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Mitigating Discrimination and Privacy Threats in Algorithmic Pricing through Personal Data Protection Law in Indonesia

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Abstract: This research is motivated by the legal ambiguity in Article 34 paragraph (2) letter (a) of Law Number 27 Year 2022 on Personal Data Protection (PDP Law), especially related to the lack of clarity in interpreting the element "automatically" stipulated in the article towards algorithmic pricing. Basically, the article has an important role in preventing problems arising from algorithmic pricing in the form of privacy threats and price discrimination. The purpose of this research is to analyze whether the characteristics of algorithmic pricing can be categorized as an automatic decision under PDP Law and to analyze the recommendation of the appropriate regulatory substance related to automatic decisions in PDP Law against algorithmic pricing. The research method used is juridical-normative by using legislative approach and comparative approach. The result of this study found that algorithmic pricing cannot be categorized as an automatic decision under PDP Law. Therefore, Indonesia can establish an automated decision guideline issued by the Ministry of Digital and Information by referring to the Guidelines on Automated Individual Decision-Making and Profiling for the Purposes of Regulation 2016/679 issued by the Article 29 Working Party in the European Union.

Keywords: Telematics Law; Automatic Decision; Algorithmic Pricing; Data Protection Regulation.

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1. Introduction

The rapid growth of internet users in Indonesia, reaching over 221 million in 2023, has significantly transformed the way commerce is conducted.[1] With the expansion of digital infrastructure, the emergence of electronic commerce (e-commerce) has revolutionized the relationship between businesses and consumers.[2] One of the most significant innovations in this sector is the application of algorithmic pricing, a pricing method that utilizes artificial intelligence and large-scale data analytics to determine prices dynamically. This innovation allows businesses to respond more efficiently to market changes and consumer behavior in real time.

The advancement of digital infrastructure driven by technological progress such as high-speed internet and mobile applications has created significant opportunities for businesses to innovate. One concrete example of such innovation is the use of algorithmic pricing by e-commerce providers. Algorithmic pricing enables e-commerce platforms to determine prices more efficiently and in alignment with market demands. Prior to the emergence of this technology, price determination was conducted through various data considerations, such as the cost of raw materials, labor wages, distribution expenses, profit targets, competitor pricing, and so on.[3] These factors were then manually analyzed by humans. However, with the advent of algorithmic tools, such analyses can now be conducted easily by algorithms. The results of these algorithmic analyses are subsequently used as the basis for setting prices.

To date, algorithmic pricing has been implemented by various e-commerce platforms both globally and regionally. On a global level, Amazon began applying algorithmic pricing in 2001 by identifying users through cookies and analyzing their shopping behavior to differentiate DVD prices between returning and new customers.[4] Additionally, Uber, a California based ride hailing technology company, uses algorithmic pricing by tracking users' battery levels, charging higher prices to those with low battery levels who are presumed to be in greater need.[5] These examples

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[1] Asosiasi Penyelenggara Jasa Internet Indonesia (APJII). "APJII Jumlah Pengguna Internet Indonesia Tembus 221 Juta Orang," accessed October 11 2024. https://apjii.or.id/berita/d/apjii-jumlah-pengguna-internet-indonesia-tembus-221-juta-orang.

[2] Raisida, Noor, Dewi Ulfi Nurbaiti. "Peran Teknologi Internet dalam Transformasi E-Bisnis di Era Digital." *Jurnal Ilmiah Ekonomi dan Manajemen* 3 (2025): 528-541. https://doi.org/10.61722/jiem.v3i1.3745.

[3] Ananda, Farah, dan Muhammad Irwan. "Penggunaan Teknologi Big Data untuk Analisis Prediksi Bisnis." *Jurnal Ilmiah Nusantara* 1 (2024): 667-672. https://doi.org/10.61722/jinu.v1i4.1882.

[4] Hufnagel, Gerrit, Manfred Schwaiger, dan Louisa Weritz. "Seeking the Perfect Price: Consumer Responses to Personalized Price Discrimination in E-Commerce." *Journal of Business Research* 143 (2022): 346-365. https://doi.org/10.1016/j.jbusres.2021.10.002.

[5] Martin, Nicole. "Uber Charges More If They Think You're Willing to Pay More." *Forbes*, March 30, 2019, accessed November 12, 2024. https://www.forbes.com/sites/nicolemartin1/2019/03/30/uber-charges-more-if-they-think-youre-willing-to-pay-more/.

illustrate how pricing decisions today can rely on personal data, potentially resulting in individualized treatment across users.

While algorithmic pricing improves operational efficiency and can offer personalized pricing benefits to consumers, it also raises serious legal and ethical concerns, particularly regarding user data privacy and potential price discrimination. Algorithms often rely on sensitive personal data such as location, device type, shopping history, and browsing behavior to assign individualized prices. This leads to at least two critical risks that must be addressed. *First*, there is a significant threat to user privacy. The processing of personal data by e-commerce providers can reveal sensitive and sometimes intimate aspects of an individual's life.[6] This raises the risk of intrusive profiling and the misuse of data beyond its original purpose.

