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Legal Analysis of Big Data and Analytics in Preventing Discrimination and Protecting Insurance Customers

Bashori, Rommy Hardyansah, Didit Darmawan

Universitas Sunan Giri Surabaya, Indonesia

A R T I C L E I N F O

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A B S T R A C T

The development of big data and analytics has ushered in a new era for the insurance industry in Indonesia. This transformation brings great potential for improving risk management capabilities, process efficiency, and service innovation. However, the use of analytical technology presents legal and ethical challenges, particularly in relation to risk discrimination and consumer protection. This study employs a normative legal approach, analyzing the national legal framework comprising the Insurance Act, OJK regulations, the Personal Data Protection Act, the ITE Act, the Consumer Protection Act, and corporate governance provisions. The results of the analysis confirm that all practices involving the use of big data must comply with the principles of prudence, fair treatment, transparency, accountability, and non-discrimination. Model validation initiatives, audit policies, human-in-the-loop mechanisms, and access to objection are the pillars of maintaining data fairness and security. On the other hand, consumers' rights to privacy, data correction, complaint mechanisms, and remediation are explicitly guaranteed by applicable regulations. With the optimization of regulatory implementation, collaboration between regulators and businesses, and digital literacy among the public, the transformation of the big data-based insurance industry can proceed in line with consumer protection and the value of legal justice.

INTRODUCTION

The development of information technology over the past two decades has brought fundamental changes to the working mechanisms and decision-making processes in the financial industry, including the insurance industry. This digital transformation, characterized by the use of big data and analytics for risk prediction and service personalization, has also created a complex landscape related to personal data protection, potential discrimination, and consumer protection. The reliance on non-traditional data from social media to wearable devices presents fundamental legal and ethical dilemmas about fairness and transparency in risk mapping (Mayer-Schönberger & Cukier, 2013).

It is this data-rich digital transformation that makes the study of personal data protection regulations highly relevant. As analyzed by Aziz et al. (2023), the dynamics and challenges arising from big data practices in the insurance industry are a real test of the effectiveness of the existing legal framework. Their findings on the extent to which regulations can address the challenges of personal data protection, risk discrimination, and consumer interest protection, all of which are mentioned in the opening paragraph, provide a critical assessment of the ability of the law to keep pace with technological innovation in the financial sector.

The pressure on the insurance sector to maximize the use of data is inevitable due to competition between companies, the need to adapt to the digital financial ecosystem, and consumer demands for fast and accurate services. However, the use of big data often touches on discriminatory aspects that can have implications for the chances of obtaining insurance protection for certain groups considered to be at higher risk, even before individual behavioral data has been objectively verified (Johan, 2022). This raises concerns about the potential for labelling, exclusion, and misuse of data that is detrimental to consumers. Issues of algorithmic bias, transparency of assessment processes, and complaint mechanisms are crucial issues that require systematic review of the current business legal regime, particularly in

** Corresponding author, email address:* ***dr.rommyhardyansah@gmail.com***

relation to practices regulated in the Personal Data Protection Act, the Insurance Act, and the provisions of the Financial Services Authority (OJK) (Zarsky, 2016).

The recognition of big data and analytics as a double-edged innovation marks the growing tension between economic value creation opportunities on the one hand and legal risks on the other. On the one hand, technology provides sophisticated instruments for synchronizing risk management systems and ensuring excellent service based on real-time customer profiles. On the other hand, the application of analytics without adequate oversight can actually reinforce data-based discrimination, lead to violations of personal data protection, and even widen the gap in access to insurance (Susanto, 2022). Therefore, the exploration of laws related to risk discrimination and consumer protection in the use of big data by insurance companies is becoming increasingly relevant, in line with the acceleration of the application of digital ecosystems in the financial sector.

