SciencesPo

CHAIRE DIGITAL, GOUVERNANCE ET SOUVERAINETÉ

Blockchain Technology as an Instrument for Global Governance

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1. The need for trust in governance

The COVID-19 pandemic has shown the limitations of the current global governance system. Existing governance institutions, both on a national and international level, have been unable to address this global health challenge in an efficient and concerted manner. Lack of strong political leadership in the early days of the pandemic was in part due to a tendency to focus more on the short-term rather than on the long-term implications of such a crisis. Political interventions in the latter stages of the pandemic have been elaborated at the national level— often in a non-concerted or downright confrontational manner—rather than seeking to collectively come up with large-scale interventions to address the pandemic in unison. Interventions have been geared mostly on individual confinements and national lock-downs, including international travel bans, without appropriately acknowledging the growing interdependence of modern societies, populated by transnational corporations and organisations, whose long-term sustainability depends on a considerable flow of capital, goods, services, and people across borders.

Finally, a few governments around the world (e.g. China, Singapore, Israel) adopted draconian measures enabling public authorities to track down the journeys of infected people as a means to reduce the spread of the virus (Li & Guo, 2020). Other governments (e.g. in the U.K. and several European countries) developed new smartphone applications using Bluetooth signals to detect device proximity, in order to support or even automate some of the contact tracing efforts. These measures—although successful to some extent in encouraging or promoting better social distancing practices—raise nonetheless important privacy challenges (Cho & al., 2020) and are often regarded with skepticism (Zhang & al., 2020; Simko & al, 2020) as they may lead to the establishment of a new surveillance regime that may persist even after the pandemic (Ponce 2020; Whitehead 2020). Hence, the current responses to the pandemic are likely to undermine the trust that people put in governments and public institutions, regarded as either ineffective or too oppressive in their actions (Elkin-Koren 2020). This is particularly problematic given that self-discipline and social commitment—which both require trust—are crucial elements to overcome this pandemic.

2. Increasing trust through confidence

The impact of blockchain technology on institutional and corporate governance has already been explored by a variety of scholars (De Filippi & Wright 2018, Werbach 2018, Reyes 2019) seeking to better understand how blockchain technology could contribute to increasing transparency and accountability in a variety of sectors. Major banks (*e.g.,* the *R3 consortium*)

have been experimenting with blockchains and distributed ledger technologies to bring more security and efficiency in the settlement of inter-banks transactions (Eyal 2017). *Nasdaq* launched the first blockchain-based trading system for private companies shares (Rizzo 2015), and securities brokers are currently exploring the technology's potential to expedite the trading of securities by reconciling settlement and clearing into one single step (Trautman 2016). The *Blockchain Insurance Industry Initiative* (B3I) is exploring the use of blockchains in the (re)insurance industry to guarantee more transparency, accountability, and auditability to the multiple actors involved in the complex (re)insurance value chain. In the public sector, Estonia was the first to recognize the potential of blockchains and distributed ledger technology for securing the operations of governmental agencies. In the past few years, many other governments are exploring these technologies' potential to improve the transparency, integrity, and efficiency of public administrations (Ojo & Adebajo 2017, Maupin 2017).

For instance, blockchain technology is often regarded as a means to increase transparency and traceability in the supply chain (Francisco & Swanson 2018). Several initiatives are emerging using blockchain technology to improve real-time tracking and logistics (*e.g.* http://origintrail.io), or to guarantee the traçeability and the provenance of specific goods or services at they travel from one side of the planet to the other (*e.g.* http://provenance.org). The same technology could be deployed as a global and decentralized database where relevant authorities could log and trace the spread of the pandemic in different countries. While there would be no guarantee that the information recorded on such a database is actually accurate or legitimate (this is generally known as the problem of "garbage-in garbage-out"), the non-censorability and non-repudiability of the information recorded on a blockchain would make it possible to always trace back the source of the recorded data, so as to at least discourage the intentional or negligent disclosure of inaccurate information. Further, a blockchain-based system could potentially be used also to keep track of the various tests—and, eventually, vaccines—delivered to people, making it possible for individuals to prove they have been tested without excessively impinging upon their privacy.