Second, algorithmic pricing may facilitate discriminatory pricing based on user data.[7] Algorithms can adjust prices differently for each individual based on attributes such as gender, geographic location, browsing history, or spending habits. As a result, certain users may be subjected to higher prices than others for the same product or service. While price discrimination can, in some contexts, be justified as a business strategy, algorithmic pricing poses the risk of harming vulnerable consumer groups and creating unfair market outcomes, particularly when implemented non-transparently. Therefore, it is crucial to analyze and mitigate the potential harms associated with this practice.

As a mitigation measure against the problems caused by algorithmic pricing, Law Number 27 of 2022 concerning Personal Data Protection (hereinafter referred to as PDP Law) can serve as an effective solution. PDP Law is designed to protect the personal data of e-commerce platform users, one of which is through the provision on automated decision-making contained in Article 34 paragraph (2) letter (a), which regulates automated decision-making as a high-risk processing activity that requires the conduct of a Personal Data Protection Impact Assessment (PDPIA). The PDPIA itself can be interpreted as a preventive effort aimed at minimizing the risks arising from high-risk personal data processing.

However, the provision on automated decision-making in that article still contains weaknesses, particularly the vagueness of the legal norm due to the lack of detailed regulation or explanation regarding the element of "automated," especially in determining the extent to which a decision can be considered automated. The provision does not explicitly define the boundary between decisions generated by algorithms without human intervention and those that still involve humans in the

[6] Wiedemann, Klaus. "Profiling and (Automated) Decision Making under the GDPR: A Two-Step Approach." *Computer Law & Security Review* 45 (2022): 1-30. https://doi.org/10.1016/j.clsr.2022.105662.

[7] Grochowski, Mateusz, Agniezka Jablonowska, Francesca Lagioia, dan Giovanni Sartor. "Algorithmic Price Discrimination and Consumer Protection." *Technology and Regulation* 2022 (2022): 36-47. https://doi.org/10.26116/techreg.2022.004.

process. As a result, legal uncertainty arises regarding whether algorithmic pricing can be categorized as automated decision-making under PDP Law.

On the other hand, although algorithmic pricing is often referred to as an automated system, in some cases, such systems do not operate entirely without human intervention. In practice, this system is designed to analyze a large volume of data including user data from e-commerce platforms, market data, and so on in real time.[8] However, it is not uncommon for e-commerce providers to involve humans in the configuration and supervision of such systems. It is also frequently found that some algorithmic pricing systems only use algorithms as tools to analyze various types of data needed for price determination, while the final decision is still made by humans. This further complicates the determination of whether algorithmic pricing can be categorized as automated decision-making under PDP Law.

If the provision in Article 34 paragraph (2) letter (a) of PDP Law does not cover algorithmic pricing, it could become a loophole for e-commerce providers to implement algorithmic pricing practices that harm platform users. This would not only have implications for users, but also for e-commerce providers themselves, who may be subject to administrative sanctions if they fail to fulfill their obligation to conduct a PDPIA mistakenly assuming that their algorithmic pricing practices do not fall within the scope defined by PDP Law.

The legal implications of such practices have attracted significant attention, particularly within the framework of the European Union's General Data Protection Regulation (GDPR). Under Article 35(3)(a), the GDPR requires a Data Protection Impact Assessment (DPIA) for any processing likely to result in a high risk to individuals' rights and freedoms, particularly where automated decision-making and profiling are involved. Although the GDPR does not explicitly mention algorithmic pricing, the European Union, as a pioneer in personal data protection law, has proactively provided legal interpretation to capture its risks.[9] This interpretation is elaborated in the Guidelines on Automated Individual Decision-Making and Profiling for the Purposes of Regulation 2016/679, issued by the Article 29 Working Party (WP29), an independent advisory body formed by EU data protection authorities.

Although WP29 was succeeded by the European Data Protection Board (EDPB) in 2018, its guidelines remain a valid reference for interpreting the GDPR.[10] Within those guidelines, WP29 adopts a broad understanding of automated decision-making and explicitly recognizes algorithmic pricing as a form of high-risk processing, especially when it affects individuals in a significant way, such as through pricing discrimination

[8] Lazcoz, Guillermo, dan Paul de Hert. "Humans in the GDPR and AIA Governance of Automated and Algorithmic Systems: Essential Pre-Requisites Against Abdicating Responsibilities." *Computer Law & Security Review* 50 (2023): 1-20. https://doi.org/10.1016/j.clsr.2023.105833.

[9] Dauden, Cristofol E., Jordi R. Castella, dan Alexandra V. "Blockchain-Based Access Control System for Efficient and GDPR-Compliant Personal Data Management." *Computer Communications* 214 (2024): 67–87. https://doi.org/10.1016/j.comcom.2023.11.017.

