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Challenges and strategies for Chinese fintech firms compliance operations in Indonesia: Case studies and regional comparative analysis

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Abstract: This study dissects the compliance pain points facing Chinese fintech firms in Indonesia and offers actionable guidance for overseas expansion. Design/Methodology: Using a three-step framework—regulatory mapping, regional comparison (China–Singapore–Malaysia), and corporate case analysis (Akulaku, DANA, AdaKami, Kredivo; RupiahPlus)—the paper evaluates barriers and countermeasures. Findings: Indonesia's regime has tightened and diversified: the 2022 Personal Data Protection Law (PDP Law) introduces extraterritoriality, data minimization, 72-hour breach notice, and "equivalent protection" for cross-border transfers, raising data-compliance costs; the 2023 P2SK Law moves crypto oversight from Bappebti to OJK from 2025; POJK No. 40/2024 eases foreign equity caps while increasing capital/disclosure requirements and banning aggressive collections. A dual-track BI–OJK structure, Kominfo oversight, and local autonomy create fragmented standards and heavier reporting/enforcement burdens. Conclusion: China's internet-finance model is not directly transferrable to Indonesia. Practical implications: Firms should build a dual adaptation framework—institutionally, dynamic regulatory mapping and localized data-governance plans; culturally, product and process designs compatible with religious-legal norms—plus staged market-entry and compliance operating models.

Keywords: *Chinese-funded enterprises, Compliance operation, Fintech, Indonesia, Internet finance.*

1. Introduction

After the COVID-19 pandemic, the total GDP of ASEAN member states has shown a stable growth trend, becoming a stabilizing force in the face of the rising unilateral trade protectionism worldwide [1]. Meanwhile, the digital economy is also experiencing rapid development across ASEAN countries. According to the e-Conomy SEA 2024 report jointly released by Google, Temasek, and Bain, the gross merchandise value (GMV) of Southeast Asia's (SEA) digital economy reached USD 263 billion in 2024, marking a 15% year-on-year increase [2]. Among the ASEAN members, Indonesia has been the largest economy in ASEAN in recent years. With a growth rate as high as 4.87% in the first quarter of 2025, it has proven to be an important economic engine for the development of ASEAN [3]. Meanwhile, the development of Internet finance in Indonesia is also showing a high-speed growth trend. Fintech is currently an important industry in Indonesia, estimated at 40 billion US dollars in 2019, with an average annual growth rate of over 49%. By 2025, it is expected that the valuation will not be less than 130 billion US dollars, mainly concentrated in the fields of digital payment and e-commerce enterprises [4]. The underlying logic of this economic surge stems from the support of Indonesia's policies and the transformation of consumer behavior. The Indonesian government has integrated fintech into its economic recovery program, with OJK (Financial Services Authority：Otoritas Jasa Keuangan) and BI (Bank Indonesia) implementing a dual-track regulatory framework, particularly relaxing interest rate caps and registration requirements to the maximum extent [5]. Meanwhile, Indonesia is currently in the demographic dividend stage. The huge potential customer base makes the country's fintech industry

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very attractive. In addition, the "2016 Indonesian Digital Consumption Behavior" research report released by the Indonesian media DailySocial shows that as the world's fourth most populous country, half of Indonesia's population is under the age of 30. And this group of people, the "digital natives" who are passionate about fintech consumption, account for 69.3% of the total [6]. Therefore, the change in Indonesians' digital consumption habits is precisely the necessary factor for the rapid development of fintech in Indonesia.

However, amid the rapid proliferation of the fintech sector, Indonesia's regulatory landscape has progressively intensified. In response to escalating regulatory demands, the nation's fintech industry has established a robust compliance framework implementing stringent controls to mitigate emerging financial risks. For instance, the 2022 enactment of the Personal Data Protection Law mandates enterprises to adhere to data minimization principles, report breaches within 72 hours, and comply with cross-border data transfer restrictions (requiring recipient countries to maintain protection standards equivalent to Indonesia, with non-compliance penalties reaching up to USD 3.8 million [7]. Therefore, against the backdrop of high growth opportunities, companies that fail to adjust their business plans in a timely manner and comply with laws and regulations may encounter significant legal risks and economic losses.

Chinese fintech companies already held more than half of the global fintech patent share in 2022 and are rapidly expanding into international markets [8]. Southeast Asia, particularly Indonesia, has emerged as a critical strategic hub for the global operations of Chinese enterprises. This trend stems from Indonesia's robust economic growth, which holds significant appeal for Chinese companies. Furthermore, to attract international investment and stimulate regional economic expansion, the Indonesian government has established multiple special economic zones. Under the Special Economic Zones Law (Undang-Undang No. 39 Tahun 2009 tentang Kawasan Ekonomi Khusus) and related regulations, foreign-invested enterprises operating within these zones benefit from substantial tax incentives [9]. However, the complex regulatory framework and diverse legal culture in Indonesia also pose considerable compliance challenges for Chinese-funded enterprises. Indonesia's unique legal culture, characterized by the coexistence of five sources - written law, customary law, Islamic law, religious law, and Dutch colonial law, as well as the Pancasila ideology, which prioritizes religious values in the judiciary, requires enterprises to take into account religious prohibitions and local customs, thereby complicating compliance efforts [10].

Furthermore, the regulatory systems of Southeast Asian countries show considerable differences, especially in the areas of finance, data governance, industry access, and taxation. For instance, Indonesia has shifted its regulation of cryptocurrencies from commodity surveillance to financial licensing, while Singapore distinguishes between payment tokens and security tokens [11]. Against this backdrop, a comprehensive exploration of the unique compliance challenges faced by Chinese-funded enterprises in Indonesia, along with a regional comparative study, holds considerable direct practical significance in identifying feasible strategies. Therefore, this research will examine the fintech compliance practices of Chinese-funded enterprises in Indonesia, employing both case analysis and regional comparison methods to explore the compliance issues these enterprises encounter during their international development and propose targeted business solutions.

2. The Legal Environment and the Latest Status of Internet Finance in Indonesia

2.1. The Latest Development of Indonesia's Internet Finance Legal System

In recent years, the Internet finance in Indonesia has developed rapidly. The scale of the digital economy has grown from 82 billion US dollars in 2023 to 146 billion US dollars in 2025 [12]. The main catalysts for this expansion are electronic payments and P2P lending, which account for 19.3% and 61.4% of the fintech industry respectively [13]. In 2021, the transaction volume of electronic payments soared by 52%, with OVO, GoPay and DANA leading the market [13]. In 2019, Bank Indonesia launched the Payment System Blueprint 2025 (BSPI 2025) to advance the digitization of payment systems, encompassing initiatives such as the standardized Quick Response Code Indonesian Standard

(QRIS), the real-time payment infrastructure BI-FAST, and the national open API payment standard (SNAP). Since the introduction of QRIS in August 2019, as of September 2024, it has connected 52.55 million consumers and 33.77 million businesses. with transaction volume in 2023 recording a 226.54% year-on-year increase [12].

In terms of policy, the Indonesian government has formulated a strategy for the digital economy sector through the launch of the Digital Indonesia Roadmap 2021-2024 [12]. To promote the inclusive transformation of the digital economy, the government established the P2DD working group to coordinate resources and formulate relevant policies, ensuring that the benefits of digital economic development reach a broader segment of the population. This series of actions by the government has been highly successful, creating a favorable growth environment for the fintech industry in Indonesia. In 2023, the fintech industry in Indonesia witnessed a financial boom, with 26 fintech companies collectively raising 494 million US dollars in financing [13]. Meanwhile, the participation of Chinese capital in Indonesia's digital economy has also been steadily increasing. Well-known Chinese enterprises such as Alibaba and Tencent have set their sights on Indonesia and made investments in projects such as data centers and e-wallets [13]. Moreover, the rise of the fintech industry in Indonesia is driven by strong market demand. Currently, approximately 95 million people in Indonesia do not have bank accounts, indicating that a significant portion of the population faces challenges in accessing traditional financial services [14]. And, small and medium-sized enterprises (SMEs) are confronted with a credit gap, and traditional financial institutions are unable to meet their diverse financing needs. Against this backdrop, P2P lending, characterized by its flexibility and convenience, has emerged as a viable solution to the financing challenges faced by SMEs and the financial service demands of the unbanked population, thereby generating a substantial market demand for P2P lending [14].

