The EU and the Commons:

A Commons Approach to European Knowledge Policy

HEINRICH BÖLL STIFTUNG
The Green Political Foundation

Commons Network

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Authors: Sophie Bloemen & David Hammerstein.
Editor: David Bollier
Design: Roman Leskov

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www.commonsnetwork.eu
www.boell.de

Commons Network promotes access to knowledge and other social and ecological causes from the perspective of the commons. We are a non-profit organization and think-tank that engages in policy formulation as well as public debate, promoting the common good through commons-based solutions. We cooperate with civic initiatives, translating ideas and concerns into broader policy initiatives.

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Acronyms & Definitions:

EU:	*European Union*
GMO:	*Genetically Modified Organisms*
GDP:	*Gross Domestic Product*
FLOSS:	*Free/ Libre and Open Source Software*
IP:	*Intellectual Property*
IPR:	*Intellectual Property Rights*
WHO:	*World Health Organization*
WIPO:	*World Intellectual Property Organization*
WTO:	*World Trade Organization*

Commons: *- Shared resources governed by a given community.*
- An ethical perspective that emphasizes ecological sustainability, equity and participation.

Common goods: *Goods that benefit all people in society and are fundamental to people's well-being and every day lives, irrespective of their mode of governance.*

Introduction

Thanks to the Internet and scores of new digital technologies, the past two decades have seen revolutionary changes in economic production, much of it stemming from unprecedented new forms of collaboration in the creation and sharing of knowledge. The sharing of useful knowledge brings significant economic, social and civic benefits, allowing people to have access to valuable knowledge goods, to participate and exercise their democratic rights.

Unfortunately, many of the economic and legal structures that govern knowledge and its modes of production – not to mention cultural mindsets – are exclusionary. They presume certain modes of corporate organization, market structures, government investment policies, intellectual property rights and social welfare metrics that are increasingly obsolete and socially undesirable. The European Union therefore faces an urgent challenge: How to manage knowledge in a way that is socially and ecologically sustainable? How can it candidly acknowledge epochal shifts in technology, commerce and social practice by devising policies appropriate to the current age?

Such a shift is important if the EU is to assure the vitality of its scientific research, enhance social wellbeing, as well as maintain its economic position in the world. Policy structures have to enable ordinary people to freely access and share knowledge and reap the benefits of collaborative technologies. Without such legal rights and practical capabilities, Europeans will not be able to act as sovereign democratic citizens in the face of powerful large state and corporate institutions. In this sense, EU policies for knowledge-creation and sharing have profound implications for well-being, human rights and social justice.

To be sure, the European Union (EU) embraces the idea of the "knowledge economy" as an area of competitive advantage; its Lisbon strategy declared the EU's ambition to become 'the most competitive and dynamic knowledge economy in the world'. Paradoxically, this ambition is undercut by the EU's fierce commitment to expanding intellectual property rights (IPR) and enforcement, which often undercut the great competitiveness and innovation unleashed by collaborative knowledge-creation. Indeed whether these policies are serving the purpose of fostering innovation is subject to debate while enclosing knowledge has led to high costs for society and the exclusion of many from accessing knowledge goods. The lack of access to medicines and a weaker dissemination of climate change technologies are prime examples.

EU policies generally focus on the narrow benefits of IRP-based innovation for individual companies and rely on archaic social wellbeing models and outdated models of human motivation. The EU has failed to explore the considerable public benefits that could be had through robust, open ecosystems of network-based collaboration. For example, the EU has paid little serious attention to the enormous innovative capacities of free, libre and open source software (FLOSS), digital peer production resulting in for

example Wikipedia, open design and manufacturing, social networking platforms, and countless other network-based modes of knowledge creation, design and production.

Additionally, much of the EU's public investment in research and innovation does not sufficiently take into account the public interest. With the exception of recently adopted open access publishing requirements and some proposals towards open science, it uses public funds to subsidize proprietary technologies for example in health or environment, while scanting on the larger payoffs that could result from public investments in knowledge that remains a public good available to all.

Within this context, the fate of the Internet as a central gateway to knowledge and information must be a primary concern. The Internet is a foundational infrastructure of our time. Everything from commerce and research, education and social life, and the environment and democratic culture, depend upon affordable, easy and private access to the Internet and technologies that connect to it. It is therefore worrisome that large private actors are increasingly laying claim to this indispensable public infrastructure and cultural space, while public policies that would assure net neutrality are defeated. These developments are threatening the future of democracy and open society as well as innovation and competition.

Many initiatives now seek to ameliorate EU knowledge policy in one domain or another, but none really address the core moral and philosophical deficiencies that lie at the heart of so many of them. The paradigm that governs EU policies for IPR, digital infrastructure, public investment, and democratic participation, fails to represent current, on-the-ground realities and citizens interests. We therefore need to reexamine basic questions about how value in the broadest sense is created in the networked environment; how innovation requires openness and the capacity to build on the past; and how to ensure that technological developments and collaborative production is helpful not only to markets but to social justice, environment and democratic culture.

This paper describes how the commons perspective, as a new framework for understanding knowledge,[i] can contribute to some important, long-overdue EU policy discussions. The commons embraces knowledge as a shared resource and its management a joint responsibility. It points towards policies that facilitate equitable access to and the sustainable management of knowledge. Rather than a narrow focus on intellectual property or economic value alone, the commons approach requires us to attempt a more comprehensive understanding of value and policies that serve the common good. Commons thinking takes a community and ecosystem perspective, placing issues of stewardship, social equity and long-term stability at the forefront of policy. With the commons paradigm, we can go beyond a purely individual rights- and market-oriented worldview: the very perspective that many consider to be at the root of current economic and environmental crises. Instead of conceiving of society as a mere collection of atomized individuals principally living as consumers, commons thinking points to the reality of people's lives as deeply embedded in social relationships,

communities, histories and traditions. Challenging the dominant ideas of ownership and governance, the commons approach enables policy to assess the collective interests of citizens as a whole.

As such a commons approach embraces the new opportunities for civic participation, nonmarket self-provisioning and reduced inequality as well as greater de-centralized innovation. The perspective points towards policies that for example favor open sharing of knowledge and alternative incentive models that could make medicines far more affordable; generate more useful, localized environmental technologies; and facilitate more copious knowledge transfers to a Global South struggling to meet basic human needs. This paper outlines the compelling logic, benefits and ethic of a commons approach to knowledge, with an emphasis on how that could improve policy in certain areas such as health, the environment, science and culture, and the Internet. First we will consider current challenges and then discuss how the commons approach could inform EU policymaking and yield better outcomes.

1. The Social Inequities and Lost Opportunities of Current Knowledge Policies

Knowledge differs from most other resources as one person's use of knowledge does not subtract nor limits from another's person capacity to use it. Therefore facile comparisons of knowledge works to real property are misguided. Books, articles, research, film, photos, music and other works are not necessarily "nonrivalrous," as economists put it; my use of it does not preclude your use of it. The more people share knowledge -- with carefully defined exceptions – the greater the common good. Access to knowledge and knowledge goods are key factors for social and economic wellbeing. It is not surprising that Thomas Piketty, in his research on sources of income inequality over the course of 250 years, identified the spreading and sharing of knowledge as the main factor in reducing inequality and stimulating market activity.[1]

Digital technologies bring many possibilities and have created an environment in which the marginal transaction costs for digital information and creative works approach zero[2],opening up new prospects for innovation. To be sure, technological developments bring opportunity, they always have. But as history has shown, technological developments do not *necessarily* serve the common good, nor will they solve ecological problems and could very well achieve the opposite. In order to optimize their benefit, society has to subject them to value based institutions with clear social and ecological objectives.