[10] Kaminski, Margot E., dan Gianclaudio Mantelero. "Algorithmic Impact Assessment under the GDPR: Producing Multi-layered Explanations." *International Data Privacy Law* 11 (2020): 125–138. https://doi.org/10.1093/idpl/ipaa020.

or opaque profiling. The European approach illustrates a risk-based regulatory framework that emphasizes anticipatory safeguards, legal clarity, and the protection of fundamental rights.

In contrast, Indonesia's legal framework, regulated under Law No. 27 of 2022 on Personal Data Protection (PDP Law), also acknowledges the risks of automated processing by requiring a Personal Data Protection Impact Assessment (PDPIA) under Article 34(2)(a). However, a central issue lies in the normative ambiguity of the regulation, particularly the absence of a clear legal definition of "automated decision-making." The statute does not clarify the threshold at which automated systems are considered autonomous decisions, nor does it differentiate between fully automated processes and those involving human oversight. This lack of clarity gives rise to legal uncertainty regarding whether algorithmic pricing falls within the scope of PDPIA obligations.

So far, there is limited academic literature in Indonesia that examines this issue in depth, and little discussion about how local law should be interpreted in light of global standards like the GDPR. This article seeks to fill that gap by analyzing whether algorithmic pricing qualifies as a form of automated decision-making requiring prior impact assessment, and whether the current legal framework in Indonesia provides adequate protection against the risks associated with such practices.

By identifying regulatory gaps and comparing them with international practices, this study aims to contribute both conceptually and normatively to the understanding of algorithmic pricing under personal data protection law. In doing so, it seeks to propose more precise legal criteria for defining automated decision-making in Indonesia, and to promote regulatory reform that ensures algorithmic systems operate transparently and fairly in the digital marketplace.

2. Method

This research adopts a normative juridical method, which focuses on analysis legislation, legal principles, and legal doctrines. The study applies two main approaches: the statutory and comparative approaches. The legal materials used in this research consist of, (a) Primary legal materials, including statutes and regulations; (b) Secondary legal materials, such as legal textbooks, law journal articles, expert legal opinions, online legal articles, and previous legal studies; and (c) Tertiary legal materials, including legal dictionaries, the *Kamus Besar Bahasa Indonesia* (Great Dictionary of the Indonesian Language), and other reference materials. The legal materials are collected through library research and internet-based document retrieval. The analysis of legal materials is carried out using grammatical interpretation, which focuses on the textual meaning of legal provisions, and systematic interpretation, which examines the relationship of legal norms within the broader legal system.

3. Algorithmic Pricing as an Automated Decision with Legal or Significant Impact: A Juridical Analysis under Indonesia's Personal Data Protection Law (Law No. 27 of 2022)

This section of the discussion is structured into three parts. The first part explores the characteristics of algorithmic pricing, providing an overview of its technical features, operational mechanisms, and practical applications in digital commerce. The second part examines the legal relationships between the parties involved in the implementation of algorithmic pricing, particularly the dynamics between e-commerce platform providers, users, and third-party data processors. The final part presents a juridical analysis of algorithmic pricing as a form of "automated decision with legal effect or significant impact" within the meaning of Article 34(2)(a) of Law Number 27 of 2022 on Personal Data Protection.

3.1. Examining the Characteristics of Algorithmic Pricing

Currently, algorithmic pricing has become a central instrument in data-driven pricing strategies. Its ability to process a wide range of complex variables in a relatively short time enables e-commerce platforms to automatically adjust prices for each individual user. Behind this efficiency lie several distinctive characteristics unique to algorithmic pricing. Understanding these features is essential for analyzing algorithmic pricing in the context of "automated decisions with legal effect or significant impact" under Article 34(2)(a) of Law Number 27 of 2022 on Personal Data Protection. These characteristics include the following:[11]

1. Algorithm Based Decision Making

Algorithmic pricing is characterized by its reliance on automated systems to process data and generate decisions. As previously discussed, algorithmic pricing systems used by e-commerce platforms do not always operate entirely autonomously. They can also involve varying degrees of human intervention, known as Human-Machine Teaming (HMT).[12] Several HMT models are commonly found in algorithmic pricing:

a. Human in the Loop (HITL)

   This model involves human intervention at certain stages of the algorithmic process.[13] HITL combines human judgment with algorithmic output to enhance the quality of decision-making. Humans may serve as decision makers, validators, or evaluators in the process.

b. Human On The Loop (HOTL)

[11] Pautassi, Paolo. "Algorithmic Pricing in the Digital Age (Ethical Considerations on Its Economic and Social Implications, and an Analysis of Possible Solutions to Overcome Its Critical Issues)." Accessed December 28, 2024. Politecnico di Torino, 2024. https://webthesis.biblio.polito.it/31375/1/tesi.pdf .

[12] Tsamados, Andreas, dan Luciano Floridi. "Human Control of AI Systems: From Supervision to Teaming." AI and Ethics 5 (2023): 1535–1548. https://dx.doi.org/10.2139/ssrn.4504855.

[13] Crootof, Rebecca, Margot E. Kaminski, dan W. Nicholson Price II. "Humans in the Loop." *Vanderbilt Law Review* 76 (2023): 429–440. https://dx.doi.org/10.2139/ssrn.4066781.

