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Legal Regulations for Digital Insurance in Commercial Transactions in the Technology-Based Economy Era

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Abstract
This study examines the implementation of fundamental insurance principles within digital insurance (insurtech) models and the readiness of Indonesian commercial law regulations in responding to technological transformation. The development of insurtech introduces efficiency and broader access to risk protection; however, policy digitalization, algorithm-based underwriting, and automated claims may weaken the application of the principles of insurable interest, indemnity, and uberrimae fidei if not accompanied by legally recognized digital verification and documentation mechanisms. The findings indicate that insurance regulations and POJK 3/2024 on financial sector technological innovation remain general in nature and have yet to regulate specific issues such as smart contracts, definitions of digital loss, data governance, and electronic dispute resolution. Therefore, adaptive regulatory reform is required through sectoral insurtech regulations, classification of digital intermediaries, recognition of electronic evidence, Online Dispute Resolution (ODR) mechanisms, and regulatory sandboxes. This study recommends establishing a responsive legal framework grounded in legal certainty to support digital insurance innovation while strengthening consumer protection.

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1. INTRODUCTION

The development of the digital economy has triggered the emergence of new business ecosystems, including InsurTech, the integration of digital technology into the entire insurance industry value chain. This transformation affects not only product distribution but also underwriting, risk assessment, and claims services, thus overhauling the traditional insurance industry business model. Recent studies confirm that insurtech plays a role as a driver of efficiency and product innovation, requiring regulatory and governance changes. Technological evolution, such as big data, artificial intelligence (AI), blockchain, and IoT, is driving the emergence of microinsurance products, pay-as-you-go, and the use of parametric insurance based on measurable events. These innovations are expanding insurance access to previously underinsured segments, but are also changing the legal framework because these products require contractual mechanisms and automated evidence that differ from traditional policies. An OECD report documents the impact of these technologies on insurance business models and the need for adaptive policies.

The competitive impact of InsurTech on incumbents shows that technology startups are not only becoming alternative distribution channels but are also forcing conventional insurance companies to transform (collaboration, acquisition, or digital spin-off). This transformation impacts the rights and obligations of parties in insurance relationships

because the involvement of third parties (technology platforms, data providers) increases contract complexity and legal liability. Empirical studies on InsurTech disruption highlight this shift in market structure. Nationally, research on the digital transformation of the insurance industry in Indonesia shows accelerated technology adoption but also reveals variations in readiness among players (traditional insurers vs. startups). Local literature emphasizes the need for regulatory strategies that encourage innovation while maintaining market stability and consumer protection, as the characteristics of Indonesian consumers (varying financial literacy) pose unique challenges in implementing digital business models.

Normatively, the development of insurtech raises questions about legal thresholds: how can basic insurance principles, such as insurable interest, indemnity, and uberrimae fidei, remain protected when policies and claims are automated? Recent local studies suggest synergy between policymakers, regulators, and industry players to formulate appropriate technical standards while formulating adaptive consumer protection principles. This is crucial to ensure innovation does not compromise legal certainty.

The shift in transactions to the digital realm is transforming insurance contracts, from paper policies and face-to-face transactions to electronic contracts created, agreed upon, and monitored through digital platforms. This change impacts the verification, signing, and validity of contracts under civil law, a crucial topic because the classical legal system is built on the presupposition of physical transactions. Studies of electronic law in Indonesia emphasize the need for adaptive interpretation of contract principles. Digital mechanisms support automation, such as smart contracts, which enable the immediate execution of obligations when certain conditions are met. Technically, this promises efficiency and transparency, but from a legal perspective, it raises issues, including the interpretation of automated contractual clauses, determining who is responsible when code fails, and how court decisions interpret digital evidence or transaction logs. Studies on the application of smart contracts in insurance highlight their potential and limitations.

