Invest in Open Infrastructure

Governance and Sustainability Needs Assessment

The Catalyst Project: Open Cloud Collaborative Project for Latin America and Africa

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Introduction

In May 2023, Invest in Open Infrastructure (IOI) began research activities on governance and sustainability modeling for the Open Cloud Collaborative Project for Latin America and Africa (the "Catalyst Project"). Supported by CZI, this project is a collaborative effort among six partner organizations[1] to achieve four goals[2]: (1) Deploy and manage open cloud infrastructure for under-resourced communities in Latin America and Africa, (2) Create training and pedagogical content to assist others in using this infrastructure for cloud-based science workflows, (3) Build capacity for technical, pedagogical, and leadership skills within these communities, and (4) Identify a participatory service model to sustain, scale, and generalize impact for global communities. The project timeline spans from October 2022 to March 2025.

This governance and sustainability needs assessment summarizes our findings and preliminary recommendations to date. It presents initial findings around governance and sustainability elements and identifies critical elements that would benefit from collective work. Based on our interviews with project leads and desk research findings, we present a Strengths, Weaknesses, Opportunities, Threats (SWOT) analysis and a summary of emerging themes on governance and sustainability expectations for the project. We contextualize this information with our extensive desk research on models and implementations that have been used by similar open source computational services and cloud service providers.[3] We outline our next steps for the Catalyst Project, which will focus on working sessions (from October 2023 to February 2024) with project participants for co-producing governance and sustainability structure and norms for the project. This needs assessment serves to guide the next steps in governance formation for our work.

Our efforts in the Catalyst Project align closely with IOI's mission to improve funding and resourcing for open technologies and systems supporting research and scholarship. IOI works to shed light on challenges, conducts research, and works with decision makers to improve the funding and support of open infrastructure.

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[1] Partner organizations are: 2i2c, OLS, MetaDocencia, The Carpentries, CSCCE, and IOI.
[2] According to the project documentation, the project manager is currently developing a mission statement.
[3] For further details on the governance and sustainability models studied, please see the "Exploratory Research on Governance and Sustainability Practices of Cloud Computing and Open Source Computational Services."

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Findings

SWOT analysis

Based on the interviews and project document review we conducted, we have developed a SWOT analysis for the Catalyst Project. SWOT is a tool commonly used to help organizations and collaborations identify their strategic position at a moment in time. It provides a quick overview of the strengths, weaknesses, opportunities, and threats facing an organization or collaboration, given the organization's existing resources and current position and status.

We summarize findings based on the analysis of interviews and desk research on governance and sustainability practices. For details on data collection and analysis, including our analytical approach, frameworks used, key concepts, methods, and our interview guide, please review Appendix A. The current state of the project as of July 2023 is summarized below, and a more traditional SWOT analysis format is deployed in Appendix B.

Strengths reflect the diversity of partner voices and the common aims they share.
The Catalyst Project:

- involves partner organizations who have expressed interest in collaborating together and now have the chance to do so.
- targets underserved areas in Latin America and Africa.
- brings together skilled and knowledgeable partners in the open science space.
- encompasses a diverse array of partners, which cover the spectrum from infrastructure and tech support to training to community governance.
- intends to test a service that brings both cloud capacity and pedagogical materials to ensure results are scalable and replicable in different contexts.

Weaknesses reflect the lack of connection and structure between the partners and slow start-up processes that may jeopardize the good intentions.
The Catalyst Project:

- lacks accountability primarily due to the fact that funds were disbursed before activities started, resulting in partners having less motivation to produce desired results.
- lacks clarity on the timeline, responsibilities, and dependencies regarding services and activities.

- lacks clarity on decision-making approaches, with a tension between a leading organization for the project (e.g., 2i2c) versus a horizontal approach (all organizations collaborating equally).
- has resource limitations in terms of attention to partner organizations for this project; for most of them, this is a side project.

