

Research Article

Legal Positivism and Natural Law in the Age of Algorithms: Hart and Fuller in the Digital Frontier

Md Ikra^{1,*} , Fahim Faisal Khan Alabi^{2,3} 

¹Department of Law, Bangladesh University of Professionals (BUP), Dhaka, Bangladesh

²Barrister-at-Law (of Inner Temple, UK), Black & White Law House, Dhaka, Bangladesh

³Department of Law, Faculty of Arts and Social Sciences, American International University, Dhaka, Bangladesh

Abstract

The debate between H.L.A. Hart and Lon L. Fuller is one of the most important discussions in legal philosophy. Hart argued that law is mainly a system of rules created and recognized by state institutions, and that law can exist separately from morality. Fuller, on the other hand, believed that law must contain certain moral qualities, such as clarity, consistency, and fairness, in order to be considered legitimate. Today, rapid technological development and the rise of decentralized digital systems have created new challenges for both theories. Technologies such as blockchain, cryptocurrencies, smart contracts, and Decentralized Autonomous Organizations (DAOs) allow communities to create and enforce rules without relying on governments or traditional legal systems. This paper examines whether the moral ideas within Hart's and Fuller's theories can still survive in a digital and post-sovereign world where many competing systems of rules exist outside state control. The paper uses a doctrinal and qualitative research method. It analyzes Hart's *The Concept of Law* and Fuller's *The Morality of Law* together with recent scholarship on digital governance, legal pluralism, and decentralized technologies. The paper argues that both theories still remain partly relevant, although they face serious limitations in decentralized environments. Hart's theory is useful for explaining how communities accept and follow shared rules, even without a central authority. Fuller's theory is especially relevant because decentralized systems often depend on clear, transparent, and predictable procedures to maintain trust among users. However, both theories struggle to explain legitimacy and morality in global digital communities where people follow different values and where no single sovereign authority exists. The paper concludes that modern legal theory must move beyond traditional state-centered ideas of law and develop more flexible approaches suitable for decentralized and technology-driven governance systems.

Keywords

Legal Positivism, Decentralized Governance, Post-Sovereignty, Legal Pluralism, Digital Law

*Correspondence: Md Ikra (ikra@bup.edu.bd)

Received: 2 May 2026; **Accepted:** 12 May 2026; **Published:** 16 May 2026



Copyright: © The Author(s), 2026. Published by Science Publishing Group. This is an **Open Access** article, distributed under the terms of the Creative Commons Attribution 4.0 License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

1. Introduction

The 20th-century debate between H.L.A. Hart and Lon L. Fuller remains a cornerstone of legal philosophy, often framed as a contest between legal positivism and natural law theory. Hart's legal positivism asserts that law is a system of rules established through social facts and institutional authority, distinct from moral considerations [16]. In contrast, Fuller contends that legality is intrinsically moral; the internal morality of law is essential to its legitimacy [12]. This foundational divide in legal thought is now confronted by a radically different legal and political terrain. In what some scholars term a post-sovereign world, the traditional supremacy of nation-states is increasingly undermined by the rise of transnational actors, decentralized autonomous organizations (DAOs), blockchain-based governance systems, and globally networked online communities. These formations create alternative normative orders that challenge the primacy and legitimacy of state-centric legal frameworks [32].

In such contexts, governance often occurs without centralized authority, and legitimacy is derived through code-based consensus, open-source rules, or community recognition rather than state-sanctioned legal systems. For example, smart contracts on blockchain platforms enforce rules autonomously without invoking any formal legal system [37]. These developments demand a reevaluation of the assumptions embedded in both Hart's and Fuller's theories [18, 23].

Accordingly, this paper seeks to answer the following research question: Can the moral assumptions embedded in both Hart's legal positivism and Fuller's natural law theory survive in a digitalized, post-sovereign world where decentralized communities generate competing normative orders outside traditional legal frameworks? This paper argues that while the digitalized, post-sovereign world poses profound challenges to the moral foundations of both Hart's and Fuller's theories, elements of their thought remain relevant. Hart's insistence on the separation of law and morality offers a descriptive clarity suited for understanding decentralized norm systems devoid of explicit moral aims. Meanwhile, Fuller's attention to the procedural virtues of law offers a critical framework to assess the legitimacy of emerging rule systems beyond state control. Understanding how these theories interact with decentralized legalities is essential for reconceptualizing law in a time when sovereignty is increasingly fragmented. To address this research question, the paper adopts a purely doctrinal and qualitative methodology. Doctrinally, it engages in close textual analysis of primary legal-philosophical sources, principally Hart's *The Concept of Law* (1961) and Fuller's *The Morality of Law* (1964), situating their arguments within the broader jurisprudential tradition. Qualitatively, the paper draws on theoretical literature across legal philosophy, digital governance, and political theory to evaluate how decentralized normative orders.