In this model, human involvement is more supervisory.[14] The human oversees the algorithmic process but does not actively interfere unless necessary. This is also referred to as human oversight in some academic literature.

c. Human Out Of The Loop (HOOTL)
.[15] This refers to fully autonomous systems in which the algorithm performs the entire decision-making process from start to finish without any human input or supervision

Each of these models contributes to pricing decisions that support the long-term sustainability of e-commerce businesses. Combining algorithmic computation with human judgment allows prices to be technically optimized while also remaining flexible to market conditions.

2. Dynamic Pricing

Another key feature of algorithmic pricing is its dynamic nature. Algorithms can automatically respond to real-time changes in supply and demand. For example, when demand for a product rises sharply, the algorithm may increase prices to manage consumer pressure and maximize profit. Conversely, in times of low demand, the algorithm may reduce prices to attract more customers and minimize potential losses.

3. Personalization

Personalized pricing is a hallmark of algorithmic pricing used by e-commerce platforms. This is largely based on the Willingness to Pay (WTP) model. Prices are tailored to individual users by analyzing their specific data. A user who appears more willing to pay for a certain product may be charged more, while price-sensitive users may receive discounts or special offers. This strategy allows businesses to maximize profit without compromising sales volume.

4. Data-Driven Operation

Data is the foundation of algorithmic pricing. The effectiveness of the algorithm depends entirely on the quality and quantity of data it processes. This includes data collection, analysis, and decision-making. By leveraging data, e-commerce platforms can optimize pricing strategies to increase profits, attract specific user segments, and target consumers based on their WTP.

5. Limited Transparency and Accountability

Algorithmic pricing is also marked by limited transparency and accountability, largely due to the complexity of the algorithms themselves. Several factors contribute to this

[14] Anderson, Marc, dan Karen Fort. "Human Where? A New Scale Defining Human Involvement in Technology Communities from an Ethical Standpoint." *International Review of Information Ethics* 31 (2022): 1-15. https://inria.hal.science/hal-03762035v1.
[15] *Ibid.*, 5.

characteristic. First, many algorithms used in pricing strategies involve complex models such as deep learning and big data analytics, which are not easily interpretable by non-experts. Second, the data used in algorithmic pricing often includes personal and highly specific information, such as purchase history, personal preferences, location, and more. This data is frequently collected and analyzed without the user's direct awareness. As a result, users often do not understand what data is being used to determine the price they are shown. For instance, product or service prices may vary depending on a consumer's browsing behavior, loyalty history, or the frequency with which a particular product is viewed. Users may not realize that their personal habits are influencing the prices they receive.

In summary, the characteristics of algorithmic pricing include algorithm based decision making, dynamic pricing, personalization, data dependency, and limited transparency and accountability. While this pricing model enhances efficiency and profit margins for e-commerce providers, it also raises significant legal challenges, particularly in relation to price discrimination and the security of users' personal data. Therefore, the role of personal data protection law, especially Law Number 27 of 2022 is crucial in safeguarding users rights within algorithmic pricing practices.

3.2. Legal Relationships in Algorithmic Pricing Under Law Number 27 of 2022 on Personal Data Protection

Legal relationships refer to the binding connection between parties concerning their respective rights and obligations. Such relationships are generally established through agreements that reflect the parties' consent to contractual terms. In the context of algorithmic pricing within e-commerce platforms, legal relationships can be observed primarily through the platform's Terms of Use agreement and its Privacy Policy. The Terms of Use give rise to two primary legal relationships: (1) the legal relationship between the e-commerce provider and merchants; and (2) the legal relationship between the e-commerce platform provider and end-users. Similarly, the Privacy Policy also establishes key legal relationships: (1) the relationship between the e-commerce provider and the algorithm service provider; and (2) the relationship between the e-commerce provider and the platform's users.

These two types of agreements, Terms of Use and Privacy Policy are inherently interrelated and form the legal basis for the services provided by e-commerce platforms. The Terms of Use establish the contractual framework between the platform provider and users, which subsequently serves as a legal foundation for the Privacy Policy to govern the processing of personal data. Without a valid Terms of Use agreement, the legality of the data processing under the Privacy Policy may be questioned, potentially undermining the enforceability of the data protection obligations. Therefore, both agreements must be coherently structured and meet the legal requirements for valid contracts in order to provide legal certainty and protect the rights and obligations of all parties involved. This is particularly essential in ensuring compliance with Law Number 27 of 2022 on Personal Data Protection as well as consumer rights as stipulated under Law Number 8 of 1999 on Consumer Protection.