Opportunities are highly collaborative and focus on the potential outcomes of the project. The Catalyst Project:

- provides a space to foster collaborations among partner organizations for future projects.
- has the opportunity to make services scalable and available to more communities in Latin America, Africa, and other underserved parts of the world.
- has no clear competitors providing similar services in Latin America and Africa.
- has recognized emerging needs for cloud services in the research and scholarly space.
- is an opportunity to test and pilot cloud solutions in order to show their value for research communities in Latin America and Africa and therefore unlock more open science grants and resources.

Threats[4] generally highlight a lack of maturity in organizations and collaborations. The Catalyst Project:

- may bring reputational damage to both partners and project's funder if services promised are not delivered.
- may limit access to additional funding for continuing the project.
- may bring distrust among communities in Latin America and Africa if formal and informal commitments are not honored.
- may generate distrust and disagreements among partner organizations if collaboration expectations are not fulfilled.
- may bring tensions among partners in the same space because some skills are overlapping, which may lead to competition rather than collaboration in shaping the materials.

[4] During the presentation on SWOT analysis on July 20, 2023, participants noted that some threats mentioned in the report could be better framed as effects or results. Our goal was to consolidate key insights from interviews, but we acknowledge the SWOT analysis' limitations in distinguishing current challenges from potential threats.

Emerging Themes

From interviews with project participants and project documentation, we focused on studying both common narratives around goals and areas of tension due to conflicting values and expectations for the project. We also analyzed the expectations around the relationships that participant organizations hope to develop with local research communities in Latin America and Africa (as the potential users of the cloud computing services intended in the project).

Our general finding was that partners hope to develop clear structures to encourage and reward engagement. They emphasized that recruitment of local community partners needs to be prioritized and acted upon so that these voices help to shape the project. Taking these points as examples, establishing common ground across partners is a key starting point for suggesting governance and sustainability directions. Based on our findings, partner organizations share many expectations around the project. But we also identify some areas that would benefit from discussion and actions in order to reduce the gaps in expectations and produce agreements among partner organizations.

Common ground

- **Regular project meetings —** Most partners agree on the need for regular project meetings. From the recent discussions, we understand project meetings will be held monthly on the third Thursday.
- **Reporting channels —** Partners shared the need for establishing reporting channels to encourage and reward engagement.
- **Aim to trial and learn —** All partners agree this is a pilot project and proof of concept. It is an opportunity to pilot, gather feedback, test, and learn together; depending on the results, it may unlock additional open science resources.
- **Sustainability of the project depends on ongoing funding —** Partners share a common understanding that this project relies on a two-year grant and that it will not be self-sustained after two years. Questions are arising about the need for local tech infrastructure as well as social infrastructure in order to enable continuity for this work.
- **An opportunity to bridge resources to communities —** Project partners (especially 2i2c) are seen as potential connectors between funders and marginalized communities.
- **Understanding the context of communities —** Partners mentioned that the project should look for cultural competency by accurately understanding the context and needs of communities and considering that what we (the initial funded

partners) mean by partnership may differ from what our community partners want and need.

- **Onboarding process for communities —** Partners were united in their desire for a clear onboarding process that is transparent, has clear goals, documents the experimental nature of this initial project, and is co-organized to ensure that communities receive clear and consistent communication from multiple partners. Partners suggested creating memorandums of understanding (MOU) that clearly state this is an experimental pilot and that its future expansion will depend on its current success.
- **Horizontal relationships with communities —** Partners suggested that it's important to treat communities in Latin America and Africa as partners by consulting with them and including them in meetings. This will allow us to gain a full understanding of their needs and expectations.

Areas that need to be addressed

- **Recruitment of community partners —** Needs to be prioritized and acted upon so that these voices help to shape the project.
- **Handbook for onboarding communities —** Partners understand that a deliverable of the project is a document that will guide the processes for onboarding communities. At first, based on the interviews, it was unclear if the same handbook would be used for Latin America and African communities or if there would be two handbooks. We understand now that there will be a single handbook with sections for Latin America and Africa[5].
- **Tie the funding distributed concretely to the deliverables expected from each partner —** A lot of trust was demonstrated up front as 2i2c distributed funding to all partners at the start; accountability frameworks need to be implemented to make it easy for partners to demonstrate their fulfillment of work and their responsible use of the CZI funding to fuel this work. Partners suggested the project manager be the one to nurture and foster accountability among partners.
- **Clearly document the project timeline, including milestones and deliverables for each partner —** Partner organizations mentioned that the project will benefit from clarity on the timeline and deliverables from each partner.
- **Clarify responsibilities —** Some partners mentioned the urgency to have clear guidelines for who is responsible for particular products and activities. A solution suggested was to establish working groups or designate specific members to hold responsibility for specific deliverables and outcomes.