The proliferating ease of access to knowledge and the sharing of it pose a serious challenge to industries whose entrenched business models rely upon strong intellectual property rights (IPRs). The film, music, book and information industries are staunchly trying to fend off competition from new rivals who are exploiting collaborative strategies on networked platforms. The incumbents invoke the sanctity of IPRs, which were originally designed to provide incentives for the production of creative works, medicines, inventions and other knowledge resources. But the over-extension of especially copyright and patent protection is now proving harmful, and stifling innovation.

In many instances IPRs appear to be privatizing and commoditizing – "enclosing" – socially useful knowledge that, if widely shared, could result in more affordable and accessible medicines, scientific research, educational resources and climate technologies. In recognition of this reality, EU policy ought to empirically examine whether existing policies are sanctioning severe opportunity costs. By recognizing contemporary technological and economic realities, EU policies could unleash moves towards more affordable health systems, wider uptake of green technologies, a more open, participatory creative culture, and more responsive democratic governance. We now briefly discuss several areas of knowledge management that have our concern.

Health

The contemporary model of biomedical research and medicines development is proving to be increasingly inefficient at generating a steady supply of therapeutically significant and socially needed medicines at affordable prices.[3] While this monopoly- driven model has produced many important medicines in several disease areas, it has resulted in needlessly high medicines prices. Increasingly now, also European health systems are having trouble to keep up with rising costs.

Driven more by market demand than priority health needs, the current model produces a systemic under-investment in biomedical research that could benefit people in poorer nations suffering from diseases such as Tuberculosis, Malaria and especially people suffering from less-prevalent diseases such as Ebola, sleeping sickness or chagas disease.[4] IP rights are irrelevant for stimulating innovation in the absence of a profitable market. The Ebola crisis in West Africa, and the lack of treatment has posed fundamental questions about the way that R&D is financed and what should be drivers of innovation.

Patent monopolies encourage biomedical innovation for people in affluent nations, often for medicines of modest therapeutic value, while drugs that might help serious diseases afflicting the majority of the world's population are either over-priced, available only through illegal markets of dubious reliability or not developed in the first place. In this sense, the current innovation model structurally excludes millions of people from the benefits of scientific knowledge, in direct conflict with the recognized human right "*to enjoy the benefits of scientific progress and its applications*."[5] This while a significant part of the investment in R&D consists of the funding of research at universities with public money. [6]

A focus on litigation and marketing instead of R&D has also contributed to high prices, and poor innovation levels.[7] It is important to realize that many patents are *defensive*, contrived as strategies to undermine competition. Patent thickets are created to block competitors from entering a field of research, for example, as are the launching of follow-on products and in order to displace more affordable generic medicines based on the original product.[8]

The current innovation model guided by exclusive patent rights has other serious deficiencies. It shrouds the results of clinical trials and other health research data in secrecy, exposing patients to unnecessary risks, stifling scientific research, and impeding regulatory oversight. In an attempt to evade increasingly stringent regulatory demands of transparency and evidence based proof of therapeutic value of new medicines, 'early market access' is the most recent strategy of the industry.[9]

The opportunity costs for spending so much on medicines are high, diverting money that could otherwise fund hospital stays and physician visits with patients. The Global South has long suffered from this system, now the harmful side-effects of this model are increasingly afflicting European countries as they struggle to afford the high price of new medicines.[10] The system is proving to be too expensive for societies *everywhere* to afford. [11]

Environment

Global civilization is facing unprecedented ecological challenges: climate change, the loss of biodiversity, deforestation, desertification, and many related problems, all of which are seriously affecting people's livelihoods and political stability, especially in the Global South. The magnitude of these challenges calls for the most aggressive research, collaboration, knowledge sharing and technology diffusion possible. Unfortunately, we are not truly addressing the grave ecological crisis as societies are not socializing the knowledge at hand. Additionally, the use of patents and copyrights to privatize knowledge is often locking up vital knowledge and technologies, preventing their use, as well as the further development of cheaper, more ecological benign alternatives.[12]

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For example, even though green technologies are needed everywhere to slow and adapt to climate change, intellectual property rights are inhibiting the rapid and affordable diffusion of such technologies, especially in poorer countries of the Global South.[13] The patenting of various life forms is empowering patent holders to disrupt living systems, as well as forcing farmers into greater dependency. In many countries patented GMO crops, synthetic pesticides and fertilizers are displacing agro-ecological practices,

destroying traditional knowledge systems.[14] The recent approval by the EU of 19 new varieties of GMOs is another step that will accelerate the enclosure and commodification of our fragile natural commons.[15] In early 2015 the Commission finally withdrew a controversial seed law voted down by the European Parliament that would limit the legal sharing and innovation now enjoyed by seed banks, organic growers and small-scale market farmers.[16] Meanwhile nearly 20 percent of the human genome, or more than 4,000 genes, are already covered by at least one U.S. patent.[17]

Seed Bank Commons

In farmers' fields and in rural communities, there is a dynamic living laboratory of tremendous biological diversity sustained primarily by small-scale farming communities that have pooled their knowledge over centuries. Seed banks accumulate traditional knowledge about the use of biodiversity for food security and community health. The development and adaptation of plants and crops to different ecological conditions, such as soils, rainfall, temperature, altitude, and to meet specific community nutritional, medicinal, cultural, and spiritual needs, is the product of real-life shared knowledge.

This knowledge mobilizes sophisticated and complex observations and understandings of, and experience with, the properties of living organisms and their interactions with all elements of local ecosystems. Indigenous peoples, local communities and farmers retain this crucial knowledge through practices of seed saving, storage and exchange that allow for continued innovation in plant breeding.

The privatization of genetic diversity is limiting our ability to collectively study and adapt to the changing natural world. The growing global crisis of our natural commons demands energetic policies aimed at preserving our most precious common good.

Science & Culture

Over the last several decades there has been a rapid global expansion of copyright protections to benefit the film, publishing, music and information industries, aided by an international harmonization of copyright standards to be as strict as possible. There has been no corresponding development of the rights of users even though there is a long history of "limitations" and "exceptions" to copyright law to authorize sharing and re-use, which has always been an important part of economic activity.[18] By one respectable estimate, commons-oriented peer production, as expressed by industry sectors that rely upon open-source and "fair use" content, contribute to one-sixth of US GDP. The one-sided expansion of copyright law at the expense of users has meant that dominant

players in copyright industries have been able to criminalize and inhibit creativity in diverse fields – education, literature, media, music, film, publishing, the Internet.

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Meanwhile, scientific publishing is burdened with high subscription prices and strict copyright limitations even though a great deal of research is funded by taxpayers. This is a huge burden to university library budgets, constrains the flow of scientific knowledge and innovation, and limits access to knowledge in many developing and developed countries.[19] Copyright now often has the effect of locking away cultural goods and limiting access to educational resources and our cultural heritage.

