

## Makers Project — Research Findings | Arc II

### Decentralized Web – Challenges to Use and Access

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This report is funded by a grant from the FileCoin Foundation,<sup>1</sup> which, among other activities, supports a short research inquiry into the use and applications (or potential applications) of decentralized web technology (DWeb) in the nonprofit sector. Thus far, we have spoken to a number of people who are already engaged with using DWeb technology and who either work in or with nonprofits. For this phase of our research, which was preceded by a rigorous literature review on the topic, our goal was to collect information from different parties on their understanding, uses, and overall experience surrounding DWeb, specifically, the challenges and barriers faced by different actors when implementing decentralized technologies in their nonprofit work.

DWeb involves a reorganization of the Internet using peer-to-peer infrastructure rather than centralized data hosting services.<sup>2</sup> Despite nonprofit organizations traditionally being excluded from the development of DWeb technologies,<sup>3</sup> their considerations are relevant to TechSoup and other stakeholders because they provide insights that can inform future actions regarding DWeb applications in the nonprofit sector.

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<sup>1</sup> For more information visit this website: <https://ffdweb.org/>.

<sup>2</sup> More information can be found [in this article on Mozilla Hacks](#).

<sup>3</sup> Dhillon, V., Metcalf, D., & Hooper, M. (2021). Decentralized Organizations. In *Blockchain Enabled Applications*. Apress. [https://doi.org/10.1007/978-1-4842-6534-5\\_5](https://doi.org/10.1007/978-1-4842-6534-5_5)



In order to learn more about these different groups' perceptions of DWeb as it relates to the challenges and barriers to their use and adoption by nonprofits, we conducted several interviews with consultants ( $n=4$ ), representatives from different nonprofit organizations ( $n=5$ ), founders of tech companies ( $n=5$ ), developers ( $n=1$ ), and academics ( $n=2$ ).<sup>4</sup> These resulted in a multifaceted understanding of the different uses and perceptions of DWeb in the nonprofit sector. To triangulate our findings, the research team held weekly meetings to discuss the content of the interviews and reflect on our findings. This iterative process allowed us to attune to the similarities and differences of the multiple stakeholders occupying the DWeb space.

We had the following objectives for the interviews:

- to understand the perceptions of organizations and developers around decentralized technologies
- to understand NGOs' experiences deploying DWeb technologies
- to develop a deeper understanding of the different actors in the DWeb space
- to synthesize understandings and formulate ideas to increase future adoption in the NPO space

## Methods

To recruit research participants, we followed a convenience sampling technique in which participants in this study responded to a LinkedIn post by a person working with numerous makers in the DWeb space for an online event. A recruiting email was sent to all participants of that event, and those who responded were scheduled for an interview. The following research questions guided our semistructured interviews.<sup>5</sup>

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<sup>4</sup> Some of these interviewees fit into more than one category, e.g., "founder and consultant."

<sup>5</sup> The interviews were prefaced by a brief explanation of our project and a short introduction of the researchers. [See the slide deck.](#)



- What are the barriers to the adoption of decentralized technologies?
- How did these barriers impact the adoption of open-source technologies previously?
- Are organizations already using open-source technologies more receptive to the use/adoption of decentralized technologies?

Asking these questions allowed lively and informative conversations to ensue. Since our goal for Arc II of this research project was to collect data on the challenges and barriers related to using and adopting new technologies by nonprofit organizations around the globe, the qualitative, semistructured interviews added deeper insights regarding user interface in DWeb products, tax challenges, and legal compliance involving the use of DWeb technologies by nonprofits.

With this in mind and focusing mainly on the challenges and barriers to the use and access of DWeb technologies, in Arc II of the Makers Research Project, we collected data through virtual interviews on Zoom.<sup>6</sup> We conducted 11 interviews in total. Most of the research participants were in the U.S. and based in the following states: North Carolina ( $n=1$ ), Texas ( $n=1$ ), Iowa ( $n=1$ ), Washington ( $n=1$ ), California ( $n=1$ ), and Oregon ( $n=1$ ). To increase diversity in representation, we also talked to participants in Brazil ( $n=1$ ), Canada ( $n=1$ ), Mexico ( $n=1$ ), and Nigeria ( $n=2$ ). Each interview was recorded and uploaded into the project folder on the Box platform for further analysis. The following steps ensured that data was securely stored and ready to be analyzed by the research team:

1. Participants scheduled interviews via Bookings by Microsoft.
2. Interviews were held on Zoom.

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<sup>6</sup> We shared information about the interview on LinkedIn and sent emails directly to NGO-related personnel for the second round of interviews.