[5] This is based on Slack communication among project partners on July 3rd, 2023.

- **Increase project oversight and direction to aid in partner trust and commitment —** Some partner organizations are hesitant to dedicate resources to the project due to the lack of trust and confidence in it. They need more evidence of progress before committing further. Additionally, these partners plan to do minimal activities due to the lack of oversight from CZI.
- **Lack of clarity on the Principal Investigator (PI) role and weight in the project —** Some partner organizations mentioned that Chris Holdgraf (ED at 2i2c) did well in putting together the grant proposal. However, some have concerns about his less visible role in the project's operation and would like 2i2c to have a more active role in pushing things forward.
- **Horizontal leadership vs. 2i2c leadership —** Partners observe conflicting logic in decision-making. Although most prefer a horizontal approach, they acknowledge that 2i2c is responsible for providing the essential cloud and technical capacity for the project.
- **Can't have consensus all the time —** While many partners prefer consensus as their desired approach to making decisions, they also recognize limitations around being unable to meet all the time. Suggestions to address this problem include instituting a voting system and having one vote per organization. Others also suggested that 2i2c should have veto power since they provide most of the technical capacity[6].
- **Partner representation —** As the project develops, expectations need to be articulated and co-governed by community partners in Latin America and Africa. The project's longer-term aims (to provide tools that enable independent growth of social and technical infrastructure) can only be achieved if a balance of power is struck between the initial six partners and the community partners recruited in the project.
- **Relationships among partner organizations —** Although the project was intended as a collaboration opportunity for partners who had expressed an interest in working together, there are conflicting reports regarding expectations for the partnership. Some partners expressed concerns about the large number of partners involved in the project and have different expectations for the continuation of the relationship after the project is completed.
- **Expectations around the deployment of local cloud —** Mentioned as the second stage of the project (and outside of the scope of the grant) that will provide local capacity to communities. We encourage partners to document plans and commitments around this idea.

[6] Additional suggestions mentioned by the Executive Director of 2i2c include giving organizations the opportunity to request changes and to object and then an organization having a "final decision" veto power in the case that the group is at an impasse and we need to move forward.

Next steps

Our assessment finds the need for actions and changes in decision-making processes and vision for the project in order to improve and establish a basic collaboration structure. We recognize that this project is a learning experience for partner organizations and that collaboration processes take time to build. Still, we also notice a sense of urgency to accelerate the delivery of services in order to accomplish the intended goals in the two-year grant. Such a process should delineate clear responsibilities that hold each partner organization accountable for specific deliverables on a specific timeline.

In the second phase of our work, Governance and Sustainability Structure and Norms (Sept 2023-March 2024), we will engage with participants of the Catalyst Project to design together how the project can best move forward. Most of our recommendations will be derived collaboratively with project participants rather than being handed off in a report. Lastly, in the third phase of our work, Final Report (July 2024-December 2024), we will contribute to synthesizing major findings and learnings around governance activities and sustainability plans. See the table below for details on IOI's work phases for the Catalyst Project.

Table 1.
IOI's Work Phases

Phase	Steps	Description	Deadline
1st	Initial interviews with project leads	Interviews with project leads around governance and sustainability expectations for the project	Completed June 2023
1st	Exploratory Research on Governance and Sustainability Practices of Cloud Computing and Open Source Computational Services	Document based on desk research and analysis of open source computational services and cloud service providers	August 2023[7]
1st	Governance and sustainability needs	Document that identifies needs for the project around governance and	August 2023

[7] Document shared with project leads on July 28 and reviewed on August 24, 2023.

