Title: Which Disputes for Decentralized Justice? A Functional Typology of Cases Fit for Blockchain-Based ADR/ODR Platforms

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Abstract:

This article explores the limits and potential of decentralized dispute resolution platforms by developing a functional typology of disputes that are suitable for resolution in such environments. While these blockchain-based systems promise low-cost, transnational, and automated justice, they are not universally applicable to all kinds of legal conflicts. The article classifies disputes across several axes, including their legal nature (commercial vs non-commercial), complexity and value (small vs large), digital context (on-chain vs off-chain), procedural structure (simple vs fact-intensive), and party configuration (bilateral vs multilateral). Each category is evaluated in light of enforceability, procedural fairness, and compatibility with smart contract. The analysis reveals that while many disputes, especially those arising from digitally native transactions, may be apt for such platforms, others raise serious concerns regarding due process, public policy, and legal recognition and enforcement of awards or decisions. The article proposes a set of suitability criteria and emphasizes the need for hybrid or adaptive procedural models. This typology contributes to the growing academic and regulatory discourse on decentralized justice and offers guidance for platform designers, policymakers, and legal scholars.

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1. Introduction

The emergence of blockchain-based dispute resolution platforms has raised numerous legal questions that continue to be examined with growing attention by scholars at the intersection of technology and dispute resolution. One such critical question concerns the types of disputes that are suitable for submission to these decentralized platforms. While these mechanisms offer innovative procedural advantages, it is clear that not all disputes possess the legal or technical aptitude to be effectively resolved through such novel systems.

This paper adopts a legal and functional analytical approach to clarify this ambiguity by proposing a structured categorization of disputes along five distinct axes. Each category is assessed against a set of suitability, regulatory, and technical criteria to determine the extent to which it can be managed by decentralized justice platforms. In cases where a dispute type fails to meet these thresholds, two outcomes are considered: either the matter must be referred to traditional forums of adjudication (on-chain resolution included), or it may be resolved through a hybrid mechanism combining elements of both decentralized and conventional dispute resolution models.

1.1 Context and Problem Statement

Over the past decade, blockchain technology has moved from a niche innovation to a foundational infrastructure in sectors ranging from finance to governance. Within this shift, decentralized dispute resolution platforms, notably Kleros, have emerged as novel tools aimed at addressing disputes in a decentralized, autonomous, and cross-border fashion. These platforms promise low-cost, efficient, and transparent processes, often involving smart contracts, oracles, and crowdsourced jurors.

Despite their technological appeal, these mechanisms raise a pressing legal question: Which types of disputes are legally and practically suitable for such platforms? This question has gained relevance as decentralized platforms seek recognition not only within crypto-native communities but also in broader regulatory and judicial systems. However, the boundaries of their legal applicability remain unclear, particularly with regard to arbitrability, procedural fairness, and the enforceability of outcomes.

Thus, the central problem this paper seeks to address is the lack of a structured, functional classification of disputes appropriate for resolution by blockchain-based ADR/ODR platforms. Without such a framework, users, developers, and regulators face uncertainty about the proper scope and legal viability of decentralized justice systems.

1.2 Structure of the Paper

This paper is organized into six sections, following a logical progression from conceptual foundations to applied legal analysis. After the introduction, which outlines the context and problem statement, the second section provides a technical and legal overview of decentralized dispute resolution platforms. It explains their core procedural features, underlying technologies, and how they can be differentiated from traditional

ADR/ODR mechanisms, thereby laying the groundwork for the typological analysis that follows.

The third section constitutes the analytical core of the paper. It develops a functional typology of disputes across five axes: legal nature, scale and complexity, digital context, procedural structure, and number of disputants. Each category is examined in light of its legal and technical suitability for resolution on decentralized platforms.

The fourth section proposes a set of evaluation criteria, both legal and technical, to assess whether a given dispute type may be appropriately resolved through blockchain-based mechanisms. It also considers the extent to which current regulatory frameworks can accommodate such platforms.

The final section concludes the paper by summarizing the main findings, highlighting the normative and practical relevance of the proposed typology, and identifying areas for further research and regulatory development.

2. Decentralized Justice Platforms: Conceptual and Technical Framework

2.1 Definition and Key Features

As a delimitation of this section, it should be noted that the analysis presented herein is primarily grounded in the structure and operational model of Kleros, the first and most well-known decentralized dispute resolution platform, which remains at the center of attention in legal tech scholarship. The paper focuses on Kleros to outline the key definitions, fundamental mechanisms, juror incentivization processes, and decision-making procedures that characterize decentralized justice. Other emerging models of private digital adjudication, although conceptually related, are excluded to the extent that their design diverges significantly from the Kleros framework and falls outside the scope of the issues addressed in this study[1]. Nonetheless, the general observations and typological analysis proposed in the following sections remain applicable to the broader category of decentralized justice platforms, even when these newer platforms have not yet reached the level of maturity or prominence necessary to warrant their own systemic treatment.

Decentralized dispute resolution platforms are blockchain-enabled, on-chain systems to which parties may refer specific disputes for settlement and final determination[2].

[1] BUCHWALD, A. (2020) SMART CONTRACT DISPUTE RESOLUTION: THE INESCAPABLE FLAWS OF BLOCKCHAINBASED ARBITRATION, University of Pennsylvania Law Review, Volume 168; J.D. (While each currently available application differs from its peers in certain key respects, every application flows from the same basic premise: arbitration that incorporates a blockchain is the most effective method for resolving disputes that arise on a blockchain. In practice, this means that emerging Ethereum platforms such as Kleros, JUR, Aragon Network Jurisdiction, and OpenCourt enable contracting parties to precode an option for ex-post, fully decentralized arbitration).

[2] Kleros Short Paper v1.0.7, Cl´ement Lesaege, Federico Ast, and William George, September 2019: (Kleros is a decentralized application built on top of Ethereum that works as a decentralized third party to arbitrate disputes in every kind of contract, from very simple to highly complex ones. It relies on game theoretic incentives to have jurors rule cases correctly. The result is a dispute resolution system that renders ultimate judgments in a fast, inexpensive, reliable and decentralized way).

These platforms function through mechanisms such as juror crowdsourcing[3], whereby randomly selected and anonymous participants adjudicate cases in a binary format (e.g., yes/no, win/lose)[4]. The adjudication process is further structured through game-theoretic incentives, particularly the Schelling Point theory[5], which encourages jurors to vote in alignment with what they believe others will choose. Jurors are typically required to stake platform-specific tokens in advance, and they are rewarded or penalized based on the extent to which their decisions align with the majority, thereby reinforcing consistency and discouraging manipulation[6].