3.3. Analysis of the Characteristics of "Automated Decisions with Legal Effect or Significant Impact" Under Law Number 27 of 2022 on Personal Data Protection

In Law Number 27 of 2022 on Personal Data Protection (hereinafter "PDP Law"), the regulator stipulates an additional obligation for Personal Data Controllers to conduct a Personal Data Protection Impact Assessment (PDPIA) if the processing of personal data poses a high risk to the protection of personal data. This is stated in Article 34 of the PDP Law as follows:

> (1) *"Personal Data Controllers are obliged to conduct a Personal Data Protection Impact Assessment (PDPDIA) in cases where the processing of Personal Data poses a potential high risk to the Personal Data Subject."*
> (2) *High-risk Personal Data processing as referred to in paragraph (1) includes:*
> a. *Automated decision-making that has legal effects or significant impact on the Personal Data Subject;*
> *b. Processing of specific types of Personal Data;*
> *c. Large-scale Personal Data processing;*
> *d. Processing of Personal Data for systematic evaluation, scoring, or monitoring activities of the Personal Data Subject;*
> *e. Processing of Personal Data for data matching or combining activities;*
> *f. Use of new technologies in the processing of Personal Data; and/or*
> *g. Processing of Personal Data that restricts the exercises of the rights of the Personal Data Subject."*
> (3) *Further provisions regarding the Personal Data Protection Impact Assessment shall be regulated by Government Regulation."*

Accordingly, the compliance of Personal Data Controllers in carrying out a PDPIA is expected to align with the mandate of the PDP Law. In doing so, the Controller must meet at least one of the high-risk processing criteria outlined in Article 34(2). The focus of this study is on one specific criterion, namely automated decision-making that has legal effects or significant impact, as stated in Article 34(2)(a).

In order for algorithmic pricing to fall under the scope of Article 34(2)(a), several interpretative elements must be considered:

1. Automated Decision Making

The PDP Law does not provide a clear definition of this phrase, creating potential ambiguity in its application. Linguistically, the phrase consists of two elements, "decision-making," referring to the process of arriving at a decision, and "automated" describing the method by which the decision is made. The main issue arises in interpreting the term "automated." According to the *Kamus Besar Bahasa Indonesia (KBBI)*, "otomatis" means a system that operates independently or without human intervention.[16] This creates two possible interpretations, *first*, "automated" refers only

[16] Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi. "KBBI VI Daring," accessed January 13, 2025. https://kbbi.kemdikbud.go.id/entri/presiden

to the final stage of the decision-making process, implying that human involvement may still exist in the preliminary data processing stages.

Second, "automated" could mean the entire process from data collection to final decision is carried out without any human intervention. Article 16 of the PDP Law outlines the stages of data processing as follows:

a. Collection and acquisition;
b. Processing and analysis;
c. Storage;
d. Correction and updating;
e. Display, dissemination, transfer, or disclosure; and/or
f. Deletion or destruction

Based on this, the second interpretation suggests that an "automated decision" should encompass an end-to-end system with no human involvement at any stage. While both interpretations are plausible, the second appears more aligned with the risk-based approach of the PDP Law. However, the statute does not explicitly clarify whether "automated decision-making" refers only to the final decision or to the entire processing cycle.

2. Legal Effects or Significant Impact

This phrase is also undefined in the PDP Law and must be carefully interpreted to avoid ineffective application. The clause requires that at least one of the two consequences be present: either legal effects or a significant impact on the data subject.

The term legal effects may be interpreted as consequences that create, alter, or terminate a legal status or relationship. In legal literature, at least three forms of legal effects are generally recognized:[17]

a. The creation, alteration, or extinction of a legal state;
b. The creation, alteration, or extinction of a legal relationship; and
c. The imposition of sanctions, particularly those not desired by the subject (i.e., unlawful acts).

As for significant impact, this phrase remains vague and subjective. Based on the KBBI, "impact" refers to an influence that produces consequences, while "significant" means important or substantial. Thus, the phrase may be interpreted as consequences that are materially important or impactful for the data subject. However, the law provides no parameters to assess what qualifies as "significant," leaving room for uncertainty in practice.

Table 1. A Comparative Analysis of the Characteristics of Algorithmic Pricing and Automated Decision-Making

[17] Mas, Marwan. *Pengantar Ilmu Hukum.* (Bogor: Ghalia Indonesia, 2003), 39.

No.	Characteristic Element	Algorithmic Pricing	Automated Decision Making	Fulfilled or Not Fulfilled
1.	Element of automated decision-making	The algorithm has the ability to make decisions in the form of determining product or service prices. However, such decision-making is not always fully automated.	The ability to make decisions without human intervention, either throughout the entire process or only at the final decision-making stage.	Not Fulfilled.
2.	Element of automated decision-making	The personalization aspect of algorithmic pricing impacts individuals through price discrimination, which relates to Article 4 point (g) of Law No. 8 of 1999 on Consumer Protection.	The decision must have legal effects or a significant impact on the Personal Data Subject.	Fulfilled.

