Jurnal Pembaharuan Hukum
Volume 13, Number 1, April 2026
E-ISSN : 2355 – 0481 (Print)
ISSN : 2580 – 3085 (Online)

HARMONIZATION OF OPEN BANKING REGULATIONS AND PERSONAL DATA PROTECTION: A COMPARATIVE ANALYSIS OF INDONESIA, JAPAN, AND THE EUROPEAN UNION

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ARTICLE INFO

Keywords:
Comparative Law; European Union; Open Banking; Personal Data Protection; Regulatory Harmonization.

ABSTRACT

The rapid advancement of financial technology has led to the emergence of open banking systems, which grant standardized access to consumers' financial data for third parties. This transformation presents significant opportunities for innovation while also raising serious challenges to personal data protection. This study aims to analyze the regulatory frameworks of open banking and personal data protection in Indonesia, Japan, and the European Union using a normative juridical method and comparative legal approach. The analysis examines policy structures, legal instruments, and supervisory mechanisms within each jurisdiction. The findings reveal that the European Union provides the most comprehensive legal framework through the integration of PSD2 and GDPR, ensuring a balance between financial innovation and privacy protection. Japan adopts a regulatory model emphasizing technical security and third-party licensing but still faces challenges in harmonizing with international standards. Indonesia remains in an early stage, with fragmented regulations between the banking and personal data protection sectors, necessitating regulatory synchronization to ensure legal certainty and consumer protection. This article recommends cross-sector harmonization and stronger regulatory oversight to build a secure and inclusive open banking ecosystem.

A. INTRODUCTION

The rapid development of digital technologies and financial innovation has profoundly transformed the architecture of the global financial services industry, ushering in what is commonly referred to as the open banking era.[1] This model represents a fundamental shift from a traditionally closed banking ecosystem where financial institutions operate in siloed systems and retain exclusive control over customer data toward a more interconnected and collaborative environment. Through the use of secure and standardized Application Programming Interfaces (APIs), banks and other financial institutions can share customer data with licensed third-party providers, such as fintech companies, under specific legal and technical safeguards.[2] This transformation is designed not only to increase market competition by lowering barriers to entry but also to stimulate the development of innovative financial products and services that are more responsive to consumer needs. By enabling new players to access financial data securely, open banking fosters greater financial inclusion, broadens the reach of banking services to underserved communities, and drives overall digital economic growth.

However, this opening of access to financial data simultaneously introduces a complex set of legal, regulatory, and ethical challenges, particularly in relation to the protection of personal data and individual privacy.[3] Unlike traditional banking systems, where customer information remains largely within the control of a single entity, open banking involves multiple actors banks, third-party providers, regulators, and consumers—

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[1] Pinky Eskah Prayoga, "Pelindungan data pribadi dalam open application programming interface (open api) payment: studi komparatif inggris dan indonesia," *Viva Justicia*: Journal of Private Law 1, no. 2 (2025): 89. See too, Douglas W. Arner, Ross P. Buckley, and Dirk A. Zetzsche, "Open banking, open data and open finance: lessons from the European union," *Forthcoming in Linda Jeng (ed), Open Banking (Oxford University Press, 2021)* (2021): 23.

[2] Annisa Monica, Cahya Yulianti, and Azzahra Nurintiara, "Upaya Penguatan Hukum Pelindungan Data Pribadi Dalam Keamanan Transaksi Menggunakan Dompet Elektronik Melalui Penerapan Zero-Knowledge Proof," Padjadjaran Law Review 13, no. 1 (2025): 436. See too, Christopher C. Nicholls, "Open banking and the rise of FinTech: innovative finance and functional regulation," *Banking & finance law review* 35, no. 1 (2019): 123.

[3] Emily Nicolella, "Evolving Privacy Protections for Emerging Machine Learning Data Under Carpenter v. United States," *FIU Law Review* 17, no. 2 (2023): 232. See too, Guswan Hakim, Oheo Kaimuddin Haris, and Muthaharry Mohammad, "Analisis Perbandingan Hukum Mengenai Regulasi Perlindungan Data Pribadi Antara Uni Eropa dan Indonesia," *Halu Oleo Legal Research* 5, no. 2 (2023): 446.

interacting across digital infrastructures.[4] This creates new vulnerabilities, including heightened risks of unauthorized data access, data breaches, misuse of personal information, and difficulties in ensuring accountability when multiple entities handle the same data.[5] These risks are amplified in jurisdictions where regulatory frameworks are fragmented or lack coherent data protection mechanisms. As financial transactions increasingly occur across borders and involve multinational service providers, the question of how to ensure consistent and effective protection of personal data has become not only a domestic legal concern but also a pressing global policy issue. Consequently, the protection of personal data within the open banking framework is not merely a technical challenge but a matter of ensuring public trust, legal certainty, and the protection of fundamental rights in the digital age.[6]

In this context, the harmonization of open banking regulations with comprehensive personal data protection regimes is essential to establishing a regulatory environment that simultaneously promotes innovation and safeguards individual rights.[7] Regulatory harmonization involves aligning financial and data protection frameworks to avoid inconsistencies, legal gaps, and overlapping mandates that may undermine both consumer protection and industry development.[8] A well-designed harmonized framework can create legal clarity for financial institutions and fintech companies while ensuring that data subjects retain meaningful control over their personal information through mechanisms such as explicit consent, transparent data usage policies,

[4] Trisadini Prasastinah Usanti, "The principle of amanah in the utilisation of consumers' personal data and information in open banking," *Journal of Central Banking Law and Institutions* 1, no. 1 (2022): 119. See too, Francesco De Pascalis, "The journey to open finance: learning from the open banking movement," *European business law review* 33, no. 3 (2022): 34.

[5] Muhammad Prakoso Aji, "Sistem Keamanan Siber dan Kedaulatan Data di Indonesia dalam Perspektif Ekonomi Politik (Studi Kasus Perlindungan Data Pribadi) [Cyber Security System and Data Sovereignty in Indonesia in Political Economic Perspective]," *Jurnal Politica Dinamika Masalah Politik Dalam Negeri dan Hubungan Internasional* 13, no. 2 (2023): 222.

[6] Douglas W. Arner, Ross P. Buckley, and Dirk A. Zetzsche, "Open banking, open data and open finance: lessons from the European union," *Forthcoming in Linda Jeng (ed), Open Banking (Oxford University Press, 2021)* (2021): 25. See too, Christian Calliess, and Ansgar Baumgarten, "Cybersecurity in the EU the example of the financial sector: a legal perspective," *German Law Journal* 21, no. 6 (2020): 1154.

