

A COMPREHENSIVE REGULATORY MECHANISM FOR CRYPTO-ASSETS AS A TOOL FOR REDUCING LEGAL UNCERTAINTY

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Abstract. The paper examines the need to develop a comprehensive regulatory mechanism for crypto-assets in the context of decentralized digital financial systems. The relevance of the study is determined by the fact that traditional regulatory approaches, based mainly on formal restrictions, licensing, and control of individual market participants, do not fully eliminate legal uncertainty in the crypto-asset market. The purpose of the paper is to substantiate a mechanism-oriented model of crypto-asset regulation that integrates declaration, recordkeeping, monitoring, control, enforcement, and regulated circulation into a unified governance system. The study is based on an institutional approach and applies structural-functional, comparative, and mechanism-based analysis. The findings show that the effectiveness of crypto-asset regulation depends not only on the existence of legal norms, but also on the coherence of regulatory procedures, infrastructure intermediaries, financial monitoring mechanisms, and behavioral incentives for market participants. The paper concludes that reducing legal uncertainty requires the development of institutional infrastructure, including banking integration, licensed intermediaries, payment channels, identification procedures, and agency-based access mechanisms to the regulated segment of the crypto-asset market.

Keywords: *crypto-assets; regulatory mechanism; digital governance; legal uncertainty; licensed intermediaries; banking integration; regulated circulation; institutional infrastructure.*

Introduction

The development of crypto-assets has created a new institutional environment in which financial transactions, digital technologies, and regulatory systems interact under conditions of decentralization and cross-border circulation. Unlike traditional financial instruments, crypto-assets may circulate outside centralized financial infrastructure and can be transferred through decentralized platforms, peer-to-peer channels, non-custodial wallets, and foreign service providers. This creates serious challenges for public regulation, financial monitoring, and enforcement.

The theoretical basis for understanding these challenges lies in the hybrid nature of crypto-assets. Previous research has shown that crypto-assets cannot be reduced to a single economic category, since they combine the features of financial instruments, digital technologies, investment assets, payment instruments, and tokenized forms of real assets (Iminokhunov & Khakimov, 2026a). This complexity complicates not only their scientific classification, but also the construction of effective regulatory mechanisms.

A subsequent study demonstrated that the main difficulty of crypto-asset regulation is not limited to the existence or absence of legal norms. The more fundamental problem lies in institutional uncertainty in law enforcement, which arises from the absence of unified criteria for interpreting legal categories and results in heterogeneous enforcement decisions and asymmetry of legal risks (Iminokhunov & Khakimov, 2026b). Therefore, the development of crypto-asset regulation requires not only legal clarification, but also the formation of mechanisms that ensure consistency in implementation and enforcement.

The present paper develops this research logic by focusing on the comprehensive regulatory mechanism proposed in the authors' current study on institutional governance of crypto-asset regulation. This study substantiates that legal uncertainty is reproduced through institutional gaps between formal norms, their interpretation, enforcement practice, infrastructural implementation, and the behavior of market participants. It also proposes a coordinated governance mechanism aimed at reducing such uncertainty through the integration of declaration, recordkeeping, monitoring, control, enforcement, and regulated circulation (Iminokhunov & Khakimov, 2026c, in press).

The purpose of this paper is to substantiate a comprehensive regulatory mechanism for crypto-assets as a tool for reducing legal uncertainty and forming the institutional infrastructure of the regulated crypto-asset market. The paper argues that regulatory effectiveness depends not only on the strengthening of control, but also on the development of accessible and legally identifiable channels through which market participants can operate within the regulated segment.

Methods

The methodological basis of the study is the institutional approach, which makes it possible to analyze crypto-asset regulation as a system of interaction between formal rules, infrastructure mechanisms, enforcement procedures, and the behavioral responses of market participants. This approach is appropriate because crypto-asset regulation cannot be fully understood only through the analysis of legislation. It requires consideration of how legal norms are implemented through intermediaries, technological systems, financial monitoring procedures, and market incentives.

The study applies structural-functional analysis to identify the main elements of the proposed regulatory mechanism. These elements include declaration, recordkeeping, monitoring, control, enforcement, and regulated circulation. Each element performs a specific function in the regulatory process, while their integration forms a unified governance cycle.

A mechanism-based analysis is used to explain how the proposed regulatory mechanism can reduce legal uncertainty. This method allows the study to move beyond the description of individual regulatory instruments and examine the sequence through which information is collected, processed, assessed, transformed into a decision, and then implemented through enforcement or regulated circulation.