The impact on people who live in Asia, Africa and Latin America is especially acute because industries are not meeting their legitimate daily needs and aspirations with affordable, legal content. Instead the overreach of global copyright law has in effect excluded tens of millions of people from access to all sorts of knowledge goods, spurring the emergence of huge underground markets for "pirated" information, music, films and other content.[20] So although originally intended to provide incentives for creativity and innovation, copyright protection has become increasingly divorced from the reality of social practice, becoming a protectionist tool for dominant industries and a powerful legal deterrent to innovation. The deference given to IPR models of knowledge production is so extreme that even knowledge goods funded by public money – research, inventions, databases – are being privatized, limiting social return and depriving the public of a basic entitlement.[21]

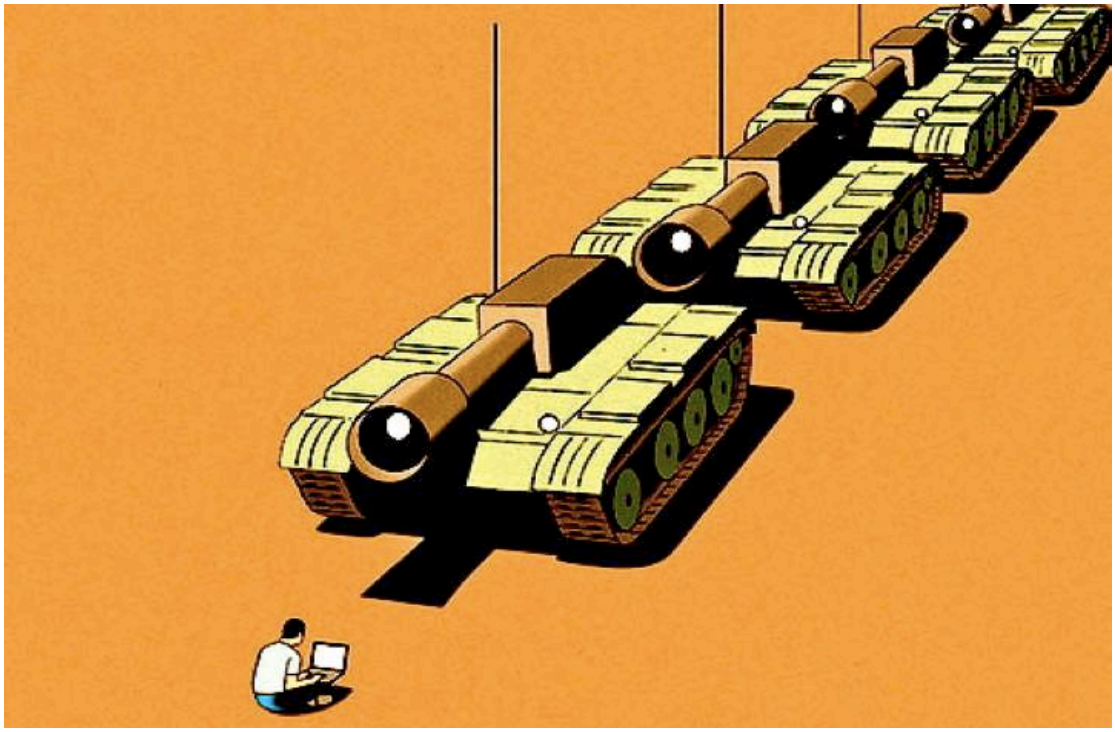
The Internet

The Internet has become an essential gateway and public infrastructure for nearly everything in modern life. Unfortunately, as much as people now intuitively expect a diverse and open Internet, we seem to be rapidly moving away from it. Access and use of the internet is increasingly being commercialized and monopolized by a handful of giant corporate actors. A few large enterprises now dominate social media platforms, search engines, and software and hardware choices. Facebook and Google are now

offering free Internet in countries in Africa and Asia for areas where it was lacking. As useful and laudable as it may seem at first glance, the unhampered control by one company over access to information and the global public sphere is actually quite troubling. Companies are free to collect and sell personal information about us in ways that threat our privacy, freedom of speech and democratic participation. This trend is mirrored in government surveillance of Web activity in all sorts of invasive, authoritarian and unaccountable ways.

The pervasive centralization of control of digital spaces has ramifications for major sectors of the economy as companies like Amazon, Google, Uber, Airbnb and others become dominant network platforms linking sellers and buyers. It also has serious consequences for workers as the "Uber-ification of services" spreads beyond taxis and apartment rentals, converting people formerly known as employees into unprotected wage laborers. As "power law" dynamics play out on the Internet – giving a few top players overwhelming market power in specific sectors and marginalizing most others – it is undermining the great potential of cooperative production and noncommercial activity on the Internet as well as aggravating economic and social inequality.[ii]

The domination of the Internet by several large actors raises important policy questions about how to manage a digital infrastructure that is so central to people's livelihoods and to social justice and democratic citizenship. The thwarting of net neutrality rules in Europe suggests just how vulnerable the open Internet truly is. It is troubling, therefore, that policymakers have no real vision or policy agenda that acknowledges the gravity of these problems.



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2. The Commons Approach

Part I outlined many troubling limitations of the prevailing policies in managing knowledge resources and infrastructure. We believe there are a range of practical alternatives that derive from an attractive new policy paradigm, *the commons*, which sets forth a different framework for understanding how knowledge is created, curated, maintained and shared. The principles, ethical orientation and social practices seen in countless network-based commons that manage code, creative works, information, scientific research, and much else, ask us to revise our understanding of knowledge production and management, and to consider some very different policy directions and solutions.

The Basic Idea

Commons refer to shared resources, the communities that manage them, and the specific rules, practices and traditions that those communities devise. The term emphasizes that certain resources are fundamental to the health and wellbeing of a society and people's everyday lives. And so, common goods are goods that benefit all people in society, no matter how the goods are governed or created. Health, education and public infrastructure, for example, have usually been considered common goods that public bodies provide. Taken together, the commons refers to a new perspective and ethic.

For decades, the commons has been dismissed as a failed system of governance and resource management. This misconception stems from a famous 1968 essay by biologist Garrett Hardin, "The Tragedy of the Commons," which proposed the metaphor of an open pasture that anyone could graze his or her cattle on. Such an arrangement will inevitably result in the over-exploitation and ruin of the resource, he argued, because no individual will have a rational motivation to restrain her use of the pasture. As Hardin famously wrote: "Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all." The article was hugely influential and is routinely quoted by economists, conservative politicians and property-rights advocates to argue for the privatization of resources.

However, commons scholars have pointed out a number of key errors in Hardin's narrative.[iii] He was actually discussing an open access regime, or "free for all," rather than a managed commons that has boundaries around a resource, rules for its use, sanctions against free riders, etc. Hardin also assumed that people have little or no communication in a commons and act only in their narrow and immediate self-interest – something that empirical studies of hundreds of commons around the world have

proven to be false: people can and do negotiate effective systems for managing shared resources sustainably. In short, Hardin wasn't really describing a commons.

The late Professor Elinor Ostrom is widely credited for rebutting the "tragedy" fable and conducting rigorous social scientific research to confirm the possibilities of collective management of natural resources – as well as other types of shared resources, including knowledge. Ostrom won the Nobel Prize in Economics in 2009 for her landmark 1990 book, *Governing the Commons*, and for her decades of fieldwork and creative theorizing about the design principles of successful commons. In contrast to most of her peers in economics, Ostrom repeatedly stresses the importance of community, trust and cooperation and combines elements of economics, anthropology, political science and philosophy. For her, the essential questions of any commons analysis are related to social equity, efficiency and sustainability. As Ostrom wrote:

> *'The commons paradigm … looks to social norms and rules, and to legal mechanisms that enable people to share ownership and control of resources. The matrix for evaluating the public good is not a narrow economic index like gross domestic product or a company's bottom line, but instead looks to a richer, more qualitative and humanistic set of criteria that are not easily measured, such as moral legitimacy, social consensus and equity, transparency in decision making, and ecological sustainability, among other concerns.*[22]

Magna Carta & the Charter of the Forest:

At the root of the document that forms the basis of constitutional civil liberties in Anglo-Saxon law, one finds the protection of the commons. Established in 1217 by King Henry the IIIrd, the Magna Carta & the Charter of the Forest, protect civil liberties and are an important legal settlement to determine use rights and access to historical common pool resources such as pastures, woods, fish ponds.

At a time when the royal forests were the most important potential source of fuel for cooking, heating and industries such as charcoal burning, and such hotly defended rights as pannage (pasture for their pigs), estover (collecting firewood), agistment (grazing), or turbary (cutting of turf for fuel), this charter was almost unique in providing a degree of economic protection for free men, who also used the forest to forage for food and to graze their animals.

