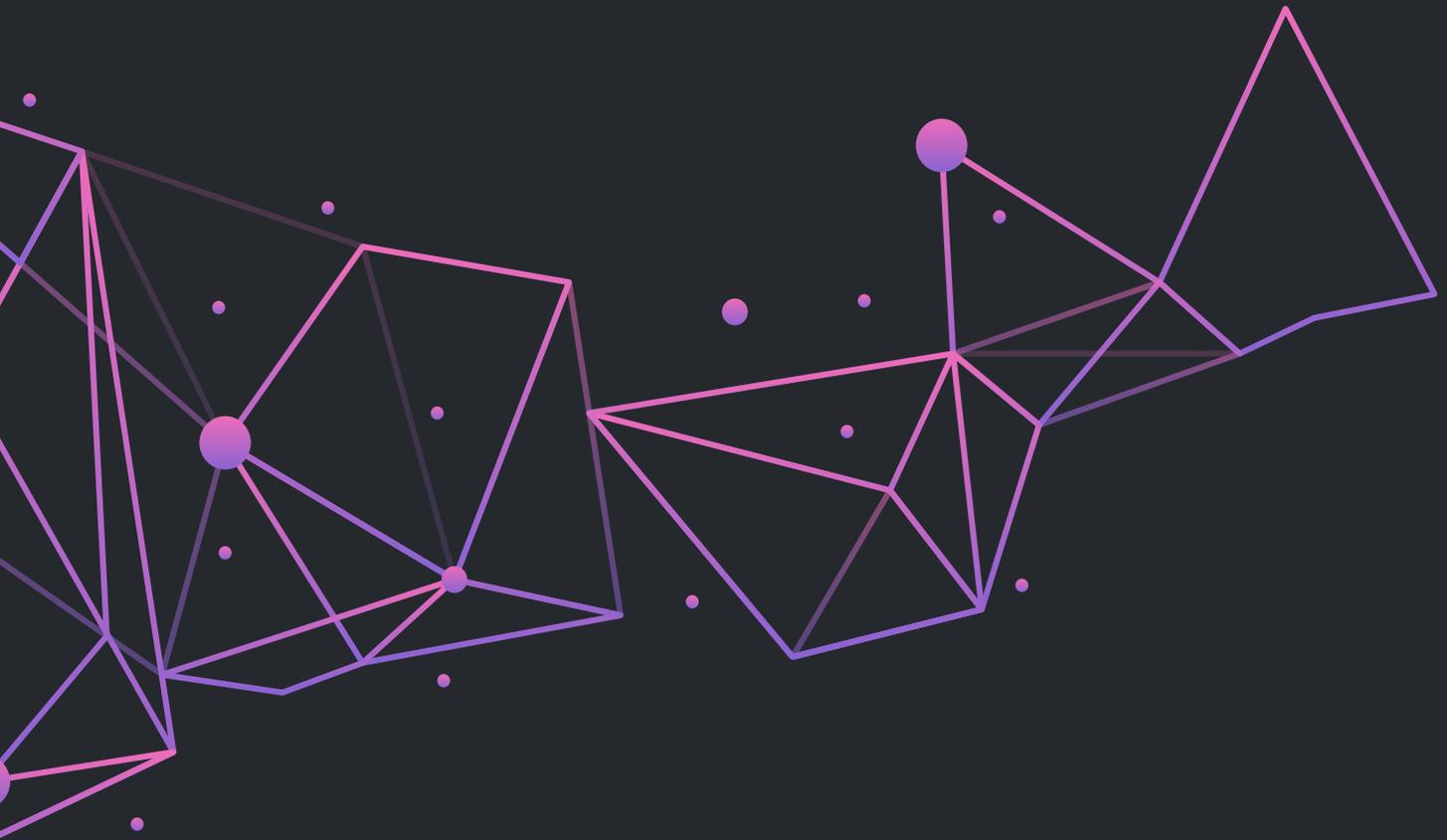




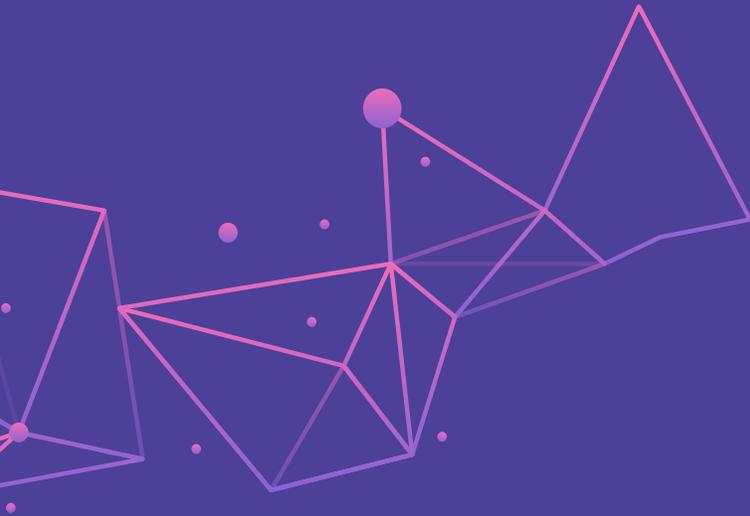
# Open Source Software in the Social Sector

Examining Barriers, Successes, and Opportunities



WRITTEN BY GITHUB WITH ♥  
WITH SUPPORT FROM THE CASE FOUNDATION

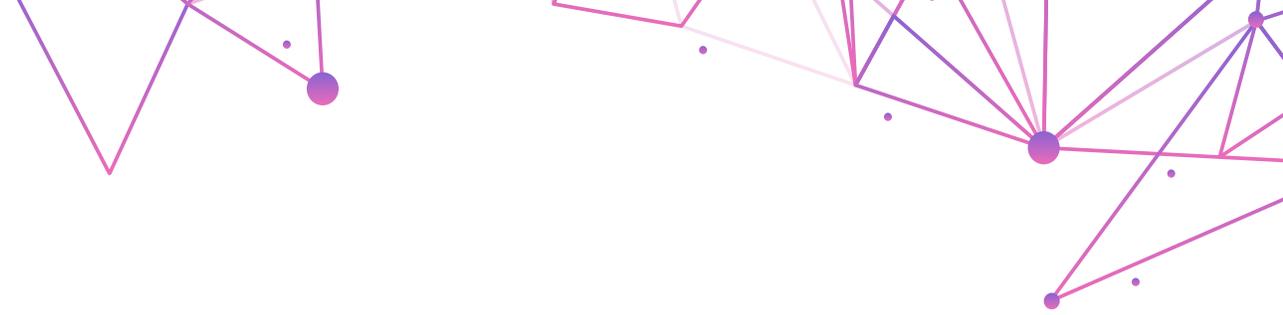




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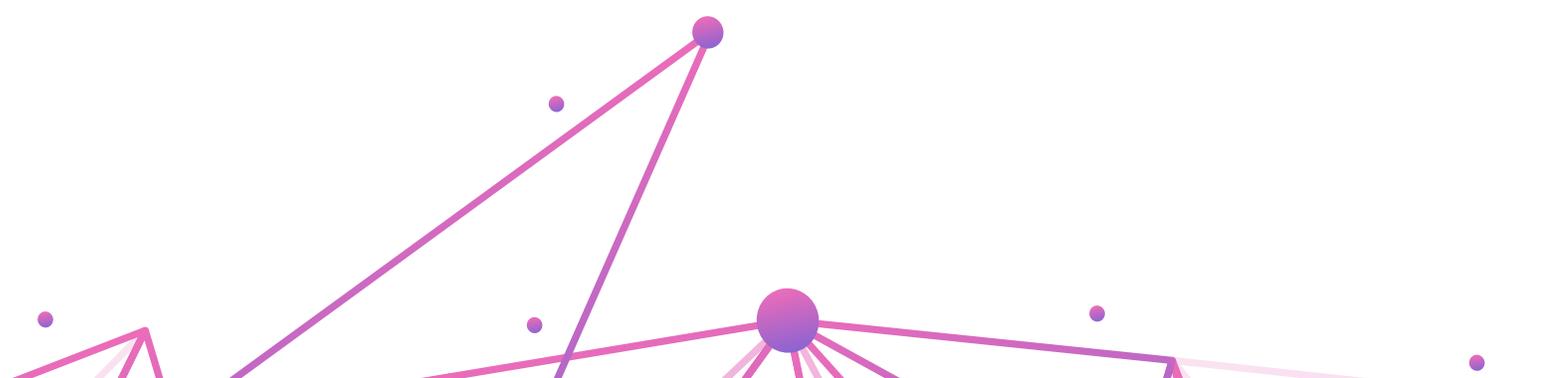
This report was written by Gina Assaf, Independent Consultant and Mala Kumar, GitHub. Contributions were made by Admas Kanyagia, GitHub and John Jones, the Case Foundation. Special thanks to Rebecca Jablonsky and Cate Johnson for their help on the research and draft writing. Thanks to Alex Kovac from Dev Design, to Benjamin Donahue, to Margaret Furr, and to Aspiration Tech for lending their expertise and network.

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# Introduction





## Quick Read

- This report is based on research undertaken by the GitHub Social Impact team and the Case Foundation on the barriers and opportunities of open source software (OSS) in the social sector.
  - It includes practical steps the social sector can take to increase its adoption of OSS, the benefits of more strongly integrating the social sector in the open source ecosystem, and actionable recommendations for **funders**, **producers**, and **consumers** of OSS in the social sector.
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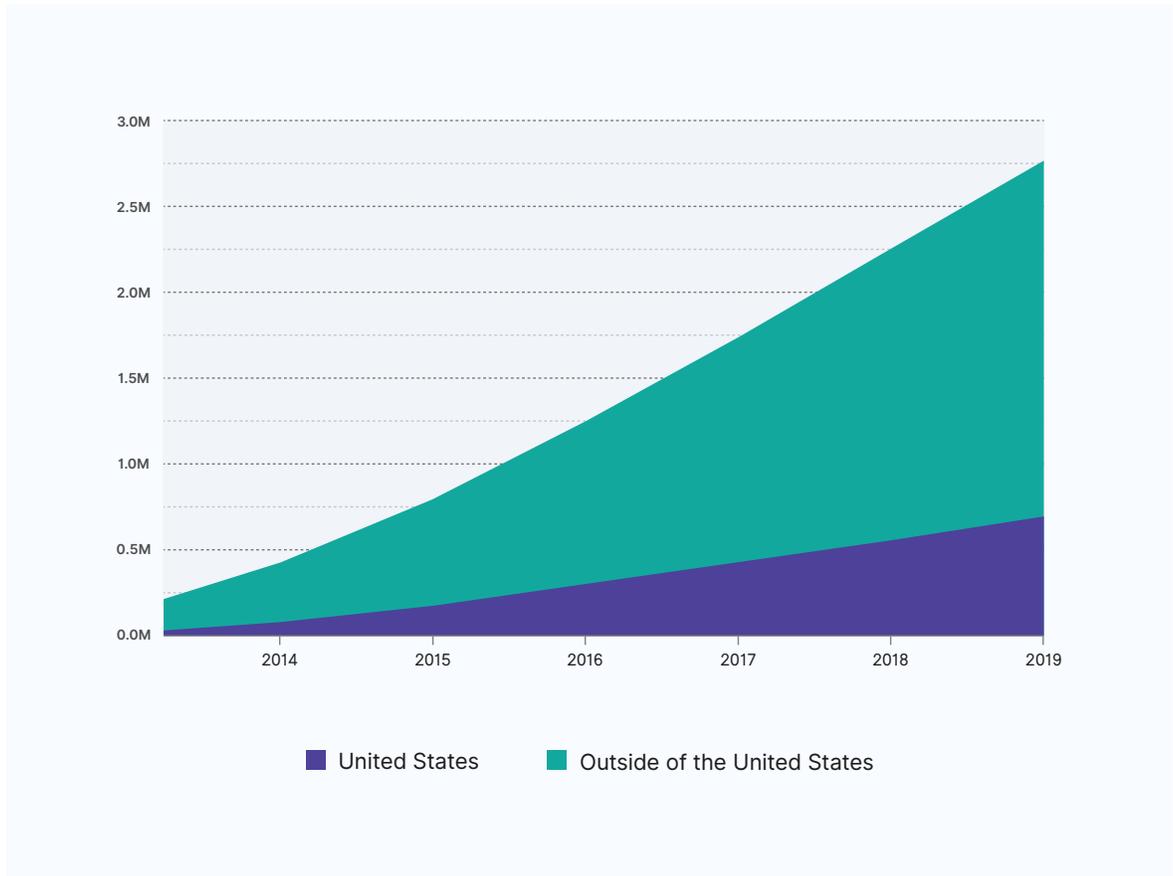
The monetary and functional value of open source software (OSS) has spurred its exponential growth. In 2019, GitHub, the global leader in OSS hosting, had 2.5+ million open source contributors, which is a more than five-fold increase since 2014. The majority of these open source contributors came from outside of the United States, with notable project and contributor growth in Nigeria, Kenya, Indonesia, Pakistan, and Turkey, among others.<sup>1</sup> As digital technology plays an increasingly central role in major industries such as healthcare, finance, retail, and civil services, adoption of OSS and open source concepts are becoming more common in commercial private sector and government technology.<sup>2</sup>

1 <https://octoverse.github.com/#where-open-source-is-growing>

2 For the purposes of this paper, “commercial sector” refers to for-profit entities that do not primarily engage with social sector causes. The social sector is mostly comprised of not-for-profit organizations (non-profits and I/NGOs). Private, for-profit companies may also be considered social sector organizations if their primary purpose is to engage with social sector causes.



