THE ECONOMIC AND ENVIRON-MENTAL SUSTAINABILITY OF DIGITAL COMMONS.

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O'NEIL BROCA CAI DALY RIKAP SHULZ ZACCHIROLI

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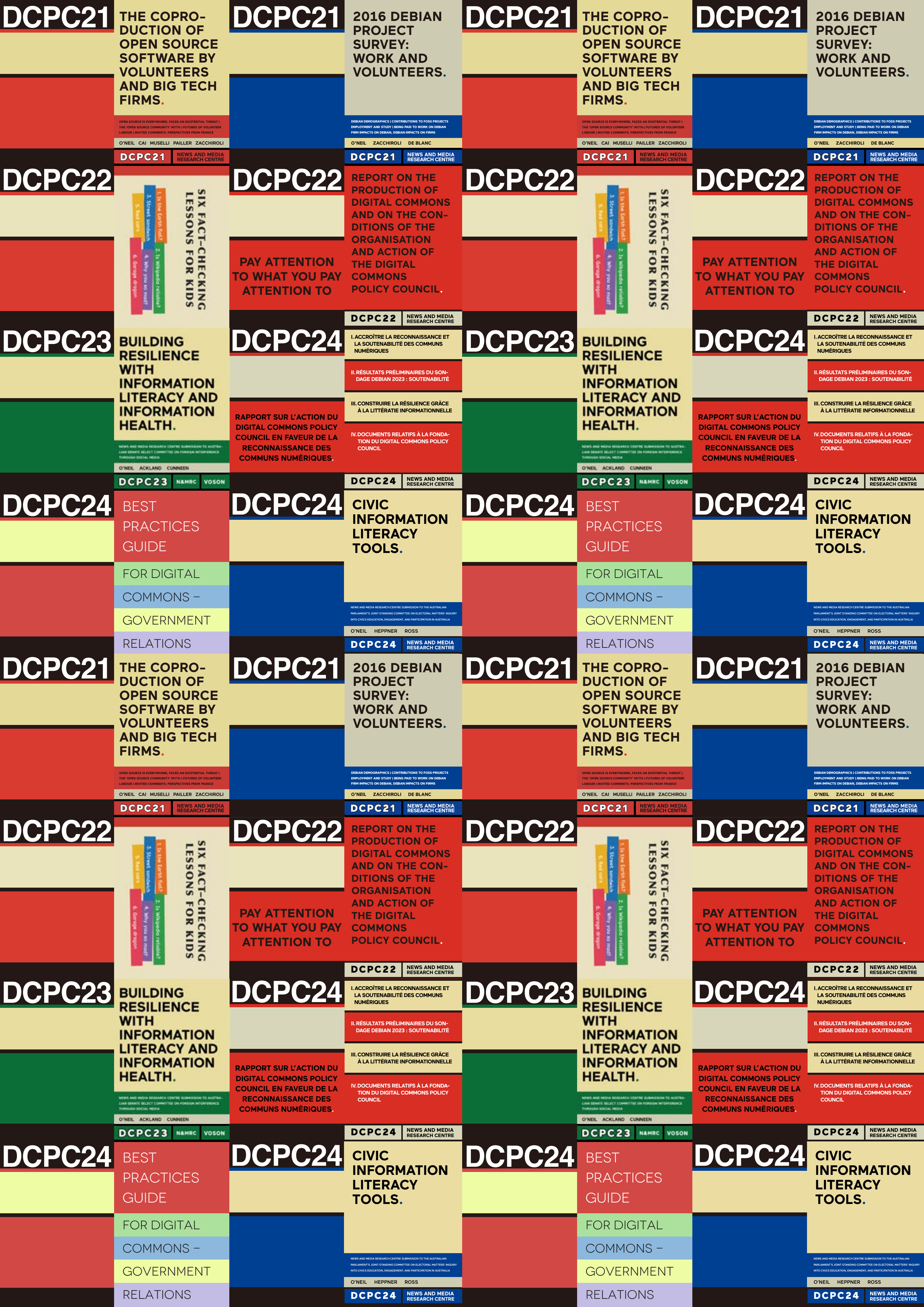
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THE ECONOMIC AND ENVIRONMENTAL SUSTAINABILITY OF DIGITAL COMMONS

LESSONS FROM THE 2023 DEBIAN PROJECT SURVEY

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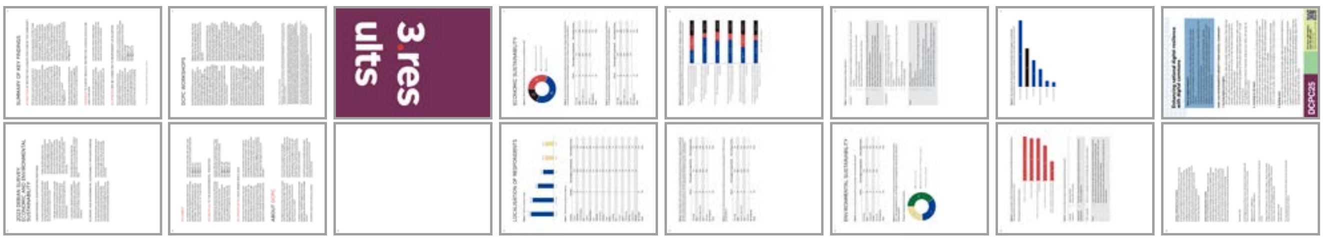

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ABOUT DIGITAL COMMONS

Digital commons are shared information and knowledge resources such as data, software and cultural content

Liberal democratic institutions are seen by many citizens as opaque and elitist, leading to widespread crises of trust and confidence. Digital commons[1] practically implement democratic principles of transparency, accountability and participation.

