NGI FORWARD

GENERATIVE INTEROPERABILITY

BUILDING ONLINE PUBLIC AND CIVIC SPACES

March 2022

NEXT GENERATION INTERNET
INTERNET OF HUMANS

Commons Network

OPEN_FUTURE

AUTHORS

Alek Tarkowski
Sophie Bloemen
Paul Keller
Thomas de Groot

This publication was produced by
Commons Network and Open Future

ACKNOWLEDGMENTS

SUMMARY

We need online public and civic spaces. This fight has become more urgent than ever, as it has come to define the way we work, live, play, travel and much more. Our social and economic lives are increasingly organized around a few digital mega-platforms.

Interoperability is one of the original design principles underpinning the internet. By ensuring that information and data was able to flow freely between different parts of the network infrastructures, the principle allowed the internet to grow to its current size.

Interoperability is still relevant and resurfacing in policy debates as a solution to many of the problems of the internet today. Here we ask the questions: what kind of interoperability? And moreover: how can interoperability help us achieve the just and democratic digital spaces we need? Can interoperability policies help us build public and civic spaces online?

SETTING THE SCENE

The digital transition has come with many opportunities, but also with tremendous challenges. It has brought us surveillance capitalism and ever-growing societal and economic power imbalances. The infiltration of platforms into all spheres of our life has accelerated the hegemony of the logic of the market, of commodification and competition, marginalizing and replacing relational dynamics of cooperation, solidarity, and care.

- The privatization of digital spaces is affecting our democracy. Polarization, censorship and misinformation, intrinsic to current extractive business models, all harm the public sphere.

- Instead of challenging inequalities, the digital economy mainly reinforces them. Platforms are eroding local economies while their disregard for workers' rights is a major challenge to the social contract.

Interoperability has the potential to enable structural shifts and changes to the power balance. It is generative in nature, enabling other improvements in the online environment.

- However, interoperability of the core protocols or internet's basic infrastructure will not suffice. Interoperable ecosystems are prone to centralization and capture by a limited number of platforms.

- Today, commercial entities can benefit enormously from the scale of the interoperable internet, without being obliged to make their own data and services interoperable.

- Policies need to be introduced to ensure interoperability at the level of data, content and sercices. In particular, regulation should require commercial gatekeeper platforms to become more interoperable.

The European Union has the ambition to ensure that the further development of the internet is shaped by social values and objectives.

- In order to address societal challenges, mission-oriented policies have been able to create new technologies and sectors that did not previously exist. The same policy tools should be used to create a more socially-oriented digital space.

- Interoperability should be purpose-based and part of a broader integrated approach and policy program to re-build the internet as a European public space

COMPETITIVE INTEROPERABILITY: FIXING THE ONLINE PLATFORMS

Discussions around interoperability often focus on what we call 'competitive interoperability'. This approach is market-focused, frames the issue in terms of market competition, and is about creating a level playing field for companies and freedom of choice for consumers:

- Interoperability is then mostly seen as a corrective measure for the deficiencies related to the dominant online platforms and the envisioned impact is 'greater competition among market actors'.

- Improving the market for current platforms will not likely lead to a less centralized ecosystem. Regulation itself will not shift the current power balance away from a few dominant players.

- A market competition approach is not enough. In order to solve the problems we now face in the digital economy, a broader approach should be adopted. We call this approach 'generative interoperability' – a design principle to build a digital space.

GENERATIVE INTEROPERABILITY AND ECOSYSTEM BUILDING

It is important that we shift our perspective, from a single platform to an ecosystem view. Public policies should not only fix 'market failures'. They should actively co-create other ecosystems. This requires imagination and vision that goes beyond the need to regulate markets.

- As a positive norm, interoperability can serve as a foundational element of more complex policies aimed at nurturing healthy and just digital ecosystems.

- The aim should not be to facilitate the creation of another dominant platform, not even a European one, which would then operate under the existing rules of the game while relying on the same exploitative business models.

- Instead, decentralized and federated solutions should be co-developed, stewarded and supported. Fostering a different architecture of the digital space requires engaging with a variety of actors, not only commercial but also public and civic in nature. It is also a matter of investing in new digital infrastructures.

- In terms of interoperability, there is an important distinction between policies that target platform APIs and those that are applied to protocols. Open, standardized protocols that define how different platforms become interoperable with each other are key in fostering a different architecture.

BUILDING AN ECOSYSTEM OF PUBLIC AND CIVIC SPACES

All in all, there is a need for both competitive and generative interoperability. While the first focuses on market competition and regulation, generative interoperability, in turn, employs a broader range of policy instruments not just to regulate a market, but to intentionally build a digital ecosystem.

A public digital space means an ecosystem with a strong presence of public institutions and civic initiatives. The online environment has to be considered as a core aspect of our societies. Hence, there should be room for other social-relational logics than the transactional ones prevalent in the market.

- We need to create an ecosystem of public and civic online spaces. Today, public and civic actors communicate on the terms set by the largest commercial actors in mainstream communication spaces. These resemble public spaces but are in fact private commercial spaces.

- Policies that regulate the digital economy should be based on the principle of balancing the power of private, commons and cooperative, and public sector actors.

Public institutions have an important role to play as enablers of a different type of online space. Public broadcasters, universities and other educational institutions, libraries are some of the types of institutions that should engage as its makers and maintainers.

- Europe has a strong history of public institutions providing services and infrastructure. It should keep building these also in the digital realm, as the EU has done with Europeana and the European Open Science Cloud.

Data commons and cooperative models hold promise today as they offer ways to implement democratic governance and business models which are not based on extraction.

- Fostering these approaches and regenerative ways of production requires not only investing in technical infrastructure but also in the digital cooperative economy itself.

- Collaborative peer production and democratic stewardship have proven their potential through for example Linux, Apache or Wikimedia.

- As an alternative to current platforms, platform coops are often community-based and stimulate the local economy, while using open-source software.

BUILDING BLOCKS OF A GENERATIVE INTEROPERABILITY POLICY

Interoperability requirements should underpin the creation of a truly open and public internet in the coming decade. In order to do so, these requirements need to be part of an integrated strategy and vision for the digital environment. We cannot separate this from defining a vision of the economy that we want, as the digital space shapes our economy.

- We should see the internet as a living system that we build and sustain together. We constantly build the internet together and we can adapt it, develop it, nourish it.

There is a need for an ethic of cooperation instead of the ethic of competition which has become deeply ingrained in our societies.

- The social-cultural environment is therefore very important: interoperability rules need to be supported by different entities and individuals that adopt an ethic of cooperation and interdependence.

- We need cooperation on the maintenance of shared systems by public institutions; strong public institutions that can be key nodes that support the network of cooperating institutions.

- For this we need capacity building for institutions and more skilled professionals in the public sector, of which there is now a significant lack.

In the techno-political sphere of digital policymaking, we cannot just address the technical and be deaf to the political.

- Standard setting and governance of standards should be conducted in the open, by dedicated public service entities — with multi stakeholder representation.

The European digital public space base cannot be established without substantial public investment into both large-scale European level infrastructures, as well as incubation of smaller initiatives that will populate this ecosystem.

- For the pluralist economy to function, we need to transition to diverse ownership models geared towards local economies, regenerating and sharing wealth rather than extracting it.

- This means investing in public-civic digital infrastructures and varied business models such as the digital cooperative sector.

- Collective action is needed on different levels of government in funding, regulation and procurement. European, national governments and municipalities all have their roles to play.

"Public policies should build public and civic spaces, instead of just fixing market failures."

INTRODUCTION

Societies across the world need to imagine and strive towards different online spaces then we see now. Just like we need public and civic spaces offline, we need them online. Spaces that can be governed democratically, and stewarded in a way that brings benefits and gains to all, not just the few. What do these public and civic spaces look like? What does this mean for the internet and the economy?

Interoperability is one of the original design principles that underpinned the original internet, as it was designed in the twentieth century. A principle that allowed this communication network to grow to planetary scale by ensuring that information and data could flow freely despite differences between different parts of the network's infrastructures. Interoperability means that different technologies and infrastructures can function as a single communication place, without the need for centralized control by a single entity. Today, this principle can be used to ensure that the internet can function as a public space.

For years, interoperability was seen as an underlying infrastructural principle. Important, but debated only by engineers and technologists interested in the structural design of the internet. But in recent years this humble technical concept is mentioned more and more in public debates on internet governance, and regulation of platforms in particular. This is happening at a time when the growing power of online platforms, and resulting centralisation, mean that the free flow of information and the decentralized character of the internet are increasingly at risk.

Interoperability is still relevant, only now needs to be re-applied especially at the layer of online platforms and services. At this layer, interoperability was not introduced by design, as platforms strived for a dominant position and the cost of the broader ecosystems - so it needs to be introduced as public policy. These policies should be seen as not just market-fixing measures, but instead be framed as measures for strengthening the digital public space.

The need for a European Digital Public Space is something that is recognized widely. To some extent one could say it is already there, only it's dominated by private infrastructure and platforms. In this paper we argue that striving towards a quality European digital public space means strengthening the role of public and civic digital spaces as part of a larger digital ecosystem.

In this report, we present a vision of generative interoperability policies. It is an approach to designing public and civic spaces that treats interoperability as a starting condition for building healthy and just ecosystems online.