**Figure 1: Total open source contributors**



In this paper, the “social sector” is defined as non-governmental organizations that have a primary purpose to actively advance or positively contribute to any pressing societal issue or challenge. International (global) development, disaster risk management and humanitarian response, public health, and human rights are major industries that comprise the social sector.

While there are U.S. domestic and international organizations that focus almost exclusively on technology for social good, most of the social sector focuses primarily on programmatic work that directly touches beneficiaries or clients.<sup>3</sup> The importance placed

<sup>3</sup> Examples of organizations that focus primarily on technology for social good: US domestic organizations - NTEN, Aspiration Tech, TechSoup, International - ITU, Inveneo, Dimagi, Ushahidi



on using technology best practices, tools, and methods—both to support programmatic work and general operations—therefore varies widely in the social sector. As this paper will cover, **OSS is one such set of technologies that could be better utilized.**

A recent report conducted by Devex, a leading global development media outlet, found that 86 percent of their survey respondents, “believe that the technology, skills and approaches [international] development professionals use in 10 years will be significantly different than they are today.”<sup>4</sup> Indeed, research conducted for this paper found a high demand of social sector professionals who want to strengthen and diversify their technology capacity.<sup>5</sup> Building off these ideas, this paper will demonstrate that:

If the social sector does not actively and continuously consider open source, it may miss opportunities to adopt technology solutions that best strengthen its programmatic and operational work.

In May 2019, the GitHub Social Impact team, along with the Case Foundation, launched a research project exploring the barriers the social sector faces in engaging with OSS.<sup>6</sup> Though this paper is the first known to explore the intersection, the innovative power of open source in the social sector is not a new topic. Interviewed experts cautioned that open source has previously been promised to the social sector as a cure-all solution, which in many cases has set expectations unrealistically high. Further, many of the challenges the social sector faces in **producing** and **consuming** OSS exist in the greater open source ecosystem and/or are

4 <http://reports.devex.com/nextgenpro/>

5 At the time this report was published, the COVID-19 pandemic was rapidly evolving globally, making collaborative, remote work in the social sector critical. Check the GitHub blog and join the Open Source for Good listserv at <https://socialimpact.github.com> for regular updates on COVID-19 open source projects.

6 The Case Foundation was created by digital pioneers Jean and Steve Case in 1997.

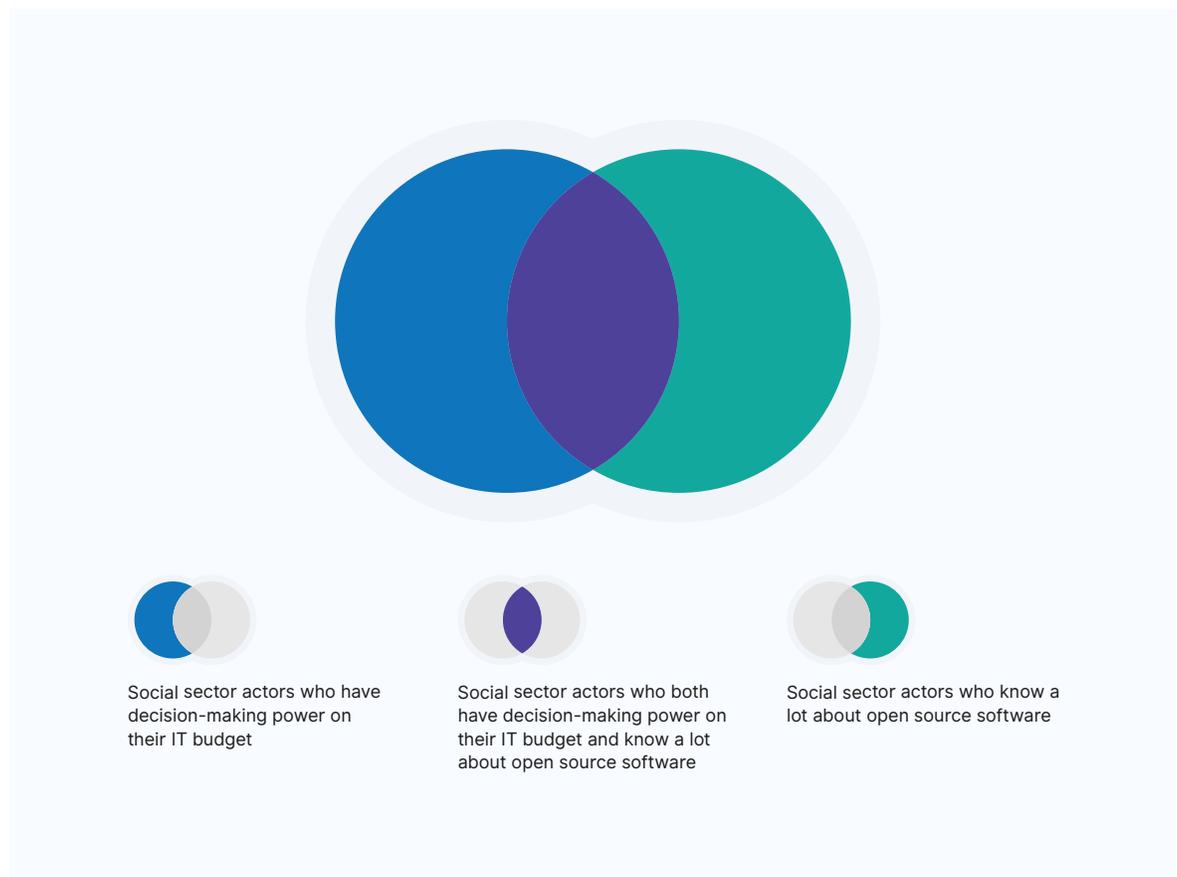


indicative of broader technology challenges in the social sector. To this aim, this paper will set out realistic barriers and opportunities for stronger collaboration as identified in the research.

## The Opportunity

With few exceptions, research for this paper showed that those who make decisions about technology budgeting in the social sector have little knowledge of OSS.

**Figure 2: Decision-making power and knowledge of OSS in the Social Sector**





Experts working in technology for social good spoke about the missed opportunities that result. OSS development can help guide organizations to use iterative design. Open source experts noted popular OSS often incorporates best security practices, makes security practices visible and easier to identify and OSS is widely adopted as components of infrastructure technology in the commercial private sector. In the research for this paper, OSS was shown to increase operational efficiency through better communication and collaboration that reduces redundancies across projects and offices. It was also shown that OSS can lead to better customized solutions for use cases that proprietary tools may not consider, and OSS can build technology capacity in an organization by involving employees to create custom solutions.

Similarly, experts in technology for social good spoke about missed opportunities of low social sector participation in the open source ecosystem. A pervasive challenge, many open source communities of developers, maintainers, and other contributors lack diversity.<sup>7</sup> The social sector, on the other hand, has high gender diversity, is highly geographically dispersed, represents nearly every race and ethnicity, and actively seeks participation from people of marginalized identities. Stronger social sector collaboration would likely bring a highly diverse participant pool into open source communities, similar to the technology for social good landscape compared to commercial technology.<sup>8</sup>

## Structure of this report

This report is based on a research project of GitHub Social Impact's Open Source for Good program and the Case Foundation on the barriers and opportunities of open source software (OSS) in the social sector. It includes the benefits of more strongly

7 <https://opensourcesurvey.org/2017/>

8 <https://technation.io/insights/tech-for-social-good/>



integrating the social sector in the open source ecosystem, practical steps the social sector can take to increase its adoption of OSS, and actionable recommendations for **funders, producers,** and **consumers** of OSS in the social sector. See the Research section below for definitions of **funders, producers,** and **consumers.**

Insights in this paper are organized in four major sections:

1. The **mutual benefit** of deepening the intersection of OSS and the social sector.
2. How OSS is **communicated and socialized** in the social sector, and education efforts that can reduce common misconceptions.
3. **Best practices** the social sector needs to adopt to fully realize the benefits of OSS.
4. **Funding models** and other **sustainability support** social sector OSS needs to ensure collaboration lasts.

Opportunities are identified in each major section. Several points are relevant to multiple sections but have been sorted into one for clarity. The following sections are key terms and an overview of the research methodology.



# Key Terms and Acronyms





## Scope of the Social Sector

In this paper, the term “social sector” refers to non-governmental organizations that have a primary purpose to actively advance or positively contribute to any pressing societal issue or challenge. This definition includes foundations, nonprofits, inter/national non-governmental organizations (I/NGOs), and some for-profit companies. Common industries include international (global) development, disaster risk management and humanitarian response, public health, and human rights. Government agencies that specifically act as funders in the social sector, such as the United States Agency for International Development (USAID) and the Department for International Development (DFID), were included in the scope of this paper. Other government agencies, U.S. domestic healthcare organizations, traditional commercial social responsibility efforts, and academic institutions were excluded, as their engagement with open source differs greatly from the rest of the social sector.

## Open Source Software

The open source ecosystem extends to many types of products and data. The working definition of open source software (OSS) used in this report is software distributed and uploaded to an accessible repository with source code that may be read or modified by users. [The Linux Foundation](#) and the [Open Source Initiative](#) provide more comprehensive definitions. GitHub is the world’s largest community of developers and their code, including open source software. Other platforms include BitBucket and Gitlab.

The history of open source is complex and has gone through many evolutions. Documented by various technology publications,



the origin of open source is rooted in an unaffiliated community that developed software by developers for developers.<sup>9</sup> Today, most open source software contributions are made on behalf of businesses that have widely adopted, championed, and invested in open source software. Large technology companies such as Microsoft, IBM, Google, and AWS contribute greatly to the open source ecosystem.<sup>10</sup>

## Open Source and Open Data

OpenDefinition.org states, “Open data and content can be freely used, modified, and shared by anyone for any purpose.” As is the case with OSS, open data must be in the public domain, in a machine-readable format, and easily accessible online.<sup>11</sup>

## Open Source Applications vs. Infrastructure

In the commercial sector, OSS is typically built by developers for developers with an emphasis on infrastructural technology such as systems architecture, language frameworks, and APIs. In the social sector, most open source is comprised of user-facing applications intended for non-developers. Applications are defined as pieces of software meant to help an end-user achieve a particular purpose.