Indonesian legislation has established a legal basis for personal data protection and preventing discriminatory practices in insurance services, but the pace of technological change has outstripped the speed of regulatory adaptation. The gap between the principle of legal certainty and big data-based algorithmic practices raises the possibility of a legal protection vacuum or even overregulation if not regulated proportionally. Therefore, this paper stems from the need to analyses the practices of big data usage in the insurance sector, particularly in the context of consumer protection and the control of risk discrimination that is cost-effective for businesses.

Wahyudi et al. (2021) describe the transformation and profound impact that big data has had on various aspects of social life. However, translating this conceptual understanding into a framework that protects fundamental rights and justice requires a more focused study of sectors with direct legal implications. In this regard, it is crucial to examine the use of big data and analytics in the insurance industry in relation to risk discrimination and consumer protection issues. Such studies not only view big data as something new in social life, but also explore its implications for the national legal structure, the balance of interests between companies and consumers, and the protection of individuals' rights to their data.

The development of human resource capabilities in data analysis, as emphasized by Khairi & Darmawan (2022), is a key step in creating more effective decision-making in various organizations. However, this effectiveness must be built on a deep understanding of the risks and legal implications of using data and algorithms. For example, legal issues in the use of big data in the insurance sector lie in the relationship between algorithmic automation and the principle of nondiscrimination, which is universally guaranteed, including under Indonesian law. Policy underwriting and premium setting decisions based on machine learning have the potential to create biases that are difficult to detect and legally accountable. Therefore, data analysis capability development programmed focus on equipping human resources, particularly in departments such as Human Resources, Compliance, and Risk Management, with the awareness to identify information imbalances between companies and consumers that can increase the potential for moral hazard, as well as limitations in public oversight (Barocas & Selbst, 2016).

Global challenges in protecting personal data in the digital age, as analyzed by Gardi and Eddine (2023), take on very concrete and complex forms in certain industrial practices. For example, the use of big data analytics tests the limits of personal data protection in the insurance industry. The main challenge arises when companies manage large amounts of sensitive individual data, ranging from habits to health status, where data management mechanisms (acquisition, storage, analysis) are often too complex to be effectively audited by authorities or even understood by consumers. This situation reflects two core challenges mentioned in global discussions: the risk of privacy violations due to unclear consent procedures and the lack of access to objection mechanisms (Tene & Polonetsky, 2013).

Another issue concerns the insurance industry's compliance with consumer protection regulations, which include the right to fair treatment, clarity of information, and fairness in access to insurance products. There are concerns that the potential for covert discrimination in the use of big data and analytics could erode public trust in companies and the entire insurance system itself. Procedural fairness, transparency, and complaint mechanisms are issues that require specific compliance standards, amid ongoing regulatory developments.

This topic is particularly relevant at this time, given the rapid acceleration of insurance process digitalization in the wake of the pandemic and the push for national digital reform. The transformation of data-driven insurance business models has moved beyond conventional frameworks, leveraging sophisticated data and algorithms that impact social and economic structures, including consumer treatment. In addition, gaps or overlaps in regulations at the sectoral and general levels, such as

between personal data protection rules and OJK standards, need to be re-examined to ensure that consumer interests are protected.

The study aims to provide a critical understanding of the effectiveness of national legal regulations relating to the use of big data and analytics by insurance companies, particularly in addressing risk discrimination and ensuring consumer protection. The contribution of this research not only theoretically enriches the discussion of business law amid the dynamics of digital technology, but also provides a practical foundation for regulators, industry players, and the public in dealing with the flow of big data in the financial services industry.

RESEARCH METHOD

This study uses a qualitative literature review approach with a normative legal method to analyses the legal aspects of the use of big data and analytics by insurance companies, focusing on the issues of risk discrimination and consumer protection. This study examines the applicable positive law through a review of documents, laws, government regulations, and related Financial Services Authority policies. In addition, verified academic sources from reputable journals and scientific methodology books are used as a basis for maintaining the accuracy of the arguments. The analysis process was carried out through the interpretation of relevant legal provisions, taking into account how business law principles can be applied to the use of big data by insurance companies.

