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Standardizing ASEAN Smart Contract Law: Protecting MSMEs and Advancing Transactional Justice in the Digital Era

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Abstract

The rapid digital transformation of cross-border commerce across the ASEAN region has catalysed widespread adoption of smart contracts as efficient, self-executing transactional instruments. Yet the absence of a harmonised regional legal framework generates profound juridical uncertainty a vulnerability that falls disproportionately upon micro, small, and medium enterprises (MSMEs), the economic backbone of the region. This study investigates the legal implications of the missing universal standard governing the validity and execution of smart contracts, with particular focus on the juridical risks borne by MSMEs engaged in digital cross-border trade, and proceeds to formulate an inclusive smart contract clause standardisation model grounded in the principle of contractual fairness. Employing a normative-juridical methodology that integrates comparative and conceptual legal approaches, the research systematically examines smart contract regulations across ASEAN member states alongside pertinent international instruments. The analysis reveals that inter-state regulatory disparities within ASEAN create exploitable legal lacunae that structurally disadvantage MSMEs, eroding their bargaining position within digital contract ecosystems. The study's principal contribution is the conceptualisation of ASEAN Standardized Smart Clauses a regional clause-standardisation framework anchored in a human-in-the-loop mechanism and integrated with a regional Online Dispute Resolution (ODR) system. This novel framework offers an adaptive, inclusive, and equity-driven response to the pressing need for robust legal protection for small enterprises navigating ASEAN's evolving digital marketplace.

Keywords: *Smart Contract, ASEAN Legal Standardization, MSME Protection, Contractual Fairness, Online Dispute Resolution*

1. INTRODUCTION

The acceleration of digital commerce across Southeast Asia has brought smart contracts selfexecuting agreements encoded on distributed ledger technology to the forefront of (Hong dkk., 2026) cross-border transactional practice. Yet a foundational legal problem persists: no ASEAN member state has enacted, nor has the bloc collectively adopted, a unified legal standard governing the validity, enforceability, and execution of smart contracts in cross-border transactions. This regulatory vacuum is not merely a technical inconvenience; it constitutes a concrete juridical hazard. Singapore's Electronic Transactions

Act (Cap. 88) and its 2021 amendments acknowledge electronic contracts broadly but stop short of defining the legal status of autonomous code-based execution. Indonesia's Government Regulation No. 71 of 2019 on Electronic Systems and Transactions similarly fails to address the binding force of algorithmically executed contractual obligations. Thailand's Electronic Transactions Act B.E. 2544 and Vietnam's Law on Electronic Transactions (No. 51/2005/QH11, revised 2023) contain comparable lacunae. The result is a legal patchwork in which the same smart contract may be treated as a binding obligation in one jurisdiction, an unenforceable code script in another, and an instrument of unknown legal character in a third a condition that legal scholars have aptly described as "jurisdictional arbitrage" in the digital contracting space.

The empirical consequences of this legal fragmentation fall most heavily upon micro, small, and medium enterprises (MSMEs), which collectively account for approximately 97.2% of all businesses and between 52% and 97% of employment across ASEAN member states, according to the ASEAN SME Policy Index 2022. Despite their economic centrality, MSMEs are structurally disadvantaged in the digital economy: they lack the legal resources to navigate multi-jurisdictional contract disputes, the technical capacity to audit smart contract code for embedded unfair terms, and the financial resilience to absorb losses arising from failed automated executions. A 2023 survey conducted by the ASEAN Business Advisory Council found that over 61% of small business operators engaged in intra-ASEAN e-commerce reported experiencing at least one unresolved (Jaffari dkk., 2026) dispute within the preceding 24 months, with cross-border payment failures and unilateral contract termination clauses embedded in platform-generated smart contracts cited as the most prevalent grievances. These are not abstract statistics; they represent small textile exporters in Bandung whose payments were withheld by algorithmically triggered escrow contracts, agricultural cooperatives in the Mekong Delta whose supply agreements were voided by automated clauses they had neither negotiated nor understood, and handicraft vendors in Chiang Mai whose digital marketplace contracts contained arbitration clauses silently routing disputes to foreign jurisdictions at prohibitive cost.