[7] Marianna Gounari, George Stergiopoulos, Kosmas Pipyros, and Dimitris Gritzalis, "Harmonizing open banking in the European Union: an analysis of PSD2 compliance and interrelation with cybersecurity frameworks and standards," *International Cybersecurity Law Review* 5, no. 1 (2024): 82. See too, Guswan Hakim, Oheo Kaimuddin Haris, and Muthaharry Mohammad, "Analisis Perbandingan Hukum Mengenai Regulasi Perlindungan Data Pribadi Antara Uni Eropa dan Indonesia," *Halu Oleo Legal Research* 5, no. 2 (2023): 448.

[8] Bernardo Nicoletti, Palgrave Studies in Financial Services Technology: The Future of Fintech – Integrating Finance and Technology in Financial Services, (Singapore: Springer Nature, 2017), 42.

and effective remedies in cases of misuse.[9] Moreover, harmonization helps facilitate international cooperation, enabling jurisdictions to develop interoperable standards that support cross-border data flows while maintaining high levels of privacy protection. Without such alignment, there is a risk that regulatory fragmentation could deter innovation, erode consumer trust, and expose individuals to significant privacy violations. Therefore, creating a balanced legal ecosystem where open banking and data protection operate in synergy is crucial for the sustainable development of the digital financial sector.[10]

The European Union, Japan, and Indonesia provide distinct approaches in regulating open banking and personal data protection, shaped by their respective legal traditions and governance systems.[11] The European Union stands as a global pioneer through the integrated implementation of the Payment Services Directive 2 (PSD2) and the General Data Protection Regulation (GDPR).[12] PSD2 enables broad access to financial systems for third-party providers to facilitate payment innovations, while GDPR ensures a high standard of personal data protection based on principles of transparency, explicit consent, and accountability. Japan, through the Financial Services Agency (FSA), promotes the integration of financial technology by tightening licensing systems for third-party providers and strengthening technical security measures. However, it continues to face challenges in fully aligning domestic standards with stricter international principles. Indonesia, on the other hand, remains in the early stages of open banking development. Its regulations are still dispersed across multiple authorities (Bank Indonesia, the Financial Services Authority, and the Ministry of Communications and Informatics), and the Personal Data Protection Law was only enacted in 2022.[13] This regulatory

[9] Christopher C. Nicholls, "Open banking and the rise of FinTech: innovative finance and functional regulation," *Banking & finance law review* 35, no. 1 (2019): 124. See too, Mamiko Yokoi-Arai, "The Regulatory Efficiency of a Single Regulator in Financial Services: Analysis of the UK and Japan," *Banking & Finance Law Review* 22 (2006): 29.

[10] David Debenham, "Big data analytics, big financial institutions, and big money fraud litigation," *Banking & Finance Law Review* 32, no. 1 (2016): 103.

[11] Anton N. Didenko, "Cybersecurity regulation in the financial sector: prospects of legal harmonization in the European Union and beyond," *Uniform Law Review* 25, no. 1 (2020): 126. See too, Christian Calliess, and Ansgar Baumgarten, "Cybersecurity in the EU the example of the financial sector: a legal perspective," *German Law Journal* 21, no. 6 (2020): 1156.

[12] Dian Anggi Rahayu, Syahira Rafah Santika, Widya Tri Lestari, and Irsyaf Marsal, "Analisis Hukum terhadap Netralitas Presiden dalam Pemilu sebagai Wujud Kepatuhan terhadap Prinsip Demokrasi," *Media Hukum Indonesia (MHI)* 3, no. 3 (2025): 93. See too, Pieter TJ, Wolters, and Bart PF Jacobs, "The security of access to accounts under the PSD2," *Computer law & security review* 35, no. 1 (2019): 32.

[13] Renaldi Aditya, "Perlindungan Hukum Bagi Pengguna Jasa Rekber (Penjual) Oleh Pihak Bank Sesuai Dengan Peraturan Bank Indonesia Nomor: 3/10/PBI/2001 Tentang Prinsip Mengenal Nasabah," *Novum: Jurnal Hukum* 4, no. 2 (2017): 165.

fragmentation creates an urgent need for cross-sectoral harmonization to avoid overlaps, legal uncertainty, and data breach risks.

Previous studies have discussed open banking and personal data protection separately, from both domestic regulatory and comparative perspectives.[14] However, most of these studies focus on normative or sectoral technical aspects, paying little attention to the functional relationship between open banking regulatory frameworks and personal data protection across jurisdictions.[15] In reality, the integration of these two legal regimes is a key determinant of the secure, sustainable, and equitable implementation of open banking. This gap calls for a comprehensive and contextual comparative legal analysis, particularly as the three jurisdictions differ in legal systems, governance structures, and digital economic dynamics.

The novelty of this research lies in its analytical approach that simultaneously compares the regulatory frameworks of open banking and personal data protection in Indonesia, Japan, and the European Union, with an emphasis on their functional and integrative dimensions.[16] Rather than merely examining legal structures and policies, this study investigates how the interaction between financial regulation and data protection is operationalized in practice, and the extent to which oversight mechanisms, compliance, and individual rights protections are effectively enforced in each jurisdiction. This approach enables a more precise mapping of strengths, weaknesses, and opportunities for regulatory harmonization, providing evidence-based policy recommendations for Indonesia.

Taking into account the constitutional, legal-political, and regulatory contexts of each country, this research aims to provide a thorough comparative analysis of the effectiveness, consistency, and comprehensiveness of open banking and personal data protection frameworks.[17] Specifically, the study aims to: identify similarities and

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[14] Douglas W. Arner, Ross P. Buckley, and Dirk A. Zetzsche, "Open banking, open data and open finance: lessons from the European union," *Forthcoming in Linda Jeng (ed), Open Banking (Oxford University Press, 2021)* (2021): 26. See too, Marianna Gounari, George Stergiopoulos, Kosmas Pipyros, and Dimitris Gritzalis, "Harmonizing open banking in the European Union: an analysis of PSD2 compliance and interrelation with cybersecurity frameworks and standards," *International Cybersecurity Law Review* 5, no. 1 (2024): 86; Pieter TJ, Wolters, and Bart PF Jacobs, "The security of access to accounts under the PSD2," *Computer law & security review* 35, no. 1 (2019): 37.

