Pathways through the Polycrisis: Proceedings of the critical infrastructure lab retreat

Perast, 2025

critical infrastructure lab

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Proceedings of the critical infrastructure lab retreat, Perast, 2025

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Who is who?

Andreas Baur

Researcher, International Centre for Ethics in the Sciences and Humanities, University of Tübingen

External PhD candidate, University of Amsterdam

Research fellow, critical infrastructure lab

I have worked on research projects focusing on privacy and data protection, 'ethical' AI infrastructures, and technology ethics. I am also an external PhD candidate at the University of Amsterdam. My PhD focuses on 'The Politics of the Cloud', examining the relationship between politics and cloud infrastructures in Europe, including attempts at digital sovereignty in the cloud. Furthermore, I am a fellow at the Critical InfraLab, where I coordinate the group of fellows.

https://andbaur.net/

Asia Bazdyrieva

PhD candidate, University of Applied Arts Vienna

As an art historian, I am obviously interested in *landscapes*. But not so much as passive backdrops to human activity or symbolic terrains to be imaged and imagined, but as deeply saturated sites where imperial logics are enacted and reproduced. I am interested in *how landscapes are constructed—materially and affectively—by interrelated infrastructures* of energy, war, data, and extraction through interwoven regimes of media, technoscience, and geopolitics. In my recent work I look at the ways *land itself becomes a medium*: inscribed by planetary sensing networks, shaped by sociotechnical imaginaries, and strained by the *violences of scalability*.

Dmitry Kuznetsov

Postdoctoral researcher, critical infrastructure lab

I joined the lab in September 2024 and since then I've been engaged with the geopolitics track.

Elizaveta (Liza) Yachmeneva

Community and Research Coordinator at OONI (Open Observatory of Network Interference)

I have a very mixed background of cultural studies, public policy, urban studies and activism, which I am trying to bring together in my work and research.

Currently, I am working as Community and Research Coordinator at OONI (Open Observatory of Network Interference), most of my work is focused on investigating network-level censorship in different countries.

My favourite part of this job is collaboration with digital rights organisations to gather contextual information surrounding censorship in their countries: the narratives built by the government to justify censorship, the legislations adopted to provide the government with more power to control information flows in their countries, the disparity in how different communities are affected by censorship, etc.

https://ooni.org/

Eric Zhang

PhD candidate, critical infrastructure lab, geopolitics track

My research at the lab focuses on industrial policy of digital technologies in the EU, China, and Russia, with a focus on the role of technical standards. I have a background in Political Science and IR, with a methodological interest in applying Natural Language Processing in my research. Before joining the University of Amsterdam, I was a researcher at the Leiden Institute of Area Studies, where I studied issues such as China's role in global cyberspace and China-Russia relations.

https://criticalinfralab.net

Fieke Jansen

Co-Principal Investigator, critical infrastructure lab, environment track

I am Fieke, one of the three co-PIs of the critical infrastructure lab. In the lab I lead the environment track. Like Niels I'm very excited about moving towards biological computing, trying to change the materiality of our infrastructures.

https://criticalinfralab.net

Gargi Sharma

programme coordinator, critical infrastructure lab

Outside the lab, I work at the intersections of climate justice and data justice, focusing specifically on questions of *self-determination, non-discrimination, and restorative justice*. Inside the lab and at this gathering, I am helping with logistics (among others). Please let me know if there is anything I can do to support your attendance!

https://criticalinfralab.net

Grace X. Yang

PhD candidate, Free University of Berlin

My research focuses on China and Russia's promotion of *"cyber sovereignty"* in global cyber governance.

Kalema, Nai Lee

PhD candidate in Innovation and Public Policy at the UCL Institute of Innovation and Public Purpose

My interdisciplinary research explores the global political economy of digital transformation and AI governance, focusing on global institutions' (mainly the World Bank) translation of their global digital transformation policy agenda into national contexts through DPI initiatives and their relevant policy instruments—economic, regulatory, and informational—in several domains (e.g., digital development, digital-era government, and data- and AI-driven governance initiatives). I argue that this process is reconfiguring governance structures, institutionalising technocratic logics, and diffusing ideological norms into the state, as well as embedding more extractivism and asymmetric power dynamics into global systems, societies, and people's everyday lives, especially in many Global South contexts. To explore the material implications of this process, my empirical case studies (primarily Kenya and Uganda) draw on critical perspectives from global political economy, economic sociology, public administration, STS, and global health, also integrating intersectional, decolonial, and postcolonial perspectives into my analysis.

I'm submitting my PhD this August (deadline) and aiming to defend early fall. Beyond academia, I'm also deeply interested in design, data, and health justice, volunteering in related efforts.

Lisa Gutermuth

Senior Program Officer, Mozilla Foundation

I'm Lisa Gutermuth, a Senior Program Officer at Mozilla Foundation, based in Berlin. I'm Mozilla's representative member of the Green Screen Coalition, and part of my job is to *coordinate Mozilla's sustainability efforts* across the org, from the funding programs around environmental justice and AI, to programming at MozFest around *unlearning tech immateriality* (which all, really, builds on the foundation that Michelle Thorne created in her time at Mozilla).

I am very interested in questions of how and why (or why not) *environmental impact measurement tools are adopted in tech development* (like CodeCarbon), and how in the world companies can be compelled or convinced to enable people to have more insights into the environmental impact of engaging with their tools/products/platforms.

And maybe one more thing to mention is that my introduction to the critical infrastructure space was via my master thesis over a decade ago focused on *satellite imagery in agriculture* and tracing its path from Landsat to commercial applications in Europe through the geopolitical and economic incentives in between.

https://mozillafoundation.org/

Maxigas

Co-Principal Investigator, critical infrastructure lab, standards track

Assistant Professor of Computational Methods for Media and Culture Studies, Utrecht University

I am Maxigas, Co-PI of critical infrastructure lab, leading the track on standards. I work at Utrecht University as Assistant Professor of Computational Methods for Media and Culture Studies, which kind of describes what I do, if not necessarily in a way envisioned by the institution. Within the academia, I study the standardisation, implementation and deployment of 5G in order to find out how programmable infrastructures can serve people and planet better by incorporating public values. This work is now centred on alternative technological trajectories of 5G based on field work in India. Outside of the academia, I experiment with the low-profile, low-energy, anti-AI and anti-military Reticulum protocol stack, collaborating with the local hacklab in Amsterdam for anarchist technologists. I come to the mud batteries infrastructure of the infralab from the direction of having built a biocomputing laboratory in the past, and a research interest in mobilising the history of cybernetics for a constructive critique of cybernetic capitalism and its infrastructural ideologies.

I am working on a primer on infrastructural ideologies as a theoretical framework, which is sketches out in this report that we compiled using an open source publication pipeline fed from plain text:

https://zenodo.org/records/10912418

Mehwish Ansari

Program Officer, Ford Foundation's Technology & Society Program

The Program supports people, research institutions, and civil society organizations working at the intersection of technology and social justice. Specifically, my grantmaking is focused on challenging the concentration of corporate power and the impunity of state power through a *"global governance"* approach, which includes addressing the discrete decision-making in traditional transnational institutions and processes as well as regional / national regulatory, policy, and legal decisions that impact the global business models and value chains of dominant tech companies across the stack. Prior to joining the Ford Foundation, I was the Head of Digital at ARTICLE 19 (following in Niels's footsteps), where I worked on *strengthening human rights considerations in the design, development, and deployment of Internet infrastructure*.

Michelle Thorne

Co-Lead of the Green Web Foundation

I'm Michelle Thorne, co-lead of the Green Web Foundation working to phase out fossil fuels in data centers as well as a co-conspirator with Fieke, Lisa and other fabulous people on the Green Screen Coalition working to

bridge movements for tech justice and climate justice. Some recent projects include a joint statement on keeping AI within planetary boundaries and using open web protocols to make the materiality of digital infrastructure more findable. While we're in Montenegro, we'll also be launching the next edition of Branch Magazine that Fieke co-edited with me and a colleague featuring experiments in regenerative internet infrastructures, grid-aware websites and more.

For this event, it's my honor to be supporting the critical infar lab on the facilitation and agenda design. While we're in Perast, I will also happily be part of swimming outings or paddling on a SUP.

https://greenscreen.network/en/blog/within-bounds-limiting-ai-environmental-impact/

https://carbontxt.org/

https://branch.climateaction.tech/issues/

Niels ten Oever

Co-Principal Investigator, critical infrastructure lab

Lately I have been very inspired by building an organic data center, powered by mud batteries, and running a miniature language model. We hope to be running this on a chip made of clay or a kombucha scoby. In the lab I also lead the geopolitics work where we look at how Europe, China, and Russia maintain interconnection but inscribe their local norms in internet networks. But most of all I am very much looking forward to seeing you all in less than two weeks!

https://nielstenoever.net

Patrick Brodie

Assistant Professor in the School of Information and Communication Studies, University College Dublin.

My work is generally interested in the political ecology of digital infrastructures, with a particular interest in the politics of *industrial development*, *extractivism*, and *environmental justice*. My most recent work is looking into the dynamics of geopolitical and technological dependency during the so-called *"twin transition,"* through the lens of an *"anti-imperialist environmental politics,"* which I've started to develop with my colleague Paddy Bresnihan in our upcoming book *From the Bog to the Cloud: Dependency and Eco-Modernity in Ireland*. I'm staring at the proofs now in the airport, which I'm happy to share with anyone interested in advance of the publication!

https://bristoluniversitypress.co.uk/from-the-bog-to-the-cloud

Yichen Rao

Assistant Professor of Anthropology, Utrecht University

I study the social impact of games, fin-techs, and all sorts of digital infrastructure (broadly speaking) in global China, especially how they reshape people's subjectivities.

https://www.uu.nl/staff/YRao

Sam Ju

Former OTF Fellow

I am an internet freedom researcher with a focus on China. I study things such as chilling effects, online censorship, digital transnational repression, foreign access question, etc. Up until recently, I was an OTF fellow where I was thinking about forced identifiability and empirically testing access to Chinese online spaces from overseas.

The term "(digital/online) Sovereignty" has popped up in intros here and there; which I am excited to read, because I am very curious about it both on a policy and a political science level. My background is in political science and China studies, but I am also a self-taught data analyst.

https://www.opentech.fund/news/chinas-new-effort-to-achieve-cyber-sovereignty/

Stanislav Budnitsky

Visiting Assistant Professor at Colgate University

My name is Stanislav (Stas, for short) Budnitsky. I'm a Visiting Assistant Professor at Colgate University, a liberal arts college in snowy upstate New York. (Yup, that's the same Colgate family as your toothpaste this morning!)

I am delighted to be joining this brilliant group at the last minute, after clearing some bureaucratic hurdles for traveling. I've been fascinated to read about your personal and professional trajectories on this thread.

My critical-cultural research on global communication spans multiple concurrent agendas, including global digital politics, strategic humor in global politics, and the role of George Soros and his Open Society Foundations in shaping the post-Cold War information order (from a non-conspiratorial, archive-based perspective, to be clear).

This summer, I'm working on my book proposal about the connection between state nationalism and global technology policy. The project demonstrates this idea by comparing how Russia's and Estonia's official national identities have shaped their respective approaches to global governance of digital technologies from the early 1990s to the present. At the same time, I'm developing an article that traces the history of the "digital solidarity" concept, which recently reappeared in the 2024 US State Dept global cyber strategy.