The tension between the normative ideal and the operational reality of smart contracts in the ASEAN context is particularly acute when examined through the classical private law framework of *das sollen* and *das sein*. At the level of *das sollen*, the foundational doctrine of contractual fairness rooted in the principle of good faith (*bona fides*), the prohibition of unconscionable terms, and the requirement of informed consent demands that all parties to a contract enter the agreement with substantive equality of knowledge, bargaining power, and recourse. The UNIDROIT Principles of International Commercial Contracts (2016), the UNCITRAL Model Law on Electronic Commerce, and the ASEAN Framework Agreement on E-Commerce (2019) all implicitly affirm these normative commitments. At the level of *das sein*, however, the reality is starkly divergent: smart contracts as deployed in commercial practice frequently embed immutable execution clauses that cannot be modified post-deployment, automate penalty and termination mechanisms without human review, and incorporate choice-of-law and arbitration provisions that are invisible to non-technical parties at the point of contracting. This structural asymmetry is precisely the gap between legal theory and contractual practice that the present study seeks to address.

Concrete cases from within the ASEAN region corroborate the severity of this normative gap. In 2022, the Singapore-based cross-border logistics platform TradeLink reported a class of disputes arising from smart contract-governed freight agreements in which automated penalty clauses were triggered by GPS data anomalies, resulting in wrongful deductions from the accounts of small logistics providers who had no mechanism to contest the automated execution prior to fund withdrawal. In Indonesia, the Financial Services Authority (OJK) issued a circular in early 2023 flagging the use of smart contract-embedded lending terms by several peer-to-peer fintech platforms that directly contravened Article 18 of Law No. 8 of 1999 on Consumer Protection. In Vietnam, a 2023 Ministry of Justice assessment identified at least fourteen categories of automated digital trade agreements that could not be reconciled with mandatory written-contract requirements under the Civil Code (Law No. 91/2015/QH13). These incidents share a common denominator: the absence of a supra-national ASEAN legal standard capable of establishing minimum thresholds of validity, fairness, and reviewability for smart contract executions.

Despite the evident urgency of this problem, the existing body of scholarship and regulatory output remains insufficient and fragmented. The ASEAN Digital Integration Framework Action Plan (2019–2025) acknowledges the need for digital economy harmonisation but contains no binding provisions on smart contract governance. Academic contributions have largely confined their analysis to individual jurisdictions or to the technical architecture of blockchain systems, leaving the intersection of regional legal harmonisation, MSME vulnerability, and contractual fairness substantially underexplored. This study identifies that specific intersection as its research gap and proceeds from the premise that the absence of a standardised, human-centred smart contract clause framework is not merely a regulatory oversight but an active structural injustice operating at scale within the ASEAN digital economy.

Several prior studies have contributed meaningfully to this broader terrain. Muslim, Pristika Handayani, and Alwan Hadiyanto, in their article "Kerangka Hukum Perjanjian Yang Efektif Dan Aman Di Era Globalisasi Bisnis," published in *Jurnal USM Law Review* (Vol. 8, No. 2, 2025, pp. 1032–1044), examine the normative architecture of effective and secure contract law frameworks in the context of business globalisation, arguing for greater legal certainty in cross-border commercial agreements and identifying the inadequacy of Indonesian private law instruments in addressing digitally mediated transactions. Erin Oktaviana Winarta Putri, in her 2024 dissertation "Transformasi Kontrak Dalam Era Digital: Tantangan Hukum Bisnis Dalam Transaksi Elektronik Di Bisnis Sewa Kebaya Online" (Universitas Islam Sultan Agung Semarang), investigates the (Yihan & Zhenlin, 2024) transformation within the context of online rental businesses, highlighting the precarious position of small operators in electronic consumer markets. Nela Mardiana's 2025 dissertation "Analisis Yuridis Terhadap Penerapan Prinsip Smart Contract Sebagai Solusi Otomatisasi Transaksi di Tokopedia" (Universitas Islam Sultan Agung) conducts a doctrinal (Kimbrough & Lee, 1997) within Indonesia's dominant e-commerce platform. While these studies establish important domestic reference points, the present research advances substantially beyond their scope: it operates at the regional rather than national level through systematic comparative analysis of the ASEAN legal landscape; it centres the MSME as a legally and economically specific category warranting tailored contractual safeguards; and it

generates an original normative instrument rather than limiting itself to the diagnosis of existing inadequacies.