Traditionally, the term commons has referred to natural resources such as forests, rivers, fisheries or grazing lands that are shared, used and enjoyed by all. Yet the commons as a paradigm can be applied to other types of shared resources such as infrastructure, intangible knowledge and creativity, and systems for delivering services. Essentially a commons can arise whenever a distinct community chooses to manage a resource in a collective manner, with a special regard for equitable access, use and sustainability.

People often refer to commons as *inert resources* that provide some sort of economic utility. In this sense, a commons is often used as another word for a "public good" or "public property," which we have traditionally left to public bodies to govern and manage.[23] Thus, by the terms of standard economic discourse, a commons might include things like roads, highways, urban sidewalks, scientific research and the majority of human knowledge that has entered the public domain, as well as, public utilities like electricity, water and sewage systems, telecommunications networks and systems of law.[24]

While this understanding of the commons is widespread, a commons is, in truth, something richer and deeper. It is not just the resource alone, but a social system – one that arises through the interactions of people who devise their own locally appropriate, mutually agreeable rules for managing resources that matter to them. Value creation and stewardship in a commons occur through the active participation of a community of people. Or as the historian Peter Linebaugh has put it, "There is no commons without commoning." Thus, "common goods" are not just public resources managed by government; they are resources that morally "belong" to citizens and are fundamental to their everyday lives. To the maximum extent possible, therefore, they should be accessible to and managed by them.

The discourse of the commons is important for calling attention to another phenomena – the privatization and commodification of shared wealth. In the Middle Ages and periods of industrialization, English aristocrats and land-owners frequently seized forests, pastures and other lands used as commons, and asserted private ownership over them, often in collusion with the Parliament. Shared community resources were converted into privately owned, marketable commodities – an act of dispossession and criminalization of customary usage.

The language of the commons is often invoked today to point to similar acts of enclosure of the biophysical world, urban spaces and culture. Private actors are not only claiming private ownership rights in genes and other life forms, but in the mathematical algorithms used in software code, two second clips of music, images of public buildings, amateur performances of songs posted on YouTube, and fundamental types of medical knowledge. The excessive expansion of intellectual property rights has been called a "second enclosure movement."[25]

Treating Knowledge as a Commons

It is helpful to talk about knowledge as a commons in contemporary policy discussions because it recognizes that it is generally shareable ("nonrivalrous") and socially based. Knowledge is not a finite physical resource like land, but something that can actually grow as more people use it. Moreover, given the low marginal costs of sharing knowledge, there is a moral presumption that access to knowledge should be maximized, not constricted. Since one person's use does not subtract from other peoples' capacity to use it, especially in the Internet age, policies ought to promote greater access to knowledge. Unfortunately, the proliferation of IPR claims for knowledge today are leading to the exact opposite – a kind of dysfunctional gridlock that *diminishes* access to knowledge. This phenomenon is known as the "tragedy of the anti commons."[26] When patent claims for biomedical research are excessive, for example, the overlapping or ambiguous property rights mean that further research and innovation are stymied because of the threat of litigation.

Knowledge creation tends to be motivated not just by material gain but by curiosity, psychological well-being and social connectedness.[27] It cannot be explained by the logic of *homo economicus*, the fictional abstract individual of standard economics, the person who maximizes his personal material gain through rational calculation. Even though contemporary economic research shows that human cooperation and reciprocity are at least as important as the desire for material gain,[28] the *homo economicus* ideal lies at the heart of intellectual property policies and of the neoliberal paradigm more generally. The IP system assumes that 'free riding' by competitors or consumer-producers will unfairly steal from prior work and undermine any incentives to create and invent.[29] As on-the-ground realities confirm, however, this fundamental worldview and analysis is flawed. In fact, in stark contrast to recent tendencies toward the enclosed commodification of knowledge-generation, successful scientific method has always required an ethos of open, rational broad-based critical sharing and debate.

One of the most significant facts about knowledge production and distribution today is that it is highly social in character. There are many situations in which free riding does not undermine incentives to produce knowledge resources. [30] In fact, the sharing of knowledge serves as highly productive and useful for "open collaboration." The stunning success of free and open source software over the past generation, the tens of thousands of contributors to Wikipedia, and the flourishing open design and manufacturing community are but three notable realms in which collaborative activity have disrupted 20th century models of knowledge production. An estimated 100.000 hobbyists and entrepreneurs are now using 3D printing to manufacture their own goods[31] -- part of the burgeoning maker movement that is using hackerspaces and FabLabs to pioneer new forms of distributed local production. Open network platforms are also catalyzing a variety of crowdsourcing and crowdfunding enterprises, a new movement of "citizen science," influential forms of citizen journalism, a global explosion of "open educational resources," and new initiatives in green energy and biomedical research.[32]

The GNU General Public License used by the free software movement famously uses copyright to promote sharing and collaboration instead of privatizing knowledge. This allowed for thousands of loosely networked free software developers to produce a massive and widely used operating system: Linux. Creative commons licenses follow this example, using law to place knowledge and culture in the commons. There are now an estimated 852 million creative and informational works around the world that are tagged with Creative Commons licenses as a way to make them legally shareable with others, the number will surpass the one-billion mark in 2015.[33] These are only some of the more prominent examples of collaborative and commons-based peer-to-peer production.

As a networked public sphere the Internet empowers people to engage in these collaborative practices and knowledge sharing, creating vast economic value yet even more importantly, huge social value. The facilitating of participation in social political and economic life generally is invaluable. Society and policies needs to recognize the rich benefits of a non-discriminatory Internet – economically, socially and civically – and to actively support the development of the Internet in a democratic and decentralized fashion.

Access Rights and Governance

The notion of a knowledge commons is useful for many reasons. The new framing allows us to understand the actual dynamics of knowledge production and distribution in an age of electronic networks. The commons perspective does not confine itself to the narrow individual interest of creators or intermediary/distributors, but demands a holistic systems-analysis for creativity and knowledge. It provides an intellectual framework for assessing the social dynamics and structural flows of knowledge-creation, for example, and the role that inherited knowledge and the public domain play in the health of knowledge ecosystems.

In this sense, the commons perspective provides a richer framework for defending not just individual rights (as individuals are both creators *and* users), it forces us to consider larger social, democratic and societal objectives as well. Enabling us to raise important questions about the social governance of knowledge and rights of access, the commons perspective opens up new "solution spaces". The approach also helps us identify the differential benefits of an *open* management of knowledge and *commons-based knowledge production*. In general, open systems such as open access publishing, open data, open source software, and so on, represent a significant improvement over closed, proprietary systems. But the term "open" is tricky because its implementation often varies in ways that may or may not favor the broader common good.[34] For instance, "open innovation" may not necessarily assure that the knowledge goods produced (e.g., drugs, data, journal articles) are publicly accessible. The principle of "openness" might be applied solely to early research and precompetitive processes, for example, leaving companies free to privatize the value and knowledge that is created later. The virtues

of “openness” may be even more problematic in terms of data because sharing data online may end up violating people’s privacy and commodifying their digital identities. Here, the commons approach can help give more substance to the principle of openness by raising issues of governance of the resource and socially appropriate limits on its use.

Distinguishing between open platform and specific commons based solutions, often still emerging and not well-established, is not always self evident and often they overlap. Yet creating a knowledge commons implies participatory management to the knowledge and does not just mean putting data, knowledge and facts out there to be available. It means creating the structures, channels and organizational pathways to enable real-life participation in re-mixing, interpreting, re-creating and inserting knowledge into socially and ecologically meaningful contexts.[iv]

3. The EU Challenge: New Policies to Protect Knowledge Commons

A great deal can be achieved by inaugurating a new discussion of knowledge as a commons. Besides addressing the limitations on access caused by enclosure, the commons paradigm provides opportunities for building new types of institutions for the knowledge economy.[35] The commons perspective can inform EU policy relating to knowledge in several important ways.