Timo Seidl

Assistant Professor of Political Economy, Technical University of Munich

My research focuses primarily on the political economy of technological change. That means I explore how technological transformations are both shaped by—and themselves shape—dynamics at the intersection of politics and economics. I ask questions like: Why do different countries respond so differently to emerging technologies, and what political, economic, and social consequences follow from that? Who—or what—determines which technologies are developed and how they're deployed? How do narratives and ideas influence how new technologies are perceived, regulated, or promoted? And what role do geopolitical shifts play in all of this? In my research, I try to unpack these developments—whether it's the return of industrial policy in an era of strategic technologies, the rivalry between competing digitalisation models from the US, China, and Europe, or the peculiar world of cryptocurrencies and 'Web3'. In the coming years, I also hope to look more closely at the convergence of what may be the two most consequential technological waves of our time: artificial intelligence on the one hand, and biotechnology on the other.

https://www.timoseidl.com/

Zuzanna Warso

Director of Research, Open Future

I'm Zuza, one of the co-directors of Open Future, a think tank focusing on EU policy around digital infrastructure. I lead our work related to public digital infrastructure, which we deliberately distinguish from the more commonly used term *digital public infrastructure/DPI*. Lately, much of this work has centered on the concept of *digital sovereignty*. Together with a coalition of other organizations, we're exploring whether this term can be framed as part of a progressive agenda. I'm also very interested in how EU industrial policy can move beyond a narrow focus on "competitiveness" to *shape markets that serve the public interest* and ensure that *public funding creates public value*.

https://openfuture.eu/author/zuzanna/

https://ainowinstitute.org/publications/xii-toward-public-digital-infrastructure-from-hype-to-public-value

Programme

- Introductions

Monday: *It's a lab adventure*

- Context: Welcome and introduction in the morning
- Lab adventure:
  - Lab adventure with Dmitry: What is lab about the Lab?
  - Lab adventure with Eric: Research in geopolitics
  - Lab adventure with Fieke
  - Lab adventure with Niels
  - Lab adventure with Maxigas

- Books mentioned over lunch:
  - The Mechanic and the Luddite
  - The Price is Wrong
  - Abundance

- Afternoon group work on the timeline

- Reading with Pat
  - We will discuss the report *Hyper-Imperialism: A Dangerous Decadent New Stage* by the Tricontinental Institute for Social Research

- The First Space Discussion

Tuesday: *How did we get here?*

- Defining infrastructures
- Histories of digitalisation and decarbonisation
- Histories of digital sovereignty
- Histories of modernity

- Infrastructure Reading Group
  - More info on the reading group including book downloads:
    - https://www.criticalinfralab.net/2024/02/01/infrastructure-reading-group/

- 18:30 start the procession of boats to the Lady of the Rocks
- 21:00 concert of Dalmatian music on the main square

- World Cafe: Russia – World Cafe: China
- World Cafe: Serbia
- World Cafe: EU

"Nerd out with me" & "check out my project":

- *Knowledge Management Tools* (no notes)
- *Activist researcher* (no notes)
- *Natural Language Processing* (no notes)

Wednesday: *What is happening?*

- Industrial policies, states and infrastructures
- Governing through standardisation
- Alternative technological trajectories
- War, extraction and infrastructure

- Book publishing (no notes)
- Creative writing and speculative design
- Civil society in the age of the capacitive state

Thursday: *Building the research, policy and practitioner agenda*

- Building a research agenda about information controls
- Building a research agenda about communication infrastructures
- Building a practitioner agenda
- Building a technology governance policy agenda

Proud to present the next issue of *Branch Magazine* on "Attunement": Designing in an Era of Constraints.

It is a collab between the Green Web Foundation and the critical infrastructure lab. You can read all about ideas for grid aware computing, digital futures that are built by default to operate within planetary constraints and how to build your own electrical garden.

Near future climate science fiction books:

- https://www.vauhinivara.com/the-immortal-king-rao
- https://www.hachettebookgroup.com/titles/kim-stanley-robinson/the-ministry-for-the-future/9780316300148/

Friday: *Choose your own future!*

- I learned...

- Strategy / Future: Global (no notes)
- Strategy / Future: States and corporations (no notes)
- Strategy / Future: Environment (no notes)
- Strategy / Future: Civil society (no notes)

- Digital sovereignty in a society that builds
- Ruins of surveillance systems
- Normative science and the example of archival research

- Quantum turn (in space?) (no notes)
- Its a new cold war, baby!

Postcard from Perast

→ **Monday:** *It's a lab adventure!*

What is “critical” and “lab” about the critical infrastructure lab?

Being a “critical infrastructure lab” without state involvement is a radical statement.

“Critical” as a frame of seeing that goes back to critical theory, understanding things as historically, politically, and economically situated. Not as sites of eternal truth. In contrast, the word “lab” comes from a particular tradition of scientific enquiry in the natural sciences. Yet, both imply some experimentation and failure. The orange colour is also such a warning about experiments and failures. The lab colour is orange as an allusion to infrastructural situations that are marked out by orange signs and vests, etc. Why not yellow, like some other high-visibility equipment? There is apparently a hierarchy of safety colours!

How can you remain *critical* of the methods and tools you use in your research? What safeguards can you implement to ensure you remain critical of the methods you’re using?

Beyond the genealogies, the current implication of “lab” within any Faculty of Humanities is about being a cooperative structure, where researchers are joined together by a common project. A place that can be visited, because it’s open to the outside. An open space for discussion and collaboration, supportive.

What would be the opposite of “critical infrastructure lab”?

- *Positive (Friendly) Infrastructure Lab*.
- *Applied Infrastructure Office*.
- *Infrastructure for Good*.
- *Sustainable Infrastructure Development Bureau*.
- *The Bureau of Infrastructural Continuity*.

The lab takes up a formal space in the university, but engages like a squatter: doing first and asking permission later, if at all. – Lab members are sympathetic to the idea of being a “collective”, but recognize past experiences in civil society where the term is used and abused to legitimize the same top-down, patriarchal structures being contested. - This is a mindset that informs the way the lab works and labsters relate to each other.

The university belongs to the public.

Trying to develop affirmative visions for technologies - this is very hard to do in practice, because we are not trained methodologically in how to make these types of proposals. Our comfortable space has largely been in critique, but this has not been a successful approach in challenging dominant paradigms.

The lab work on bacterial mud batteries is a case in point: this is not only an example of considering alternative materiality of infrastructure and “lab” in action, but raises interesting questions that are actually fundamental to how we develop alternative visions. — Is this approach exploiting the labor of the bacteria? Can we create “humane” conditions for the bacteria without anthropomorphizing them? Etc.

The infralab challenges the university infrastructure, but has been accepted over time by the administrative bureaucracy, because of the sheer time that passed and the exposure received. We need to engage deeper with the idea that the university belongs to the public. To be an academic is to be in service to the public, too! This means facilitating the use of the physical space of the university for communities.

Composing a common time horizon

→ **Tuesday:** *How did we get here?*

→ **Wednesday:** *What is happening*?

Industrial policies, states and infrastructures

By Andreas, Stas, Zuza

Define a good industrial infrastructure policy. Discuss the world views and politics that are guiding China, Russia, and EU industrial policy. What is unique about each of those approaches, what is inspiring, and what would need to be reconfigured for a political project to move to a world view that centres people and planet?

Build an industrial policy. Start by identifying failure points in attempts to build infrastructure, from railways to industrial ecosystems. Choose one or more cases and identify the political, ideological, legal, and economic factors that derailed or delayed them. Practically develop industrial policy and also think of legal and institutional tools to slow, reshape, or block the project.

The state has to go beyond the narrowly conceived idea of fixing up market failures.

Industrial policy came to the foreground of discussions because of increased geopolitical tensions. European dependencies on the US, the PRC and the Russian Federation are now perceived as problematic, because those regimes are seen as politically – and thus infrastructurally — unreliable or adversarial. Recent events thus cast the relationship between the Western nation state and its national industries in a new light.

Until recently, state-market relations have been structured by the neoliberal orthodoxy that the role of the state in regards to industry is to shape the regulatory environment in order to correct for "market failures". The recent upsurge of interest in industrial policy has implications for that doctrine. The state has to go beyond the narrowly conceived idea of fixing up market failures, which is a very reactionary approach. Instead, the state should adopt a more pre-emptive approach that considers the fact that markets are simply not optimized for "public interest infrastructures" (e.g. utilities). A good industrial policy should also create space for market actors that are not oriented towards profit-making, such as open source communities, the caretakers of the digital commons, civil society organisations, even social enterprises. Ultimately, the state should consider its active role in planning, generating and regulating both supply and demand.

The prioritisation of technological developments in the context of industrial policy can be done based on the organising principle of "strategic indispensibility". In short, the state should prioritise *what it is good at* and *what other regions cannot live without* — that is, taking care of the essential infrastructure and essential utilities. This is why it is necessary to rethink and foreground what critical infrastructure is from the perspective of a healthy democracy!

States should take political responsibility.

The larger implications of the turn to industrial policy in the West is that from now on, states cannot hide behind the idea that what happens in markets is apolitical by definition. States should take political responsibility

for launching, funding, and regulating market dynamics. This does not mean that everything should be controlled by the government, just that many more infrastructures should be publicly owned and governed in line with public interest policies. That is, once again, industrial policy should focus on the demand side, not only supply side funding. Furthermore, it is of pivotal importance to avoid replicating the example of the United States and the Russian Federation where natinal champions are nurtured through a "no rules" approach, resulting in monopolistic situations, novel supply chain dependencies, as well as extractivist relations to populations and territories. What should drive industrial policies instead is the cultivation of ecoystems that are composed and comprised of a number of smaller, cooperating actors.

The known limitations of state interventions and the historical lessons from past experiences should also be taken into account when developing industrial policies. The new approach to industrial policy necessitates capacity building in the public sector and wider civil society, including the capacity to learn from mistakes and evaluate policies in hindsight. An emblematic example is the surveillance of electronic messages, which have been introduced in the West, but then it turned out to be inadequate for addressing societal challenges and inadvertedly became a model for information control in authoritarian regimes. This example shows that there is no universally "good" industrial policy.

Examples from Russia are also instructive. After the change of system, which was the initial period for digital infrastructures, a hands-off approach successfully encouraged the development of domestic products and services such as in email provision, social media, and web search (VK, MailRu, Yandex, respectively). In the next decades, namely the 2010s-2020s, the tide turned and the state became the driving force behind creating digital infrastructures from scratch (cf. the Russian national e-governance platform). Despite the different dynamics in these two periods of economic development, both can be considered as functional examples of industrial policy for digital infrastructures. The example of Russia also shows that just because an industrial policy has oppressive purposes, it is not bound to fail or end up being ineffective. There is no causation between the purposes of policies and they being successfully implemented in terms of structural changes in the national economy. Authoritarian censorship technologies and useful e-citizenship services can be equally (in)efficient, depending on the experience and expertise of their designers and implementers.

What are the lessons that can be learned from Gaia-X regarding industrial policy?

The critical mistake was the inclusion of US hyperscalers.