Sources: Primary and Secondary Legal Materials, 2025 (Edited)

Based on the table above, it can be concluded that algorithmic pricing does not fulfill all the elements required under Article 34 paragraph (2)(a) of Law No. 27 of 2022 on Personal Data Protection (PDP Law). The elements stipulated in this provision are cumulative in nature, meaning that each element must be fully satisfied in order for the Personal Data Controller to be obligated to conduct a Personal Data Protection Impact Assessment (PDPIA). If any of the elements are not met, the PDPDIA is no longer a mandatory obligation for the controller. In the context of algorithmic pricing, the first characteristic—particularly the "automated" element—cannot be adequately fulfilled. If the term "automated" in the PDP Law is interpreted according to the first interpretation (i.e., referring only to the final decision-making stage), e-commerce providers may argue that their pricing decisions are not made by algorithms, but by humans. This is problematic, as in reality, the decision-making process is entirely based on algorithmic analysis, and the human decision-maker often does not conduct any substantive review of the algorithm's outcome.

Conversely, if the term "automated" is interpreted based on the second approach (i.e., encompassing the entire personal data processing chain without human intervention), then only algorithmic pricing models categorized as Human Out of The Loop (HOOTL) would fall under this provision. However, this interpretation could also be misused by e-commerce providers who claim that human involvement is present at some stage of processing, even if nominally, to avoid PDPDIA obligations. This ambiguity in interpretation is not limited to Article 34 paragraph (2)(a), but also extends to Article 10 paragraph (1) of the PDP Law, which governs the right of data subjects to object to automated decision-making. The relevant provision reads:

> "*Personal Data Subjects have the right to object to decisions made solely on the basis of automated processing, including profiling, that produce legal effects or significantly affect the Personal Data Subjec*t."

It is clear from this wording that the concept of "automated" decision-making refers not only to the final decision but also to the entire processing sequence that precedes the decision. Therefore, it reinforces the interpretation that "automated" means a complete absence of human involvement throughout the data processing lifecycle.

In light of this, algorithmic pricing cannot be categorized as a form of "automated decision-making that has legal or significant effects" as regulated under the PDP Law. The primary regulatory weakness in Article 34 paragraph (2)(a) lies in the vague and undefined interpretation of the term "automated," which creates a legal loophole that may be exploited by e-commerce providers to avoid the obligation of conducting a PDPDIA. Furthermore, this legal ambiguity also undermines the right of data subjects to object to automated decisions, as outlined in Article 10 paragraph (1). In practice, the execution of a PDPDIA determines whether an algorithmic pricing system falls under the category of automated decision-making regulated by the PDP Law—especially since a PDPDIA must be carried out before any personal data processing begins. Lastly, the lack of legal clarity significantly increases the risk of harmful algorithmic pricing practices that exploit users' data without adequate safeguards. Therefore, a substantive revision of the legal definition and scope of automated decision-making under the PDP Law is urgently needed to ensure effective protection of personal data in Indonesia's digital economy.

4. Substantive Regulatory Recommendations for "Automated Decision-Making That Produces Legal Effects or Significantly Affects" in Law Number 27 of 2022 on Personal Data Protection with Respect to Algorithmic Pricing

Algorithmic pricing involving the use of personal data from e-commerce platform users has become an increasingly complex issue, especially amid the rapid growth of Indonesia's digital economy. E-commerce providers engaging in algorithmic pricing intentionally exploit their users' personal data to maximize commercial profits. Such practices clearly pose a threat to individual privacy and may potentially violate Law No. 27 of 2022 on Personal Data Protection (PDP Law), which serves as the fundamental legal framework for protecting data subjects against acts that endanger

their personal data security. Article 34 paragraphs (1) and (2)(a) of the PDP Law stipulate that data controllers are obligated to conduct a Personal Data Protection Impact Assessment (PDPIA) when processing personal data for automated decision-making. However, the existing regulation suffers from legal ambiguity, particularly due to the absence of a clear definition or elaboration on the meaning and scope of "automated decision-making."

This lack of clarity impairs the enforcement of data subjects' rights to object to automated decisions and weakens the obligation of data controllers to assess high-risk processing activities. Therefore, regulatory refinement is urgently needed to ensure that the legal concept of automated decision-making can adequately cover harmful algorithmic pricing practices that negatively affect data subjects. In this section, the discussion of recommended regulatory reforms for automated decision-making is developed through a comparative legal method, using the European Union's General Data Protection Regulation (GDPR) as a reference. Accordingly, the discussion will be divided into two sub-sections: (1) A comparative analysis of the regulation on automated decision-making with legal or significant effects under Indonesia's PDP Law and the European Union's GDPR; and (2) The formulation of substantive regulatory recommendations for defining and implementing automated decision-making with legal or significant impact under Law No. 27 of 2022.

4.1. Comparative Analysis of the Regulation on "Automated Decision-Making with Legal or Significant Effects" under Indonesia's Law No. 27 of 2022 on Personal Data Protection and the European Union's General Data Protection Regulation (GDPR)

With the continuous development of various forms of personal data processing, particularly those involving algorithms, the European Union has introduced a relatively new provision in its personal data protection framework: automated decision-making. Philosophically, several foundational justifications underlie the regulation of automated decision-making under the General Data Protection Regulation (GDPR)[18], (1) Instrumental, which considers the practical impacts of automated decisions on society, including issues of fairness, efficiency, and social consequences; (2) Dignitary, aimed at protecting human dignity by preserving each individual's right to autonomous decision-making; and (3) Justificatory, which ensures that automated decisions provide clear and fair reasoning, especially when such decisions have a significant impact on individuals. These three rationales are interconnected, but they necessitate distinct regulatory approaches to address the needs and challenges posed by automated decision making. As a result, the GDPR explicitly regulates automated decision-making in Article 22(1) and Article 35(3)(a).