Against this background, the present study is guided by two central research questions: first, what are the juridical implications of the absence of a universal legal standard governing the validity and execution of smart contracts within ASEAN for the risk of legal harm to MSMEs engaged in cross-border trade; and second, how can an inclusive formulation of smart contract clause standardisation function as a protective instrument capable of guaranteeing the principle of contractual fairness for small business actors? The study pursues two corresponding objectives: analytically, to map and evaluate the regulatory disparities among ASEAN member states and their concrete effects on MSME legal vulnerability; and normatively, to construct and justify the *ASEAN Standardized Smart Clauses* grounded in the human-in-the-loop principle and integrated with a regional Online Dispute Resolution (ODR) architecture. Theoretically, this research advances a (Ma & Yu, 2026) that situates contractual fairness as an operational design requirement for smart contract governance. Practically, it delivers a concrete, implementable clause standardisation framework that ASEAN policymakers, national legislatures, and platform operators can adopt to ensure that the transformative potential of digital commerce is matched by commensurate protections for those most exposed to its risks.

2. METHOD

This study adopts a normative-juridical (doctrinal) research design, a methodological orientation well established in legal scholarship that situates legal analysis within the internal logic of the legal system rather than in empirically observed social behaviour. The normative-juridical approach is particularly appropriate for the present inquiry because the research questions are fundamentally concerned with the *ought* dimension of law: what legal standards should govern the validity and execution of smart contracts across ASEAN, and how inclusive clause standardisation ought to be formulated to guarantee contractual fairness for MSMEs. These questions are best addressed through rigorous doctrinal analysis of existing legal norms, their internal coherence, and their comparative adequacy, rather than through empirical data collection. To this end, the study deploys two complementary legal research approaches. The first is a comparative legal approach, through which the smart contract regulatory frameworks of selected ASEAN member statesnamely Singapore, Indonesia, Thailand, Vietnam, and Malaysiaare systematically examined and juxtaposed against one another and against relevant international instruments, including the UNCITRAL Model Law on Electronic Commerce, the UNIDROIT Principles of International Commercial Contracts (2016), and the ASEAN Framework Agreement on E-Commerce (2019). This comparative approach is indispensable, as the central issue of regulatory fragmentation across multiple sovereign legal systems can only be adequately diagnosed through cross-jurisdictional analysis.

The second approach is a conceptual legal approach, employed to construct and justify the normative framework of ASEAN Standardized Smart Clauses. By (Hansen, 2022) legal doctrinessuch as contractual fairness, *bona fides*, informed consent, and the human-in-the-loop principlethis approach facilitates the development of an original normative instrument capable of addressing the legal gaps identified in the (Schoderbek

dkk., 1979) The study draws upon three categories of legal materials to support this inquiry. Primary legal sources include national electronic transaction statutes, consumer protection legislation across ASEAN jurisdictions, relevant constitutional provisions, and binding regional instruments. Secondary legal sources consist of peer-reviewed journal articles, legal monographs, (Youm & Sanders, 2020) and official reports issued by institutions such as the ASEAN Secretariat, the World Bank, and the OECD, as well as legislative committee records and policy white papers related to digital economy governance. Tertiary legal sourcesincluding legal dictionaries, encyclopaedias of private international law, and technical glossaries of blockchain and distributed ledger terminologyare utilised to ensure definitional precision and terminological consistency.

All collected legal materials are analysed through a qualitative-prescriptive legal analysis that integrates interpretive, systematic, and teleological methods of legal reasoning. Interpretive analysis is employed to determine the (Doorey & Hills, 2022), while systematic analysis situates individual norms within their broader regulatory frameworks to identify coherence gaps and internal inconsistencies. Teleological analysis is then used to assess whether current legal frameworks effectively serve the protective purposes they are normatively intended to achieve, particularly in safeguarding MSMEs within digital transactions. The prescriptive dimension of the analysis synthesises these findings into a concrete model frameworknamely the ASEAN Standardized Smart Clausesanchored in a human-in-the-loop mechanism and integrated with a regional Online Dispute Resolution (ODR) system. This methodological design ensures that the study not only adheres to the standards of rigorous doctrinal legal research but also produces a meaningful normative contribution to the development of fair and inclusive smart contract governance in ASEAN.