2.2 Distinction from Traditional ADR/ODR

One might consider, first, the common grounds of both decentralised platforms and the traditional ADR/ODR platforms. The decentralised platforms share some basic elements with classic ADR/ODR mechanisms required for constitution of a simple private adudication. To name a few, non-judicial nature, party autonomy, efficiency and flexibility goals and the potential for rendering binding decisions or awards can be observed in each method. The establishement of a virtual platofrm on the headstock of internet is anohter exsting similarity between decetralised and the more well-known ODR settlement. However, these assimilations come to an end once the decesion making process of each category concerns whether a decentralized or centralized approach is adopted.

The traditional ADR/ODR platforms and the decentralized ones are distinguished, however, in several critical aspects; namely, the mode of governance (centralized institutional oversight versus distributed, protocol-based systems), the anonymity and crowdsourcing of adjudicators (where traditional systems rely on appointed and identifiable arbitrators or mediators, while decentralized platforms engage pseudonymous jurors selected algorithmically), and the integration of blockchain infrastructure and crypto-economic incentives. Unlike conventional mechanisms, decentralized platforms utilize smart contracts and game-theoretic models, to guide

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[3] For more computational information: Yudian Zheng, Reynold Cheng, Silviu Maniu, and Luyi Mo, On Optimality of Jury Selection in Crowdsourcing, *Department of Computer Science, University of Hong Kong, Pokfulam Road, Hong Kong,* 2015 pp. 193-204

[4] Alesia Zhuk, Applying blockchain to the modern legal system: Kleros as a decentralised dispute resolution system, *International Cybersecurity Law Review (2023) 4:351–364*. (This system is efficient in binary disputes where parties have only two options to choose from. However, in non-binary disputes, each side may have a different opinion, such as a "yes if" statement).

[5] Florence Guillaume and Sven Riva, Blockchain Dispute Resolution for Decentralized Autonomous Organizations (2023): The Rise of Decentralized Autonomous Justice, (Kleros developers have explicitly referred to economic theories such as game theory when designing their dispute resolution mechanism. The main economic mechanism used currently is the Schelling Point (or focal point). The Schelling Point is, in game theory, a solution to which the participants in a game who cannot communicate with each other will tend to adopt because they think that this solution presents a characteristic which will make the other participants choose it too. Under this theory, "if everyone expects everyone else to vote truthfully, then their incentive is to also vote truthfully in order to comply with the majority, and that's the reason why one can expect others to vote truthfully in the first place).

[6] However, some forms of manipulation is possible in blockchain-based dispute resolution, such as "Sybil Attack" or 51% attack to deviate the judgement of its right path. See, Yannick Gabuthy, Blockchain-Based Dispute Resolution: Insights and Challenges, *Games 2023, 14, 34.* https://doi.org/10.3390/g14030034 (Several mechanisms have been proposed to prevent such attacks. For example, Kleros uses its own token (i.e., the Pinakion) which is considered as a protection against Sybil attacks: an attacker wishing to flood the juror pool would have to buy enough PNK to be selected a high enough number of times as a juror in the same case to be able to alter the outcome. This means that the attacks needs 51% of the total staked tokens (knowing that the price of a token increases with demand). It remains true, however, that the absence of an identity validation mechanism does not allow preventing some manipulations to occur, such as unobservable agreements or coalitions.

juror behavior, replacing legal ethics and professional standards with incentive engineering. Moreover, procedural guarantees that are standard in traditional ADR, such as the right to be heard, the ability to present evidence, or to appeal decisions, are often absent or structurally modified in shape and formalities in decentralized systems. This leads to legitimate concerns regarding fairness, due process, and legal defensibility. Additionally, the recognition and enforcement of decisions marks another key difference: while traditional arbitral awards benefit from established frameworks like the New York Convention, the enforceability of blockchain-based outcomes remains uncertain as far as off-chain recognition and enforcement of the awards are concerned[7], often relying on reputational pressure or voluntary compliance rather than formal legal remedies[8]. These cumulative distinctions shape the legal, practical, and ethical boundaries of decentralized dispute resolution in contrast to its traditional counterparts.

2.3 Legal and Procedural Constraints

This section moves the discussion from functional and structural comparisons to the core legal challenges that decentralized platforms face in real-world application. While the promise of low-cost, efficient, and borderless dispute resolution is compelling, these mechanisms encounter several legal and procedural hurdles that cannot be overlooked. First, one of the primary issues is the absence of legally binding procedural safeguards. Unlike traditional ADR, decentralized platforms often lack codified rules of procedure governing the conduct of proceedings, admissibility of evidence, timeframes, and the right to representation. This can raise concerns about the integrity of the process and the protection of parties' fundamental procedural rights, particularly in disputes that involve asymmetrical power relationships, or multilateral counterparty arrangements with more than two disputants or even third parties.

Second, the anonymized nature of jurors and the absence of identifiable decision-makers make it difficult to guarantee accountability, which is a cornerstone of any legitimate dispute resolution process. There is no mechanism to challenge herd behavior[9], bias (particularly in cases where certain professions or business are involved), conflict of interest, or procedural irregularities in a meaningful way. While the logic of decentralization aims to reduce central control and improve impartiality, it may paradoxically undermine procedural legitimacy when parties are left without recourse to due process measures indispensable for securing a fair trial.

Finally, there are inconsistencies between these emerging systems and existing legal orders. Courts or state institutions asked to recognize or enforce decisions from such platforms may question whether the process meets minimum standards of due process,

[7] Matthias Lehmann, The New York Convention's Borderline. Blockchain Arbitration and Artificial Intelligence, *Transforming Arbitration. Exploring the Impact of AI, Blockchain, Metaverse and Web3, RADBOUD UNIVERSITY PRESS (2024),* (It is doubtful whether this model is sufficient to qualify BA processes as 'arbitration' under the New York Convention. As a matter of fact, many of the features of the new type of dispute resolution are at odds with the Convention's provisions).

[8] Florence Guillaume and Sven Riva, (Reputational risk has proven to be an effective means of addressing the lack of enforceability of the outcome of ODR s. However, in BDRs, reputational risk is found in the decision-making process, not in the enforcement of the decision…. However, this does not mean that the reputation of the disputing parties is not likely to be tainted in proceedings submitted to BDR).