The case of Gaia-X forcefully demonstrates the importance of taking political responsibility for industrial policies. It started out as a political initiative by Germany and France, yet by the time it became a legal entity in Belgium in the form of a new NGO, state actors moved to the background. The result was a contradiction at the core of the project. On the one hand, Gaia-X is driven forward by big values and political ideas. On the other hand, there is no real political oversight — despite funding by states, the government adisory board has no say over substantial matters. What is worse, the

contradiction between political and economical motivations that characterises the relationship between the state actors and the market actors around Gaia-X is repeated as a symmetrical contradiction within the structure and interests of the market actors themselves. Different participant companies have different ideas about what Gaia-X should be. The critical mistake was the inclusion of US hyperscalers. The decision was justified by the perceived dependence on them, but they soon acquired a hegemonic position in Gaia-X working groups. Finally, Gaia-X is still not finished: what we can see now is that it turns out to be not a real ecosystem as originally envisioned, but rather a certification scheme.

The lessons to be learnt from the case of GAIA-X are the following:

1. Industrial policies need a clear mission and mandate.
2. States who make industrial policy need to assume political responsibility for them, organise a political debate and set up governance structures where they can exercise their political influence on the process.
3. In order to ensure democratic participation, accountability and a governance structures that take into account the power differentials between the participants have to be in place from the beginning.
4. There has to be safeguards against powerful actors with misaligned interests derailing industrial policies, such as when Gaia-X working groups have been flooded by representatives of US hyperscalers.

The Project of Common European Interest (IPCEI), and particularly its Next-Generation Cloud Infrastructure and Services (CIS) package is probably an attempt to learn from the case of Gaia-X. It has potential to be a veritable example of a powerful industrial policy. We should follow and engage with IPCEI developments!

References

Baur, A. (2025). European ambitions captured by American clouds: digital sovereignty through Gaia-X? Information, Communication & Society, 1–18. https://doi.org/10.1080/1369118X.2025.2516545

Governing through standardisation

Standardisation is increasingly being used as a way to regulate technology, setting the rules not through laws, but through technical specifications. Is this an effective approach? Discuss the benefits and the risks! Are standards organisations ready for this? How the necessary expertise to accommodate the changing role of standards bodies can be — or is it already — provisioned. Reflect on whether standardisation helps to make technology more reliable and interoperable — or does it end up concentrating power in the hands of a few, limiting possibilities for alternatives to materialise and bypassing democratic oversight?

Let's explore: In what cases can standardisation be a useful tool for shaping fair and open technologies? And where should we be cautious, or avoid using it altogether? How can we ensure that standards serve the public interest rather than just the interests of powerful actors?

By Eric, Grace, Neils, Timo

How much interest is involved?

Defining standardisation

Standardisation can be defined as an institutional mechanism that allows a diverse group to work together and coordinate in a specific area along the lines of perceived common interests. In many standards bodies most participants are delegated by companies. Whose interests the delegates represent?

We cannot just assume that the behaviour of Huawei engineers in standards committees can be accounted for in terms of Chinese foreign policy objectives, for example. It is not trivial to tie what individual engineers do in working groups to the strategic interests of the company that employs them. There is a revolving door between major firms such as Cisco and Huawei. The same person might represent one in one year and the other in another year in the same standards body and the same working group. Participants in the standardisation process might have their own agenda, or at least might not translate corporate or national agendas mechanically into participation behaviours.

Yet technology standards are also used by states as policy instruments. Domestic standards in AI governance in China and India are a case in point. In the EU, politicians are often afraid to set goals for industry leaders, but the Commission can explicitly ask for standards to be made, as have been the case with the AI Act, similarly to China and India. Still, the participation of engineers from companies that are based in China is often looked upon suspiciously by Western observers. This is not always justified, for the reasons listed above.

What we *can* do is to discern different approaches that state formations take to international standardisation in particular historical moments. US standards policy is traditionally driven by firms, while in China industrial policy plays a bigger role. The EU has to learn from both

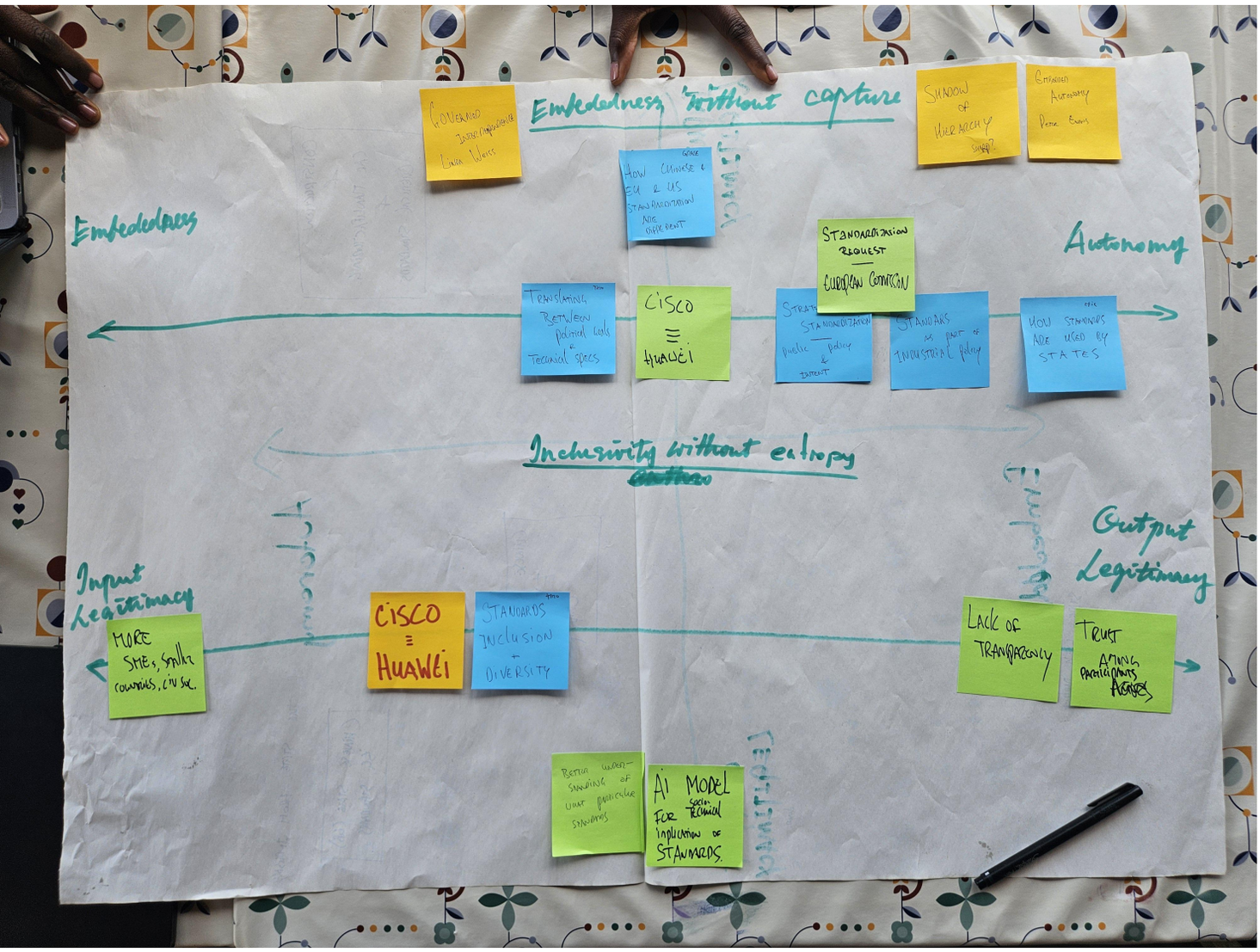
these days, when it is confronted with the questions of technological sovereignty. Chinese policy have also been different at different times. They gave more free reign to market actors in 2019, while from 2021 the state used standards policy to encourage the diffusion of 5G across industrial sectors. As these examples show, we can observe notable shifts in states' standards policy over time, not just regional variation.

Characterising standards processes normatively

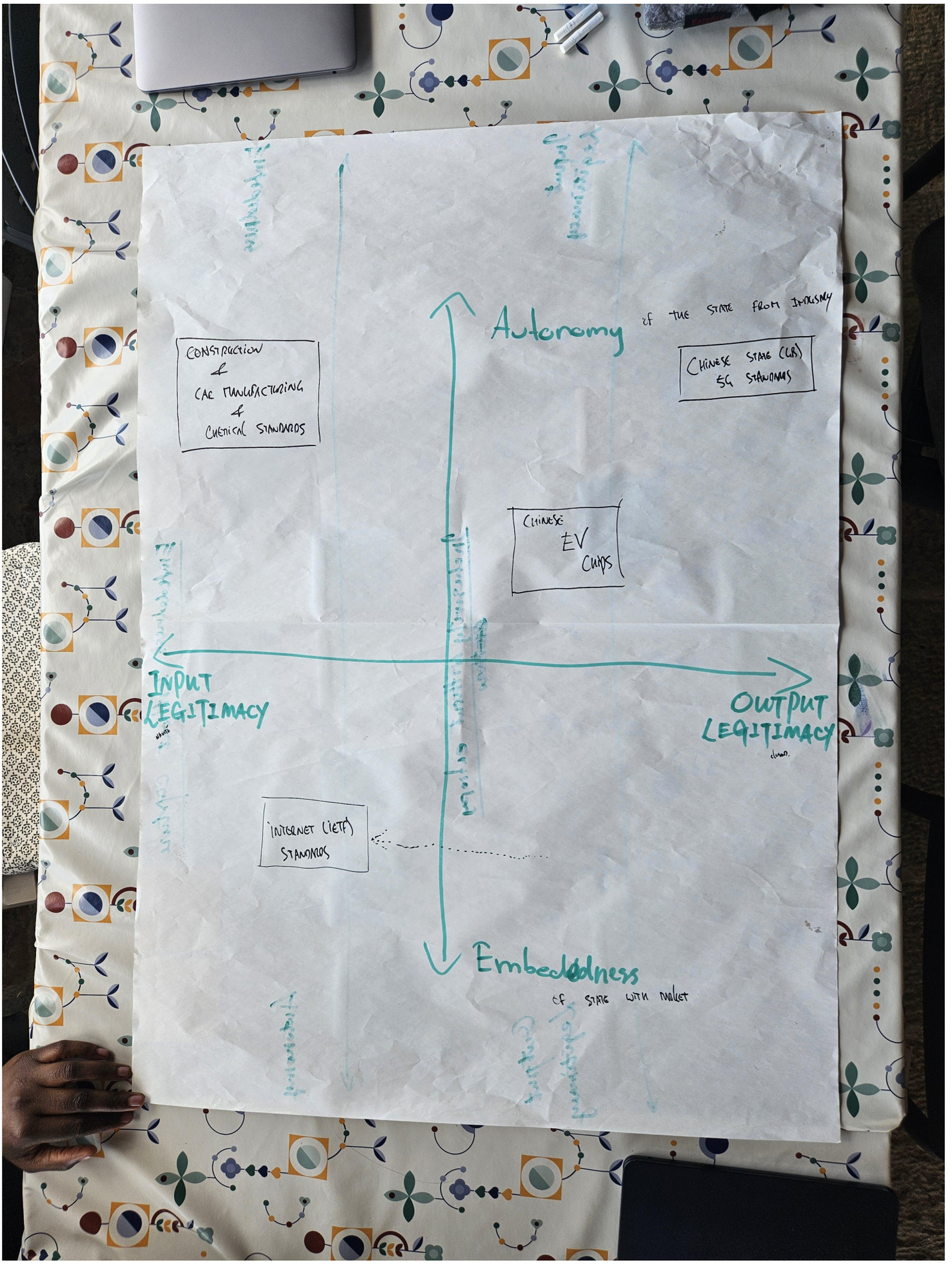
We can situate particular standards processes in terms of their input and output legitimacy, as well as according to the role of the state vis-a-vis industry. Input legitimacy refers to the range of actors that are involved in the process. More democratic processes are inclusive of a wider range of actors, which translates to higher input legitimacy. On the other hand, output legitimacy is a measure of how the final products affect different social groups. High output legitimacy refers to design decisions that serve the public interest through their consequences. The role of the state vis-a-vis industry can be another dimension for the characterisation of standards processes. Then, the question is whether the state acts on its own accord, or following industry interests. Concrete examples can be located along these axes.