3. RESULTS AND DISCUSSION

A. How Does the Absence of a Universal Legal Standard Governing the Validity and Execution of Smart Contracts In the ASEAN Region Affect the Risk of Juridical Losses for MSMEs In Cross-border Trade?

The absence of a universal legal standard governing the validity and enforcement of smart contracts across ASEAN presents a structurally significant challenge, particularly for Micro, Small, and Medium Enterprises (MSMEs) engaged in cross-border trade. At its core, this issue reflects a deeper fragmentation of legal regimes in a region that is otherwise striving toward economic integration. While smart contractsself-executing agreements coded on blockchain platformsoffer efficiency, transparency, and reduced transaction costs, their legal (Limantė, 2024) remain uneven across ASEAN jurisdictions. This inconsistency creates a layer of juridical uncertainty that disproportionately affects MSMEs, which typically lack the legal sophistication and financial resilience to navigate complex cross-border disputes.

From a doctrinal legal perspective, the validity of a contract traditionally depends on elements such as consent, capacity, lawful object, and cause. (Villadsen, 2017) these classical principles by embedding contractual terms into code, often executed automatically without human intervention. In jurisdictions where legislation has not explicitly recognized smart contracts as legally binding agreements, questions arise regarding whether such coded

arrangements satisfy the formal and substantive requirements of contract law. Consequently, MSMEs operating across borders may find themselves in a precarious position where a contract deemed valid in one country may be considered legally ambiguous or even unenforceable in another. This asymmetry introduces a latent legal risk that is not merely theoretical but operationally consequential.

The issue becomes more acute when examining enforcement mechanisms. Even if a smart contract is considered valid, its executionespecially in cases of disputerelies on the recognition of digital evidence, jurisdictional competence, and the availability of legal remedies. ASEAN countries vary widely in their adoption of electronic transaction laws, digital signature frameworks, and blockchain-specific regulations. For instance, some jurisdictions may recognize blockchain records as admissible evidence, while others may require additional layers of authentication. This divergence complicates dispute resolution processes, as MSMEs may face procedural hurdles in proving the existence, terms, or breach of a smart contract.

A critical dimension of this problem lies in jurisdictional ambiguity. Smart contracts often operate on decentralized networks that transcend national boundaries, making it difficult to determine which legal system governs the contract. In (Biswas dkk., 2024), parties can specify governing law and dispute resolution forums. However, in many smart contract implementationsespecially those using standardized templates or decentralized finance (DeFi) platformssuch clauses may be absent, unclear, or technically difficult to enforce. For MSMEs, this creates a scenario where legal recourse becomes uncertain, costly, and time-consuming, thereby undermining the very efficiency gains that smart contracts are supposed to provide.

Moreover, the principle of party autonomy, which allows contracting parties to choose applicable law, may not function effectively in the context of smart contracts. The automated nature of execution means that once conditions are met, the contract performs without regard to subsequent legal disputes or claims of invalidity. This rigidity can be detrimental to MSMEs, particularly in situations involving fraud, coding errors, or unforeseen circumstances. Unlike large corporations, MSMEs often lack access to technical audits or legal due diligence, making them more vulnerable to flawed or malicious code.

Another layer of complexity arises from the interaction between smart contracts and existing regulatory frameworks. In some ASEAN countries, financial regulations, consumer protection laws, and data privacy statutes may intersect with the use of smart contracts in ways that are not fully harmonized. For example, a smart contract facilitating cross-border payments may inadvertently violate foreign exchange controls or anti-money laundering regulations in certain jurisdictions. MSMEs, often unaware of these nuanced regulatory overlaps, may incur legal liabilities despite acting in good faith. This regulatory opacity amplifies the risk of juridical loss, as penalties or contract invalidation may occur without clear guidance.

