

Exploring Sustainable Technology Commons using Appreciative Inquiry

A White Paper from Rebooting the Web of Trust VI

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INTRODUCTION

Technology Commons are critical for the development of technology that is used across platforms, companies, and industries. In the internet age, corporations structured around monetizing defensible intellectual property frequently utilize common technology to produce innovative products that work across shared infrastructure, including most of the core platforms and building blocks of what we know as the internet industry. These technology commons include the Internet and the standards that make it run. There are several standards bodies that support the development of these standards, primarily the IETF, W3C, and OASIS.

The W3C defined web standards that could be used by everyone (including companies, individuals, nonprofits, governments) for the creation of the web. As one common saying summarized the thinking of the early 00s, “Nobody owns it, everyone can use it, and everyone can improve it.”

Technology commons come in a variety of flavors and have achieved varying levels of financial success. For-profit corporate activities have in few historical cases been set up with a financial feedback mechanism to support the commons upon which they depend and capitalize. Why do the commons and the technology sectors’ available forms of capitalism act as incompatible as oil and water, even though they support each other’s aims? When capitalist benefactors support the technology commons that they utilize, it creates a sustainable and thriving commons which enables and supports additional



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capitalistic technology innovation.

Having worked on both sides of the equation, the authors of this piece propose a vocabulary to nourish these interactions between the two sides; identified characteristics of a sustainable technology commons; identified commons models and variations; applied Appreciative Inquiry principles to one commons model; and identified future research areas.

WHAT IS A TECHNOLOGY COMMONS?

We identified four characteristics of sustainable technology commons. These characteristics grow in an atmosphere of identity and autonomy, yet the pressures of interfacing with existing systems (data systems but also systems of intellectual property and/or social control and capital capture) make them feel like distant abstractions in 2018.

- **Re-decentralization:** this term names the reverse trend away from our current web ecosystem driven by privacy-poor, capital-rich big-data players and towards decentralized forms of the Web, ideally via self-sovereign technology that distributes data power and governance downward. It is the counter-trend to centralized web services successfully deployed by a few massively powerful corporations (e.g. Google, Amazon), and is often construed in cultural and ideological terms as a return towards the attitude of the early internet.
- **Sustainable Capitalism:** sustainable technologies foster sustainable forms of capitalism and intellectual property. These forms consider economic externalities and end-to-end infrastructural costs and include them in their calculations of market ROI. They protect the standards process from financial influence (regulatory capture), while leveraging market diversity/competition and production, without harming the commons.
- **Infrastructure:** elaborating on the last point, these interactions of capital and the common good would need to treat specifications and protocols as a public infrastructure, and thus consider all web users as sovereign stakeholders. By this analogy, internet and other information technology protocols are similar to roads and other essential infrastructure that is used by many entities and people.
- **Human Dignity:** protecting privacy and self-sovereignty are an information protocol's duty to human dignity, as many aspects of individual and family health, property rights, and political participation hinge upon privacy and control over one's own data in ways both culturally-specific and protected by international law. Much as economic externalities have been excluded from the economic calculus of private corporations operating on a broader public, so too have the rights of individuals fallen neatly outside the ethical consideration of technological projects scoped only by their direct litigative and regulatory obligations, typically referred to as compliance.

To understand what works in the real world, we identified existing technology commons in which we participate firsthand and applied a form of Appreciative Inquiry. We have tried to apply terminology consistent with Christopher Allen's adaptation of Nobel Laureate Elinor Ostrom's "8 principles of Commons Governance" as spelled out in his succinct 2015 blog post, available [here](#).

Current Technology Commons Models

Commons are many and vary in the models that they apply, how they are used, and who uses them. The authors identified multiple commons and commons-adjacent models of IT development and variations within those models used to build/design trust systems and protocols.

Ad-hoc Technology R&D: Like-minded people organically create communities to explore new technology. These communities can start inside another community or due to the death of a community. The Internet Identity Workshop (IIW) and Rebooting Web of Trust (RWoT) are two examples of community-created technology commons. IIW in particular has been a spawning ground for new protocols, incubating ongoing work and the formation of associations for the general benefit of the broad digital identity space.

The boundaries and technology ownership in these communities are often vague and there tends to be less corporate control of products created within the community. Participants tend to be early adopters exploring the bleeding edge of new technology. Participants may come from company technology divisions, however they are rarely expected by their employers to return significant economic benefit.