Famous examples of digital commons include Linux (free, libre and open source software or FLOSS), Firefox (Web browser), Wikipedia (online encyclopedia), OpenStreetMap (geographic database) and LibreOffice (office suite). Contemporary technological innovation relies on open source software (OSS). Consider the 'LAMP' open source Web application acronym (Linux, Apache, MySQL, Perl/PHP/Python): Google owes its dominance to Linux (used in Android and Chrome); Apache powers 25% of the Internet's Web servers; without the MySQL database, there would be no online commerce (Amazon, Paypal), social media (Facebook, LinkedIn, X), or so-called 'sharing economy' (Uber, Yelp); Perl/PHP/Python are popular programming languages. Finally open source Python libraries such as PyTorch, Scikit-learn and TensorFlow are key to AI development.

Digital commons are produced and managed for collective use, and to be modified and redistributed as needed

The collaborative co-creation of digital commons illustrates how people from all over the world can work together to create valuable resources which anyone can use. The shape of these resources is directed by the requirements of the producing community: the objectives and outcomes of projects primarily reflect the demands of their initial contributors, who are also its prime beneficiaries. On the one hand this means resources are not always, in the first instance, 'user-friendly,' so they may be reserved for a technically proficient minority. On the other hand, this integrity of product and process results in exceptional robustness, and digital commons have been widely adopted by industry and society.

Digital commons communities develop governance mechanisms and rules (such as licences) which prohibit the resources' enclosure: this allows anyone to access them and improve them. Since no one organisation or person controls the resource, there is transparency over its functioning and, usually, no payments are required to use it. Since FLOSS has been adopted by the IT industry, some developers are paid to create and maintain code, but volunteer labour still plays a key role.

Is the FLOSS development model economically sustainable? What role can FLOSS play in the transition to more environmentally sustainable production and consumption?

[1] Closely related terms are 'open digital infrastructure' and 'digital public goods.'

ECONOMIC SUSTAINABILITY OF DIGITAL COMMONS

Public goods, whether industrial or not, are meant to be open: FLOSS developers agree to renounce to their exclusive property rights over the resource they have created (Benkler, 2013). FLOSS intellectual property (IP) licenses such as the GPL created a legal environment in which motivated contributors could entrust their work with individuals with whom they had no prior personal contact (Lee & Cole, 2003).

In other words volunteer FLOSS work was primarily done for the benefit of a community or project, and developers contributing without being paid challenged traditional understandings of work as linked to a firm. Whether this relationship exploited individual developers has been the object of much debate.[2]

It seems less controversial to suggest that increased firm involvement is likely to influence project decisions of all kinds, from technical to licensing ones. And indeed the open status of industrial public goods is now at risk. To understand why this is the case, it is necessary to briefly review the current IT industry landscape.

Open digital infrastructure is the layer on which Big Tech have built their monopolies

The near-ubiquity of FOSS in a growing range of applications means all firms today, not just IT firms, are benefiting from the free labor of FOSS project contributors who are not their employees. With a few exceptions – such as the automotive sector for example – most non-IT firms which use FLOSS components in 'products and services' (Butler et al., 2019) are reaping the benefits of FLOSS without contributing in return. Foley (2013) calls this capture of outsourced intellectual rents 'surplus-value appropriation.'

Non-IT firms are purchasing data storage and analysis services, based on FOSS, from 'Big Tech' firms, sometimes referred to as 'GAFAM' (Google, Amazon, Facebook, Apple, and Microsoft). These large IT firms contribute to FLOSS projects 'in ways that may not always be apparent from public sources, such as employing core project developers, making donations, and joining project steering committees in order to advance strategic interests' (Butler et al., 2019).

Yet this firm support has entailed a considerable cost: several of the dominant 'GAFAM,' with Amazon Web Services as the lead offender, are using cloud computing and Software as a Service built with open source software to transform this scientific and technological knowledge, which is intended to be shared, into closed assets.[3] These assets are then sold as privately owned software business solutions to non-IT sectors such as the automotive, entertainment, and energy industries.

[2] Please refer to the full article, cited at the end, for a complete review of this issue.

[3] In a 'traditional' mode, a software program is downloaded and executed by customers on their own hardware. In a SaaS mode, the program is never transferred onto the customers' machines, but is executed remotely on the provider's hardware and used online. With SaaS, service prevails over use: a subscription to a service is bought, rather than a user licensing agreement being accepted for software copied onto the user's computer. This creates a SaaS 'loophole' in the FOSS principle, as the service provider is no longer obliged to offer access to the code (O'Neil et al, 2021).

Big tech firms appropriate researcher labour and do not recognise volunteer labour

Rikap and Lundvall (2020) position the involvement in FLOSS of 'GAFAM' as typical of their widespread 'predatory' behaviour. Examples include releasing libraries to open source in order to set standards, enabling start-ups to integrate their applications into GAFAM platforms and – in case they are acquired – facilitating their integration into the platform. Predatory GAFAM behaviour also takes the form of the re-appropriation of co-authored research: 78,3% of Microsoft's 17,405 publications between 2014 and 2019 were co-authored with university researchers; during the same period Microsoft applied and was granted 76,109 patents, 0,2% of which were co-owned (Rikap & Lundvall, 2020).

Several interlocking reasons explain why the open source community has been unable to withstand this expropriation: the use of aggressive tactics by Big Tech companies to reject SaaS resistant licenses such as Affero; the fact many developers are themselves employed by Big Tech firms; the rhetorical strategies deployed by firms which aim to transform open source developers' values (Muselli et al. 2024); finally this is also due to the way FLOSS developers view themselves and their activity.