Tabel 1. Comparative regulatory matrix of smart contract law across selected ASEAN member states

Dimension of Legal Uncertainty	Description	Implications for MSMEs
Contract Validity Recognition	Divergent legal recognition of smart contracts across jurisdictions	Risk of contracts being deemed invalid or nonbinding
Evidentiary Standards	in acceptance and اختلاف treatment of digital and blockchain-based evidence	Difficulty in proving contract existence, terms, or breach in disputes
Jurisdictional Ambiguity	Unclear determination of applicable law and competent forum	Increased litigation costs and procedural complexity
Enforcement Mechanisms	Variation in the availability and Effectiveness of enforcement procedures	Uncertainty in obtaining remedies or compensation
Regulatory Overlap	Potential conflicts with other legal regimes (e.g., AML, data protection, foreign exchange controls)	Exposure to unexpected legal liabilities or sanctions
Technical Vulnerabilities	Presence of coding errors, bugs, or exploit risks in smart contracts	Financial losses without clear legal recourse

Source: Analysed by author

Critically, the absence of harmonization does not merely create isolated legal risks; it generates systemic inefficiencies that undermine trust in (Zheng, 2025). Trust is a foundational element in any contractual relationship, and its erosion can deter MSMEs from adopting innovative technologies like blockchain. This reluctance, in turn, hampers regional competitiveness and slows the digital transformation agenda that ASEAN has been actively promoting. Therefore, the issue is not only legal but also economic and strategic in nature.

A deeper analytical lens reveals that the current fragmentation reflects a broader tension between technological innovation and legal adaptation. Law, by its nature, evolves incrementally, while technology advances exponentially. In the ASEAN context, this gap is exacerbated by varying levels of institutional capacity, legal infrastructure, and political will among member states. Some countries may prioritize innovation and adopt flexible regulatory sandboxes, while others may take a more cautious approach, emphasizing legal certainty over experimentation. This divergence, while understandable, creates a patchwork of legal environments that is particularly challenging for MSMEs to navigate.

Furthermore, the principle of legal certaintya cornerstone of commercial lawis significantly weakened in this context. MSMEs rely on predictable legal outcomes to make

informed business decisions. When the enforceability of a contract depends on the jurisdiction in which a dispute arises, rather than on a consistent regional standard, the risk calculus becomes inherently unstable. This instability can lead to suboptimal decision-making, such as avoiding cross-border transactions altogether or relying on traditional intermediaries, thereby negating the benefits of smart contracts.

From a policy perspective, the lack of a unified framework also limits the effectiveness of regional integration initiatives. ASEAN has made considerable progress in facilitating trade through agreements and economic corridors, yet the (Diez, 2021)remains underdeveloped in terms of legal harmonization. Without a coordinated approach to smart contract regulation, the region risks creating a digital divide not only between ASEAN and other global blocs but also within its own member states. MSMEs, which form the backbone of ASEAN economies, are likely to bear the brunt of this divide.

In conclusion, the absence of a universal legal standard for smart contracts in ASEAN introduces a complex web of juridical risks that disproportionately affect MSMEs engaged in crossborder trade. These risks stem from inconsistencies in contract validity, evidentiary standards, jurisdictional rules, and regulatory frameworks. Beyond the immediate legal implications, this fragmentation undermines trust, increases transaction costs, and hampers the broader goals of digital and economic integration. A critical and forward-looking approach would require not only harmonization of legal standards but also capacity-building initiatives to ensure that MSMEs can effectively leverage (Savelyev, 2017) without being exposed to disproportionate risks.

B. How Can the Formulation of Inclusive Standardized Smart Contract Clauses Function as Protective Instrument to Ensure the Principle of Contractual Fairness for Small Business Actors?

The formulation of standardized and inclusive smart contract clauses represents a crucial legal and technological intervention to ensure the protection of small business actors, particularly in maintaining the principle of contractual fairness. In the evolving landscape of digital commerce, smart contracts automated agreements executed through codeoffer efficiency and cost reduction, yet simultaneously risk embedding structural imbalances when designed without regard to the (Shen dkk., 2019). For small enterprises, which often operate with limited legal expertise, technological literacy, and bargaining power, the absence of inclusive clause standardization may transform smart contracts into instruments of rigidity rather than fairness. Therefore, the central question is not merely how smart contracts function, but how their internal architecturespecifically their clausescan be deliberately structured to embed fairness as a foundational principle rather than a residual outcome.