To guide the interpretation of automated decision-making provisions under the GDPR, the Article 29 Working Party (WP29) issued a guideline titled Guidelines on

[18] Kaminski, Margot E. "Binary Governance: Lessons from the GDPR's Approach to Algorithmic Accountability." *Southern California Law Review* 92 (2019): 1529–1548. https://southerncalifornialawreview.com/wp-content/uploads/2019/12/92_6_Kaminski.pdf.

Automated Individual Decision-Making and Profiling for the Purposes of Regulation 2016/679, which was later updated in 2018 by the European Data Protection Board (EDPB). The EDPB is an independent European body established to replace WP29 and tasked with overseeing the consistent application of the GDPR across EU member states. It also serves as the umbrella body for national Data Protection Authorities within the EU. Specifically, the guidelines issued by the EDPB serve as a primary interpretive reference for member state authorities and courts in understanding and applying the GDPR. In the context of automated decision-making, the EDPB provides clear guidance to define and interpret the relevant provisions effectively.

Table 2. A Comparative Analysis of Regulatory Frameworks in Indonesia and the European Union

No.	Aspect	Indonesia	European Union
1.	Regulation on Automated Decision-Making	Law Number 27 of 2022 on Personal Data Protection.	• General Data Protection Regulation (GDPR); and • Guidelines on Automated Individual Decision-Making and Profiling for the Purposes of Regulation 2016/679.
2.	Substantive Regulation on Automated Decision-Making	Covers the absolute right of Data Subjects to object to automated decisions (Article 10(1) of PDP Law) and the obligation of Data Controllers to conduct a Personal Data Protection Impact Assessment (PDPIA) (Article 34 of PDP Law).	Covers the right of Data Subjects not to be subject to automated decision-making (Article 22 GDPR) and the obligation of Data Controllers to conduct a Data Protection Impact Assessment (DPIA) (Article 35 GDPR).
3.	Interpretation of "Automated Decision-Making	No specific information.	Interpreted as a decision made without human intervention. However, if human intervention by the Data Controller exists during the processing, it must be **meaningful** and

			must be **documented** in the DPIA.
4.	Interpretation of "Significant Effect"	No specific information.	Interpreted as a consequence that has an impact equal to or as significant as legal effects.
5.	Meaningful Human Intervention by the Data Controller	Not regulated.	Must include: a. Performed by a person with the authority and competence to change the decision; b. Intended to ensure fairness and accuracy of the decision by reviewing all relevant data; and c. Cannot be a mere automatic acceptance of algorithmic outcomes to avoid automation bias.
6.	Involvement of Data Protection Officer (DPO) in Automated Decision-Making	Not required, based on Article 53(1) PDP Law which applies cumulatively	Required, based on Article 37(1) GDPR which applies alternatively
7.	Explicit Rights Related to Automated Decision-Making	Regulated in Article 10(1) of PDP Law as the right to object, with several exceptions under Article 15(1).	Regulated in Article 22(1) GDPR as the right not to be subject to automated decisions, with conditional exceptions under Articles 22(2) and 22(3) GDPR.
8.	Personal Data Processing Impact Assessment Provision	Article 34 of PDP Law regulates only the conditions requiring PDPIA	Article 35 GDPR regulates: a. Conditions requiring DPIA; b. DPIA content standards; and c. DPIA procedures. Additionally, further guidance is provided in the DPIA Guidelines

Sources: Primary Legal Materials, 2025 (Edited)

Based on the comparative table above, it can be seen that the regulation of automated decision-making in the European Union (EU) has a broader and more detailed scope compared to that in Indonesia. *First*, one of the strengths of the GDPR lies in the existence of interpretive guidelines issued by the EDPB (European Data Protection Board). These guidelines provide a broader interpretation of automated decision-

making. In the context of algorithmic pricing, the GDPR regulation may encompass all types of decision-making processes. This is because the interpretation of automated decisions involving humans, whether in HITL (Human in the Loop) or HOTL (Human on the Loop), is not automatically excluded from the scope of the GDPR. Instead, it must first be examined whether such human involvement qualifies as meaningful human intervention rather than mere formality or rubber-stamping. Hence, the guideline clearly states that if a Data Controller is unsure whether their automated decision falls within the scope of high-risk processing, the EDPB obligates them to carry out a Data Protection Impact Assessment (DPIA), which must be completed before any processing activity begins.[19] This interpretation ensures legal certainty and safeguards the rights of citizens regarding data processing involving automated decisions, including the enforcement of the right not to be subject to such decisions under Article 22(1) GDPR. In contrast, Indonesia's Law No. 27 of 2022 still contains legal ambiguity regarding automated decisions due to the lack of a clear and precise definition, potentially opening loopholes for e-Commerce providers to evade compliance.