The shift in insurance distribution to digital platforms and multi-sided marketplace models has transformed the traditional role of agents and brokers from mere policy sellers to ecosystem facilitators. They now often act as data aggregators, product comparison providers, and user interface managers that mediate interactions between customers, insurance companies, and technology providers. This transformation raises fundamental questions about who legally occupies the position of agent or broker when platforms perform these functions, and whether platform operators should be subject to traditional agent/broker obligations, such as duty of care, duty to advise, and disclosure obligations. Conceptual and empirical analyses suggest that the form and boundaries of liability must be reconsidered as digital platforms take on substantive economic roles previously performed by human intermediaries.

This changing role directly impacts pre-contractual information disclosure requirements and representation standards. Platforms and their intermediaries must ensure that product information, premiums, exclusions, and coverage limitations are presented clearly, not misleadingly, and readily accessible. Failure to disclose information by digital intermediaries, whether due to confusing interface design, biased recommendation algorithms, or dark patterns, can give rise to misrepresentation or negligence claims that are more complex to prove in the context of digital evidence. International regulatory bodies emphasize that market conduct requirements should be expanded to cover digital distribution practices and ensure that information obligations remain effective in electronic formats.

From the perspective of evidential law and representation clauses, digitalization poses practical and normative challenges: evidence regarding what an intermediary represents, such as chat logs, UI screenshots, and recommendation logs, is technical in nature and must be standardized to be reliable in court. Meanwhile, clauses on representation and warranty in policies need to be adjusted to address automated interactions, algorithmic recommendations, and the role of third-party data providers. Legal literature on broker and platform liability indicates that courts tend to judge based on the actual conduct and reliance of the insured. Therefore, platform operators acting like brokers are at risk of similar liability. Consequently, practical recommendations for policymakers include: (a) regulating the classification of platform roles (agent, broker, or mere intermediary), (b) mandatory logging and retention of digital transaction evidence, and (c) tailored disclosure standards for digital UI/UX.

From a law enforcement and dispute resolution perspective, the shift to digital transactions has stimulated the need for online dispute resolution (ODR) mechanisms. ODR can offer fast and low-cost access, but must be designed to meet due process standards such as the right to defend, provide evidence, and enforce judgments. The literature on ODR and online mediation discusses implementation barriers and the requirements for institutional legitimacy.

Digitalization introduces new risks unfamiliar to traditional insurance, such as data breaches, cyberattacks, algorithm manipulation, and the risk of reliance on cloud service providers or third parties. Consequently, demand for cyber insurance products is increasing, and their development requires a clear legal basis for coverage, loss definitions, and proof mechanisms. A literature review on cyber risk and cyber insurance illustrates the complexity of quantifying and establishing cyber insurance coverage. In addition to technical risks, regulatory and operational risks also arise: inconsistent data processing standards across jurisdictions, ambiguity in platform responsibility for product distribution, and the potential for unfair contract terms (clauses that disadvantage policyholders). Therefore, the legal protection system must be able to address issues across the domains of civil law, consumer protection, and data protection. The MDPI report and several local studies emphasize the urgency of regulatory harmonization.

The need for legal protection extends beyond covering material losses to safeguarding consumer rights, such as the right to clarification regarding AI-based underwriting decisions, the right to data correction, and the right to an effective complaint mechanism. The legal aspects must be designed in an integrated manner: product, market regulation, and oversight mechanisms. Local studies in Indonesia have also begun to address the function of cyber insurance as a corporate risk mitigation instrument. Finally, legal certainty regarding the definition of digital loss, standardization of electronic evidence, and rules for the recovery and execution of judgments are crucial for digital insurance to function as a pillar of financial stability and commercial protection. Therefore, synergy between public policy (regulators), industry standards, and market literacy is crucial to reduce protection gaps.

Regulatory gaps arise because many insurance regulations were drafted before the wave of digitalization, thus failing to address issues such as telemetry data management, underwriting algorithms, or the role of digital platforms as contract facilitators. Normative research on Insurtech regulation in Indonesia shows that the Financial Services Authority Regulation (POJK) and related regulations have not fully accommodated the unique characteristics of Insurtech. Therefore, there is a need for sectoral and technical regulatory reform.

