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Reconstruction of the Inheritance of Cryptocurrency Assets in the Civil Code: A Review of the Saisine Principle and the Valuation of the Legitimate Portion

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ABSTRACT

The advancement of blockchain technology and the Web3 ecosystem has generated new forms of wealth in the shape of digital assets (such as cryptocurrencies and NFTs), creating a conceptual dissonance within Indonesia's civil inheritance law framework. The legal vacuum concerning the status of decentralized cryptographic assets controlled by private keys has resulted in obstacles to the implementation of the saisine principle (the automatic transfer of rights by operation of law), while simultaneously giving rise to appraisal challenges in determining the legitime portie (forced heirship portion) due to extreme price volatility. This research aims to reconstruct the modern concept of proprietary control in relation to the saisine principle and to formulate equitable mechanisms for the execution and valuation of digital assets for heirs. The method employed is normative legal research using statutory, conceptual, and analytical approaches. The findings conclude that: (1) cryptographic access rights (private keys) must be juridically recognized as an inherent part of intangible movable property. The implementation of the saisine principle in relation to crypto assets requires ex-ante mitigation through Digital Wills, the institutionalization of smart contracts as executors of testamentary intent, and the adoption of multi-signature wallets and Shamir Backup methods; (2) the fulfillment of the legitime portie necessitates a paradigm shift from fiat-based appraisal toward in-natura distribution (token-based appraisal) by applying the Shared Volatility Risk Principle. This adjustment in valuation methods demonstrates the hermeneutic flexibility of the Civil Code in preventing inheritance disputes while safeguarding the civil rights of heirs in the era of digital transformation.

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1. INTRODUCTION

The dynamics of global society over the past two decades have undergone fundamental disruption due to the penetration of blockchain technology and the Web3 ecosystem. This phenomenon has given rise to entirely digital forms of wealth, such as cryptocurrencies, Non-Fungible Tokens (NFTs), assets within the metaverse, and balances stored in electronic wallets (e-wallets). Unlike conventional wealth instruments, these assets are decentralized, intangible in nature, and their control derives from cryptographic code in the form of private keys. The shift in societal preferences from physical assets such as land or precious metals toward digital representations demonstrates that economic value is no longer anchored to physical form, but rather to mathematical proof and functional utility within a network.(Afrizal and Marliyah 2021)

In Indonesia, legal challenges arise because the regulatory foundation governing objects and property rights still relies on the Kitab Undang-Undang Hukum Perdata (Civil Code), a legal product of the nineteenth-century agrarian industrial era. The definition of "object" (zaak) under Article 499 of the Civil Code, which traditionally emphasizes material tangibility, is now confronted with the reality of bits and bytes that possess no clear physical locus. Although Article 503 of the Civil Code recognizes intangible objects, its scope remains limited to conventional claims or intellectual property rights, which existentially continue to depend on centralized systems subject to supervision. This situation creates a gap between normative concepts and factual phenomena, whereby digital assets that substantively carry significant economic value fall into a legal gray area within property law.

This legal vacuum has direct implications for the law of succession. Normatively, pursuant to the saisine principle embodied in Articles 830 and 833 of the Civil Code, the entirety of a decedent's estate should transfer automatically to the heirs by operation of law at the moment of death. In practice, however, the pseudonymous and irreversible nature of blockchain technology renders such transfer impossible if the decedent dies without transmitting the access credentials (private key) (Nurima and Mairul, n.d.). In the absence of explicit recognition of digital access as a modern civil object, heirs are deprived of legal protection and effective remedies when such assets become inaccessible, disputed, or lost due to platform breaches or hacking incidents.

The issue becomes increasingly complex due to the conflict between national law and the privacy policies of global digital platforms such as Google and Meta. These platforms frequently vest account ownership solely in the individual user through unilateral electronic contracts, without accommodating the principle of universal succession recognized under Indonesian law. Consequently, even when heirs are legally entitled under national law, they remain constrained by internal platform policies that offer only limited features such as account memorialization or data deletion rather than the transfer of full control over the economic value embedded within the account. This tension between post-mortem privacy rights (personality rights) and the proprietary rights of heirs (property rights) calls for more progressive regulatory harmonization.