3. Interviews started with a brief introduction of the researchers and a brief description of the project along with its purpose.
4. Participants ( $n=11$ ) were asked if they agreed to take part in the recorded interview and were then informed that their information would be anonymized.
5. All interview files were saved into a Box folder.<sup>7</sup>
6. Interviews were conducted in English and transcribed with Otter.AI.
7. Interview transcripts and notes were coded in MAXQDA.<sup>8</sup>

Table 1 shows detailed information about the length of each interview conducted in the scope of research Arc II.

**Table 1**

*Length of Interviews in Research Arc II*

File	Duration
Interview #1	29'59"
Interview #2	42'
Interview #3	51'21"
Interview #4	36'36"
Interview #5	34'23"
Interview #6	41'14"
Interview #7	32'22"
Interview #8	1h6'20"
Interview #9	25'09"
Interview #10	31'29"

<sup>7</sup> We'll retain all interview files until the end of the research project (April 2024).

<sup>8</sup> MAXQDA is qualitative data analysis software.



Interview #11

27'12"

The following codes with their corresponding definitions were used to group information during the qualitative analysis in MAXQDA:

- Introductions: Who is this person? How did they get to DWeb?
- Definitions: How does this person define DWeb and other technologies associated with DWeb?
- Examples: Ways research participants illustrate DWeb concepts and ideas to a general audience<sup>9</sup>
- Critiques: Negative commentary of DWeb
- Benefits: Factors that were perceived as advantageous to users of DWeb<sup>10</sup>
- Future: Topics related to the potential of these technologies
- Challenges and Barriers:
  - Barriers to public adoption and DWeb
  - Challenges encountered during DWeb adoption

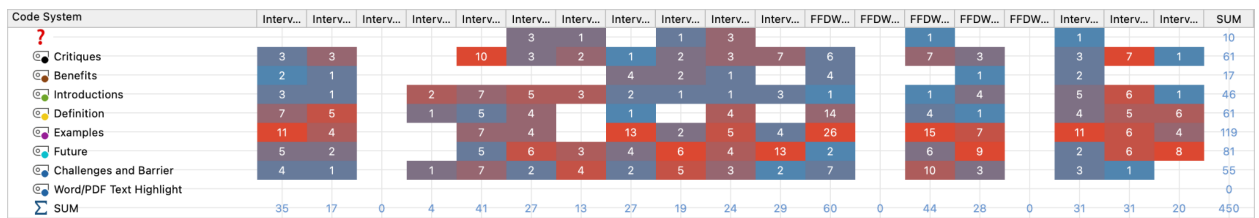
The specific frequency of each code is noted in Figure 1.

## Figure 1

*Code Matrix Generated on MAXQDA*

<sup>9</sup> Examples also included something bad or a critique, such as when the interviewee criticized centralized technologies or the dominance of a segment by a company such as Google or Meta.

<sup>10</sup> This code overlaps with "future." This code refers to individual, industrial, and nonprofit perceived benefits.



Note: Vertical lines indicate the interviews (1 to 11). The color blue indicates a lower frequency of a certain code, and red indicates a higher frequency of the code. When more than one code has been attributed to the same section of a text, the color will be a mix of red and blue.

## Research Findings

The initial results stem from the analysis of interview transcripts and interview notes, which are summarized below with brief descriptions.

### User Interface Is a Barrier to the Adoption of DWeb Technologies

“The challenge is to get people to engage with DWeb without realizing they’re doing that from a design standpoint” (Interviewee 6).

### Interfaces Need to Be Easy to Use and Intuitive, Like Popular Social Media Platforms

“You need to be able to explain something to your grandma in less than 5 minutes” (Interviewee 4). As another example, Interviewee 6 mentioned how Facebook and social media, in general, have trained users to interact with their feeds. According to them, “DWeb applications should follow a similar design approach to capture this audience. Interfaces need to be easy to use and intuitive like popular social media platforms.” Also, “I think for this technology to achieve its full potential, that barrier has to be reduced; you have to make stuff that's intuitive that you can explain to people easily and quickly” (Interviewee 6).

### The Term “Hybrid Technologies” Is More Accurate Than “Decentralized Technologies”

Participants were critical of DWeb advancements and affirmed that DWeb is rather a hybrid approach that still relies on centralized technologies. “A lot of people think that



decentralization is here, it doesn't exist. Like it's here, but it doesn't necessarily exist, a lot of it is hybrid" (Interviewee 5). This has led some makers to act cautiously in this "hybrid" terrain. "We're not there yet, and this or that system will be gone in a year" (Interviewee 5).