2. Hart's Moral Assumptions and Their Survival

H.L.A. Hart's theory of legal positivism rests on the foundational assumption that law is a system of rules created and recognized by a centralized sovereign authority. In *The Concept of Law*, Hart emphasizes that legal systems consist of both primary rules (which govern conduct) and secondary rules (which provide mechanisms for creating, interpreting, and enforcing primary rules), all validated by a central "Rule of Recognition" [16]. This rule is a shared standard among officials that identifies valid legal norms and anchors the authority of the legal system. Hart's framework implicitly assumes the presence of a state-like sovereign structure: a centralized authority capable of enforcing rules, recognizing officials, and maintaining institutional continuity. This assumption becomes deeply problematic in digitalized, decentralized environments [43]. Platforms like Bitcoin or Ethereum operate without a centralized authority, yet function according to precise rules encoded into their infrastructure. Their governance does not derive from sovereign enactment but from broad-based consensus and protocol adherence [29]. These phenomena illustrate the shift toward "algorithmic governance," where law-like norms are embedded in code rather than enacted through sovereign political processes [2]. Consequently, the absence of a traditional sovereign challenges Hart's concept of a unified Rule of Recognition and raises questions about how legal validity and authority are constituted in such distributed systems [9].

The difficulty legal positivism faces in these settings is the absence of a unified or institutionalized Rule of Recognition. There is no parliament, court, or government body authoritatively declaring which rules are valid or invalid. Instead, legitimacy emerges through collective adherence to code, community forking practices, and informal norms. Such fluid, pluralistic norm systems are difficult to classify within Hart's model, which depends on hierarchical, state-centered rule validation [1, 25, 26]. Nevertheless, Hart's theory is not entirely obsolete in this context. His analysis of law as a social practice offers an interpretive lens to understand decentralized normativity. If one reads the Rule of Recognition more flexibly as a form of communal recognition rather than state-imposed validation, then decentralized communities like open-source software projects or DAOs may exhibit similar structures. Their members adhere to shared norms, recognize rule creators, and enforce standards informally or through automated mechanisms [10]. In this sense, Hart's attention to "acceptance from the internal point of view" may be extended to these communities, where norms gain authority from collective internal recognition. However, Hart's theory reaches its limits where enforcement and finality collapse. Without centralized dispute resolution or ultimate authority, many decentralized orders lack the juridical coherence Hart's model presumes. Legal positivism may adapt descriptively to capture some elements of decentralized legalities, but it struggles to normatively account

for legitimacy when sovereignty is dispersed or absent [21, 37, 42].

3. Fuller's Moral Assumptions and Their Survival

Lon L. Fuller's theory of natural law is rooted in the idea that legality is not merely about rule-following but about fulfilling certain moral requirements inherent to the concept of law itself. These include generality, publicity, clarity, consistency, non-contradiction, possibility of compliance, constancy through time, and congruence between official action and declared rule [12]. To Fuller, these procedural principles form the "internal morality of law," without which legal systems become arbitrary and fail to guide human behavior effectively.

In a digitalized, post-sovereign context, where decentralized systems operate without traditional state authority, Fuller's framework takes on renewed relevance. Platforms such as blockchain-based systems or smart contracts exhibit high degrees of transparency, consistency, and other traits Fuller regarded as fundamental to legitimate law. Smart contracts, for instance, execute rules automatically and predictably, minimizing the discretion and arbitrariness Fuller criticized in opaque legal systems [40, 41].