At the international level, bodies like the OECD have identified regulatory areas requiring attention, such as digital intermediation supervision, digital consumer protection, and market conduct standards in the digital environment. These reports encourage the harmonization of regulatory principles that are flexible (technology-neutral) yet specific enough to address new risks. This serves as an important reference for national policymakers. Meanwhile, in Indonesia, regulatory responses have demonstrated initiatives, such as the issuance of a Financial Services Authority Regulation (POJK) on financial sector technology innovation, but the general clauses in these regulations often lack operational provisions for regulating smart contract-based insurance practices, the use of third-party data, or system interoperability. The OJK's recent announcement on strengthening InsurTech standards acknowledges this gap, but technical implementation and enforcement remain challenging.

Regulatory gaps are also evident in law enforcement and dispute resolution procedures: the old regulations do not explicitly regulate ODR mechanisms for digital insurance disputes, the validity of blockchain evidence, or the governance of electronic logs as primary evidence. Studies on smart contracts and ODR emphasize the need for regulatory drafting that addresses the technology lifecycle in the context of civil law and consumer protection. Ultimately, the regulatory solution suggested in the literature is a multi-faceted approach: (i) formulating technical standards (data governance, interoperability), (ii) updating substantive insurance rules (digital policy coverage, loss definitions), and (iii) strengthening supervisory capacity and cross-jurisdictional harmonization. Implementing these solutions requires regular dialogue between regulators, industry, academia, and consumers so that regulations are not merely reactive but proactive in governing the digital insurance ecosystem.

Based on the background description that has been explained, the main problem in this research lies in how the commercial law system can adapt effectively to the development of digital insurance technology without sacrificing the basic principles of insurance and legal protection for consumers. Therefore, the problem formulation in this journal research is: first, how effective is the application of fundamental principles of insurance, including insurable interest, indemnity, and uberrimae fidei, in the implementation of technology-based insurance (Insurtech) when the transaction mechanism, policy distribution, and claim process are carried out digitally and automatically. Second, to what extent is the readiness and adequacy of the commercial law regulatory framework in Indonesia in ensuring legal certainty, accountability of business actors, and consumer protection in digital insurance practices, and how can the formation of adaptive legal norms be designed to address the gap between traditional regulations and the development of modern digital-based insurance businesses?

2. RESEARCH METHODS

In this study, we employ normative legal research with a statutory, conceptual, and comparative approach, conducted through an analysis of positive legal provisions related to insurance and digital commerce transactions, including Law Number 40 of 2014 concerning Insurance, Law Number 8 of 1999 concerning Consumer Protection, and regulations related to the digital economy and personal data protection. This study also uses a conceptual approach to examine the relevance of basic insurance principles such as insurable interest, indemnity, and uberrimae fidei in the implementation of digital insurance (Insurtech), and analyzes the legal implications of the digitalization of policy distribution mechanisms, insurance intermediation, and automation-based claims. Furthermore, a

comparative approach is used by examining Insurtech regulatory practices from other jurisdictions such as the European Union and Singapore, to identify adaptive legal governance models that can be implemented in Indonesia. The research data were obtained through a literature study of legal journals, international policy reports (e.g., OECD and IAIS), and relevant academic literature, then analyzed qualitatively using descriptive-analytical techniques to produce normative recommendations for the formation of responsive digital insurance regulations based on legal certainty.

3. RESEARCH RESULTS AND DISCUSSION

3.1.Research result

The application of fundamental insurance principles in a digital insurance model demonstrates that Insurtech transformation brings significant efficiencies but also poses serious challenges to the consistency of fundamental principles such as insurable interest, indemnity, and good faith. The digitization of the underwriting process, the issuance of e-policies, and automated data-driven claims introduce new complexities in verifying ownership, the validity of the insured object, and the accuracy of information provided by the insured. Reliance on online declarations, external data integration, and risk assessment algorithms increases the potential for moral hazard, adverse selection, and uncertainty regarding disclosure standards for material facts. On the other hand, the use of big data and AI to determine premiums can produce more precise risk profiles, but risks obscuring the principles of transparency and fairness if the assessment criteria are not accessible or verifiable by the insured. Accelerating services through digital platforms also presents a dilemma between efficiency and accountability, as overly simplistic verification procedures can undermine the applicability of the indemnity principle and the validity of insurable interest at the time of claim submission.