[15] Alessandro Palmieri, and Blerina Nazeraj, "Open banking and competition: an intricate relationship," *EU and comparative law issues and challenges series (ECLIC)* 5 (2021): 223.

[16] Anton N. Didenko, "Cybersecurity regulation in the financial sector: prospects of legal harmonization in the European Union and beyond," *Uniform Law Review* 25, no. 1 (2020): 127. See too, Christian Calliess, and Ansgar Baumgarten, "Cybersecurity in the EU the example of the financial sector: a legal perspective," *German Law Journal* 21, no. 6 (2020): 1157.

[17] Alessandro Palmieri, and Blerina Nazeraj, "Open banking and competition: an intricate relationship," *EU and comparative law issues and challenges series (ECLIC)* 5 (2021): 225. See too, Guswan Hakim, Oheo Kaimuddin Haris, and Muthaharry Mohammad, "Analisis

differences in the regulatory architecture of open banking and data protection in Indonesia, Japan, and the European Union; evaluate the mechanisms for protecting user rights and the effectiveness of supervisory frameworks in implementing open banking policies; and formulate strategic recommendations for regulatory harmonization in Indonesia to effectively balance financial innovation with personal data protection. Accordingly, this study is not merely descriptive and comparative but also constructive, offering concrete policy reform ideas to strengthen Indonesia's regulatory framework in facing the increasingly complex global digital financial ecosystem.

To guide the analysis in this study, the following research questions are formulated to reflect the key dimensions of regulatory development, institutional frameworks, and comparative challenges:

1. How have the historical and regulatory developments of open banking and personal data protection evolved in Indonesia, Japan, and the European Union?
2. How are institutional structures, legal mechanisms, and enforcement models designed in regulating open banking and data protection across these jurisdictions?
3. What are the main challenges in conducting comparative analysis and achieving regulatory harmonization of open banking and personal data protection in Indonesia, Japan, and the European Union?

B. RESEARCH METHODS

This research employs a normative juridical approach combined with a comparative legal method to examine the regulatory frameworks of open banking and personal data protection in Indonesia, Japan, and the European Union.[18] The normative juridical approach is used because the primary focus of this study is on legal norms, principles, and regulatory instruments that govern the relationship between open banking implementation and personal data protection. Through this approach, the research analyzes relevant legal provisions, doctrines, and regulatory policies that form the basis of financial data governance in each jurisdiction.[19] The comparative legal method is applied to identify similarities, differences, and unique characteristics in the

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Perbandingan Hukum Mengenai Regulasi Perlindungan Data Pribadi Antara Uni Eropa dan Indonesia," *Halu Oleo Legal Research* 5, no. 2 (2023): 449.

[18] Mexsasai Indra, Geofani Milthree Saragih, and Mohamad Hidayat Muhtar, "Strength of Constitutional Court Decisions in Judicial Review of the 1945 Constitution in Indonesia: Kekuatan Putusan Mahkamah Konstitusi dalam Pengujian Undang-Undang terhadap Undang-Undang Dasar 1945 di Indonesia," *Jurnal Konstitusi* 20, no. 2 (2023): 279.

[19] Elisabeth Nurhaini Butar-Butar, *Metode Penelitian Hukum, Langkah-Langkah Untuk Menemukan Kebenaran Dalam Ilmu Hukum*, (Bandung: PT. Refika Aditama, 2018), 23. See too, Ayça Atabey, "Open banking & banking-as-a-service (BaaS): a delicate turnout for the banking sector," *Global privacy law review* 2, no. 1 (2021): 71.

legal frameworks of the three jurisdictions, allowing for a deeper understanding of how different legal systems address similar regulatory challenges.

The data used in this research consist of primary and secondary legal materials. Primary legal materials include laws and regulations related to open banking and data protection, such as Indonesia's Law on Personal Data Protection (2022) and relevant regulations issued by Bank Indonesia and the Financial Services Authority (*Otoritas Jasa Keuangan*/OJK); Japan's Banking Act and Act on the Protection of Personal Information (APPI); as well as the European Union's Payment Services Directive 2 (PSD2) and General Data Protection Regulation (GDPR). These are supplemented with implementing regulations, regulatory guidelines, and official documents issued by financial and data protection authorities in each jurisdiction.[20] Secondary legal materials are drawn from legal literature, academic journals, policy papers, textbooks, and previous research that discuss regulatory developments, comparative financial law, and data protection frameworks relevant to the topic.

The analysis method employed is qualitative analysis, which involves systematically describing, interpreting, and comparing the collected data to identify key patterns, regulatory principles, and doctrinal foundations. The comparative analysis focuses on several aspects: regulatory structure, scope of legal protection, institutional arrangements, and mechanisms for ensuring compliance and accountability. Additionally, a conceptual approach is used to examine the theoretical underpinnings of data protection and financial regulation, particularly regarding the balance between innovation and privacy in the digital financial ecosystem. Through this methodology, the research aims to provide a comprehensive and systematic understanding of how different jurisdictions harmonize open banking regulations with personal data protection frameworks. Furthermore, this study is expected to produce normative and policy recommendations that can inform regulatory development in Indonesia, particularly to ensure that financial innovation proceeds hand in hand with robust personal data protection and legal certainty.

C. DISCUSSION

1. Historical and Regulatory Development of Open Banking and Data Protection Frameworks

The development of open banking and personal data protection frameworks reflects broader transformations in financial regulation and digital

[20] Zainuddin Ali, *Metode Penelitian Hukum*, (Sinar Grafika, 2014), 323.

governance over the past two decades.[21] Historically, traditional banking systems operated under a closed architecture, in which financial institutions held exclusive control over customer data and provided services through proprietary platforms.[22] This model emphasized security and stability but often limited innovation and competition, as third parties had little to no access to financial infrastructure. The rise of financial technology (fintech), driven by advances in digital platforms, mobile applications, and data analytics, disrupted this conventional model by introducing new service providers that rely heavily on access to financial data to deliver innovative solutions.[23] Open banking emerged as a regulatory and technological response to this shift, encouraging interoperability between financial institutions and third-party providers through standardized and secure data-sharing mechanisms, typically via Application Programming Interfaces (APIs).[24] In parallel, growing awareness of data privacy risks and high-profile data breaches worldwide spurred the development of personal data protection frameworks to ensure that the increasing circulation of sensitive information in digital ecosystems would not compromise individual rights.