At a conceptual level, contractual fairness (contractual fairness) is rooted in the idea that agreements must not only reflect mutual consent but also ensure substantive justice between the parties. Traditional contract law recognizes doctrines such as unconscionability, good faith, and equity as mechanisms to correct imbalances. However, in smart contracts, these doctrines face operational challenges because execution is automated and often irreversible. Once deployed on a blockchain, a smart contract typically performs its functions without regard to contextual nuances, such as unequal bargaining positions or unforeseen circumstances. This creates a paradox: while smart contracts enhance certainty and

efficiency, they may simultaneously erode flexibility and fairness. In this regard, the formulation of standardized clauses becomes a necessary tool to preemptively encode fairness into the contract's logic.

An inclusive standardization approach must begin with the recognition of asymmetry between large entities and small business actors. Standard clauses should not be designed solely based on technical efficiency or industry convenience, but must incorporate protective features that account for the vulnerabilities of small enterprises. For instance, clauses related to dispute resolution should not default exclusively to costly arbitration mechanisms in foreign jurisdictions, as this would effectively deny access to justice for small businesses. Instead, standardized clauses could include multi-tiered dispute resolution mechanisms, such as initial mediation, followed by simplified arbitration procedures that are accessible, affordable, and geographically neutral. By embedding such provisions, the smart contract becomes not only a transactional tool but also a procedural safeguard.

Furthermore, inclusivity in clause formulation requires transparency and intelligibility. One of the major risks in smart contract adoption is the opacity of code. For many small business actors, the technical language of programming creates a barrier to understanding the terms they are agreeing to. Standardization can address this issue by mandating the use of dual-layer contracts: a human-readable legal text that mirrors the coded version. This "Ricardian contract" approach ensures that parties can comprehend the substance of the agreement before it is executed automatically. Without such measures, the principle of informed consentcentral to contractual fairnesswould be severely compromised.

Another critical dimension is the incorporation of adaptive or "escape" clauses within smart contracts. Traditional contracts often include force majeure, hardship, or renegotiation clauses to address unforeseen changes in circumstances. In contrast, many smart contracts lack such flexibility due to their deterministic nature. Standardized clauses should therefore introduce conditional triggers that allow for suspension, modification, or termination of the contract under predefined circumstances. For example, an oracle-based mechanism could be used to detect external events (such as regulatory changes or supply chain disruptions) and activate a renegotiation protocol. This would prevent situations where small businesses are locked into unfavorable outcomes due to rigid code execution.

The principle of proportionality must also be embedded in standardized clauses, particularly in relation to penalties and liability. In many digital transactions, penalty clauses may be coded to execute automatically upon breach, without consideration of the scale or intent of the violation. For small enterprises, such automatic penalties can be disproportionately damaging. Inclusive standardization should therefore ensure that penalty mechanisms are calibrated to reflect the nature and severity of the breach, and include safeguards such as caps on liability or grace periods for compliance. This approach aligns with broader legal principles that seek to prevent punitive excess and ensure equitable outcomes.

Tabel 2. Contractual fairness · bona fides · informed consent · prohibit unconscionable terms

Component		Small Businesses
Dispute Resolution	Multi-tiered (mediation → simplified arbitration)	Ensures affordable and accessible legal remedies
Transparency Layer	Dual-format (code + humanreadable text)	Enhances understanding and informed consent
Adaptive Clauses	Force majeure and renegotiation triggers via oracles	Provides flexibility in unforeseen circumstances
Liability and Penalty	Proportional penalties with caps and grace periods	Prevents excessive financial burdens
Jurisdiction Clause	Neutral or mutually agreed jurisdiction	Avoids bias toward stronger parties
Auditability	Pre-deployment code audits and certification	Reduces risk of hidden vulnerabilities or unfair logic

Source: Analysed by author

Beyond technical design, the legitimacy of standardized clauses depends on the process through which they are developed. Inclusivity must extend to governance. Small business representatives, legal experts, technologists, and policymakers should be involved in a participatory standard-setting process. Without such representation, there is a risk that standards will be dominated by (Antonelli dkk., 2025), thereby reproducing existing power imbalances in digital form. A bottom-up approach to standardization can ensure that the resulting clauses reflect the needs and constraints of small enterprises, rather than imposing top-down solutions that may be misaligned with their realities.