In the first chapter, we show how the principle of interoperability–which has been foundational to the design and development of the internet–applies today. We present the context of the current interoperability debate and the increasing platformization of the internet. We argue that strengthening interoperability can only be done effectively through harnessing a broader strategy focused on constructing a European digital public space. Strengthening the interoperability principle is just one of several policies that would contribute to this goal. In this section, we also provide a short explanation of what interoperability is, and the different forms it appears in.

In chapters two and three, we present two approaches to interoperability, which we define as competitive and generative interoperability. The first approach frames impact in market terms and focuses on fixing individual platforms, in order to open up market competition. We argue that this approach will not be sufficient. Instead, a generative interoperability approach should see this principle as able to generate and support a digital public space.

In chapter four, we define key elements of such a public space and show where interoperability can successfully be applied in the digital environment. Finally, in chapter five we present the building blocks that should underpin a generative interoperability policy. We show that technical measures should be supported with policies that ensure cooperation, proper governance, investment in- and production of shared code and infrastructures, and collective action to build the digital public space.

NGI FORWARD

SETTING THE SCENE

THE RENAISSANCE OF THE INTEROPERABILITY PRINCIPLE

There is a lot of expectation riding today on the shoulders of this abstract principle, established over 50 years ago in a different era, and for a network that was not imagined in its current form.[1] While the general principle remains the same, it is today applied to a different internet, and a different web. The founders of the internet did not take into account the adtech economy, content recommendation and

filtering, the growth of personal data as the de facto currency of the web, or the level of centralization attained by today's online platforms.

So why is the technical principle of interoperability appearing in so many policy debates, repeated in so many conversations, listed as one of proposed solutions to a very broad range of issues, from platform regulation, through data governance, to market competition? This technical concept–now turned into a policy slogan–catches on in so many policy debates, because it signals the possibility of a better internet. It creates the possibility that the internet can be reshaped once more, and regain at least to some extent its earlier form as a communication environment that was much more open, non-commercial, civic communication environment.

INTEROPERABILITY PROPOSALS ARE NOW APPLIED TO ONLINE PLATFORMS

The principle was originally understood as a positive norm that supported a utopian vision of free, universal exchange of information.[2] And it was applied to the underlying layers, protocols and infrastructures that create the digital environment in which individual services flourish. Today's growing interest in interoperability as a guiding principle is based on a realisation that openness needs to be ensured not just at these lower layers of the internet. Instead, it should be a principle applied across different levels of the internet stack, and ensured in particular at the level of platforms and services.

The principle of interoperability, as its proponents argue, should be applied at the level of online services

and applications, to the platforms that increasingly dominate the internet. If successful, such regulation would open up the walled gardens of commercial platforms, enable competition with their services, and provide access to the data and information that they store. The societal and institutional layers are also important, as they define the ability of society's members and institutions to make use of interoperable systems. This distinction is important, because it makes it clear that technical rules need to be supported with proper regulation, societal norms and even necessary skills and awareness.

In Europe, the currently debated Digital Markets Act includes interoperability measures that would – upon adoption of the Act– at least partially open up the largest commercial services, the so-called gatekeeper platforms.[3] The policy debate that has been ongoing at the time of writing this report concerns the scope of these provisions. They could be either adopted as general rules for platforms–for example those that meet a certain minimal size criterium–or be limited only to specific type of services (one proposal limits the scope to app stores) or as a rule target only non-core services of a given platform. Furthermore, a data portability provision is included in the GDPR regulation, although evaluation of the regulation shows very limited effects of this provision. And additional interoperability proposals have been emerging in policy debates on almost every file in the Commission's policy program - for example, the Digital Services Act might include provisions that would enable alternative recommender services to connect with dominant social networks.[4]

PLATFORMIZATION HAS ADVERSE EFFECTS ON POWER BALANCES AND EQUALITY

As the digital transition takes place in all spheres of social life, there are growing power imbalances in the digital economy. Not only did the internet fail to avoid replicating the same inequalities already present in the offline world, , but it is now actively reinforcing them. The extractive and unequal nature of our economy has been worsened by platformization: a continuing expansion and penetration of online platforms that reorganizes social and economic life

1   Baran, Paul (1964), On distributed communications. Santa Monica, California: RAND Corporation. Available at: https://www.rand.org/pubs/research_memoranda/RM3420.html
2   Berners-Lee, Tim (1990). Information Management: A Proposal. Available at https://www.w3.org/History/1989/proposal.html
3   European Commission (2020). Proposal for a regulation of the European Parliament and of the Council on contestable and fair markets in the digital sector (Digital Markets Act), available at https://eur-lex.europa.eu/legal-content/en/TXT/?uri=COM%3A2020%3A842%3AFIN
4   Panoptykon Foundation (2021). Webinar: Alternative recommender systems in the DSA [recording]. Available at: https://en.panoptykon.org/articles/webinar-alternative-recommender-systems-dsa-recording

around them.[5] Our digital ecosystem is increasingly privatized and dominated by a small group of tech companies, with adverse effects not just on markets, but also on societies. The internet has become a "platform Web", dominated by privately owned spaces and governed by business incentives, and not the collective good.[6]

Not only has the internet been almost fully commodified, it is now shaped by the logic of "surveillance capitalism", with extraction of data at a massive scale leading to control of both individual behavior and whole societies.[7] Market logic of commodification and competition are increasingly replacing relational dynamics of cooperation, solidarity, peer-to-peer production and caring, which are the fundamental aspects of our societies, rooted in human needs.[8]

These privatized spaces are undermining our democracies, in ways that are directly tied to their core business models. Social networks face problems such as high prevalence of misinformation, social polarization or censorship of free speech, which harm the public sphere. These problems are tied directly to business models based on the logic of extraction and surveillance. These dynamics are also undermining our social contract and the gains of the socialist and social democratic projects of the last century. Workers' rights are being weakened by the gig economy, where platforms are circumventing labour rights and adversely affecting local economies.[9]

The pervasive nature of platformization and its impact on all spheres of social life show the broadest context for interoperability policies. These will not directly fix all the problems of the modern internet. Yet this principle, as it enables structural shifts across the internet, and therefore changes to the power balance, has the potential to contribute to various improvements in the online environment.

INTEROPERABILITY PRINCIPLE AND THE MODERN INTERNET

We cannot revert planetary-scale infrastructure used by billions to the small internet of the 1990s and earlier years. And we need to take into account key developments that transformed the internet over the recent decades, including ad-driven business models, algorithmic content recommendation and filtering, or the gradual shift from a multitude of web pages

to a small number of feeds as the dominant type of content interfaces on the web. This is also a matter of new gatekeepers, such as app stores, and of the spread of dominant platforms into new digital spaces, such as the sharing economy, smart cities or the Internet of Things.

Because of this, the idea of the open internet - and thus interoperability- by itself no longer offers the progressive vision that we need for a planetary communication network. Interoperability, as an infrastructural principle, today has one certain effect: scale. By ensuring some form of interconnectivity between communication networks, it leads them to unprecedented growth - ultimately to planetary scale. And commercial platforms that are the gatekeepers of today's internet dependent on this as they grew to unprecedented sizes for individual services. Piggybacking, in a way, on the potential afforded by the internet - but not ensuring, in turn, interoperability of their own services and the data that they store. Other effects of interoperability, such as decentralization, are increasingly missing, due to increasing platformization.

INTEROPERABILITY IS NOT ENOUGH TO FIX THE INTERNET

Introducing interoperability on its own, will not solve the most urgent problems facing the internet today. In the worst case, increasing access to data and mandating new standards might even strengthen the imbalance of power that we witness today.

In policy proposals and debates, interoperability is often presented as a silver bullet, a policy lever that will shift the power balance on the internet. Tellingly, there is little work done on imagining, designing, modelling future environments that would emerge if this principle was introduced to today's dominant platforms. And policies designed as simple levers rarely work on their own.

For this reason, we propose to give the technical principle of interoperability a clear social purpose. The principle is sound, but needs to be introduced as part of a more complex set of policies that aims to ensure that outcomes of interoperability will be beneficial and meet societal objectives. The purpose of interoperability policies should be the creation of conditions for re-building the internet as a digital public space.

5   Poell, T, David Nieborg, and José van Dijck. "Platformisation." Internet Policy Review 8, no. 4 (November 29, 2019). https://doi.org/10.14763/2019.4.1425.
6   Owen T (2019) Introduction: why platform governance? In: Owen T (ed.) Models for Platform Governance. Waterloo, ON, Canada: Centre for International Governance Innovation, available at: https://www.cigionline.org/articles/introduction-why-platform-governance.
7   Zuboff S (2019) The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power. New York: PublicAffairs.
8   Fiske, A. P. (1991). Structures of social life: The four elementary forms of human relations: Communal sharing, authority ranking, equality matching, market pricing.
9   ETUC (2016). The Commission needs to get serious about tackling new forms of undeclared work. Available at: https://www.etuc.org/en/pressrelease/commission-needs-get-serious-about-tackling-new-forms-undeclared-work

A MISSION TO BUILD EUROPEAN DIGITAL PUBLIC SPACE

A policy program to develop such a European digital public space, building public and civic spaces online, is in line with Europe's general ambition to ensure that further development of the internet, and the digital transformation of society, is shaped by social values and objectives. Such a program, if launched, would be a perfect fit for what Mariana Mazzucato calls a mission-oriented policy: one aimed at solving a complex challenge of high societal relevance. A mission is made distinct from other policies by clear direction, a need for cross-disciplinary and cross-sectoral cooperation, and the importance of bottom-up solutions.[10]

Interoperability policies, in order to generate the desired outcomes, need to be made part of a broader policy program. We call this approach generative interoperability. In this approach, interoperability is a positive norm that is one of the foundational principles for an open online ecosystem that functions as a public space. Through such a program, the potential of interoperability can be harnessed to build a different kind of digital environment than the one we face today. This will be possible only if additional measures are introduced, to shape information and data flows made open by introducing the principle of generative interoperability.