## Human-Centered Design

According to IDEO.org, a leading design company in the social sector, human-centered design (HCD) puts the end user of

9 <https://techcrunch.com/2019/01/12/how-open-source-software-took-over-the-world/>

10 <https://octoverse.github.com/#top-and-trending-projects>

11 <http://opendatatoolkit.worldbank.org/en/essentials.html>



product or service at the center of the design process. IDEO.org’s HCD methodology consists of inspiration, ideation, and implementation phases.<sup>12</sup>

## Agile Methodology

According to Zenkit, “Agile is a type of project management process, mainly used for software development, where demands and solutions evolve through the collaborative effort of self-organizing and cross-functional teams and their customers.” The methodology is based on six deliverables: product vision statement, product roadmap, product backlog, release plan, sprint backlog, and increment.<sup>13</sup>

## Forking

GitHub defines a fork as a copy of a repository. “Forking a repository allows you to freely experiment with changes without affecting the original project.”<sup>14</sup>

## Refactoring

The process by which code is restructured without changing external behavior.

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<sup>12</sup> <https://www.designkit.org/human-centered-design>

<sup>13</sup> <https://zenkit.com/en/blog/agile-methodology-an-overview/>

<sup>14</sup> <https://help.github.com/en/enterprise/2.13/user/articles/fork-a-repo>



## Frequently Used Acronyms

- DIAL – Digital Impact Alliance of the UN Foundation
- FOSS – Free and open source<sup>15</sup>
- EDC – Economically developing country
- RFP – Request for proposals
- I/NGO – International / Non-governmental organization
- OSS – Open source software
- OS – Open source
- SDG – Sustainable Development Goals
- UN – United Nations
- USAID – United States Agency for International Development

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<sup>15</sup> For a discussion of FOSS vs FLOSS, refer to <https://www.gnu.org/philosophy/floss-and-foss.html>



# Research Overview





## Intended Audience

This report is intended for wide audiences of the social sector and open source communities. Findings and recommendations are particularly actionable for:

1. Technology implementers in the social sector
2. Funders of social sector technology
3. Developers and technology companies interested in the social sector
4. Open source platform providers and supporters

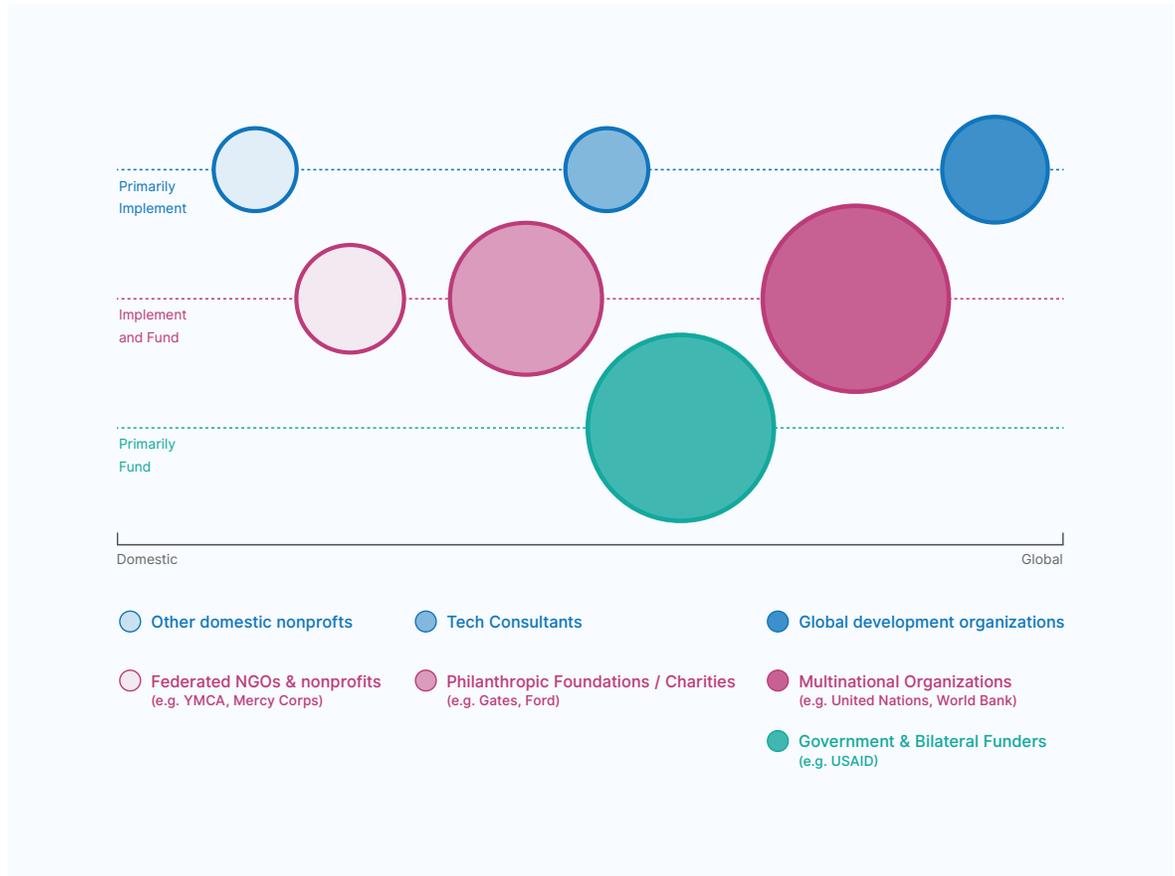
## Purpose and Scope

The purpose of this paper is to help the social sector and open source communities understand the benefits, challenges, and opportunities of stronger mutual collaboration. This includes information on how to better **consume, produce, and fund** open source solutions. This report is **not intended** as an evaluation of whether OSS contributes to better social sector solutions.

As one contributor noted, there are pockets of open source for the social sector activity among small organizations that have 10 or fewer staff, such as in the environmental and conservation space. However, this paper was primarily focused on large organizations with 50+ staff, including individual tech consultants that work for large organizations. Figure 3 below shows a visual mapping of research priorities within the social sector.



**Figure 3: Our Social Sector research priorities**



## Research Methodology and Questions

### Major lines of research inquiry were:

- What is the current state of OSS in the social sector?
- What are the challenges and barriers to engagement?
- What are the successes and what can they teach us?
- How might the social sector benefit further from leveraging OSS? What are the opportunities?
- How might the open source ecosystem benefit from social sector engagement?



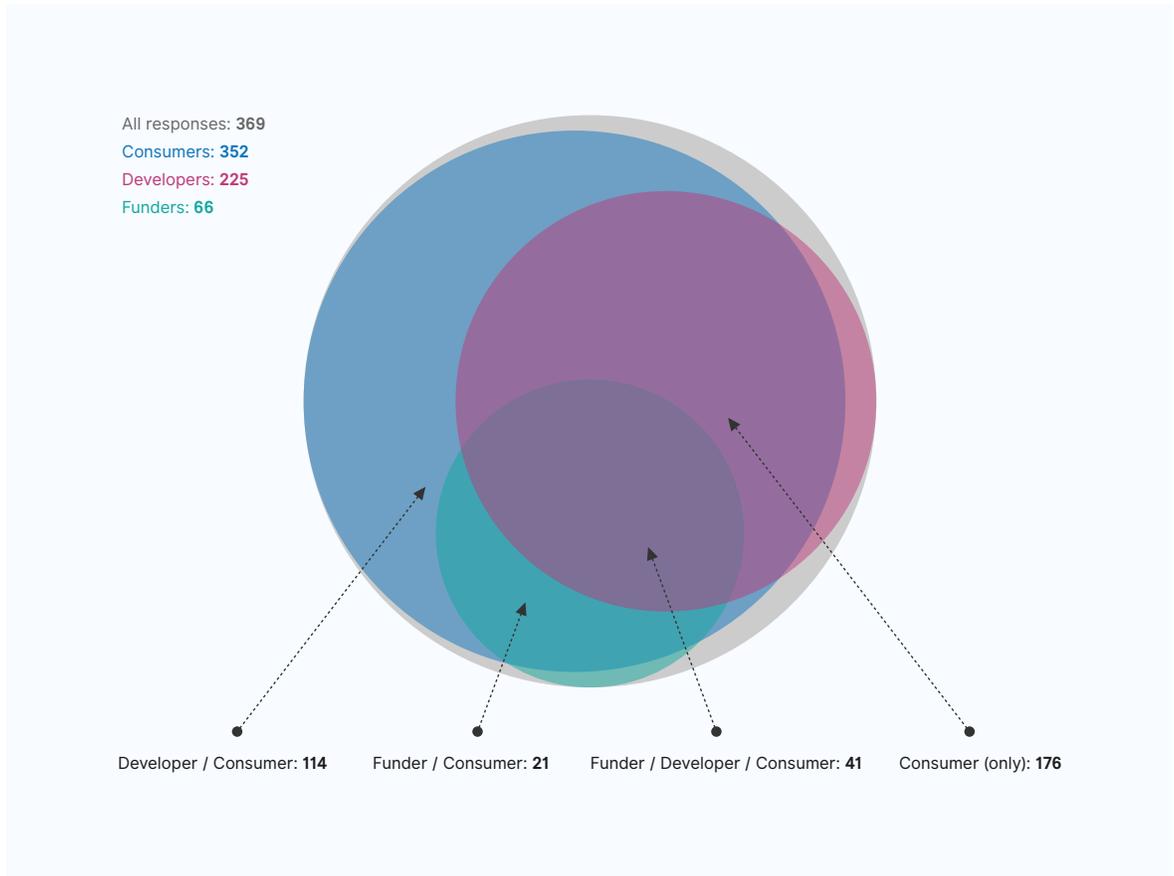
Methods included two convenings of experts, an in-depth literature review, a widely disseminated survey with 350+ responses, feedback on drafts of this paper and 55 in-depth qualitative interviews with **consumers, producers, and funders**, defined below:

<b>Producers</b>	Contribute to the building of OSS in the social sector by: <ul style="list-style-type: none"><li>• Writing code as a software developer.</li><li>• Designing or researching user interfaces, or contributing to the UI or visual design.</li><li>• Maintaining OSS through triaging bugs, responding to comments, managing project boards, and onboarding new producers.</li><li>• Defining and aligning projects to governance structures or other requirements.</li><li>• Creating, maintaining, or otherwise contributing to documentation.</li></ul>
<b>Consumers</b>	Primarily use at least one OSS <i>without</i> : <ul style="list-style-type: none"><li>• Contributing back to the original OSS.</li><li>• Open sourcing work built off the original project(s).</li></ul>
<b>Funders</b>	Provide external monetary support to an organization, person, or project for technology in the social sector.

Many individuals in the research fell under more than one category; in particular, most OSS producers of a certain project are also consumer of others. Figure 4 shows the breakdown of survey respondents.



**Figure 4: Breakdown of survey respondents**



Research questions were explored with those who advocate the use of OSS, and **consumers, producers, and funders** of technology in the social sector. Human Centered Design (HCD), Service Design, and Jobs to be Done methodology techniques were leveraged to conduct and synthesize the research. Hundreds of informal conversations, three related conferences, and feedback on draft versions of this paper further contextualized the findings.



## Personas

Personas are a key tool in the HCD methodology. They are fictional “persons” meant to represent behaviors, needs, wants, and constraints of research subjects or target users. Each of the below personas is a synthesis of several people who were interviewed during the research. Personas were used to target research efforts and to select findings discussed in this paper. Persona categories are bolded throughout this paper.<sup>16</sup>

<b>Persona Names</b>	<b>Persona Category</b>
US Non-Profit Tech Consultant; International Tech Consultant; Tech Staff at Social Sector Organization in the U.S.; Program Specialist	Consumer
CTO at Social Sector Organization; Social Sector Software Lead; Senior UX Designer in Tech Sector; Software Developer in Tech Sector	Producer
Program Officer – Generalist Funder; Social Sector – Tech Focused Funder	Funder

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<sup>16</sup> Full personas will be released online in the future.



# Mutual Benefit





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## Quick Read

Stronger collaboration between the social sector and the open source ecosystem could:

- Maximize technology budgets
  - Bridge technology gaps
  - Bring **consumption** costs down
  - Increase transparency and efficiency of programs
  - Diversify the open source ecosystem
  - Align values
- 

What is the mutual benefit of deepening the intersection of OSS and the social sector?