At the same time, research into Indonesian regulations reveals a significant normative gap between the characteristics of conventional insurance that form the basis of regulation and the operational realities of digital insurance. The unclear legal status of e-policies, parametric claims mechanisms, the use of smart contracts, and third-party data processing creates legal uncertainty that directly impacts consumer protection and industry compliance. While POJK 3/2024 provides a general framework for financial sector technology innovation, the regulations do not address specific technical issues related to Insurtech, such as automated contract validity, digital evidence standardization, telemetry data governance, or the legal classification of digital intermediaries. The research highlights the need for an adaptive sectoral legal framework to ensure that innovation remains aligned with fundamental insurance principles. Recommendations include standardization of e-policies and digital evidence, technical regulations for automated underwriting, classification and obligations of digital platforms, data governance standards, and the development of sandbox mechanisms and electronic dispute resolution as part of a comprehensive digital insurance regulatory roadmap.

3.2.Discussion

Application of Fundamental Insurance Principles in Digital Insurance Models (Insurtech)

The digital insurance industry (insurtech) offers significant opportunities for expanding access and efficiency in insurance delivery. However, this innovation must be evaluated from the perspective of basic insurance principles to avoid undermining its primary purpose: protecting against real risks. The principle of insurable interest

requires that the insured have an economic interest in the insurance object, an existential condition that underlies the validity of the insurance contract. Without insurable interest, insurance can become a form of financial speculation. Normative research on fire insurance in Indonesia confirms that the application of insurable interest and the indemnity principle is a legitimate basis for ensuring fair compensation for the insured.

In the traditional model, insurable interest and indemnity can be more easily verified through tangible assets or tangible objects, such as property and vehicles. However, when underwriting and policy issuance are conducted electronically through digital platforms, verifying asset and ownership data becomes more complex, especially if the data relies on insured declarations or external data integration. This creates the risk of moral hazard and adverse selection if data is not thoroughly verified. Therefore, the transition to digital insurance requires underwriting mechanisms that maintain the validity of insurable interest and indemnity principles, for example, through real-time data verification, digital documentation, and data audit systems.

Under the indemnity principle, insurance only compensates for actual losses and should not generate profits for the insured. This also assures addressing challenges in digital insurance, particularly in algorithm- or parameter-based products such as microinsurance, pay-as-you-go, or parameter-triggered products. In cyber insurance or usage-based insurance, claims can be triggered automatically by sensor data or digital logs, rather than by traditional manual claims. Therefore, there needs to be a clear definition in the policy of what constitutes an "insurable loss" and how indemnity is calculated to avoid violating the indemnity principle. Literature studies show that digitalization carries the potential for loosening the indemnity principle if contracts are not carefully drafted.

The principle of uberrimae fidei, or good faith, in insurance contracts, which requires the insured and, in some cases, the insurer to disclose all material facts, becomes even more critical in the digital context. When policy registration takes place online, the insured may fill out data on a form without face-to-face interaction and direct clarification. These risks claim denials if the data turns out to be incomplete or erroneous, and it leaves uncertainty about whether electronic declaration data meets disclosure standards as in traditional contracts. Therefore, implementing the principle of good faith in digital insurance requires a clear legal and regulatory framework.

urthermore, the use of big data, AI, or algorithms in underwriting and premium setting presents challenges to transparency and fairness. Algorithms can process large amounts of data, including personal data, telemetry, and behavioral history, to determine premiums or evaluate risk. However, if the insured is not provided with sufficient information regarding the risk assessment criteria and algorithmic mechanisms, the principle of good faith and the right to fair information may be violated. Therefore, automated underwriting processes must be accompanied by adequate disclosure and access for insureds to understand how their data is used, as well as mechanisms for correcting data errors.