Since 2020, Indonesia has commenced revisions to its legislative framework governing internet-based currency. These amendments aim to accommodate the rapid evolution of internet finance while strengthening regulatory oversight to protect market integrity and the rights of all stakeholders. In 2022, Indonesia enacted the Personal Data Protection Law concerning data governance. This legislation explicitly defines nine rights of data subjects, including rights of access, rectification, erasure, objection to automated decision-making, restriction of processing, withdrawal of consent, data portability, and recourse to compensation, thereby establishing a definitive legal framework for safeguarding data subjects' entitlements. The legislation establishes two mechanisms to ensure effective exercise of these rights [15].

i. Civil litigation mechanism: According to Article 12 of this legislation, when data subjects encounter infringement during the processing of personal data, they can seek legal recourse in court and claim compensation from the infringing party.

ii. This legislation stipulates severe criminal penalties, including hefty fines and imprisonment for unauthorized access, use or forgery of data. The deterrent effect of criminal sanctions can effectively reduce illegal activities in the data sector, thereby maintaining data security and market order.

In 2023, Indonesia enacted the Financial Sector Development and Strengthening Law 2023 (Undang-Undang Nomor 4 Tahun 2023, commonly referred to as the "P2SK Law"). This legislation introduces significant provisions governing financial technology innovation and the regulation of digital financial assets [16].

i. Regulatory Changes: Article 8(4) stipulates that, commencing in 2025, the Financial Services Authority (OJK) shall oversee regulatory oversight of technological innovations in the financial sector (ITSK), encompassing crypto assets and digital financial assets, including cryptocurrencies. Article 312(1) mandates that relevant regulatory responsibilities must be fulfilled within 24 months after the *enactment of this Bill, with the regulatory authority for crypto assets formally transitioning from the Commodity Futures Trading Regulatory Agency (Bappebti) to the OJK in January 2025.*

ii.Specialized Regulatory Framework: The OJK has promulgated several specialized regulations to enhance regulatory obligations. Regulation No. 10/POJK.05/2022 governs the operations of financial institutions and mitigates financial risks through requirements such as minimum capital, shareholder lock-up periods, and lending restrictions. Regulation No. 40/2024, effective December 2024, significantly relaxes restrictions on foreign ownership, permitting cooperatives to operate peer-to-peer (P2P) lending enterprises. Concurrently, it elevates capital adequacy ratio standards, mandates disclosure of ultimate beneficial owner information by financial institutions, establishes individual platform lending limits, and prohibits aggressive collection practices [17]

Furthermore, in the realm of anti-fraud measures, Indonesia promulgated the "Regulation on the Implementation of Anti-Fraud Strategies" in 2024. This legislation authorizes the establishment of a dedicated unit or role responsible for executing anti-fraud initiatives. This measure establishes a comprehensive anti-fraud framework, enhancing the efficiency and effectiveness of anti-fraud efforts. Simultaneously, it effectively combats various fraudulent activities in Indonesia, safeguarding the integrity of financial markets and social stability.

2.2. Latest Changes in Foreign Investment Access, Shareholding Ratios and Regulatory Systems

In terms of foreign investment access, Indonesia has adopted a dual-track approach, combining different regulatory and equity restrictions to manage foreign participation in the Internet finance industry. Different regulatory bodies oversee different company sectors and enforce different equity restriction regulations. Additionally, the BI plays a crucial role in the payment industry. The foreign equity cap for electronic money institutions is 49%, while the restrictions for clearing and settlement institutions are more stringent, with a foreign equity cap of 20% [18]. At the same time, local board members must hold the majority of seats on the board. Moreover, innovative enterprises including credit and insurance are managed by the OJK. In many industries, such as the P2P lending industry, the maximum foreign shareholding ratio set by the OJK may reach 85%. However, foreign entry must be subject to three basic restrictions [19].

A. The principle of business isolation stipulates that P2P networks only serve as information intermediaries and are prohibited from engaging in self-operated lending or guarantee services. Additionally, borrowers must be local companies in Indonesia to ensure business compliance and effective risk management.

B. Localization compliance requirements: To ensure data security and regulatory efficiency, the relevant data centers must be entirely located within the territory of Indonesia. At the same time, financial transactions must be conducted through the regulatory accounts of local banks to ensure transparent and traceable capital flows. Additionally, local financial experts in Indonesia must be involved in the management team to ensure the compliance efficiency of the company's operations.

C. Equity Structure Restrictions: When the foreign shareholding ratio reaches 85%, domestic partners must maintain at least 51% of the voting rights (a new regulation in 2024) to ensure representation of local interests in major decisions.

In terms of procedures, the process for foreign capital to enter Indonesia's internet finance business is complex and strict. As can be seen from Table 1, the process involves multiple stages. Firstly, the minimum capital requirement for the establishment of a PT PMA company is 100 billion Indonesian rupiah. Secondly, a regulatory sandbox test (lasting 6 to 12 months) is also required. Finally, a formal license application must be submitted. The entire process takes approximately 18 months. Despite the strict approval procedures, Indonesia continues to attract numerous foreign investors to strategically penetrate the market through technology exports and other means, due to its huge demographic dividend (about 270 million people) and the expected expansion of the digital lending market, which is projected to reach 9 billion US dollars by 2025 [20].

Table 1.
Application process for financial licenses (Taking P2P as an Example).

Stage	Requirements	Cycle
Registration and Filing	Submit an application to OJK with a paid-in capital of 10 billion Indonesian rupiah (approximately 4,500 US dollars).	1 to 3 months
Sandbox Testing	Enter the regulatory sandbox for trial operation and accept the monitoring of OJK on risk control and data security.	6 to 12 months (extendable)
Formal Permission	After passing the test, the investment was increased to 25 billion Indonesian rupiah (approximately 11,000 US dollars), and the official license was obtained.	1 to 3 months

Source: The form is designed in accordance with the relevant laws and regulations of Indonesia [21]

2.3. Comparative Analysis of Legal Environments with Representative Countries in China and Southeast Asia

2.3.1. Comparison with China

China's Internet finance regulation has transitioned from inclusive innovation to full standardization. Prior to 2013, it was characterized by an experimental and fragmented regulatory phase focused on individual laws governing sectors such as payments and peer-to-peer (P2P) lending. From 2013 to 2014, the Chinese government issued the Notice of the General Office of the State Council on Strengthening the Supervision of Shadow Banking [22] integrating Internet finance into national planning and emphasizing the risks associated with "shadow banking[22]. In 2015, the Guidelines on Promoting the Healthy Development of Internet Finance introduced a "categorized supervision framework," clarifying the responsibilities of the People's Bank of China, the China Banking and Insurance Regulatory Commission, and the China Securities Regulatory Commission. After 2017, China entered a phase of stringent regulatory enforcement, establishing a comprehensive supervisory framework through measures such as centralized reserve deposit requirements, P2P lending quota management, and the "de-financialization of technology conglomerates," adhering to the principle that "all financial enterprises must hold appropriate licenses [23].