“In a space where we’re all ostensibly trying to save the world...we can both be contributing...because we have the same goals.”

**Jake Watson**, Senior Director at DIAL

For the common use cases of knowledge management; monitoring and evaluation (M&E); and data collection, mapping and visualization, interviewed experts for this paper pointed to how both **producing** and **consuming** open source in the social sector can maximize limited budgets, fundamentally improve how



organizations work, bridge technology gaps that limit impact, strengthen overall OSS product offerings, and, ultimately, build products of a high societal value add that may not have otherwise been created.

Open source creates resource sharing opportunities in the social sector, especially for technology talent. As Jake Watson, a Senior Director at the UN Foundation's Digital Impact Alliance (DIAL) explained on the **production** side, "The argument that I always make about open source for good is it's a mechanism for collaboration. In a space where we're all ostensibly trying to save the world...we can consolidate the market - you're at UNICEF, and I'm at IRC, and we can both be contributing code in the same project because we have the same goals." Abel Miller of the Gates Foundation stressed this form of collaboration can bring down the cost to the **consumer** to, "essentially zero, so that cost is no longer a barrier for use."

Suzi Grishpul, a Web Product Manager at 350.org went further, saying that **being a consumer of open source software aligns more with the social sector world values over proprietary software**, as open source is rooted in social sector ideals of openness, collaboration, and inclusion. This sentiment was echoed in a 2018 report by the Technology for Social Justice Project, which states that "Free/Libre and Open Source Software is seen by many practitioners as crucial to growing and sustaining the ecosystem, because its values are consistent with their goals of equity and social justice, and because in practice it enables resource sharing around technology development, rather than competition."<sup>17</sup> Indeed, in the survey conducted for this paper, both developers and non-developers pointed to Value Collaboration as a top reason to use OSS in the social sector, below.

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<sup>17</sup> [https://morethancode.cc/T4SJ\\_fullreport\\_082018\\_AY\\_web.pdf](https://morethancode.cc/T4SJ_fullreport_082018_AY_web.pdf)

**Figure 5: Survey respondents on why they use OSS**

	Developers	Non-developers
Value Collaboration	35%	33%
Interoperability	48%	25%
Can Build on Existing Work	47%	15%

Andrew Pham, formerly of Mercy Corps, explained that by **producing** the OSS TolaActivity and scaling to 40 Mercy Corps offices, **he was able to bridge the gap between developers and non-developers, and producers and consumers within the organization.** Organizational leaders of a non-technical background could actively participate in the software build process, which strengthened communication and the technology capacity of staff. TolaActivity also created more transparency and efficiency across programmatic work.<sup>18</sup>

A contributor to this report pointed out that as **consumers** and **producers** of OSS, **visibility into the algorithms and code**

<sup>18</sup> <https://www.youtube.com/watch?v=-pyqoLl4fU>



allows for greater transparency during the creation of OSS products. They explained the ability to scrutinize biases in code and audit security is especially important for technology that may directly impact the vulnerable communities social sector organizations serve.

## Building for a More Diverse Audience

A pervasive challenge in greater open source **producers** is a lack of diversity.<sup>19</sup> In the Roads and Bridges report, Nadia Eghbal wrote, “One reason why open source contributors are strikingly more homogenous than the technology sector at large is that they need time and money to make significant contributions in the first place.” Lorena Mesa, an engineer at GitHub and the Director and Vice-Chair Elect of the Python Software Foundation, emphasized that diversity, inclusion, and accessibility must be addressed for the open source ecosystem to strengthen. Justin W. Flory, who works with RIT LibreCorps and UNICEF on open source initiatives, offered an historical perspective, saying early leaders of OSS movements heavily recruited from demographically homogeneous communities, which still affects the current OSS ecosystem.

One related mutual benefit that emerged from the research was further integrating a diverse social sector into open source communities. Amy Sample Ward, CEO of NTEN, remarked that,

“This presents an opportunity for nonprofit organizations who have more diverse staff than a traditional technology team in a for-profit tech company, and more diverse communities getting to build the products...this is an opportunity to create products that really do work for all people.”

.....  
<sup>19</sup> <https://digitalimpactalliance.org/towards-a-more-gender-inclusive-open-source-community/>



Commenting on the diversification of the greater OSS ecosystem, Justin W. Flory stated, “I look at what we're going through now in this emergency of emphasis on communities, on diversity inclusion, and I feel like there is no other way to describe it then as a feminist movement in free software.”

Indeed, several powerful examples of open source and social sector community collaboration surfaced in the research. Chayn, for example, is an open source global volunteer network that **produces** fact-based information for victims of domestic and other forms of gender-based violence in 12+ countries in nine languages. Its 400+ volunteer developers, designers, and other contributors are mostly survivors themselves, and represent women of color and other intersectional identities.

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## Spotlight: Chayn

Chayn is a global volunteer network that creates open source guides to help victims of domestic and other gender-based violence get the information they need in more than 12 countries. The organization is made up of 400+ volunteers, most of whom are themselves survivors and represent intersectional communities.

**Success story:** building an open community and platform around a strong social need.

**Challenge:** managing a volunteer community without adequate institutional funding.

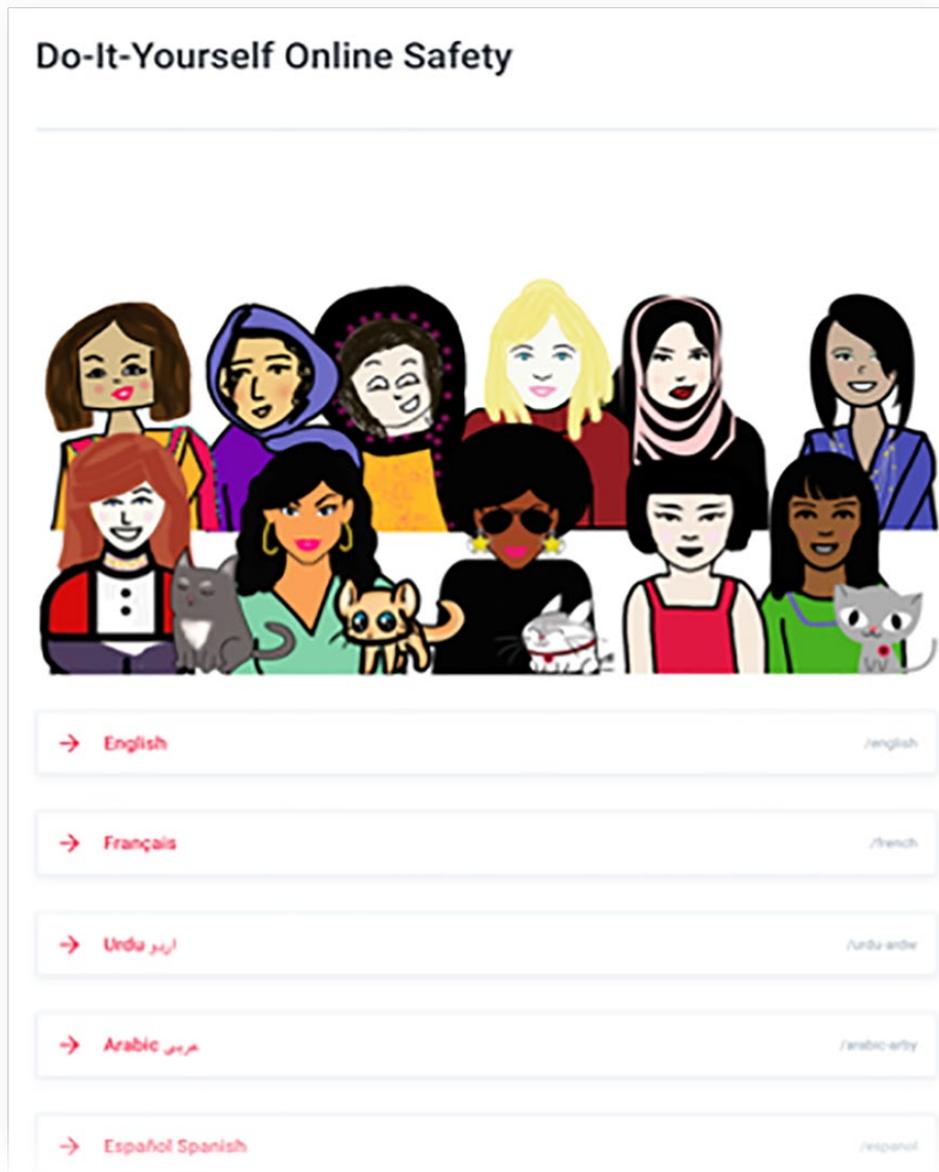
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As Chayn founder Hera Hussain explained, by appealing to a compelling and relevant social cause and basing everything in open source, she was able to attract a passionate, committed



talent pool to **produce** decidedly-needed products that may not otherwise have been created.

**Figure 6: Screenshot of Chayn's Do it Online Safely Guides**





# Opportunities for Deeper Social Sector Open Source Collaboration

## Inspiring Designers, Developers, and Other Volunteer Producers

Ushahidi is a popular open source application and non-profit technology company based in Nairobi, Kenya. Their Open Design program is in partnership with the Adobe Fund for Design and Designit.<sup>20</sup> The aim of the Open Design program is, “To create and deliver accessible processes and systems to organize distributed, remote, collaborative design at a global scale, thereby enabling design contributions to OSS.” Eriol Fox, the former lead designer for Ushahidi, noted that in all her speaking engagements, workshops, and other activities about the work, designers have responded positively because they were motivated to work on socially impactful problems and projects.

Jake Watson (senior director at DIAL) also noted that software developers and other tech talent may be interested in the social sector not only because of their values, but because, “There are interesting challenges to be worked on from a software development perspective in the social sector...[such as] software that works asynchronously and online/offline, etc.”<sup>21</sup>

Yaw Anokwa, co-founder of ODK, a popular open source data collection project for international development, described his

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<sup>20</sup> <https://opendesign.ushahidi.com/>

<sup>21</sup> <https://digitalimpactalliance.org/>



team as incredibly diverse, which resulted in a better product.<sup>22</sup> “People from different walks of life with different priorities [contribute to ODK]... we reach out to everyone who wants to contribute,” he explained. Further, “We’re not building tools for developers, so the more input we have from non-developers, the better. The diversity in the contributions to ODK resulted in a product that reflected the needs of the contributors.”

**Figure 7: Screenshot from ODK website**



.....  
22 <https://opendatakit.org/>



## Using Contextual Analysis

Open source creates interconnected communities. **Many social sector actors are formally educated and trained in contextual analysis that looks at those communities**, and often accounts for the impact of technology and its methods at a societal level. Frameworks and best practices exist for different aspects of contextual analysis in the social sector, including building cultural competency, analyzing with intersectional lenses, accounting for political contexts, and incorporating quantitative economic and financial indexes.<sup>23</sup>

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### Spotlight: Open Data Kit (ODK)

Open Data Kit is a free, open source suite of tools that allows data collection using Android mobile devices and data submission to an online server, without an Internet connection or mobile carrier service at the time of data collection.

**Success story:** ODK has been widely adopted all over the world for global development and aid projects. Several widely popular projects depend on ODK components, including Ona, Kobo Toolbox, and Medic Mobile.

**Challenge:** Sustaining the funding of the team for continued development and support. ODK has diverse revenue streams but is mainly reliant on grants. They are looking for more stable and predictable funding.

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<sup>23</sup> Examples of contextual analysis methods: <http://www.fao.org/3/ca5968en/CA5968EN.pdf> and <https://odihpn.org/magazine/urban-context-analysis-toolkit/>



As one expert pointed out, this may be particularly useful for assessing open source opportunities at the national level. Ukraine, for example, encourages open source in the government and social sector. Similarly, in 2012, the French government created an initiative to embrace FOSS.<sup>24</sup> A presentation at the conference CHAOSScon in Brussels, Belgium, explained this initiative spurred a strong OSS ecosystem in France. In other countries, companies are encouraged to create and expand businesses that build proprietary software. Understanding the history, politics, law, economic, and trade systems that create these differences can help identify **production** and **funding** opportunities for OSS.