### **Disappointment in the Face of Lack of Regulation**

The existing regulation of certain DWeb products in the U.S., such as crypto, is causing some confusion to potentially interested users in the nonprofit sector. U.S.-based interviewees ( $n=6$ ) mentioned disappointment in the face of the current lack of regulation of digital products while at the same time voicing concern about the way uninformed lawmakers have conducted important trials of digital platforms such as TikTok, Google, and Facebook in the past few years. These are factors we have identified as barriers for the development of a 100% DWeb environment, and there may likely be more to be discovered.

### **There Are Concerns Related to Privacy and Legal Compliance**

There is concern in the realm of legal compliance and privacy as it relates to DWeb, and organizations need support and advice to address it. "So one of the major concerns that we have with decentralization is, you know, how this balances censorship versus privacy considerations. ... And so when you have content that may be sensitive ... we don't want to have that in the blockchain, because of privacy considerations and even human rights considerations" (Interviewee 11). In order to increase adoption by organizations, concerns surrounding legal compliance with DWeb technologies must be addressed with direct advice and support.

### **Additional Facts to Consider**



At the end of each interview, research participants were asked if they had any questions for us. Four interviewees asked us questions about the role of TechSoup in the DWeb sector, as well as the interest of the TechSoup Global Network in this field. Four participants suggested that TechSoup's rapport in the nonprofit realm could advance the adoption of crypto in a direct way. "Even if they wrote about it in a newsletter" (Interviewee 2), it could impact the perception of crypto by nonprofits in a positive way. These research participants were eager to contribute to TechSoup's efforts to expand into the domain of decentralized finance in different ways, such as through advocacy, consultancy, and the development of new tools.

### **Discussion and Insights**

This research developed a deeper understanding of the challenges and barriers to DWeb use and adoption in the nonprofit sector. Insights are derived from a variety of representatives, including different organizations, researchers, and consultants who are directly involved with DWeb services and investigate trends and insights involving their work and perceptions of this field. The main findings of our research highlight a need to improve user interface and experience as they refer to DWeb applications. The lack of regulation of DWeb also appeared as a challenge to the adoption of DWeb technologies by nonprofits.<sup>11</sup>

A more detailed analysis of each finding follows in this section.

#### **Lack of Regulation**

Six of our research participants expressed concern about the lack of regulation on decentralized technologies. For interviewees based in the U.S. and Canada, the lack of regulation makes it harder for their organization to fully transition to a decentralized space. The

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<sup>11</sup> We believe future research should focus on what kind of regulation would encourage users to migrate to this space.





lack of regulation is preventing a fully decentralized internet. Responses suggest a fear of losing data and having to pay hefty fees since tax laws regarding digital currencies are not well developed.<sup>12</sup> This contributes to negative perceptions of digital assets that could be mitigated by better tax laws.

### **Interface and User Experience**

Three participants acknowledged the complexity of DWeb products, making user experience difficult and impacting understanding of DWeb itself. Interviewees explained that these platforms are very unfamiliar to most users in terms of aesthetics and functional interface. This suggests the user interface of these apps is currently underdeveloped due, in part, to most DWeb adherents being generally more technically literate than its target users. Additionally, this may impact NGOs more significantly, and addressing it by integrating more of their specific feedback could improve perceptions, usability, understanding, and adoption rates.

NGOs noted a lack of technical fluency in DWeb applications,<sup>13</sup> which means that many NGOs interested in decentralized applications (DApps) or receiving donated digital assets must either devote their limited and overworked staff attention to learning about decentralized systems or they need to hire outside consultants. Similarly, Interviewee 4 suggested that users “want cheap products that are not difficult to use.” Subsequently, the proposed interfaces should be intuitive and similar to the centralized programs they are used to if the goal is to increase adoption in this space.

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<sup>12</sup> Interviewees 1 and 2 mentioned that potential fees and taxes could contribute to negative perceptions of DWeb especially as it relates to financial applications. Both interviewees were from Nigeria. Interviewee 2 also highlighted that the Nigerian Naira (national currency) was weak if compared to U.S. dollars.

<sup>13</sup> McGuinness, T. D., & Schank, H. (2021). *Power to the public: The promise of public interest technology*. Princeton University Press.