In the European Union, the historical trajectory of open banking regulation is closely linked to the broader objective of creating a single digital market and enhancing competition in financial services.[25] The enactment of the Payment Services Directive (PSD) in 2007 laid the groundwork for regulatory openness by establishing uniform rules for payment services across member states. This was followed by the more transformative Payment Services Directive 2 (PSD2) in 2015, which mandated banks to provide licensed third-party providers with access to customer account data subject to explicit

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[21] Yingsi Chen, "Research on Regulation of Personal Financial Data Sharing in Open Banking," As*ian Journal of Education and Social Studies* 45, no. 3 (2023): 31. See too, Ayça Atabey, "Open banking & banking-as-a-service (BaaS): a delicate turnout for the banking sector," *Global privacy law review* 2, no. 1 (2021): 62.

[22] Irina Grekova, and Maxim Storchevoy, "Regulation of Financial Conduct in Russia." In *Handbook on Ethics in Finance, edited by Leire San-Jose, José Luis Retolaza, and Luc Van Liedekerke*, International Handbooks in Business Ethics, (Springer International Publishing, 2020), 32.

[23] Daniel Bunge, "In the shadow of banking: Oversight of fintechs and their service companies," In *New technology, big data and the law*, (Singapore: Springer Singapore, 2017), 301. See too, Christopher C. Nicholls, "Open banking and the rise of FinTech: innovative finance and functional regulation," *Banking & finance law review* 35, no. 1 (2019): 127.

[24] Ayça Atabey, "Open banking & banking-as-a-service (BaaS): a delicate turnout for the banking sector," *Global privacy law review* 2, no. 1 (2021): 69. See too, Alessandro Palmieri, and Blerina Nazeraj, "Open banking and competition: an intricate relationship," *EU and comparative law issues and challenges series (ECLIC)* 5 (2021): 226.

[25] Marianna Gounari, George Stergiopoulos, Kosmas Pipyros, and Dimitris Gritzalis, "Harmonizing open banking in the European Union: an analysis of PSD2 compliance and interrelation with cybersecurity frameworks and standards," *International Cybersecurity Law Review* 5, no. 1 (2024): 88. See too, Frank Schimmelfennig, Dirk Leuffen, and Catherine E De Vries, "Differentiated Integration in the European Union: Institutional Effects, Public Opinion, and Alternative Flexibility Arrangements," *European Union Politics* 24, no. 1 (2023): 36.

consent through standardized APIs. PSD2 is widely regarded as the global reference point for open banking regulation, as it not only promotes competition but also incorporates strong consumer protection safeguards.[26] Alongside PSD2, the European Union introduced the General Data Protection Regulation (GDPR) in 2016, which came into effect in 2018. GDPR sets a high global standard for personal data protection, emphasizing principles such as lawfulness, fairness, transparency, purpose limitation, data minimization, and accountability. The coexistence of PSD2 and GDPR illustrates a deliberate regulatory strategy to balance financial innovation with privacy protection, ensuring that data sharing occurs within a clear legal framework that upholds individual rights and imposes strict compliance obligations on financial institutions and third parties alike.[27]

Japan's regulatory development took a different path, shaped by its unique legal and institutional context. Following the global fintech wave in the late 2000s and early 2010s, Japan began reforming its financial regulatory landscape to accommodate new digital services. The Banking Act was amended to introduce a registration system for Third-Party Providers (TPPs) and to establish secure data-sharing practices between banks and TPPs.[28] The Financial Services Agency (FSA) played a central role in issuing guidelines and monitoring compliance to ensure both innovation and stability. Japan's approach is characterized by gradual adaptation rather than radical transformation, with regulatory changes introduced incrementally to respond to technological developments.[29] In terms of personal data protection, Japan enacted the Act on the Protection of Personal Information (APPI) in 2003, which has undergone several amendments to align more closely with international standards. The 2017 and 2020 amendments strengthened data subject rights, introduced new rules on cross-border data transfers, and enhanced the powers of the Personal Information Protection Commission (PPC). Japan's approach emphasizes cooperation between regulators and industry stakeholders, with a focus on fostering trust in digital financial services. Although Japan's legal standards are not as stringent as GDPR, the

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[26] Pieter TJ, Wolters, and Bart PF Jacobs, "The security of access to accounts under the PSD2," *Computer law & security review* 35, no. 1 (2019): 35. See too, Giuseppe Colangelo, "Open banking goes to Washington: Lessons from the EU on regulatory-driven data sharing regimes," *Computer Law & Security Review* 54 (2024): 106019.

[27] Marianna Gounari, George Stergiopoulos, Kosmas Pipyros, and Dimitris Gritzalis, "Harmonizing open banking in the European Union: an analysis of PSD2 compliance and interrelation with cybersecurity frameworks and standards," *International Cybersecurity Law Review* 5, no. 1 (2024): 82. See too, Pieter TJ, Wolters, and Bart PF Jacobs, "The security of access to accounts under the PSD2," *Computer law & security review* 35, no. 1 (2019): 35.

[28] Dmitry V. Pushnyakov, "Analysis of the financial system of Japan," *Tuculart Student Scientific* 3 (2023): 34.

[29] Markus Heckel, and Franz Waldenberger, *The future of financial systems in the digital age: Perspectives from Europe and Japan*, (Singapore: Springer Nature, 2022), 23.

European Commission recognized Japan's data protection regime as "adequate" in 2019, enabling smoother cross-border data flows between the two jurisdictions.[30]

In Indonesia, the development of open banking and personal data protection frameworks is at a relatively early stage compared to the EU and Japan.[31] Regulatory initiatives related to open banking have primarily been led by Bank Indonesia and the Financial Services Authority (OJK), focusing on creating digital payment ecosystems and interoperability between banks and fintech companies.[32] Key milestones include the National Payment Gateway policy and the establishment of the Open API Standard for the Indonesian Payment System, aimed at enabling standardized data exchange between financial service providers. However, these initiatives remain fragmented and sector-specific, lacking a comprehensive legal framework that governs open banking as a whole.[33] On the personal data protection side, Indonesia long relied on a patchwork of sectoral regulations, such as those in telecommunications, banking, and electronic transactions, until the enactment of the Personal Data Protection Law (Law Number 27 of 2022).[34] This law represents a significant shift toward a unified data protection regime, introducing principles such as lawfulness, purpose limitation, data minimization, and data subject rights. Nonetheless, the implementation phase is still ongoing, and harmonization between financial regulations and data protection provisions remains a major challenge. Different regulatory bodies Bank Indonesia, OJK, and the Ministry of Communication and Informatics hold overlapping authority, creating potential gaps and inconsistencies in enforcement.