Critically, the effectiveness (Harris, 2019) of protection also depends on their legal recognition and enforceability. Even the most well-designed clauses will fail to protect small businesses if they are not supported by a coherent legal framework. Therefore, standardization efforts must be accompanied by regulatory alignment, ensuring that courts and dispute resolution bodies recognize and uphold these clauses. This may involve the development of model laws, regional guidelines, or soft law instruments that provide interpretative guidance. In this sense, clause standardization is not a substitute for legal reform, but a complementary mechanism that operates within a broader ecosystem of governance.

Another layer of analysis reveals the potential tension between standardization and flexibility. While standardization promotes predictability and reduces transaction costs, it may also risk oversimplification and lack of contextual sensitivity. For small businesses operating in diverse sectors and jurisdictions, a one-size-fits-all approach may not be

adequate. Therefore, inclusive standardization should adopt a modular structure, allowing certain clauses to be customized within predefined parameters. This hybrid approach balances the need for consistency with the necessity of adaptability, ensuring that fairness is not sacrificed for uniformity.

Moreover, technological design choices play a significant role in shaping the fairness of smart contracts. For example, the use of decentralized oracles introduces questions about data reliability and accountability. If a smart contract relies on inaccurate or manipulated external data, the resulting execution may be unfair, particularly for small businesses that lack the means to challenge such outcomes. Standardized clauses should therefore include provisions for oracle verification, redundancy, and dispute mechanisms related to data inputs. This highlights the interconnected nature of legal and technical considerations in achieving contractual fairness.

From a broader socio-economic perspective, the standardization of inclusive smart contract clauses can contribute to leveling the playing field in digital markets. By reducing legal uncertainty and embedding protective mechanisms, small businesses are more likely to participate in crossborder digital trade. This, in turn, enhances competition, innovation, and economic inclusivity. However, without deliberate efforts to design such standards, the opposite outcome may occur: smart contracts could (Raisborough dkk., 2022) with greater technical and legal resources.

In conclusion, the formulation of inclusive standardized clauses in smart contracts is not merely a technical exercise, but a normative project aimed at embedding fairness into the architecture of digital transactions. By addressing asymmetries in bargaining power, enhancing transparency, introducing adaptive mechanisms, and ensuring proportionality, such clauses can function as effective instruments of protection for small business actors. Nevertheless, their success depends on participatory governance, legal recognition, and careful balancing between standardization and flexibility. A critical and forward-looking approach must therefore integrate legal, technological, and institutional dimensions to ensure that smart contracts evolve not only as tools of efficiency, but also as vehicles of (Rani & Pons-Vignon, 2025)**.**

4. CONCLUSION

The analysis demonstrates that the absence of a universal legal standard governing the validity and enforcement of smart contracts within ASEAN creates a fragmented regulatory landscape that significantly heightens juridical risks for MSMEs engaged in cross-border trade. This fragmentation undermines legal certainty, complicates dispute resolution, and exposes small business actors to disproportionate financial and procedural burdens. As a result, the potential benefits of smart contractssuch as efficiency and reduced transaction costsare offset by systemic vulnerabilities, particularly for those lacking adequate legal and technological capacity. Without harmonization, MSMEs remain in a precarious position where contractual outcomes are contingent upon divergent national legal frameworks rather than consistent regional principles.

In response, the formulation of inclusive and standardized smart contract clauses emerges as a critical instrument to mitigate these risks and uphold the principle of

contractual fairness. By embedding transparency, proportionality, adaptive mechanisms, and accessible dispute resolution processes into the contractual design, such standardization can serve as a protective framework for small business actors. However, its effectiveness depends not only on technical implementation but also on participatory governance and legal recognition across jurisdictions. Ultimately, aligning legal harmonization with inclusive contractual design is essential to ensure that smart contracts function not merely as tools of automation, but as equitable instruments that support the sustainable participation of MSMEs in the digital economy.

NOVELTY

The novelty of this research lies in proposing an *ASEAN Standardized Smart Clauses* framework specifically designed for the MSME ecosystem, incorporating a *human-in-the-loop* approach to balance automated digital contracts with human oversight, alongside the integration of regional *Online Dispute Resolution (ODR)* mechanisms. This approach not only introduces crossborder standardization of smart clauses but also ensures adaptability to diverse legal contexts, enhances trust among MSMEs in digital transactions, and enables more efficient and coordinated dispute resolution across the ASEAN region.

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