For example, privacy advocates might argue that more civil society participation in standards bodies may lead to standards that better serve the public interest. Increasing the inclusivity of the process is a measure that aims to increase *input legitimacy*. In contrast, *output legitimacy* would come from showing that the same standards effectively protect personal information, thus addressing the societal issues adequately. In the alternative dimension, when the EU asks standards bodies to generate specific standards, it acts with relatively great autonomy in relation to industries. In contrast, 5G standards made by the 3GPP are driven by the telecommunications industry, with limites opportunity for states to intervene on their own initiative.

A sweet spot across these dimensions is when state actors can reconcile the particular economic interests of industrial sectors with the public good, while input legitimacy is increased without the diversity of participants fuelling entropy within the standards body.



Posters from the session “Governing through standardisation” (this and next page)


Autonomy
of THE STATE FROM INDUSTRY
CONSTRUCTION
&
CAE MANUFACTURING
&
CHEMICAL STANDARDS
CHINESE STATE (GB)
5G STANDARDS
CHINESE
EV
CHIPS
INPUT
LEGITIMACY
OUTPUT
LEGITIMACY
INTERNET (IETF)
STANDARDS
Embeddedness
of STATE WITH MARKET

Alternative technological trajectories

Let's explore the idea of alternative technological trajectories — paths that steer clear of dominant models shaped by big tech, powerful states, or colonial histories. What does it mean to talk about a non-aligned technology? Can we find historical or contemporary examples where communities, movements, or states have developed or adapted technologies on their own terms, outside dominant geopolitical or corporate agendas?

What values or priorities guided those choices? What made them possible — and what were the limits? Did alternative technological trajectories that ran across an extended period of time stay true to their original values? How can such examples help us imagine different futures for technology: more democratic, situated, decolonial, or ecologically grounded?

By Maxigas, Nai, Pat, Yichen

Definitions and examples

Technological trajectories are threads in the history of technology that encompass a coherent vector of technological development, including the techniques themselves but also the social forces that make them possible. Thus, alternative technological trajectories nurture and sustain for some time technologies, services, products or infrastructures that take shape without the decisive influence of hegemonic political factors, be those techno-feudalism, geopolitical superpowers, or colonialist projects. Finally, non-aligned technological trajectories are a bit more specific and refer to technological developments in response to geopolitics and the changing global division of labour, aiming to escape the logic of unequal exchange during technology transfer from core countries of the world system towards the peripheries.

Examples can be small or big, top-down or bottom-up. The case of the open-source 3D printer is rooted in hacker and maker circles and thus quite small. But the idea was big! It started as a Marxist idea, that if everyone can print objects than the market where commodities circulate willl collapse, and that will be the end of capitalism. The way it would grow from a prototype to a mass movement was that open-source 3D printers would be able to replicate themselves. This plan came up when the already existing industrial patents on 3D printers expired. Even if the underlying idea is silly, it was a significant divergence from mainstream industrial research and development. Eventually, it has been re-integrated into the capitalist system, and now it is a toy to print other toys that eventually become plastic trash. In any case, the open-source 3D printer was a whole technological trajectory, not just some ideas or prototypes and it is documented in the *Resistancece to the Current* book.

A big one is the non-aligned technological trajectory of indigenous 5G networks in India that Maxigas studied last year. While the full-stack suppliers are either Ericsson/Nokia, or Huawei/Samsung, India is building cheaper and simpler 5G networks based on local suppliers where possible, including resources from national research centres, academia, small and big enterprises, etc. Now there is a whole ecosystem around indigenous 5G networks that can serve local needs, implementing only the needed features. Most places do not necessarily need 5G networks, but many would benefit from the speed, coverage, and some specific featuresof next generation telecommunications. Indigenous 5G is on a technological trajectory that allows India to steer clear of the rivalry between the US and China, avoiding technological dependencies on either of them – this is why Maxigas calls it a *non-aligned* technological trajectory.

Mapping the problem domain

An industrial eco-system steering clear from US and China 5G rivalries.

Who shapes technological trajectories? The actors on the one side are Big Tech who claim the future, powerful states that rule the present, and colonial histories that exert their influence from the past. On the other side, transformation can come from collectivist approaches in communities, advocacy by social movements, and governance by states. The environment is shaped by factors such as funders' strategies and industrial policy. Many alternative approaches to technology have been mentioned in the discussion. Examples are: resisting planned obsolescence with design and upcycling; scavenging in the ruins of smart cities by stealing and repurposing sensor infrastructures; as well as alternative innovation ecosystems (Jugaad in India, or Shenzen in China, copycats in Cuba, the Web3 mirage Fundi, etc.). From this brief survey it is clear that impactful cases combine top-down approaches – which can access capital on a larger scale for technology development — with bottom-up approaches — which can scale the political organisation towards visions of a better life.

So, a combination of bottom-up and top-down approaches in necessary for nurturing alternative technological trajectories. While the direction of technological innovation is largely dictated by capital, an alternative would be fuelled by democratic participation. However, democratic participation is prone to corporate capture, especially when it comes to inventions that can be turned into innovations. Alternatives that would scale or just show the potential of doing technology differently are often killed off (sometimes violently) by the backers of the dominant trajectory. This brings up the question of recuperation.

How do we protect and nurture alternative technological trajectories? We only had stray ideas about this issue. Protecting the tech commons, preserving the opportunities to embrace friction, focusing on who uses technology and why were some of those ideas. In particular, we discussed the figure of the user, which is dissappearing in recent paradigms of "Experience Design" (XD). Alternative technological trajectories are not necessarily designed for the universal user, for "everybody" in a global market. Perhaps we should bring back the "real user" and see if it makes sense to work on the basis of user communities!

Case of the AI hype machine

Our approach is based on Public Enemy's track "Don't Believe the Hype", which was popularised by Spike Lee. We are looking at what powers the hype machine. Consulting and Venture Capital are pushing the AI hype machine through various institutional ecosystems. Either it is a response to the crises of capitalism, or an opportunity for growth, or both. The role of the state can be seen in how the AI hype machine shapes academic knowledge production through founding new institutions, directing research funding, and reputational capital (when leadership is seen as equivalent with buying into the hype). There is a tension in the academia between technical universities and engineering departments, on the one hand, and the social sciences and humanities, on the other. Yet both should be incorporated into technological trajectories towards social goods, in terms of values funding and policy! Why AI have to be so fast and complicated? *Longevity, repairability, simplicity*... these are all characteritics of a social good, and the opposite of what hyped AI stands for.

We can talk about AI power blocks such as US, China, EU — yet the EU is an odd one out because its positionality and dependencies are uncertain. EU wants to stand to "catch up" and "be a leader" at the same time, which are contradictory aims. Is just following existing trends effective for either "cathing up" or "leading" in emerging technologies? In India, technology education is pursued for social mobility and social security. Given the current outlook on AI, how likely is this strategy to work? What would it take to see Big AI as vampiric? Draining expertise and capabilities from people while extracting, coopting and appropriating knowledge from the world? Similar to the film *Sinners*, where vampires form a sort of hive mind.

Characteristics of non-aligned technologies

A combination of bottom-up and top-down approaches can be an invitation to play with the scale and directionality of technologies.

We need to think differently because we are not going to win *their* game! Yet, does it have to be small and slow just because innovation and marketing are capital intensive? A combination of bottom-up and top-down approaches can be an invitation to play with the scale and directionality of technologies. What are the gaps in the supply chains? These are routinely used for leverage in geopolitical strategising. Below some nanometers, there are only so few actors who can play the game of chip manufacturing. Can both capital and participation fuel alternative technological trajectories that are more robust and flexible than current AI monocultures? Such questions can lead to new ways of participation in the governance, implementation, and deployment of technological alternatives. Innovative participation mechanisms, in turn, are to protect the commons from the onset (as Elinor Ostrom would have it), put safeguards in place against cooptation and corporate capture, and design for longevity in view of the public good.