The secondary data search strategy was carried out systematically by utilizing online library catalogues, reputable legal journal portals, and regulatory documents from official government sources. The main references were sourced from literature published in the last two decades, with selection based on inclusion criteria such as relevance to consumer protection issues, insurance policy, and the use of big data analytics. Meanwhile, exclusion criteria were applied to unverifiable sources, fictitious references, and regulations that had been revoked. The search was conducted thematically to ensure that the arguments referred to the latest legal developments, including paying sufficient attention to primary sources such as laws and implementing regulations that are still in force in Indonesia.

The coding and quality assurance process of the analysis was carried out manually by creating a thematic matrix that mapped the main issues in two focuses, namely regulations preventing risk discrimination and consumer protection mechanisms. Validity was maintained through triangulation of sources and cross-examination of findings, as suggested by Darmawan (2015), so that the resulting synthesis met scientific standards and avoided interpretative bias. By following these principles, this study is expected to contribute to a clear and accountable interpretation of the law in both academic and practical business contexts.

RESULT AND DISCUSSION

Regulations on the Use of Big Data and Analytics by Insurance Companies in Risk Discrimination Prevention

The use of big data in the financial sector requires guidelines that maintain the integrity of the risk assessment process. As a tool, big data analytics enables businesses to analyses large and complex data sets to identify correlations, generate predictions, and monetize the results or use them to reduce risk (Yeh, 2017). In insurance in Indonesia, its use is designed to balance business innovation with protection from unfair risk discrimination. From a positive legal perspective, the application of this technology is permitted to improve underwriting efficiency and accuracy. However, all activities must be guided by the principles of prudence, fair treatment, transparency, and accountability. A clear process is needed to determine the information that must be considered to prevent unfair discrimination (Ho et al., 2020). The main regulation, namely the Insurance Law (Law No. 40 of 2014), requires insurance companies to apply the principles of sound business management and fair treatment, so that any use of big data must comply with valid actuarial principles and not be based on irrelevant personal attributes. In practice, data and algorithms may only be used as long as they remain within legal and actuarial limits, to ensure that there is no exclusion or discrimination that conflicts with the insurable rights of every person (Susanto, 2022). It should also be noted that algorithms can be used to make marketing decisions that may have significant consequences (Vladeck, 2015; Ali & Darmawan, 2023).

This framework of principles and regulations is a crucial foundation not only for preventing discrimination, but also for combating the misuse of data and the insurance system itself. The concrete implementation of Indonesian positive law in addressing this misuse is discussed in depth by Setiawan et al. (2023) in combating fraud and forgery in health insurance. Thus, their study of fraud is a concrete example of the importance of law enforcement on the one hand, while the regulatory framework for the accountable and fair use of big

data (as outlined above) serves as a prevention and control mechanism on the other. The legitimacy of big data use is highly dependent on compliance with the principles of fairness and actuarial accuracy, which ultimately also protects the industry from losses due to illegal practices.

The strengthening of technical regulations in the insurance sector demonstrates the need for consistent supervision of the use of analytical technology. The Financial Services Authority (OJK) has strengthened this normative framework through various derivative regulations, particularly POJK No. 69/POJK.05/2016 concerning the Implementation of Insurance Business, which requires every insurance company to have internal policies to prevent unfairness in premium setting and the claims process. The use of analytics must be verified through model standardization, as well as ensuring fairness and objective reasons in business decision-making. Meanwhile, POJK No. 1/POJK.07/2013 concerning Consumer Protection in the Financial Services Sector reinforces the obligations of transparency, information disclosure, and clear access to complaints for customers. SEOJK No. 5/SEOJK.05/2020 concerning the Application of Risk Management for Non-Bank Financial Services Institutions emphasizes the requirement for the identification, management, and mitigation of risks associated with the use of information technology, including periodic evaluation of analytical models so as not to cause legal consequences or consumer losses. Insurance companies are required to demonstrate that all of their assessment variables are actuarially accountable and that there is no discriminatory bias in their practices (Johan, 2022). In big data actuarial research, quality standards and validated predictive risk models are required. This is important to maintain fairness and ensure that personal data and information are processed fairly (Blasimme et al., 2019). The effectiveness of insurance regulations is largely determined by model verification standards and fairness principles that maintain actuarial accuracy and consumer protection.