More generally, because of the higher degree of transparency and accountability it provides, the adoption of blockchain technology into the information system of public or private institutions could lead to greater confidence in their operations. First, the use of deterministic computation (via smart contracts) can increase the predictability of specific transactions (e.g. the repayment of a loan, or the disbursement of a payroll) by making it possible to determine *ex-ante* the rules and conditions under which these transactions shall or shall not be executed, with no possibility of interference from the parties at stake. Second, the recording of a specific set of data or information onto a blockchain (although in an encrypted format) will increase the verifiability of these data, by making it possible for the relevant authorities to verify *ex-post* the content these data (if needs be), with the guarantee that they could not have been manipulated by anyone. Accordingly, to the extent that they do not have the power to unilaterally modify or influence the operations of a blockchain-based system, the adoption of blockchain technology by public or private institutions makes it impossible for them to deviate from what they have committed to, or even just to act in an opportunistic manner that would go counter to the counterparty's interests or expectations. Ultimately, therefore, the technological guarantees of blockchain technology (in terms of, e.g. transparency, immutability, non-repudiability, etc.) may reduce the need for third-party's scrutiny and oversight over these institutions.

By enhancing the perceived confidence in the operations of both public and private institutions, blockchain technology can reduce the level of risk or vulnerability that is generally associated with trust.[1] As such, the technology could indirectly contribute to increasing the level of trust that people may be willing to confer in these institutions, because of the higher degree of predictability associated with their actions. Indeed, thanks to blockchain technology, people would no longer need to trust these institutions *in toto*, but only to the extent necessary for them to carry on these specific operations that cannot be codified into the formal and deterministic language of a blockchain-based system.

3. Addressing interdependence

The widespread adoption of blockchain technology could have important implications on corporate and institutional governance, bringing more transparency and accountability to create more confidence and trust in public or private institutions. But what is the potential impact of this technology on a broader societal scale? While the benefits of blockchain technology have been thoroughly analysed from a sectoral perspective (in terms of e.g., financial applications, supply chains management, impact assessment, philanthropy, etc.), still too little attention has been paid to analysing whether the principles of distributed consensus and bottom-up coordination elaborated within the blockchain space could be transposed in the global arena to support the resolution of global challenges in a more concerted and coordinated manner. In particular, it has yet to be understood whether blockchain technology could facilitate greater coordination and cooperation amongst a variety of institutions that do not know or trust each other, without the need to establish an overarching entity or organisation in charge of coordinating the activities of these different parties.

We live in an increasingly interconnected world, yet we lack proper mechanisms of international or even transnational coordination (Keohane 1998). Existing multilateral organisations, such as the United Nations, the G20, the World Trade Organisation (WTO) or the World Health Organisation (WHO) are limited in their *scope*—as they only involve state actors, at the exclusion of large corporate actors and non-governmental organisations that are assuming a significant role in the global arena (Cohen 2019, pp. 202-237)—and *legitimacy*, as they are often accused of being poorly managed and not sufficiently accountable to their mission (Lenz & Viola 2017), or muddled with conflicts of interest (Martin 1992)—sometimes to the point of being regarded as an instrument of American hegemony (Falkner 2005). These organisations also have limited *effectiveness*, since they ultimately rely on domestic policy

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[1] Drawing from Luhmann's distinction between "trust" and "confidence" (Luhman 2000), we refer here to "confidence" as a set of expectations about the operations of a person or system, based on personal experiences or inductive knowledge about the way the world works. We refer instead to "trust" as the act of delegating power to a third party as a result of insufficient knowledge or excessive complexity for carrying on the task at the individual level. Hence, as opposed to confidence—which is based on rational expectations and predictability—trust necessarily involves some degree of risk or vulnerability, as it requires taking a leap of faith as regard the trustee's good intentions to act in the trustor's best interest.

decisions and national enforcement mechanisms, which have become increasingly fragmented over time (Raustiala 2000). These and other issues have led to the emergence of a series of overlapping initiatives and institutions (see e.g. China's attempt to work around the existing—mostly U.S.-led—international order with the creation of new multilateral institutions, such as New Development Bank, the Shanghai Co-operation Organisation and the recently inaugurated Asian Infrastructure Investment Bank) competing for influence and authority over a range of transnational issues, ultimately leading to a further fragmentation of the global governance landscape (Benvenisti & Downs 2007; Biermann & al. 2009).