The study also uses comparative analysis. The proposed model is compared with two institutional forms: the traditional financial system and the modern crypto-asset market. The traditional financial system is characterized by centralized institutions and formalized control channels, while the crypto-asset market is characterized by decentralization, technological flexibility, cross-border interaction, and fragmented regulatory coverage. The proposed model is interpreted as an intermediate institutional form that combines regulatory controllability, infrastructural accessibility, and adaptability to the decentralized nature of crypto-assets.

The methodological logic of the paper follows the continuity of the authors' previous and current studies. The first study clarified the theoretical and categorical foundations of crypto-assets as hybrid objects of the digital economy (Iminokhunov & Khakimov, 2026a). The second study identified institutional uncertainty and contradictions in law enforcement practice (Iminokhunov & Khakimov, 2026b). The third study developed an institutional governance framework and a comprehensive mechanism for crypto-asset regulation (Iminokhunov & Khakimov, 2026c, in press).

Results and Discussion

The analysis shows that fragmented regulatory approaches are insufficient for reducing legal uncertainty in crypto-asset markets. Regulation based only on licensing, prohibitions, or

the control of individual service providers cannot fully address the institutional nature of uncertainty. This is because legal uncertainty arises not only at the level of formal norms, but also at the stages of interpretation, implementation, monitoring, enforcement, and behavioral adaptation.

The first element of the proposed comprehensive mechanism is declaration. Declaration performs the function of forming an initial information base about crypto-asset transactions, participants, and the movement of digital assets within the regulated environment. Without such an information base, the regulatory system remains reactive and fragmented, because public authorities and infrastructure intermediaries receive information only after violations or suspicious transactions have already occurred.

The second element is recordkeeping. In the context of crypto-assets, recordkeeping should not be understood narrowly as accounting in the traditional sense. It includes the systematic recording of transactions, identification data, obligations of participants, transaction history, and relevant compliance information. This element is necessary for ensuring transparency and creating the institutional memory of the regulated market.

The third element is monitoring. Monitoring makes it possible to detect deviations, suspicious transactions, unusual patterns of behavior, and inconsistencies between declared activity and actual market operations. In the crypto-asset market, monitoring is especially important because transactions may move across centralized and decentralized channels, and market participants may rapidly change their behavior in response to regulatory pressure.

The fourth element is control. Control ensures the verification of compliance with regulatory requirements. However, control becomes effective only when it is connected with a clear decision-making procedure. In many regulatory systems, there is a gap between monitoring and enforcement: violations may be detected, but the transformation of analytical information into regulatory action may remain delayed, inconsistent, or institutionally fragmented.

For this reason, the proposed mechanism includes a decision-making point. This element answers the question of whether a violation has been detected and whether enforcement measures should be applied. The presence of such a point is essential because it transforms the regulatory process from a passive system of observation into an active governance mechanism. It links information collection, monitoring, and control with practical institutional consequences.

The fifth element is enforcement. Enforcement includes measures aimed at responding to violations, restricting illegal activity, blocking suspicious transactions, limiting access to assets, imposing sanctions, or applying other legally established measures. In this context, enforcement should not be considered only as punishment. It is a functional element of institutional governance, because it closes the gap between regulatory requirements and actual behavior.

The final element is regulated circulation. The purpose of regulation is not only to restrict illegal activity, but also to create conditions for legal and institutionally supported participation in the crypto-asset market. Regulated circulation means that crypto-assets operate through identifiable participants, licensed intermediaries, monitored transaction channels, and legally recognized infrastructure. This is essential for reducing the asymmetry of legal risks and increasing trust in the regulated segment.

The proposed mechanism differs from traditional risk-based approaches. International standards, including FATF recommendations, primarily focus on anti-money laundering and counter-terrorism financing risks, as well as on the control of virtual asset service providers. These standards are important, but they do not fully resolve the institutional problem of legal uncertainty. Their main focus is risk prevention, while the proposed mechanism is aimed at

ensuring institutional coherence between legal norms, infrastructure, enforcement, and market behavior.

The development of institutional infrastructure is a necessary condition for the practical functioning of the proposed mechanism. If the regulated market segment is difficult to access, expensive, inconvenient, or technologically unattractive, market participants may continue to use decentralized platforms, P2P transactions, foreign services, and informal channels. Therefore, regulation should not rely only on restrictions. It should also create accessible and economically rational channels for legal participation.