Phase	Steps	Description	Deadline
	assessment (*current report*)	sustainability elements	
2nd	Ongoing consultation and working sessions	To host six working sessions carefully designed to guide and facilitate the creation of the Catalyst's governance model. This requires engagement with all stakeholder groups, including communities in Latin America and Africa. We are hoping to start sessions once at least three communities per region are onboarded.	March 2024
2nd	Governance and sustainability structure and norms for the Catalyst project	Across the six highly structured working sessions (including asynchronous work between sessions), we will guide participants to co-produce the initial governance structure and norms and to design sustainability provisions for the Catalyst project resulting in a set of documented processes and policies to guide ongoing activities and decisions.	March 2024
2nd	Summary report of governance activities	A final summary report of completed governance activities, including documentation of the initial plan, changes to the plan over the course of the project, and final recommendations based on the findings from working with the project teams.	June 2024
3rd	Public CC-BY licensed documentation	IOI will contribute to producing public CC-BY licensed documentation by summarizing governance and sustainability learnings.	December 2024
3rd	Synthesis document	IOI will contribute to the synthesis document that summarizes and	December 2024

Phase	Steps	Description	Deadline
		describes major learnings of the project and our proposed next steps moving forward. IOI's contribution to such a report will be on governance and sustainability matters.	

There are a few recommendations we can already make based on the common ground that emerged from the interviews and project communications. We're grouping them here into three categories: governance, sustainability, and operations. We also identify best practices from the Summary of Governance and Sustainability Models (to be shared by the end of July 2023).

IOI will facilitate much of this work in the forthcoming working sessions. We also note below where other project partners may play a crucial facilitation role.

Governance

- **Establish clear roles and expectations now in order to enable more horizontal leadership opportunities in the future.** These partners have not all collaborated previously and this project is an opportunity for them to *build* trust and relationships that they want but do not yet have. Trying to enact a horizontal leadership model before there is horizontal trust can lead to partner frustration and disengagement. For now, clarify project structures for where and how decisions are made, what timeline the project will follow, and what expectations guide partners' individual and collaborative work[8]. Once the group has experienced success based on these initial structures, the project team can begin to broaden and share leadership among the partners.
- **Assign a leading partner for delivering services** in order to direct critical activities and outputs. Given that the principal investigator in the project is Chris Holdgraf, we propose 2i2c take that role. While most partner organizations prefer a horizontal approach in decision-making, they also recognize the primary role of 2i2c in providing the cloud capacity that is central to this project. We propose a leading partner to be defined by the end of Q3 (Sept 2023) in order to direct

[8] Based on meeting of July 20, 2023; there was a discussion on the timeline with most organizations oriented to request a no-cost extension.

activities and ensure completion of outputs[9]. Please see alternative governance models and assumptions in Appendix E.

- **Define responsibilities and target deadlines for tasks and deliverables** to enhance accountability among partner organizations. CSCCE[10] recently proposed the RACI[11] model, and we recommend that CSCCE work with the Project Manager and PI to facilitate the creation of this tool. As part of this process, the PI will likely need to request that each organization list its key tasks, deliverables, and deadlines and share this information for negotiation with the project manager by the end of July. By early August, the project manager will be able to put in place a unified timeline with accountability mechanisms to monitor activities on a monthly basis. We recommend using Monday, Asana, or another tool to help visibly track this work.
- **Enhance external accountability** in order for partners to have incentives for delivering outputs and services. We propose to keep CZI and all partners informed of activities with monthly reports beginning in August 2023 that detail what is complete, what is coming next, what is behind, and what implications any late activities have for the project partners and for the project's success. The project manager may compile such reports from the accountability tool (e.g., Monday, Asana, Trello) and then share a draft with each partner organization for feedback/corrections before submitting to CZI and all partner organizations.
- **Institute a voting system** in order to speed up the decision-making process. We propose that each organization has one vote and that 2i2c has veto power. While most partner organizations indicated that they prefer consensus in decision-making processes, in this case, they also recognized the project partners have limited synchronous time to generate consensus.
- **Inform and let onboarded communities be part of the decision-making processes** in order for the project to serve community needs. As soon as communities are onboarded, we propose to keep them informed of project activities[12] and host regular meetings for them to provide input in the design and implementation of the services intended in this project. We also strongly recommend implementing the governance working sessions IOI will facilitate only after at least three communities have been onboarded in each region so that they can have fair representation in this process.