While global interdependencies provide many opportunities for cultural and economic growth, they also introduce multiple points of failure that might propagate errors across multiple social and economic systems (Balsa-Barreiro & al. 2020). We have witnessed the breadth of this problem with the recent developments in the spread of the covid19 pandemic, where failure of even a single country to counter the spread of the virus has led to the emergence of a global health crisis—followed by a social and economic crisis. The problem is that, given the high level of interdependence, and the rapid pace at which people, products and information travels from one side of the planet to the other, many issues that were previously specific to one particular country or jurisdiction are rapidly acquiring a global footprint. These global challenges cannot be addressed from an independent standpoint (i.e. from the perspective of a single entity or nation state) because any domestic action will have important repercussions at the global level. Yet, they also cannot be collectively addressed through the existing arrangement of multilateral organisations or bilateral agreements, in that they have failed at providing an effective mechanism of global coordination.

If neither an individualized approach nor a multilateral arrangement can cope with such a high degree of global interdependencies, one possible solution would be to rely on a centralized coordination system. This would mean the establishment of a global governance institution, *i.e.* a transnational superpower which—unlike the United Nations—would actually possess some degree of coercive power, and would therefore be able to enforce its decisions onto third parties, with regard to both public and private actors. Although theoretically more effective than the current model of multilateral rules and institutions, in practice, such a solution would, however, introduce a single point of failure and control, which may ultimately go counter to the established principles of global governance and international law.

On the opposite side of the spectrum, an alternative solution would be to reduce interdependence, *i.e.* to "deglobalize" by limiting the number of connections—or the strength of these connections— while progressively trying to build more resilience at the local level. This is what happened, in part, during the covid19 pandemic, as many countries implemented a national lock down, closing their borders to the rest of the world as an attempt to limit the spread of the virus. This form of fragmentation exhibits some features of decentralization. Yet, as Harari (2020) suggests, this is a form of "decentralization without trust". The focus is on avoiding the problems caused by global interdependencies by getting rid of these interdependencies altogether, instead of trying to find ways to accommodate them.

The most appropriate solution probably lies in between these two extremes, with a resilient and trustworthy governance system that actually embraces (rather than rejects) interdependence; one that supports and encourages cooperation amongst multiple interrelated parts, so that global challenges can be addressed collectively, through a

decentralized yet coordinated approach. If, during the covid19 pandemic, all countries had acted in a concerted manner, and western countries had gathered more knowledge and insights from the more experienced eastern countries—e.g. China, Hong Kong and South Korea, which already had to cope with the previous SARS outbreak—before enacting their own domestic measures; if governments from all over the world had reacted expeditiously at the national level, while coordinating their responses at the global level to ensure a consistent and complementary set of domestic actions, perhaps it would have been possible to contain the spread of the virus before it turned into a pandemic. Most importantly, if the benefits of global interdependencies had been put into fruition, with governments collaborating more closely with one another, not only through the sharing of medical data and laboratory results, but also through the provision of crucial medical equipments, including masks, gloves, respirators, or even medicines and treatments, perhaps the healthcare systems of many countries would have not reached saturation and the number of deaths from the pandemic would have been drastically reduced. Last but not least, if governments had engaged into closer collaboration with large multinational corporations, private companies and non-governmental organisations, and better acknowledged the role that private actors could play in addressing the pandemic; if they had all participated to the elaboration of a collective plan to help reduce the spread of the virus, ensuring that everyone's efforts complement each other and ultimately converge towards the achievement of a common objective, perhaps we would have a achieved a better allocation of resources to fight the pandemic. And if governments had actually solicited relevant market players and civil society organisations to contribute to the fulfillment of 'sovereign functions' like the preservation of public health and safety, as well as the provision of communal benefits for the fostering of economic and cultural life, then perhaps the social and economic crisis that ensued from the pandemic would have had a lesser impact on the lives of many.

4. Blockchain technology for polycentric governance

Achieving the vision described above would require a more holistic approach to global governance —one that properly accounts for the needs and interests of all relevant stakeholders (both public and private actors). This would also call for a better understanding of the mutual interdependencies at play within the global ecosystem—in terms of social, economic, and political relationships—so that global governance challenges can be addressed collectively, in a coordinated yet decentralized manner. Such an approach to governance is akin to what Ostrom (1999, p.57) described as a *polycentric* system: one where multiple independent parties make mutual adjustments for ordering their relationships with one another, within a general system of mutually agreed-upon rules.

