lessons learned, issues encountered, project files, and reports)
- 2024
 - Establish a Project Management Office that is charged with governance tasks, scope activities, developing methodologies, and training and guidance for other Project Managers.

Metrics for 2022-2024

Based on the above priorities and milestones, metrics needed for the Finance and Operations team include:

Metrics for Finance:

- Continue to have clean annual audits and remaining a low risk single auditee while looking for opportunities in financial reporting and internal controls
- Collaborate with Finance Committee and Leadership Team to create unrestricted endowment
- Work with the Finance Committee to institute an investment policy statement and invest reserves in alignment with this policy

Metrics for the DEI initiative:

- Representation
- Retention
- Recruitment
- Selection
- Promotion
- Development
- Pay and Benefits
- Employee Opinion Survey questions on DE&I
 - Note: not currently broken down by demographics so would be measuring overall perceptions

Metrics for Human Resources Systems:

- Employee Opinion Survey questions on Performance Management

Metrics Comprehensive Review of Organizational Policies and Procedures

- Identification of all existing HR and PM policies and whether key policies are missing
- Based on the assessment, determine whether new policies are needed