In terms of the global governance framework for cryptocurrencies, the regulatory approaches of China and Indonesia reflect two distinct concepts and governance principles. China's regulatory framework for cryptocurrencies is characterized by a clear focus on "risk prevention". The formulation of these policies can be regarded as a systemic restructuring prioritizing national financial security. The 2013 decision to restrict financial institutions' access to Bitcoin trading platforms marked the first regulatory warning regarding the potential risks posed by "decentralized" monetary systems [24]. In 2017, a joint announcement by seven Chinese regulatory authorities, the Notice on Preventing Financial Risks of Token Offerings, comprehensively prohibited Initial Coin Offerings (ICOs) and domestic cryptocurrency exchanges [25]. This can be considered a significant measure by the Chinese government to address systemic threats arising from "disorderly innovation." In 2021, ten Chinese ministries issued the Notice on Further Preventing the Risks of Virtual Currency Trading Speculation, which further classified virtual currency-related enterprises as "illegal financial activities" and eliminated energy-intensive virtual currency mining sectors [26].

On the contrary, Indonesia's regulatory approach embodies a cautious "risk mitigation" technique. It classifies cryptocurrencies as commodities rather than currencies, acknowledges their market value as investment tools, and at the same time, creates an "observable, traceable and taxable" regulatory framework by imposing a 0.1% value-added tax and establishing a national exchange [27]. This "limited opening" governance model has established a dynamic balance between technological innovation and financial stability: it permits transactions while restricting payment functions to prevent the disruption of the legal tender system; at the same time, it incorporates cryptocurrencies into the national governance framework through tax mechanisms and platform supervision, facilitating the transition from "wild growth" to "orderly domestication".

In the P2P sector, China has undergone a regulatory reform and business consolidation of profound revolutionary significance. In 2016, the State Council established a "1+3" institutional framework including fund escrow, filing and registration, and information disclosure. Industry regulation has gradually shifted from "inclusive prudence" to "risk liquidation [28]. The concept of "maximum withdrawal" proposed in the 2019 "Opinions on Properly Conducting Categorized Disposal and Risk Prevention Work for Online Lending Institutions" (Document No. 175) is essentially a "shock therapy" governance approach targeting problematic platforms [29]. This powerful regulatory intervention led to a significant decline of 70% in the industry's scale from its peak of 17 trillion yuan, dropping to 5 trillion yuan by 2023. This marked the end of the era of wild expansion for China's P2P industry [30].

In contrast, the P2P market in Indonesia is in the institutionalization stage of regulatory framework development. The POJK 40 issued by the OJK in 2024 marks the transition of the regulatory framework from a "development priority" to "risk prevention and control". This regulation establishes multi-faceted market access and operational standards through quantitative indicators, including a paid-in capital requirement of 200 billion Indonesian rupiah (approximately 11 million yuan), a foreign shareholding limit of 85%, and a maximum limit of 50 billion Indonesian rupiah (approximately 22 million yuan) for productive loans [31]. This governance model that combines the "regulatory sandbox" with the "negative list" has driven the industry's financing scale to reach 2.5 billion US dollars in 2023, representing a year-on-year growth of 14.28%, and initiated the second boom cycle led by institutions with Chinese capital background such as Akulaku [32].

In the field of digital payment, China's digital payment system has entered a relatively mature stage. It has demonstrated a three-spiral evolution model of "technological iteration - institutional innovation - market monopoly". As of 2023, the penetration rate of mobile payment in China has reached 86%, leading the world [33]. Among them, Alipay and WeChat have formed a duopoly covering all consumption scenarios through the strategy of "scene penetration - network effect - ecological closed loop", with a market share of over 90% [34]. This market structure can be viewed as the outcome of the concurrent advancement of China's technological innovations (such as biometric identification and blockchain) and institutional regulations (such as the Administrative Measures for Online Payment Services of Non-bank Payment Institutions). Notably, since the People's Bank of China issued the Digital Currency/Electronic Payment (DC/EP) in 2014, it has undergone a transformation from "technological reserve" to "strategic instrument [35]. The innovative features of this new type of digital currency, such as dual offline payment and smart contracts, not only change the nature of monetary and payment infrastructure, but also provide a technical solution to overcome the "Triffin Dilemma" in the context of the internationalization of the RMB.

However, Indonesia's digital payment system is catching up from behind. Nevertheless, compared with China, despite the government's implementation of a standardized QR code system, QRIS, in 2019, aiming to unify the fragmented payment market through a "regulatory patch", there still exist significant contradictions: cash dependence exceeds 50%, and bank transfers only account for 32.21% of e-commerce transactions, indicating the insufficiency of traditional financial infrastructure [36] Meanwhile, the electronic wallet industry in Indonesia is highly competitive, with over ten rivals, including GoPay and OVO [37]. This has led to the fragmentation of the digital payment market in Indonesia. Such a fragmented payment system has instead made it difficult for Indonesians to develop a preference for digital payment systems. Additionally, insufficient infrastructure (for instance, 4G coverage in rural areas is less than 60%) and increased operating costs have also indirectly hindered the inclusiveness of digital payments.

2.3.2. Comparison with Singapore

The regulatory environment for Singapore's Internet finance embodies "institutional rationalism." The centralized regulatory framework centered on the Monetary Authority of Singapore (MAS) has established a tripartite coupling mechanism encompassing monetary policy, institutional supervision, and innovation incentives. This "decision-making center-execution terminal" flat structure minimizes opportunities for regulatory arbitrage while establishing a dynamic equilibrium between "controlled experimentation" and "risk mitigation" through a layered "regulatory sandbox" design incorporating a three-tiered system of standard sandbox, fast-track, and premium versions [38]. In addition, MAS's regulatory framework classifies digital currencies into payment tokens, security tokens and utility tokens [39]. This reflects a "risk stratified governance" concept at the risk governance level. Digital assets are classified into three attributes: payment tools, security certificates, and functional carriers, allowing for tailored regulatory measures based on risk transmission mechanisms and the degree of externality, such as mandatory licensing for payment tokens and minimum regulatory standards for functional tokens. This adaptive design of "risk tools" not only mitigates the efficiency losses caused by a one-size-fits-all regulatory approach but also prevents systemic vulnerabilities resulting from regulatory gaps.

Unlike Singapore, Indonesia's internet finance regulatory framework features a "dual-track" institutional structure that fundamentally reflects the differentiated control of "systemic risks" and "individual risks" within fintech. The BI mitigates risk transmission through "top-down" macroprudential supervision, while the OJK addresses moral hazard through "bottom-up" micro-regulation, thereby establishing a complementary "risk firewall" system. From a comparative institutional perspective, Singapore's "unified regulation" approach centered on the MAS and Indonesia's "dual-track" structure represent two distinct fintech regulatory models. The main advantage of the Singapore model lies in the dual benefits of regulatory consistency and sandbox efficiency: through the coordinated supervision of monetary policy, institutional regulation, and innovation incentives by the MAS, fintech companies can rapidly iterate "regulatory innovations" within a standardized sandbox framework. In contrast, the Indonesian model prioritizes an institutional framework that isolates risks and clearly defines responsibilities; the distinction in roles between BI and OJK not only reduces the excessive concentration of power within a single regulatory entity but also enhances the accuracy of risk management through specialized division of labor (for example, BI leads the Quick Response Code Interoperability Standard (QRIS), which is different from the P2P lending sector supervised by OJK).

2.3.3. Comparison with Malaysia

The main differences in internet finance regulation between Malaysia and Indonesia stem from the inherent disparities in their functional positioning and the principles of regulatory sandboxes. Malaysia has an open and adaptable regulatory sandbox framework. The fundamental idea of this mechanism is to establish an "innovation incubator" to create the best environment for financial innovation. The Central Bank of Malaysia (Bank Negara Malaysia, BNM) and the Securities Commission have jointly formulated a two-tier regulatory system [40]. This framework features flexible testing cycles, enabling enterprises to adjust the testing periods according to their own innovation progress. The implementation of the joint application model effectively lowers the entry barriers for innovation entities, thereby stimulating market innovation. Meanwhile, the establishment of the "green channel" expedites the commercialization of mature products and promotes the transformation of innovation achievements into practical applications.