We juxtapose generative interoperability with a different approach, which we call competitive interoperability. This is a one dimensional approach that sees interoperability as a way to fix the deficiencies and pathologies related to the dominant online platforms. We are critical of this approach as it frames interoperability mainly in terms of market competition, and fails to consider societal outcomes of more interoperable online platforms. As such, it is insufficient to meet the goal of creating a digital public space in Europe.

In the generative interoperability approach, a prominent role is played by public and civic actors. Shared resources are managed as a commons, and technical principles support social values, while reducing social harms. Finally, policies support decentralization of infrastructures and self-sovereignty of different users of the network. This is a vision that we presented in 2018 in a policy position titled "Vision for a Shared Digital Europe".[11] The four key directions for European digital policymaking presented in that report should guide a European mission to build the digital public space: supporting the commons, decentralizing infrastructure, strengthening public institutions and ensuring self-determination.

As a result, interoperability, and the vision of an open internet, will stop being a policy goal in itself. Rather they are seen as a measure employed towards a societal purpose: that of building public and civic digital spaces: a more equitable and democratic digital environment, where basic freedoms and rights are protected, where strong public institutions function in the public interest, and where people have a say in how their digital environment functions. We will revisit this objective in more detail in chapter four after taking a closer look at the two different approaches to interoperability.

---

10   Mariana Mazzucato (2018). Mission-Oriented Research & Innovation in the European Union. Available at: https://op.europa.eu/en/publication-detail/-/publication/5b2811d1-16be-11e8-9253-01aa75ed71a1/language-en

11   Bloemen, Sophie, Keller, Paul, Tarkowski, Alek (2018). A Vision for a Shared Digital Europe. Available at https://shared-digital.eu/

HOW DOES INTEROPERABILITY WORK?

We come into contact with interoperable systems everyday, when we use the internet. We can send and receive emails no matter what operating system or email software we use. We can access web pages using a variety of web browsers. We also experience everyday systems that are not interoperable and we intuitively feel the barriers around them. We cannot send a message from Facebook Messenger to our WhatsApp, Twitter, Instagram, Telegram or Signal account.

Interoperability, by definition, is the technical ability to plug one product or service into another product or service. The International Organization for Standardization defines it as the capability of systems to "communicate, execute programs, or transfer data among various functional units in a manner that requires the user to have little or no knowledge of the unique characteristics of those".[12] And Urs Gasser, professor of law at Technical University Munich, describes it as "central, and yet often invisible, to many parts of a highly interconnected modern society."[13]
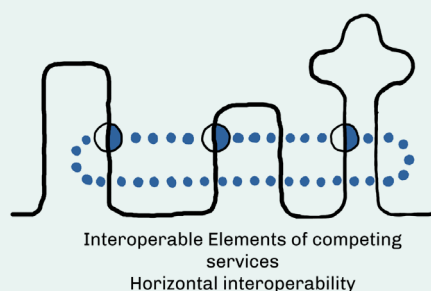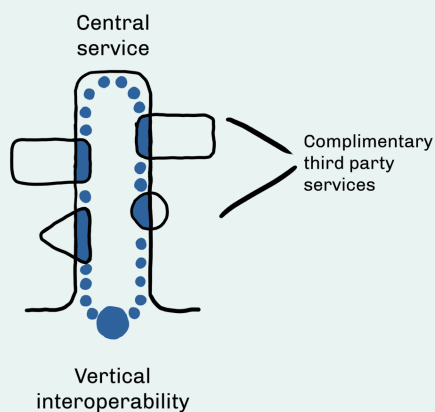
There is a spectrum of forms of interoperability, as services can be interoperable only to some extent. For example, a social networking platform could make its chat interoperable, but block the sharing of posts and other content, or of data collected about users. The extent of platform interoperability is at heart of the policy debate on the Digital Markets Act. The challenge of applying it as a basic principle is related to the variety of types of services and underlying business models. Interoperability means a different thing for social networks and for sharing economy platforms. There is also an ongoing, lobbying effort to reduce the scope of these provisions, and limit them only to very narrow cases: for example, only search engines or app stores.

And to exclude from this rule core services of a platform - so that, for example, a social networking site might make it's chat interoperable, but not it's core functionalities related to publishing and recommending user generated content, and to building adtech platforms based on data about users.

Finally, interoperability can be either vertical or horizontal. The distinction, while seemingly technical, helps to understand how interoperability can be introduced to the benefit of not just one actor, but a broad ecosystem. A service that is vertically interoperable provides access to other services, but only those that are complementary to its own, not those competing with it. An operating system–Microsoft Windows for example– is vertically interoperable, as it is an environment, in which third parties can create their own software, as long as it meets standards defined by the creators of the system. Yet software created for Microsoft Windows will not run on other operating systems. Vertically interoperable systems are controlled by a central party, which decides the exact shape its version of interoperability gets to take.

Horizontal interoperability in turn means that several, similar services are interconnected and form an ecosystem – even if they rival each other. Email is such a system, as messages can be exchanged between users of different operating systems and email software.

Broadly speaking, vertical interoperability benefits a service or platform that plays the central role in a given system, as third-party elements generate added value under conditions defined by the owner. And only with horizontal interoperability can we speak of ecosystems that benefit as a whole from interoperability. In these systems, the standards are defined together by all actors, who agree on the interoperability rules. Decentralization is one of key outcomes of horizontal interoperability.

Central service

Complimentary third party services

Vertical interoperability

Interoperable Elements of competing services
Horizontal interoperability

---

12   International Organization for Standardization (2015)., "ISO/IEC 2382:2015 Information technology", Vocabulary Fundamental Terms.
13   Urs Gasser (2015). Interoperability in the Digital Ecosystem. Available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2639210

COMPETITIVE INTEROPERABILITY: FIXING THE ONLINE PLATFORMS
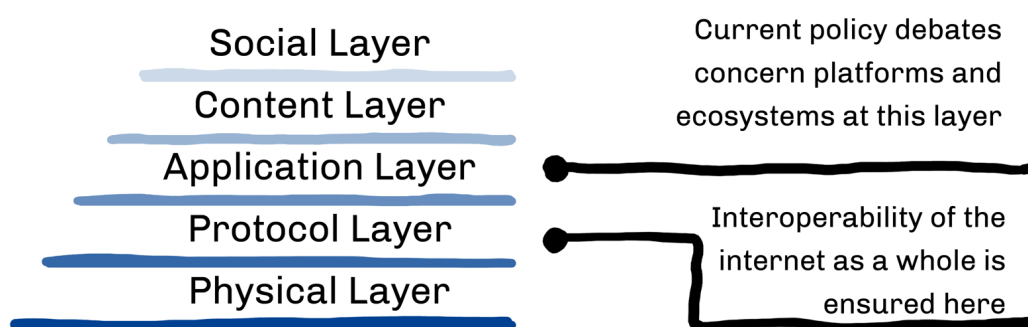
INTEROPERABILITY BY DESIGN

Both the internet and the World Wide Web were communication systems that were made interoperable by design. In 1964, Paul Baran–an analyst at the RAND corporation–wrote a memorandum "On distributed communications". He proposed a distributed network that is also a commons, noting that "it is more economical for many users to share a common resource rather than each to build his own system".[14] Interoperability and decentralization were two key principles proposed by Baran that were then applied to the internet. In 1990, Tim-Berners Lee–in his proposal for the World Wide Web–listed six requirements, two of which ensure interoperability. Heterogeneity requirements allow access to the same data from different systems. And non-centralisation means that systems can be linked together without requiring any central control or coordination.[15]

Today, interoperability is in part still ensured by self-regulation of private actors. Niels ten Oever, who researches how the internet is governed, notes that in such governance debates interoperability is compatible with an expansive vision of the internet's growth. It is therefore a principle supported–when applied to the internet itself–by all commercial stakeholders. As mentioned previously, they can benefit enormously from the scale of the interoperable internet, without being obliged to make their own data and services interoperable. Interoperability is seen as a means towards a goal shared by all of them - that of further growth and expansion, of both the internet and their businesses.[16]

THE INTERNET BECOMES CENTRALIZED, AGAINST ORIGINAL DESIGN

It is increasingly clear that if interoperability only ensures that the internet can continue to grow, then it does not necessarily generate any societal benefit. In the last decade, the internet became increasingly centralized, against the original designs for a decentralized communication network. An increasingly small oligopoly of online platforms has begun to dominate the internet. These platforms benefitted from the interoperable character of the underlying network, and at the same time gained the power to control the extent and scope of interoperability allowed with its own services.