Banking integration is one of the most important components of this infrastructure. It does not mean that banks must directly become crypto-asset operators. Rather, it means that regulated channels of interaction should be formed between the banking system and licensed crypto-financial service providers. Through such channels, it is possible to organize deposits and withdrawals of funds, customer identification, compliance procedures, payment processing, transaction monitoring, and the transfer of necessary information within the framework of financial control.

Licensed intermediaries also play a central role. They serve as legally identifiable points of interaction between the state, the financial system, technological infrastructure, and market participants. Unlike decentralized platforms, licensed intermediaries can perform identification, verification of the origin of funds, monitoring of transactions, storage of information, compliance procedures, and communication with regulators. In this sense, they transform abstract regulatory requirements into practical operational procedures.

Agency-based access mechanisms represent another important component of institutional infrastructure. These mechanisms may include authorized agents, banking interfaces, payment organizations, fintech platforms, and other regulated participants through which users can access licensed crypto-financial services. Their role is to reduce the institutional distance between market participants and the regulated segment. If access to the legal market is too narrow, users may prefer alternative and less transparent channels. If access is convenient and institutionally supported, the incentives to remain within the legal segment increase.

The combination of banking integration, licensed intermediaries, identification procedures, payment channels, and agency-based access mechanisms allows the regulatory system to perform two functions simultaneously. First, it strengthens control by making transactions more transparent and participants more identifiable. Second, it creates service conditions that make legal participation more practical and attractive. This combination is necessary because excessive reliance on restrictions may push participants into informal channels, while excessive liberalization may weaken regulatory oversight.

Thus, the comprehensive regulatory mechanism should be understood as a closed-loop governance system. It collects information through declaration and recordkeeping, analyzes risks through monitoring, verifies compliance through control, transforms analysis into action through a decision-making point, applies enforcement where necessary, and supports regulated circulation through institutional infrastructure. Such a system makes it possible to move from fragmented regulation to coordinated digital governance.

The proposed model also has practical significance for countries developing regulated crypto-asset markets. In such jurisdictions, the key task is not only to prohibit illegal circulation, but also to create institutional conditions for the growth of the legal segment. This requires infrastructure that connects crypto-financial services with banks, licensed intermediaries, payment systems, and user identification mechanisms. In this respect, the model can serve as a methodological basis for improving crypto-asset regulation and reducing legal uncertainty.

Conclusion

The study shows that reducing legal uncertainty in crypto-asset regulation requires a transition from fragmented regulatory measures to a comprehensive institutional governance mechanism. Traditional approaches based mainly on licensing, restrictions, and control of individual participants are insufficient because they do not fully address the institutional gaps between norms, interpretation, enforcement, infrastructure, and market behavior.

The proposed comprehensive mechanism integrates declaration, recordkeeping, monitoring, control, enforcement, and regulated circulation into a unified governance cycle. Its key advantage lies in the presence of a decision-making point that links analytical procedures with regulatory action. This makes it possible to move from a reactive model of regulation to a proactive model aimed at preventing deviations and reducing institutional uncertainty.

The paper also shows that institutional infrastructure is not a technical supplement to regulation, but a necessary condition for its effectiveness. Banking integration, licensed intermediaries, payment channels, identification procedures, and agency-based access mechanisms make it possible to expand the regulated segment of the crypto-asset market and reduce incentives to use informal or decentralized channels.

The thesis demonstrates continuity between the authors' three studies. The first study clarified the theoretical and categorical foundations of crypto-assets as hybrid objects of the digital economy (Iminokhunov & Khakimov, 2026a). The second study identified institutional uncertainty and law enforcement contradictions in the regulation of crypto-assets (Iminokhunov & Khakimov, 2026b). The third study proposed an institutional governance framework and a comprehensive regulatory mechanism aimed at reducing legal uncertainty and developing the infrastructure of the regulated crypto-asset market (Iminokhunov & Khakimov, 2026c, in press).

Thus, the effectiveness of crypto-asset regulation depends not only on the content of legal norms, but also on the ability of the institutional system to ensure coherence between regulation, infrastructure, enforcement, and market behavior. In the context of decentralized digital finance, the development of such a mechanism is a necessary condition for forming a transparent, predictable, and institutionally stable crypto-asset market.

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