## Mobile

According to the UN, “Basic infrastructure like roads, information, and communication technologies, sanitation, electrical power, and water remains scarce in many developing countries.”<sup>25</sup> For those working in areas that do not have access to reliable electricity or broadband Internet, actively participating in open source has been difficult when projects exist on platforms that only have traditional desktop or laptop computer interfaces available. This difficulty extends to thousands of international development, disaster risk response, and humanitarian aid workers working on technology in infrastructurally underdeveloped areas.

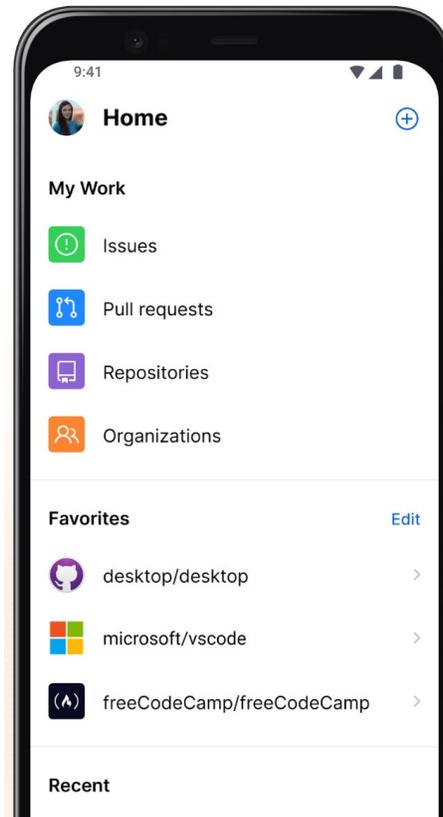
In recent years, there has been a push for mobile apps that allow users to engage with open source through smartphones and tablets. Most exist as third-party apps on iOS and Android that allow users to interface with the version control system, Git. However, third-party apps do not always have the same level of security, functionality, or stability as apps that are owned by code-hosting companies.

24 <https://opensource.com/government/12/11/france-latest-fully-embrace-open-source>

25 <https://www.un.org/sustainabledevelopment/infrastructure-industrialization/>



**Figure 8: Screenshot of GitHub mobile app**



Android, the open source operating system, powers most of the smartphone devices in economically developing countries.<sup>26</sup>

Mobile solutions built for the social sector must therefore be Android-compatible. In 2020, GitHub beta launched its Android smartphone app, which gives users in infrastructurally underdeveloped areas a direct way to engage with much of the open source ecosystem through mobile devices.<sup>27</sup> The GitHub Android app covers common **production** workflows for maintainers and moderators of OSS tools. At the time of this publication, the app allows users to merge pull requests, add

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26 Statcounter is an analytics company and reports 85% or higher Android market share for Africa, India and South America. See here: <https://gs.statcounter.com/os-market-share/mobile/africa>. Device Atlas shows 73% or higher Android market share for Nigeria, South Africa, Brazil and India.

27 As of this paper publication, the Android app is in beta testing.



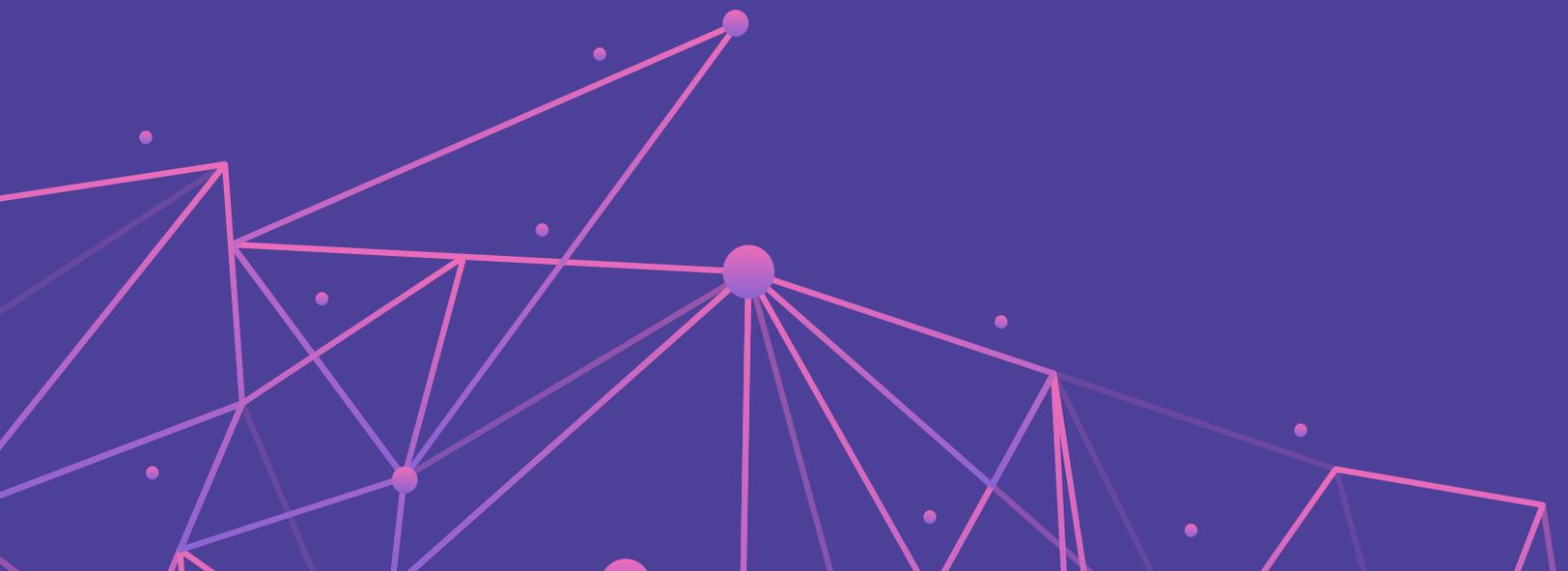
comments to issues, triage bug notifications, and review code. More feature additions will roll out throughout 2020.<sup>28</sup>

While current functionality on GitHub's Android app does not yet extend to writing code, as features are added, the possibility of meaningful and deep **production** engagement increases for the social sector actors in infrastructurally-challenged environments. Robust Android apps that allow users to interface with open source may also improve **consumption** through better open source education and training for larger population segments in economically developing countries. As one expert highlighted, current open source education opportunities are lacking.

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<sup>28</sup> <https://github.com/mobile>.



# Communication and Socialization





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## Quick Read

- Social sector organizations often conflate “free” with “open” due to misunderstanding pricing models.
- Open data and open source are also often confused.
- Adequate ways to search for an OSS in the social sector is a problem.
- Federated and/or multinational organizations have had great success in producing OSS.

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How is OSS communicated and socialized in the social sector and what are education efforts that can reduce common misconceptions?

“There are many organizations...where they don’t even understand...what they developed as a product could be pushed and shared with other people in the community.”

**Amy Sample Ward**, CEO of NTEN

A challenge in technology for the social sector **is a lack of cohesion and standardization of technology terms and ideas**, which was cited in our research to stifle growth, innovation, and adoption. Interviewed experts pointed out some social sector organizations understand the standard definition of OSS: software distributed and uploaded to an accessible repository with source code that may be read or modified by users. Less technologically-



adept organizations, however, considered any code on any device, such as a USB thumb drive, that they have given or intended to give away for free, as open source. This has made it difficult for social sector technologists to bring nuanced discussions to their organization about the value-add of **consuming, producing, and funding** open source.

Gabriel Krieshok, Global Lead for Digital Transformation at Abt Associates, explained that he worked with clients that want open source, “Because they see it as free,” highlighting another common misunderstanding that “no cost” is the same as “open source.” This may be due to **confusion among consumers in the social sector around pricing models**. Most paid licenses are relatively easy to decipher and require costs to be paid upfront or as a subscription model. Licenses generally provide transparency around included features. In the social sector, such pricing can be especially important for traditional logframe project planning, as licenses can tie to line items in a budget. OSS, on the other hand, often requires a less obvious implementation and deployment with installation, customization, and troubleshooting. Those costs can be difficult to estimate up front and create confusion for social sector **consumers** and **funders**.

## Open Data vs. Open Source

Although open data was not directly covered in this paper’s major lines of inquiry, the topic came up often, because historically, **open data has been both a driver for and against making a piece of software open source**. In a survey conducted for this paper, worries about data protection were the second overall highest-reported concern for open sourcing software, below.



**Figure 9: Respondents' concerns with open sourcing software (not all responses shown)**

	Developers	Non-developers
Worried about data protection	25%	45%
Off-the-shelf tools meet our needs	23%	26%
Don't know how to use open source	11%	30%

Shena Ashley, Vice President at the Urban Institute, stated that the main motivation to open source a piece of software that they produced was to make a dataset available to researchers. On the other hand, the Urban Institute produced a set of simulation-based software and data that they felt they could not open source. Michael Moszczynski, the former CTO of ImmerLearn elaborated by saying, "It is risky to release data science software that requires a bunch of data cleaning and steps to make the correct 'conclusions.'" For example, performing automated data cleans or



cross-referencing datasets can carry the risk of exposing personal identifying information of vulnerable populations.

While the above illustrates real considerations between the relationship of OSS and open data, **experts cautioned that some OSS and open data concerns in the social sector are based on misconceptions.** As one contributor to this paper pointed out, proprietary software can create open data and open source software can create proprietary data. This distinction is not always understood in the social sector.

At a convening of experts working at the intersection of open source and social good, more than 40 open data / OSS problem statements were identified based on work with social sector **consumers, funders, and producers.** One expert noted that many social sector organizations believe paid licenses inherently secure data better than free licenses. Another expert who regularly engages with non-technology social sector staff said they felt that open source software automatically exposes the data it stores or analyzes. An expert who works as a developer noted some of his more inexperienced colleagues do not know how or when to do data security tests, and assumed companies that provide paid proprietary licenses will provide such services.

## Capacity and Discoverability

The level of tech capacity in an organization impacts whether it **consumes** OSS. As seen in figure 10 below, there was a positive correlation between technology staff at an organization and an affirmative answer to the question “Does your organization use open source software?” A significant jump occurred



between having only one full-time staff and having more than one, suggesting that one full-time staff is enough to run an organization's technology operations, but not necessarily enough to implement open source solutions across an organization.

**Figure 10: Correlation between the number of technology staff at an organization, and if that organization uses open source software**

Number of Staff Dedicated to Technology	Organization Uses Open Source		
	Yes	No	Don't Know
None	-0.30	0.25	0.13
Mainly Volunteers	-0.04	0.07	-0.04
1 Part-time or consultant	-0.24	0.20	0.11
2+ Part-time or consultant	0.09	-0.08	-0.03
1 Full-time	-0.01	0.01	0.01
2+ Full-time	0.28	-0.25	-0.09

One reason why this happens may be due to the discoverability of OSS in the social sector, which refers to the ease of which someone can find a relevant solution. **Discoverability is a**



**challenge across the greater open source ecosystem. In the social sector, however, its effect is disproportionate.**

Daryl Thomann, an executive at Make-A-Wish Foundation in Illinois explained she didn't, "View technology as a current core competency" within her organization. "We were not staffed to have the expertise in application or system development, therefore I would say most staff within our organization didn't know where to look [for appropriate OSS.]"

Infrastructure technology dominates OSS use cases in the commercial technology sector. Developers or other IT staff are therefore most likely to "discover" OSS, as many OSS products don't have an end user interface. As experts pointed out, most OSS use cases in the social sector still heavily focus on user-facing products. Tools targeted to the social sector are unlikely to gain a large enough following to reach trending lists on hosting platforms. Search tools for non-developer social sector **consumers** are lacking, and search functions on hosting platforms do not currently enable social sector actors to find relevant projects with keyword searches. That being said, one contributor to this paper noted they are rapidly progressing.