This happened not against the principle of interoperability, but precisely because of this principle. To understand this, we need to see the internet as a stack consisting of three broad layers: the underlying hardware layer, the protocol layer in the middle, and the application and content layer on top. In the internet's original design, interoperability is secured by design choices in the protocol layer, designed in a way that makes very few assumptions about how the other layers are structured, and how the network is used. This layer is feature-free and only meant to ensure that content and data can flow freely, fulfilling the principle of interoperability.[17]

Social Layer
Content Layer
Application Layer
Protocol Layer
Physical Layer

Current policy debates concern platforms and ecosystems at this layer

Interoperability of the internet as a whole is ensured here

14   Baran, Paul (1964), On Distributed Communications, available at https://www.rand.org/content/dam/rand/pubs/research_memoranda/2006/RM3420.pdf
15   Berners-Lee, Tim (1990), ibid.
16   Ten Oever, Niels (2021). The metagovernance of internet governance. in: Haggart, Blayne, Tusikov, Natasha, Scholte, Jan Aart (eds.) (2021). Power and Authority in Internet Governance. Return of the State?. Routledge.
17   Zittrain (2006), ibid.

For this reason, it was possible for the application layer to become centralized in the hands of several commercial platforms. This forced users –both individual and commercial–to rely on proprietary, closed services instead of an open ecosystem. In this sense, commercial platforms at the same time benefitted from interoperability and broke the principle. It served the expansion of power structures, instead of undermining them. And the open nature of this broader communication space is one of the reasons that online services have been able to scale at such a rapid pace.

It is for this reason that the current policy debate on interoperability focuses on platform regulation, and not internet governance. At this layer, interoperability by design is not sufficient - as it is rarely in the economic interest of dominant platforms to do so. Project BlueSky, an effort led by Twitter to establish an interoperable, decentralized standard for social networking is a rare example of such an approach.[18] In 2019, Jack Dorsey, former CEO of Twitter, announced that his company will support the creation of a social networking protocol that will be open. In his vision, Twitter will become one of many clients of this protocol, who will together create a decentralized, but interoperable communication space.[19] In 2021, Twitter began funding a team tasked with building technologies for "open and decentralized public conversation. While this is a promising development that is a much needed exception to the approach of gatekeeper platforms, it will not be enough. Interoperability becomes a principle that needs to be introduced through regulation.

INTEROPERABILITY AND MARKET COMPETITION

As the regulatory debate unfolds, it is important to distinguish between different visions and approaches to interoperability. The same term - and the same technical principle - form the basis for two very different approaches.

In today's policy debates, interoperability is often mentioned as a corrective measure for the deficiencies and pathologies related to the dominant online platforms and their influence on the online ecosystem. We call this approach competitive interoperability, as it is strongly connected with a perspective focused on market competition. As such, it is close to the market-based logic of voluntary, self-regulated interoperability. The first order outcomes are defined in market-related terms, and the envisioned impact, if we reduce it to a simple statement, would be: greater competition among market actors.[20]

Some proponents of competitive interoperability also expect second-order, societal outcomes. In a widely-cited essay titled "Protocols not platforms", Mike Masnick makes the argument that greater competition among social networks that conduct content moderation will lead to a decrease of societal harms related to such activities.[21] This would be the result of increased innovation through competition, assuming that competing services would have commercial interest in protecting user rights and paying more attention to societal needs.

Competitive interoperability is one of the regulatory options on the table in current debates about regulating the dominant internet platforms. For example, it is an important mechanism in the European Commission's proposal for the Digital Markets Act, which stipulates that the largest online platforms should make at least their non-core services interoperable. It is also listed as a key regulatory measure in the report on "Online platforms and digital advertising", published in July 2020 by UK's Competition & Markets Authority,[22] as well as the "Investigation of Competition in Digital Markets" by the Judiciary Committee of the United States Congress.[23] Finally, interoperability and the related mechanism of data portability form the core of the ACCESS Act, proposed in 2019 in the United States.[24]

REGULATING PLATFORMS WITHOUT OPENING THEM UP IS ANOTHER POLICY OPTION

Introducing such structural changes to the platform ecosystem is not a commonly accepted idea, even if there is consensus that this ecosystem needs to be fixed. Some stakeholders bet instead on regulating platforms in their current shape, also seeing advantage in having large commercial players

18   https://blueskyweb.org/
19   Copeland, Tim (2019). "Jack Dorsey wants to decentralize Twitter". Decrypt. Available at: https://decrypt.co/14386/jack-dorsey-wants-to-decentralize-twitter
20   Mayer-Schönberger, Viktor and Ramge, Thomas (2018). "A Big Choice for Big Tech. Share Data or Suffer the Consequences", Foreign Affairs.Available at: https://www.foreignaffairs.com/articles/world/2018-08-13/big-choice-big-tech
21   Masnick, Mike (2019). Protocols, Not Platforms: A Technological Approach to Free Speech. Available at: https://knightcolumbia.org/content/protocols-not-platforms-a-technological-approach-to-free-speech
22   Competition and Markets Authority, Online platforms and digital advertising market study (2020), Available at https://www.gov.uk/cma-cases/online-platforms-and-digital-advertising-market-study
23   Subcommittee on Antitrust, Commercial and Administrative, Investigation of Competition in Digital Markets (2020), Available at https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf
24   H.R.3849 - ACCESS Act of 2021 (2021). Available at: https://www.congress.gov/bill/117th-congress/house-bill/3849/text

enforce state regulation, using the centralized power of their services.[25] This is currently the case with some proposals for the Digital Services Act, and in the past has been an approach favored by such European regulation as the Copyright in the Digital Single Market Directive.

Yet there are multiple issues with this approach, which aims to regulate the behavior of the existing platforms without attempting to reshape the dynamics in the ecosystem in which they function. Firstly, it has the adverse effect of giving these commercial players even more power. Proposals for platform interoperability focus on its vertical form, which creates conditions for even greater centralization of power. Cory Doctorow notes that historically companies have often subverted interoperability mandates and standardization processes. Standards can be used by dominant players to "create a new ecosystem where everything that's not forbidden is mandatory, freezing in place the current situation, in which Facebook and the other giants dominate and new entrants are faced with onerous compliance burdens".[26]

Secondly, it also makes public regulation dependent on the ability of these commercial actors to enforce the rules. Finally, the financial burden of complying with regulation means that a given market might be even more centralised than before. These risks were made visible during the policy debate on so called content filtering, included in Article 17 of the Copyright in the Digital Single Market Directive. Critics of the proposal point out that the obligation to use algorithmic filtering systems puts a burden on small platforms, while favouring those that have already implemented such systems, such as Youtube with its Content ID mechanism.[27]

For these reasons, advocates of competitive interoperability advocate for mechanisms that force open the "walled gardens" of today's online platforms. For example, the Electronic Frontier Foundation argues that it is a simple measure with potentially broad outcomes, believing that market competition "fix[es] the Internet by making Big Tech less central to its future".[28]

The competitive interoperability approach fails at the same time to model the outcomes of such regulation on the ecosystem to which it applies. Arguments

in favour of regulation focus on prior evidence that interoperability supports competition, innovation and choices.[29] Yet introducing interoperability into the complex online services of today is different from the typical cases of interoperability that are usually referred to: emails, SMS messages or text messaging systems.

In particular, it is unclear what will be the more complex social outcomes of competitive interoperability measures. How will they affect content moderation, or the collection and processing of our personal data by commercial actors? Will choice of content moderation options indeed improve user experience, and at societal level fix the problem of disinformation, propaganda and hate speech? Will market competition indeed solve the issue by giving more socially aware actors an opportunity to compete on equal footing with incumbent players? Or will the newly opened ecosystem face a race to the bottom - as demonstrated by the online advertising ecosystem, where limited interoperability measures provided by dominant platforms fuel an ecosystem which generates proven societal harms?

One example of potential risks is a recent case from June 2021, where the French market regulator fined Google for anti-competitive practices in the online advertising space and mandated interoperability, while not introducing any measures to fix the underlying problems and societal harms caused by online advertising.[30] Cory Doctorow notes that this regulatory intervention fixes the competition problem, but fails to address the problem of harmful practices of the ad-tech industry. As a result, applying this competitive interoperability requirement might have the effect of spreading harmful practices, by introducing more competition into a market that already negatively impacts the society.

Finally, approaches based on competitive interoperability follow a market logic which sees the creation of platforms–which are basically marketplaces controlling a certain part of digital communication and transactions–as the basic tool with which the digital environment is shaped. We see this perspective in measures equate fixing platforms through competitive interoperability with building a better internet. It is also at the heart of policies that see the development of commercial digital services as

25   Brown, Ian (2021). "Where Frances Haugen errs on interoperability". Interoperability.news,. Available at: https://interoperability.news/2021/11/where-frances-haugen-errs-on-interoperability/

26   Cory Doctorow (2021). "Google and France agree on ad-tech interop", Pluralistic. Available at: https://pluralistic.net/2021/06/08/leona-helmsley-was-a-pioneer/#monkeys-paw

27   Competitive Compatibility: Let's Fix the Internet, Not the Tech Giants, Communications of the ACM, https://cacm.acm.org/magazines/2021/10/255710-competitive-compatibility/fulltext

28   Cory Doctorow (2019). "Interoperability: Fix the Internet, Not the Tech Companies". Electronic Frontier Foundation. Available at: https://www.eff.org/deeplinks/2019/07/interoperability-fix-internet-not-tech-companies

29   Crémer, Jacques, de Montjoye, Yves-Alexandre, and Schweitzer, Heike (2019). Competition policy for the digital era. Available at https://ec.europa.eu/competition/publications/reports/kd0419345enn.pdf

30   Cory Doctorow (2021) ibid.

key to the broader goal of building a digital society. For example, the 2021 "Digital Compass for the EU's digital decade"[31] strategy defines as one of its goals the emergence of "European unicorns" - online platforms with high valuation that are based in Europe but able to compete globally.