[30] Sean H. Vanatta, Eiji Hotori, and Kazuhiko Yago, "Introduction to Special Issue on Human Capital in Financial Regulation and Supervision," *Management & Organizational History* 20, no. 1 (2025): 12.

[31] Guswan Hakim, Oheo Kaimuddin Haris, and Muthaharry Mohammad, "Analisis Perbandingan Hukum Mengenai Regulasi Perlindungan Data Pribadi Antara Uni Eropa dan Indonesia," *Halu Oleo Legal Research* 5, no. 2 (2023): 449.

[32] Christopher C. Nicholls, "Open banking and the rise of FinTech: innovative finance and functional regulation," *Banking & finance law review* 35, no. 1 (2019): 123. See too, Giuseppe Colangelo, "Open banking goes to Washington: Lessons from the EU on regulatory-driven data sharing regimes," *Computer Law & Security Review* 54 (2024): 106018.

[33] Emma Leong, and Jodi Gardner, "Open banking in the UK and Singapore: open possibilities for enhancing financial inclusion," *Journal of business law* 5 (2021): 434. See too, Nydia Remolina Leon, "Open finance: Regulatory challenges of the evolution of data sharing arrangements in the financial sector," *Banking and Finance Law Review* 40, no. 1 (2023): 36.

[34] Evelyn Angelita Pinondang Manurung, and Emmy Febriani Thalib, "Tinjauan yuridis perlindungan data pribadi berdasarkan UU nomor 27 tahun 2022," *Jurnal Hukum Saraswati (JHS)* 4, no. 2 (2022): 141. See too, Lenny Maria Aritonang, Zyetwill Zyetwill, and Rara Handayani, "Analisis Hukum terhadap Kebocoran Data Pribadi dan Penyalahgunaan Identitas dalam Perbankan Berdasarkan Undang-Undang Nomor 27 Tahun 2022 Tentang Perlindungan Data Pribadi," *Ranah Research: Journal of Multidisciplinary Research and Development* 7, no. 5 (2025): 3148.

Comparing these three jurisdictions reveals divergent regulatory trajectories shaped by different legal traditions, institutional capacities, and policy objectives. The EU represents a comprehensive and integrated model, where financial innovation and privacy protection are advanced in tandem through robust legislative instruments. Japan exemplifies a pragmatic and adaptive approach, gradually adjusting existing frameworks to incorporate open banking while aligning data protection with international norms.[35] Indonesia, meanwhile, is in a formative stage, with significant regulatory potential but also considerable institutional fragmentation that must be addressed to ensure coherence. Historically, while the EU and Japan developed their frameworks in contexts of relatively stable legal systems and mature regulatory institutions, Indonesia is undergoing a transitional phase marked by the simultaneous development of digital finance and data governance structures. These historical and regulatory differences have profound implications for how each jurisdiction manages the balance between promoting innovation and safeguarding personal data, a balance that lies at the heart of effective open banking regulation.[36]

2. Institutional Structures, Legal Mechanisms, and Enforcement Models

The institutional structures and legal mechanisms underpinning open banking and personal data protection play a decisive role in determining how effectively regulatory frameworks are implemented and enforced.[37] These structures involve a complex network of public authorities, financial regulators, data protection agencies, and private sector actors, each with distinct but interrelated mandates.[38] At their core, open banking regulations rely on mechanisms that enable secure, standardized, and controlled data sharing

[35] Odile Ammann, and Audrey Boussat, "The Participation of Civil Society in European Union Environmental Law-Making Processes: A Critical Assessment of the European Commission's Consultations in Connection with the European Climate Law," *European Journal of Risk Regulation* 14, no. 2 (2023): 236. See too, Frank Schimmelfennig, Dirk Leuffen, and Catherine E De Vries, "Differentiated Integration in the European Union: Institutional Effects, Public Opinion, and Alternative Flexibility Arrangements," *European Union Politics* 24, no. 1 (2023): 37.

[36] Emma Leong, and Jodi Gardner, "Open banking in the UK and Singapore: open possibilities for enhancing financial inclusion," *Journal of business law* 5 (2021): 436. See too, Mamiko Yokoi-Arai, "The Regulatory Efficiency of a Single Regulator in Financial Services: Analysis of the UK and Japan," *Banking & Finance Law Review* 22 (2006): 25.

[37] Alessandro Palmieri, and Blerina Nazeraj, "Open banking and competition: an intricate relationship," *EU and comparative law issues and challenges series (ECLIC)* 5 (2021): 228. See too, Andrew Mazen Dahdal, and Bruno Zeller, "Open Banking and Open Data: Context, Innovation, and Consumer Protection," *Banking Law Journal* 138 (2021): 390.

[38] Michał Polasik, Agnieszka Butor-Keler, Paweł Widawski, and Grzegorz Keler, "Evaluating the regulatory approach to open banking in Europe: An empirical study," *Financial Law Review* 34, no. 2 (2024): 63. See too, Paripurna P. Sugarda, and Muhammad Rifky Wicaksono, "Enhancing the competitiveness of Indonesia's financial services sector in the digital era through open banking: Lessons learned from the UK's Experience," *Journal of Central Banking Law and Institutions* 2, no. 1 (2023): 163.

between financial institutions and third-party providers, while data protection frameworks establish the legal boundaries and principles governing the collection, processing, storage, and transfer of personal data.[39] The interaction between these two regulatory spheres requires clear institutional arrangements, effective coordination among regulators, and robust enforcement models to prevent legal fragmentation, ensure compliance, and protect individual rights.