[9] Herd behavior, where individuals in a group adopt the same actions and beliefs, is also known as herd mentality, mob mentality, or crowd mentality. These terms all describe the phenomenon of individuals conforming to group norms, often at the expense of their own judgment.

including the right to be heard and the impartiality of decision-makers, let alone the evidence taking process and matters of legal jurisdiction and competency[10]. Without a reliable link to jurisdiction, or a clear legal basis for authority and enforcement, these platforms remain in a legal gray area, particularly when the disputes involve parties from different national systems with varying degrees of openness to technological innovation in legal processes.

In summary, while decentralized platforms offer a novel procedural framework, they currently lack many of the legal assurances that make dispute resolution both credible and enforceable.

3. Typology of Disputes: A Functional Approach

This section proposes a functional typology of disputes suitable for resolution through decentralized blockchain-based platforms. Rather than adopting a purely doctrinal or technological lens, the approach here is grounded in practical suitability, evaluating the legal, procedural, and technical characteristics that make certain categories of disputes more apt for such mechanisms. By examining disputes through axes such as legal nature, monetary value, digital context, procedural complexity, and number of parties involved, the aim is to provide a structured framework to assess which types of cases decentralized platforms can realistically and legitimately handle, and under what conditions.

3.1 By Legal Nature: Commercial vs Non-Commercial Disputes

Before delving into the specific merits of commercial versus non-commercial disputes, it is essential to address whether non-commercial disputes are, in principle, referable to decentralized platforms at all. In many jurisdictions, the question of arbitrability serves as a threshold criterion, determining which types of disputes can be validly submitted to alternative forums such as arbitration or ADR. Non-commercial disputes, particularly those involving family law, status-related claims (e.g., citizenship, capacity), or certain public interest matters are often considered non-arbitrable due to their close connection to the state's sovereign interests or the need for judicial oversight[11]. These disputes are typically viewed as falling within the exclusive jurisdiction of national courts.

Article V(2)(a) of the New York Convention[12] allows a court to refuse the recognition and enforcement of an arbitral award if the subject matter of the dispute is not capable of settlement by arbitration under the law of the country where enforcement is sought. This provision reflects a longstanding principle in international arbitration: that certain disputes are non-arbitrable due to their inherent public interest character or because

[10] BUCHWALD, A. (2020), (By and large, most transactions on Ethereum occur between parties that are effectively locationless, nameless, and unidentifiable. This pseudonymity creates major jurisdictional complications with regard to transaction dispute resolution and greatly limits the opportunity for off-chain alternatives).

[11] Bruc, Édouard. 'Nonarbitrability and Mandatory Rules: Brothers, Not Twins'. Journal of International Arbitration 41, no. 5 (2024): 599–622.

[12] "Recognition and enforcement of an arbitral award may also be refused if the competent authority in the country where recognition and enforcement is sought finds that: (a) The subject matter of the difference is not capable of settlement by arbitration under the law of that country […]".

they implicate exclusive state authority. Conventional examples of non-arbitrable matters include categories such as criminal disputes, family law matters (e.g., custody or divorce), bankruptcy proceedings, antitrust and competition law claims, employment grievances, sanctions, and aspects of intellectual property disputes involving validity or registration[13]. These disputes are often seen as involving fundamental rights or regulatory frameworks that demand state supervision and judicial adjudication.

Transposing this logic to decentralized dispute resolution platforms, which may be seen as derivative or "deviated" forms of arbitration, it would follow that the same categories of non-arbitrable disputes would not be appropriately referable to such platforms, especially where enforcement in a national court system is anticipated. However, this conclusion depends on how we legally characterize these mechanisms. If we adhere to the premise that blockchain-based platforms are not arbitration in the classic legal sense[14], and instead view them as private, self-enforcing systems of dispute resolution, different standards may apply. Provided that party autonomy is respected, and all aspects of the dispute, including enforcement, occur within a purely on-chain environment, there may be no legal barrier to referring even traditionally non-arbitrable matters to these platforms. In such cases, the dispute would be governed by smart contracts, and outcomes would be executed automatically via crypto-economic mechanisms (e.g., token release or digital asset transfer), making court enforcement unnecessary and legal arbitrability rules arguably inapplicable. This interpretation aligns with the emerging doctrine of blockchain self-regulation[15], which posits that decentralized systems may constitute autonomous normative environments capable of operating outside the traditional constraints of state-based legal frameworks, especially when confined to digitally native contexts.

In contrast, commercial disputes, which involve contractual or transactional relationships between private parties, are widely considered arbitrable and are often undoubtedly suitable for out-of-court resolution, provided that party consent and minimum procedural standards are respected.

With this background, decentralized platforms appear more appropriately tailored to commercial disputes, particularly those that are relatively low in value but high in volume (e.g., freelance work, e-commerce, service provision). The suitability arises from the platforms' speed, cost-efficiency, and ability to handle standardized cases through code-based procedures. However, one should not entirely exclude certain categories of non-commercial disputes, especially where consent, low stakes, and

[13] (Although defining a uniform rule on the type of issues capable of being settled by arbitration and therefore arbitrable might be a difficult task, one may agree that more international consensus on arbitrability among national laws would be desirable and would increase legal certainty). https://www.acerislaw.com/the-concept-of-arbitrability-in-arbitration/

[14] Matthias Lehmann, The New York Convention's Borderline, (Yet BA is designed in such a way that the right result is not even looked for, just the result that the majority will probably think is right. It is hard to imagine that the states of the NYC signed up to enforce the results of such a mechanism and were willing to renounce their right to exercise their own judicial power in its favour. Gaming cannot replace adjudication).

[15] Florence Guillaume and Sven Riva, (A BDR mechanism can be granted "jurisdiction" (i.e., power) over some cryptocurrencies or other crypto assets that are part of the blockchain environment in which it is implemented, the same way that assets on the territory of a state are under the jurisdiction of the judicial authorities of that state. The BDR mechanism exercises its power of jurisdiction autonomously as no state can interfere with the crypto assets under its jurisdiction. It is also independent and self-reliant in the enforcement of its decisions as the BDR mechanism has the power to directly and automatically transfer the subject matter of the dispute (i.e., valuable resources that are in its power) to the winning party at virtually no cost and without the involvement of a third party or coercive state authorities. By producing decisions that can be automatically self-enforced by the system, BDR s represent the culmination of a private justice system).

procedural simplicity align with the operational limits of decentralized systems. Still, these should be approached cautiously and likely reserved for pilot projects or hybrid mechanisms[16] where legal enforceability and ethical oversight are ensured. Overall, while commercial disputes form the core use case for decentralized platforms, a limited and well-regulated inclusion of non-commercial disputes may gradually emerge under appropriate safeguards.