In fact, one could argue that the ethos of decentralized systems is inherently Fullerian. These environments rely on procedural legitimacy rather than sovereign command. Users must trust the code not because it is morally good in a substantive sense, but because it is knowable, predictable, and enforceable aligning precisely with Fuller's vision of legality. The axiom "code is law," popularized in crypto-legal discourse, encapsulates this procedural turn: legitimacy stems not from political authority but from the structural integrity of the system [23, 37, 42]. Moreover, decentralized orders demand a new kind of legal trust one based not on institutions, but on algorithms. This procedural trust echoes Fuller's insistence that the rule of law is a matter of form as much as substance. In contrast to Hart's emphasis on social rules validated by official recognition, Fuller's model appears more naturally extensible to decentralized networks. These systems often surpass traditional law in fulfilling the criteria of legal morality Fuller envisioned [3-6, 45].

However, Fuller's theory still assumes a shared normative commitment to legality, which may be lacking in decentralized ecosystems where participants act out of economic incentive, not moral duty [6, 7, 11]. In these cases, legality may function mechanically without genuine normative engagement. Thus, while Fuller's internal morality remains highly relevant, especially where procedural rigor is paramount, its moral dimension may be diminished in code-based environments governed more by logic than by justice [3, 13-15]. Despite the apparent compatibility between Fuller's procedural ideals and the architecture of decentralized legal systems, his

theory faces a key tension in the globalized digital environment: the assumption of shared moral goals [16]. Fuller's internal morality presupposes a baseline of common ethical commitment that legal actors are not only adhering to procedures but doing so in pursuit of just, communal purposes [18, 19]. However, in decentralized, transnational networks, no such moral consensus is guaranteed [11, 24, 27].

Digital communities (from blockchain collectives to metaverse governance structures) often operate under vastly different value systems. Some prioritize libertarian autonomy, others focus on collective decision-making, environmental goals, or market efficiency. In such an ethically fragmented terrain, the question arises: whose morality prevails? Fuller's model assumes a degree of normative homogeneity that is difficult to sustain when communities across the globe enact conflicting codes of conduct based on divergent moral frameworks [24, 27-29, 46]. Moreover, procedural morality in decentralized systems can become detached from substantive justice. A system can be transparent, predictable, and internally coherent and yet enforce rules that are exploitative, discriminatory, or harmful. For example, automated smart contracts have been used to enforce exploitative terms in decentralized finance (DeFi), all while maintaining procedural integrity. This reveals a potential blind spot in Fuller's framework: a focus on form over the content of justice, which may not suffice in morally diverse ecosystems [27, 31, 33, 34].

Still, Fuller's emphasis on legality as a normative process remains more resilient than Hart's institutional model in these settings [36]. Even in the face of moral relativism, the procedural aspects of law clarity, consistency, and reliability remain foundational for legitimacy in decentralized spaces [32]. Yet without shared moral aspirations, Fuller's vision risks becoming a merely technical standard rather than a moral one [33].

3. Competing Normative Orders

The digital age has given rise to competing normative orders that function independently of traditional legal systems. These alternative structures including cryptocurrencies, online platforms, and Decentralized Autonomous Organizations (DAOs) challenge conventional notions of legality, legitimacy, and governance by operating outside the purview of state sovereignty. Cryptocurrencies like Bitcoin and Ethereum exemplify this shift. These technologies do not merely facilitate transactions; they create self-contained normative frameworks for financial interaction. Through consensus mechanisms and immutable code, they define and enforce rules for trust, ownership, and exchange roles traditionally fulfilled by central banks and regulatory authorities [34]. These systems are transnational by design and unresponsive to national jurisdictions, making them both resistant to state control and difficult to classify within standard legal taxonomies [30].

Similarly, online platforms such as Reddit, Wikipedia, and GitHub function as semi-autonomous governance spaces.

These platforms establish their own norms and rule-enforcement mechanisms through community guidelines, moderation protocols, and banning powers. These mechanisms while lacking legal enforceability in a formal sense are nonetheless deeply normative, shaping behavior and resolving disputes. Users often treat platform rules as binding, and violations can result in real-world consequences, such as reputational damage or loss of access [13]. In effect, these platforms create quasi-legal environments governed by what some scholars call "platform law" [38].

DAOs push this logic even further. These are digitally native, code-governed organizations that manage assets, vote on decisions, and enforce outcomes through smart contracts all without a traditional legal entity or centralized leadership. Governance is encoded into the platform itself, and decisions are executed automatically when quorum and consensus thresholds are met. Legal recognition of DAOs remains uncertain, but their operational coherence and billions in assets under management illustrate their growing normative power [33, 39]. DAOs challenge the Westphalian legal model by demonstrating that organized, rule-based governance can occur without territorial jurisdiction, elected officials, or state-sanctioned authority [8, 9, 17].