## Training and Education

Training and education are huge barriers impeding the adoption of decentralized technologies. All the consultants we spoke with ( $n=4$ ) highlighted that there are many technologies available, especially as related to finance, and it is difficult for small NGOs to select a technology that's appropriate for their case, as demonstrated by the vast array of available possibilities (Interviewees 1, 2, 3, and 5).<sup>14</sup> For these four interviewees, training and education go beyond the need to make DWeb technologies more like social media regarding UX and interface. According to them, NGOs lack understanding of what DWeb is, what it does, and its potential.

## Costs/Environment

Especially for interviewees located outside of the U.S., the cost was a major barrier impacting the adoption of DWeb technologies. Because of the U.S.-centric transaction system in place, conversion rates for other national currencies limit buying and exchanging power. Therefore, the cost negatively impacts users located in countries with weaker currencies. When it comes to the environmental impact of DWeb technologies, all the participants considered the benefits of decentralized technologies to outweigh the possible environmental impact of such technologies, even though current research<sup>15</sup> suggests decentralized technology requires a significantly higher usage of energy than older technologies.<sup>16</sup> Other participants (Interviewees 2, 5, and 9), however, mentioned a factor that may explain this lack of concern: the expanding

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<sup>14</sup> It's important to consider that consultants' primary business is to provide advice and services in their area of expertise. With this in mind, two of our interviewees (Interviewees 2 and 3) mentioned selling online classes and writing educational material related to decentralized finances, namely, crypto and NFT. These interviewees also mentioned every organization and individual interested in DWeb should work closely with a consultant to address their specific issues, goals, and concerns, as they relate to DWeb.

<sup>15</sup> [Ecological Awareness for the Decentralized Web | Internet Archive Blogs](#).

<sup>16</sup> More information can be accessed at [Cambridge Bitcoin Electricity Consumption Index \(CBECI\)](#).



use of validation of ledgers (IIRC) has recently reduced the power costs of blockchain, as some of our interviewees mentioned.

### **Different Terms to Address Decentralized Technologies**

When it comes to the terms used to refer to and describe DWeb technologies, there were no agreements, and research participants sometimes used different terminologies to refer to the same technologies. For instance, all the consultants ( $n=4$ ) used the term “Web3” to address applications made possible due to the existence of blockchain. Though consultants consistently use these terms, people outside of that realm do not. Consultants also mentioned the words *crypto* and the acronym *NFTs*. Other participants, on the other hand ( $n=4$ ), do not want to be associated with either of these words and demonstrated concern over DWeb being solely associated with crypto. In short, terminologies associated with crypto result in hesitation that may interfere with the future adoption of DWeb technologies.

### **Conclusion**

In sum, our research reveals that regulation will improve financial transactions and exchange power and will undoubtedly require education and training, which will help if in conjunction with UI/UX improvements for increased adoption by CSOs. The increased user adoption will best be served by increasing environmental mitigations. Organizations interested in expanding DWeb use and access should consider these factors as they design new technologies, as they should also consider the environmental impact of their applications.



## Appendix A

### Next Steps: Arc III

In Arc III of this project, we will consider a CSO-relevant application of DWeb tech, such as community archives.

Community archives are community-led efforts that aim to collect categories of materials with the goal of documenting one aspect important to that community or organization.<sup>17</sup> For this phase of the project, we will focus on the Internet Archive and Wikimedia as successful examples of the potential of decentralized technologies to promote community-led projects.<sup>18</sup>

Our objective is to conduct interviews with personnel at both organizations to gain insight into how these two organizations have been structured in a decentralized format and whether other groups can replicate this model.

We also plan on conducting rapid ethnographies<sup>19</sup> and participant observation in local community archives based in Oregon. Here, our goal is to pay attention to and document community archives trends in relation to decentralized technologies firsthand.

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<sup>17</sup> Gilliland, A., & Flinn, A. (2013, October). Community archives: What are we really talking about? Retrieved from CIRN Prato Community Informatics Conference. Also: Caswell, M. (2014). Community-centered collecting: finding out what communities want from community archives. *Proceedings of the American Society for Information Science and Technology*, 51(1), 1-9.

<sup>18</sup> We will start by focusing on these two projects since they're built around decentralized technologies. We also understand there are community archives that don't have a decentralized approach, in this case, our goal would be to learn from them about their interests in engaging with these technologies.

<sup>19</sup> Vindrola-Padros, C. (2021). *Rapid ethnographies: A practical guide*. Cambridge University Press.