Notably, Malaysia's regulatory sandbox maintains a complex nexus with its comprehensive Financial Inclusion Framework. The Financial Inclusion Framework issued by BNM explicitly mandates prioritizing accessibility, affordability, and customization of financial products and services to address the specific needs of diverse demographics, including SMEs, low-income populations, and residents of remote regions. It requires financial service providers to deliver more inclusive solutions that lower entry barriers and enhance penetration rates while aligning with contextualized requirements across different demographic segments [41]. Additionally, the Financial Inclusion Framework underscores the critical importance of universal access to financial services for the general populace, necessitating the assurance of secure and prudent utilization of such services. This entails

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preventing over-indebtedness, fraud, and inadequate financial management while fostering prudent decision-making among financial consumers. From this perspective, Malaysia has implemented a multi-level regulatory framework to enhance market transparency. On the one hand, pre-emptive legal regulation compels financial companies to report risks and use data encryption technology to reduce risks from the source. In turn, it strengthens regulatory cooperation. Bank Negara Malaysia and the SC maintain distinct roles, promoting real-time data exchange for anti-money laundering and establishing an integrated regulatory framework of "inclusiveness + transparency" to support the stable and robust growth of the financial industry.

On the contrary, Indonesia views the regulatory sandbox more as a "regulatory testing ground", with the main purpose of rapidly transitioning the internet finance industry from chaos to a structured state. Critically speaking, the current sandbox process design in Indonesia lacks flexibility. The testing period is strictly limited to one year, and the "cluster prototype testing" method is used to optimize testing efficiency [42]. The test results are closely related to the license permission, as the outcome of the third-level test determines the company's viability [42]. This approach highlights the urgency of risk management in Indonesia. The turbulence in the nascent P2P market has compelled regulatory authorities to expedite the legislative process. The 2024 law abolished the registration system and requires companies to successfully complete sandbox testing before transitioning to fully licensed operations, aiming to enhance regulation of the internet finance sector. Although Indonesia emphasizes "supporting inclusiveness" in its sandbox entry criteria, there are no clear service scope measurement standards in practice. In terms of establishing transparent procedures, Indonesia mainly relies on post-event accountability measures, leveraging self-regulation by industry groups and the OJK to address the increasing number of complaints. This approach results in an imperfect real-time data exchange system, affecting the timeliness and effectiveness of regulation.

Table 2.
Summary of Core Differences between Malaysia and Indonesia.

Dimension	**Malaysia**	**Indonesia**
Sandbox Positioning	Innovation Incubator (Long-term Cultivation of Ecosystem)	Supervisory test field (for rapid verification of compliance)
Test Flexibility	Extendable cycle and dynamic adjustment of rules	Fixed-cycle, result-bound license
Inclusive Implementation	Systemic framework (services + capabilities + facilities)	The entry threshold requirements are not clear, and there is a lack of service depth indicators.
Transparency Mechanism	Pre-event regulations (disclosure standards + data sharing)	Post-event accountability (complaint handling + self-discipline of the association)
Formal Regulatory Shift	Progressive (sandbox maturity → green channel)	Mandatory approach (sandbox ends → full license or exit)

3. The Current Situation and Challenges of Compliance Operations of Chinese Fintech Enterprises

3.1. The Current Investment Situation of Major Chinese Enterprises in Indonesia

Facing the vast Indonesian market, Chinese Fintech companies are actively participating in the digital transformation of Indonesia's financial infrastructure by leveraging capital empowerment, technology export and the transfer of management expertise. Chinese enterprises, under the framework of the "Digital Outbound" strategy, have gained market shares in Indonesia through various channels, with many well-known companies leading the way [43]. For instance, Ant Financial Services Group has adopted a capital integration approach. By collaborating with Emtek Group to operate the DANA e-wallet and making a strategic investment in the consumer finance platform Akulaku, it has established a localized payment ecosystem [44]. Tencent has strengthened its business strategy in Indonesia through equity connections and has also influenced its layout in the digital entertainment and banking services industries in Southeast Asia by investing in Sea Group [45]. In addition, JD Group adopts a "heavy asset + technology closed loop" approach, forming a coordinated economic model of branch enterprises in Indonesia through its proprietary logistics network and digital banking platform [46].

As a pioneer of Chinese fintech in the Southeast Asian market, Akulaku has established a unique competitive edge since its establishment in 2014 through strategic relocation and localization strategies. The company was initially founded in Shenzhen, China, and later moved its headquarters to Jakarta, Indonesia. Akulaku has capitalized on the underdeveloped financial infrastructure in the emerging Southeast Asian market, particularly in the banking sector with a coverage rate of less than 40%, to develop an ecosystem focused on digital inclusive finance [6]. An ecosystem focused on digital inclusive finance has been developed. Meanwhile, Akulaku has adopted a dual-driven approach of "deep integration into consumption scenarios and intelligent risk control credit" to address the issue of people in Indonesia with no credit records accessing financial services [47]. This series of measures enabled Akulaku to successfully gain a first-mover advantage in the Indonesian market.

DANA, a digital payment network jointly founded by Ant Financial, a subsidiary of Alibaba Group, and Emtek Group of Indonesia in 2018, has been labeled as the "Indonesian version of Alipay" in the booming fintech sector in Southeast Asia [48]. In the 39%-61% equity agreement, Ant Financial Services Group provided the necessary technical infrastructure and operational skills, while Emtek Group leveraged its regional media and telecommunications networks to enhance market penetration [49]. This collaboration enables DANA to rapidly implement a wide range of digital financial services, such as e-commerce payment gateways, point-of-sale transaction systems, mobile prepaid recharge solutions, utility bill aggregation platforms, and consumer credit installment plans, thereby creating a multi-channel ecosystem that aligns with Indonesia's evolving cashless economy. Additionally, Ant Financial leverages its global payment network resources to provide DANA with cross-border transaction capabilities and a regulatory compliance framework, facilitating DANA's scalable growth in the ASEAN market [48]. The improvement of this technology has made DANA the first e-wallet service in Indonesia to obtain PCI DSS certification, enhancing the confidence of Indonesian customers.

AdaKami and Kredivo have developed in different ways and at different paces: one driven by capital-fueled growth, the other by technology-driven innovation. AdaKami is also a typical example of China's fintech capital export, mainly supported by FinVolution [50]. The company focuses on the Indonesian subprime credit market (FICO < 650) and has rapidly penetrated this sector through unsecured daily loans (up to 3 million Indonesian rupiah) and consumer installment products (up to 10 million Indonesian rupiah) [51]. In contrast, Kredivo places greater emphasis on its own technological development, thereby building a competitive barrier within the ecosystem. As a leader in the "Buy Now, Pay Later" (BNPL) sector in Southeast Asia, it ensures the acquisition of target customers through a dual-track credit product (30-day interest-free installments plus a revolving credit limit of up to 50 million Indonesian rupiah) and an algorithmic risk control system (with an AI approval time of only 2 minutes) [52]. The most notable aspect is its scene penetration strategy: by exclusively integrating the payment systems of well-known e-commerce platforms such as Tokopedia, Shopee, and Lazada, Kredivo has established a closed-loop ecosystem encompassing over 4,000 merchants, with an average of 25 transactions per user annually, significantly exceeding the industry average of 12-15 [53]. The combination of "technical infrastructure and market dominance" enables it to create a sustained and unique advantage in the digital credit sector in Indonesia.

3.2. Analysis of Compliance Difficulties

3.2.1. Enforcement and Regulatory Dilemmas

The financial regulatory framework in Indonesia has encountered a considerable number of regulatory challenges due to the overlapping responsibilities of the BI, the OJK, and the Ministry of Communication and Information (Kominfo). This structural conflict has led to persistent regulatory ambiguity, reduced market efficiency, and exacerbated systemic risks. The fundamental issue lies in the unclear legal parameters and the lack of a coordination mechanism, especially in the fields of fintech and cross-border capital.