3.2 By Value and Complexity: Small Claims vs High-Stakes Disputes

Another important axis for evaluating the suitability of disputes for resolution through decentralized platforms is their monetary value and procedural complexity. Most existing platforms, such as Kleros or Aragon Court, have been primarily designed to accommodate low-value disputes that would otherwise be inefficient or impractical to pursue through traditional courts or even institutional arbitration. This includes, for example, freelance contract breaches, disputes over digital goods, or token listing conflicts, where the value at stake does not justify high legal costs, but the parties nonetheless require a reliable and timely resolution mechanism[17].

Small claims disputes are especially compatible with blockchain-based dispute resolution due to their standardizable procedures, low evidentiary burden, and relative simplicity. The automated nature of decentralized platforms allows for streamlined case handling and reduced human intervention, resulting in cost-effective justice delivery. Moreover, the crypto-economic design of such systems, including juror incentives and the use of smart contracts for enforcement, functions well in scenarios where efficiency and scalability matter more than full procedural elaboration.

By contrast, high-stakes or complex disputes, those involving significant monetary amounts, multi-jurisdictional issues, nuanced evidentiary assessments, or novel legal questions, pose significant challenges for decentralized systems. These cases often require procedural flexibility, expert adjudication, and due process guarantees that current platforms are not yet equipped to provide[18]. Furthermore, where reputational enforcement is insufficient or there is no on-chain remedial solution at hand, and formal recognition or enforcement by state courts is necessary, the absence of a clear legal framework and the anonymized nature of adjudication in decentralized systems can

[16] Craig Kevin, Blockchain and Legal Systems: Challenges and Opportunities in Regulation, ResearchGate (2025), (This integration might involve creating hybrid systems where smart contracts are used for routine, well-defined agreements, while traditional legal mechanisms are retained for more complex or contentious matters. Furthermore, policymakers should ensure that smart contracts are subject to adequate oversight to mitigate risks related to coding errors or bugs. Legal professionals should also work with blockchain developers to ensure that smart contracts are clear, transparent, and legally enforceable).

[17] Bronwyn E. Howell and Petrus H. Potgieter, Uncertainty and dispute resolution for blockchain and smart contract institutions, *Cambridge University Press, Journal of Institutional Economics (2021), 17, 545–559 doi:10.1017/S1744137421000138*, (These factors render it unsuitable for all but the simplest and most straightforward agreements with a very limited number of expected outcomes and potential disputes, which must be capable of rendering into bright-line‘yes/no’, ‘right/wrong’, or other formulaic checklists. That is, the disputes most suited to Kleros are ones that arise frequently and already have tailor-made remedies available to be executed after jurors viewing the evidence respond to predeter- mined choices of assignment of liability).

[18] BUCHWALD, A. (2020) SMART CONTRACT DISPUTE RESOLUTION: THE INESCAPABLE FLAWS OF BLOCKCHAINBASED ARBITRATION, (Any such notion of viability disappears the moment that the scale and complexity of a transaction increases. The source of complexity is largely irrelevant, as complicated contractual provisions and intricately organized disputants both erase on-chain viability. In either instance, scale magnifies the negative effects of inherent blockchain shortcomings).

frustrate due and fair process principles, accountability, and enforceability in cases where off-chain recognition is to be sought[19].

That said, a hybrid model could eventually emerge wherein decentralized platforms act as the first-instance mechanism for high-value disputes, followed by optional review or confirmation by more formal arbitral or judicial bodies. For now, however, the most fitting domain of decentralized justice remains small claims resolution, particularly in digitally native contexts where transactions and enforcement are self-contained within the blockchain ecosystem.

Despite the practical limitations of decentralized platforms in handling high-stakes and complex disputes, the emergence of blockchain oracles, which serve as trusted data feeds or bridges between off-chain information and on-chain smart contracts[20], offers new potential for expanding the scope of such systems. In complex cases involving dynamic facts, technical evidence, or real-world contractual performance, oracles can be employed to automatically verify and input external data, allowing the platform to process information that would otherwise be inaccessible or unverifiable within the blockchain environment. This capability makes it technologically feasible to adjudicate even high-value disputes, particularly where factual determinations depend on measurable and objectively verifiable data. However, the reliance on oracles introduces its own challenges, notably regarding security, data protection, manipulation risks (e.g., oracle attacks), and added costs related to oracle integration and maintenance[21].

Moreover, as the reliance on oracles increases in complexity, so too does the infrastructure needed to ensure reliability, accuracy, and auditability. This raises the question: if resolving a high-value dispute on a decentralized platform ultimately requires elaborate oracle inputs, multi-step verification, and protocol-level governance, what is the advantage over using conventional ADR/ODR mechanisms? The cost and time benefits typically associated with decentralized justice may erode in proportion to the complexity of the dispute, particularly where procedural safeguards, expert input, or legal certainty are necessary. Therefore, while oracles offer an important functional extension that can help accommodate complex disputes, their application must be balanced against the cost-efficiency rationale that underpins the very appeal of

[19] Bahadir Köksal, A Trade-Off in Smart Contract Arbitration; Sacrificing Arbitrators' Anonymity for Transparency?, *Fordham Intell. Prop. Media & Ent. L.J. 131 (2024). Available at: https://ir.lawnet.fordham.edu/iplj/vol35/iss1/3* (… Conversely, anonymity may bring new complexities and risks to the decision-making process, such as hindering the voir dire process, mitigating accountability, undermining the presumption of innocence, and dilution of the proof standard…. a cliché but reasonable apprehension comes up here: how to protect a party from shady jurors? Because it may be possible for jurors to access a party's personal information while remaining under the cover of anonymity. For instance, if a dispute arises between a business owner and a website designer due to a defective website, jurors will probably inspect and assess the website as evidence).

[20] Ortolani, P., The impact of blockchain technologies and smart contracts on dispute resolution. Arbitration and court litigation at the crossroads 2019, *Uniform Law Review = Revue de Droit Uniforme, 24, 2, (2019), pp. 430-448,* (The mechanism of oracles can be readily applied to arbitration; a smart contract can defer to the decision of a third party adjudicator, such as an arbitral tribunal, and determine the final recipient of certain disputed assets on the basis of a ruling made by that oracle. In other words, the external information retrieved by the smart contract could be an arbitral award, and software script could be used to enforce the outcome of the procedure. Through this type of device, the potential for self- enforcement already inherent in the 'routine escrow mechanisms' first theorized by Nakamoto could extend to a much wider range of economic interactions, inasmuch as different types of contracts are increasingly translated into code).