This market logic is well established in European policy debates, shaped for over a decade by an underlying policy frame of the Digital Single Market. It is also an approach that will not allow digital policies to serve broader societal goals as we have discussed in our Vision for a Shared Digital Europe.[32] The fact that competitive interoperability proposals are opposed as market competition measures further proves that interoperability needs to be treated as a principle with a societal purpose.

31   European Commission (2021). Europe's Digital Decade: digital targets for 2030. Available at: https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en
32   Bloemen, Sophie, Keller, Paul and Tarkowski, Alek (2019) ibid.

GENERATIVE INTEROPERABILITY AND ECOSYSTEM BUILDING

Interoperability policies should go beyond fixing individual platforms, and beyond outcomes framed largely in terms of market competition. The principle should also not be seen in a deterministic way, as a simple infrastructural fix that on its own will solve social problems.

This is easier to do if we shift the perspective from a single platform or service being made interoperable - as is the case in a typical competitive interoperability scenario - to an ecosystem view, in which interoperability applies to all actors. This is a perspective that underlies an approach that we call generative interoperability. Policies that further this approach use the interoperability principle as a starting point for building and managing new, open ecosystems that serve as alternatives to the current platform economy.

INTEROPERABILITY CAN HELP GENERATE NEW SYSTEMS

The idea of generative interoperability is based on a concept proposed by Jonathan Zittrain, who defines generative systems as those that "produce unanticipated change through unfiltered contributions from broad and varied audiences". In other words, they are open ended, and provide support for a wide variety of actors to build on the foundations that they provide. Systems that are generative enable their users to generate new systems.

They do this by providing leverage, by being adaptable, easy to access and master, and by allowing improvements to be easily shared with others.[33] Zittrain argues that the original Web was a prime example of a generative system, but it began losing this trait as it matured. Hence, he argues, the interoperable and open nature of digital technologies–such as PC computers, computer networks, or services built on top of the Web–is crucial for the sustainability and further development of the digital environment.

A SHIFT AWAY FROM MARKET-FIXING LOGIC

In this approach, interoperability is not just a fix to problems caused by dominant online platforms, but a positive norm that is foundational for an open online ecosystem. And in turn instead of a simple policy instrument, interoperability becomes part of a broader policy program aimed at developing the digital public space. This approach also shifts the perspective from a purely market logic. Mariana Mazzucato argues that public policies should not only fix market failures but also actively co-create new markets.[34]

Mazzucato notes that policies focused only on fixing problems, and in particular market failures, are not enough to address societal challenges. Furthermore, mission-oriented policies cannot be sustained solely through market-fixing policies, as these "cannot explain the kinds of transformative, catalytic, mission-oriented public investments that created new technologies and sectors that did not previously exist".[35]

We agree with this perspective and understand that Mazzucato uses the term "markets" broadly, and in line with her economic perspective. Nevertheless, we prefer to define this ecosystem as a digital public and civic space, instead of a market.

BEYOND COMPETITIVE INTEROPERABILITY

The two policy approaches to interoperability refer to the same positive vision of interoperability and to the experiences of interoperable systems and services that have been part of the digital environment. "We need to take inspiration from what the Internet's early days looked like", declares the Electronic Frontier Foundation.[36] The two approaches are also not very different in terms of specific policy measures. In the end, interoperability is a simple rule and both types of interoperability start with the same premise: how to open up services, provide access to them, and treat some part of theirs as shared.

Competitive interoperability measures are needed to make sure that platforms are part of the interoperable online ecosystem, and that their data and services provide value to this greater whole. Without competitive measures, ecosystems that embrace interoperability will always be at a losing position to commercial actors that leverage open infrastructures, and then hold on to centralized power by building

---

33   Zittrain, Jonathan (2006). *The Future of the Internet and How to Stop It*, available at https://dash.harvard.edu/bitstream/handle/1/4455262/Zittrain_Future+of+the+Internet.pdf
34   Mariana Mazzucato (2018) ibid.
35   Mariana Mazzucato (2016). *From market fixing to market-creating: a new framework for innovation policy*. Available at: https://doi.org/10.1080/13662716.2016.1146124
36   Windwehr, Svea and Schmon, Christoph (2020). "Our EU Policy Principles: Interoperability". Electronic Frontier Foundation. Available at https://www.eff.org/deeplinks/2020/06/our-eu-policy-principles-interoperability

closed, non-interoperable solutions on top of them. At best, they will be pushed to the margins and function as ecosystems that are sustainable–and even interoperable–but tiny, compared to the mainstream internet.

While competitive interoperability focuses on market competition and regulation, generative interoperability, in turn, employs a broader range of policy instruments with a mission to not just regulate a market, but to intentionally build a digital ecosystem, a public space. To this end, generative interoperability is also focused on developing, stewarding and supporting alternatives, such as the space of decentralized and federated solutions. And these alternatives should be not only commercial, but also public and civic in nature.

This is the main problem with competitive interoperability approaches: they pay little attention to the outcomes of interoperability, especially non-economic ones. In this approach, interoperability seems to be a measure that will work like a self-fulfilling prophecy. Yet this is never certain. Using the example of dominant social network sites, how do we know that interoperable access to the Facebook feed will lead to an ecosystem of connected services? And even more importantly, how do we know that this will ultimately reduce societal harms?

Ethan Zuckerman observes that there is a failure of imagination visible in policy debates about platform ecosystems: "we are comfortable having wide-ranging arguments about the shortcomings and failings of existing digital platforms. We are nowhere near as good at proposing and exploring alternatives".[37]

INTEROPERABILITY AS STARTING POINT FOR ECOSYSTEM BUILDING

The generative approach sees interoperability only as a starting condition for ecosystem design and building. It is an approach to regulation that treats interoperability rules as only one element of more complex policies, aimed at nurturing healthy and just digital ecosystems. As the free software creator and activist Jaromil told us, interoperability gives the potential for freedom. A generative approach acknowledges that additional measures are needed, to make use of this freedom, and to build a digital ecosystem in the public interest.

The distinction between the two approaches to interoperability policy can be made more clear by returning to the idea of vertical and horizontal interoperability. Competitive interoperability, aimed at opening up a siloed platform, is mainly concerned with ensuring vertical interoperability, that is ensuring that a single platform creates a level playing field for competition. For example, this could mean that Facebook will allow users of competing messaging apps to communicate with users of Facebook Messenger, as if they were both on the same network.

But there is always the risk that the network of different services–which is the result of interoperability policies–remains controlled by the dominant actor. This is because in the case of a vertical interoperability scenario the service that is forced to be interoperable still retains its dominant role in the network. The ecosystem is built around this service and depends on the provision of key resources–usually interoperable data–to other services.

Here, we return to the fact that as competitive interoperability measures are put on the table, the new ecosystems that could emerge as a result are not being yet modelled. In one scenario, diverse services–Facebook, Twitter, TikTok, Telegram (to name just a few)–become horizontally interoperable and thus interconnected. In another, a platform like Facebook, through vertical interoperability measures, becomes surrounded by a network of small services, tightly connected and even dependent on Facebook data and services. The first scenario is the one that is demonstrated as viable by the Fediverse project, which creates an interoperable and decentralized communication space.[38] The second is typical of the online advertising space, where there are vibrant (and also toxic) commercial ecosystems, each built around a single, dominant actor that controls the advertising network.

PROTOCOL DESIGN IS CRUCIAL FOR HEALTHY ECOSYSTEMS

The generative interoperability perspective shifts the focus from a single platform to a horizontal view of an ecosystem of platforms. The starting point is not the opening up of any single platform, but the establishing of a standard that will ensure that all services in the ecosystem are open to each other. The important distinction here is between policies that target platform Application Programming Interfaces (APIs), and those that are applied to protocols.

APIs are gateways into platforms that can be opened by their owners. APIs are the means through which a third-party can access data and content stored on a platform. Usually this means that the external service is compliant with the API standards (which mainly

37   https://knightcolumbia.org/content/the-case-for-digital-public-infrastructure
38   https://jointhefedi.com/

define what data can be used and in what way) and is registered as an API user. Introduction of an open API to a platform is the most basic measure of competitive interoperability. Yet APIs are, by their nature, controlled by the platform, as they are ultimately just data interfaces created in the platform code.

The shape of the API – for example the extent to which it is required to make data available – can of course be mandated. But even then, an API-focused approach sees a platform as forming the center of an interoperable ecosystem. Although detailed blueprints of such interoperable settings are not usually described in policy proposals, there is a sense that these measures do not recreate the broad interoperability of the internet, at the services layer. Instead, we end up with multiple spaces that are characterized by some interoperability, but still not interconnected. There would be an interoperable Facebook space, interoperable Twitter space, interoperable LinkedIn space - with no obligation to further interoperate. We would then no longer be faced with walled gardens, but end up facing pastures that are still enclosed by barbed wire at their borders.