## Ownership of OSS

WordPress and Android are open source platforms that are nearly ubiquitous in the social sector. WordPress sites power a significant portion of international development knowledge management efforts. Phones running on the Android operating system are most prevalent among consumers in sub-Saharan Africa, South Asia, and Latin America. Therefore, Android is the go-to mobile operating system for nearly every app—social sector



or otherwise—in the three regions. Detailed in further sections of this report, especially in public health in economically developing countries (EDC), several popular mobile data collection and national health record systems are open source.

Despite these common and strong use cases, in a convening of experts held in Washington, D.C. at the Case Foundation’s offices, it was noted many social sector organizations **do not associate formal ownership with open source products**. In some cases, social sector organizations are unaware they **are already consuming open source**. For example, while the company Automattic develops, maintains, and governs WordPress.org and Android is a Google/Alphabet product, many social sector organizations have disassociated OSS from WordPress and Android by virtue that both offer support and ownership.

Amy Sample Ward explained that on the **production** side, “There are many organizations, even if they’re using WordPress... where they don’t even understand the connection. They don’t know what they developed as a product could be pushed and shared with other people in the community.” Communicating and socializing the value of open source in language relatable to the social sector actors and clarifying misconceptions is thus critical to more appropriate and increased engagement with OSS in the social sector.



# Opportunities to Better Communicate and Socialize OSS in the Social Sector

## Federated and Multinational Organizations

Research has shown that federated and multinational organizations are in a strong position to produce successful OSS.

YMCA of the Greater Twin Cities, Mercy Corps, and UNICEF are all organizations that built widely-adopted OSS for the social sector. Mercy Corps, for example, built a tool called TolaActivity that scaled to 40 countries. All three of these organizations follow either a federated or multinational country office model, which has proven to create a strong position for successful OSS because of a common organizational strategy, mission, and terminology.<sup>29</sup> Projects can originate in one or more locations and then scale to other offices in the same organization, which can circumvent budgetary, privacy, and capacity constraints involved with external collaboration. Research covering the organizations suggested that internal champions are critical to secure initial funding and position OSS as a way to build software iteratively.

## Lead Education Efforts with Examples

DIAL recently launched a **product registry** that maps OSS

<sup>29</sup> One expert noted that other successful OSS have expanded their mission to increase their scale



to the SDGs and common social sector workflows. Similarly, UNICEF, DIAL, and Ovio have taken a lead on **building a list of Digital Public Goods**, which by definition must be open source.<sup>30</sup> There are clear use cases where open source is a preferred option in social sector technology, namely for content management (WordPress), mobile operating systems (Android), mobile data collection (Open Data Kit and RapidPro) and health programming (DHIS2).

In order to dispel misconceptions about open source in the social sector, several social organizations used concrete examples instead of speaking about OSS in theory. Nathan Maehren, Senior Vice-President of Digital of the YMCA of the Greater Twin Cities, and Andrew Pham, formerly of Mercy Corps, both made cases to their leadership that **producing** open source helps teams work better, use local talent, and stretch funding further. As Nathan said, “We did a lot of education and presentations to leadership about the digital opportunity and sold the idea of OSS bringing the YMCA of the Greater Twin Cities together to solve problems more effectively.” Focusing on the alignment of OSS with a mission or values is easier to understand than the nuances of OSS itself.

## Leveraging In-Person Events

The open source and social sector communities host many in-person conferences, meetings, and other events. In the past decade, hybrid fields such as technology for international development (ICT4D) have spawned more targeted events that cover open source in some capacity. Adopted in nearly half the world, the District Health Information Software (DHIS2) is one of the most widely used OSS ever built for the social sector. Scott Russpatrick, the DHIS2 Analytics Product Manager emphasized

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<sup>30</sup> <https://registry.dial.community/> and <https://digitalpublicgoods.net/explore/>



one of the strategies the platform employed was to create a community that wanted to meet in person. Neil Planchon, an ambassador of CiviCRM, another popular OSS in the social sector, echoed this strategy.

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## Spotlight: CiviCRM

CiviCRM is web-based open source customer relationship management (CRM) software that was built in 2005.

**Success story:** CiviCRM's large user base exists thanks in part to leaders who emphasized in-person community-building and ownership and understanding the problems the social sector looks to solve.

**Challenge:** Users advocate that the CiviCRM data model is a better choice for the social sector than Salesforce. However, challenges understanding its interface and OSS have prevented faster adoption.

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PDX Diaper Bank is an organization that helps low income families in the U.S. with young children, older adults, and people with disabilities receive free diapers. The organization partnered with Ruby for Good to build an open source diaper inventory management system called DiaperBase.<sup>31</sup> Rachel Alston, Executive Director and Founder of PDX Diaper Bank, saw a positive impact on the project following in-person events. She described how the PDX Diaper Bank stakeholders were invited to a Ruby for Good conference to communicate their needs and learn how to socialize the product within other chapters.

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<sup>31</sup> <https://diaperbase.org/>



Two popular programming languages used in open source—Ruby and Python—host conferences in cities with large social sector communities. In 2020, Ruby and Python events will take place in Cape Town, South Africa; Bangkok, Thailand; and Abuja, Nigeria.<sup>32</sup> Another expert noted Ruby for Good build-a-thons and hackathons played a role in helping develop social sector OSS, and regularly take place in the U.S., Latin America, Eastern Europe, and Japan.<sup>33</sup> These efforts are facilitated through Slack, Twitter, and other social media. Coordinating can allow for cross-over, especially using open source as a vehicle and when facilitated by communities of similar job functions (such as data scientists in the commercial sector and monitoring and evaluation (M&E) advisors in the social sector).

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<sup>32</sup> <https://www.python.org/events/> and. <https://rubyconferences.org/>

<sup>33</sup> Events schedules were changing rapidly at the time of this paper publication due to COVID-19. Some of these events may instead be virtual in 2020.



# Best Practices





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## Quick Read

- OSS **producers** should structure new code with the flexibility to contribute and should focus on good design and documentation.
  - DIAL Catalytic Grants can be used toward the cost of refactoring old code.
  - OSS **consumers** should look for opportunities to contribute back to the OSS tools they use. Ways to contribute include documentation and project management.
- 

What are best practices the social sector needs to adopt to fully realize the benefits of OSS?

“It is hard to make the case to spend time for software adoption and OSS that has bad UX usually makes it harder.”

**Lisa Jervis**, Principal Consultant of Information Ecology

In the commercial sector, OSS is typically built by developers for developers, with an emphasis on infrastructural technology. Common commercial applications of OSS are systems architecture, language frameworks, and APIs. Conversely, in the social sector, most OSS used are user-facing applications



intended for a non-developer end-user. Experts stressed that for **producers** to achieve an uptake of OSS in the social sector, **it is essential to focus on intuitive design** and clear user manuals (documentation). Lisa Jervis, Principal Consultant of Information Ecology, explained unintuitive design is especially hard for the social sector to navigate. “At nonprofit organizations, everybody’s schedule is spread thin. It is hard to make the case to spend time on software adoption. OSS that has bad UX usually makes it harder.”

Poor design practices also contribute to the idea that OSS is too complex or too costly to customize. When attempting to implement a popular OSS application, Eva Kaplan, Regional Director of Innovation at IRC, said that they had to hire consultants to help with customization, because the design wasn’t intuitive enough for project staff to use otherwise. The consultants had not been accounted for in the original budget, making OSS adoption harder to justify in the future.

## Code Structure

For a piece of software to be properly open sourced, its code must be structured in a way that allows for others to customize and build out new features for their work. Older software may need to be refactored —restructured in a way that doesn’t change external behavior—to make it usable as OSS. However, Siobhan Green, CEO and co-founder of Sonjara, summarized the challenge therein by saying,

“There is no time or money to refactor the open source code.”



Suzi Grishul, a Web Product Manager at 350.org, similarly recounted a project wherein she had a group of volunteer developers ready to contribute to her open source project but did not have time to refactor the code to prepare for external contributions. The effort of refactoring the code would be considered overhead work that did not directly impact project results, which made it hard to justify in a budget. An executive working in technology for the social sector at a large organization said that they would rather sunset projects instead of putting in the overhead effort to refactor code that would allow them to open source their work.

To avoid refactoring, OSS for social sector **producers** emphasized the importance of **structuring new code so it can be easily customized or have new features added**. Scott Russpatrick of DHIS2 pointed to an example in which the Government of Malawi, with support from international development organization Cooper/Smith, adapted a DHIS2 mobile application being used in Tanzania. The mobile application was rapidly repurposed to work with the Malawi DHIS2 instance and is now fully operational, demonstrating how well-structured code for replication and customization can create more opportunities to **consume** and **produce** OSS.

## Contributing Back to the Ecosystem

In open source, the **free rider problem** refers to OSS consumers forking or downloading code, but not contributing back to the original code base. In the social sector, the free rider problem can be detrimental when niche markets might not have alternatives. Andrew Pham, formerly of Mercy Corps, explained a case in the monitoring and evaluation (M&E) public health community. A



company forked open source code and created a paid proprietary solution, which boxed in **consumers** to the expense of growing the ecosystem. While **producers** offering customization services to **consumers** is a valid business model, Andrew stressed the importance of **producers** open sourcing components and contributing back to the ecosystem wherever possible.

As one contributor to this paper pointed out, the social sector employs many strong writers, communicators, and project managers **who, with paid time, could contribute significantly to improving documentation and maintenance of open source tools they use.** Understandably, many social sector organizations are overstretched, and it can be a time-consuming task to understand if and how contributions are needed. However, Andrew explained how critical it is for **consumers** of OSS in the social sector to become **producers** by reaching out and contributing back however they can.



# Opportunities for the Social Sector to engage in Best Practices

## Use OSS to Implement HCD and Agile Methodologies

Throughout the social sector, experts that we interviewed spoke about how human-centered design (HCD) and Agile methodologies are increasingly popular. Most social sector organizations, however, do not have a dedicated budget or funding prospects to hire design teams or send staff to trainings. Adoption of both methodologies thus remains low, even if demand is high.

One contributor to this paper pointed to Open Source Design, Simply Secure, and Open Design as organizations that are trying to open source HCD and other design methodology processes, as well as bring good design to open source. Simply Secure focuses on the needs of vulnerable populations and Ushahidi's Open Design focuses on humanitarian projects. All three organizations provide free resources that may help (prospective) **producers** navigate around common open source design challenges in the social sector, such as designing with local populations and around language barriers.

Mercy Corps, The Gates Foundation Mojaloop team, and the YMCA of the Greater Twin Cities were able to build open source with Agile processes. Andrew Pham noted this was critical to the tool he built and allowed him to cost-effectively train non-Agile certified staff to build iteratively. Combining Agile and OSS



allowed senior leaders at Mercy Corps HQ to gain visibility into **production** at offices in different countries; helped developers stretch budgets by engaging local staff in sprints; and created a common language between technologist and non-technologists in the organization. Andrew said that while at first it was a hard sell, the organization eventually learned how to work in Agile because of OSS.

## Current Efforts to Help Producers and Consumers

On the **production** side, DIAL's Open Source Center is actively funding projects to refactor OSS and make them more generalizable through its Catalytic Grant Program.<sup>34</sup> For OSS **consumers**, the Open Source for Good program at GitHub has formed working groups of monitoring and evaluation (M&E) and social good technologists to create education materials that will help social sector actors understand how and when to use OSS.<sup>35</sup> The Funding section below lists more general opportunities.

Scott Russpatrick of DHIS2 attributed their success in working with high-level social sector management or procurement officers to understand how their open source products can be used. He also attributed DHIS2 success to dedicated communications officers that built out full communications plans. Both DHIS2 and Open Street Maps publish case studies, highlight new products, and work for free online.<sup>36</sup>

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34 <https://www.osc.dial.community/grants.html>

35 The GitHub Open Source for Good Program sits in Social Impact Team and is the author of this paper.

36 [https://docs.dhis2.org/2.33/en/user\\_stories\\_book/dhis2-tracker-improving-surveillance-of-visceral-leishmaniasis-vl-in-somalia-draft.html](https://docs.dhis2.org/2.33/en/user_stories_book/dhis2-tracker-improving-surveillance-of-visceral-leishmaniasis-vl-in-somalia-draft.html)



# Funder Support and Sustainability





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## Quick Read

- There are major gaps throughout the funding lifecycle for OSS in the social sector.
- **Producers** often face unrealistic requirements in the RFP process and have challenges securing funding for ongoing work.
- **Producers** and **consumers** are not incentivized to use open source.
- **Producers** are creating and finding new **funding** models to meet infrastructure and end-user **consumer** needs.
- Adapting commercial models of sustainability and using volunteer platforms may help **producers** with long-term, non-funding related sustainability.