[21] Sharmin N. Chougule - Luigi Cantisani, The oracle problem in smart contracts: data privacy, security, and solutions, *MediaLaws 2024*, (…the more oracles are added to the equation, the more the automation is reduced as a result of the intermediate steps performed by the oracles before self-execution occurs. We add that the more oracles are involved, the more privacy could be undermined where principles such as data minimisation, limitation of purpose, and privacy by design and by default are not concretely applied).

decentralized platforms. As such, referral of high-stakes disputes to these systems may only be justified in fully digitized ecosystems where both the dispute and its enforcement are intrinsically on-chain, and the parties prioritize automation, transparency, or ideological commitment to decentralization over traditional adjudicatory assurance.

3.3 By Digital Context: On-Chain vs Off-Chain Disputes

As elaborated earlier in this paper, one of the most fundamental criteria in assessing the suitability of disputes for resolution through decentralized platforms lies in their digital context, namely, whether the dispute is fully on-chain or involves significant off-chain elements. In the case of on-chain disputes, where all parties, transactions, obligations, and evidence are embedded within a blockchain environment (such as smart contract execution failures or token-based DAO governance decisions), decentralized platforms function with optimal efficiency. This is because crypto-economy[22], the underlying mechanism driving blockchain systems, relies on economic incentives and automated enforcement through smart contracts, thereby reducing the need for human discretion and external verification. The determinism and transparency inherent in blockchain environments support secure, tamper-proof, and rule-based adjudication that can execute outcomes directly on-chain.

By contrast, off-chain disputes, which originate in the real world, such as those involving service contracts, physical goods, or legal identities, pose challenges due to the need for off-chain fact-finding, party identification, and enforceability. Nevertheless, these disputes can still be accommodated within decentralized platforms under certain conditions. One approach is through the transposition of contractual obligations into smart contracts, either at the outset or after the dispute arises. This requires that the terms be sufficiently clear, objectively verifiable, and capable of being executed programmatically[23]. Moreover, parties must voluntarily agree to submit their disputes to such platforms and recognize the binding nature of the outcome, typically enforced through reputational incentives or escrow mechanisms rather than state coercion. As such, while fully on-chain disputes remain the most natural candidates for decentralized resolution, a carefully designed procedural bridge can extend these platforms' reach into off-chain domains, provided appropriate consent, clarity, and enforcement architecture are in place, with a particular attention to the applicable law upon the contractual obligations envisaged in the underlying agreement.

3.4 By Procedural Requirements: Simple vs Fact-Intensive Disputes

When assessing the suitability of disputes for resolution via decentralized platforms, another key dimension is the procedural complexity, in particular, the distinction between simple and fact-intensive disputes. Simple disputes, such as non-payment for services rendered or minor contract performance issues, are generally well-suited to blockchain-based platforms. They involve straightforward factual scenarios, often self-

[22] For more information: Iris H.-Y. Chiu, 'Pathways to European Policy and Regulation in the Crypto-Economy' (2019) *10 Eur J Risk Reg 738*

[23] For a very clear and simple explanation of how the legal terms are encoded, see: Stazi, Andrea., Smart Contracts and Comparative Law, A Western Perspective (2021), *Springer*

contained within the blockchain environment, requiring limited evidence and procedural steps. In contrast, fact-intensive disputes often involve multiple layers of complexity and external variables that decentralized platforms are not yet equipped to manage reliably.

Such disputes may require third-party evidence, including witness statements, documentary records, or data housed off-chain. They frequently necessitate expert opinions, site inspections, or technical verifications that cannot be easily automated or validated through smart contracts or oracles. Additionally, certain disputes are contextually bound to ongoing or prior real-world litigation or arbitration, raising legal and evidentiary interdependencies that decentralized systems cannot effectively address in isolation. While blockchain oracles provide a potential gateway for feeding off-chain information into on-chain systems, their accuracy, cost-efficiency, and reliability remain uncertain, particularly in situations demanding nuanced human judgment, case-specific analysis, or interpretation of complex legal standards[24].

Until technological advances allow for more refined integration of off-chain information in a trustworthy, scalable, and cost-effective manner, fact-intensive disputes remain largely unsuitable for resolution via decentralized platforms. This limitation, however, is not necessarily inherent to blockchain technology itself but rather reflects the current state of development. Future progress in areas like AI-integrated oracles may gradually close this gap, provided that such enhancements do not compromise the foundational principles of decentralization and autonomy.

3.5 By Number of Disputants: Bilateral vs Multilateral Disputes

The distinction between bilateral and multilateral disputes presents a significant functional boundary for decentralized dispute resolution platforms. Most existing systems, Kleros being the most prominent example, are structurally designed around binary adjudication mechanisms, where jurors must choose between clearly defined options presented by two opposing parties. This Schelling-point-based model, which leverages incentive-aligned majority voting among anonymous jurors, performs efficiently in two-party disputes where resolution hinges on factual verification or contractual clarity. However, in multilateral disputes, involving three or more parties with competing claims or overlapping interests, this model quickly encounters practical and conceptual limitations. However, it appears that effort have been made to enable the resolution of multiparty disputes[25].

In Kleros's current architecture, the binary nature of juror decision-making cannot accommodate triangular or pluralistic claims, where outcomes may involve apportioning fault, determining priority, or assessing cumulative liability. Such

[24] BUCHWALD, A. (2020), (Further recall that as complexity increases, a transaction becomes costlier and slower to complete. This means that the promise of cheap and expedient adjudication begins to vanish as the pile of documents, number of hearings, and filing of briefs increases).

[25] Federico Ast, Kleros, a Protocol for a Decentralized Justice System, Building a Judicial System for the Internet Age (2017), https://medium.com/kleros/kleros-a-decentralized-justice-protocol-for-the-internet-38d596a6300d

At is early stage of the project, Kleros will work mostly for simple disputes involving few parties and voting options. Over time, as technology improves, more complex disputes will be adjudicated. For example, cases involving multiple parties, multiple issues and multiple voting structures. Imagine Huey, Dewey and Louie are claiming Mr. Scrooge's estate, consisting of cash, a mansion, a yacht and a luxury car. The jury could have the following voting options: "Pay Huey X% of the cash amount; Pay Dewey Y% of the cash amount; Pay Louie Z% of the cash amount (where X+Y+Z = 100). Transfer Huey the property of the mansion; transfer Dewey the property of the yacht; transfer Louie the property of the luxury car"

complexity undermines the feasibility of rendering a decision that reflects the diverse factual and legal positions of multiple parties, especially in non-mutually exclusive outcomes. Furthermore, multilateral disputes often require nuanced procedural coordination, such as multi-party notice, reply and rejoinder rounds, and evidence triangulation, all of which are absent or highly constrained in current decentralized platforms. These technical limitations are exacerbated by the lack of centralized case management and rigid procedural scripting via smart contracts, which do not lend themselves to adaptive adjudication[26].