First, it provides an intellectual *framework for discourse* taking into account social and ecological sustainability considerations as well as innovation. By taking a systems approach, the commons framework helps identify what could be managed better while also pointing to improved ways to disseminate knowledge, making it more accessible and useful.

Second, the idea of knowledge commons can help us develop policies that would ensure broad access to goods that are of fundamental benefit to our societies and people's lives, such as medicines, educational resources and climate technologies. Such policies point toward specific *knowledge management regimes* that assure a fair public return on public investments in new knowledge-generation ("research"). For example, the EU could favor conditions and forms of licensing that generate the highest possible social benefit, particularly for publicly funded research, information databases, or scientific journal articles. Non-exclusive licensing, which allows for different licensees for an innovation or intellectual property right, is one obvious tool that could provide a variety of social benefits, especially in the area of biomedical innovation. Variations of such licenses, drawing on the Creative Commons licenses, could make research findings innovations more widely and inexpensively accessible.

Third, the commons perspective can help us create and invest in *institutions* that foster collaborative knowledge creation as well as flourishing open knowledge initiatives. By highlighting the principles of commons, policymakers can more deliberately design legal systems, funding programs, and international frameworks to support knowledge sharing and access. The value of investing in democratic knowledge infrastructure through net neutrality regulations becomes more evident, for example, as do the value of incentive mechanisms that reward social benefit innovation and Multilateral Treaties that invest in development of common goods such as health R&D and climate technologies.

The crucial point is that the information economy has the potential to democratize access to knowledge and its production. The goal is clear: ***create a structural environment***

that enables society to fully reap the benefits of knowledge sharing and collaborative production. There are already many important initiatives – for drug research, scholarly publishing, data sharing, Internet management, copyright reform, and more – that are advancing this idea. The commons perspective can help explore policies to further advance this. How could the EU in its policy decisions and political choices move in this direction? We will now look at five specific policy arenas where the commons perspective is helpful: health, the environment and green technologies, science and culture, Internet infrastructure, and trade.

The box below summarizes key principles of the commons, policy designs, and outcomes that could be pursued through a knowledge commons agenda.

Knowledge Resources		Principles	Design	Outcomes
• Data • Software • Biomedical knowledge • Creative works • Scientific publications • Climate technology	**Commons**	• Sharing • Common goods • Cooperation • Complex human motivation	• Copyleft & non exclusive licensing • Conditions on public funding • Internet regulation encouraging de-centralisation	• Broad access • Public knowledge goods • Democratic shared infrastructure • Cooperative peer to peer innovation • Diffusion Ecological knowledge
	Proprietary	• Protection • Private property • Commodi-fication • Personal gain maximization	• Exclusive licensing • No conditions on public funding regarding knowledge sharing • Free market allowing for centralisation	• Exclusion • Private knowledge goods • Private infrastructure & monopolies • Data commodifica-tion • Limited use of sustainable technology

Knowledge Commons for Health

For reasons noted above, the current model of medical research and innovation leads to suboptimal outcomes for patients and societies. Medicines are highly expensive, and few medicines of added therapeutic benefit come onto the market. EU policies often sanction this model: granting long monopolies, publicly financed innovation is often privatized, for example, and EU open-innovation pilot programs are weak. There are no requirements in EU funded programs of health research that data be released under open standards or meet social responsibility requirements.[36]

A commons perspective helps focus attention on a variety of feasible solutions-directing EU policies on R&D to open knowledge and collaborative innovation, exploring avenues to the use of incentive systems, where IP does not establish a barrier to use, while innovators are still rewarded. Additionally a commons perspective could inform how to address certain contradictions that form stumbling blocks for a strong coordinated approach. One important challenge is that of privacy regarding health data and how to reconcile that with the public benefits of open data policies. While highlighting the limits of 'open' as employed by the pharmaceutical industry, the view points towards solutions that keep the knowledge in the commons. The commons perspective also sheds light on problematic developments with industry pressure for early market access through for example adaptive licensing, where individual rights of patients are used to overrun the common good of high safety standards serving public health.

Fortunately, there are already quite a few initiatives and proposals that could produce medicines as a public good, putting them in the commons for all to use. An important principle is "de-linkage" – that is, models which delink the incentive to develop medicines from the expectation of high prices. The World Health Organisation (WHO) has hosted discussions about a variety of open source, collaborative and open knowledge initiatives that could complement or substitute for existing IPR-driven policies to stimulate innovation in medical technologies.[37] There are plenty of opportunities for the EU to move medical R&D in more constructive directions.[38] These include:

- EU policy could mandate socially responsible licensing (SRL) for EU funded biomedical research; especially in the implementation of R&D funding for the Horizon 2020 program, the European Research Area and the European Research Council. This would be a relatively easy and non-intrusive way to add biomedical knowledge to the commons. SRL encourages the non-exclusive or conditional licensing of patented technologies in order to encourage affordable access to medicines, instant generic competition and quicker follow-on innovation.[39] Good licensing practices such as social responsible licensing in early research stages are an essential tool to keep knowledge that is openly shared in the commons.

- EU policy could affirmatively require that the public receive greater direct benefits from EU-financed biomedical R&D. As an alternative to patent monopolies to stimulate investment, innovation inducement prizes could reward innovation for priority health needs while assuring open licensing and enhancing generic competition, greater affordability and widespread access. Current EU experimentation with innovation prizes is promising although still limited to small monetary quantities, and unfortunately not mandating the use of non-exclusive IPR licenses.[40]

- The EU could support open source research where results are treated as public goods, and Product Development Partnerships (PDPs) that are nonprofit and focus on delivering treatments for poor populations. It is important to demand that public-private partnerships to break with the present practice of allowing publicly financed research to be placed under private monopoly rights. The Innovative Medicines Initiative (IMI) which has seen heavy scrutiny by the European Parliament, is a prime example if this practice.

- Clinical trial data on the safety and efficacy of medicines must be publicly accessible in order to protect public health. At the European Medicines Agency (EMA) and in EU legislation, moves towards greater transparency and publication of all data are still being thwarted. An overly broad definition of trade secrets proposed in the new trade secrets directive should be avoided as this might undo the progress made towards transparency.[41]

- The EU should support the WHO Convention on Essential Health R&D, where countries invest in a sustainable system of medical innovation with adequate and predictable financing, to deliver products that are focused on the priority health needs. The Convention would create norms to ensure that the fruits of innovation and new medical products are accessible and affordable.[42]

A commons perspective could improve policymaking by emphasizing fundamental principles for advancing public health and taxpayer saving through transparency, efficiency, access, affordability and sustainability.

Climate Change and Green Technologies

If countries are to meet the challenges of climate change and defend or improve the living conditions of their populations, they must move away from fossil fuels and adopt sustainable green technologies. It is imperative that the EU and international bodies adopt policies to hasten the transition from highly centralized, non-participatory and extractive resource-intensive economies to ones that are more democratic, localized and stable with much slower material growth. While the EU has been a global leader with its proposed mandatory reductions of greenhouse emissions, its rigid IPR and knowledge governance systems have at the same time prevented the Global South from adopting more effective climate policies and aggravated North/South divisions. [v]

Patents can be an added serious deterrent factor in countries' efforts to make a transition to a sustainable mode of development with the help of green technologies.[43] Countries have not had the discretion or resources to tailor their IP systems to meet their specific needs or move towards climate change goals.