These systems illustrate the emergence of functional legality rule-based behavior, enforced through technical or communal means, that fulfills many roles of traditional law without fitting into its formal definitions [15]. They pose fundamental challenges to Hart's and Fuller's theories, both of which assume some form of central authority, shared normativity, or institutional structure. In these decentralized environments, normative orders are both plural and competitive, responding to new forms of legitimacy grounded in code, consensus, and community [8].

What unites cryptocurrencies, online platforms, and DAOs is their defiance of the foundational assumptions that underscore traditional state-centric legal models [1]. They do not operate within territorially bounded jurisdictions [45], nor do they rely on centralized enforcement, legislative authority, or a shared moral framework. Instead, they are structured around dispersed authority, algorithmic enforcement, and voluntary association features that strain the interpretive capacity of both Hart's legal positivism and Fuller's procedural natural law [39, 40]. From Hart's perspective, these systems challenge the very basis of legal validity. Hart's model hinges on a recognized "Rule of Recognition" upheld by officials within a unified sovereign legal system [16]. But decentralized communities lack both officials and sovereignty. There is often no clear hierarchy, no final arbiter, and no institutional rule-maker whose authority is uncontested. The fragmentation of authority in these systems disrupts Hart's central premise: that legal systems are institutional and structured around official recognition and enforcement [25, 26, 28, 29].

Fuller's framework faces a different but equally significant difficulty. While many decentralized orders adhere to proce-

dural standards such as publicity, consistency, and clarity often more rigidly than state systems they lack a unified moral purpose. Fuller's theory presumes that law is a purposive enterprise aimed at facilitating responsible human agency within a morally coherent community [13]. But decentralized systems are ideologically heterogeneous. One DAO may prioritize radical financial autonomy, another may center social justice, while yet another might function purely for speculative gain. This moral fragmentation undermines Fuller's assumption that the internal morality of law presupposes a broadly shared ethical commitment [6, 11, 17]. Furthermore, these systems often include participants from divergent legal traditions, cultures, and ethical orientations. As such, they instantiate legal pluralism the coexistence of multiple, overlapping legal orders within the same space [24]. In these environments, the boundary between law and non-law becomes porous. Norms that may appear "legal" to one community may seem merely technical or contractual to another. As a result, both Hart's positivism and Fuller's natural law theory each grounded in a unified concept of law encounter interpretive instability when applied to these pluralist, fragmented domains.

In essence, these digital normative orders do not merely supplement traditional legal systems; they expose their conceptual limits. They operate legally, but not always as law has been traditionally understood. To analyze them effectively, legal theory must evolve beyond sovereignty, uniform morality, and centralized institutions.

4. Hart-Fuller Revisited

Hart's legal positivism offers valuable tools for descriptively analyzing emergent rule systems in decentralized contexts. His focus on law as a social practice, particularly the notion that rules are accepted from an "internal point of view," allows for a flexible reading of how communities recognize and follow shared norms [7]. This conceptual openness means that decentralized digital environments such as open-source communities, cryptocurrency networks, or DAOs can be described in Hartian terms, insofar as they exhibit rule-following behavior and community-level recognition [14]. However, Hart's framework falters when confronted with the problem of legitimacy in leaderless, post-sovereign systems. In traditional state-based law, legitimacy stems from political authority, institutional recognition, and the Rule of Recognition a standard shared among officials for identifying valid legal norms. Yet in decentralized systems, there are often no "officials" in Hart's sense, nor is there a centralized institution to define or enforce the Rule of Recognition. Instead, legitimacy emerges from practices like consensus mechanisms, forking procedures, or informal reputational hierarchies mechanisms Hart's framework was not designed to explain [15, 28, 29].

Furthermore, Hart's theory provides little normative guidance in distinguishing between rule systems that are merely effective and those that are just. In leaderless systems, where

governance is conducted by code or crowd, the source of normative legitimacy why participants ought to follow the rules is unclear. Hart deliberately separates law from morality, which creates descriptive clarity but leaves a normative vacuum in environments where traditional authority structures are absent [10, 22]. For example, if a DAO implements exploitative economic mechanisms through smart contracts all while adhering to the community's accepted protocols Hart's theory might classify these as valid "laws" in a sociological sense, but cannot account for their moral or political legitimacy. This limitation is particularly acute in global, pluralist digital spaces, where enforcement, recognition, and authority are not centralized but constantly contested [35, 40, 41].