The Indonesian government's move to classify crypto assets as commodities through regulations issued by Badan Pengawas Perdagangan Berjangka Komoditi (Bappebti), alongside supervisory authority granted to Otoritas Jasa Keuangan (OJK) under the Undang-Undang Pengembangan dan Penguatan Sektor Keuangan (UU P2SK), has indeed provided an administrative and trading framework. However, this regulatory regime has yet to address a fundamental issue in civil law: the substantive recognition of digital assets as proprietary objects that may lawfully serve as collateral or as inheritable property before the courts. The lack of synchronization between financial administrative law and substantive civil law results in weak legal certainty for digital asset holders and their heirs in the future.(Luthfi et al. 2024)

Based on the foregoing background, this research becomes crucial in undertaking a deconstruction of the traditional concept of property in order to accommodate digital entities as modern civil objects. The novelty of this study lies in the integration of civil law doctrinal analysis with the technical constraints of execution within a decentralized ecosystem. This research not only seeks to justify the status of digital assets as inheritable property, but also to formulate adaptive execution mechanisms including the use of

smart contracts and digital wills to address the existing legal vacuum while safeguarding the rights of heirs in the era of digital transformation.

Based on the background outlined above, the problem formulation of this research is focused on two fundamental issues, namely:

1) How can the saisine principle in civil inheritance law be reconstructed in relation to cryptographic assets, given that the automatic transfer of rights by operation of law conflicts with the absolutism of private key encryption systems?
2) What are the appraisal challenges and mechanisms for fulfilling the legitime portie (forced heirship portion) for heirs with respect to digital assets characterized by extreme volatility?

2. METHODS

This methods section has been designed to align with the two problem formulations above, demonstrating a rigorous and systematic research workflow. This study constitutes normative (juridical-normative) legal research, focusing on the vacuum of norms and the vagueness of norms within the Civil Code when confronted with the decentralized characteristics of digital assets.

Research Approaches:

a) Statutory Approach: employed to examine the coherence between Book II of the Civil Code (particularly Article 833 concerning the saisine principle and Article 913 concerning the legitime portie) and modern regulations such as the Personal Data Protection Law and regulations issued by the commodity futures authority concerning crypto assets.
b) Conceptual Approach: applied to deconstruct the concepts of possession (bezit) and ownership (eigendom) in classical property law in order to accommodate cryptographic encryption systems and the fluctuating value of virtual assets.
c) Analytical Approach: used to resolve the technical problem of determining the appropriate timing of appraisal (whether at the time of the decedent's death or at the time of estate distribution) to ensure fairness in the heirs' forced shares.

Legal Materials:

a) Primary Legal Materials: the Civil Code; Law No. 11 of 2008 as amended by Law No. 1 of 2024 concerning Electronic Information and Transactions; Law No. 27 of 2022 concerning Personal Data Protection; and regulations related to crypto commodities.
b) Secondary Legal Materials: doctrinal literature and legal journals indexed in SINTA as well as international publications relevant to digital inheritance and cryptocurrency.

Technique of Legal Material Analysis:

Legal materials are analyzed qualitatively using systematic and teleological interpretation. This interpretive method aims to formulate a new legal construction (reconstruction) that not only fills the legal vacuum but also provides precise solutions concerning the execution of private keys and the mitigation of valuation disputes over crypto assets among heirs.

3. FINDINGS AND DISCUSSION

3.1. Reconstruction of the Saisine Principle in Civil Inheritance Law with Respect to Cryptographic Assets

The saisine principle embodied in Articles 830 in conjunction with 833 of the Civil Code constitutes the core of civil inheritance law. This principle affirms that at the moment of the decedent's death, all proprietary rights and obligations of the decedent automatically transfer by operation of law to the heirs. The principle is grounded in the conceptual assumption that the decedent's estate exists within a legal system that can be accessed, supervised, and transferred through formal juridical instruments.(Ramadhani 2024)

However, when this principle is confronted with cryptographic assets such as cryptocurrencies and NFTs that are entirely controlled by private keys, a fundamental conflict arises between legal norms

and technical reality. Within blockchain systems, ownership is not determined by state recognition, but by mathematical control over cryptographic keys. In other words, the blockchain does not recognize the concepts of "heirs," "court judgments," or "certificates of inheritance." The system recognizes only the party in possession of the private key.