[9] We recognize that this suggestion may need an assessment of the additional labor associated with 2i2c leading the project as a whole. Based on comments to this report, that role was not clearly considered when scoping the grant.
[10] Presented in the project meeting of June 22, 2023
[11] RACI stands for Responsible, Accountable, Consulted, Informed.
[12] By sending them monthly reports of project activities.

- Each organization should commit to following the **Principles of Open Scholarly Infrastructure (POSI)** for the activities associated with this project**.** Over the last years, the POSI tool has become increasingly important to open infrastructure providers. It assists these entities in ensuring that their actions align with the values of the open science and scholarship community. Specifically, we propose that project participants follow three focal principles:
    - Be **stakeholder governed** by including the participation of communities in Latin America and Africa.
    - Have **transparent operations** where each partner organization documents and shares information on their operations and processes associated with this project.
    - Implement **formal incentives to fulfill mission & wind-down**. Partner organizations should take responsibility for achieving the project's goals and allocate appropriate resources to accomplish them.

Sustainability

- **Nurture relationships with partner organizations** in order to deliver committed outputs and engage in future projects. This was recognized as a desired outcome for most partner organizations. Deeper engagement as a project team may help bring this recommendation to fruition; we applaud efforts by the Project Manager and others to increase communication between and among the partners, including through meetings and through slack channels.
- **For all partners to have financial accountability** by reporting back to the project team how they are using funding for committed outputs in the grant and also to report back any project work that is supported through different funding streams. This will provide the necessary grounding for understanding how much it costs to run this project and its affiliated services, which is essential for planning expansion and ongoing work in this area.
- **For the project itself to document results and learnings** in order to have a proof of concept to document results that may be used for future implementations both by this set of partners and by other groups seeking to expand opportunities for engaging in cloud infrastructures in Latin America and Africa.
- **For the project to recognize and learn from lifecycle models and other tools** describing how successful initiatives emerge and grow. This will help the Catalyst project to know where best to invest time and energy when many elements are competing for both of these scarce resources. For example, it may focus on proven areas of impact for initiatives in the FORMATION stage:

- **Vision:** Define the core problem to be addressed by the project in collaboration with communities in Latin America and Africa. This critical step will help to draft/refine the mission, vision, and values statements to guide the remaining activities in the project. We ask for the help of the project manager to guide such a process.
- **Engagement:** Host regular meetings (even if not everyone can attend!), establish subgroups, and document who is engaged (including through watching recordings when unable to attend meetings). Keeping stakeholders informed is also essential for this stage, including CZI and communities, as described in the "Enhance External Accountability" element above.
- **Financial sustainability:** assess the initial pilot pricing for services and products. So far, the project has assumed that communities in Latin America and Africa have limited financial resources to access cloud services. An assessment of the real and hidden costs of services will help partners to assess the minimal financial resources needed for the project to continue after the CZI grant finishes. Furthermore, there is a discussion regarding whether the project focuses on helping communities in Latin America and Africa to utilize commercial cloud services or to build their own clouds to implement locally.

Operations

- **Define a deadline for the project in order to plan tasks and deliverables**. This point was discussed in the project meeting on June 22, 2023. IOI, MetaDocencia[13], and CSCCE prefer to finish in October 2024. Based on the last update[14], The Carpentries would also prefer the project to end by October 2024. 2i2c and OLS prefer to end in March 2025. As other partners suggested, this date should be set as soon as possible to plan activities accordingly. The PM and PI will need to establish this detail and ensure all project partners can work within the selected deadline[15].
- **Hold monthly meetings** to discuss project updates, identify blockers, and make decisions. We ask organizations to adjust and commit to dates suggested by the project manager. Provide agendas ahead (to give room for those who cannot

[13] Based on communications from PI and PM around the project timeline up until March 2025, MetaDocencia assumed the project will end by March 2025, which is fine for them.
[14] Based on the comments from project leads to this report on July 18, 2023.
[15] From the project meeting on July 20, 2023, most partners are inclined to request a no-cost extension. This means that most activities will finish in 2024 and the first months of 2025 will be dedicated to writing final reports.

attend to weigh in pre-meeting via a shared document), record the meetings (giving a way for all project members to “attend”), and encourage the use of Slack for meeting elements that need further input or discussion. We suggest that meetings be scheduled and coordinated by the PM.