To overcome these challenges, future iterations of decentralized justice systems could experiment with multi-option voting mechanisms or layered decision phases that permits a wider array of verdicts. Another pathway could be the development of modular dispute layers, where individual bilateral components of a multilateral dispute are adjudicated separately, followed by an integrated consensus mechanism[27]. However, these innovations must not erode the fundamental tenets of decentralization, namely transparency, immutability, and juror independence. Until such solutions are technically and economically viable, multilateral disputes remain relatively incompatible with the current design and logic of decentralized platforms.

4. Suitability Criteria and Regulatory Alignment

This section aims to articulate the fundamental criteria against which the suitability of various categories of disputes for resolution by decentralized platforms can be evaluated. Drawing from both legal doctrine and procedural logic, the analysis proceeds on the premise that not all disputes, by their nature, complexity, or regulatory context, lend themselves equally to adjudication via blockchain-based systems. Accordingly, this chapter introduces a framework composed of three interdependent dimensions: the challenges surrounding enforcement and recognition, the clarity and robustness of applicable legal frameworks and procedural design, and the technological architecture and constraints embedded in the platforms themselves. The objective is not merely to offer a taxonomical classification of referable disputes, but rather to investigate how regulatory coherence, enforceability conditions, and design limitations interact in determining whether a given dispute type can be resolved effectively and legitimately in a decentralized, on-chain environment. Of particular interest is the role of international and domestic standards, such as the New York Convention and national arbitration laws, in shaping the enforceability of decisions issued by these platforms, especially when questions of arbitrability and party consent are implicated. As such, this chapter lays the groundwork for a nuanced, criteria-based suitability analysis that complements the typological categorization developed earlier in the paper.

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[26] For a critical discussion about the absence of the due process bottlenecks in decentralised platforms, see: Cemre Ç. Kadıog˘lu Kumtepe, Defining Boundaries of Due Process in Blockchain Arbitration, *Transforming Arbitration. Exploring the Impact of AI, Blockchain, Metaverse and Web3, RADBOUD UNIVERSITY PRESS (2024)*, (These procedures are designed by coders allowing anybody to create hubs to have absolute freedom over their rules and procedures leading to self-executed outcomes. Parties to arbitration typically have autonomy over the procedure, but in these systems, they are restricted by the platform's design and the rules provided to them. As in traditional arbitration, parties do not need to have the same procedural rights as in court litigation. However, if the parties cannot alter the procedure, they must be made aware of the process, understand the extent of their procedural rights, and voluntarily submit their disputes to that platform).

[27] For exploring the innovative capacities of smart contracts in dispute resolution through more diversified methods of decision making, see: Christoph Salger, Decentralized Dispute Resolution: Using Blockchain Technology and Smart Contracts in Arbitration, *24 Pepp. Disp. Resol. L.J. 65* (2024).

4.1 Enforcement and Recognition Challenges

While decentralized dispute resolution (DDR) platforms such as Kleros have introduced novel mechanisms for adjudication through blockchain-based processes, their legal status and the enforceability of their decisions remain deeply uncertain. One of the principal benchmarks for evaluating the potential recognition and enforcement of decisions rendered by such platforms is the 1958 New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards. Although originally intended for conventional arbitration, the Convention offers a useful analytical framework through which the legal viability of decentralized justice systems can be appraised, particularly if jurisdictions begin treating these decisions as analogous to arbitral awards.

Article V(1) of the New York Convention establishes the conditions under which recognition may be refused. These include the absence of a valid arbitration agreement in writing, lack of due notice, excess of jurisdiction, and irregularities in the composition of the arbitral tribunal. Crucially, under Article V(2)(a), enforcement may be refused if the subject matter of the dispute is not "capable of settlement by arbitration under the law of that country", i.e., the arbitrability requirement. Additionally, Article V(2)(b) allows a state to refuse enforcement where it would violate the public policy of the enforcing country. These provisions pose significant challenges for DDR platforms that lack a centralized seat as the most essential element of any arbitral proceeding, institutional backing, or a clearly defined legal procedure[28].

The requirement of a written arbitration agreement (Article II of the Convention) is particularly problematic in decentralized environments. Smart contracts embedded in blockchain protocols may reflect mutual assent, but they typically lack the formal clarity and intent-based negotiation processes expected in traditional arbitration[29]. Furthermore, it is questionable whether the appointment of anonymous jurors by an algorithmic mechanism can fulfill the Convention's demand for a "duly constituted arbitral tribunal[30]."

Despite these formal gaps, certain jurisdictions have started to display legal flexibility. For instance, the Mexican courts have recognized and enforced a decision rendered by Kleros in a landlord–tenant dispute, signaling an openness to treating platform-based adjudications as enforceable outcomes when they meet minimum standards of procedural fairness and party consent[31]. This case sets a potentially influential precedent and demonstrates that national courts may, over time, expand their

[28] Matthias Lehmann, The New York Convention's Borderline, (… Art II(1) NYC requires an agreement 'in writing', and it is by no means sure that this also covers an electronic exchange of communication, let alone agreements made on a blockchain.15 Second, Art V(1)(b) NYC requires that each party is able to present its case, which it may be inhibited to do in a blockchain context, where the parties do not interact with the jurors. Third, Art I(1) NYC starts from the idea that the award is made within the territory of a certain state, however such a 'seat state' is impossible to locate in the decentralised environment of BA. Fourth, Art IV(1)(a) NYC calls for a 'duly authenticated original' of the award, which may be difficult to produce where jurors vote in cyber-space. Fifth, the typical motivation of awards is highly unusual in BA, where jurors cast their votes independently of each other and most often need not give any reason why they voted in a certain way).

[29] *ibid*

[30] *ibid*

[31] For information about the details, consult: https://arbitrationblog.kluwerarbitration.com/2022/03/04/arbitration-tech-toolbox-is-a-mexican-court-decision-the-first-stone-to-bridging-the-blockchain-arbitral-order-with-national-legal-orders/

interpretation of enforceable decisions to include technologically derived rulings, particularly when aligned with domestic ADR principles.