For instance, in the payment industry, BI supervises the payment system infrastructure, including the issuance of electronic money, while OJK supervises the behavior of payment institutions. Such multiple reporting obligations can easily lead to regulatory difficulties. Fintech enterprises that are engaged in both payment and lending businesses must obtain licenses from each regulatory body separately. Enterprises find it difficult to correctly understand the reporting standards, which may result in the same enterprise reporting multiple times under different standards, leading to data duplication, inconsistent standards, and distorted regulatory data. The most urgent problem is the ambiguity of the regulatory body for emerging enterprises: first, crypto assets are classified as "commodities" rather than "financial products", and the regulatory power belongs to BAPPEBTI instead of the OJK or the BI, which has led to a clear regulatory gap for crypto assets [54]. Secondly, in the P2P sector, OJK formulates regulations for P2P lending, Kominfo supervises and prohibits non-compliant platforms, and BI oversees the flow of funds. Data shows that 49% of fintech companies believe that this fragmented regulatory approach is too slow, and 61% of fintech companies think that the existing laws in Indonesia are still ambiguous or unclear [55].

Meanwhile, the development of the fintech industry in Indonesia is also restricted by several institutional conflicts at the regulatory enforcement level. Firstly, the disconnection in the vertical regulatory structure has distorted the policy transmission mechanism. Although the BI and the OJK have established a national institutional framework, including the regulatory sandbox mechanism launched in 2016 and the specific regulations for P2P lending introduced in 2018, the constitutional principle of local autonomy grants local governments significant legislative power, resulting in a dichotomy of "central policy - local implementation [56]. This institutional misalignment directly creates opportunities for regulatory arbitrage: The national payment business licenses issued by OJK may face validity disputes in certain provinces, thereby forcing market participants to go through redundant compliance declaration procedures. Additionally, the regulatory sandbox was originally designed to reduce the costs associated with innovative compliance. However, the scarcity of local technical resources, coupled with insufficient regulatory coordination and communication mechanisms, hinders the effective participation of enterprises in remote areas or with limited technological capabilities, thereby exacerbating the innovation gap [42].

Secondly, horizontal regulatory competition has led to fragmentation of regional markets. Local governments' reliance on business tax revenue compels them to establish covert trade barriers through administrative actions and judicial discretion. Pursuant to Indonesia's Law on Regional Autonomy and Law No. 1 of 2022, local governments possess legislative authority to impose surtaxes in addition to standard central tax rates [57]. For instance, West Java Province, as an important economic province in Indonesia, has certain autonomy to modify local tax types through provincial regulations (Perda). Such differences in local legislative powers may increase the compliance burden on foreign-funded enterprises and even affect their investment preferences. Finally, the insufficient regulatory capacity of local governments amplifies the arbitrariness of law enforcement. Local finances rely heavily on central transfer payments, resulting in a serious lack of investment in supervision [58]. For instance, the shortage of qualified professionals and technical funds is likely to cause delays in environmental impact assessments and other approvals. Moreover, Indonesia's own technological deficiencies in Fintech further undermine the effectiveness of regulation. Local governments lack real-time monitoring tools and are unable to track the actual operational data of P2P platforms.

3.2.2. Data Security, Credit Information System and Privacy Protection Obstacles

Chinese fintech enterprises operating in the Indonesian market face challenges in data security and privacy protection, primarily attributable to three overlapping issues: stringent legal restrictions, inadequacies in the local data ecosystem, and cultural-religious conflicts. Indonesia's Personal Data Protection Law enacted in 2022, establishes exceptionally rigorous compliance standards within the Asia-Pacific region. Article 2 of this legislation explicitly confers extraterritorial applicability, mandating compliance obligations for any entity or individual processing the personal data of

Indonesian nationals, irrespective of their registration status within Indonesia [15]. This rule legally ensures the traceability and consistency of cross-border data operations, successfully reducing the ambiguity of "compliance arbitrage". The PDP law also stipulates severe penalties. Under this framework, enterprises that violate the law may be subject to an administrative fine of up to 2% of their annual total revenue, or a maximum fine of 600 billion Indonesian rupiah (approximately 28 million yuan); for individual offenders, they may be sentenced to up to five years in prison and fined billions of Indonesian rupiah [15]. In addition, this legislation requires enterprises to comply with six types of legal standards (including explicit user consent) and safeguard 11 rights of data subjects (such as the right to be forgotten and the right to object to automated decision-making), and its response time frame is stricter than that of the GDPR [15].

Moreover, Indonesia has yet to establish a cohesive national credit information exchange framework, which may lead to a paradox of "data hunger" for Chinese fintech institutions throughout the customer due diligence process. To make up for the insufficiency of public data, enterprises may be forced to over-collect sensitive personal information, including biometric data (such as fingerprints and facial recognition) and financial trajectory data. Additionally, locals often use a compound naming structure of "first name + father's name + surname [59]. Due to the inability of Chinese enterprise risk management systems to effectively interpret the abbreviation requirements of lengthy names, it may easily lead to a manual review rate higher than the industry standard, thereby increasing the risk of personal information exposure.

Meanwhile, Indonesia's data protection legal framework stipulates the "equivalent protection principle", which requires that the data receiving country must be certified by the OJK to achieve an "appropriate level of protection [60]. Secondly, it implements the "double consent rule", meaning that in addition to the standard user authorization, fintech enterprises must obtain specific approval. This legal framework poses a dilemma for Chinese-funded institutions: they either have to endure the risk of algorithm model degradation due to data isolation or bear the long-term operational costs of transmission licenses.

It is worth noting that within the dominant Islamic financial framework in Indonesia, Chinese-funded institutions must abide by the redefinition of traditional interest (Riba) [61]. Indonesian Muslims generally recognize the prohibition of Riba. Therefore, this change in terminology has produced a difference in the data display: According to OJK Regulation No. 77/POJK.5/2022, financial institutions are required to retain original documents related to their core business [62]. Therefore, this data management strategy with religious and cultural elements will increase the difficulty for Chinese-funded enterprises in cross-border capital flows and financial compliance. At the same time, without adopting Sharia-compliant solutions, it will be difficult to obtain financing from local Islamic banks or qualify for government-related projects.

3.2.3. Legal Adaptation Dilemmas under the Influence of Local Culture and Religious Factors

Indonesia, with a Muslim population of approximately 235 million (accounting for 87%), is the country with the largest Muslim population in the world. Its financial ecosystem exhibits distinctive features of religious compliance [63]. This has a structural impact on the market entry and sustainable operation of enterprises from non-Islamic countries. This means that the religious and cultural compatibility of their financial products and services is not only a market access standard, but has also become a key strategic lever for effectively leveraging the demographic advantage of the Muslim community.

Indonesia implements the principles of Islamic law in the financial industry through a dual framework of laws and religious decrees. For instance, the "Islamic Banking Law of 2008" outlines three fundamental principles: the prohibition of interest (Riba), the prohibition of speculative behavior (Gharar), and restrictions on investment in unethical industries [64]. It stipulates that financial transactions must adhere to a profit-sharing framework based on tangible assets, such as the Mudaraba trust financing model and the Musharaka partnership investment model. Secondly, the National Council for Fatwa (DSN-MUI), as the authoritative body for religious decision-making, conducts comprehensive compliance evaluations of financial products by issuing legally binding religious decrees (Fatwa) [65]. This means that financial products without halal certification will face sales bans and may also run the risk of being boycotted by religious groups.