Digital insurance also enables rapid policy issuance and claims processing, for example through applications that increase the speed and efficiency of service. However, this acceleration must be balanced with verification and audit procedures to ensure that basic insurance principles are met. If processes are oversimplified solely for efficiency, there is a risk that risk objects are not properly verified, insured data is

not validated, or risk circumstances are not adequately documented, which can lead to controversy and disputes in future claims. Therefore, standardized procedures, digital audit trails, and accountable electronic documentation are essential elements of a legally valid Insurtech model. Furthermore, in digital insurance, the use of technologies such as blockchain and smart contracts has been proposed to increase transparency, automation, and auditability. For example, blockchain-based solutions enable the storage of immutable records of policy and claim transactions, facilitating verification and audits. A study of blockchain solutions for the insurance industry in "smart cities" showed that this technology can reduce administrative costs and accelerate the claims process while maintaining data reliability. However, from a legal perspective, it is important to emphasize that smart contracts cannot always replace conventional adjudication. Regulations and legal frameworks must be adapted so that the results of automation remain legally binding and protect the rights of the parties.

In terms of regulation and consumer protection, the need for legal certainty is crucial. Recent research on digital insurance in Indonesia shows that existing regulations designed for traditional insurance are not fully adequate to regulate digital insurance products, particularly regarding the validity of electronic transactions, data protection, information transparency, and electronic dispute resolution. Therefore, to ensure the protection of principles such as insurable interest, indemnity, and good faith, normative updates and adaptive regulations that establish technical and procedural standards for Insurtech are needed.

The normative legal approach in the literature suggests that regulatory reform initiatives must involve regulators, industry players, and academics to formulate implementable guidelines for digital insurance. For example, legal protection for customers in the digital era requires data transparency, mandatory electronic disclosure of information, the validity of digital evidence (e-policies, transaction logs), and alternative dispute resolution mechanisms (online dispute resolution). Therefore, without new regulations, digital insurance could lead to legal uncertainty and losses for policyholders.

Regulatory Gaps and the Urgency of Establishing an Adaptive Legal Framework for Digital Insurance Practices in Indonesia

Indonesian insurance regulations were essentially constructed in the era of conventional insurance business. Consequently, several phenomena unique to digital insurance, such as electronic policy issuance, underwriting utilizing third-party data, and automated parametric claims mechanisms, are not expressly regulated in applicable substantive or procedural norms. This ambiguity is not merely a matter of terminology; it also impacts the validity of insurance agreements, such as whether e-policies fulfill the elements of a contract, the status of electronic evidence, and the limits of the obligations of agents and platform providers facilitating the contract. In this regard, a normative study is needed to interpret the legal force of electronic documents in domestic insurance construction.

This regulatory ambiguity creates legal uncertainty that directly impacts business practices and consumer protection: insurance companies face compliance risks and litigation exposure if data verification mechanisms or parametric trigger criteria are questioned, while consumers are potentially harmed by claim denials based on algorithmic logic or external data that is difficult for them to verify. Empirical studies of the use of big data in underwriting demonstrate that technical speed and efficiency must be balanced with verification and accountability standards to mitigate adverse

selection and moral hazard; court rulings regarding e-policies also reflect the complexity of determining liability when electronic documents issued through platforms become the center of disputes.

Therefore, systematic identification of regulatory gaps and proactive normative revision measures are needed, rather than merely reactive responses, to prevent innovation from "exceeding" supervisory capacity. Recommended approaches include (a) recognition and standardization of e-policies and digital evidence requirements, (b) specific rules for parametric products that establish loss definitions, trigger mechanisms, and indemnity principles, (c) data governance and interoperability provisions for third-party underwriting, and (d) sandbox mechanisms and activity-based supervision to allow regulators to evaluate the impact of innovations before full implementation. The OJK's recent initiative on the implementation of technology innovation in the financial sector (POJK No. 3/2024) is a relevant initial step, but policy literature and international experience demonstrate the need for more specific sectoral regulations to fill this regulatory gap.

On February 19, 2024, the Financial Services Authority (OJK) issued Regulation (POJK) 3/2024 concerning the Implementation of Financial Sector Technology Innovation (ITSK) as a new authority mandated by Law No. 4 of 2023 concerning the Development and Strengthening of the Financial Sector. This regulation replaces the previous POJK and establishes a general framework for innovation in the financial sector, covering aspects of sandbox, licensing, monitoring, reporting, consumer protection, and protection of consumer personal data. Through POJK 3/2024, the OJK affirms its commitment to innovation and risk mitigation, provides a legal basis for fintech providers wishing to provide technology-based financial services (including digital insurance services), and defines general ITSK concepts such as "organizer," "service," and "sandbox."