It is at this point that a conceptual dissonance emerges. The saisine principle presupposes that ownership can transfer normatively without technical impediments, whereas blockchain technology establishes technical barriers as an absolute condition of ownership. The transfer of rights by operation of law as guaranteed by the Civil Code thus loses its executory force when the heirs neither know nor possess access to the decedent's private key.(Aprilia, Januardy, and Wulandari 2025)

Accordingly, the issue that arises is not merely the recognition of digital assets as intangible property, but rather the inability of the saisine principle to operate within a proprietary context that does not submit to a centralized authority system.

The reconstruction of the saisine principle in this context must be undertaken through a functional rather than a textual approach. The essence of saisine lies not merely in formal transfer, but in the assurance that heirs do not lose access to the economic value forming part of the estate. Accordingly, what must be reconstructed is the meaning of "control" within modern property law.

In conventional property law, possession can be distinguished from ownership (bezit versus eigendom). In cryptographic assets, however, possession and ownership converge into a single inseparable entity. Whoever controls the private key is, in effect, the owner.(Marsanti and Urbaniasi 2025)

Consequently, for the saisine principle to remain relevant, the law must recognize that:

"access to digital credentials (private keys, seed phrases, wallet access) constitutes an inherent part of the proprietary object itself."

This means that, in the context of cryptographic assets, what is inherited is not merely the "digital asset," but also the cryptographic access rights as an integral component of the inheritable object.

Before addressing the technical deadlock of the saisine principle, the dogmatic status of digital assets must first be firmly situated within the proprietary regime of the Civil Code. Juridically, crypto assets fulfill the qualification as "objects" (zaak) as referred to in Article 499 of the Civil Code, as they constitute goods or rights capable of being subject to ownership. Furthermore, these digital assets may be specifically classified as movable property. In addition, digital assets also fall within the category of intangible objects under the construction of Articles 503 and 504 of the Civil Code, since their ownership exists purely in digital form.

This dogmatic classification is crucial, as the recognition of crypto assets as intangible movable property provides full legitimacy for their ownership to be transferred through inheritance, testamentary disposition, or other legal acts. In other words, the saisine principle is, in theory, validly operative with respect to such assets, since these cryptographic instruments embody proprietary rights that may be transmitted to heirs as economically valuable investment assets.

Although conceptually inheritable, the saisine principle encounters the absolutism of digital security. Access to digital assets whether economically valuable social media accounts or crypto wallets is often protected by stringent security systems such as two-factor authentication (2FA) and passwords known exclusively to the decedent(Wardhana 2024). This creates a paradox: the law guarantees the automatic transfer of rights, yet digital security systems (such as blockchain encryption) deny access to legally entitled heirs.

The legal vacuum in Indonesia becomes even more apparent when compared with other jurisdictions that have sought to reconcile the saisine principle with digital realities. For instance, the United States has enacted the Uniform Fiduciary Access to Digital Assets Act, which provides a legal basis for fiduciaries or executors to lawfully bypass security systems and access a decedent's digital assets. Singapore has likewise developed guidance on digital inheritance through its Personal Data Protection Act (PDPA). In Indonesia, however, instruments such as Law No. 1 of 2024 amending the Electronic Information and Transactions Law, as well as currency-related legislation, have yet to

provide clear guidance regarding the inheritance of digital assets and the transfer of access rights(Limna and Nivornusit 2026).

Given that blockchain systems do not submit to conventional court orders, civil law must adapt by recognizing technical engineering measures as valid means of implementing the saisine principle. The transfer of private keys must be institutionalized within estate planning mechanisms through three legally acceptable technical alternatives:

a) Custody of an Authentic Will Secured by Physical Safeguards: The decedent may draft a will with the assistance of a notary, the substance of which includes the private key and technical instructions for accessing the crypto wallet. This document is then secured within a bank safe deposit box, accessible to the heirs only upon presentation of a death certificate.
b) Utilization of Multi-Signature Wallet Ecosystems and Custodial Services: Access rights may be secured from the outset through the use of a multi-signature (multi-sig) wallet. Under this scheme, the execution of the digital will is distributed among the decedent, the notary, and the heirs, thereby ensuring transparency in the transfer of assets. Additionally, the decedent may utilize custodial services provided by officially registered crypto exchanges, enabling heirs to claim their rights upon presentation of authentic documents such as a death certificate and proof of heirship.
c) Legal Recognition of the Shamir Backup Method (Key Fragmentation): Civil law should recognize the application of the Shamir Backup mechanism, a cryptographic method that divides the master seed of a crypto wallet into multiple fragments. These key fragments are distributed to several heirs during the decedent's lifetime. Upon the decedent's death, a quorum consensus (for example, 3 out of 5 key holders) is required to reconstruct the key and execute the transfer of inherited assets. This method perfectly reflects the collective nature of heirs' control over the estate while simultaneously preventing unilateral misappropriation of assets by any single party.