- **Establish working groups to coordinate tasks** in order to have peer accountability, begin testing shared leadership, and ensure work is completed well and on time. We suggest the PM coordinate and host meetings with the partner organizations around the four goals in the grant.

Acknowledgments and Contributors

Our thanks to CZI for providing funding for the “A Collaborative Interactive Computing Service Model for Global Communities” project.

IOI’s team members that participate in reviewing the report include Dr. Katherine Skinner (Research Lead), Kaitlin Thaney (Executive Director), and Anne Britton (Research Project Manager).

IOI is grateful to the interview participants for their time and candor. The team thanks the project manager, Tajuddeen Gwadabe, for actively participating during interviews. We welcome corrections, revisions, and suggestions regarding any and all aspects of this report.

Appendices

Appendix A. Analytical Approach

For this report, we explored governance and sustainability frameworks used in the open infrastructure space to propose guidelines for governance and sustainability aspects. We also defined key concepts to guide our common understanding of the collaborative approach planned for the project. We then conducted desk research on open source computational services and cloud service providers in order to identify models and regularites among services. Still, data from interviews with project leads is our main source of information for this report.

Governance and Sustainability Models

We reviewed and compared frameworks and models that provide guidelines on decision-making processes, governance structures, and sustainability aspects with a focus on initial or nascent initiatives, collaborations, and organizations. For our analysis, we follow an organizational life cycle approach (McCoy, n.d.; Social Impact Architects, 2019; Hager, 2018, Stevens, 2002). We focus on identifying the elements that will help the project to formalize its governance structure and eventually transition from an initial idea to a structured organization or collective. For this plan, we primarily follow and adapt the Principles of Open Scholarly Infrastructure (POSI) and Community Cultivation, a Field Guide (Skinner, 2018).

Transversal to the governance and sustainability directions, we use a collaborative network approach, leveraging and adapting guidelines from the Manager's Guide to Choosing and Using Collaborative Networks (Milward & Provan, 2006). Specifically, we document the current status of decision-making processes among partner organizations and provide recommendations to make partnerships and decision-making processes more productive for the project's goals.

Key Concepts

We identified essential concepts to guide our common understanding of governance and sustainability elements for this report. We use existing definitions and previous IOI's research on good community governance (Moore, 2022; Ravin et al., 2022). As the project progresses, key concepts are subject to be redefined by partner organizations. We aim to provide some ground and refine and include more concepts as needed for the plan:

- Collaborative governance: “An approach to public problem solving that brings stakeholders together in a neutral setting to share their views and resources to accomplish a goal.” (Johnson et al., 2020, p. 7)
- Community governance: An approach to balancing the interests of multiplicity of stakeholders by following transparency and accountability principles.
- Consensus: A decision-making process and result that focus on general agreement among participants.
- Collaborative sustainability: An approach to designing and enabling actions among stakeholders pursuing a common long-term goal.

Method and Data

We followed an iterative research process for this report that consisted of various iterations of research design, data collection, and analysis. We reviewed the governance and sustainability frameworks presented above. To gain a deeper understanding of the working of organizations and services in the ecosystem, we conducted desk research on general characteristics and specific governance and sustainability aspects of open source computational services and cloud service providers. For more details on desk research, please check the Summary of Governance and Sustainability Models (to be shared in July 2023).

For this report, we use both desk research and data from interviews conducted with project leads and participants in the project. We collected information from the six partner organizations by conducting interviews, having meetings, and collecting asynchronous input between May and June 2023. Additional data sources include email communications and brief reports shared by the project manager. Interviews and meetings were conducted/hosted by the IOI’s research team in Zoom. Interviews were recorded for note-taking purposes, and answers were anonymized in this plan.