Modern data protection regulations require legal certainty that protects individual rights when analytical technology is used. The Personal Data Protection Act (Law No. 27 of 2022) is the backbone of regulations protecting the rights of data subjects in big data analytics schemes. This protection becomes increasingly crucial when we understand that insurance-related decisions that are the target of analysis and algorithm output are a reflection of complex and personal socio-cultural, demographic, and psychological factors (Issalillah et al., 2021).

The PDP Law not only regulates data processing and security, but also specifically protects consumers' rights to object, access, and request the deletion of their data used for profiling or automated decision-making mechanisms, which is vital when the data being processed covers sensitive aspects of a person's life. Any high-risk analytics process, such as determining premiums or policy acceptance, requires a Data Protection Impact Assessment (DPIA) and a human intervention pathway. This provision is essentially a legal recognition that algorithmic outcomes mapping individual preferences or risks should not ignore or discriminate against the underlying complexity of human factors. Thus, the continued use of big data is highly dependent on compliance with data protection principles and bias prevention, which essentially aim to ensure fairness for every data subject regardless of their social and psychological background.

The implementation and enforcement of personal data protection laws as reviewed by Baraja et al. (2023) requires strict digital security standards. Legal frameworks such as the Electronic Information and Transactions Law require insurance companies, as Electronic System Operators (PSE), to ensure data security, integrity, and audit trails. Transparency and internal audits of analytics processes are operational prerequisites that are inseparable from the effectiveness of data protection laws. On the other hand, consumer protection also demands certainty that every business decision does not harm consumers. The Consumer Protection Law guarantees the right to fair treatment and accurate information, so that the use of big data that results in exclusionary practices or unreasonable premiums has the potential to violate consumer rights. Compliance with the principle of fair treatment is key to preventing the misuse of big data while closing loopholes for systemic discrimination in the insurance industry.

While Putra and Arifin (2021) emphasize the central role of big data as the foundation of digital transformation, the collection and analysis of data on this massive scale requires a robust supervisory framework. The application of strong governance principles is an important foundation for supervising the use of analytical technology in corporate environments. In this case, management accountability as mandated by the Limited Liability Company Law is key to ensuring the lawful and supervised use of big data.

The need for a transparent and verifiable oversight framework has driven the exploration of

technological solutions such as blockchain. As highlighted by Costa et al. (2023), this includes features such as immutable audit trails, encrypted transparency, and decentralized access control. These principles are in line with the legal obligations mentioned earlier, whereby all data usage policies and audit results must be recorded in the internal control system.

The consistent application of technical standards is an important foundation for the reliability of analytical processes in the insurance industry, which requires internal standards such as routine model validation and bias testing. Such implementation also requires human-in-the-loop mechanisms and consumer complaint channels to prevent discrimination, as the study by Jamiri et al. (2023) reveals the consequences of weak oversight in the insurance ecosystem. Indonesian law legitimizes the use of big data analytics as long as it does not conflict with the principles of fairness, honesty, equitable treatment, and transparency which are crucial given that premiums are a key factor influencing consumer interest (Issalillah & Khayru, 2022). The successful utilization of big data ultimately depends on consistent legal compliance, synergy among stakeholders, and strict risk management to minimize discrimination and maintain public trust in digital innovation.