This system requires that the specific financial operations of foreign-funded enterprises achieve dual goals of economic efficiency and religious mission (Da'wah): at the risk management level, they must avoid traditional prohibited industries such as alcohol and gambling, and also require emerging financial models (such as P2P lending) to strictly prohibit forced debt collection to adhere to the moral principle of "prohibiting the humiliation of debtors (Ihtikar) [66]. Meanwhile, religious and cultural traditions also provide an inviolable bottom line for foreign-funded institutions in their operations, requiring enterprises to implement comprehensive localization reforms. At the level of human resource allocation, flexible working hours are adopted, the right to worship on Fridays is guaranteed, and religious allowance incentive mechanisms are implemented during the fasting month. This way of integrating religious culture into business operations has constructed a trinity value network with Indonesian characteristics, namely "adhering to religious laws - business ethics - market trust".

4. Analysis of Failure or Compliance Crisis Cases of Chinese Fintech Enterprises

4.1. RupiahPlus: Crisis of Illegal High-interest Loans and Violent Debt Collection

In 2018, Rupiah Plus, an Indonesian licensed fintech company with Chinese capital background (hereinafter referred to as "RP"), triggered a major compliance issue due to systematic data abuse. This case was the first instance in Indonesia's regulatory history where the "finance and communication" departments jointly imposed penalties. Its handling framework is crucial for understanding the development of the internal regulatory logic within the digital credit industry.

RP has developed a complex user relationship network mapping system through extensive application permission requests: by including mandatory authorization clauses in loan agreements, it requires borrowers to provide their contact lists, call records, and text messages, thereby creating a digital archive containing social relationship networks [67]. This privacy policy adopts a structure of "general authorization plus exceptions and exemptions", using ambiguous language such as "may violate the confidentiality obligation during debt collection", providing legal loopholes for potential data abuse. The collection team can obtain the borrower's contact list data in real time through the back-end interface and use the close relationship algorithm to adopt a hierarchical harassment strategy for non-emergency contacts [67]. This has thus formed a three-stage aggressive collection model composed of "debt information disclosure - personal insult threats - third-party cost transfer".

The Financial Services Authority of Indonesia (OJK) concluded that RP had engaged in "data collection exceeding service necessities," constituting a violation of the data minimization principle outlined in Article 12 of the "Fintech Regulatory Sandbox Guidelines" (POJK 77/2016) [68]. The OJK has implemented three fundamental measures [68]. (1) Suspend the qualification for license application for three months (from July 2018 to October 2018), and impose the most severe penalties on the licensed preparatory institutions; (2) Authorize the establishment of an independent collection audit committee; (3) Be obligated to clear the excessive data within the prescribed period and submit a compliance rectification report.

The Ministry of Communication and Informatics (KOMDIGI) classified violent debt collection as "illegal interception of electronic information" and "insult and defamation" pursuant to Article 27(3) of the Electronic Transactions Law, thereby facilitating victims' engagement in criminal prosecution procedures [67]. Under the regulatory link system, RPs must undergo third-party security assessments, clear all past data, and establish a composite regulatory framework of "administrative penalties + criminal prosecution + technical rectification".

Overall, this case established three precedents for Indonesia's fintech regulatory framework: (1) transcending traditional institutional oversight boundaries by implementing a multidimensional governance model integrating "conduct supervision, technical scrutiny, and data auditing"; (2)

proactively enforcing the purpose limitation principle under Article 15 of the yet-to-be-effective Personal Data Protection Law (PDP Law), demonstrating regulatory foresight; and (3) establishing an "end-to-end supervision" standard that nullifies financial institutions' attempts to transfer compliance obligations through outsourcing agreements. In terms of governance efficacy, while the precise penalty amount remains undisclosed, the interplay between license revocation and criminal prosecution has generated substantial deterrent effects.

4.2. The Warning from the Compliance Dispute Incident of Akulaku Company

Akulaku is a well-known entity in the fintech industry of emerging Southeast Asian countries. The company was established in 2014 as a digital credit platform named silverr. After a strategic transformation in 2016, it solidified its fintech positioning and gradually developed a licensing framework covering Southeast Asian countries such as Indonesia: it obtained multiple financial licenses from the Indonesian OJK, a digital credit business license, and a cross-border remittance and financial services license approved by the Central Bank of the Philippines (BSP) [69]. It has become the only non-bank financial institution in the "buy now, pay later" (BNPL) sector in Southeast Asia to hold multiple financial licenses in Indonesia.

However, its regulatory process exhibits typical three-stage characteristics:

i. The first compliance issue (2017-2019): Akulaku was one of the P2P platforms that received the most complaints from the Indonesian Consumers Association around 2018 [66]. The platform rapidly expanded in the Indonesian market and accumulated a large user base, which helped it quickly gain market share. However, the large number of complaints indicated that the company had some deficiencies in compliance, user experience, risk management, and practices, revealing its initial insufficiency in adapting to local rules and social norms in Indonesia.

ii. Failure of Risk Management System: In 2020, Akulaku faced suspension of its primary and secondary market debt financing operations by Mintos [70] an international P2P lending platform, due to "default on payment settlements," which referred to borrowers' failure to fulfill repayment obligations on schedule [70]. After negotiations, Akulaku successfully reached a debt restructuring agreement with Mintos, modifying the repayment schedule for outstanding principal and interest, with the aim of completing the repayment of the remaining debt by the end of 2021[71]. This incident has exposed the flaws in the institution's credit risk management framework, post-loan asset quality monitoring system and capital allocation strategy. The continuous increase in the proportion of overdue loans may lead to a deterioration in its credit rating by international rating agencies and prompt it to cease business cooperation with important partner platforms including Mintos. This chain reaction indicates that there is a structural contradiction between risk exposure and risk management capabilities during the expansion process of enterprises.

iii. Enhanced Regulatory Scrutiny Period (2021-2024): Following the enactment of Indonesia's 2021 "Implementing Regulations for Microfinance Institutions" (POJK No. 19/POJK.05/2021), the Otoritas Jasa Keuangan (OJK) substantially intensified its regulatory focus on Akulaku. On October 5, 2023, the OJK formally imposed an administrative prohibition mandating Akulaku to immediately cease provision of "Buy Now, Pay Later" (BNPL) consumer credit services to all customers, both new and existing [72]. This regulatory action was initiated following a compliance review by the authorities, which revealed that Akulaku had "systemic deficiencies in implementing regulatory requirements", particularly significant flaws in its risk control systems, including post-loan management and joint financing. This incident highlights Akulaku's inadequate risk management and post-loan supervision, poor execution of regulatory tasks in borrower credit assessment and overdue collection, as well as deficiencies in the framework of its joint financing business.

The case of Akulaku serves as a warning to all Chinese fintech enterprises operating in emerging markets such as Indonesia, highlighting the necessity for companies to have a thorough understanding of and proactively adapt to local compliance policies and regulatory frameworks. At the same time, they should promptly revise their risk control and compliance systems to effectively reduce compliance risks and achieve sustainable development.

5. Countermeasures and Suggestions for Chinese Fintech Enterprises

5.1. Capacity Building of Enterprises Themselves

In the highly competitive Fintech industry in Indonesia, where the regulatory environment is complex and the market potential is huge, Chinese-funded enterprises must prioritize the development of a proficient compliance team as a key component of their corporate strategy. The fundamental value of a localized compliance team lies in their ability to successfully resolve the three major paradoxes existing in the country's Fintech industry.

Firstly, addressing compliance obstacles stemming from legal uncertainties. Indonesia's existing regulatory framework, encompassing the Data Localization Act and Negative Investment List, permits significant interpretative latitude. The application thresholds and limitations of cross-border data flow restrictions and prohibitions on foreign equity holding through proxy structures occasionally exhibit ambiguity. In such contexts, individuals possessing comprehensive expertise in local judicial systems can furnish precise interpretations of pivotal statutory provisions, enabling enterprises to formulate effective compliance frameworks.