The European Union represents one of the most sophisticated and integrated institutional models in this regard. The implementation of open banking under PSD2 is primarily overseen by National Competent Authorities (NCAs) in each member state, which are responsible for licensing Third-Party Providers (TPPs), supervising banks, and ensuring compliance with technical and security standards.[40] These authorities operate within a harmonized framework coordinated by the European Banking Authority (EBA), which issues Regulatory Technical Standards (RTS) and guidelines to ensure uniform implementation across the EU. For personal data protection, the General Data Protection Regulation (GDPR) is enforced by national Data Protection Authorities (DPAs), coordinated at the EU level through the European Data Protection Board (EDPB).[41] This dual institutional arrangement ensures both financial supervision and data protection oversight, with clearly delineated responsibilities but frequent cooperation. For example, data breaches or misuse involving TPPs may trigger simultaneous investigations by both financial regulators and DPAs. Legal mechanisms under PSD2 include mandatory registration and authorization of TPPs, strong customer authentication (SCA), liability rules for unauthorized transactions, and explicit consent requirements for data access.[42] GDPR reinforces these mechanisms through obligations such as lawful processing, data minimization, purpose limitation, and the right to be informed. Enforcement is supported by

[39] Guswan Hakim, Oheo Kaimuddin Haris, and Muthaharry Mohammad, "Analisis Perbandingan Hukum Mengenai Regulasi Perlindungan Data Pribadi Antara Uni Eropa dan Indonesia," *Halu Oleo Legal Research* 5, no. 2 (2023): 446.

[40] Alison Johnston, and Aidan Regan, "Introduction: Is the European Union Capable of Integrating Diverse Models of Capitalism?" *New Political Economy* 23, no. 2 (2018): 145. See too, Anton N. Didenko, "Cybersecurity regulation in the financial sector: prospects of legal harmonization in the European Union and beyond," *Uniform Law Review* 25, no. 1 (2020): 128.

[41] Frank Schimmelfennig, Dirk Leuffen, and Catherine E De Vries, "Differentiated Integration in the European Union: Institutional Effects, Public Opinion, and Alternative Flexibility Arrangements," *European Union Politics* 24, no. 1 (2023): 32. See too, Umi Khaerah Pati, and Anugrah Muhtarom Pratama, "Indonesia's Open Banking Future: Designing Effective Regulatory Approaches," *Jambe Law Journal* 8, no. 1 (2025): 31.

[42] Thorsten Schulten, and Torsten Müller, "A paradigm shift towards Social Europe? The proposed Directive on adequate minimum wages in the European Union," *Italian Labour Law e-Journal* 14, no. 1 (2021): 12. See too, Frank Schimmelfennig, Dirk Leuffen, and Catherine E De Vries, "Differentiated Integration in the European Union: Institutional Effects, Public Opinion, and Alternative Flexibility Arrangements," *European Union Politics* 24, no. 1 (2023): 34.

significant administrative fines, cross-border cooperation between DPAs, and judicial remedies available to individuals.

In Japan, institutional responsibility for open banking is centered on the Financial Services Agency (FSA), which regulates banks and licenses third-party service providers under the amended Banking Act.[43] The FSA establishes guidelines for data sharing, technical security, and contractual arrangements between banks and TPPs. It requires TPPs to register and comply with operational and cybersecurity standards, while also supervising banks' due diligence in partnering with TPPs. On data protection, the Personal Information Protection Commission (PPC) is the central authority responsible for monitoring compliance with the Act on the Protection of Personal Information (APPI).[44] The PPC has the power to conduct investigations, issue recommendations or orders, and impose administrative sanctions for violations. Coordination between the FSA and PPC is crucial because open banking arrangements inherently involve the processing and sharing of personal financial data. Japan relies heavily on administrative guidance and industry self-regulation to complement formal legal mechanisms. For example, industry associations play an important role in establishing best practices and ensuring alignment with FSA and PPC policies. Legal mechanisms include TPP registration, mandatory contracts defining liability and data handling responsibilities, and security standards for API use. While enforcement powers are less punitive than those under GDPR, Japanese regulators emphasize compliance through continuous supervision, corrective guidance, and cooperative relationships with regulated entities.

Indonesia, by contrast, exhibits a more fragmented institutional landscape, reflecting the country's evolving regulatory environment. Open banking initiatives fall primarily under the jurisdiction of Bank Indonesia (*Bank Indonesisa*/BI) and the Financial Services Authority (*Otoritas Jasa Keuangan*/OJK), each overseeing different aspects of the financial system. BI has focused on payment systems and issued standards for open API development, interoperability, and digital payment infrastructure. OJK regulates the broader financial services sector, including banks and fintech companies, with a growing interest in digital financial innovation. Meanwhile, the Ministry of Communication and Informatics (*Kementerian Komunikasi dan Informatika*/Kominfo) is responsible for implementing and enforcing the Personal Data Protection Law (Law Number 27 of 2022), including issuing

[43] Sean H. Vanatta, Eiji Hotori, and Kazuhiko Yago, "Introduction to Special Issue on Human Capital in Financial Regulation and Supervision," *Management & Organizational History* 20, no. 1 (2025): 14.

[44] Felix Doege, "Who is Driving Financial Market Governance of Cryptocurrencies in Japan? Actors and Institutions behind Japan's FinTech Revolution," *ASIEN: The German Journal on Contemporary Asia* 160/161 (2021): 119.

implementing regulations, overseeing data controllers and processors, and imposing administrative sanctions.[45] This division of authority creates potential overlaps and coordination challenges, as financial data flows often intersect between the jurisdictions of these institutions. Unlike the EU, Indonesia does not yet have a single centralized data protection authority, which can complicate enforcement and create legal uncertainty for market participants.[46] Legal mechanisms include licensing of financial institutions and fintech operators, mandatory compliance with BI and OJK regulations for API use and cybersecurity, and the emerging obligations under the Personal Data Protection Law, such as consent requirements, data subject rights, and breach notification duties.[47] However, detailed technical standards and enforcement guidelines are still being developed, leading to varying levels of compliance across the industry.

When comparing enforcement models, clear differences emerge among the three jurisdictions. The EU adopts a strong, hierarchical model with clearly defined regulatory roles, harmonized rules, and powerful enforcement mechanisms, including substantial administrative fines and coordinated cross-border investigations. Japan employs a hybrid model combining regulatory oversight with administrative guidance and industry self-regulation, emphasizing compliance through collaboration rather than heavy sanctions.[48] Indonesia is in the process of building its enforcement model, transitioning from sectoral, fragmented oversight toward a more integrated system, but challenges remain in ensuring institutional coordination and regulatory clarity. These differences reflect not only legal traditions civil law versus administrative guidance cultures but also varying levels of regulatory capacity and maturity.