For the interviews, we followed an interview guide designed to collect information primarily from project leads directly working on the project. Questions of the interview focused on three broader areas: (i) decision-making experiences in their own organizations, (ii) governance and decision-making expectations for the project, and (iii) sustainability expectations for the project. After each interview, we wrote a short memo which is a condensed summary of key highlights from the interview.

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Interview Guide

The guide has the purpose of structuring the data collection process. The five sections aim at identifying general and specific expectations around the governance and sustainability aspects of the project.

Questions

Section 1: Your role(s) within your organization

1. What is your role within your organization?

Section 2. Understanding the goals and expectations of your organization on the Open Collaborative Cloud Project for Latin America and Africa

2. What is your role in the Open Collaborative Cloud Project for Latin America and Africa?
3. Who else within your organization collaborates on the Open Collaborative Cloud Project for Latin America and Africa? What are their roles?
4. Would you mind briefly describing your organization's goals in the Open Collaborative Cloud Project for Latin America and Africa?
5. From the standpoint of your organization, what would success look like once the project finishes?

Section 3. Governance

6. Would you briefly describe the governance structure of your organization?
    a. How does collaborative decision-making look for your organization?
7. For the Open Collaborative Cloud Project for Latin America and Africa, what would effective decision-making look like?
8. Considering that the Open Collaborative Cloud Project for Latin America and Africa is a collaborative project between six organizations, what elements or conditions need to be considered for every organization to participate in the decision-making processes?
9. Regarding engagements with communities of practice in Africa and Latin America, what elements or conditions need to be considered to include them in the decision-making processes effectively?

Section 4. Sustainability

10. What elements and conditions must be implemented or taken into consideration to ensure the project's sustainability five years from now?
11. What minimal resources does the project need to ensure its continuity after the CZI grant finishes (in October 2024)? You can think broadly, e.g., leadership, processes, etc.
12. Now, thinking about the financial resources, how do you envision the desired funding model for the computing service model for global communities be?

Section 5. Snowballing: Governance and sustainability models

13. We are looking to identify best practices on governance and sustainability models for open cloud infrastructure. Do you have any recommendations on individuals, organizations, or initiatives providing/advocating for such services?

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Appendix B. SWOT analysis for the Catalyst Project

Strengths	Weaknesses	Opportunities	Threats
Governance • Involves partner organizations who have expressed interest in collaborating together and now have the chance to do so. **People** • Brings together skilled and knowledgeable partners in the open science space. • Encompasses a diverse array of partners, which cover the spectrum from infrastructure and tech support to training to community governance. **Service** • Targets underserved areas in Latin America and Africa. • Intends to test a service that brings both cloud capacity and pedagogical materials to ensure results are scalable and replicable in different contexts.	**Governance** • Lacks accountability primarily due to the fact that funds were disbursed before activities started, resulting in partners having less motivation to produce desired results. • Lacks clarity on decision-making approach with a tension between 2i2c leading the project versus a horizontal approach (all organizations collaborating equally). **People** • Has resource limitations regarding attention to partner organizations to this project; for most of them, this is a side project. **Service** • Lacks clarity on the timeline, responsibilities, and dependencies regarding services and activities.	**Governance** • Provides a space to foster collaborations among partner organizations for future projects. **People** • Expected to provide valuable services to unlock grants and resources in the open science space. **Service** • Has the opportunity to make services scalable and available to more communities in Latin America, Africa, and other underserved parts of the world. • Has no clear competitors providing similar services in Latin America and Africa. • Has recognized emerging needs for cloud services in the research and scholarly space.	**Governance** • May bring reputational damage to both partners and project's funder if services promised are not delivered. • May limit access to additional funding for continuing the project. **People** • May generate distrust and disagreements among partner organizations if collaboration expectations are not fulfilled. • May bring tensions among partners in the same space because some skills are overlapping and it may lead to competition rather than collaboration in shaping the materials. **Service** • May bring distrust among communities in Latin America and Africa if formal and informal commitments are not honored.