Part of the computer hacker philosophy is to view one's activity as a calling, not a profession, with Eghbal (2016) suggesting for example that money is a 'taboo' topic in projects. The ethics of reciprocity, transparency and openness which animate FLOSS have traditionally been understood in terms of the need to protect the 'four freedoms' (to access, copy, and modify software, as well as to release modified versions). Software should be considered as an asset upon which users have certain rights – not as the product of work that deserves monetary retribution, or as a now-fragile resource that needs to be cared for (O'Neil & Broca 2021).

Will Big Tech firms' increasing expropriation of collective resources and subversion of developer values generate a reaction from FLOSS developers? At the least a wide-ranging public debate in the FOSS community would perhaps clarify whether the term 'free and open source' still has any meaning when its core principles of openness and sharing are being systematically flouted.

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O'Neil, M., Cai. X, Muselli, L. & Zacchiroli, S. (2024). Co-producing industrial public goods on GitHub: Selective firm cooperation, volunteer-employee labour and participation inequality. New Media and Society, 26(5): 2556–2592. https://doi.org/10.1177/14614448221090474

The full text of the article is available at:
https://hal.science/hal-03662850v1/file/IndustrialPublicGoods_preprint.pdf

ENVIRONMENTAL SUSTAINABILITY OF DIGITAL COMMONS

A core belief of the digital commons movement has long been that technological innovation is key to human progress. Digital commons are shared digital resources that contributors co-produce by establishing their own governance rules. Starting in the 1990s, massively distributed online communities formed to develop free software projects (e.g., Linux), collaborative databases (e.g., OpenStreetMap), and shared knowledge resources (e.g., Wikipedia).

These communities believed that digital technologies – provided they were liberated from the enclosures of intellectual property – would make the world a better place. Knowledge would be made accessible to the many; collaborations would be enabled worldwide; meaningful social relations outside the realm of the market would blossom. Whilst these promises were championed by prominent liberal scholars such as Lawrence Lessig (2001, 2004) and Yochai Benkler (2006), they also served to reinvigorate the Marxist dream of an exit from capitalism made inevitable, or at least plausible, by the development of technical productive forces (Gorz 2008).

This narrative of abundance deserves further scrutiny, and not just because of its utopian sociotechnical overtones. Are constant economic growth and technological innovation truly the best way to tackle the global climate and ecological crises? And should digital technology not be put to work in a more localized and simple manner, oriented towards 'degrowth' for example? Indeed, while digital information has specific properties that distinguish it from rivalrous resources such as land or material goods, it is equally important to recognise that the flourishing of the digital is not free of material limits.

Digital technologies, whether open source or proprietary, consume non-renewable resources, depend on rare earth minerals, require energy, and emit CO2. Environmental sustainability and climate warming mitigation thus concern both digital capitalism and the digital commons. Silicon Valley seems ill-suited to deliver the urgently needed ecological transition. As even the *Financial Times* recently admitted, 'capitalism won't deliver the energy transition fast enough… There's too much to do, and given the urgency and the need to get the solution right, this isn't a task for your favourite ESG-focused portfolio manager or the tech bros' (Brower, 2023). Can the digital commons do better?

Digital sobriety: Towards an ‘ecology of demand’ or *degrowth*, not an ‘ecology of supply’ or *green growth*

Some activists within the digital commons movement believe the ecological transition can only be achieved by reducing the use of digital technologies while simultaneously incorporating these technologies into a mode of production distinct from digital capitalism (Fuchs, 2022). In the past ten years, a number of these activists have attempted to introduce environmental concerns into the digital commons movement and to place the digital commons at the service of the ecological transition. Three main strategies for greening the digital commons have been adopted so far: the use of free and open source software to make digital devices and services sustainable (e.g., Fairphone[4]), the creation of platform cooperatives to improve the sustainability of the sharing economy (e.g., Fairbnb[5]), and open hardware manufacturing initiatives in distributed workshops that are guided by circular economy and/or degrowth principles (e.g., makerspaces). By and large, these approaches seem to converge on a type of ‘digital sobriety’ that we define as the practices aiming to reduce the production and use of digital technologies, while maximising their efficiency and recycling capacity, to mitigate their material and energy footprints.

To be consistent with an emancipatory perspective, digital sobriety, as we defined it, requires two conditions. On the one hand, it calls for an objective assessment of the environmental impact of digital technologies (Pasek, Vaughan and Starosielski 2023). On the other hand, digital sobriety requires a democratic debate about the societal needs that these technologies are intended to meet, favouring ‘an “ecology of demand” (degrowth), rather than an “ecology of supply” (green growth)’ (Bihouix 2021, 96).

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The full text of the article is available at:
https://www.triple-c.at/index.php/tripleC/article/view/1456

[4] See https://www.fairphone.com/en, accessed on 06 March 2024.

[5] See https://fairbnb.coop, accessed on 06 March 2024.

2.over view

ABOUT DEBIAN

Debian[6] is a free and open source software distribution. A distribution is a software suite comprising an operating system and applications.

Established following a community model in 1993, Debian aims to be a ‘universal’ system both in the sense of operating on as many architectures as possible and of featuring as many application packages as possible.

It is famous for its robustness and strict adherence to the principles of free software. Debian is used by organisations, governments, and individuals all over the world, including much of the critical digital infrastructure that runs our daily lives.

Debian has adopted a Social Contract[7] and a Code of Conduct[8] spelling out the project’s goals and shared values.