However, as Ostrom (2000) would point out, decentralized yet coordinated action may be difficult to achieve without proper monitoring or enforcement. Monitoring is necessary to ensure that all actors remain accountable to each other and continue to act in accordance with the general system of rules they have agreed to. In a centralized setting, this is generally

referred to as "surveillance". Enforcement is necessary to ensure that all actors who diverge from these rules will be sanctioned, and potentially even banned or excluded from the system. This is usually referred to as "policing".

Blockchain technology provides a decentralized solution to precisely both of these challenges. While decentralized monitoring would be problematic as it would require an excessive degree of transparency, with an ensuing invasion of privacy for all of the participants, the same benefits can be achieved in a decentralized setting by means of *ex-post verifiability*, using blockchain technology to record (proofs of) information in an encrypted and tamper-resistant manner—so that the information does not have to be disclosed to the public, but the content and integrity thereof can subsequently be verified by the relevant third parties (Rozas & al. 2018). Enforcement—which is generally done *ex-post (i.e.* after the fact)—can be achieved in a decentralized setting by means of *ex-ante automation*, using a system of smart contracts for the trusted execution of specific agreements, automatically executed by the underlying technology (De Filippi & Hassan 2016).

Accordingly, the benefits of blockchain technology for global governance are essentially twofold. Through *ex-post verifiability*, blockchain technology could increase confidence in the operations of public and private institutions, restoring the trust level conferred to these institutions while simultaneously reducing the need for global scrutiny and oversight. Through *ex-ante automation,* the use of blockchain technology could facilitate new forms of cooperation amongst these different institutions, providing for a trusted and coordinated mechanism of bottom-up collaboration that does not rely on any centralized superpower or other trusted authority.

Yet, to achieve the kind of *polycentric governance* described above, there would need to be a common framework or infrastructure on top of which such decentralized mechanisms of *ex-ante* automation and *ex-post* verification can be built. This would require all relevant stakeholders to agree upon a common set of rules governing their interactions with one another—a "*global social contract*" of some sort (Inoguchi 2017). Such an agreement would have to be voluntary and consensual, but also universal in scope—encompassing all relevant actors (public or private) from different sectors of activity. While this may be difficult to achieve with standard international law tools, this is precisely where blockchain technology may come in handy. A consortium blockchain collectively maintained and governed by all relevant stakeholders could potentially serve as an ideal framework for implementing such a global social contract—enabling all parties to pre-define the rules that will govern their interactions on a voluntary and consensual basis, while ensuring that these rules will be automatically enforced by the underlying technology (De Filippi & Wright 2018).

Although there are still few empirical data on the benefits of blockchain technology for corporate and institutional governance (due to the limited adoption of the technology in existing institutional settings), the feasibility of blockchain technology for global coordination is already being explored with a few pilot projects, including the *European Blockchain Service Infrastructure*[2] designed to provide a EU-wide cross-border platform for digital services deployed by the public sector, and eventually private actors; and the United Nations' World

[2] The European Blockchain Services Infrastructure is an initiative of the European Commission intended to deliver EU-wide cross-border public services: https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/EBSI

Food Programme's *Building Blocks* pilot, leveraging blockchain technology to promote interoperability amongst multiple UN agencies and other third-party humanitarian organisations, creating new opportunities for global coordination and cooperation, while decreasing the amount of fragmentation and unnecessary (*i.e.* redundant) data collection.[3] At the same time, the World Intellectual Property Organisation (WIPO) established a working group to explore potential uses of blockchain technology in the global IP ecosystem, while the G7 *Cryptocurrency* task force is investigating the feasibility of using blockchain technology and stable coins to improve the efficiency and lower the cost of global payments and financial services worldwide, without undermining the stability of the global financial system.[4]

More broadly, the use of blockchain technology is fostering new relationships between public and private actors, which could not have been otherwise achieved through traditional means. Due to the greater level of confidence, transparency and accountability it provides, the adoption of consortium blockchains for global coordination could potentially reduce, or even eliminate, the need for centralized oversight — therefore making it possible for multiple actors to collaborate on issues that had previously only been addressed through government regulation or market forces alone (Rozas & al., 2018).