Policies based on the vision of generative interoperability focus not on APIs of individual platforms, but on open, standardized protocols that define how different platforms become interoperable with each other. Mike Masnick argues that we need to build new protocols, instead of more platforms.[39] Protocols are the mutually agreed instructions and standards that anyone could use to build compatible services - ensuring interoperability among them. The distinction between platforms (and their APIs) and protocols can also help understand the difference between competitive interoperability - focused on the platforms - and generative interoperability, which starts from the protocol.

From a generative interoperability perspective, a digital ecosystem should not be described in reference to any single platform - which is the focus of competitive interoperability. Instead, the policy vision should pay attention to simple building blocks that can be used by all actors in the ecosystem, and which have the advantage of making them interconnected - and as such in fact a shared system. For example, the previously mentioned Fediverse is an ecosystem of interconnected social networking sites that can exchange data and information using a protocol called ActivityPub. As a result, users of these different services have access to a network connecting also with users of all the other services - a space that

is both interoperable and decentralized . It is an ecosystem that cannot be defined by reference to any single platform - all are relevant to the ecosystem, although they provide different functionalities and user experiences. Shared protocols are just one means of achieving such interconnectivity - one that is closest to the principle of interoperability. But there are also other generative "building blocks" that support open yet interconnected ecosystems - for example open source software.

The concept of generative interoperability breaks with this logic and avoids thinking in terms of online platforms and marketplaces, which are successful by establishing centralized control, from which the owner of a given platform benefits. The aim of European digital policies should not be to facilitate the creation of another dominant platform, even a European one. Katja Bego notes that any such European, commercial platform would be "forced to operate under the existing rules of the game, rely on the same exploitative business models and would thus risk only perpetuating existing problems".[40]

Instead, it should aim to foster a different architecture of the digital space - based on the idea of building and strengthening public and civic spaces, and on the engagement of varied actors, such as trusted public institutions, cooperatives and civic organisations, public-interest technology networks. We explore this approach in the following chapter.

---

39   Masnick, Mike (2019) ibid.
40   Bego, Katja (2021). Public digital infrastructure should be at the core of Europe's tech sovereignty strategy. NGI Forward. Available at: https://research.ngi.eu/public-digital-infrastructure-should-be-at-the-core-of-europes-tech-sovereignty-strategy/

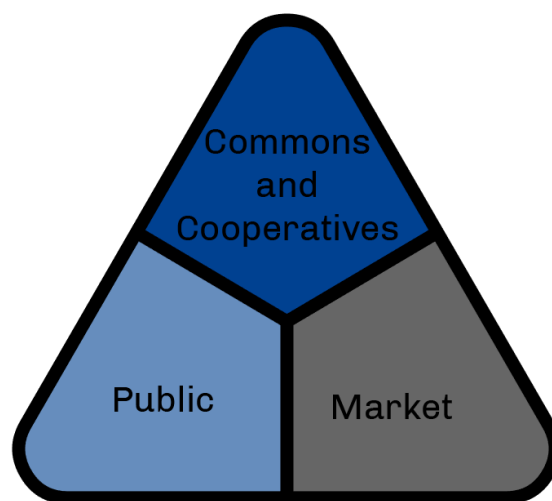# BUILDING AN ECOSYSTEM OF PUBLIC AND CIVIC SPACES

In order to build a digital public space, the internet should be considered as much more than just a marketplace. Instead, it should be treated as a core aspect of our societies, as it undergoes the digital transformation. Space should be made for another logic than that of financialised markets, for other dynamics and practises.[41]

In order to do this we have to create other spaces than the privatized spaces now so dominant: we have to build a public digital space. This should be an ecosystem with a strong presence of the commons, public institutions and civic initiatives. An important role in such a public and civic ecosystem should be played by public institutions that function as its enablers: public broadcasters, universities and other educational institutions, libraries and other cultural heritage institutions, as well as civic- and commons-based initiatives. In this way, the digital ecosystem would be democratic in nature, and ascribe to values of privacy, equality and diversity. Spaces where dynamics are not based only on market transactions, but also on social relations.

Today, public and civic actors communicate on the terms set by the largest commercial actors that create and maintain the mainstream communication spaces. These resemble public spaces due to their ubiquity and scale, and the sense of public conversation that they offer - but in fact they are tightly controlled commercial services. When engaging on these platforms, public institutions and civic actors expose themselves and citizens to the extractive business models. A public and civic ecosystem would allow these actors to route around the gatekeepers of the commercial internet in the top layers of the stack, without becoming disconnected from their audiences and communities. Katja Bego, researcher at Nesta, stresses the crucial role of collaborative, democratic governance - so that public and civic actors can shape the rules and standards underpinning this model.[42] At the same time, it's a system that's open to market players - provided that they respect the underlying logic, societal values and rules for democratic governance of this space.

In this section we outline different domains and their institutional logics that should underpin the digital public space: the commons, cooperativism, and public institutions. In these domains interactions

are more value driven, less transactional and based more on sharing and cooperation. Initiatives based on these logics exist today to some extent, but they need to be strengthened and expanded. Supporting these initiatives and helping them grow should be one of the core goals of European policies based on the vision of generative interoperability. As a result, a digital public space that embraces the principle of interoperability and decentralization would be based on the balancing of different domains: commons and cooperative, public and private and their underpinning logics.

The three domains of a plural economy and internet

THE DIGITAL COMMONS

Digital spaces that are managed as a commons through appropriate governance structures are a key element of a more democratic internet. Their collaborative, democratic, equitable governance establishes the commons as a model for organising, as well as a sector in society which thrives when people collectively manage and take stewardship over resources without the dominant role of either the state or the market. The commons intrinsically have a decentralised and distributed infrastructure. The potential for digital commons and peer to peer production has been shown by open source software

41 Bloemen, Sophie, Keller, Paul, Tarkowski, Alek (2018) ibid.
42 Bego (2021) ibid.

(such as Linux and apache, still underpinning large parts of the internet), Wikimedia, or sharing enabled by Creative Commons and other open licences.

Data commons hold a lot of promise in terms of democratic governance and public interest stewardship. Data is central to the digital economy and at the same time most of it is held and used by large corporations. This provides a huge economic advantage in terms of innovation, resource distribution and overall power overall. Therefore a key concern is how to steward data in a more equitable and democratic manner.

Data commons are a form of knowledge commons with institutionalised community governance of the sharing of varied types of data and information.[43] Hence, in a data commons, data is shared and pooled as a common resource. Governance should be understood as a type of stewardship, built on principles of responsible and careful management of entrusted resources. This approach coincides with the FAIR standard for data to be findable, accessible, interoperable and reusable and the avoidance of data lakes.[44] More and more research communities across the globe are exploring and using these data commons models.[45] Data commons models are most advanced in research communities, but can also be used in other spheres.

DIGITAL COOPERATIVISM

Platform cooperativism or more broadly digital cooperativism relates to the commons model of shared ownership, democratic governance and solidarity. It addresses the current gigantic power asymmetry between those who own the dominant platforms and the users who depend on them. Platform cooperativism aims to shift this asymmetry by re-designing governance, ownership and levels of centralisation of a platform infrastructure. Democratizing the governance of platforms means a shift in ownership and control over internet platforms from managers and shareholders to its workers and users.[46] Furthermore it will expand their offer to be geared towards local economies and local community needs, by giving their representatives control over the platform.

Cooperative models are a way to implement democratic governance and equitable business models and to contribute to a more regenerative economy.[47] Locally embedded platform economies will contribute to the creation of beneficial social and environmental cycles. Such an economy could move us away from the extractive business models of today. For example, digital cooperatives could provide governability and a business model for open source software, which is open to all, and also vulnerable to exploitation and capture.[48] Cooperative business models have also been tested in federated ecosystems, which enable cooperative solutions to "balance small-scale accountability with large-scale economic power".[49] An example is the above-mentioned Fediverse, the federated network of social platforms. Data cooperatives explore the collective ownership of user data such as medical data and transport data and how it can be controlled more democratically, countering the extractive model of big Tech.[50]

Fostering these alternative models requires not only investing in the technical infrastructure but also into the digital cooperative economy as such. The fact that cooperatives were mentioned in the proposal for the Digital Governance Act is an important signal that cooperatives are considered by policymakers as one of the building blocks - in this case of the European data economy.

PUBLIC INSTITUTIONS AND INFRASTRUCTURE

Europe has a long history of public institutions that provide services that cannot be entrusted to the market. These range from public educational institutions (entrusted with civic education) and cultural heritage institutions (entrusted with long term cultural memory and democratizing access to culture and knowledge), through public utilities to–most recently–a strong and vibrant public media sector. These institutions should not be reduced to being corrections to market failures, but rather as deliberate efforts by democratic societies to enact the primacy of civic and public structures over crucial elements of how societal relations are governed. The successful establishment and continued existence of

43   Brett M. Frischmann, Michael J. Madison, and Katherine J. Strandburg, Governing Knowledge Commons, 2014, Oxford University Press.
44   https://www.go-fair.org/fair-principles/
45   See for example the NIH Cancer Research Data Commons projects: https://datacommons.cancer.gov/ or Sage Bionetworks https://sagebionetworks.org/in-the-news/how-data-commons-can-support-open-science/
46   Scholz, Trebor (2016). Platform Cooperativism: Challenging the Corporate Sharing Economy. New York: Rosa Luxemburg Foundation, 2016. Available at: https://platformjpcoop.wordpress.com/2017/08/02/scholz-trebor-platform-cooperativism-challenging-the-corporate-sharing-economy-new-york-rosa-luxemburg-foundation-2016/
47   See Kate Raworth's Doughnut Economics (2017) on a regenerative and redistributive economy by design that meets social needs within the limits of the planet's capacity.
48   https://medium.com/open-collective/social-coop-a-cooperative-decentralized-social-network-c10980c9ed91
49   Irving, Alanna (2017). Social.coop: A Cooperative Decentralized Social Network. Available at: https://medium.com/open-collective/social-coop-a-cooperative-decentralized-social-network-c10980c9ed91
50   Josh Gebert-Doyon, Digital Coops and the Democratic Economy (2021)Commonwealth. Available at:https://www.common-wealth.co.uk/reports/digital-co-ops-and-the-democratic-economy

these institutions demonstrates that there is space outside the market and that this space is there to be taken.