TESLA CARS: 'ALL OUR PATENTS BELONG TO YOU'

Tesla cars produces sustainable electrical cars and is based in Silicon Valley, California. The successful and innovative company has famously recognized the patent obstacles for the diffusion of green technologies to address the carbon crisis - and acted on it. In 2014 Tesla's CEO, Elon Musk, a blog post with the title 'all our patents are belong to you' declared the company was giving up all its patents ''in the spirit of the open source movement, for the advancement of electric vehicle technology''. Zero-emission vehicles account for less than one percent of the world's total new car production - to accelerate the advent of sustainable transport, keeping the technology behind a patent wall was not going to help.

''If we clear a path to the creation of compelling electric vehicles, but then lay intellectual property landmines behind us to inhibit others, we are acting in a manner contrary to that goal'' "..too often these days they serve merely to stifle progress, entrench the positions of giant corporations and enrich those in the legal profession, rather than the actual inventors".

A recent UN report on climate change urges the international community to consider a broad research exemption for experimental users and to authorize non-exclusive licensing to serve the public interest.[44] Indeed, socially responsible licensing and potentially compulsory licensing for green technologies could be important tools for increasing access to research and technology transfer for countries of the Global South.[vi] So could open-source research, collaborative scientific projects, open knowledge initiatives and patent pooling. The monopoly patenting of publicly funded research of green technologies can be especially problematic because it impedes the global diffusion of publicly financed technologies. The UN report concludes: "Various forms of incentives or subsidy provision are needed to correct market and coordination failures and to generate economies of scale. The international community, including the United Nations, may consider setting up a global fund to support R&D activities into new environment-friendly technologies and to promote their diffusion."

The United Nations COP talks that will culminate in December 2015 offer a prime opportunity to move in this more constructive direction. EU policymakers should make the necessary compromises to inaugurate a new knowledge commons of shared green technology and appropriate sustainability know how for all. The EU should orient toward the "climate commons" its Horizon 2020 program, the European Institute of Technology, the Joint Research Centre and the European Research Council with concrete policies of open knowledge sharing and North-South technology transfer to favor successful resilience in the face of climate change.

Science and Culture Commons

European copyright policy is a vital area of social and economic concern in which backward-looking, ineffectual policies are impeding the full potential of collaborative knowledge commons. As the former Digital Agenda Commissioner of the EU, Neelie Kroes, stated,

"Today the EU copyright framework is fragmented, inflexible and often irrelevant. It should be a stimulant to openness, innovation and creativity, not a tool for obstruction, limitation and control."

The new *EU Copyright Directive* now under discussion is an important focal point for discussion about the future of copyright policies in Europe. Its outcome will profoundly affect the vitality of scientific research, creative communities, economic performance and democratic culture. It will also determine how flexible, open and fair the copyright system will be – and how healthy or crippled countless knowledge commons will be.

Many vested interests in copyright industries would rather not see any change and will do anything to ensure that the scope of copyright exceptions and flexibilities remain limited.[45] However, it is important that the EU consider proposed legislation that would expand exceptions and limitations to include text and data mining; access to cultural materials for persons with disabilities; non-commercial sharing; user generated content; e-book lending and conservation by librarians. There is also a proposal to create a single digital market which could favorably impact the cross border flow of cultural works.

The harmonization of such changes throughout Europe is important because currently all European countries have slightly different laws; a harmonized copyright regime could greatly benefit consumers and creators, especially since licensing regimes across Europe are difficult and expensive to navigate for smaller enterprises, academics and noncommercial endeavors. Libraries are also limited by the current patchwork of rules and outdated copyright laws. They have vast collections that they can't preserve, store or share digitally: another instance of copyright law stifling rich opportunities. For a good overview of copyright and commons oriented proposals see the Communia Platform.[46]

One of the most promising vehicles for disseminating scientific knowledge and institutionalizing it as a commons is Open Access publishing. Instead of locking research behind Web paywalls, open access publishing models make this knowledge available to the public on the Web for free in perpetuity, under Creative Commons licenses. The EU´s research and innovation program Horizon 2020 has mandated an open access policy for all the academic projects that the EU finances,[47] but these goals could be encouraged much more broadly. In the same vein, Horizon 2020 is committed to promoting an *Open Data policy,* which should make datasets from EU-financed research progressively more accessible until it becomes the norm by 2020. The new Science 2.0 framework that is under consideration is another positive opportunity where the EU is aspiring to strengthen open, collaborative and flexible research ecosystems. The Commission's Open Innovation Strategy Group[vii] also embraces collaborative practices and with its narrative for Science 2.0, DG Research Innovation seems to be shifting towards an approach of knowledge sharing and embracing the benefits of broad access to knowledge: [48]

''It is now widely recognized that making research results more accessible to all societal actors contributes to better and more efficient science, and to innovation in the public and private sectors. In 2012, via a Recommendation, the European Commission encouraged all EU Member States to put publicly-funded research results in the public sphere in order to strengthen science and the knowledge-based economy."[49]

Yet, for now this narrative remains limited to open access publishing and pilots on open data. Copyright and patent monopoly challenges have not been addressed; there is no mentioning of non-exclusive licensing policies for example. Sharing knowledge or not sharing it starts in universities. Depending on the conditions of the grants, these huge EU funding programs, as well as other public funding, can have a profound effect on the culture of knowledge sharing in universities.

The World Intellectual Property Organization (WIPO) has become an important forum on the future of copyright law. Here, too, the EU has many opportunities, in cooperation with other Member States, to make scientific, creative, educational and cultural goods more accessible. Librarians from around the world, including the EU, have proposed that copyright exceptions and limitations should expand to include conservation, archives, orphan works, scientific research and e-book sharing. These policies would have enormous benefits for researchers, educators, scientists, authors, artists and ordinary citizens. And they are energetically supported as well by most the Global South, which consider such freedoms under copyright law an important part of the "*development agenda*."[50] This agenda has also led to a project on Open Collaborative Projects– according to Brazil "of great importance for developing countries, since it deals with one of the alternatives for the promotion of innovation without intellectual property protection, allowing for the creation of public goods in a cooperative fashion." [51] The EU, however, mostly opposes such proposals at WIPO.

The EU is aligned against these same interests in its support for the Broadcasting Treaty, now pending before WIPO. This treaty, that ostensibly aims at preventing "signal piracy," would give broadcasters a new layer of copyright protection and economic rights as intermediaries and distributors, at the expense of performers, authors and citizens in general.

One bright spot at WIPO is a new international treaty, *The Marrakesh Treaty to Facilitate Access to Published Works for Persons Who Are Blind, Visually Impaired or Otherwise Print Disabled*, which was agreed to in June 2013 after many years of discussions.[52] This internationally binding treaty is the first global instrument that incorporates human rights obligations into an international law that limits intellectual property rights. A number of countries have already ratified the Marrakesh Treaty, but EU ratification has been blocked to date, due to technical-political reasons. Prompt EU action is urgently needed to guarantee access for millions of blind persons to printed works.

Infrastructure & Democracy: Internet as a Commons.

The Commons approach insists on the protection of the Internet as a public space accessible to everyone. As an essential public infrastructure, it must be controlled by and managed in the interests of citizens. EU policies must therefore ensure equal, nondiscriminatory rights of access to the Internet; promote decentralization of Internet infrastructures; and protect the mix of commercial, public and social uses of the Internet. The central issue of the net neutrality debate is whether the Internet will continue to be managed as a mixed-use commons, or whether discriminatory tiers of service and market segmentation will transform the Internet into a predominantly commercial system for production and distribution. The important questions are: *Who controls the infrastructure? What are the terms and conditions under which the public gets access?* The organization of infrastructure has far-reaching implications for social policy and democratic principles as well as economic, competition and innovation policy.[53] [54]

A generally open Internet has supported an incredibly productive innovation system, posing low barriers to access and allowing for robust competition. Net neutrality is essential to sustaining this ecosystem.[55] In March 2015, the US Federal Communications Commission agreed with this general analysis when it formally classified Internet broadband service as a public utility that must be governed by principles of net neutrality. The current EU *Regulation on Telecoms Single Market (TSM)*[56] under consideration by the EU institutions has already gone through a contentious political process. In 2014, the European Parliament amended the regulation proposed by the Commission in 2013, establishing key principles of net neutrality. Unfortunately additions made in the Council in early 2015 subsequently undermined net neutrality.[viii] A 'trialogue' between the three EU institutions is meant to finalize the text, possibly already concluding it by summer 2015.