In practice, even where full arbitral recognition is not attainable, DDR decisions can serve as pre-arbitral or pre-litigation procedural requirements. Parties may agree contractually that such decisions act as a condition precedent to initiating state proceedings or arbitration, akin to multi-tiered dispute resolution clauses (e.g., negotiation, then mediation, and then arbitration). Alternatively, these decisions may be framed as contractual determinations, obliging the losing party to perform a specific act (e.g., repay funds, release tokens, or deliver goods). In such cases, failure to comply with the DDR decision may give rise to a new cause of action, allowing the prevailing party to request specific performance or damages before a national court.

Nonetheless, the public policy exception remains a considerable hurdle. Decisions rendered without respect to adversarial principles, due process, or transparency, such as lack of opportunity to present a defense, unknown adjudicator identities, or opacity in procedural rules, may be struck down by state courts. Moreover, the anonymity of parties, difficulty verifying identity, and lack of formal procedural safeguards further undermine enforceability in many jurisdictions. Unless DDR platforms can demonstrate procedural integrity, transparency, and compliance with minimal standards of justice, they will continue to face challenges in achieving recognition as legitimate dispute resolution mechanisms under both domestic and international law.

4.2 Clarity of Legal Frameworks and Procedural Design

A key determinant of whether decentralized dispute resolution (DDR) mechanisms can be considered suitable substitutes or complements to traditional adjudicative systems lies in the clarity, coherence, and legal validity of their procedural frameworks. In traditional arbitration or court-based mechanisms, procedural design is anchored in codified norms, whether national civil procedure rules or institutional arbitration rules, which ensure predictability, legal certainty, and compliance with fundamental procedural guarantees. In contrast, many blockchain-based platforms operate within technologically programmed and self-executing procedures, often governed by protocols developed unilaterally or through decentralized communities, without clear links to national legal orders. This raises profound concerns about their legal intelligibility, the enforceability of their outcomes, and their conformity with internationally accepted standards of justice.

One of the primary shortcomings in current DDR procedural design is the absence of universally recognized rules of procedure. While platforms like Kleros provide documentation outlining their process, including evidence submission, juror selection, and voting mechanics, these protocols do not correspond to established procedural norms recognized under domestic arbitration laws or international frameworks such as the UNCITRAL Model Law[32]. Moreover, the static and code-dependent nature of smart contract-based adjudication restricts flexibility in procedural management, there is

[32] However, national courts of state might tend to interprete the DDR awards as ones issued by "delocalized" arbitration tribunals to give them a legal effect. See: Ast, Federico and George, William and Kamalova, Jamilya and Sharma, Abeer and Aouidef, Yann, Decentralized Justice: State of the Art, Recurring Criticisms and Next Generation Research Topics (April 10, 2023). *Available at SSRN: https://ssrn.com/abstract=4414291 or http://dx.doi.org/10.2139/ssrn.4414291*

typically no provision for motions, hearings, or procedural discretion. This rigidity may severely affect the ability to deal with complex fact patterns or procedural incidents such as joinder, interim measures, or bifurcation.

In addition, the legal qualification of such procedures remains unsettled. Are they arbitration, contractual adjudication, or sui generis mechanisms of private ordering? [33] The uncertainty surrounding their classification makes it difficult for parties, counsel, and courts to determine the consequences of participating in such processes or challenging their results. This ambiguity may discourage parties from engaging DDR platforms, particularly in cross-border disputes where procedural clarity is essential to secure recognition.

For DDR systems to gain legal credibility, they must evolve towards transparent, well-documented, and legally interoperable procedural schemes. This might include aligning core steps with those recognized in arbitration (such as notice, opportunity to respond, impartial decision-making), integrating adaptable procedural layers through governance modules, or developing "legal wrappers" around the protocol that allow courts to identify the procedural legality of decisions rendered[34]. Without such alignment, DDR platforms risk being perceived as opaque or arbitrary, limiting their acceptance in both private contracts and public enforcement regimes.

4.3 Technological Constraints and Platform Design Considerations

Beyond legal frameworks, the architecture and operational logic of blockchain technology itself present fundamental constraints on the full delivery of justice through decentralized dispute resolution (DDR) platforms. While blockchain enables core features such as transparency, automation, and tamper-resistance, it simultaneously introduces structural limitations that complicate compliance with traditional principles of fairness, accountability, and procedural integrity.

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[33] Platforms like Kleros cannot be squarely classified as arbitration due to a lack of traditional procedural guarantees and forms. Yet, they also go beyond simple contractual remedies, hence, a sui generis qualification may be appropriate, particularly as legal systems struggle to recognize or enforce these outcomes. Varda Saxena & Harshitha Swarna, The Conundrum of Enforceability of Blockchain Arbitration: Learnings from Kleros, *https://jgu.edu.in/mappingADR/the-conundrum-of-enforceability-of-blockchain-arbitration-learnings-from-kleros-2/#:~:text=Specifically%2C%20Section%2031%20of%20the,the%20enforcement%20of%20blockchain%20arbitration*
(the principle of *ex aequo et bono* (Latin for "according to the right and good"), which is an approach that enables party autonomy and the ability to decide the dispute in accordance with the rules of law designated by the parties as applicable to the substance of the dispute, could therefore be the key to a robust regulatory system that enables the enforcement of blockchain arbitration).

[34] Florence Guillaume, Decentralized Autonomous Organizations (DAOs) Before State Courts (2023), (From a procedural perspective, when a DAO is attached to a legal wrapper, the latter in principle has the capacity to sue and be sued in court and therefore the DAO can be a party to litigation "through" the legal wrapper. However, even if the various legal wrappers offer practical solutions to DAO users, they entail a significant amount of legal uncertainty. In particular, the exact scope of the legal relationship between the DAO and the legal entity is unclear. Moreover, attaching the DAO to a legal wrapper brings an element of centralization in the sense that the legal entity anchors the DAO in the territory of a particular state. This entails significant practical consequences when it comes to linking the DAO to a state using the rules of private international law).

One significant challenge is the immutability of the blockchain ledger. Once decisions are recorded and executed via smart contracts, they are practically irreversible, regardless of procedural errors, new evidence, or changes in legal interpretation. Moreover, the anonymity or pseudonymity of participants, both disputants and jurors, creates obstacles for ensuring impartiality, verifying identity, and detecting conflicts of interest. Jurors in platforms such as Kleros operate under pseudonyms and are incentivized to vote with the perceived majority through token-based reward systems, a model that is vulnerable to herd behavior and informational cascades[35]. These dynamics may undermine truth-seeking and instead promote conformism, particularly in fact-sensitive or morally complex cases.

The gamification of adjudication via staking tokens and probabilistic selection raises additional concerns about the seriousness with which jurors treat their role. In systems where jurors are rewarded or penalized depending on their alignment with majority outcomes, incentives may prioritize economic gain over legal reasoning[36]. This creates the risk of a system that optimizes for consensus rather than correctness, especially when cases lack objectively verifiable outcomes.