Ultimately, while Hart's model remains useful for mapping how decentralized rules emerge and operate, it lacks the conceptual tools to fully grasp the legitimacy of rule systems that are not rooted in sovereign command [31]. The legal pluralism and ethical fragmentation of the digital world demand more than descriptive jurisprudence; they require normative criteria for evaluating governance in stateless contexts [22].

4.1. Fuller's Framework and Moral Disagreement

In contrast to Hart, Fuller's natural law theory emphasizes the internal morality of law the procedural virtues such as clarity, consistency, publicity, and congruence between rules and official actions. This procedural framework better captures the normative dimensions of decentralized governance systems [5], which rely heavily on transparent, predictable, and consistent rule enforcement to maintain trust among participants [39]. Decentralized actors, whether in blockchain networks, DAOs, or online communities, often demand procedural fairness to legitimize their rules and decisions. The automatic execution of smart contracts or algorithmic enforcement exemplifies Fuller's ideal of laws that are publicly known, stable over time, and generally applicable [17, 37]. Such procedural rigor is vital to sustaining cooperation and coordination where formal legal institutions are absent [8, 9]

However, Fuller's framework encounters significant challenges in addressing moral disagreement within pluralistic digital environments. His theory presupposes some degree of shared moral purpose underpinning the procedural rules [12]. Yet, decentralized communities frequently consist of actors with divergent values, goals, and ethical commitments. For instance, one DAO may prioritize open access and democratic governance, while another may focus exclusively on maximizing financial returns, even at the expense of equity or environmental concerns [20]. This moral pluralism strains Fuller's assumption that procedural morality alone suffices to ground the legitimacy of law. When fundamental ethical conflicts exist, procedural compliance may not guarantee justice or acceptance. The "internal morality" of law, while necessary, is insufficient to resolve deep normative disputes in decentralized, globalized spaces [4, 46]. Moreover,

procedural legitimacy can be hollow if it masks substantive injustices or exclusionary practices coded into governance protocols. Thus, while Fuller's focus on procedural morality survives well in decentralized settings, it becomes strained without mechanisms for addressing substantive moral divergence and conflict [45].

4.2. The Challenge of Decoupling Law from Territorial Sovereignty

A significant limitation shared by both Hart's and Fuller's theories is their implicit assumption that law is inseparable from territorial sovereignty. Hart's legal positivism is built upon the idea of a sovereign authority with a monopoly over the creation and enforcement of law within a defined geographical domain [16]. Fuller's natural law theory similarly presumes a moral community bounded by shared norms and mutual recognition, which traditionally coincides with political borders [12]. The emergence of digital, decentralized governance fundamentally disrupts this territorial nexus. Normative orders created by blockchain networks, DAOs, and transnational online communities operate across borders, without reference to any single sovereign jurisdiction. This decoupling of law from territory introduces a novel challenge: how to conceptualize legal authority and legitimacy when geographic boundaries no longer anchor normative systems [44].

Neither Hart nor Fuller fully predict or accommodate this phenomenon. Hart's Rule of Recognition presupposes identifiable officials and institutions within a sovereign state, which decentralized networks lack [21]. Fuller's internal morality assumes a unified moral community, difficult to sustain in transnational, culturally diverse digital environments [4]. Consequently, both theories confront a fundamental conceptual gap when applied to normativity that transcends or bypasses traditional state sovereignty [2, 21]. This gap calls for new jurisprudential models that recognize legal pluralism and networked governance as intrinsic features of contemporary law. These models must grapple with legitimacy grounded not in territorial power but in procedural trust, consensus, and technological enforcement. The decoupling of law from sovereignty thus marks a paradigm shift that neither Hart nor Fuller could fully anticipate, challenging the core of classical jurisprudence [23].

5. Conclusion

This paper has explored the resilience of the moral assumptions embedded in Hart's legal positivism and Fuller's natural law theory within a digitalized, post-sovereign world characterized by decentralized normative orders. Neither Hart's sovereign-centered framework nor Fuller's assumption of a coherent moral community fully survives intact in these contexts. The erosion of territorial sovereignty, the emergence of leaderless communities, and the pluralism of normative commitments challenge the foundational premises of both theories.