30 years into the emergence of an entirely new realm of cultural and societal circulation - that has so far been largely left to the market - it is time for society to reaffirm the importance of civic and public structures in these spaces. This must be done by providing public institutions and civic institutions with the means to carry out their missions in the digital environment and by investing in the creation of new institutions and initiatives that can play that role. One example of such institution-building is Europeana, the European platform for access to digital cultural heritage that was established in 2008 in a joint effort between Member States and the European commission in reaction to Google's efforts to digitize the collections of European libraries.[51]

Similarly Europe needs to have sustainable and accessible digital infrastructure, where the public sector is not dependent on private sector infrastructures for data management and communication services. The European Open Science Cloud (EOSC) is an example of a large, federated public infrastructure project.

It is a publicly funded infrastructure that started from a commons-based approach and a vision of interoperable infrastructure for the sharing of research data amongst researchers. The European Commission notes that "the ambition of the European Open Science Cloud is to provide European researchers, innovations, companies and citizens with a federated and open multi-disciplinary environment where they can publish, find and re-use data, tools and services for research, innovation and educational purposes."[52] This logic does not only apply to cloud storage infrastructure but should be applied to a wider range of infrastructural services that public institutions rely on, including communication services such as video conferencing or identification services.

So how can we leverage the design principle of generative interoperability to foster the emergence of these public and civic spaces online? We propose to do this by focussing on a number of building blocks that can be collectively used to build value: shared protocols, open source infrastructure solutions or public digital services, but also an ethic of cooperation, investment in new economies, democratic governance and collective action.

51 https://www.europeana.eu/en
52 European Commission (2021). European Open Science Cloud (EOSC). Available at: https://ec.europa.eu/info/research-and-innovation/strategy/strategy-2020-2024/our-digital-future/open-science/european-open-science-cloud-eosc_en

BUILDING BLOCKS OF A GENERATIVE INTEROPERABILITY POLICY

There is a growing body of policy visions that see the online ecosystem in line with our proposal for generative interoperability. They share the aim of reshaping the balance of power on the internet and include the interoperability principle as one of proposed measures in a broader policy mix.

This is most clearly visible in a recent report titled "European Public Sphere. Towards Digital Sovereignty for Europe", published by acatech, the German National Academy of Science and Engineering.[53] A similar perspective is presented in "A Vision for the Future Internet", a working paper recently published by NGI Forward, which argues for a "more democratic, resilient, sustainable, trustworthy and inclusive internet by 2030".[54] One more example is the report on "Digital European Public Spaces", published by Waag.[55]

With our report, we contribute to this debate by looking more closely at how the principle of interoperability fits within the designs for a digital public space.

As we have already argued, interoperability by itself will not bring all the societal benefits that are associated with the concept. It will not shift power imbalances automatically, but might even lead to a more centralised internet. It is highly dependent on the context in which interoperability operates. Interoperability is important but on its own it will not achieve anything. The ecosystem will not spring magically out of the box - it needs to be built and sustained. Technical interoperability is one of several elements that are necessary for a public and civic ecosystem.

So what do these additional policies and other building blocks look like? What is it that we need? In the final part of this paper we will propose some key building blocks to achieve this ecosystem. To gain additional insights into these questions, we have conducted a series of interviews with practitioners, academics and policy makers working towards digital public spaces. What we have learned from them is reflected in our proposals.

As we describe in the "Vision for a Shared Digital Europe", what is needed to come out of the current traps of digitalisation is a different perspective, and embrace a different set of values and goals. In order to make the interoperability requirements relevant at all for a truly open and public internet, it needs to be part of an integrated strategy and vision for the digital environment that we want and that meets our societal needs and goals. Moreover, we cannot separate this from the economy we want, as the digital space shapes our economy. ''Interoperability is not enough, there is also a political, social-cultural environment needed which stimulates this sort of model and behaviour. But also where commercial parties start relating to this principle in a positive way", Geert-Jan Bogaerts from the Public Spaces initiative told us.

Below, we explain how this principle can be seen as part of a broader integrated program, in which interoperability mutually supports other measures. We outline the principles, building blocks and government policies for moving towards a public and civic, interoperable ecosystem.

EMBRACE AN ETHIC OF COOPERATION AND ENABLE TRUST

We should see the internet as a living system that we build and sustain together. We constantly build the internet together and we can adapt it, develop it, nourish it. "Cooperation is not an issue of designing interoperable architecture. It often already exists. But of the mentality of the connected parties to implement its potential without limits. It's not the technology, it's the players", Geert-Jan Bogaerts from the Public Spaces Initiative told us.

Interoperable systems are fragile ecosystems that need to be actively maintained in order to keep their interoperable features. Software development itself is not just a static thing, it is a continuously developing process. Interoperability implies action: just having the right plug does not go anywhere. Someone also has to plug it in – so to say. Hence people and communities, not rules, make systems interoperable and interdependent. So in order to create these ecosystems we need an ethic of cooperation, not so much an ethic of competition. The latter is deeply ingrained in society as in the idea of interoperability as a market-fixing measure. An

53 Kagermann, Henning, Wilhelm, Ulrich (2020). European Public Sphere. Towards Digital Sovereignty for Europe. acatech. Available at: https://en.acatech.de/publication/european-public-sphere/

54 Bego, Katja (2020). Working Paper: A vision for the future internet. London: Nesta. Available at https://research.ngi.eu/working-paper-a-vision-for-the-future-internet/

55 van der Waal, Sander, et al. (2020). Digital European Public Spaces. Available at: https://waag.org/sites/waag/files/2021-04/Waag%20Report%20on%20Digital%20European%20Public%20Spaces.pdf

ethics of cooperation therefore goes hand in hand with a more societal perspective on interoperability. Looking beyond government policies, there is also a need for a mentality shift from where we are now, with competition being the main considered strategy for societal and individual gains.

This is also a matter of addressing the norms of cooperation and mutual behavior in networks and communities that sustain shared infrastructures and systems for the digital public space. Mai Ishikawa Sutton, researcher at Hokkaido University and editor of Compost Magazine, notes that building a healthy digital public sphere also requires dealing with existing toxicity in these structures, which affect their capacity to function effectively.

FOSTER PEER PRODUCTION OF SHARED SYSTEMS

An ethic of cooperation should translate, in particular, into supporting means for shared design, creation and stewardship of broadly understood code and infrastructure that underlie the digital public space. According to Boris van Hoytema from the Foundation for Public Code, public and civic institutions–which should play a key role in building an interoperable digital public space–lack the capacity to do so. This is largely a matter of lacking institutional capacity, which often does not meet the lofty slogans of "digital transformation". There is simply a recruitment gap, with hundreds of thousands of skilled professionals missing from these institutions. This means that key tasks related to building elements of this digital public space are outsourced to commercial actors - instead of being built in a democratic and self-sovereign way by public and civic actors.

These capacity issues cannot be solved by introducing standards such as those for interoperability. And in turn, the potential created by such measures might simply not be fulfilled, as there will not be people and institutions available to build the alternative services and spaces. "Instead of just standards, we need real, large-scale collaboration of public organizations on shared solutions", Boris van Hoytema told us. In his opinion, cooperation on shared systems is an easier way towards interconnection than trying to establish interoperability between separate systems.

In the vision of the Foundation for Public Code, public software code becomes a live resource that is collectively maintained. And interconnection is a result of cooperation, and not a prescribed condition of this ecosystem. In this vision interoperability and interconnection are one of the key properties of an open, co-developed communication system - but one that is not mandated, but rather an organic outcome of collaboration and peer production. In order to attain this vision, we need strong public institutions that are able to play the role of key nodes that support the network of cooperating institutions.

ADDRESS POWER ISSUES THROUGH GOVERNANCE

In the techno-political sphere of digital policy making we cannot just address the technical and be deaf to the political. When we introduce interoperability measures we have to consider in whose interest interoperability will be implemented and who will define the necessary standards and scope of interoperability. Standards for APIs and data sharing can be used by dominant services to control the interoperable space, forcing compliance on other actors. And ultimately, technical details concerning flows of data and information determine the characteristics and overall balance of societal benefits and harms of any online space. Democratic governance over interoperability standards will translate into building an ecosystem that is also beneficial to democratic societies.