Insurance Consumer Protection in the Era of Big Data: Analysis of Applicable Law

A coordinated regulatory framework is essential for consumer protection when data technology is widely used in the insurance sector. Consumer protection in the insurance industry in the era of big data is built on the integration of complementary legal regimes, namely insurance law, financial services sector regulations, personal data protection, and electronic system operator governance (Li et al., 2022). From a normative legal perspective, insurance companies are permitted to utilize big data and analytics technology for underwriting, premium setting, fraud detection, and claims management, provided that all processes are carried out in accordance with the principles of prudence, fair treatment, information disclosure, accountability, data security, and non-discrimination. Basic consumer rights, such as obtaining accurate information, receiving unbiased treatment, having personal data protected, and gaining access to complaint and remediation mechanisms, are guaranteed through existing laws and implementing regulations. The effectiveness of consumer protection is highly dependent on the consistent application of the principles of fairness, data security, and access to remediation guaranteed by various relevant legal regimes.

The principle of responsible business management is an important basis for every data-driven decision in the insurance sector. The normative framework stipulates, through Law No. 40 of 2014 on Insurance, that insurance companies are obliged to conduct business in a sound manner with the principles of prudence, adequate risk management, and comprehensive protection for policyholders, insured parties, and parties entitled to insurance benefits. Big data-based decisions must have a valid actuarial basis and must not use variables that have the potential to cause discriminatory or unfounded bias. The POJK on Insurance Business Operations emphasizes the application of governance and internal control over the use of digital data and technology, including model documentation, internal approval, and periodic reviews by risk management and audit functions. This norm ensures that analytics-based processes do not compromise fair access and premium setting for consumers (Khaleel et al., 2023). The sustainability of analytics practices is largely determined by compliance with the principles of prudence and governance that maintain fairness for all policyholders.

Strong consumer protection standards are an important prerequisite for the use of data technology in the financial services sector. In the realm of consumer protection in the financial services sector, OJK regulations require fair treatment, transparency of information, and clear and effective complaint handling mechanisms. In the practice of using big data, insurance companies are required to explain the process of setting premiums or rejecting coverage in a concise and easily understandable manner; provide channels for objections and corrections to automated decisions; and ensure that data-based marketing materials are not misleading. All analytics-based decisions that result in unfair outcomes must be followed by remediation, either through review or compensation if actual losses are incurred by consumers. Derivative regulations in SEOJK related to risk management add obligations to information technology risk management, data validity validation, and analytics algorithm control as part of consumer protection rights in the digital era (Johan, 2022). The success of consumer protection is greatly supported by transparency, effective objection mechanisms, and technological risk control that ensures analytical decisions remain fair and accountable.

Privacy protection is a key element that must be

fulfilled when personal data is used for analytical purposes in the insurance sector. Consumers' rights to privacy and data control are explicitly guaranteed in Law No. 27 of 2022 concerning Personal Data Protection. Insurance companies must have a valid legal basis for data processing in the form of clear consent, a contract, or a legal obligation, while also applying specific principles of processing purpose, data minimization, storage limitation, and adequate technical and organizational security. The scope of protection under the PDP Law includes the rights of data subjects to access, correct, and delete data, object to processing, and request explanations and human intervention in automated decision-making processes that have a significant impact. Premium setting and analytics-based underwriting must provide meaningful explanations and open appeal channels. Mass profiling and high-risk analytical processes require the implementation of a Data Protection Impact Assessment to prevent systemic bias and discrimination. In the event of violations or consumer losses due to data misuse, the PDP Law opens the door to administrative and criminal sanctions as a form of legal accountability. The success of personal data management is largely determined by compliance with the principles of legality, transparency, and oversight mechanisms that ensure every analytical process remains fair and accountable to consumers.