This reconstruction carries an important implication: the need to recognize digital wills or digital credential testaments as new legal instruments. A will would no longer contain merely the distribution of assets, but also the mechanism for transferring technical access.(Limna and Nivornusit 2026) In this context, notaries and deed officials must begin to adopt schemes for storing encrypted credentials that can be accessed after the testator's death, for example through multi-signature authorization or smart contract–based inheritance mechanisms.

Furthermore, the saisine principle must be reinterpreted as follows:

> *"The transfer of rights by operation of law entails the obligation of the legal system to ensure the continuity of access to inheritable objects, including through the engineering of technical mechanisms that enable the execution of such rights."*

Without this reconstruction, the saisine principle risks losing its relevance in the Web3 era, as it would apply only to objects subject to institutional control, while a substantial portion of future digital wealth exists beyond such control.

From a deeper dogmatic legal perspective, the reconstruction of the saisine principle must be confronted with the property law maxim "Bezit geldt als volkomen titel" (Article 1977 of the Civil Code), which holds that whoever possesses a movable object is presumed to be its lawful owner. Within the blockchain ecosystem, this maxim operates in an absolute technical sense: the holder of the private key is both the bezitter (possessor) and the eigenaar (owner) in a definitive manner. If the private key falls into the hands of a third party whether through hacking or unilateral control by a bad-faith heir the traditional civil law system becomes effectively powerless. Lawful heirs cannot bring a revindicatoir action (a proprietary recovery claim under Article 574 of the Civil Code), due to the immutable nature of blockchain transactions, which cannot be altered or reversed even by court order.

Therefore, legal protection for heirs can no longer rely on post-factum mechanisms (dispute resolution after the decedent's death), but must instead shift toward ex-ante mitigation (preventive measures undertaken during the decedent's lifetime). This shift opens the way for the application of smart contracts as a Digital Executor of Wills (*Digital Executeur Testamentair*).

Pursuant to Article 1005 of the Civil Code, a testator is entitled to appoint an executor of the will. Within the Web3 context, a smart contract may be legally construed as an autonomous agent that executes the testator's intent. When connected to an oracle (an external data provider that verifies the testator's death through a digital death certificate issued by the civil registry), the smart contract can automatically distribute crypto assets proportionally to the respective wallets of the heirs. Under this construction, the smart contract functions not merely as a technological protocol, but acquires juridical legitimacy as an instrument for the execution of saisine by operation of law, immune to manipulation or concealment of assets by certain parties.

3.2. Problematics of Appraisal (Valuation) and the Mechanism for Fulfilling the Legitime Portie in Relation to Digital Assets with Extreme Volatility

The second fundamental issue in the inheritance of cryptographic assets concerns the challenge of fulfilling the legitime portie (forced heirship portion). Pursuant to Article 913 of the Civil Code, the legitime portie constitutes a portion of the estate that must mandatorily be granted to heirs in the direct line under the law, which the testator is not permitted to derogate from either through a will or through inter vivos transfers.

The problem arises because digital assets, particularly crypto assets, do not possess a value base guaranteed by any central authority; rather, their price is driven purely by market participants' expectations of future appreciation(Afrizal and Marliyah 2021). This characteristic causes crypto assets traded on public markets to experience rapid and extreme price volatility. It is precisely this high degree of fluctuation that fundamentally complicates the valuation process for inheritance distribution, making it difficult to ensure an equitable division among heirs.