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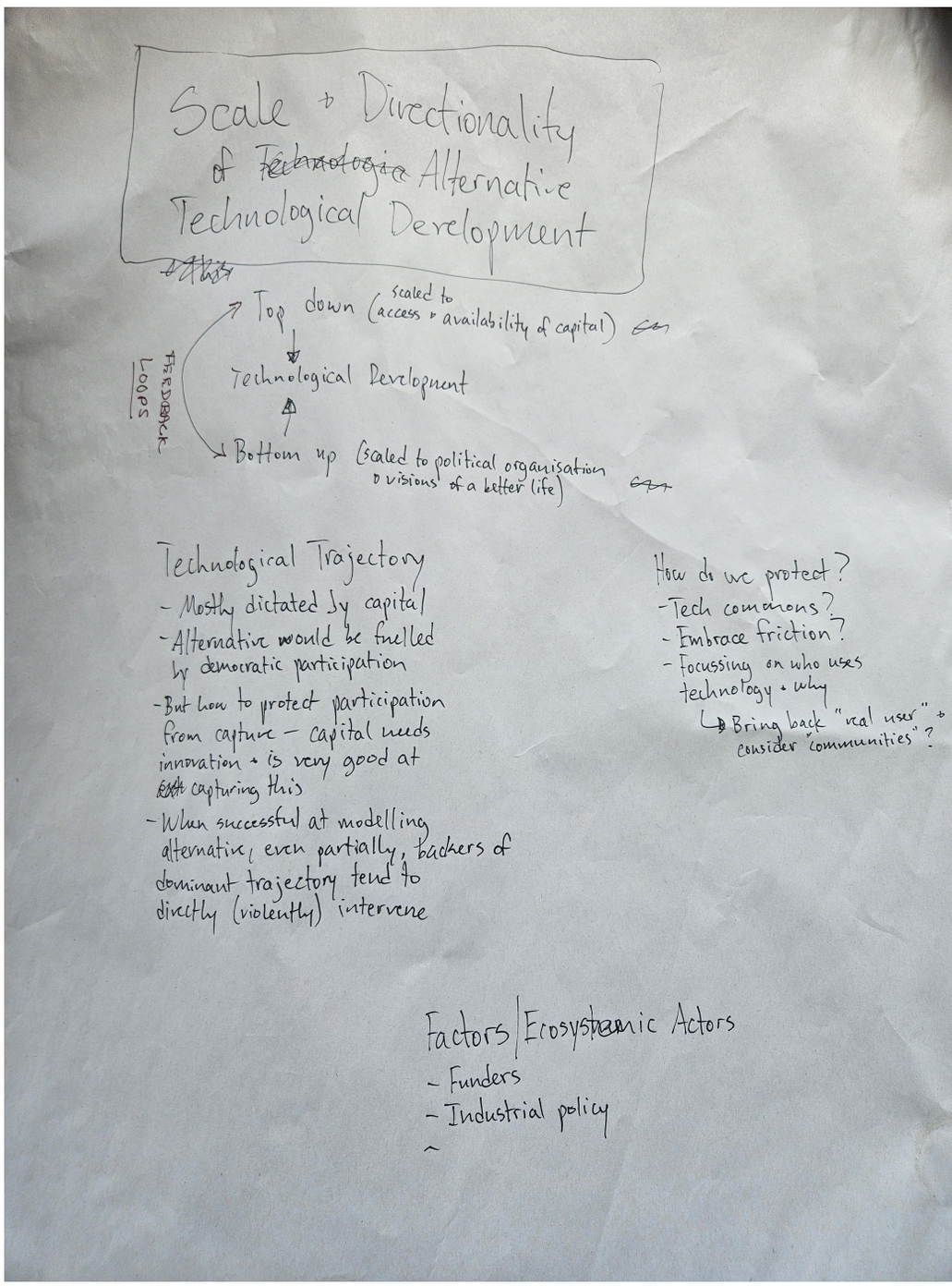
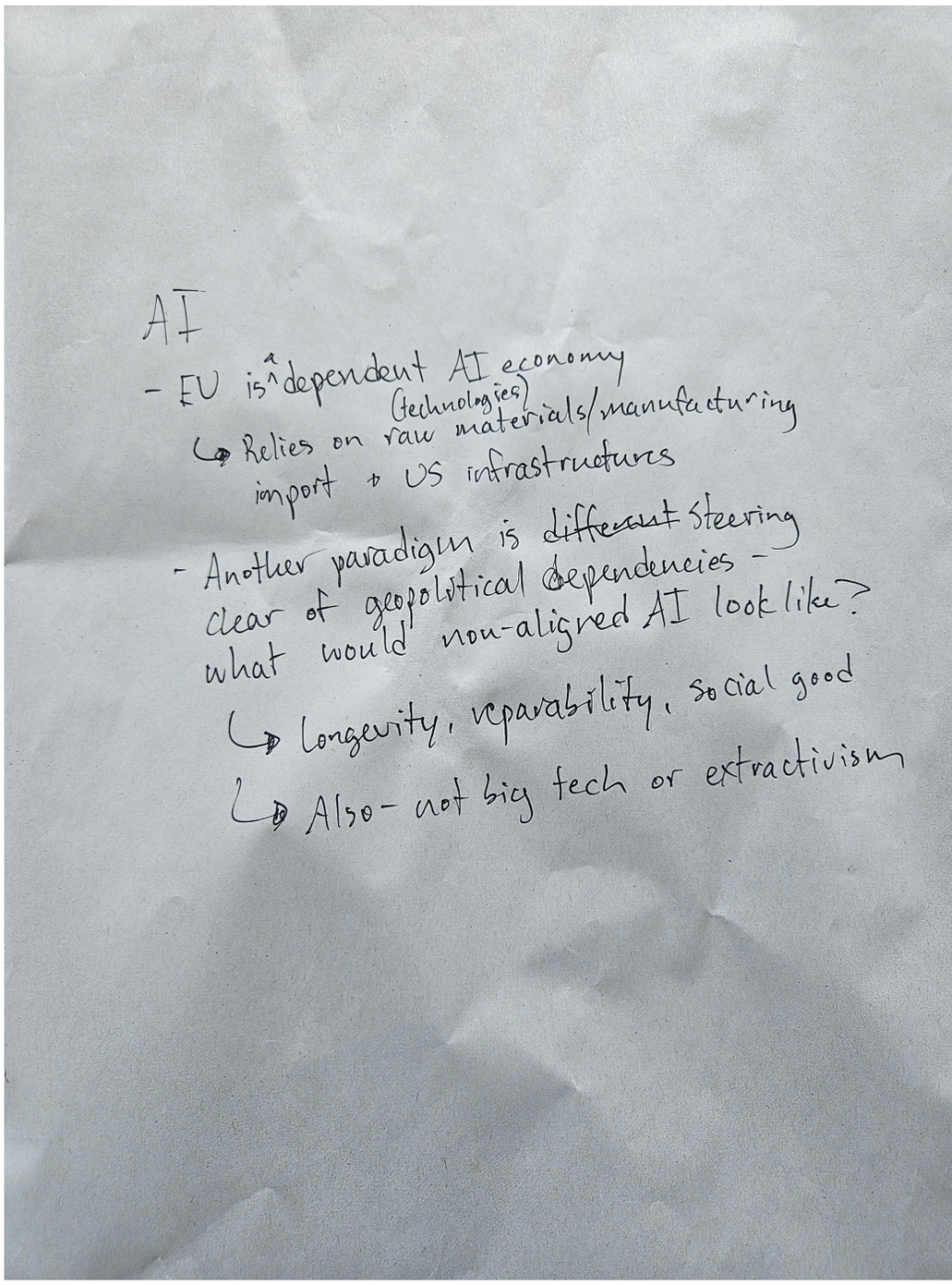


Poster from the session “Alternative technological trajectories” 1/2



Poster from the session “Alternative technological trajectories” 2/2

War, extraction and infrastructure

Let's unpack how nature is treated as a resource to be extracted, scaled, and secured — often through systems shaped by militarism and colonial logics! How are infrastructures of extraction (mines, data centres, logistics networks, satellites, undersea cables, etc.) tied to military power, territorial control, or security agendas? What does it mean when nature is seen not as a living system, but as raw material to be managed or exploited at scale?

Can we trace specific examples — past or present — where military or extractive logics have shaped the design and function of infrastructure? What infrastructural trajectories are current geopolitical tensions strengthening and reinforcing? How do these patterns persist in today's green or digital transitions? And what alternatives exist: ways of relating to land, materials, and technology that resist extraction and centre care, reciprocity, or repair?

By Asia, Fieke, Gargi, Lisa, Liza, Oli, Sam

War is environmental and the environment is militant

Infrastructures are both technical and epistemic objects: material devices for practical purposes, but at the same time ways of seeing the world. They are rooted in the history of wars, the modern drive for scale, in resourcification (see separate section below on resourcification). In this context, there is a circular relationship between geopolitics, extractivism and infrastructure: *geopolitical* power struggles motivate the *extractivism* of resources (such as raw materials, labour, data, etc.), which is instrumentalised through *infrastructures*. The circle closes when infrastructures become a source of geopolitical tensions themselves.

However, the connection between these topics is seldom recognised in the way people think about them. There is a profound discoursive seperaration of discussions about war and environment. Conversations about geopolitics, governance, militarization are taking separate spaces from conversations about climate, ecology, ecological ways of living. There is a lack of understanding of how planetary politics, ways of living, environment, and further imperial and colonial logics that produce various forms of violence, including war, are directly related. — War is environmental and the environment is militant. Sloterdijk writes about the change of the paradigm: "You no longer have to be the strongest man to kill the other man. You can target their environment."

Logics of imperialism and colonialims are performed and engrained by infrastructures

"Letting them have internet" is a surveillance tactic.

Targeting the environment is a common tactic in conflicts and wars. For example, there are many studies of information controls in conflict zones in the present and the past. Network shutdowns in occupied territories. The

current communications infrastructures are also shaped by previous conflicts.

Seeing Like a State (by James Scott) features many examples of standardizing and conquering nature for the purpose of state building. One is the LACIE Program using satellite imagery to see what the harvest projections in Russia would be during the cold war. A contemporary example is Israel – while technically it would be not difficult to have internet everywhere, the occupied territories only get 2G or 3G. Yet, "internet everywhere" can also be used for repression: "letting them have internet" is a surveillance tactic.

The conflicts around China are often around the contestation of resources. The cultural genocide of Uyghurs in Xinyang is partly about the extraction of resources via indentured workers. Another example are the Ohahu water protectors in Hawaii. The US naval base is taking away the drinking water from the local people there. Shell working in the Niger Delta to suppress communities in the area is another example. Communities and environmental activists are suppressed because they are "in the way of resources". These territories are perceived in terms of the resources that can be extracted from them through infrastructures. The common thread is *resourcification*.

Framework of resourcification: How it works with Ukraine

Ukraine is conceived as "the breadbasket of Europe".

Ukraine is conceived as "the breadbasket of Europe". As in the LACIE Program mentioned above, the territory is looked at in terms of the projections of grain harvests, which become the basis for the calculation of value. Ultimately, it is not about the humans living on the land any more, and their humanity.

During the 20th century a novel understanding of the earth as a territory has been developed, where resources can be identified and moved on a planetary scale. When we saw the "whole Earth" as a blue marble on a photograph taken from space in 1972, it was a turning point. Yet the making the state of Israel — the declaration that "this land is suitable" was already a step in the same direction. The framework of the war as it is defined by international legal conventions can be limiting, as it obscures the material processes. The othering of Arabs and Jews in the current framing of Palestine as a regional conflict is a case in point. In fact, European countries have been solving their own issues from the Second World War: after killig Jewish people during the war, after the war they seeked to find a different, "suitable" land for them. None of the European countries is directly at war with Palestine today, but the material history of geoopolitics reveals their responsibility for the conflict. This is why we study infrastructures. Infrastructures enable us to tap into the material reality that is often obscured otherwise!