Secondly, Addressing cultural and religious disparities. In Indonesia, where the Muslim population constitutes an overwhelming majority, enterprises must effectively reconcile the dual legal frameworks of Islamic law and secular law. Cultural and religious differences may lead to misjudgments in human resource management and corporate operations, potentially triggering labor disputes or adverse regulatory reactions. For instance, in June 2022, Indonesian nightlife chain Holywings launched a social media campaign offering complimentary alcoholic beverages to individuals named Muhammad (male) and Maria (female) [73]. This marketing strategy was regarded as a "blasphemy" against Islam and quickly aroused intense anger. As a result, six new workers were charged with blasphemy and faced up to 15 years in prison. This incident warns Chinese-funded companies that if they do not understand the religious sensitivity of Indonesia, they may easily encounter problems. From a human resources perspective, it includes personal responsibility of employees, insufficient training, delayed crisis communication, and fintech regulatory legal violations that may lead to personal criminal liability. Therefore, it is necessary to hire local compliance teams to ensure that the company has cross-cultural communication and coordination capabilities, while adhering to local regulations and fully respecting and adapting to local cultural and religious customs.

Thirdly, establish and improve the communication bridge for personnel exchanges between the government and enterprises. For instance, by recruiting former officials from regulatory bodies such as the Indonesian OJK and the BI, or experts recognized by the Indonesian Fintech Association (AFTECH), enterprises can quickly and accurately obtain dynamic policy information and participate in the consultation and formulation of regulatory sandbox testing regulations. This comprehensive participation enables companies to proactively modify their business plans to comply with regulatory requirements, thereby significantly reducing the trial-and-error costs associated with policy uncertainties.

To achieve the above goals, the professional compliance team needs to fully cover the four major strategic functions:

The team should take the lead in comprehensively managing the regulatory sandbox tests, including optimizing and iterating the plan in the pre-review stage, systematically establishing an anti-money laundering (AML) framework, and meticulously designing consumer protection mechanisms. Special emphasis must be placed on local risks, including preventing aggressive debt collection and other behaviors that may trigger social controversy, to ensure that the company's business practices comply with local regulatory standards and social ethical norms.

Secondly, the team must design a legal and compliant cross-border optimized equity structure that conforms to Indonesia's foreign investment restrictions, ensuring effective resource allocation while meeting regulatory requirements. At the same time, to address the Indonesian rupiah's mandatory settlement system, a systematic and reasonable currency exchange rate hedging strategy must be formulated to mitigate the impact of exchange rate fluctuations on the company's financial situation.

In addition, the team should advocate for the implementation of AI-driven Know Your Customer (KYC) and Anti-Money Laundering (AML) technologies to meet the strict requirements of regulatory authorities for real-time transaction monitoring. For instance, Tookitaki [74] analysis indicates that fintech companies in Indonesia face significant risks in consumer identity verification and transaction monitoring [74]. To address these difficulties, some entities have implemented AI-driven transaction monitoring systems and customer due diligence tools, which use machine learning algorithms to automatically detect abnormal patterns and provide real-time risk warnings.

In conclusion, the continuous growth of Chinese-funded companies in Indonesia's Fintech system largely depends on the strategic support of skilled local compliance teams. By implementing a localized compliance framework that includes three main strategic tasks, enterprises can skillfully alleviate legal, cultural, and policy concerns while ensuring a competitive edge in the highly competitive market environment.

5.2. Enhancement of Technology and Data Management

Under Indonesia's Personal Data Protection Law (PDP Law), Chinese-funded enterprises encounter multifaceted challenges including restrictions on cross-border data transfers, data localization mandates, and compliance with time-sensitive user rights requirements. Consequently, blockchain technology—characterized by immutability, traceability, and smart contract functionality—may serve as a strategic tool to mitigate compliance challenges, provided it is meticulously structured to avoid legal infringements [75].

The fundamental characteristic of blockchain technology lies in its distributed ledger architecture, which establishes a framework for full traceability of data activities—a feature directly relevant to the mandatory provisions governing data accuracy and security safeguards under Indonesia's PDP Law. From a technical architecture perspective, implementing local nodes through a private chain framework within Indonesia constitutes a practical solution. By employing encrypted sharding storage technology, raw data remains stored off-chain while hash values of critical operational processes are recorded on-chain [76]. This storage technology ensures local data storage and processing, complying with Indonesia's data localization legislation. It also significantly reduces the risk of data leakage through encryption and sharding techniques. The source data remains off-chain, minimizing direct exposure within the blockchain network, while the on-chain storage of hash values for key operations guarantees data traceability and immutability, thus achieving a balance between data security and compliance.

Meanwhile, the programmable feature of smart contracts is an important catalyst for the application of blockchain technology in compliance procedures, facilitating the effective execution of basic compliance tasks. In terms of user consent management, smart contracts can autonomously obtain and record the consent status of users, ensuring that companies have the legal authorization to collect, use, and process user data [77]. In the context of cross-border data transmission, smart contracts can independently verify the legality of the receiving party's agreement (such as the Standard Contractual Clauses, SCC) and record the verification results on the blockchain, thereby ensuring compliance with relevant laws and regulations on cross-border data transmission [78]. This automated regulatory compliance process significantly enhances regulatory compliance efficiency while reducing human errors and regulatory compliance risks.

In addition, blockchain technology enables comprehensive data traceability throughout the entire chain, facilitating the rapid generation of audit reports. In the event of data leakage, regulatory authorities and enterprises can leverage the traceability feature of blockchain to quickly identify abnormal nodes, promptly determine the source and transmission route of the leakage, thereby significantly reducing the response time to the incident. At the same time, the enhanced degree of regulatory openness boosts the confidence of regulatory authorities in the data governance of enterprises, further encouraging enterprises to prioritize data security and compliance management, and thus establishing a constructive regulatory interaction system.

However, it is worth noting that the compliance and adaptive risk management of blockchain technology must be advanced simultaneously in both the technical and legal fields to ensure the legality and security of the implementation of blockchain technology.

From a technical perspective, it is necessary to develop a key escrow method to facilitate data erasure. Key escrow enables enterprises to obtain keys when they need to delete or access data, thereby meeting the legitimate requirements of data subjects. From a legal perspective, enterprises must proactively disclose their technical solutions to the Indonesian data protection agency (Lembaga) and cooperate with regulatory authorities to ensure compliance with local laws, regulations and standards. At the same time, they may use the regulatory sandbox to be opened in 2024 to assess the feasibility of their technical solutions. Currently, the Bank of Indonesia is advocating for the digital rupiah technology, creating a favorable regulatory environment for the compliant development of blockchain technology [79]. Therefore, Chinese-funded enterprises need to take this opportunity to carefully investigate the application of blockchain technology in compliance and promote creative progress in digital finance and data governance.

5.3. Support From the Government and Industry Levels

Chinese-funded enterprises can actively participate in the Indonesian fintech market and promote the establishment of a comprehensive and in-depth cooperation mechanism with key stakeholders such as Indonesian financial regulatory authorities and industry associations. At the same time, under this cooperation mechanism, a mutually trusted and effective information sharing platform should be established. The basic approach to this process is to establish a tripartite collaborative governance framework of "regulatory leadership, industry collaborative operation, and technological empowerment". This will enable Chinese-funded enterprises and Indonesian regulatory authorities to seamlessly integrate regulatory effectiveness, industry vitality, and technological progress.

When identifying partners, Chinese enterprises should focus on the two main regulatory authorities in Indonesia: the OJK and the BI. For instance, cooperation with OJK should be centered on mutually reinforcing the regulatory sandbox mechanism, including jointly developing a credit information exchange database for small and medium-sized enterprises. The World Bank has found that the implementation and strengthening of credit information sharing systems significantly increase the chances of enterprises obtaining financing, particularly raising the possibility of micro and small enterprises accessing financing by 7-8 percentage points while reducing interest rates by approximately 5% [80]. Meanwhile, this method can systematically address the issue of information asymmetry in small and medium-sized enterprise finance and enhance the efficiency of financial resource allocation. When cooperating with BI, priority should be given to integration with the National Payment Gateway (NPG), strictly adhering to the strategic goals outlined in its "2024-2045 Payment System Development Roadmap [81]. Meanwhile, sharing the financial behavior data of the unbanked population will promote the development of an inclusive financial system in Indonesia.