We identified the following variations to this base model. Variations are not mutually exclusive:

- Benevolent Dictator: one or a small number of primary organizer(s) take(s) the main leadership role, primarily for altruistic, ideological, or other non-monetary motivation.
- Do-Ocracy: a peer to peer volunteerism model, where the people doing the work make the decisions, often in a very ad hoc or social/informal governance model.
- Blockchain and Fat Protocols: a new model that structures ownership and governance of a project around a central ledger. One key trait of this model is the potential to issue residual payments and governance to contributors over time, independent of traditional employment or stock ownership; theoretically, this could include sending residuals back to a commons or collective contributor post-factum.

Examples: RWoT, IIW, Digital Life Collective, other public blockchains.

Open Standards: Open standards are the development of approved standards that are open and available to the public. They can be thought of as public infrastructure. Regulators enforce regulations and depend on industries to write the standards to support the regulations. Regulatory capture can occur when the people writing the standards hold regulators hostage to use their standards.

An example of regulatory capture can be seen in health records interoperability. Health records themselves are specific to the health vertical and need to be developed by healthcare industry incumbents. Patient and physician identity and authorization protocols however are not specific to the healthcare industry and could be left to others. This, however reduces the market power of the healthcare incumbents so they prefer to reinvent or “enhance” authentication and authorization standards to raise the barrier to entry.

We believe involving multiple stakeholders in the standards process can help address this issue; however in the end only implementers, typically industry, can create useful standards. Layered (scope-specific) standards are more resistant to the corrosive influence of regulatory capture. This is a problem in healthcare and other verticals where commerce is not built on mostly open-source technologies.

Another problem occurs when these standard groups ignore history and the experience of adjacent groups activities, mainly due to interpersonal power dynamics and differing objectives.

Examples: Open-stand.org, Internet Engineering Task Force, HTML, IP, TCP.

Regulatory capture example: HL7 mixing data model and authorization to lock out innovation based on non-healthcare standards like UMA (User-Managed Access).

Government Funded R&D: The U.S. government has a history of investing in new technology standards to support a diverse and competitive marketplace. One goal of these investments is to support the development of interoperable technology and technology standards that otherwise would not be developed by competitive corners of the free market.

Examples: DHS S&T Investments: Digital Bazaar/VeresOne, Evernym/Sovrin, Open Whisper Systems (Signal protocol), Tor.

Open Source: It has been argued that open-source code bases in practice are often driven by and structured to maximize how large companies benefit from sharing one large code base for core infrastructure elements. Prominent examples include the Apache Web Server (which serves over 90% of the conventional web at time of press) and the Linux Operating System. Almost all large web and tech firms significantly reduce their costs by sharing infrastructural code with each other while competing at the edges of the product. For example, companies like IBM sell their own Web Servers based on Apache. This dual-licensing model (partly proprietary, partly open) enabled by BSD-style licenses uses proprietary licensing fees to pay back into open-source development costs. A common pattern is that companies pay a developer's salary while they work full time on the open-source code base that has applications for its own proprietary business model.

For projects with less obvious proprietary/monetizable applications, the open-source model has had more limited economic success. The question remains: how to compensate developers who are not working for a large company that leverages the open-source code base.

Examples: Linux, Apache, Drupal, WordPress.

Commons-Adjacent Business Models

In addition to true commons models, we identified a variety of for-profit models that are “commons-adjacent”.

Corporate Non-Profit (e.g. SWIFT), Corporate Co-Op (variation): A top-down approach, this is a model where a non-profit representing a consortium of corporate interests is created to solve common technology and/or informational infrastructure problems for the benefit of member organizations. This closed process produces standards that may or may not be open when finalized. The jointly-developed technology can also be licensed or sold on a for-profit basis for the benefit of the consortium companies.

While sharing infrastructure costs, these entities may find themselves starved of resources or limited in their ability to explore new technology solutions due to political goals of stakeholder companies (that generally drive resource allocation and development timelines) without much consideration for other stakeholders like end-users and regulatory bodies.

Examples: Swift, CableLabs.

Closed Technology: A company develops technology to be used by others but is restrictive as to how and who can use it. This is generally seen as a negative in the tech world but one of the most successful software platforms — the Apple App Store — utilizes this. This enables Apple to have complete control over what third party applications are allowed and distributed through their platform, retaining the power to revoke and remove that app from previous installations on their hardware. Because Apple owns the hardware and software they are able to retain this power while opening up the platform to

developers who follow their rules.