There is a risk - overlooked in most competitive interoperability proposals of a "ticking the box" scenario, where the measure is fulfilled through the most basic application of the principle, with few positive effects. And as noted by Jan-Hendrik Passoth, researcher at the Viadrina University, European regulation often leaves the technical details - which are key to an effective interoperability policy - to industry actors. In such a scenario, there is a risk that societal goods and harms will not be addressed, or even that the standard will be captured by some of the private actors. For this reason, regulators should be aware of risks related to interoperability. According to Boris van Hoytema, standards can seem to put the public sector in control, but a poorly designed standard can be counterproductive, and even lead to closure of resources. One way to mitigate them is by securing a strong governance model for APIs, standards and protocols.

At a minimum, governance processes should be transparent and bodies should be publicly accountable. Furthermore, participation of civil society actors representing the public interest should be ensured when innovation policy to develop the economy is made. This should be more than just a principle of openness and transparency. There are well documented histories of key internet protocols, governed by the W3C consortium, being captured by industry players mainly due to the fact that civic and

public actors don't have the capacity to participate at the same scale that industry representatives can.[56]

Standard setting and governance of standards should be conducted by a dedicated public service entity. This agency would also be responsible for securing and managing public funding, and coordinating research and innovation efforts. The previously mentioned acatech report proposes to couple such an entity, called the Digital Agency, with a stakeholder body that would possibly have a cooperative character.

INVEST IN PUBLIC INFRASTRUCTURE AND NEW ECONOMIES

A generative interoperability model implies a diverse economy in the digital ecosystem: an economy that does not only consist of large market players but also civil society, cooperative economy, the commons and public players. A diverse and pluralist economy[57] includes competitive markets for profit companies, but also the public sector and the cooperative economy based on democratic and collective ownership. For this pluralist ecosystem to function, market-building efforts need to include investments in digital infrastructures but also support for new economies with varied business models. Regulation to foster competitiveness is not going to do it by itself, there is a need for incentives and investment for the digital cooperative sector. Fostering alternatives in the face of deeply undemocratic platform giants and huge concentration of wealth means investing not just in regular start ups, but specifically in business models with diverse ownership models geared towards the needs of communities and local economies. Hence supporting platform cooperatives, commons such as Wikipedia and the care economy such as informal peer to peer networks. There is a role for the public sector to incubate these democratic alternatives that share wealth rather than extract it and help them scale.[58]

Digital infrastructures are the foundations of any digital ecosystem and therefore their sustainability and health is of crucial importance. "Solutions that focus on interoperability won't have an impact without a wave of innovation in creating new digital public infrastructures, especially social networks", notes Ethan Zuckerman.[59]

Today, lack of necessary expertise in the public administration and public institutions, coupled with a belief in market-based solutions, led to the outsourcing of large parts of those digital infrastructures that could be public in nature. This is clearly visible during the pandemic, when education systems across Europe, in order to conduct remote education, relied on just several commercial e-learning solutions.[60]

In 2017, the Ford Foundation published a report that framed the importance of these infrastructures in social, and not technical terms. A failure of these infrastructures would crucially mean great increases in social inequality, according to the Foundation. Nadia Eghbal, the lead researcher of this project, noted that these infrastructures should be built with open source code, and treated as a necessary public good.[61]

Public investments in these infrastructures are also needed because many companies fail to contribute to these open source projects, even though they use and benefit from the code. The Waag's report on European Digital Public Spaces includes an analysis of current gaps and lists among them the lack of "a shared digital infrastructure that begins the process of developing online public spaces in a way that can be adopted and adapted locally while also being interoperable internationally".[62] Funding these infrastructures requires both large scale investments in European-level infrastructures, and an incubation of smaller initiatives that will populate this ecosystem.

The European Open Science Cloud is a publicly funded interoperable digital infrastructure that is an example of an exception to this trend. Examples of such programs include the European Next Generation Internet project,[63] the German Prototype Fund[64] - an example of a national level initiative to support open source infrastructures, or even infrastructure projects funded by philanthropies.[65]

56   Lapowsky, Issie (2021). Concern trolls and power grabs: Inside Big Tech's angry, geeky, often petty war for your privacy. The Protocol. Available at: https://www.protocol.com/policy/w3c-privacy-war

57   Pluralist economics refers to a plural approach to economics and what it consists of. Hence apart from neoclassical, also political economy, social solidarity economics, degrowth economics, feminist economics which apply another logic and for example might see human nature as cooperative and caring, just as it is competitive and individualistic.

58   Josh Gebert-Doyon, Digital Coops and the Democratic Economy (2021)Commonwealth. Available at:https://www.common-wealth.co.uk/reports/digital-co-ops-and-the-democratic-economy

59   Zuckerman, EThan (2020). The Case for Digital Public Infrastructure. Available at: https://knightcolumbia.org/content/the-case-for-digital-public-infrastructure

60   Nikola Wachter (2019). When Open Educational Resources and platform capitalism meet. Available at: https://archive.discoversociety.org/2019/05/01/when-open-educational-resources-and-platform-capitalism-meet/

61   Nadia Eghbal (2017). Roads and Bridges: The Unseen Labor Behind Our Digital Infrastructure. Available at: https://www.fordfoundation.org/work/learning/research-reports/roads-and-bridges-the-unseen-labor-behind-our-digital-infrastructure/

62   van der Waal, Sander, et al. (2020) ibid.

63   https://www.ngi.eu/

64   https://prototypefund.de/

65   Ford Foundation (2021). Major Philanthropies Tackle Inequality by Strengthening How Open Source Code is Developed and Maintained. Available at: https://www.fordfoundation.org/the-latest/news/major-philanthropies-tackle-inequality-by-strengthening-how-open-source-code-is-developed-and-maintained/

Once these foundational infrastructures are established, specific services will be developed. As organizations and public institutions undergo digital transition, they should have the capacity to develop dedicated, sometimes sector specific solutions - including those for public broadcasting, libraries and archives or media and journalism.

COLLECTIVE ACTION TO BUILD THE DIGITAL PUBLIC SPACE

The European digital public space based on the policy vision of generative interoperability, cannot be established without public funding. These funds are needed in particular to support necessary innovation and development of public interest technologies and infrastructures. Such a program would finance initial growth of digital infrastructures and promote cooperation on research and innovation.

The goal of building an interoperable digital public sphere fits ideally into the concept of mission-driven innovation.[66] An innovation agenda, in particular in digital infrastructures, is a necessary element of a public funding model for generative interoperability policy.

In the context of post-pandemic recovery, the Recovery and Resilience Facility is a funding source that provides huge resources for digital transition projects, with 20% of expenditures in national recovery and resilience plans earmarked towards this goal. Furthermore, the "Shaping Europe's Digital Future" strategy includes a coordination mechanism that will facilitate digital initiatives that are cross-national in character and involve multiple member states.

Digital levies or taxes are another possible funding source. In early 2021, the European Commission consulted on an inception document for an initiative aimed at ensuring "fairer contribution from the companies that operate in the digital sphere". It would be fitting for revenue from such digital levies to be used to fund public interest alternatives to commercial platforms.[67]

Finally, public procurement is an important funding mechanism, especially if coordinated among different public institutions at different levels of government. As a rule, public institutions should cooperate on investments into shared systems and public infrastructures, especially if substantial funds are needed to build viable alternatives to commercial services. Municipalities are an important actor in this

regard as they are in frequent direct contact with their citizens, and the manner in which they design their digital infrastructures is key to citizen data stewardship.

As Katja Bego notes in a recent Nesta paper on a "Vision for the Future Internet", public procurement is under-appreciated as an effective policy lever. Public spending, when planned correctly, can be a strong market-creating mechanism that reduces lock-in, empowers small businesses and benefits users. The Nesta paper imagines coordinated procurement by city and county governments that would create Europe-wide demand for alternatives based on the generative interoperability vision. For example, last year the German education system purchased half a million licenses for collaborative software service from Element, a company building decentralized communication solutions.[68] As Aik van Eemeren, of the Lead Public Tech at the Technology Office of the City of Amsterdam notes 'don't call it alternative, call it normal''. Coordinated procurement from other educational systems would mean significant market demand for such solutions. This could furthermore be connected with other forms of cooperation that we outlined above: on shared research agenda, or code development, for example.

On the other hand bureaucracies also need to adapt to digitalisation. In order to do this well there is a need for technical and institutional tools that ensure good digital governance. A government agency cannot just procure away its public tasks. It is their responsibility and the policy makers need to know what they are doing. This expertise is needed 'in house' and cannot be tendered away, is the point made by Boris van Hoytema of the Foundation for Public Code and confirmed by Jaromil who makes the broader point: ''If the public sector doesn't take its role, their role will be lost'.

66   European Commission (2021). Initiative on European missions. Available at: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13209-Initiative-on-European-missions_en

67   European Commission (2021). A fair & competitive digital economy – digital levy. Available at: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12836-A-fair-&-competitive-digital-economy-digital-levy_en

68   Michael Stothard (2020). "Slack-rival Element wins largest ever collaborative software deal". Sifted. Available at: https://sifted.eu/articles/element-germany-deal/

"People and communities, not rules, make systems interoperable and interdependent. So in order to create these ecosystems we need an ethic of cooperation, not so much an ethic of competition."

Websites:
https://www.ngi.eu
https://research.ngi.eu

Twitter
https://twitter.com/ngi4eu
https://twitter.com/ngiforward