By providing the necessary tools for self-governance at multiple levels of interaction, consortium blockchains could become an essential element in the creation of "polycentric systems" capable of solving complex problems on a global scale. Every node in the network—be it a public or a private actor—would have equal say in defining the manner in which such a shared infrastructure will be maintained and governed. Yet, each network node would also remain subject to the laws and regulations of the jurisdiction in which it resides or operates, thus allowing governments to (albeit indirectly) influence the operations of such a global and decentralised infrastructure.

To conclude, while blockchain technology is not the solution to all global governance challenges, it does nonetheless provide a powerful framework for achieving decentralised yet coordinated action at scale—one that could be instrumental in tackling some of the most pressing issues we face today.

More research is needed to understand the full potential of blockchain technology in the field of global governance. Insight from international law and global governance scholars (Hewson & Sinclair 1999; Coen & Pegram 2018) could help us investigate how existing blockchain solutions for institutional governance—such as public blockchains, consortium blockchains, or even private and permissioned blockchains—could be adapted to support the coordinated actions of a variety of public and private actors (e.g. market players, governmental agencies, civil society organisations, etc.) participating in a global and polycentric system of governance (Polanyi 1951, Ostrom 1999).

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[3] The *Building Block* pilot demonstrates how several organizations can collaborate on a shared blockchain network to assist the same people. Although only a few UN agencies are currently part of the pilot, the model is meant to serve as a blueprint for broader collaboration at the global level. See Wang & De Filippi (2020)

[4] See the G7 Working Group on Stablecoins (2019) "Investigating the impact of global stablecoins," available at https://www.bis.org/cpmi/publ/d187.pdf

Key Recommendations:

- *Short term:* **Encourage public and private institutions to adopt blockchain technology in order to increase confidence and trust by means of technological guarantees.**

  The adoption of blockchain technology could help restore public confidence and trust in existing governance institutions, to the extent that they would submit their operations to a series of technological guarantees that they cannot deviate from. For instance, by recording specific transactions onto a transparent, immutable and tamper-resistant public ledger, these institutions would be precluded from denying the occurrence of such transactions, or even from claiming that an unrecorded transaction has actually occurred. Similarly, the recording of the fingerprint (or *hash*) of a document onto a blockchain constitutes a non-repudiable proof that the party signing the transaction had access to that document at a particular point in time, and that the content of that document has not been manipulated over time. This makes it possible for third parties to subsequently verify the integrity and authenticity of such a document, without having to reveal its content until the point in which verification is needed—in line with the data minimization principle of the GDPR. Increased confidence could also be achieved through the use of smart contracts as a means to facilitate, verify and enforce the performance of an agreement between two or more parties. Indeed, to the extent that the terms of such an agreement can be properly codified into a smart contract, the corresponding transactions will be automatically executed by the underlying blockchain network, thus eliminating the need for third-party intermediaries or trusted authorities. It should thus come as no surprise that a variety of private companies and fiduciary institutions have been investigating ways in which they could use blockchain technology and smart contracts to make their operations more secure and predictable.[5]

- *Medium term*: **Encourage innovation in the blockchain space by promoting the use of blockchain technology for regulatory compliance**.

  Policy makers could recognise the potential of blockchain technology for regulatory compliance and encourage its use in a more general manner by publishing guidance documents that outline how existing legal requirements

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[5] See e.g. AXA's flagship experiment (*Fizzy*) using a blockchain to provide "smart insurance" with automatic compensation, with a view to reduce claim times and hassle for passengers experiencing flight delays.

can be met through the use of blockchain-based solutions. Indeed, the technological guarantees of a blockchain-based system (in terms of transparency and accountability) could help achieve specific policy or regulatory objectives, by technological means rather than legal means. For instance, audits and reporting requirements for financial institutions like banks and insurance companies are usually quite burdensome and costly; a blockchain-based solution would allow for real-time audit and reporting capabilities at no additional costs, with a lesser need for oversight due to the higher reliability of the information provided.

Policy makers could further promote innovation in the blockchain space by inviting private and commercial actors to explore the use of blockchain technology as a regulatory technology (*regtech)*. Regulators could, for instance, encourage existing institutions to adopt a variety of blockchain-based solutions for greater regulatory compliance, by providing a lower regulatory burden (e.g. fewer formalities or less stringent criteria to fulfill) provided that the technological guarantees they provide are recognised, by the regulators themselves, as "functionally equivalent" to existing legal requirements or constraints.