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[45] Evelyn Angelita Pinondang Manurung, and Emmy Febriani Thalib, "Tinjauan yuridis perlindungan data pribadi berdasarkan UU nomor 27 tahun 2022," *Jurnal Hukum Saraswati (JHS)* 4, no. 2 (2022): 144. See too, Lenny Maria Aritonang, Zyetwill Zyetwill, and Rara Handayani, "Analisis Hukum terhadap Kebocoran Data Pribadi dan Penyalahgunaan Identitas dalam Perbankan Berdasarkan Undang-Undang Nomor 27 Tahun 2022 Tentang Perlindungan Data Pribadi," *Ranah Research: Journal of Multidisciplinary Research and Development* 7, no. 5 (2025): 351.

[46] Anton N. Didenko, "Cybersecurity regulation in the financial sector: prospects of legal harmonization in the European Union and beyond," *Uniform Law Review* 25, no. 1 (2020): 129. See too, Alessandro Palmieri, and Blerina Nazeraj, "Open banking and competition: an intricate relationship," *EU and comparative law issues and challenges series (ECLIC)* 5 (2021): 229.

[47] Muhammad Prakoso Aji, "Sistem Keamanan Siber dan Kedaulatan Data di Indonesia dalam Perspektif Ekonomi Politik (Studi Kasus Perlindungan Data Pribadi) [Cyber Security System and Data Sovereignty in Indonesia in Political Economic Perspective]," *Jurnal Politica Dinamika Masalah Politik Dalam Negeri dan Hubungan Internasional* 13, no. 2 (2023): 225.

[48] Paripurna P. Sugarda, and Muhammad Rifky Wicaksono, "Enhancing the competitiveness of Indonesia's financial services sector in the digital era through open banking: Lessons learned from the UK's Experience," *Journal of Central Banking Law and Institutions* 2, no. 1 (2023): 161.

Ultimately, the effectiveness of open banking and personal data protection regulation depends on how well institutional structures and legal mechanisms align to support consistent, accountable, and transparent enforcement. The EU demonstrates the benefits of a harmonized, multi-level governance structure with strong legal mandates, while Japan illustrates the advantages of adaptive regulation in a technologically advanced environment.[49] Indonesia's challenge lies in strengthening institutional coordination, clarifying regulatory mandates, and developing robust enforcement mechanisms that can support innovation without compromising data protection and legal certainty. As open banking ecosystems continue to evolve, the role of institutional design and legal enforcement will become increasingly central to ensuring both economic dynamism and the protection of fundamental rights. [50]

3. Comparative Analysis and Harmonization Challenges

The comparative analysis of Indonesia, Japan, and the European Union (EU) reveals significant differences in the historical trajectories, institutional architectures, and enforcement approaches governing open banking and personal data protection.[51] These differences stem from distinct legal traditions, levels of regulatory maturity, and policy priorities, which in turn shape each jurisdiction's capacity to address the challenges of integrating financial innovation with robust data protection. The EU represents a highly structured and harmonized model, combining comprehensive legislation with strong supervisory institutions and clear enforcement mechanisms. Japan embodies a gradualist and cooperative regulatory culture, emphasizing administrative guidance and industry involvement. Indonesia, meanwhile, is navigating a transitional phase characterized by fragmented regulations and evolving institutional structures.[52] These divergences highlight both opportunities for mutual learning and obstacles to harmonization, especially

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[49] Christian Calliess, and Ansgar Baumgarten, "Cybersecurity in the EU the example of the financial sector: a legal perspective," *German Law Journal* 21, no. 6 (2020): 1158. See too, Rich Zukowsky, "Open banking, APIs, and liability issues," *Banking Law Journal* 137 (2020): 197.

[50] Andrew Mazen Dahdal, and Bruno Zeller, "Open Banking and Open Data: Context, Innovation, and Consumer Protection," *Banking Law Journal* 138 (2021): 389.

[51] Marianna Gounari, George Stergiopoulos, Kosmas Pipyros, and Dimitris Gritzalis, "Harmonizing open banking in the European Union: an analysis of PSD2 compliance and interrelation with cybersecurity frameworks and standards," *International Cybersecurity Law Review* 5, no. 1 (2024): 92. See too, Pieter TJ, Wolters, and Bart PF Jacobs, "The security of access to accounts under the PSD2," *Computer law & security review* 35, no. 1 (2019): 39.

[52] Michał Polasik, Agnieszka Butor-Keler, Paweł Widawski, and Grzegorz Keler, "Evaluating the regulatory approach to open banking in Europe: An empirical study," *Financial Law Review* 34, no. 2 (2024): 65. See too, Alessandro Palmieri, and Blerina Nazeraj, "Open banking and competition: an intricate relationship," *EU and comparative law issues and challenges series (ECLIC)* 5 (2021): 232.

when considering the increasingly cross-border nature of financial services and data flows.

From a regulatory framework perspective, the EU stands out for its clear and integrated legal structure. PSD2 and GDPR function in tandem to govern open banking and personal data protection, supported by binding regulatory technical standards, harmonized consent mechanisms, and uniform enforcement procedures across member states.[53] This alignment enables a coherent legal environment where financial innovation is encouraged within strict privacy safeguards. Japan, in contrast, has developed its regulatory system incrementally. Amendments to the Banking Act and the Act on the Protection of Personal Information (APPI) have been introduced step by step, allowing regulators and industry stakeholders to adapt to technological change gradually. While Japan's legal provisions are less stringent than the EU's GDPR, its system is functional and enjoys a high degree of public trust, with mechanisms emphasizing registration, contractual arrangements, and security standards. Indonesia's regulatory framework remains in the early stages of development, with fragmented oversight shared among Bank Indonesia, the Financial Services Authority (*Otoritas Jasa Keuangan*/OJK), and the Ministry of Communication and Informatics (*Kementerian Komunikasi dan Informatika/*Kominfo). The absence of a unified legal and technical framework for open banking, combined with the recent enactment of the Personal Data Protection Law, has resulted in legal overlaps, inconsistent standards, and gaps in implementation.[54]

Institutionally, the EU benefits from multi-level governance that combines national competent authorities with EU-wide coordination through the European Banking Authority (EBA) and the European Data Protection Board (EDPB). This structure ensures harmoniztion, facilitates cross-border supervision, and enables consistent enforcement. Japan relies on two central agencies the Financial Services Agency (FSA) and the Personal Information Protection Commission (PPC) that cooperate closely through guidance and oversight. Industry associations also play a key role in developing technical

[53] Umi Khaerah Pati, and Anugrah Muhtarom Pratama, "Indonesia's Open Banking Future: Designing Effective Regulatory Approaches," *Jambe Law Journal* 8, no. 1 (2025): 28. See too, Paripurna P. Sugarda, and Muhammad Rifky Wicaksono, "Enhancing the competitiveness of Indonesia's financial services sector in the digital era through open banking: Lessons learned from the UK's Experience," *Journal of Central Banking Law and Institutions* 2, no. 1 (2023): 159.