Nonetheless, Hart's emphasis on rules accepted from the internal point of view continues to offer a valuable descriptive lens for understanding how decentralized communities establish norms and maintain order. Similarly, Fuller's procedural morality provides critical insight into the necessity of transparency, consistency, and generality in rule-making processes that undergird legitimacy, even absent state authority.

As decentralized governance and transnational digital communities proliferate, future legal theories must move beyond the limitations of state-centered models. They need to embrace flexibility, legal pluralism, and forms of network-based legitimacy that recognize the multiplicity of normative orders coexisting without hierarchical sovereignty. Integrating sociological, technological, and normative dimensions will be crucial to reconceptualizing law and legitimacy in an increasingly fragmented and code-governed world.

Abbreviations

DAOs	Decentralized Autonomous Organizations
DeFi	Decentralized Finance

Author Contributions

Md Ikra: Conceptualization, Writing – original draft

Fahim Faisal Khan Alabi: Writing – original draft, Writing – review & editing

Conflicts of Interest

The authors declare no conflicts of interest.

References

- [1] Atzori, M. (2015). Blockchain technology and decentralized governance: Is the state still necessary? *Journal of Governance and Regulation*, 4(1), 45–62. https://doi.org/10.22495/jgr_v4_i1_p5
- [2] Balkin, J. M. (2014). The three laws of robotics in the age of big data. *University of Chicago Law Review Online*, 82, 111–122.
- [3] Benkler, Y. (2006). *The wealth of networks: How social production transforms markets and freedom*. Yale University Press.
- [4] Besson, S. (2016). *The authority of law: Essays on law and morality*. Oxford University Press.
- [5] Bygrave, L. A., & Kuner, C. (2019). *Data protection law: Approaching its rationale, logic and limits*. Kluwer Law International.
- [6] Christin, N. (2017). Decentralized autonomous organizations and the problem of legitimacy. *Journal of Institutional Economics*, 13(2), 291–314. <https://doi.org/10.1017/S1744137416000437>
- [7] Coleman, J. (2016). The practice of principle: In defense of a pragmatic approach to legal theory. Oxford University Press.
- [8] De Filippi, P. (2020). Blockchain technology and the law: The rule of code. In P. Boucher (Ed.), *Law and technology in the digital age* (pp. 45–68). Routledge.
- [9] De Filippi, P., & Hassan, S. (2016). Blockchain technology as a regulatory technology: From code is law to law is code. *First Monday*, 21(12). <https://doi.org/10.5210/fm.v21i12.7113>
- [10] Feldman, D. (2019). *Law and language: Theory and practice*. Cambridge University Press. Finck, M. (2020). *Blockchain regulation and governance in Europe*. Cambridge University Press.
- [11] Freeman, M. D. A. (2020). *Law and morality in a globalizing world: The challenges of normative pluralism*. Routledge.
- [12] Fuller, L. L. (1964). *The morality of law*. Yale University Press.
- [13] Gillespie, T. (2018). *Custodians of the internet: Platforms, content moderation, and the hidden decisions that shape social media*. Yale University Press.
- [14] Green, L. (2017). *The authority of the law: Essays on law and morality*. Oxford University Press.
- [15] Hacker, P., & Thomale, C. (2018). Crypto-securities regulation: ICOs, token sales and cryptocurrencies under EU financial law. *European Company and Financial Law Review*, 15(4), 645–696. <https://doi.org/10.1515/ecfr-2018-0031>
- [16] Hart, H. L. A. (1961). *The concept of law*. Clarendon Press.
- [17] Hassan, S., & De Filippi, P. (2021). Blockchain and decentralized governance: Toward a new social contract? *Social Science Research Network*.
- [18] Kaal, W. A., & Vermeulen, E. P. M. (2018). Blockchain technology and the securities market: Towards a disruptive change in financial markets. *Fordham Journal of Corporate & Financial Law*, 23(1), 1–44.
- [19] Katyal, N. K. (2001). Digital architecture as crime control. *Yale Law Journal*, 112(9), 2261–2288. <https://doi.org/10.2307/1562356>
- [20] Klabbers, J. (2020). *An introduction to international institutional law*. Cambridge University Press.
- [21] Kreutner, K. (2020). Beyond legality: The law of blockchain. *Columbia Journal of Transnational Law*, 58(3), 519–584.
- [22] Leenes, R., Lucivero, F., Milne, R., & Van den Hoven, J. (2017). Regulatory challenges of robotics: Some guidelines for addressing legal and ethical issues. *Law, Innovation and Technology*, 9(1), 1–44.
- [23] Lessig, L. (2006). *Code: Version 2.0*. Basic Books.
- [24] Michaels, R. (2009). Global legal pluralism. *Annual Review of Law and Social Science*, 5, 243–262. <https://doi.org/10.1146/annurev.lawsocsci.093008.131504>
- [25] Postema, G. J. (2011). Hart's Rule of Recognition and the System of Law. In J. Coleman & S. Shapiro (Eds.), *The Oxford Handbook of Jurisprudence and Philosophy of Law* (pp. 205–238). Oxford University Press.