A related threat to the open Internet is the rise of network-based monopolies in different industry sectors. As noted earlier, "power law" dynamics are giving a few top players overwhelming market power – Amazon, Google, Facebook, Twitter as well as niche players such as Airbnb and Uber. These network intermediaries are structurally redesigning markets to serve their own interests at the expense of competition, innovation, consumer rights and privacy. The European Parliament was mindful of these dangers when it overwhelmingly approved a resolution in late 2014 calling for a possible breakup of Google, which now dominates 90% of all Internet searches, and action by DG Competition. This could be helpful, yet we also need initiatives to protect our collective interests that do not default to competition policy.

In an information commons we would expect all to be able to communicate and access information freely without being coerced into becoming some company's product. We would expect to be able to engage in peer-to-peer cooperation without monopoly rents being charged or personal information being extracted involuntarily. Besides protecting privacy, EU policy should address issues of ownership of data, the role of the market on the Internet and the encroachments of capital into everyday life. Instead of data ownership, storage and control being managed by central repositories, whether governmental or corporate, we need to give thought to the enhancement of data infrastructures that allow individuals and communities to manage personal information in decentralized ways and with the affirmative consent of users.[57] The *Data Protection Regulation*[58] now in the Council tries to address the privacy of citizens, but by it self, just focusing on privacy and not on ownership and governance, we will not succeed in moving away from the commodification of users.

Trade and the Knowledge Commons

EU trade policies on intellectual property affect access to medicines and climate technologies, educational materials, music and film, and technological development around the world. The EU produces a great deal of technological, scientific and cultural knowledge and seeks to protect this. However, enclosing shareable knowledge goods for the benefit of its own dominant industries should not be the EUs only vision regarding knowledge management globally. Meaningful technology transfer benefiting poor populations, and broad exceptions and flexibilities to copyrights and patent rights are essential to expand the knowledge commons and include poor populations in the global knowledge economy and its benefits.[59]

In 1994, WTO members set global standards on IP through the Agreements on Trade-Related Aspects of Intellectual Property Rights (TRIPS), effectively globalizing EU and US standards. Nevertheless, the EU in recent years has expanded the scope and enforcement of intellectual property rights across the globe. Trade agreements are the main instrument to this end. The EU is engaged with many bilateral negotiations, several of which have stalled as a result of clashes with emerging economy trading partners who resent the EUs ambition to expand IPR protections.[60]

In its revised *Strategy on the Protection and Enforcement of IPRs in Third countries* (July 2014), the EU sets out its vision and plans for the management of its knowledge assets globally. Reiterating the importance of knowledge-based industries, which play a core role in its 'Global Europe' and 'Europe 2020' strategies[61], it identifies IPRs as "a key driver for growth and innovation." This approach is replicated in the Transatlantic Trade and Investment Treaty (TTIP), where there are strong calls for further strengthening of IPRs and limiting data protection.[62] Despite perfunctory recognition of social justice and innovation concerns, the European Commission and big business lobbies remain dogmatically committed to IPRs as the guarantor of economic competitiveness. The *Strategy* cites statistics on the size of international trade in counterfeited and pirated goods, especially in the BRICS [ix], as a great threat and promises to withhold EU funding for developing countries that do not sufficiently police their populations on behalf of European multinationals.[63] No attention has been given to whether such policies of structurally excluding and criminalizing large parts of the world population, much of it poor, from participating in the global knowledge economy is sustainable or just – or how such countries could conceivably embrace the EU's stringent IPR policies.

One alternative on a global level proposed by civil society is a *WTO Agreement on Global Public Goods*, that would authorize the World Trade Organisation (WTO) to invite governments to voluntarily make offers and commitments for the supply of heterogeneous public goods.[64] For knowledge, these include health R&D, green technologies, open access journals, open textbooks and distance education tools, among other resources produced through collaborative commons. The proposed agreement would use the unique powers of the WTO to make these agreements enforceable and binding. In other words, WTO negotiations would not longer be exclusive about the private goods market or the enclosure of knowledge. There would be a structure and process for enabling greater knowledge sharing and its demonstrable benefits through larger, more organized types of global commons. The EU should consider supporting proposals such as this one in international bodies, which expand structural investments and institutional systems for developing global knowledge commons.

Conclusion: Here Come the Commons

The commons perspective has been gaining ground throughout Europe and the rest of the world. There is a growing recognition that traditional economic metrics are inadequate and that new socio-economic paradigms are emerging. We have seen, for example, a growing interest in Europe in "quality of life" or ''happiness" indicators as substitutes for conventional GDP metrics for measuring economic performance.[65] Innovative commons-based policies are emerging in Spain, Greece, Italy and other European nations, often in response to the economic crisis and austerity politics. In Italy, government/commons partnerships are leveraging citizen energies in new ways.[66] In Greece, proposed commons-oriented policies are recognizing the potential of peer production.[67] In France, a conference in April 2015 brought together leading law scholars and attorneys to explore European juridical strategies for the commons.[68] A path breaking initiative by the Government of Ecuador identified state policies that can support knowledge commons.[69] The first European Citizens Initiative has demanded that water be treated as a public good,[70] and in 2015, the European Parliament established a Commons Intergroup as part of the Parliamentary Intergroup on Common Goods and Public Services to explore new policy options.[71]

As an institution, though, the EU remains largely stuck in the twentieth century narrative that implies that GDP growth and innovation require strengthening exclusive property rights in knowledge – a view that is fiercely reinforced by strong corporate lobbies. The staunch commitment to maximizing IPRs in multilateral and bilateral trade negotiations has inspired bitter resistance among the BRICs countries and other emerging economies, deadlocking trade negotiations. They consider this agenda as a threat to their technological development and an unfair continuation of North/South inequalities. The defeat of the Anti-Counterfeiting Trade Agreement (ACTA) in 2012 is another clear indicator of how the EU's approach has been out of sync with user practices and international sensibilities.

Nevertheless, the EU has paid some attention to collaborative and open innovation approaches as a way to foster "public knowledge goods." Its Innovation Union Communication and Horizon 2020 R&D program, for example are both modestly engaged with open innovation ideas. In the Commission's current Science 2.0 proposal, open innovation features prominently and with a variation of plans to structurally support open science in the European Research Area(ERA). In discussions on its Digital Single Market strategy the EU alludes to the need for broad public access to digital services and user rights. Yet overall the EU has been very hesitant to entertain or implement serious new policies in these areas that change core narratives. It pays lip service, but when it comes to the actual concrete details not much remains. It certainly does not have a comprehensive vision or potent funding process for actually generating

new types of knowledge as a public good. Indeed, the EU is wary of even recognizing Internet infrastructure as a common good, as seen by its failure to adopt clear net neutrality regulations.

It is time to move on. The universe of knowledge-creation and usage has exploded. The burgeoning power of collaboration and sharing on open networks can no longer be denied. Their impact can be seen in countless arenas of social practice and economic activity – free and open source software, medical research, data sharing innovations, creative works from music to film to books, peer production in design and manufacturing, and much else. People no longer expect to live only as consumers in markets economies that create goods for them to buy. The people formerly known as the audience and customers have become creators in their own right, reaping benefits from the social sharing of their work. People crave the community and the ecologically attractive ways of life that it makes possible. They are eager to co-create and share goods rather than just own them. It is simply unrealistic if not willfully small-minded to regard commodified exchange as the only feasible or socially beneficial ways of making or using knowledge goods.