Its Constitution[9] defines the project’s governance and the process whereby every Developer can launch a petition (‘General Resolution’) to amend it, as well as the yearly election of the Debian Project Leader (DPL).

[6] https://en.wikipedia.org/wiki/Debian
[7] https://www.debian.org/social_contract
[8] https://www.debian.org/code_of_conduct
[9] https://www.debian.org/devel/constitution

2016 DEBIAN PROJECT SURVEY: WORK AND VOLUNTEERS

A NEW PROGRAM OF WORK: MAPPING THE POLITICAL ECONOMY OF FREE, LIBRE AND OPEN SOURCE SOFTWARE

With the benefit of hindsight, the survey of the Debian community carried out in 2016, whose preliminary results were published in 2017 in the *Journal of Peer Production*,[10] represented the first manifestation of a core DCPC program of work: to empirically map which categories of workers (e.g., firm employees, foundation employees, researchers, volunteers, etc) were performing which duties in the digital commons production process, with a view to increasing the recognition of these commons and these voluntary workers by industry and society. This survey was co-conceived and publicised by two well-known members of the Debian community. It garnered a significant number of responses (N:1,479). The 2016 survey focused on demographic aspects (age, gender, time spent in the project, etc.) and on questions related to employment: for example, to what extent are contributions to Debian paid?[11] Indeed the central question we were interested in was to map the extent of firm involvement and influence in the project.

In 2021, the full 2016 Debian project survey results were published as a report by the Digital Commons Policy Council;[12] an article in a peer-reviewed scientific journal connected 2016 survey results to subsequent interviews with Debian Developers;[13] and an interview with Stefano Zacchiroli in his capacity as a former Debian Project Leader was published in the *Handbook of Peer Production*.[14] Subsequently we mapped the production of industrial public goods on Github, finding 'contribution territories' whereby contributions of dominant firm (e.g., Microsoft and Google) employees never significantly overlapped in repositories;[15] we also mapped foundation and firm employee discourses at IT conferences, finding evidence of attempts to redefine the open source institution as more 'professional' and less focused on traditional values, rights and licences;[16] more recently, we have mapped researcher contributions to R repositories on GitHub, analysing not just code contributions via commits but also discursive support via an analyses of which categories of users assign and close issues.[17]

[10] de Blanc, M., O'Neil, M., Raissi, M. & Zacchiroli, S. (2017) Preliminary Report on the influence of capital in an ethical project: Quantitative data from the 2016 Debian Survey. *Journal of Peer Production* #10 WORK. http://peerproduction.net/issues/issue-10-peer-production-and-work/preliminary-report-debian-survey/

[11] Only one out of five respondents said they were paid to work on Debian. One third of Debian Developer respondents said they were paid to contribute to the project, though more than half said only 0-20% of their Debian contributions were being paid for.

[12] O'Neil, M., Zacchiroli, S. & de Blanc, M. (2021) *2016 Debian survey: Work and volunteers*. DCPC/NMRC, University of Canberra.

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2023 DEBIAN SURVEY: ECONOMIC AND ENVIRONMENTAL SUSTAINABILITY

UNDERSTANDING A DISAPPOINTING RESPONSE

In contrast to the 2016 survey (N:1,479) the 2023 survey only garnered 235 incomplete responses and 108 complete responses. Several hypotheses can be advanced to explain this result:

- ✓ although members of the Debian community contributed to the development of the 2023 survey, they did not publicly advocate for it, as had been the case in 2016, so the 2023 survey may have seemed less legitimate than its predecessor;
- ✓ a test version, intended to seek feedback from Debian's publicity team, was mistakenly posted to the project's main email list by a publicity team member, causing some initial confusion;
- ✓ finally, the 2023 edition had a more clearly militant intent than its predecessor, as it sought to investigate community opinion about the predatory practices and environmental sustainability of large IT firms as well as about alternative models. Some of these models involved increased collaboration with government agencies, which may have confused or dismayed some of the more 'libertarian' members of the community.

The low 2023 response rate means the representativeness of our demographic results is questionable, so we have chosen not to publish them.

ECONOMIC AND ENVIRONMENTAL SUSTAINABILITY PATHWAYS EMERGE

For the same reason, the representativeness of the responses to questions about how to achieve economic and environmental sustainability must also be treated with caution. We have nonetheless decided to publish these economic and environmental sustainability question results because they are inherently interesting, and as a way to stimulate debate in the community and beyond. Again, we make no claims that they represent the views of the entire Debian community.

SUMMARY OF KEY FINDINGS

#1 REJECTION OF RESTRICTIVE LICENCES FOR CODE BY THE COMMUNITY

With the above caveat concerning the size of our sample in mind, a clear finding concerns the use of restrictive licences to incentivise environmental action. To the question 'How would you assess the proposal to prevent entities that engage in unsustainable environmental practices from using Debian, for example with a new "green open source licence"?', a majority declares that it is a 'very bad' (N: 45) or 'bad' (N: 18) idea; 26 did not comment (the highest rate of the questionnaire); 12 find the idea 'neither good nor bad'; and a microminority of 7 respondents found it 'good' or 'very good.'
See **Figure 6**. p.27

In the same way, the use of restrictive licences received the lowest positive score and the highest negative score in the list of suggested 'countermeasures' to resist Big Tech's predatory practices and appropriation of FLOSS. Though the number of respondents is low, these responses are sufficiently unbalanced to be considered significant. Though our sample is small, the fact that licences such as the Peer Production Licence or 'Copyfarleft' (which impose different costs on users according to their status, e.g., cooperatives vs. commercial firms)[18] are being so widely rejected conform to earlier instances of rejections of access restriction and can therefore be assumed to have wider implications for the entire FLOSS ecosystem. It may therefore be prudent, for the moment at least, to discontinue promoting their usage to this community.
See **Figure 3**. p.23

ADDENDUM TO SURVEY RESULTS: RESTRICTIVE LICENCES SHOULD BE USED FOR DATA

This does not that mean restrictive licenses should be abandoned altogether. For example, open data should definitely be subject to licences discriminating between use by for-profit entities, government organisations, and non-profit entities. Where suitable, datasets should be licensed openly, and where there are clear concerns for privacy and reciprocity, more restrictive licenses could be considered.