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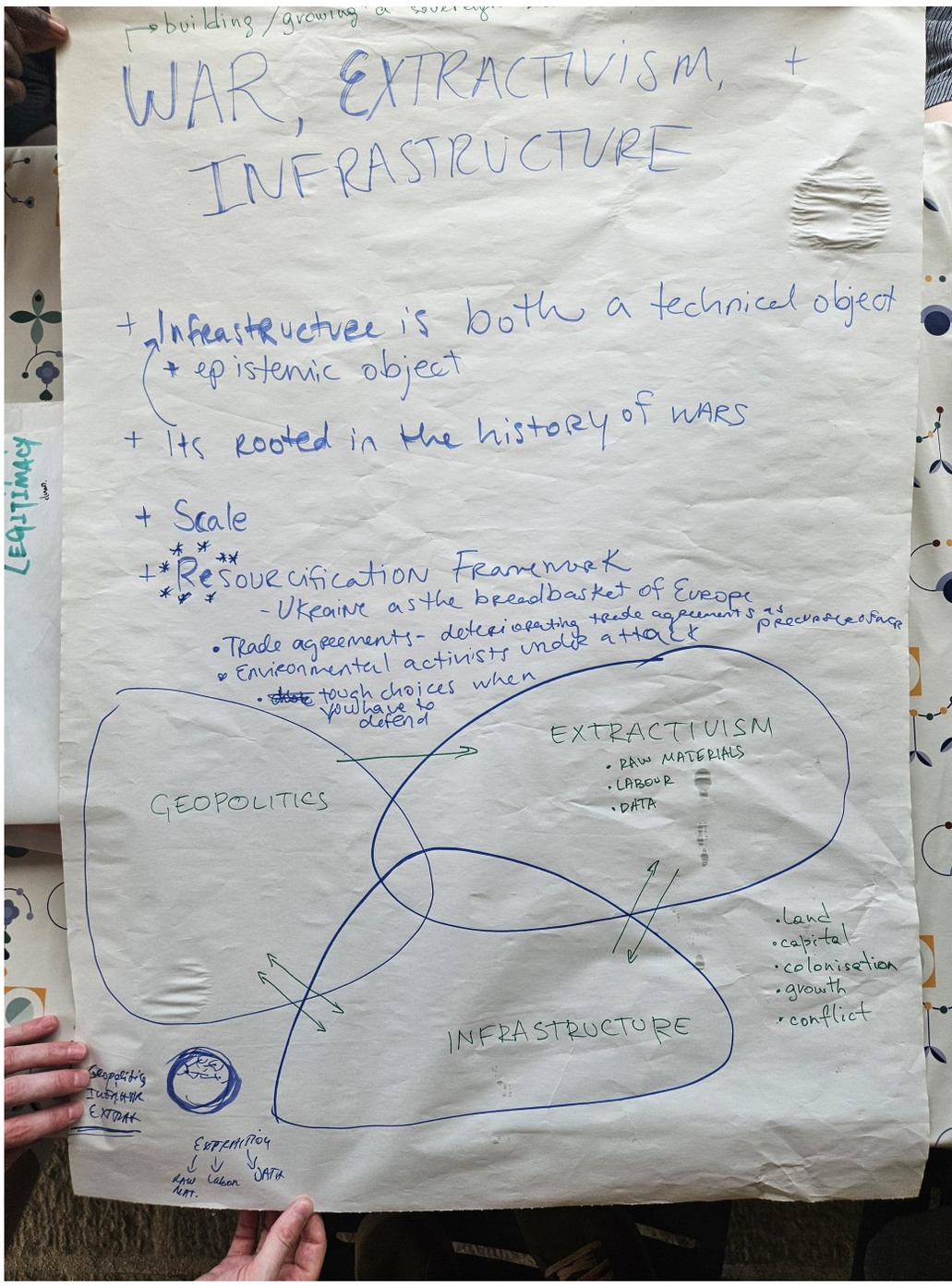

Poster from the session on “War, Extraction and Infrastructure”

→ Thursday: *Building the research, policy and practitioner agenda*

Building a research agenda about information controls

> Let's examine how states, corporations, and other actors assert control over information — through censorship, infrastructure, standardisation or claims to digital sovereignty! Who gets to decide what flows where, and under what conditions? How are tools like content moderation, firewalls, internet shutdowns, surveillance, or platform governance used to shape what can be seen, shared, or accessed?
>
> What can we observe about the uneven distribution of such practices across intensities, geographies and social strata? How do strategies of control differ between liberal democracies, authoritarian regimes, and postcolonial or transitional states? Can digital sovereignty be a shield against foreign domination and a tool for domestic repression at the same time?
>
> Where do we draw the line between legitimate regulation and repressive censorship? What are the trade-offs between freedom, security, and self-determination in different political and infrastructural contexts? And finally, what alternative models or grassroots movements challenge top-down control — and push for more open, democratic, or decentralised approaches to information governance?

Participants and lab members identified priority areas for advancing understanding of information control mechanisms across different political and technical contexts.

Areas Requiring Additional Research

- Public opinion research regarding information control technologies and government trust relationships across different countries;
- Platform-based censorship and geo-censorship including algorithmic content optimization, location-based restrictions, and infrastructure controls in occupied regions;
- Circumvention tools markets and stakeholder ecosystems covering private companies, open source projects, and state actors;
- Regional censorship variations within countries and information control infrastructures in conflict zones.

Promising Analytical Frameworks

- Application of Military Industrial Complex and "Tech Industrial Complex" concepts to information control analysis;
- Application of "strategic indispensability" framework to analysis of companies in Russian internet infrastructure sector;
- Investigation of how the ISP-Enduser relationship changes as information control mechanisms evolve in Russia.

Avenues for Tool Developer and Civil Society Engagement

The multistakeholder participant cohort allowed lab members to identify the areas in which research findings can make a tangible impact for tool developers and civil society actors:

- Research findings can inform circumvention tool development, particularly regarding OpenWRT routers;
- Integration of policy-to-implementation pipeline insights for tool developers anticipating upcoming changes in control mechanisms;
- Scholar-activism integration through pragmatic engagement models connecting research with implementation strategies;
- Improved understanding of how technological standards research can inform civil society advocacy approaches.

Datasets / Research groups

- CensoredPlanet
- OONI
- STOP Database
- CitizenLab

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Disclaimer on Russian Internet Shutdowns publications: [elizaveta] I would be very catious while referring to the data about internet shutdowns in Russia collected by NaSvyazy which this article refers to. NaSvyazy collect users reports from the ground but they do not have any verification procedure for them, neither they do collect detailed information about when in the given city the disruption happened. These reports are anonymous and include only region name, ISP name and type of the network (mobile/broadband).

Keeping it Analog: A framework for opting out of connectivity

Welcoming the Dragon: The Role of Public Opinion in Russian Internet Regulation

Russia: Proposed amendments to counter-extremism laws escalate assault on dissent

Russia: Independent media are the primary targets of Kremlin laws against “foreign agents” and “undesirable organisations”

Russia’s ICT-infrastructure and its development prospects in the near future

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Building a practitioner agenda

Let's dig into the financial and ownership structures behind Big Tech and the infrastructures they rely on. How do public investments — from subsidies for renewable energy to direct funding — support the growth and operation of massive digital infrastructures?

What does it mean when critical infrastructure is owned, operated, or controlled through complex layers of public-private partnerships, outsourcing, or acquisitions? How does this layering affect who is responsible for maintaining, regulating, and benefiting from these systems?

In what ways might public money be enabling private monopolies — and what are the consequences for transparency, accountability, and democratic oversight?

Can public funding be redirected to support more equitable, sustainable, or community-controlled infrastructures? Or can the current infrastructures be recaptured by the public? What role can (policy) practitioners play in shifting agendas — from tech hype to maintenance, from extraction to public value — and what new tactics, alliances, or coalitions might be needed to do so?

Let's consider examples from renewable energy projects powering data centers, to public-private deals in telecom, to the purchase and consolidation of infrastructure by tech giants! What lessons can we learn about the political economy of infrastructure finance and ownership?

By Maxigas, Nai, Timo, Zuza

What we want is for investment to go into the things we like!

Big tech benefits from the status quo. We need to understand what are the enablers and who controls them. – We looked at just transition agreements as a source of inspiration for just digital transition that would enable divesting from Big Tech and investing in community/local infrastructure. — What we want is for investment to go into the things we like. How do we get there? For example, currently EU savings are not invested in the EU but in the US because this is simply more profitable.

Why it would work?

- Divestment is a very scale-flexible framework:
  - it can be done on an individual level (by choosing your bank or pension fund);
  - on the municipality level (zoning);

- ◇ as state policy;
- ◇ or through Supranational mechanisms and agreements.

What should we do?

- ◈ Come up with a good story to convince people we need this, learning from the security-industrial complex and the environmental movement.
- ◈ Ensure we bring people who would be affected by what we call for over to our side.
- ◈ Advocate for (in the EU):
  - ◇ tying subsidies to public ownership;
  - ◇ differential interests from community infrastructure;
  - ◇ investment in Big Tech not to be considered "clean" but the opposite;
  - ◇ influence how the Savings and Investment Union is built.

Strategy

- ◈ Creating ongoing insitutional programs and funding mechanisms to support policy sandbox for ongoing policy experiments and research pilots on just transition projects across various scales of governments to understand the following:
  - ◇ To understand what does (or does not) work well, especially to investigate potential casual mechanisms.
  - ◇ To harmonise policy strategies and objectives across multiple scales of government through strategic funding.
  - ◇ To embed public participation requirements across engagements that create public buy-in to just digital transitions.
  - ◇ Game out scenarios, as well as encourage and learn from political experimentation and study possible fallout.
  - ◇ Invent, nurture and test new narranatives, to see what metaphors work well to tell these stories, learning from the security and green fields where activists do this well.
- ◈ Redirecting the directionality of digital transformation through more market-shaping approaches to achieve the following:
  - ◇ To create more structural incentives through policy and regulatory instruments.
  - ◇ To incorporate conditionalities into public investiment vehicles (e.g., transion plan requirements, differential interest rates for banks that invest).

Just Transition Agreements for Public Digital Infrastructures

The goal is to divest from Big Tech and invest in alternatives. A case study of a geographically targeted climate policy in Spain shows how this can be done while avoiding a political backlash at the ballot box (Bolet, Green, and González-Eguino 2024). The incumbent Social Party (PSOE) negotiated a Just Transition Agreement (JTE) with the unions shortly before the elections in order to help phase out coal from the national energy system. They negotiated using *corporatist bargaining* to transition off coal, with *trusted actors* regularly informing workers and unions in *assemblies*. The policy targeted coal mining areas and compansated the "loosers" of the green

transition, e.g. the workers themselves. The government invested in the affected regions instead of paying unemployed coal miners. The corporative approach to a collective bargaining process worked well. The Socialist Party could phase out coal and gained 2% more votes in the next election. The example shows that if climate policy compensates the loosers, then it can be both ethically just and politically viable. Maybe there is a template there?