In addition, Chinese-funded enterprises should take advantage of the resource advantages provided by industry organizations such as the Indonesian Bankers Association (Perbanas) and the Indonesian Payment System Association (Asosiasi System Pembayaran Indonesia, ASPI) to jointly develop cooperative frameworks including anti-fraud technology and cross-border payment certification system alliances. This approach can establish a closed-loop feedback mechanism that integrates regulatory policies, industry standards, and technological applications, promoting dynamic coordination between regulatory rules and industry practices. This cooperative structure not only enhances the compliance capabilities of Chinese enterprises in the Indonesian financial system but also provides a replicable model for regional financial cooperation.

On this basis, developing an efficient bilateral communication channel is equally crucial for Chinese enterprises to manage the complex regulatory environment in Indonesia. It is an important strategic approach to strengthening the China-Indonesia community with a shared future and enhancing the level of economic and trade relations between the two countries. In fact, China and Indonesia have already established a series of high-level dialogue and cooperation platforms of significant strategic importance, which have been successfully operating at the national level. The China-Indonesia High-level Dialogue and Cooperation Mechanism was launched in 2021, providing a macro-strategic direction and policy coordination platform for exchanges and cooperation between the two countries in political, economic, cultural and other fields [82]. The newly established "2 + 2" ministerial dialogue in 2025 will enhance communication and cooperation between the two countries in key areas such as security and diplomacy [82]. Therefore, through clear actions, including the implementation of the policy coordination memorandum, these bilateral dialogue institutions of the two countries can create a stable, transparent and predictable macro policy environment for enterprises. This effectively eliminates the macro barriers encountered by Chinese enterprises in investment and operation in Indonesia, and builds a solid platform for the development of economic and trade relations between the two countries.

5.4. Promote The Improvement and Application of the Regulatory Sandbox Model

Driven by the global fintech trends, the fintech industry in Indonesia is expanding rapidly. However, despite significant progress, the existing fintech sandbox regulatory framework in Indonesia reveals some urgent issues that need to be addressed. The main characteristics are insufficient flexibility, lack of cross-border compatibility, and imprecise methods for resolving outcomes. These problems not only hinder the innovation potential of the fintech industry in Indonesia but also pose significant difficulties for Chinese companies seeking to enter the Indonesian market.

Against this complex backdrop, China and Indonesia can enhance the fintech sandbox regulatory framework from multiple perspectives, leveraging the existing cooperation foundation between the two countries to support seamless growth of Chinese enterprises in the Indonesian market and promote mutual development of the fintech industries in both countries.

5.4.1. Build A Hierarchical Sandbox System to Enhance Regulatory Flexibility.

In response to the diverse innovation needs of various fintech enterprises, a tiered sandbox system should be implemented. Fintech companies consist of several sub-sectors, such as online payment services, digital banks, and insurtech, among others. The risk profiles, innovation frameworks, and technological maturity levels of different industries vary significantly. A universal regulatory sandbox is unlikely to fully address these diverse requirements. For instance, the MAS has adopted a differentiated sandbox approach for fintech enterprises in different fields, providing distinct regulatory standards and guidance measures for payment services, insurance, and the securities market [83]. This tiered sandbox enables regulatory authorities to adjust regulatory requirements based on different risk levels and technological maturity, thereby ensuring that regulatory measures are more precise and preventing overly strict regulation from hindering innovation or overly lenient regulation from causing risk spillovers. At the same time, classifying enterprises according to their development stage and risk profile can significantly enhance the efficiency of regulatory authorities, thus preventing unnecessary regulatory resource expenditures. This further lowers innovation barriers and improves overall innovation efficiency.

5.4.2. Jointly Develop Compatibility Tools to Reduce Enterprise Costs

Collaborate to create an API compatibility certification tool to ensure that fintech systems comply with the electronic money standards set by the Bank of Indonesia (BI Regulation 20/2018). By using standardized interfaces, redundant development work caused by system incompatibility can be minimized, thereby reducing the technical and time costs for enterprises. At the same time, enhance communication and coordination between China and Indonesia on technical standards, promote the formation of unified cross-border fintech technical standards, and facilitate cross-border cooperation between fintech enterprises of the two countries.

5.4.3. Introduce Regulatory Technology Solutions to Strengthen Risk Management and Control.

Adopt China's blockchain traceability technology to monitor the transaction activities in the sandbox in real time. We can also draw on the practical expertise of the UK Financial Conduct Authority (FCA) sandbox and distributed ledger technology, and leverage the tamper-proof and traceable attributes of blockchain to enhance the transparency and efficiency of supervision [68]. Meanwhile, it is advocated to establish a cross-border data security certification framework to eliminate the barriers of test data between China and Indonesia.

5.4.4. Strengthen Joint Talent Cultivation and Enhance Compliance Capabilities.

We should follow the talent development framework of cooperation between Hunan Sany Polytechnic and Indonesia's Karawang University to cultivate and train multilingual compliance experts [84]. This approach aims to cultivate multidisciplinary capabilities through cooperative education programs and academic exchanges, ensuring that students master fintech technologies proficiently on the basis of a comprehensive understanding of the legal frameworks and policies of both China and Indonesia. Meanwhile, it is necessary to create multilingual financial knowledge toolkits, including materials from the OJK's digital education program. This will enhance consumers' financial literacy and risk awareness, strengthen consumer protection, and foster a favorable social atmosphere for the robust growth of fintech businesses.

6. Conclusion

This article employs case analysis and regional comparative research methods to comprehensively analyze the compliance operation environment and related issues of Chinese fintech companies in the Indonesian market. Against the backdrop of the booming digital economy in Southeast Asia, the fintech industry in Indonesia has significant development potential and a rapidly expanding market size, creating a favorable environment for cross-border capital investment. Nevertheless, along with this business opportunity comes a multi-faceted regulatory environment characterized by Indonesia's unique legal and cultural scope, a multi-tiered regulatory framework, strict data sovereignty laws, and the intricate interplay between religious ethics and localized narratives. These factors collectively pose significant compliance challenges. This regulatory landscape demands that Chinese companies abandon standardized compliance frameworks and develop a dynamic, finely calibrated compliance strategy system to facilitate the organic integration of legal texts and local practices.

This study, through a comparative analysis of regulatory models in China, Singapore and Malaysia, reveals the dual characteristics of Indonesia's regulatory system: although its "dual-track" framework demonstrates institutional flexibility in mitigating systemic risks, the decentralized allocation of regulatory powers and inconsistent enforcement standards objectively increase the compliance costs and policy uncertainties for market entities. This institutional conflict is well illustrated in the micro-cases of RupiahPlus and Akulaku. In these cases, non-compliance or misinterpretation of regulations led to direct economic losses and may permanently erode trust capital.

This research enhances the understanding of the mechanism of reducing regulatory arbitrage in developing countries like Indonesia and clarifies the nonlinear dynamics of the "regulation-compliance" interaction in the globalization of fintech. Chinese-funded enterprises must establish a trinity compliance governance framework of "law-culture-technology": enhance dynamic compliance capabilities in the legal dimension, develop cross-cultural risk perception mechanisms in the cultural dimension, and use regulatory technology to intelligently reconstruct compliance processes in the technological dimension. This adaptive governance model not only concerns the market survival ability of individual enterprises but also provides a micro foundation for building a digital economy community of shared future between China and Indonesia.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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