#2 OPINIONS MAY BE CONNECTED TO RESPONDENT LOCALISATION

Some results may be influenced by the respondents' localisation. For example, the fact that France and Germany are the two main countries of origin of respondents could be linked to the high scores collected by 'countermeasures' opposing predation and appropriation of FLOSS which would require support from the state, such as the granting of social rights, or a universal income. These proposals are more present in mainstream public debates in these countries than in the United States, for example.
See **Figure 1**. p.20
See **Table 1**. p.20
See **Figure 3** p. 23

[18] See https://wiki.p2pfoundation.net/Peer_Production_License

#3 HUBRIS?

It is notable that respondents believe that the risks posed by free-riding behaviour and industrial predation affect FLOSS in general much more than Debian. This could be explained by the all-too-human propensity to assume that 'trouble always affects others, not me.' Though striking, these results must be taken with caution, given the relatively low number of complete responses.

See **Table 2.** p.21
See **Table 3.** p.21
See **Table 4.** p.22
See **Table 5.** p.22

#4 OBSTACLES TO THE ENVIRONMENTAL TRANSITION

Interesting lessons derived from the 2023 Debian project survey can be drawn from the comments responding to the question 'Are the main obstacles to reducing environmental impacts in your workplace economic (for example, their cost), organisational (for example, lack of support from management), technical (for example, difficulty of implementation)?' These detailed responses allow us to understand the extent and ramifications of the obstacles.

See **Figure 4.** p.24
See **Table 7.** p.25
See **Figure 5.** p.26
See **Table 8.** p.26

#5 OPPORTUNITIES HAVE ARISEN SINCE 2023

Though some of these obstacles may seem insurmountable, it should be noted that the global situation has changed since 2023. The alignment of Big Tech firms with the far-right Trump administration has led governments around the world to become concerned with the resilience and independence of their digital infrastructure. Whether this leads to increased support for sustainable solutions remains to be seen, but proprietary solutions and modes of thinking that appeared immutable in 2023 are increasingly viewed with suspicion and alarm, and alternatives are being sought in diverse areas of European governments. Please refer to the DCPC stakeholder engagement tool (available in A4 and A5 formats) and FAQ 'Enhancing national digital resilience with digital commons' for examples.[19]

ABOUT DCPC

The Digital Commons Policy Council was created at the University of Canberra in 2021, thanks to the support of the Sloan and Ford Foundation's Digital Infrastructure fund. This creation was announced in the final issue of the *Journal of Peer Production in 2022*.[20]

In addition to the scholarly and activist work that preceded it,[21] the DCPC sought to have a more public-facing, advocacy-orientated, and strategic outlook.[22]

The DCPC's research and advocacy activities aim to increase recognition for the digital commons, as well as for the volunteer work that produces these commons. The Digital Commons Policy Council is a research hub, think tank and marketing agency for the digital commons. Like the *Journal of Peer Production*, it is informal and DIY, without a charter, driven by the desires and convictions of its members.

The DCPC produces scientific articles, public reports, submissions to parliamentary inquiries, and educational resources for primary and secondary schools.

DCPC WORKSHOPS

The DCPC/CIS 2024 Policy Lab was held on 30-31 May 2024 at the Centre Internet et Société (CIS) of the French National Center for Scientific Research (CNRS) in Paris, France. The event brought together thirty digital commons experts from eight countries. They included representatives from digital commons communities, public organisations, civil society organisations, and academia. Participants shared experiences and discussed long-term challenges and opportunities. New connections were made and new plans were hatched. Participants collaboratively designed several resources such as the *Best Practices Guide for Digital Commons – Government Relations*.[23]

The Digital Commons Policy Council/Civic Data Cooperative 2025 Workshop was held on 21-23 May 2025 at the University of Liverpool's Civic Health Innovation Labs (CHIL), UK. The event represented the opportunity for 35 attendees from around the world to exchange insights about the latest developments in the digital commons policy and research space. The gathering drew participants from academia, policy, and civil society, including representatives from France's Agence française de développement and the UK Government's Digital Cabinet Office. Attendees also included non-profit organisation representatives and researchers from Australia, Belgium, Brazil, China, France, India, Italy, the Netherlands, Norway, Uganda and the United Kingdom, with sponsored delegates from low and middle-income countries supported by the organisers.

Similarly to the 2024 DCPC/CIS Policy Lab, the 2025 Workshop used an 'unconference' format whereby work directions emerged from the attendees' deliberations. After discussing issues currently impacting digital commons development, the general assembly of participants identified several resources that it would be useful to have. They then self-selected into separate breakout groups to collaboratively create these resources via open documents, with groups reporting at intervals to the general assembly for feedback. The resources are (1) new communication tools for stakeholder engagement, (2) a taxonomy of digital commons, (3) implementation mechanisms for digital commons for healthcare policy and development, and (4) aspirational principles for governments to support inclusive global digital commons. In a final debrief session, many participants declared they had found the event's positive atmosphere and mix of idealistic and pragmatic outputs inspiring. Following the Workshop, group members have continued working to finalise the resources.