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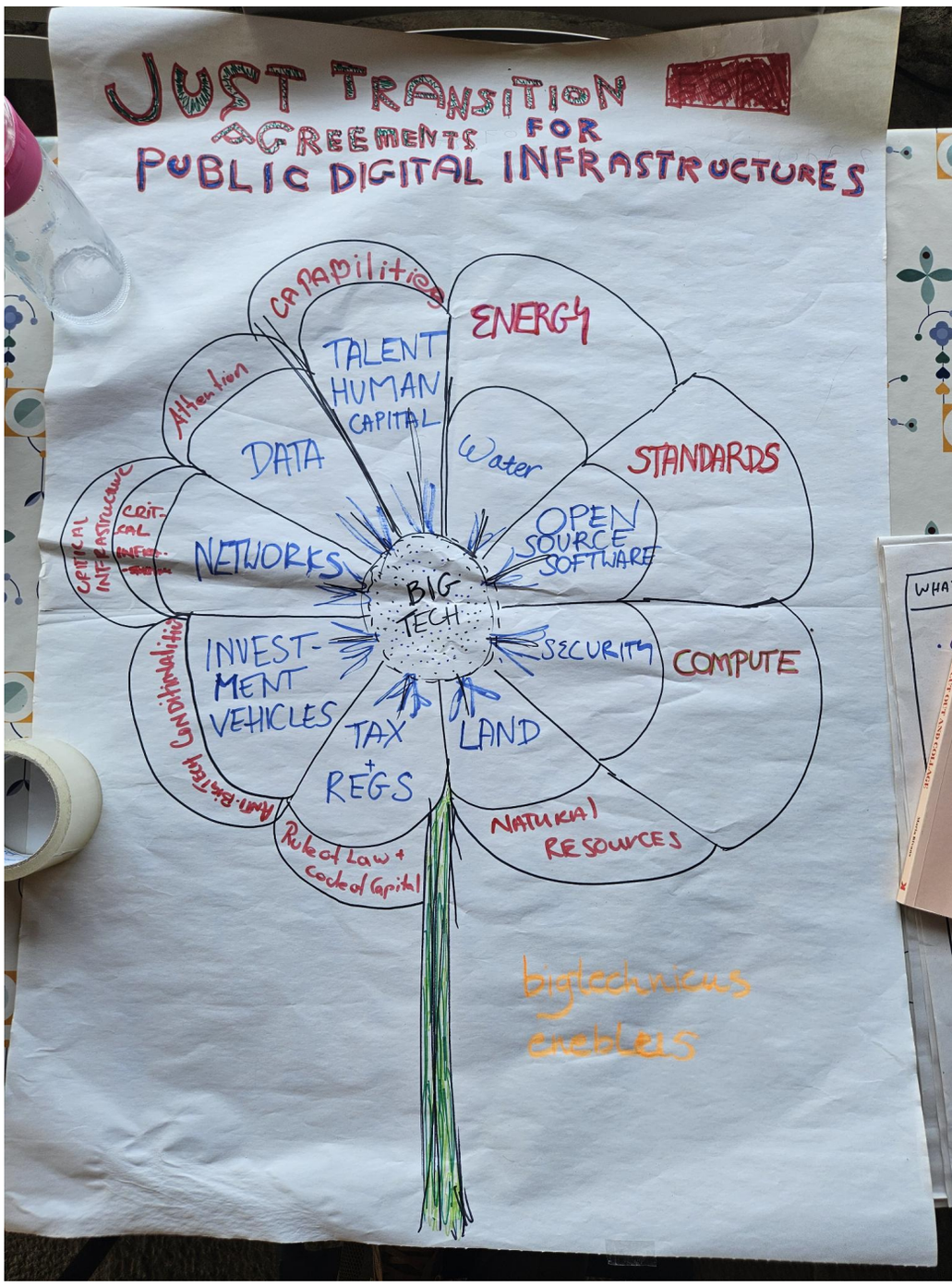
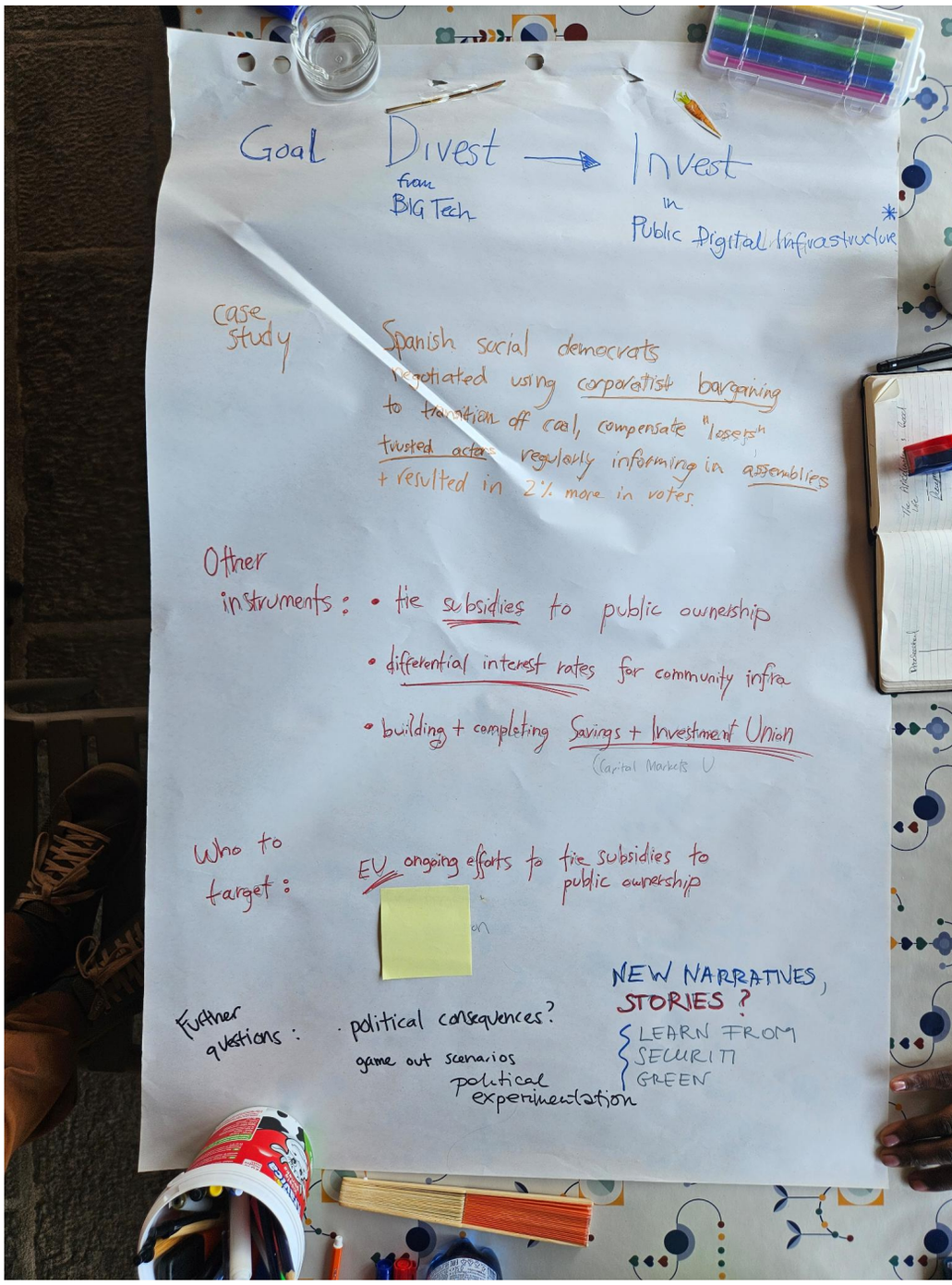


Poster page from the session on “Building a practitioner agenda” 1/3



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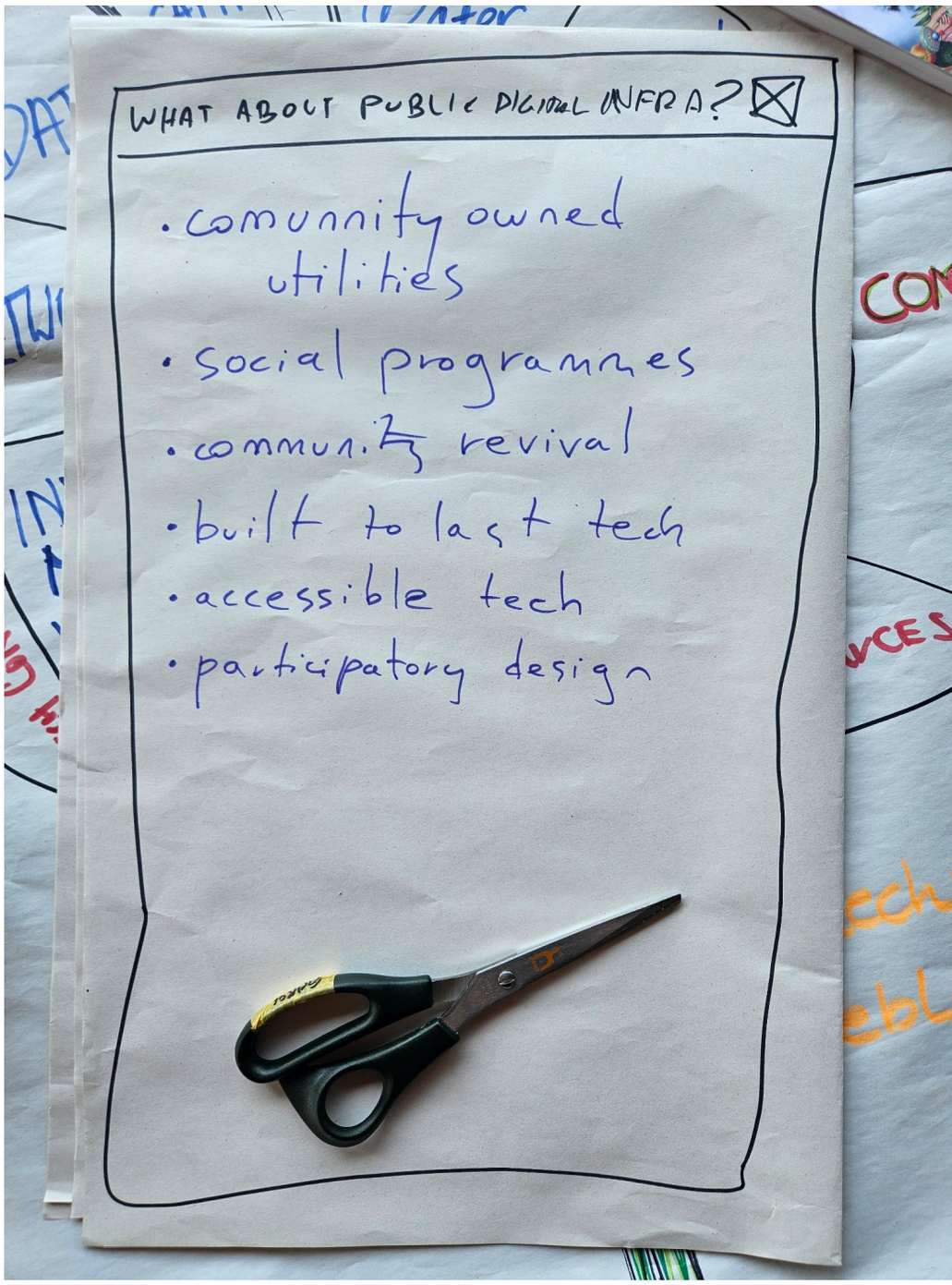

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Building a technology governance policy agenda

Let's discuss the future role of international institutions in governing global technology and communications! Take the International Telecommunication Union (ITU), for example — is it simply a platform for coordinating between states, or does it have the potential to shape norms, policies, and power structures in meaningful ways?

How effective is the ITU at balancing the interests of different countries, especially between powerful states and the Global South? Does it help ensure equitable access to communication technologies, or does it reinforce existing inequalities?

Looking forward, how might institutions like the ITU need to evolve to address emerging challenges in digital infrastructure, data governance, and technological sovereignty? Could they become more democratic, transparent, and responsive — or are they inherently limited by the competing agendas of member states?

What alternative or complementary models of global governance might better address the complexities of today's digital and geopolitical landscape?

By Andreas, Eric, Mehwish, Niels, Sam

Tech policy has had global impact, but not global representation.

Global Tech Policy is an Arena for global technology coordination and contention. It is being kept together by interests in global data flows, and hampered by the need to inscribe regional and national values, and the interest to disseminate these to other countries. Another very important force for convergenceis is the capitalist interest in a global market for hardware, software, and services. Commercial interests might be spurred by interoperability, but also by a single technological implementation. Not only everyone wants to provide technology, but everyone is a consumer of technology. Furthermore, not everyone has the same shaping or control power (standard makers vs. standard takers).