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What funding and other sustainability support does the social sector OSS ecosystem need to ensure collaboration lasts?

“Nobody pays for the core pieces of functionality that make the software and the ecosystem better.”

**Yaw Anokwa**, co-founder of Open Data Kit

DIAL staff members working on open source pointed out that



some organizations **producing** social sector OSS receive revenue from customers and commercial funding. However, most are still primarily dependent on grant and donor funding. While there are bright spots, the research for this paper noted several challenges social sector OSS **producers** and **consumers** face throughout the grant and donor funding lifecycle.

Several experts expressed frustration with how the social sector is evaluated overall. Most of the social sector is comprised of nonprofits. Siobhan Green, CEO and co-founder of Sonjara, explained that,

“Nonprofit rating organizations penalize nonprofits for having high overhead. Technology is considered overhead, so nonprofits don’t want to invest in technology.”

Nonprofit evaluation models can complicate using open source. In some cases, hiring developers, designers, writers, or other required staff to implement and customize (**consume**) OSS are considered overhead, and can therefore bring down a nonprofit rating. For **producers** of OSS software, this may mean missed revenue opportunities through customization and support services.

## Justifying OSS in Funding Bids

The Principles for Digital Development are guidelines for using digital technology in international development programming and have been agreed upon by major global funders. One of the main tenets of the Principles is to, “Use open standards, open data, open source, and open innovation.” Marnie Valdivia, an ICT4D advisor for development programs, pointed out, however, **that few of the principles have made it into the procurement process**



**for USAID**, which is one of the endorsers of the Principles and one of the largest funders in international (global) development. Some organizations have open sourced their software due to the Principles, though few go beyond uploading the code to an open source repository.

As one expert noted, **OSS in the social sector often does not meet the strict audit requirements of grant funding**, which usually require OSS to be legally affiliated with an entity and of a certain size. OSS in the social sector also often does not meet reporting requirements laid out in RFPs.

Both domestically and internationally, tech consultants are sometimes contracted to help a social sector organization select, implement, and deploy a piece of digital technology to fulfill requirements of an RFP. Robert Weiner, an independent technology advisor to nonprofit and educational institutions, spoke about how most of his clients contract him specifically to identify a piece of software to fulfill a technology need, rather than a process by which software can be created. Because of this narrow scope, rarely does he recommend social sector organizations **produce** or **consume** open source tools.

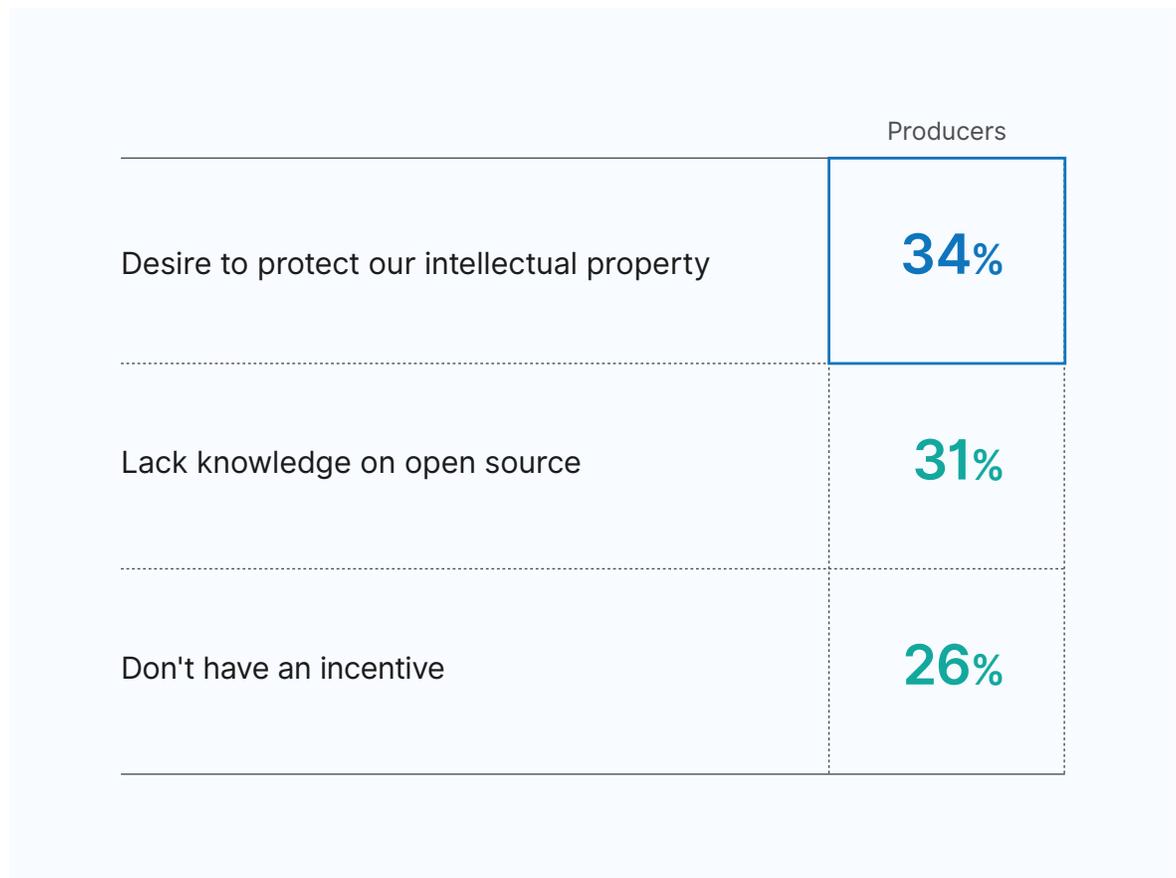
The organizations Candid and Immerlearn had concerns over open sourcing their software because losing intellectual property would cause them to lose a competitive edge in funding bids. Janet Gunter, a leader of the Restart Project said similarly, “OSS is relevant globally and can have a global impact, but many **funders** are unaware of this.” In one case, Restart received funding from the UK and South Africa to create OSS. However, a peer organization that used funding from another European country did not build upon Restart’s work and take ownership of the OSS product; instead, they built a similar, proprietary tool. If a stronger **funding** commitment were made to social sector organizations who are building the capacity needed to **produce** and **consume**



OSS, at the very least, it may encourage use and reuse of existing technology.

Survey results confirm this sentiment. The “desire to protect our intellectual property” was most often selected as a reason for social sector organizations choosing not to open source their software products. Optimistically, social sector actors working in technology said that they would consider open sourcing their software if they saw a positive social impact.

**Figure 11: Why producers don't open source their software**



The indirect benefits of open source collaboration, such as the organizational capacity gained and opportunities to leverage



local talent, are likely not to be considered in funding bids. As one expert explained, “There is little visibility into what happens in the field, including how needs evolve and how open source can be most adaptable.” Funders usually only evaluate a project at its beginning and end, and require predefined indicators before dispersing project funds. As a result, indicators to track indirect benefits of OSS are unlikely to make it into an RFP, and therefore remain unconsidered.

## Gaps in Social Sector OSS Funding Opportunities

Experts noted that technology in the social sector is still a relatively nascent intersection, and funders’ intolerance of failure is a result. While the commercial sector is willing and able to invest in technologies that may ultimately fail but provide valuable learnings, funders in the social sector are generally unwilling to do the same for promising technology. As James Vasile and Karl Fogel of Open Tech Strategies explained, not having a target failure rate that is more conducive to technological innovation and experimentation deters many social sector organizations from attempting to produce or consume OSS unless explicitly required.

Clayton Sims, CTO of Dimagi, (the company that develops CommCare), explained that **building new software is more easily funded than deploying more mature software that already fulfills requirements.** For example, Clayton recounted, “Earlier this year, we were told explicitly by a project that they chose to build a new app which replicated (with no new benefit) the functionality of an existing nearly-nation-wide system explicitly because they knew that building on the deployed system would not be perceived as ‘novel’ and would not receive funding.” This prevents social sector OSS from evolving and scaling, which in turn stunts long-term impact. Yaw Anokwa of the Open Data Kit



(ODK) open source platform, elaborated, saying it is very difficult to get funding for ODK's core development.

One expert noted funding **gaps for popular social sector OSS might be due to the cost to build applications, which often requires large code bases.** "If a donor puts in \$10 million to build things, and a project then needs \$2 million per year to sustain the core, then it is easy to see how projects run into funding problems. Compare this to many volunteer-led projects where maintainers who can get a \$100k in grant funding can be healthy and sustainable."

## Funders Are Not Set Up for Collaboration

Experts who have led OSS efforts in the social sector spoke often about how funders are not set up for collaboration. Evaluation frameworks, funding priorities, and national laws differ among funders. Due to privacy, funders cannot share donor information externally; bidders must instead submit proposals to multiple funders even if the topic or problem statement is similar. One expert who works with major funders also explained that **some funders do not have a way to reward the innovative use of technology or open source in proposals.** Another expert pointed out that **funders award bids based on the appearance of being a technology leader, rather than the actual ability to collaborate.**

## Sustainability Outside of Funding

A survey conducted for this paper found with significance that a "lack of support" was a top reason the social sector does not **consume** open source. Open Tech Strategies underscored this



challenge by saying, “Over and over, we hear that difficulty in finding consistent reliable technical support, like a vendor who will provide you with someone you can call when there's a problem, is an absolute deal breaker.”

**Figure 12: Why social sector organizations don't use open source**

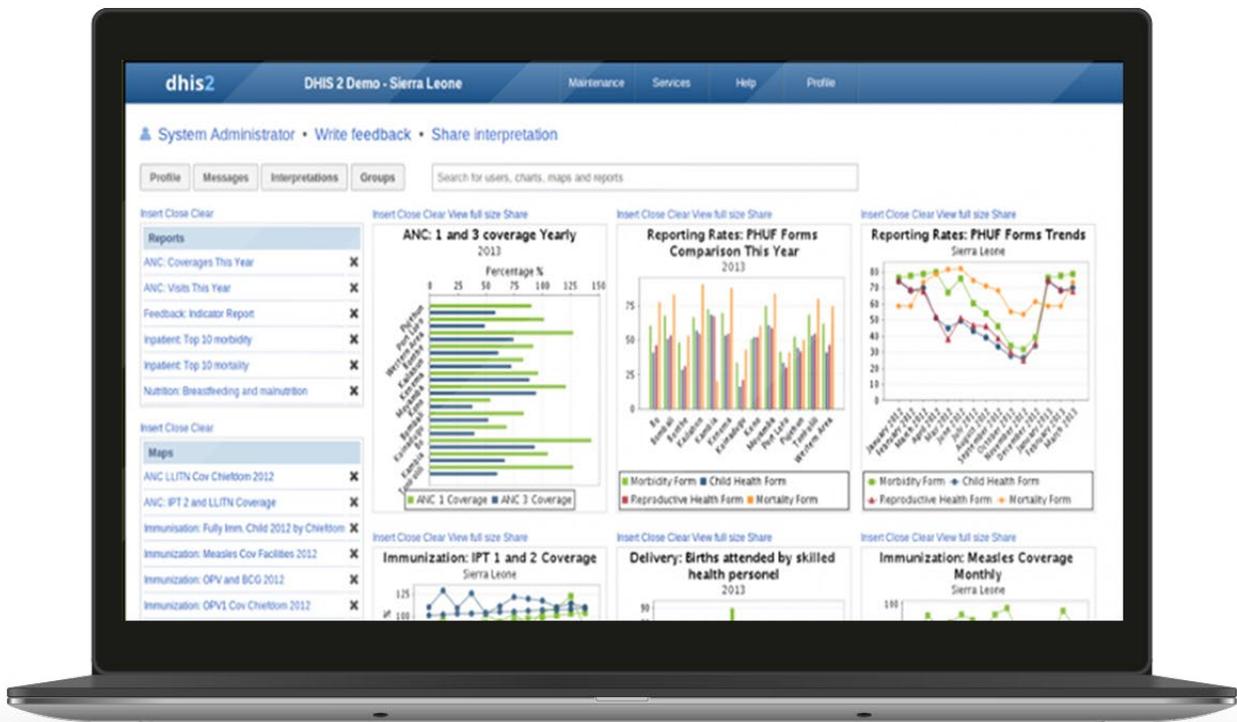
	Developers	Non-developers
Lack of support	60%	59%
Worried about data protection	25%	44%
Off-the-shelf tools meet our needs	23%	26%

The reasons why **producers** may not be able to provide the needed level of support to **consumers** is often a question of long-term sustainability. Hera Hussain, founder of Chayn, explained that the time to create adequate developer documentation,



onboard volunteers to Chayn’s methodology and work practices, and determine the level of developer commitment is a massive undertaking. For open source projects that galvanize around a social cause and not a specific technology, rarely does long-term, institutional funding materialize. This places the full burden of managing growth beyond grants on a few volunteers.