[19] See p. 29 and https://dcpc.info/faq/

[20] Braybrooke, K., Daly, A., O'Neil, M. & Zacchiroli, Z. (2022) The triumph of peer production? Announcing the creation of the Digital Commons Policy Council. *Journal of Peer Production* #15 TRANSITION: 1-3. http://peerproduction.net/issues/issue-15-transition

[21] The *Journal of Peer Production* was a community-managed peer-reviewed academic journal that released sixteen thematic issues between 2011 and 2022. It defined peer production as 'a mode of production based on, and aimed at, the production of commons, in which participation is voluntary and based on the self-assignment of tasks.' All decisions concerning the *JoPP* were debated on a public discussion list which is archived online. Notably, the *JoPP* introduced several innovations to peer review. The scientific peer review process was made more transparent by systematically publishing, in addition to the final version of articles, the original versions of articles submitted to the editorial board, the comments and suggestions of reviewers (reviewers could decide whether to remain anonymous or not), and the authors' responses to the reviewers. http://peerproduction.net/peer-review/process/

[22] In 2021, a 30-chapter volume, the *Handbook of Peer Production* was published. Two of the three editors of this volume were *Journal of Peer Production* editors, and many chapters were written by members of the journal's community. In the *Handbook*'s final chapter ('Be Your Own Peer! Policies and Principles for the Commons'), Table 30.2. Be Your Own Peer: Policies for the common good included recommendations such as 'Connect common goods sector to [other stakeholders]' and 'Establishment of websites gathering practical, legal and technical advice.' See http://peerproduction.net/projects/books/the-handbook-of-peer-production/

[23] See https://dcpc.info/publications/best-practices-guide-for-digital-commons-government-relations/

3.res ults

LOCALISATION OF RESPONDENTS

Figure 1. Top five countries of origin

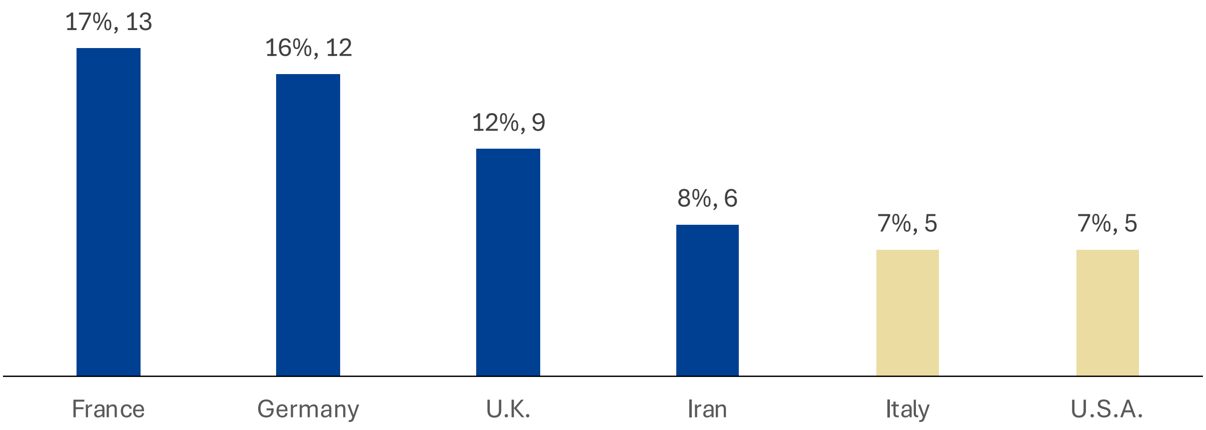


Table 1. Top 20 main countries of residence

Country	Number	Percentage of respondents	Percentage of total
France	12	16%	11%
Germany	12	16%	11%
United Kingdom	10	13%	9%
Iran	7	9%	6%
Austria	6	8%	6%
United States	5	7%	5%
Italy	4	5%	4%
Australia	3	4%	3%
Switzerland	3	4%	3%
Canada	2	3%	2%
Spain	2	3%	2%
Brazil	1	1%	1%
Catalonia	1	1%	1%
UE	1	1%	1%
Finland	1	1%	1%
Japan	1	1%	1%
Netherlands	1	1%	1%
Norway	1	1%	1%
South Africa	1	1%	1%
Sweden	1	1%	1%
No answer	33		31%
Total	108		100%

ECONOMIC SUSTAINABILITY

Figure 2. What do you think is the best Debian economic sustainability model?

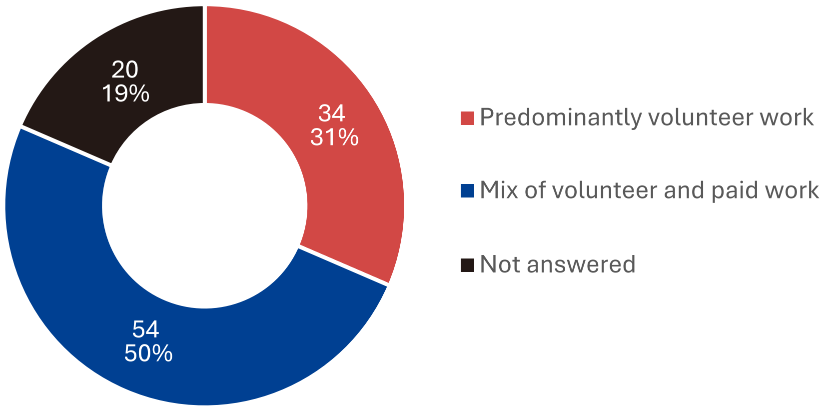


Table 2. Do you think the risk posed by predatory practices such as free-riding (entities benefiting from code development without contributing anything in return) to Debian's long-term sustainability is:

	Count	Percentage of respondents	Percentage of total
Very high	2	2%	2%
High	14	16%	13%
Neither high nor low	24	28%	22%
Low	20	23%	19%
Very low	24	28%	22%
No response	24		22%
Total	108		100%

Table 3. Do you think the risk posed by predatory practices such as free-riding (entities benefiting from code development without contributing anything in return) to FOSS's long-term sustainability is:

	Count	Percentage of respondents	Percentage of total
Very high	9	10%	8%
High	30	34%	28%
Neither high nor low	18	20%	17%
Low	20	23%	19%
Very low	9	10%	8%
No response	22		20%
Total	108		100%

Table 4. Some entities (such as Amazon) are transforming common resources meant to be shared into privately owned assets to be sold, via mechanisms such as Software as a Service (SaaS). Do you think the risk posed by predatory practices such as appropriation to Debian's long-term sustainability is:

	Count	Percentage of respondents	Percentage of total
Very high	3	3%	8%
High	21	25%	19%
Neither high nor low	25	30%	23%
Low	23	27%	21%
Very low	11	13%	10%
No response	25		23%
Total	108		100%

Table 5. Do you think the risk posed by predatory practices such as appropriation to FOSS's long-term sustainability is:

	Count	Percentage of respondents	Percentage of total
Very high	11	12%	8%
High	33	38%	31%
Neither high nor low	22	25%	20%
Low	12	14%	11%
Very low	7	8%	6%
No response	23		21%
Total	108		100%

Figure 3. If you think predatory practices such as appropriation and/or free riding pose a significant risk to the sustainability of Debian and/or FOSS, do you see the following options as useful countermeasures?

ENVIRONMENTAL SUSTAINABILITY

Table 6. How concerned are you about your employer's environmental footprint?

	Count	Percentage of respondents	Percentage of total
Extremely	7	8%	8%
Very	16	18%	15%
Somewhat	35	41%	32%
A little	8	9%	7%
Not at all	19	22%	18%
No response	23		21%
Total	108		100%

Figure 4. Are the main barriers to reducing environmental impacts in your workplace economic (e.g., cost), organisational (e.g., lack of support from management), technical (e.g., difficulty of implementation)?

50 people responded to this question.

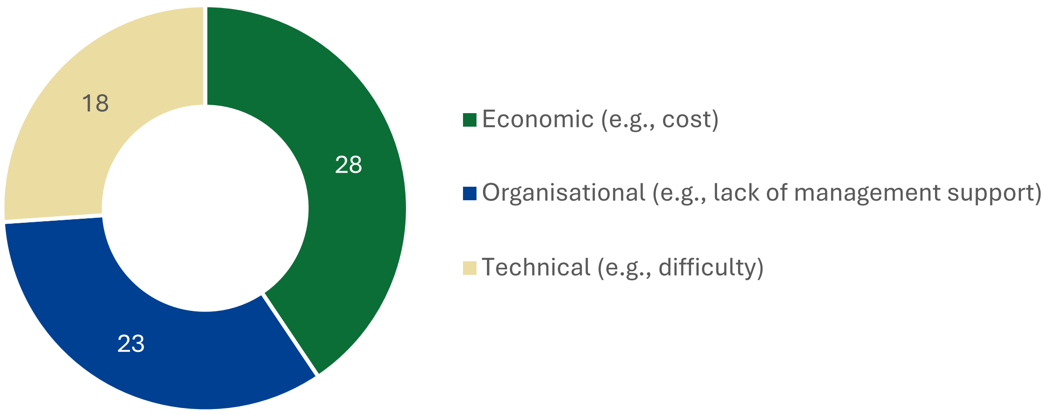


Table 7. Can you provide examples of these obstacles ?

Economic	• There's never enough effort available to do the things we want - the team is always too busy. • Cost of doing the work to change more than cost of the new state. • Low operating cost is important. • Basic science does not have funds to work in this direction.
Technical	• Rewriting older (e.g., perl) software into rust to make it energy efficient is both work and also quite difficult to avoid regressions. • High-energy particle accelerators are power hogs by construction. • Building - datacenter wasn't built according to modern standards. • Basic science research shall not strictly be limited by environmental footprint but just widespread technological applications.
Organisational	• Lobbying from proprietary solutions vendors often leads to suboptimal choices involving over-complex solutions rather than simple efficient ones. • As a gov company it is not easy. • Priorities… • Mostly people care, but not enough to put resources/effort on it. Very common around here. • Things take time, lots of red tape. • Lack of market support.
Other	• Mindset and balance of power. • Knowledge. • Global organisation. • Most measures, if not all, feel just like green-washing; employees have little to no power to take choices. • Lack of knowledge about what activities contribute the most. • I don't make any attempt, I simply do my thing and let administration administrate • Meeting in person, at least occasionally, is critical. • Debian is an open-source software project, not a state. Please leave the oversight of corporate polluters to the state. We in Debian already have enough to do.