Further, blockchain platforms lack procedural flexibility. The code-based nature of smart contracts inhibits discretionary adaptation, making it difficult to accommodate exceptions, nuanced argumentation, or evolving legal interpretations. This rigidity limits their ability to adjudicate multifaceted or precedent-sensitive disputes[37]. Also, the absence of clear mechanisms for joinder of parties, interim relief, document authentication, or evidentiary standards restricts their applicability to more complex scenarios.

Finally, the business models of most platforms are designed to favor volume and low-cost resolution rather than jurisprudential robustness. In pursuing scalability, platforms may forgo procedural sophistication or robust checks and balances, making them poorly suited for disputes that demand legal precision or substantive justice. Without addressing these foundational constraints, blockchain-based DDR platforms risk remaining peripheral to mainstream legal practice, confined to narrow use-cases where procedural and substantive stakes are relatively low.

5. Conclusion

5.1 Summary of Findings

This article has offered a functional and critical analysis of the types of disputes that may be appropriately referred to decentralized dispute resolution (DDR) platforms,

[35] Yannick Gabuthy, Blockchain-Based Dispute Resolution: Insights and Challenges, (Individuals are incited to rely on the judgment of others (and not to reveal their true preferences), which may result in so-called herding behavior or informational cascade, and hence engender consensus on an incorrect collective decision).

[36] (Economic factors can influence juror decision-making in various ways. For instance, jurors may be swayed by the economic status of the parties involved or by the potential economic implications of their verdict. Research has shown that jurors' socioeconomic backgrounds can also affect their perceptions and decisions), Jury Trials in Law and Economics
A Comprehensive Guide to Philosophical and Economic Implications, https://www.numberanalytics.com/blog/jury-trials-law-economics#:~:text=The%20Impact%20of%20Economic%20Factors,their%20perceptions%20and%20decisions%202.

[37] Kayode Akinsola, Warren Liang, Legal Risks and Challenges of Implementing Smart Contracts in Corporate Governance, *https://www.researchgate.net/* (2025).

such as Kleros. Through a typology-based approach, it has become evident that the suitability of disputes for decentralized resolution depends not solely on the subject matter or value of the claims, but on a multifaceted combination of legal, procedural, and technological criteria.

First, the legal nature of disputes significantly impacts their referability. While most commercial disputes, particularly those governed by smart contracts and involving digitally native transactions, are well aligned with blockchain-based systems, non-commercial disputes, especially those touching on public order or requiring state intervention, remain outside the practical and legal scope of DDR platforms. This distinction stems not only from arbitrability constraints embedded in national laws and international instruments such as the New York Convention, but also from the inherent limitations of party consent and enforceability frameworks.

Second, disputes characterized by low monetary value and low complexity, such as microtransactions or binary content moderation claims, are demonstrably better suited to decentralized platforms. In contrast, high-stakes or fact-intensive disputes raise concerns about procedural sufficiency, evidentiary reliability, and adjudicative depth, especially in the absence of mechanisms expert determination, or cross-examination.

Third, the dichotomy between on-chain and off-chain disputes has emerged as crucial. Fully on-chain disputes, embedded in crypto-native ecosystems, benefit from cryptoeconomic incentives and self-enforcing smart contracts. However, off-chain disputes involving real-world contractual interpretation, identity verification, or asset recovery still struggle to meet the technical and procedural demands of blockchain-based resolution.

Finally, the article has underscored the legal and technological constraints that shape the limits of these platforms. Issues such as the rigidity of procedural design, the anonymity of jurors, gamified voting mechanisms, and the absence of institutional safeguards illustrate the current gap between decentralized justice and the standards of due process and legal certainty recognized in national and international legal orders.

Collectively, these findings suggest that DDR platforms can serve as effective complements to existing systems, particularly in digital-native, low-value, or high-volume environments, but are not yet positioned to serve as full substitutes for traditional adjudication in complex or sensitive legal contexts. Further legal harmonization, procedural development, and technological refinement are necessary before they can become integral to mainstream dispute resolution.

5.2 Implications for Research and Platform Development

The analysis presented in this paper suggests several avenues through which decentralized dispute resolution platforms can evolve to meet recognized due process standards and thereby enhance their prospects for recognition by state judicial authorities. One key development would be the integration of multi-layered adjudication mechanisms, such as peer review stages, to allow for corrective procedures and mitigate risks of erroneous or biased decisions. This could be accompanied by preparatory phases wherein disputes are clarified, evidence is organized, and procedural

steps are standardized before the final deliberation, fostering both transparency and procedural rigor.

Moreover, platforms should invest in developing interoperable legal-technical tools to overcome blockchain's inherent limitations, such as pseudonymity, immutability, and lack of evidentiary discretion[38]. These tools might include identity-verification layers, secure evidence-upload protocols, and real-time communication frameworks. Lastly, embedding programs that transcribe smart contracts into legally coherent plain-language texts (and vice versa) can enable clearer understanding for users while enhancing legal reliability, ensuring greater legal certainty and enforceability across jurisdictions[39].

5.3 Areas for Further Exploration

Future research should further investigate the intersection between decentralized adjudication models and national enforcement systems, particularly in mixed legal traditions. A deeper empirical assessment of user trust, procedural transparency, and effectiveness of outcomes is also essential. Additionally, technical aspects such as AI-supported reasoning in dispute resolution, and the integration of legal ontologies into smart contract design, merit closer examination. As decentralized platforms evolve, cross-disciplinary studies involving law, computer science, and behavioral economics will be crucial to understanding how digital justice can be both scalable and legally robust without compromising fundamental rights and procedural integrity, while maintaining the core characteristics of blockchain to preserve its advantages over traditional ADR/ODR systems and thereby justify its superiority from the disputants' perspective.

[38] United Nations Conference on Trade and Development, report prepared by Mr. William Taborda, Technology and the Future of Online Dispute Resolution (ODR) Platforms for Consumer Protection Agencies (2023), (it is worth noting that new economic incentive schemes can be easily deployed on this or other future blockchain implementations once the technology is mature and stable. Additionally, since most blockchain projects, including Kleros, are open-source, they can be replicated, modified, and released (forked) in a simple and permissionless manner, enabling a fast pace of innovation.

[39] Andreas Furrer, THE EMBEDDING OF SMART CONTRACTS INTO SWISS PRIVATE LAW, Anwaltsrevue, 2018, p. 103 – 115.