**Figure 13: DHIS2 Screenshot from Open Health News**



For organizations that **produce** OSS in the social sector, geographic factors play a role in sustainability. Jake Watson (a senior director at DIAL) explained that social sector OSS development (**production**) work can be unreliable and low paying,



making it hard to attract local talent in economically developing countries. Samson Goddy, co-founder of Open Source Community Africa (OSCA) and a native of Nigeria, noted that OSS initiatives for the social sector in sub-Saharan Africa are mainly driven by UN development projects pushing for diversity and inclusion. Most small NGOs do not have the budget to prioritize OSS outside of large INGO or donor funding, which means the employment opportunities to sustain African-led or African driven OSS remain spotty.

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## Spotlight: DHIS2

DHIS2 is the world's largest Health Management Information System (HMIS) and has been deployed to nearly half of the countries in the world.

**Success story:** DHIS2 is considered a core infrastructure technology in Ministries of Health around the world, which has given it unparalleled sustainability in the social sector.

**Challenge:** Continue funding its increasing scale within current countries and to new countries.

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One of the most widely used OSS in the social sector, DHIS2 has **navigated around sustainability issues in Africa by working directly with governments.** DHIS2 is the world's largest Health Management Information System (HMIS) and has been deployed to nearly half of the countries in the world. It has paid developers in five countries and a global community. Scott Russpatrick, the



DHIS2 Analytics Product Manager, explained the key to achieving such success was to understand the daily workflows and needs of health workers globally.

Using this strategy, DHIS2 worked with government health ministries to mainstream DHIS2 as a core infrastructural technology, which has brought in continuous donor funding. DHIS2 now offers more than 30 apps built in-house, plus approximately 100 externally-built apps. In contrast to others, Russpatrick does not see “free riders” as a problem, and instead says DHIS2 has focused on converting **consumers** into **producers** by creating drag-and-drop components that allow even non-coders to contribute back plugins or other apps. This in turn, he says, builds the community out and reinforces the sustainability of DHIS2.



# Opportunities for Funder Support and Sustainability

## Creating New Models

Dan Blah, Co-Founder Emeritus of the Open Technology Fund (OTF) **recognized the merit of separating out funding streams for user-facing OSS from infrastructural code.** He explained that user-facing apps—those for which a beneficiary is an end user—have very different use cases, measures of success, and scale than infrastructure code, like libraries or frameworks. OTF funded the popular open source user-facing app, Signal, through its Internet Freedom Fund. Through OTF’s Infrastructure Fund, OTF funded Signal’s core library, which is used across multiple apps. Dan attributes this unique funding combination as one reason why Signal’s user base grew greatly in only a few years. Dan emphasized **having developers as a direct part of the funding decision-making process enabled such innovation.**

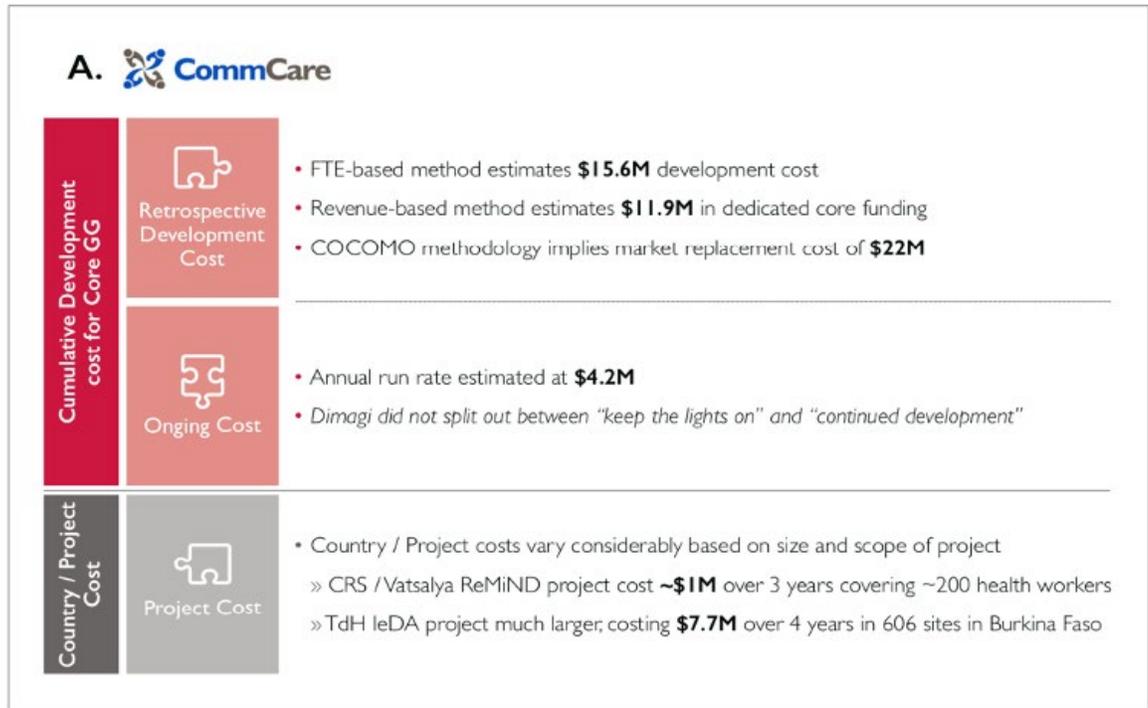
## Global Goods Valuation Framework

USAID’s Center for Innovation and Impact (CII) recently launched the Software Global Goods Valuation Framework that, “Takes a business-minded approach to fast-tracking the development, introduction, and scale-up of health interventions that address the world’s most important health challenges.”<sup>37</sup> By definition, a Software Global Good must be under a free and open source (FOSS) license. The framework is designed for investors (**funders**) and **producers** to bring transparency around FOSS **production**, and initial and ongoing maintenance costs.

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37 [www.usaid.gov/cii](http://www.usaid.gov/cii)



**Figure 14: CommCare cost estimate under the Software Valuation Framework**



## Diversify Funding Streams

Heath Arensen, Director of Business Sustainability at the Open Source Center at DIAL stressed that, "The most resilient organizations have a diversity of revenue streams...If you can have four or five sources of income or volunteer contributors, your project will be stronger. Don't say no to the grants altogether, but make sure you have several sources of sustainable revenue." Indeed, widely adopted social sector OSS such as CommCare, CiviCRM, and ODK diversified their revenue through multiple sources, including building consulting services around their OSS, providing the software as a service (SaaS) to paying customers, and relying on grants and donor funding on some level.



## General OSS Funding Opportunities

In addition to DIAL's Catalytic Grants previously mentioned, there are a number of funding opportunities for the greater OSS ecosystem. **GitHub Sponsors for Projects** allows any organization building OSS to receive financial compensation through the platform. **Two social sector organizations, Chayn and Hikaya, were part of the first cohort**, and Chayn has reported that it has already received sponsorship funds. Any social sector organization producing OSS can sign up for free at <https://github.com/sponsors>. More opportunities are available at the bottom of the Getting Paid section of the Open Source Guides.<sup>38</sup>

## Developer Volunteering Platforms

Ovio and DemocracyLab are two organizations dedicated to connecting volunteers with tech for social good volunteer opportunities. Ovio scrapes GitHub for volunteer opportunities in social sector organizations through its Explore platform. DemocracyLab builds partnerships with organizations in the local Seattle area to source opportunities. Participation is free on both platforms. While social sector organizations are cautioned to consider the sustainability of paid versus volunteer help, both platforms provide a valuable stopgap for short-term, unfunded asks.

## Adapt Commercial Models

Miller Abel, Deputy Director and Principal Technologist at the Gates Foundation, leads the Mojaloop project, which is OSS designed to increase interoperability among financial systems

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<sup>38</sup> <https://opensource.guide/getting-paid/>



and create more global financial inclusivity. Miller is working on a sustainability plan modeled after the Linux Foundation to have another legal entity take ownership of the Mojaloop IP and host the community. He has a plan for a business model that would continue sustaining the project past Gates Foundation grant funding.

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## Spotlight: Mojaloop

Mojaloop is OSS designed to increase interoperability of financial services and increase global financial inclusion.

**Success story:** Financial institutions and multinational organizations have built core infrastructure on Mojaloop, ensuring its sustainability.

**Challenge:** Coordination among the software teams at partner companies.

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**Figure 15: Screenshot of Mojaloop intro video, available at [mojaloop.io](https://mojaloop.io)**



## Academia and Social Sector OSS

The role of academia and open source is long and complex, and largely fell outside of the scope of this paper. One interesting example relevant to the social sector is the Rochester Institute of Technology's (RIT) LibreCorps, who UNICEF hired to help with their initiatives to improve the sustainability of open source projects they fund.<sup>39</sup>

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<sup>39</sup> <https://opensource.com/article/19/12/humanitarian-startups-open-source>



# Conclusion



Through an extensive research process, this paper aimed to uncover the mutual benefit, barriers, and opportunities of greater social sector and open source collaboration. Though the topic is not new, this paper serves as its most extensive known resource. As the social sector becomes more invested in digital technology to support and advance its programmatic and operational work, the need to continually and actively consider open source technologies is arguably more important than ever.<sup>40</sup>

Organizations such as DIAL, UNICEF, Dimagi, Open Technology Fund, and CiviCRM, among others, were repeatedly cited throughout the research as organizations that help form the foundation of open source in the social sector. However, many organizations, funders and individuals suggested social sector intersection with open source is largely unconnected and disparate, rather than solid communities.

Social sector industries are overwhelmingly dependent on grants and donors, and thus **funding** is one of the major obstacles to strengthening social sector open source. The Principles for Digital Development are an important step forward. The challenge now lies in adapting funding to procurement, ongoing development and maintenance **production** costs, and **consumption** realities of social sector OSS globally. Otherwise, the principle of “open” in the social sector may not be realized in practice.

With more appropriate **funding**, OSS in the social sector can help fill more social sector programmatic and operational technology

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40 At the time this report was published, the COVID-19 pandemic was rapidly evolving globally, making collaborative, remote work in the social sector critical. Check the GitHub blog and join the Open Source for Good listserv at <https://socialimpact.github.com> for regular updates on COVID-19 open source projects.



needs. Equally important, OSS **consumption** and **production** can build the technology capacity of social sector actors, create more diverse paid opportunities in economically developing countries, and diversify greater open source communities.

Optimistically, the authors of this paper were easily able to connect with many social sector OSS practitioners who were willing and able to offer their expert opinions. The passion and dedication of these **producers, consumers, and funders** will undoubtedly drive forward the advancement of OSS in the social sector, and ultimately strengthen technology for the social sector.