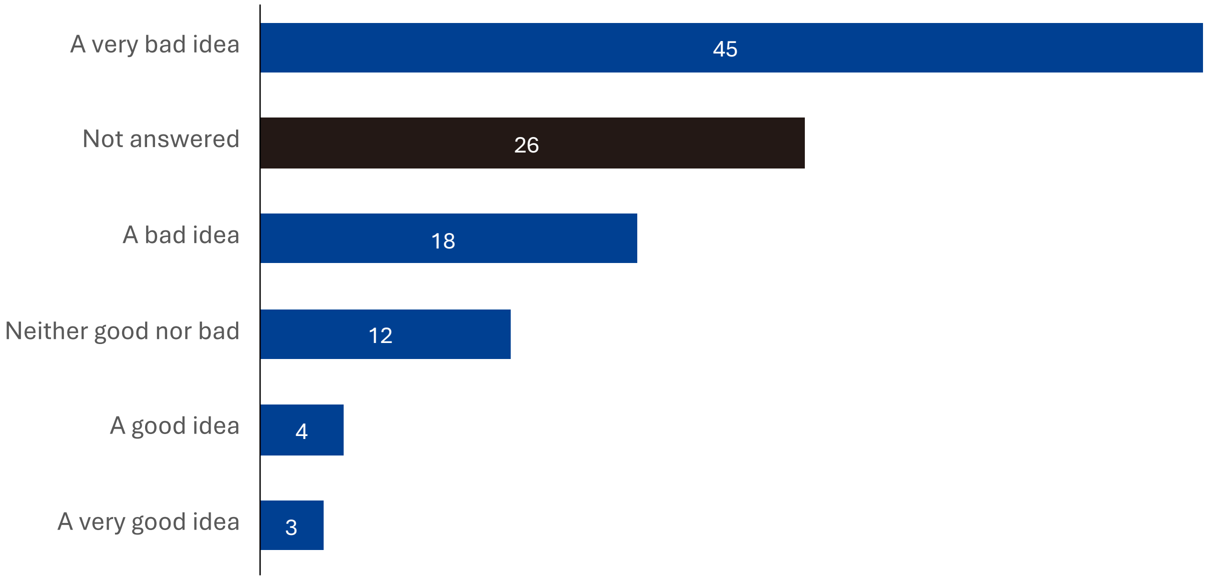
Figure 5. In your opinion, which of the following options would most effectively overcome obstacles to reducing environmental impacts at your work?

54 respondents answered this question.

Table 8. Can you provide examples of measures that would have an impact?

Financial incentives	• Electricity pricing. • Money talks, very loudly.
Support from management	• Systematic evaluation of the global ecological impact of every technical decision made by management.
Public campaign	• Many of our competitors aren't doing things right concerning env impact.
Other	• Laws-- Most obstacles are either legal (enhancement is forbidden or too difficult without breaching some laws) or about money (those who hold power prefer getting richer over really reducing environmental impact). In either case, the best way to overcome the issue is to make it mandatory. • Government intervention--Only regulation will affect my company's ability to act environmentally.

Figure 6. How would you rate the proposal to prevent entities which engage in unsustainable environmental practices from using Debian, for example with a new 'green open source licence'?



DIGITAL COMMONS POLICY COUNCIL
The DCPC is an international think tank established in 2021. It advocates for the recognition of digital commons and the voluntary work that creates these common goods. It also seeks to support initiatives that use digital commons to accelerate the transition to a more ecologically sustainable and fair society. It does so by publishing public reports based on empirical data, educational resources for schools and scientific articles, and by making submissions and recommendations to government.
Publications: https://dcpc.info/publications/
Contact: https://dcpc.info/contact/

NEWS & MEDIA RESEARCH CENTRE
The News and Media Research Centre (N&MRC) advances public understanding of the changing media environment. N&MRC is Australia's nationally recognised research centre for the study of news media industries, audiences and public discourse. At a time of epistemic crisis for the media industries, we research and advocate for a media system that builds trust, inclusivity and diversity, to defend and repair the social fabric. The Centre conducts both critical and applied research projects with partners and institutions in Australia and internationally.
More information at https://www.canberra.edu.au/research/centres/nmrc

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Enhancing national digital resilience with digital commons

What are digital commons?

- Digital commons, sometimes called open digital infrastructure, are shared information and knowledge resources such as data, software, and cultural content.
- They are produced and managed for collective use by multiple stakeholders, to be modified and redistributed as needed.
- They drive innovation and contribute to a robust SME ecosystem: Harvard researchers have estimated that without open source software (OSS) to power digital products and services, it would cost firms $8.8 trillion to develop this software from the ground up.

HOW CAN GOVERNMENTS BENEFIT FROM DIGITAL COMMONS?

1. Securing digital sovereignty

- When governments share public data with private software vendors, these data can be used in ways citizens did not consent to, or that are detrimental to the public interest. OSS helps governments be in control of who the data is shared with by providing open, reviewable code.
- When governments are involved in shaping open standards, political, legal, cultural and technical decisions are guided by norms and values that benefit all - not just industrial actors.
- The auditability of digital commons improves cybersecurity: faults can quickly be detected and corrected.

2. Investing for the future

- Adopting digital commons saves government money by making it possible to avoid software and service duplication as well as costly (and recurring) licence fees.
- Governments can conduct national digital audits to assess public service reliance on proprietary software, public service use of OSS, and what OSS solutions it would be useful for the public service to reuse or co-develop.
- Governments can also create open source program offices (OSPOs) in the public sector, as well as public sector software catalogues to foster reuse and co-creation.

3. Building trust

- When a government transparently releases open data and government applications code, the foundations for trust and accountability are laid.
- In an increasingly polarised world, the openness of digital commons brings people together by fostering cross-border knowledge transfers and collaborations.
- Digital commons allow governments to safely manage and safeguard open data and protect citizens' data privacy - see the Humanitarian OpenStreetMap Team (HOT) for an example of how this can be done.

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