According to the construction of Article 921 of the Civil Code, the calculation of the legitime portie requires the inventory and valuation of the entire estate at the moment of the decedent's death (boedel open)(Marsanti and Urbaniasi 2025). However, if this norm is rigidly applied to crypto assets (for example, Bitcoin valued in Indonesian Rupiah at the time of death), a disparity of fairness may arise at the stage of estate distribution (boedelscheiding). The interval between the decedent's death and the actual distribution of the estate often takes a considerable amount of time. If a bear market (a sharp price decline) occurs at the time of distribution, the remaining estate may be insufficient to cover the nominal Rupiah value of the legitime portie calculated at the time of death. Conversely, during a bull market (a sharp price increase), the forced heirs may be disadvantaged because their portion is fixed based on a relatively low fiat value determined in the past.

The lack of clear regulation concerning the volatility of digital assets frequently gives rise to tangible family conflicts, where disagreements over rights and asset distribution can strain relationships among heirs and culminate in protracted legal disputes. Therefore, civil law must provide an adaptive appraisal mechanism. The valuation of crypto assets for inheritance distribution may, in principle, be undertaken through several alternative approaches:

a) Valuation at the date of death: calculating the asset's value precisely at the time of the decedent's death in accordance with the literal text of Article 921 of the Civil Code.
b) Valuation at the date of distribution: calculating the asset's value at the moment the estate is actually distributed to the heirs.
c) Average valuation: adopting a median value derived from price fluctuations during the transitional period.
d) Valuation based on agreement: allowing the heirs to determine the price through mutual consensus.
e) In-kind (in-natura) distribution: distributing the assets purely in the form of the crypto coins/tokens themselves without converting them into fiat currency.

From the perspective of modern civil law dogmatics, in order to achieve absolute fairness for forced heirs, the most precise approach is a shift from fiat-based appraisal toward in-kind distribution. Given that crypto assets have been legally recognized as commodities in Indonesia, the heirs' forced shares should no longer be calculated based on the question, "How many Rupiah was the crypto asset worth

at the time of the decedent's death?" but rather, "What percentage or fraction of the total coins/tokens left behind constitutes the heirs' rightful portion?"

Through this principle, the law applies the Shared Volatility Risk Principle. Both forced heirs and testamentary beneficiaries bear the burden of market fluctuation risks proportionally, on an in-natura basis.

As an additional mitigation measure during the transitional period of valuation determination, the crypto assets must be secured in an impartial manner. Ideally, the assets should be transferred automatically or safeguarded with the assistance of a third party (custodian). The use of a multi-signature (multi-sig) wallet is highly recommended, as it enables shared control of access rights among the decedent, the notary, and the heirs.

This analytical approach demonstrates that Indonesian civil inheritance law, in fact, possesses inherent flexibility. By reconstructing the interpretation of Article 921 of the Civil Code through an in-kind appraisal approach and adopting custodial mechanisms, the law can provide certainty and assurance in the fulfillment of the legitime portie, rendering it resilient to the extreme volatility of cryptographic assets in the Web3 era.

4. CONCLUSION

Based on the dogmatic legal analysis and the technical review of the decentralized ecosystem, this research arrives at two principal conclusions:

a) Reconstruction of the Saisine Principle in Relation to Cryptographic Assets: Civil law can no longer rely solely on post-factum normative transfer of rights. For the saisine principle (Article 833 of the Civil Code) to retain its executory force, cryptographic access rights (private keys or seed phrases) must be juridically recognized as an inherent part of intangible property (Articles 503 in conjunction with 504 of the Civil Code). Accordingly, inheritance law must legitimize ex-ante mitigation measures, such as recognizing smart contracts as Digital Executors of Wills (Digital Executeur Testamentair), as well as implementing Shamir Backup methods and multi-signature wallets jointly managed by notaries and heirs to ensure certainty of access after death.
b) Appraisal Mechanism and Fulfillment of the Legitime Portie: The normative ambiguity in Article 921 of the Civil Code regarding asset valuation at the time of death (boedel open) fails to ensure fairness for forced heirs due to the extreme volatility of crypto assets. The dogmatic solution to this impasse lies in shifting from a fiat-based appraisal paradigm toward an in-natura (token-based) appraisal approach. Under this method, the legitime portie is calculated purely as a percentage of tokens, thereby distributing volatility risk proportionally among all heirs in accordance with the Shared Volatility Risk Principle. The temporary safeguarding of assets through custodial wallets is also imperative during the boedelscheiding process.

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