Social norms are one thing, legal design is another; Incumbent industry players continue to resist these new developments and dominate EU policymaking. But that is all the more reason why policymakers must articulate the long-term, best interests of society, beyond those of any individual corporation or economic sector. Will such views prevent the EU from embracing the future and its dramatic benefits? It is critical that we begin to imagine a different future – one that recognizes the great appeal and benefits of a commons approach. By providing a systems perspective, commons thinking points towards a variety of new solutions and approaches that would help the EU meet the needs of all of its citizens, help its economies become more competitive and innovative, develop more sustainable and harmonious international relations with EU trading partners, especially in the global South, and meet people's real needs in more efficient, effective ways.

Given the social needs that could be met through greater sharing of knowledge, the EU needs to ensure that knowledge is accessible as a public good (if not as commons), especially in the fields of health, environment and education. It also needs to protect against centralized corporate control of our knowledge infrastructure, and assure that the entire ecosystem of knowledge-production and distribution remains open and decentralized. There must be the structural space and legal protections for quasi-autonomous knowledge commons to thrive.

The agenda is clear and extensive: more nonexclusive and socially responsible licensing, open innovation programs, strong net neutrality rules, the decentralization and democratization of infrastructure, open data policies, a science commons infrastructure, and trade policies that promote knowledge sharing and technology transfer, especially for ecological needs. An agenda at the EU level to expand the knowledge commons might include:

Non-exclusive licensing. The EU should favor those forms of licensing for research that generate the highest possible social benefit, particularly when public funding is involved. Socially responsible or non-exclusive licenses on patents would enable broader, less expensive access to biomedical innovations as well as immediate follow up innovation by competitors. Another priority for which the same logic holds is the sharing of knowledge for green technologies to fight climate change. Mandatory open-access publishing rules and the use of Creative Commons licenses will also accelerate knowledge sharing.

New policies and institutions that support knowledge commons In light of the considerable benefits of collaborative sharing, the EU should develop new policies and types of institutions that support durable knowledge commons. Support for alternative incentives for biomedical research such as prizes, dissemination of green technologies, the use of patent pools and data-sharing, could also require new legal design, funding and the establishment of international frameworks.

Multilateral treaties or Conventions that promote common goods
Instead of using multilateral treaties solely to promote market exchange of private knowledge goods and the enclosure of knowledge, they could be designed to invest in R&D and promote knowledge sharing among countries, producing enormous social benefits for people through expanding the global knowledge commons.

Policies that recognize the Internet as infrastructure and Public Space Net neutrality regulation is one obvious way that policy can assure universal and affordable access to the Internet as a basic human right. Open standards for software and technical protocols are another way to treat infrastructure as a commons, spurring competition, better government procurement and greater democratic accountability. EU policy should also address issues of ownership of data, the role of the market on the Internet and the commodification of users.

We stand at a crossroads between a backward-looking regime of proprietary policies based on archaic economic models -- and a burgeoning new system that respects the power of innovation and social practices in open networks, inviting us to make the most of an emerging world of knowledge commons. EU policies can help to strengthen the relevant social, cultural and environmental work of tens of thousands of "knowledge commoners"- networks of innovative communities- around Europe. *They are part of* the structural environment that enables society to fully reap the benefits of knowledge sharing and collaborative production.

Let´s not miss this opportunity.

Endnotes

i) By "knowledge," we refer to "all types of understanding gained through experience or study, which includes scientific, scholarly and indigenous knowledge as well as music and the arts." (Elinor Ostrom and Charlotte Hess, *Understanding Knowledge as a Commons* MIT Press, 2007).

ii) A "power curve" embodies the principle of what is known as a power law distribution, in which a small number of people reap a disproportionate share of the benefits of a market (or other network-based activity) while the bulk of the participants receive very modest gains. This is sometimes referred to a "winner-take all" or 80/20 rule, in which 20 percent of participants reap 80 percent of the gains, and 80 percent of the people receive 20 percent of the gains. Power-curve distributions appear to describe structural inequalities produced on human networks, particularly on the Internet. David Bollier, "Power-Curve Society: The Future of Innovation, Opportunity and Social Equity in the Emerging Networked Economy," (Washington, D.C.: The Aspen Institute, 2013).

iii) Hardin's narrative contains a number of contentions that commons scholars have repeatedly found to be mistaken: (1) He was actually discussing open access rather than managed commons; (2) He assumed little or no communication among users of the resource; (3) He postulated that people at only in their immediate self interest (rather than assuming that some individuals take joint benefits into account, at least to some extent); and (4) He offered only two solutions to correct the tragedy – privatization or government intervention. (Elinor Ostrom and Charlotte Hess, *Understanding Knowledge as a Commons* MIT Press, 2007).

iv) One proposal for keeping the value created in the commons, under a certain governance is the CopyFair license ("commons-based reciprocity licenses)...CopyFair licenses will provide for the free use and unimpeded commercialization of licensed material within the Commons while resisting its non-reciprocal appropriation by for-profit driven entities, unless those entities contribute to the Commons by way of licensing fees or other means. (P2P Foundation, at http://commonstransition.org/commons-based-reciprocity-licenses/)

v) During the Climate talks in Lima 2014, India´s representative Ravi Prasad, elaborating on the issue of IPRs and technology transfer, said that developing countries are being offered a suite of technologies that have not been forthcoming. He said that developing countries need the assurance and the direction of the support from developed countries before providing their intended nationally determined contributions. "What India would like to see is a clear and supportive regime (in the Paris agreement) that provides for the technology transfer and finance necessary for developing countries to make the additional jump towards low carbon pathways." Report on South Centre-TWN Side Event at the UN Climate Conference in Lima (2014):

http://www.southcentre.int/south-centre-twn-side-event-perspectives-on-the-2015-paris-deal-options-on-the-road-from-lima-to-paris-1-december-2014/)

vi) Even though the developed WTO Member states are required under TRIPS to provide incentives to induce technology transfer to LDC Member states, to enable them "to create a sound and viable technological base," current EU tech transfer practices emphasize the transformation of knowledge into marketable, competitive products and the adoption of strict IPR standards. (See Suerie Moon, and HAI refs)

The role of technology in development has been explained by UNIDO as "a developed, innovating "North" and a developing, imitating "South." All countries initially grow by imitating and adapting existing technologies. As they approach the global "technological frontier", they move into innovation. One of the reasons that countries such as China and India can grow much faster than industrialised countries is that adapting existing technologies is much easier than creating new ones. United nations industrial development organization (2006), „The Role of Intellectual Property Rights in Technology Transfer and Economic Growth: Theory and Evidence", working paper, http://www.unido.org/fileadmin/user_media/Publications/Pub_free/Role_of_intellectual_property_rights_in_technology_transfer_and_economic_growth.pdf

vii) The EU's Open Innovation Strategy and Policy Group (OISPG) unites industrial groups, academia, governments, and private individuals to support policies for open innovation at the European Commission..

viii) Several EU member states pushed forward a proposal that radically shifted the direction as a result net neutrality has been undermined in the text: the proposal enables the creation of slow and fastlanes by allowing paid prioritization and discriminatory practices such as "zero-rating" schemes, it introduces loopholes that could authorize the blocking by Internet Service Providers of legal content. This is in contradiction with the right of expression of EU citizens, but also severely compromises competition and innovation in the EU digital economy." Access Now, https://www.accessnow.org/policy/Network-Discrimination-Europe

ix) BRICS refers to the new club of five emerging economies: Brazil, Russia, India, China and South Africa.

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