Are the rise of regional bodies and influences a result of sense of underrepresentation of most regions in global tech policy? Tech policy has had global impact, but not global representation, so fracturing is mostly a result of regionally organized influence functions, which hamper dominance in existing global tech policy fora. Powerful states have impact outside of these institutions that they can use to influence processes, while challenger-states have incentives to come up with new institutions. Does this mean that every globalised agenda needs to be decentralised?

Follow up

- Work on Global Gateway and Digital Silk Road → Economic Policy and Infrastructure Influence and Expansion.
- Work on global economic and financial powers and incenstives that steer global tech policy.
- Very good case is: China has data headers in IPv6+ that are causing fragmentation, and they don't route globally... but still (partly) based on standards from IETF.

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Poster from the session on "Building a technology governance policy agenda" is ready

→ **Friday:** *Choose your own future!*

Digital sovereignty in a society that builds

By Mehwish, Michelle, Timo, Andreas, Mehwish, Pat

Group agrees on focusing on promises, pitfalls, and local / cooperative governance models.

Consider convening stakeholders to think about new ways of engaging with the "enabling state". Specifically, functional collaborations between civil society and alternative technology builders to create an enabling environment. We need this environment in order to create alternative, affirmative visions. This could be an opportunity for developing ideas further, form alliances, engage in the current environment, and gather commercial allies to regulate Big Tech.

Such a project would necessarily entail a clarification between potential allies and definite adversaries, as well as subsequent boundary work for keeping interests within coalitions aligned. What do we mean by "Big Tech"? How do we draw a boundary around the technology developers we want to work with and whom we do not? What if "Big Tech" companies are building the type of technology infrastructure we want? Can we influence the state directly without the danger of cooptation? Can civil society actors better exert their influence on lower governance levels, such as when working with municipalities? Civil society could team up with local political representatives along the lines of standing up to Big Tech. Other than influencing policies and innovations for digital sovereignty, stakeholder coalitions could also aim to influence the structure of institutions, the governance mechanisms of digital sovereignty themselves.

The difficulties of implementing such a plan lie in the historically established fact that everything in the neoliberal order is designed to prevent alternative models from scaling. This is a major pitfall that we need to contend with. Competition law and market power issues also pose fundamental challenges.

The technological trajectory of surveillance infrastructures

By Dmitry, Gargi, Grace, Nai, Oli, Sam, Vladan

Inherent to all surveillance infrastructures are systems of classification and catorgorisation, making the study of these systems alongside surveillance infrastructures especailly important.

A book we recommend is *The Sentinel State: Surveillance and the Survival of Dictatorship in China* by Minxin Pei (2024). It is interesting to look at the ratio of agents to citizens to dismantle the preconception of places in the west not also operating as surveilance states. For example, the UK remains on of the most survielled places in the world, with its CCTV-to-person ratio exceeding that of China. Several agent to citizen ratios are highlighted:

- 1 agent per 165 citizens (Stasi during the Nazi regime)
- 1 agent per 700-800 citizens (contemporary China)
- 1 agent per 1,600 citizens (contemporary Iran)

Surveillance infrastructures in transition

Technology remained the same, but the social structure around it evolved.

Contemporary surveillance discussions sometimes refer abck to historical surveillance infrastructure in authoritarian regimes such as the Societ Union, Nazi Germany or the German Democratic Republic. A cursory look would suggest a radical break between those systems and contemporary infrastructures. However, it is worth to consider the continuities as well. Even after the fall of those regimes, the material infrastructural networks from those regimes remained (e.g., the wiretapped phone networks). This meant that the states that came next would change many things but necessarily the infrastructures tied into them retaining informational superiority. Surveillance infrastructure also evolved from a state-centered enterprise (e.g. via telephone networks during the Nazi regime) to become more community-embedded (e.g., denounciation campaigns where families reported their own family members as counterrevolutionaries to authorities) during times of regime change. Technological transformation was slower than the changes in the social structure around it.

The informational power afforded by these infrastructures proved too tempting to abandon.

Even after governments dismantled prior oppressive regimes, as was the case for the Nazi regime and former Soviet Union, the surveillance infrastructures often remained intact. These infrastructures were so deeply embedded into the bureaucratic structures of public insitutions, making them difficult to remove. Even with the entrance of a new regime, the technological networks associated with the old regime (e.g., tapped telephone networks that remained after the fall of the Nazi regime) sometimes remained in place. This signals that the informational power afforded by these infrastructures proved too tempting to abandon regardless of who came to hold political power. Being able to survive regime change and continue to serve new authorities in different idealogical contexts gave these infrastructures a sort of political resiliency.

The surveillance infrastructures driving surveillance capitalism are now merging with state capitalism to bring about a new type of governing force. Panoptic power of these networks is becoming internalised by people

whereas people are now engaging in self-censoring practices, mistrustful of others in society, and acting in anticipation of how others may perceive the data they produce. Essentially, the power of states is being extended not only through its soverign and disciplinary power but also governmentality as well (Foucauldian sense).

Technological innovations like the US DoD's ARPANET's and pre-Google's Orkut laid the foundation for the surveillance state we see today where the public an private are increasingly merging. In Brazil, where certain platfroms became widely used by many Brazilians leading to network effects that made it hard for Brazilians and the government to opt out as was the case during the Brazilian government's confrontation with Elon Musk resulting in Twitter being banned in the country for several months in 2024. Some tech may become redundant in some places, but still be used elsewhere (like Orkut in Brazil).

Contemporary situation

Today, mutual check systems are being introduced throughout tech as a form of "preventative repression" (aka "anticipatory" governance). The Chinese social credit system is not real but instead an idea made up due to Western propaganda. The internalisation of surveillance infrastructures is interesting to watch as well with regarding current geopolitical cooperation and interoperability of their different systems (e.g., in the Five Eyes alliance of states). Surveillance infrastructures are now commonly emmeshed within public services systems, across telecom mobile devices, and biometric digital identification systems. Thus, unlike social media where people can opt out, it is much harder to insulate oneself where these systems as they become requisite for political recognition as well.

I learned...

Eric Zhang

I learned a lot about industrial policy of digital technologies in the EU, as well as the lines of contentious debates in making industrial policies in the EU. I will learn more about the debates in the field of political economy regarding government-industry relations, and how states play their roles in various domestic standardisation processes. We should think more about how to translate our research to ongoing policy agendas.

Timo Seidl

I learned about how similar some of the problems in standard-setting are to those in industrial policy. I will learn more about the historical connection between state building and infrastructure provision. We should more systematically think about and experiment with how academic and civil society can jointly contribute to building more of the things we need and want (‚a civil society that builds').

Zuzanna Warso

I learned how the idea of digital sovereignty is used in different regions and contexts and how to more effectively discuss it. I will deepen my understanding of how to influence investment policy in the EU. We should continue to strategize on how to influence key processes, both from within and from the outside.

Patrick Brodie

Thanks all, great insights. Also hard to distill - but my "we should" from all of it is to fight the attempts to render social and public good secondary to broader geopolitical and geoeconomic aims in industrial and infrastructural policy... Or maybe that's an "I will" - but whatever the case, have learned a lot and have a lot of thoughts to work thru back in Ireland.

Lisa Gutermuth

I learned: about resourcification as a lens to view geopolitics and extraction. I will be more intentional about making choices to either depoliticize, build political will, or tie my political goals to other existing popular political ideals. And leverage Mozilla as a platform and convening space to bring some of the plans forward around civil society engagement in getting technologies in the public interest built. We should stay in touch! I'm at the airport. Have a good final day! ✈

Stanislav Budnitsky

It's hard to distill so many new insights and ideas this week has brought, but one of the things that stuck is the difference between critical and fatalist analysis (thanks Maxigas!); I will aim to frame my future critique productively in this spirit; we should continue sharing methodological ways of turning critical analysis into world-shaping policy. Thanks all!

Mehwish Ansari

I learned: about opportunities for intervention and potential influence in EU budgetary processes. I will follow up with Lisa, Zuza, and Timo about potential introductions, connections, and convenings of SME tech developers and corporate-activist lawyers. We should: strategize around the this week's mega International Court of Justice advisory opinion, as shared by Michelle in the chat yesterday!

Yichen Rao

I also have learned so much things that have been my blind spots. I will study more about non-aligned/alternative ways of technology and infrastructural development, and their implications for sovereignty and social change.

Andreas Baur

Thank you all for the exchange, I learned so much! I will learn and work more on industrial policies and we should use the window of opportunity of influencing these policies (at least in Europe) under the term digital sovereignty together with civil society and others for the better.

Maxigas

I learned about using a political economy lens better for analysing and strategising the trajectories of emerging technologies in light of their public interest aspects — and how non-aligned technological trajectories are possible within these parameters. I will write up the case study on the indigenous 5G networks of India in these terms. We should **(1)** dig the EDIC/IPCEI process with Timo, Zuza, Niels, etc. building on our current EU budget analysis efforts; **(2)** write up Applied Data Science projects with Liza on mapping Tier 1/2/3 networks and telco/Internet convergence (cf. work by RIPE, OII and others); **(3)** collaborate with Stan and Dmitry on processing the Open Society Archives about shaping Russian information policy and network topology; (4) integrate 5G/Reticulum community network perspectives into normative recommendations with Mehwish, Michelle, and others.

Michelle Thorne

I learned resourcification is a historical and ongoing process that extracts from people and the planet and we need an antidote. I will integrate the divestment/investment proposal into our data center and energy policy advocacy work in the EU and beyond. We should team up Zuza working on public digital infra, Timo on investment and social policy practices, Nai on community co-design and speculative fiction and Maxigas on alternative tech to strengthen our shared divestment/investment arguments.

Fieke Jansen

I learned about the different political contexts and how these influence infrastructural expansion and exclusion. I will work more on the infrastructure lab framework, and how resoursification, scale, economy, and territorialization can inform our thinking. We should do research on the

discourse and financialization of infrastructural expansion like data centers, sea cables and mining and what alternative trajectories could look like.

Niels

I learned a lot about political economy and financial incentives and their role in industrial infrastructure policy. I will suggest books for the infrastructure reading group in the political economy and infrastructure direction. We should **(1)** do research into IPv6+ and how it builds in global standards and became national standard (and perhaps becomes international again (with Sam); **(2)** engage with civil society advocate and researchers (and perhaps students) on EDICs and IPCEIs (with Timo, Zuza, Maxigas and others).

Dmitry Kuznetsov

I learned the term "strategic indispensability"; about the dynamics of international SMS two-factor authentication; how minor technological conveniences in one context can be levers of control in another (ISP web portal router settings); about the variety of internationalisation/localisation of mainland Chinese digital platforms & services. I will consider the products of companies like VAS Experts through the lens of "strategic indispensability"; look into whether the physical/virtual sim hierarchy has a historical precedent in the landline/mobile phone transition; see if the relationship between endusers and ISPs is changing as means of information controls change in Russia, especially in routers; check if a classification of online service regionalisation/localisation already exists.

We should: become more aware of how other disciplines view, describe, and operationalise particular phenomena and processes; research what other "unseen" technological processes seem to occur based on informal agreements, and in what cases a push for formalisation of practices can be a method for achieving the alternative future we seek; consider circumvention tools through a market/service lens, starting with OpenWRT routers; examine extraterritorial application of local personal data regulations beyond GDPR, research crossborder data flow agreements shaping up in the Asia-Pacific region.

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