Strengthening electronic system standards is an important step to ensure every digital process remains secure and controlled. Electronic system governance provisions, through the Electronic Information and Transactions Law and Government Regulation No. 71 of 2019, also build a protective barrier for consumers. With their status as Electronic System Operators, insurance companies are required to meet information security standards, maintain data integrity and availability, implement access controls, audit logging, and traceability capabilities for all big data-based decisions. The Minister of Communication and Information Technology Regulation on Private Scope PSE strengthens the position of consumers through mandatory documented data governance and clear mechanisms for handling problematic content. All these procedures are relevant to data quality, the reliability of analytical models, and rapid response to data breach incidents that can directly affect consumer rights. The effectiveness of consumer protection is highly dependent on the accuracy of electronic system governance that maintains data security, analytical reliability, and rapid response to any potential incidents.

Strengthening the substantive aspects of consumer protection is an important element as insurance services shift towards large-scale data processing. Law No. 8 of 1999 on Consumer Protection adds a substantive dimension to the fulfilment of insurance companies' obligations to provide security, comfort, safety, and accurate, non-misleading information throughout the entire big data-based service process. Algorithmic analytics, when applied in a biased or discriminatory manner, opens the door for consumers to seek compensation, and even administrative or civil sanctions for companies proven to have violated consumer rights. This law explicitly provides a space for consumer remediation to ensure that access to substantive justice is maintained in the digital revolution of the insurance sector. The sustainability of digital transformation in the insurance sector is highly dependent on guarantees of substantive justice and compensation mechanisms that protect consumers from the disproportionate impact of analytics.

Strengthening the role of management is an important element in ensuring that all use of analytical technology is within the corridor of lawful governance. The responsibilities of directors and corporate governance are also emphasized in Law No. 40 of 2007 on Limited Liability Companies and the POJK on Good Corporate Governance. Directors and commissioners are required to establish policies for managing analytics model risks, conduct training and internal audits, develop a list of permitted and prohibited risk assessment variables, and oversee the remediation process and periodic reporting. Failure to perform supervisory functions, resulting in discrimination or data violations, will result in legal liability for the company and its management bodies. The effectiveness of management supervision is a determining factor in preventing violations and maintaining legal accountability for all of the company's analytical practices.

Strengthening transparency and accountability is an important foundation for the use of big data analytics in insurance. Its implementation requires data transparency, the ability to explain automated decisions, and accessible redress mechanisms for consumers. An integrated regulatory framework (such as the Personal Data Protection Act and OJK regulations) provides legitimacy and systemic protection, with the main prerequisite that all processes must be based on fairness, accuracy, accountability, and transparency. The effectiveness of consumer protection is ultimately determined by the consistency of system improvements and compliance with these principles, so that digital innovation

remains oriented towards healthy, safe, and fair insurance services.

CONCLUSION

The use of big data and analytics by insurance companies in Indonesia has accelerated the effectiveness of risk management, improved services, and facilitated adaptation to the paradigm of financial digitalization. However, this technological advancement requires consistent enforcement of legal norms to ensure that every innovation does not result in consumer rights violations or discriminatory practices under the guise of system efficiency. The Indonesian legal system has provided clear guidelines through sectoral regulations, personal data protection regulations, electronic system governance policies, and the Consumer Protection Law, all of which reinforce oversight and guide insurance companies to operate based on the principles of fairness and accountability.

This analysis highlights how the existing regulatory design has actually laid a sufficiently strong foundation, both in terms of institutional risk management, information rights, freedom from discrimination, and supervision of fair treatment of insurance consumers. The enforcement of the principles of fair treatment, consumer privacy rights, data validation, algorithm auditing, and the provision of remediation channels must be a major concern for industry players and regulators. The direct implications lie in improving the quality of governance, public trust, and legal certainty in the digital insurance ecosystem.

Consistent efforts are needed to strengthen supervisory capacity, develop data literacy at both the consumer and industry levels, and ensure continuous harmonization between regulations so that adaptation to technological developments does not compromise substantive legal protection. Collaboration between regulators, industry associations, and community stakeholders must continue to be enhanced so that consumer protection remains robust amid the tide of digitalization and innovation in insurance systems.

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