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Appendix D. POSI Principles

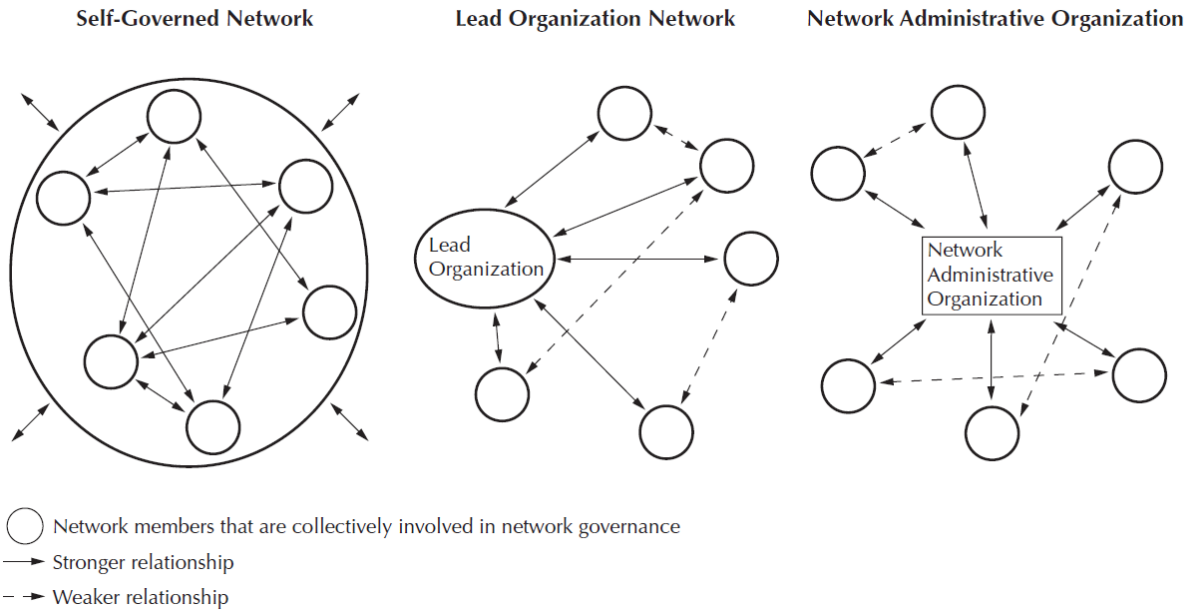
We found governance principles particularly useful for gaining transparency and accountability for the project.

POSI Principle	The Catalyst project
Governance	
Coverage across the research enterprise	
Stakeholder Governed	
Non-discriminatory membership	
Transparent operations	
Cannot lobby	
Living will	
Formal incentives to fulfill mission & wind-down	
Sustainability	
Time-limited funds are used only for time-limited activities	
Goal to generate surplus	
Goal to create contingency fund to support operations for 12 months	
Mission-consistent revenue generation	
Revenue based on services, not data	
Insurance	
Open source	
Open data (within constraints of privacy laws)	
Available data (within constraints of privacy laws)	
Patent non-assertion	

Invest in Open Infrastructure

Appendix E: Modes of Network Governance & Assessment

Image 1. Modes of Network Governance & Assessment



Description of the modes of network governance

There are three modes of network governance. The first is the self-governed network, which requires strong relationships between partner organizations and external stakeholders for decision-making processes. The second is the lead organization network, which involves a leading organization with strong connections to each partner, mediating most decisions and communications. The third is the network administrative organization, which focuses on establishing an entity with the participation of key stakeholders and is ultimately responsible for communications and decisions.

Our assessment

Right now, the horizontal model and *Self-Governed Network* is what the Catalyst Project started with. That expectation was ambitious because it requires strong relationships and full trust between every partner. We found evidence that partners on the project have limited time to build such a model while completing the large amount of work ahead in a short period of time.
More appropriately, the *Lead Organization Network* model can keep everyone aligned and engaged but provide a central point of decision-making until the trust relationships are strong enough to try again with the horizontal method.

While Milward and Provan (2006) slightly imply that mature collaborations move from left to right, for the Catalyst Project, given the limited timeframe and early partnership development stage, we propose to follow a *Lead Organization Network* model with 2i2c as the leading partner.