However, while POJK 3/2024 provides a basic framework, its nature is so general and cross-sectoral that it fails to address specific technical and substantive issues in digital insurance, such as the validity of smart contracts, third-party data interoperability, consumer data privacy and security, automated underwriting standards, and parametric claims mechanisms. This is acknowledged in recent literature on digital insurance contracts in Indonesia: an article titled "Digital Insurance Contracts in Indonesia: Potentials and Challenges" states that existing regulations are insufficient to guarantee legal certainty for all parties, particularly regarding data protection, system security, and rights and obligations in digital contracts. Without detailed sectoral regulations, digital insurance could face legal loopholes that could potentially harm both consumers and providers.

This lack of specific regulations becomes even more apparent when considering technical complexities such as smart contracts or data storage and processing using cloud/third-party services. Smart contracts in the Indonesian legal system still face significant challenges because positive regulations (civil law, electronic law) do not explicitly recognize or regulate the legal force of automated contracts, whether in terms of contractual requirements, authentication, or dispute resolution. Therefore, sectoral regulations containing operational provisions for digital insurance providers are essential to close legal loopholes, provide certainty for consumers and businesses, and support the sustainable development of Insurtech.

One central issue is the regulation of digital intermediaries (digital brokers/aggregators). The unclear legal status of platform operators, whether they are

agents, brokers, or simply technology service providers, creates difficulties in determining disclosure obligations, duties of care, and responsibility for product information. Without a clear legal classification, litigation against platforms becomes more complex, and consumer protection is reduced. Therefore, establishing a clear legal definition is a fundamental step.

Personal data protection and data governance are also vulnerable areas: underwriting and premium setting, which rely on big data and telemetry, require strict regulations regarding data collection, processing, sharing, and retention. A regulatory framework that combines technology-neutral principles with minimum data protection standards is essential to prevent data use practices from leading to pricing discrimination or misuse of consumer information. Policy literature underscores the need for synchronization between insurance regulations and data protection laws.

The need to establish an adaptive legal framework for digital insurance in Indonesia is urgent: without sector-specific normative reform, harmonization between regulations, and enhanced supervisory capacity, Insurtech innovation risks creating legal uncertainty, unfair practices, and threatening market stability. Therefore, policy recommendations include the development of specific Insurtech regulations, clarification of platform status and obligations, data governance standards, recognition of digital evidence, and the development of ODR and sandbox mechanisms as part of an integrated regulatory roadmap.

4. CONCLUSION

The application of fundamental insurance principles—insurable interest, indemnity, and uberrimae fidei—in a digital insurance (Insurtech) model faces practical and normative challenges due to the transformation of transaction mechanisms, policy distribution, and automation-based claims. Digitalization offers advantages in efficiency and broader access, but also poses risks related to data validity, real-time risk verification, and potential violations of fundamental principles due to algorithms and smart contracts that are not expressly regulated by positive legal norms. Therefore, the successful implementation of digital insurance requires technical mechanisms that guarantee the validity of electronic contracts, digital audit trails, electronic evidence standards, and the application of the principle of good faith through data transparency and accurate and non-misleading digital information disclosure.

The current legal framework, particularly national insurance regulations and financial sector technology innovation regulations (POJK 3/2024), is not yet fully able to accommodate the unique characteristics of Insurtech, particularly regarding the validity of smart contracts, data governance, parametric claims mechanisms, and the legal status of digital platforms. These regulatory gaps have the potential to create legal uncertainty and weaken consumer protection. Therefore, it is necessary to establish an adaptive legal framework through sector-specific regulations that govern the classification of digital intermediaries, technical standards, and electronic evidence, personal data protection, and Online Dispute Resolution (ODR)-based dispute resolution mechanisms. Therefore, responsive and integrated regulatory reform is of paramount importance to ensure that Insurtech innovation aligns with legal certainty and consumer protection.

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