- *Long term*: **Foster the implementation and progressive adoption of shared blockchain infrastructures for public services that extend beyond national boundaries.**

  If global challenges are to be addressed in a coordinated manner, it is crucial to have a common infrastructure which constitutes the backbone of selected public services. The European Union is already working on the implementation of such a solution with the European Blockchain Partnership. This partnership, which involves all EU Member States and members of the European Economic Area, is aimed at building a European Blockchain Services Infrastructure to deliver EU-wide cross-border public services. These services currently include notarisation services, academic accreditation, identity management and trusted data sharing.[6]

  Ideally, similar initiatives would emerge in different regions of the world, using a shared infrastructure that is governed in a distributed manner by all relevant

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[6] Although still at a prototypical stage, currently explored uses cases include: *notarisation services*, using blockchain technology to produce trusted digital audit trails with guaranteed data integrity; *education certificates* relying on blockchain technology to easily verify the source and authenticity of diplomas and other academic credentials; *self-sovereign identity,* combining blockchain technology with certified credentials to allow citizens to create and control their own cross-border identity without relying on any centralized authority; and *trusted data sharing,* leveraging blockchain technology to securely share data (e.g. VAT identification numbers and import one-stop-shop) amongst the various customs and tax authorities in the EU. For more details, see: https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/EBSI

stakeholders. Instead of relying on a centralised authority in charge of managing a centralised platform, such a shared infrastructure could be built as a consortium blockchain that is managed, collectively, by multiple governmental authorities—each operating a node within the network—along with relevant stakeholders, such as international organisations and NGOs operating in a particular sector of activity. Such a shared infrastructure would make it possible for public services to operate across borders and for governments to respond more effectively by collaborating with one another in a concerted manner and on a level-playing field—without sacrificing their sovereignty to the whims of a higher-level organisation.

Taking the pandemic as an example, a shared blockchain-based infrastructure could be deployed across multiple countries for the issuance of immunity passports and certificates, in accordance with a particular protocol, in order to facilitate the free movement of people within a particular geographic area. This could be done through the establishment of a consortium blockchain, maintained by a variety of national health agencies and other relevant authorities, in collaboration with the WHO and other health-related organisations operating at the national or international level. This blockchain-based infrastructure could be used to verify the validity and the integrity of such documents, making it possible for all relevant parties to check whether these certificates have been issued by an authorised authority, and—most importantly—to verify they have not been revoked in the meantime.

More generally, when applied on a global scale, blockchain technology has the potential to facilitate many types of cross-border interactions. Yet, more research is needed to assess how the technology can help tackle other challenges that transcend national boundaries, such as climate change,[7] global supply chain management[8] or the fight against tax evasion.[9]

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[7] Several proposals have been brought forward, using a distributed ledger to keep record of carbon gas emissions, and issue "*impact tokens*" to all those contributing to reducing them (Chamberlain, 2019; Chen, 2018). See e.g., the IXO Foundation, using blockchain technology to help governments and other relevant authorities to disburse funds linked to specific achievements in social impact and verified impact outcomes.

[8] See Francisco & Swanson (2018); Kshetri (2018); Hackius & Petersen (2017); Apte & Petrovsky (2016).

[9] See Wang (2020); Faccia & Mosteanu (2019); Houben & Snyers (2018); Stanley-Smith (2016).

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Primavera De Filippi is a permanent researcher at the National Center of Scientific Research (CNRS) in Paris, a faculty associate at the Berkman Klein Center for Internet & Society at Harvard University, and a Visiting Fellow at the Robert Schuman Centre for Advanced Studies at the European University Institute. Her research focuses on the legal challenges and opportunities of blockchain technology and artificial intelligence, with specific focus on governance and trust. She was a founding member of the Global Future Council on Blockchain Technologies at the World Economic Forum, and co-founder of the Internet Governance Forum's dynamic coalitions on Blockchain Technology (COALA).

Primavera is the author of the book "Blockchain and the Law," published in 2018 by Harvard University Press (co-authored with Aaron Wright) and she was recently awarded a € 2M research grant from the European Research Council (ERC) to investigate how blockchain technology can help improve institutional governance through greater confidence and trust, and how it can contribute to global governance. In addition to her academic research, Primavera acts as a legal expert for Creative Commons and is part of the stakeholder board of the P2P Foundation. As an artist, she produces mechanical algorithms that instantiate her legal research into the physical world, such as the Plantoid project (http://plantoid.org).

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