Example: Apple App Store

APPRECIATIVE INQUIRY ON AD-HOC TECHNOLOGY MODELS

To understand the positive effects of existing technology commons, we applied Appreciative Inquiry Principles. We limited the scope of this paper to fit into RWoT time, focusing our area of inquiry on the ad-hoc technology R&D community model. Using RWoT, IIW, and Digital Life Collective as examples, we selected the positive aspects across these instances.

While we worked from a limited set of examples, the authors have deep knowledge about them due to the longevity of the events and author participation. We use this starting point as a basis for our inquiry and invite others to build upon it.

Appreciative Inquiry Principles

We utilized the five principles for each example.

- The **Constructivist Principle** is the rule that we see the world as we are: our interior state, our mores, values, and experiences create the lens through which we view the world.
- The **Poetic Principle** says what we focus on grows.
- The **Simultaneity Principle** is the rule that when we ask questions we have already begun to change. We like to think of this as change in-flight. Change doesn't happen in a vacuum or only in a certain segment of a process. Change is happening all the time, at any stage of the process. How is your participation changing you right now?
- The **Anticipatory Principle** is the rule that what we believe, we conceive.
- The **Positive Principle** is where we identify and leverage strengths. We like to remember the successes we have already experienced as part of history.

Appreciative Inquiry Model	RWoT: workshop focused on co-developing technology papers	IIW: unconference for User Centric Digital Identity	DigiLife: community building technology with decentralized web values
Constructivist Principle: we see the world as we are	Focused on outcomes, developing ideas.	A space for signals about digital identity to be voiced/named. Grassroots. Sustainable business model (with no exit).	Create governance that assigns resources, investments, tracks reputation and credit, using ledgers instead of money itself.
Poetic Principle: what we focus on grows	Developing ideas. Deliverables: Specs, Papers, Prototype examples. Making the community sustainable.	Exploring the edge of what is possible in digital identity with the technology available.	Sustainable capitalism and IP. Growing resources / membership to fund and build the technology.
Simultaneity Principle: the questions we ask cause us to change.	How can we be more sustainable?	What comes after federation? What is new? What is emerging? What new technology and ideas gives the community energy?	What are our new models of capitalization? How can new models be found?
Anticipatory Principle: what we believe, we conceive.	By working together, we can do it better and each of us can individually benefit.	Participants learn something new. It's always going to be around. Low barrier for entry/participation.	Capitalism will not create technology we trust. We have to create it cooperatively.
Positive Principle: identify and leverage strengths.	Things are happening, people are working, we are moving the spec forward together.	Huge community. Amplifies ideas developing on the edges. Has longevity and sustainability. IIW gives space to others for disparate agendas.	Review and vet new technology. Build bridges across nascent technologies.

The three examples are similar in that each group actively explores the bleeding edge of their chosen topic through an open community. However, the groups utilize different governance models, have different community longevity, and focus on different outcomes.

AREAS FOR FURTHER RESEARCH

The initial RWOT topic paper proposed to apply AI to all commons models. However to keep our work in scope with the time available at RWOT, we applied AI to the ad hoc technology common models. We identify the following four areas for follow-up inquiry.

1. Identify a feature set for technology rooted in a sustainable commons.
Once we understand the characteristics of a sustainable technology commons, we can draft a set of requirements or use cases that identify technology may be able to “solve” and sustain.
2. Apply Appreciative Inquiry on more of the identified commons models (identified in Part 2).
3. Apply Appreciative Inquiry on RWoT’s Self-sovereign Identity architecture as it is currently being conceived and planned. At IIW in April 2018, a session exploring Self-overseign Identity was held and a link to notes is in the Bibliography.
4. Explore artificial intelligence as a technology method for the identification and measurement of market externalities.

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About Rebooting the Web of Trust

This paper was produced as part of the [Rebooting the Web of Trust VI](#) design workshop. On March 6th to 8th, 2018, over 40 tech visionaries came together in Santa Barbara, California to talk about the future of decentralized trust on the internet with the goal of writing 3-5 white papers and specs. This is one of them.

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What's Next?

The design workshop and this paper are just starting points for Rebooting the Web of Trust. If you have any comments, thoughts, or expansions on this paper, please post them to our GitHub issues page:

<https://github.com/WebOfTrustInfo/rebooting-the-web-of-trust-spring2018/issues>

The next Rebooting the Web of Trust design workshop is scheduled for for Fall 2018. If you'd like to be involved or would like to help sponsor these events, email:

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