[54] Umi Khaerah Pati, and Anugrah Muhtarom Pratama, "Indonesia's Open Banking Future: Designing Effective Regulatory Approaches," *Jambe Law Journal* 8, no. 1 (2025): 29. See too, Muhammad Prakoso Aji, "Sistem Keamanan Siber dan Kedaulatan Data di Indonesia dalam Perspektif Ekonomi Politik (Studi Kasus Perlindungan Data Pribadi) [Cyber Security System and Data Sovereignty in Indonesia in Political Economic Perspective]," *Jurnal Politica Dinamika Masalah Politik Dalam Negeri dan Hubungan Internasional* 13, no. 2 (2023): 226.

standards and codes of conduct.[55] Indonesia's institutional framework, however, remains more fragmented. While BI and OJK oversee financial innovation and API development, Kominfo is tasked with data protection enforcement. Coordination mechanisms between these institutions are still under development, leading to potential regulatory conflicts and delays in enforcement. This institutional fragmentation poses one of the most significant barriers to achieving harmonized regulatory outcomes.[56]

In terms of enforcement models, the EU adopts a robust, rules-based approach, including strong administrative sanctions, cross-border cooperation, and judicial remedies. This creates a high level of compliance pressure on financial institutions and third-party providers, ensuring accountability in both open banking operations and data processing activities.[57] Japan, on the other hand, favors a collaborative enforcement model based on administrative guidance, periodic supervision, and self-regulatory initiatives, rather than heavy sanctions. This model works effectively in Japan's socio-legal context, where trust between regulators and industry is high, but it may face challenges in addressing complex cross-border violations. Indonesia's enforcement model is still developing: while sectoral regulations exist for licensing and operational standards, enforcement remains uneven, and the practical application of the Personal Data Protection Law is in its early stages.[58] Institutional coordination and regulatory clarity will be critical to strengthening enforcement in the coming years.

Harmonization challenges emerge at both the domestic and international levels. Domestically, Indonesia must address the fragmentation between financial and data protection regulators, clarify jurisdictional boundaries, and establish interoperable regulatory standards. Japan faces the challenge of aligning its national framework with evolving international norms, especially as global data protection standards become stricter. For the EU, the main challenge lies in ensuring that its stringent standards are effectively

[55] Andrew Mazen Dahdal, and Bruno Zeller, "Open Banking and Open Data: Context, Innovation, and Consumer Protection," *Banking Law Journal* 138 (2021): 388.

[56] Andrew Mazen Dahdal, and Bruno Zeller, "Open Banking and Open Data: Context, Innovation, and Consumer Protection," *Banking Law Journal* 138 (2021): 386.

[57] Michał Polasik, Agnieszka Butor-Keler, Paweł Widawski, and Grzegorz Keler, "Evaluating the regulatory approach to open banking in Europe: An empirical study," *Financial Law Review* 34, no. 2 (2024): 59. See too, Emma Leong, and Jodi Gardner, "Open banking in the UK and Singapore: open possibilities for enhancing financial inclusion," *Journal of business law* 5 (2021): 437.

[58] Michał Polasik, Agnieszka Butor-Keler, Paweł Widawski, and Grzegorz Keler, "Evaluating the regulatory approach to open banking in Europe: An empirical study," *Financial Law Review* 34, no. 2 (2024): 66. See too, Paripurna P. Sugarda, and Muhammad Rifky Wicaksono, "Enhancing the competitiveness of Indonesia's financial services sector in the digital era through open banking: Lessons learned from the UK's Experience," *Journal of Central Banking Law and Institutions* 2, no. 1 (2023): 157.

applied in cross-border contexts, particularly when interacting with jurisdictions that have less comprehensive frameworks. Internationally, differences in legal philosophies such as the EU's rights-based approach to data protection, Japan's cooperative administrative model, and Indonesia's developing hybrid system make full legal harmonization difficult. Technical interoperability, mutual recognition of standards, and bilateral or multilateral agreements are often required to bridge these gaps.[59]

Comparatively, the EU model offers the clearest legal certainty and the strongest protection of individual rights, making it a global reference point for regulatory design. Japan's model illustrates how regulatory adaptation can be achieved incrementally while maintaining industry trust and compliance. Indonesia's experience underscores the challenges faced by emerging regulatory systems in simultaneously fostering innovation and building strong data governance structures. Harmonization for Indonesia will likely involve selectively adopting best practices from both the EU and Japan strengthening legal clarity and enforcement mechanisms while fostering cooperation with industry actors. In particular, aligning financial regulations with the Personal Data Protection Law, establishing a single supervisory framework, and adopting internationally recognized technical standards will be crucial steps. At the international level, building interoperability and engaging in regulatory dialogues with major jurisdictions will help Indonesia position itself more effectively within the global digital financial ecosystem.

D. Conclusion

The comparative study of Indonesia, Japan, and the European Union (EU) demonstrates that harmonizing open banking regulations with personal data protection frameworks is a crucial yet complex task that reflects each jurisdiction's legal tradition, regulatory maturity, and policy priorities. The EU provides a comprehensive and integrated model through PSD2 and GDPR, supported by strong institutions and robust enforcement, while Japan adopts a gradual, cooperative approach centered on administrative guidance and industry collaboration. Indonesia, in contrast, is still in a formative stage, facing fragmented regulatory structures and evolving legal frameworks that require greater institutional coordination and regulatory clarity. Effective harmonization depends on clear legal standards, coordinated oversight, and enforcement mechanisms that balance innovation with privacy protection. For Indonesia, learning from the EU's legal integration and Japan's adaptive governance offers valuable pathways to build a coherent, rights-based, and

[59] Umi Khaerah Pati, and Anugrah Muhtarom Pratama, "Indonesia's Open Banking Future: Designing Effective Regulatory Approaches," *Jambe Law Journal* 8, no. 1 (2025): 28.

innovation-friendly regulatory environment capable of supporting the sustainable development of its digital financial ecosystem.

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