- [26] Postema, G. J. (2011). Legal positivism and the moral aims of law. *Oxford Journal of Legal Studies*, 31(1), 1–24. <https://doi.org/10.1093/ojls/gqq016>
- [27] Raskolnikov, A. (2022). Smart contracts and moral blindness. *Columbia Business Law Review*, 2022(1), 1–52. <https://cblr.org/2022/01/raskolnikov-smart-contracts/>
- [28] Reijers, W., & Coeckelbergh, M. (2019). Governance of blockchain technology: Taking stock and prospects. *Philosophy & Technology*, 32, 337–361.
- [29] Reijers, W., O’Brolcháin, F., & Haynes, P. (2016). Governance in blockchain technologies & social contract theories. *Ledger*, 1, 134–151. <https://doi.org/10.5195/ledger.2016.56>
- [30] Rosanvallon, P. (2019). *The society of equals*. Harvard University Press.
- [31] Sartor, G. (2021). Legal informatics and the future of law. *Artificial Intelligence and Law*, 29, 123–140.
- [32] Sassen, S. (2006). *Territory, authority, rights: From medieval to global assemblages*. Princeton University Press.
- [33] Schuster, E. (2023). The DAO as a new legal form: On-chain governance and emergent legal personhood. *Stanford Journal of Blockchain Law & Policy*, 6(1), 1–42.
- [34] Scott, B. (2016). How can cryptocurrency and blockchain technology play a role in building social and solidarity finance? United Nations Research Institute for Social Development. <https://www.unrisd.org/blockchain>
- [35] Troncoso, C., Preneel, B., & Verbauwheide, I. (2017). Anonymous cryptocurrencies. *Foundations and Trends in Privacy and Security*, 1(1), 1–88.
- [36] Twining, W. (2009). *General jurisprudence: Understanding law from a global perspective*. Cambridge University Press.
- [37] Van der Hof, S., De Filippi, P., & Wright, A. (2019). Blockchain as a new regulatory technology: From code is law to law is code. *Internet Policy Review*, 8(4).
- [38] Van Dijck, J., Poell, T., & De Waal, M. (2018). *The platform society: Public values in a connective world*. Oxford University Press.
- [39] Wallach, W., & Allen, C. (2020). *Moral machines: Teaching robots right from wrong* (2nd ed.). Oxford University Press.
- [40] Werbach, K. (2018). *The blockchain and the new architecture of trust*. MIT Press.
- [41] Werbach, K., & Cornell, N. (2017). *Contracts ex machina*. *Duke Law Journal*, 67(2), 313–382. <https://scholarship.law.duke.edu/dlj/vol67/iss2/3>
- [42] Wright, A. (2018). Blockchain governance: Programming our future. *Philosophy & Technology*, 31(3), 413–428. <https://doi.org/10.1007/s13347-017-0279-0>
- [43] Wright, A., & De Filippi, P. (2015). Decentralized blockchain technology and the rise of lex cryptographia. *SSRN Electronic Journal*.
- [44] Zheng, Z., Xie, S., Dai, H., Chen, X., & Wang, H. (2018). Blockchain challenges and opportunities: A survey. *International Journal of Web and Grid Services*, 14(4), 352–375.
- [45] Zittrain, J. (2008). *The future of the internet and how to stop it*. Yale University Press.
- [46] Zurn, C. (2021). *The moral and political thought of the contemporary world*. Oxford University Press.