Second, the GDPR provides a more comprehensive regulation regarding DPIAs than Indonesia's PDP Law. As previously discussed, the DPIA is essential in determining whether algorithmic pricing qualifies as automated decision-making under the GDPR. The GDPR not only mandates the DPIA and lists high-risk criteria but also sets standards for content and procedures of DPIAs. Similar to automated decisions, the DPIA is also supported by official guidelines issued by the EDPB. In contrast, Indonesia's PDP Law only outlines the obligation to conduct a DPIA and the conditions for high-risk processing but lacks further elaboration or practical guidance.

Third, under the GDPR, the involvement of a Data Protection Officer (DPO) in algorithmic pricing is mandatory, whereas under PDP Law, it is not obligatory. This is due to the criteria outlined in Article 37(1)(b) GDPR, which stipulates:

> "the core activities of the controller or the processor consist of processing operations which, by virtue of their nature, their scope and/or their purposes, require regular and systematic monitoring of data subjects on a large scale."

These criteria are further detailed in the *Guidelines on Data Protection Officers* (WP 243 rev.01) by the EDPB. Therefore, under this provision, e-Commerce providers processing personal data for algorithmic pricing must appoint a DPO, as such pricing involves continuous monitoring of platform users. The DPO's role includes advising on DPIA implementation (Article 35(2) GDPR) and assessing meaningful human intervention in algorithmic pricing (Article 39(1)(c) GDPR). Although PDP Law allows a DPO to provide advice on DPIAs, appointment is not mandatory in algorithmic pricing because the conditions under Article 53(1) are cumulative rather than

[19] Christopher Kuner et al., eds., *The EU General Data Protection Regulation (GDPR): A Commentary*. (Oxford: Oxford University Press, 2020), 666–667.

alternative, making it less likely for companies to meet the threshold for mandatory DPO appointment.

Fourth, the GDPR regulates *conditional prohibition* of automated decisions through Article 22. According to the EDPB, the "right not to be subject" to automated decision-making under Article 22(1) GDPR is not only a subjective right but also a *conditional prohibition*. Exceptions to this rule are outlined in Article 22(2), which includes necessity for a contract, authorization by EU law, or explicit consent of the data subject. The EDPB argues that interpreting Article 22 merely as a subjective right without recognizing its prohibitive nature would render the exceptions, especially consent illogical. This position is supported by legal scholars, data protection authorities, and European courts. Furthermore, GDPR imposes three cumulative safeguards to apply these exceptions:

a. The right to meaningful human intervention from Data Controller;
b. The right to express one's point of view; and
c. The right to contest the decision.

Through this conditional prohibition, Data Controllers are not merely expected to conduct DPIAs as a bureaucratic formality but must justify any use of automated decisions rigorously. This aligns with the GDPR's principle of *accountability*, where Data Controllers are required not only to comply but also to prove their compliance and demonstrate they have acted responsibly to protect Data Subjects' rights. Moreover, this approach offers *human-centric protection* to individuals. In contrast, Indonesia does not regulate a *right not to be subject* to automated processing. PDP Law only grants the right to object (Article 10(1)), without an explicit prohibition or a structured system of exceptions. In the GDPR, the right to object is regulated separately under Article 21. In the context of algorithmic pricing, the GDPR's conditional prohibition ensures better protection for e-Commerce users by legally restricting automated decisions unless clearly justified. It shifts the burden away from users to continuously monitor the fairness of pricing algorithms, placing that responsibility on the e-Commerce providers instead.

4.2. Recommendations for Substantive Regulation of "Automated Decisions with Legal or Significant Effects" in Law Number 27 of 2022 on Personal Data Protection

1. Reformulating the wording of Artile 34 paragraph (2) letter (a) of Law Number 27 of 2022 on Personal Data Protection

This reformulation is necessary to ensure that the provision on automated decision-making in Article 34 paragraph (2) letter (a) of the PDP Law does not only refer to the final decision-making stage, but also covers the entire stages of personal data processing, including the data collection stage. In addition, this reformulation aims to align the wording of Article 34 paragraph (2) letter (a) with the provision on automated decision-making in Article 10 paragraph (1) of the PDP Law. The provision in Article 10 paragraph (1) emphasizes not only the final decision-making stage, but also includes the initial decision generated before the final decision is made

2. Issuing a ministerial regulation that provides guidelines on "automated decisions with legal or significant effects"

Considering that Indonesia has not yet established a Data Protection Authority as mandated by the PDP Law, the Ministry of Communication and Digital Affairs may issue a ministerial regulation governing automated decision-making under the PDP Law. This ministerial regulation should provide clearer interpretations related to automated decision-making.

In essence, the above recommendations are intended to supplement the current provisions of the PDP Law, which still contain loopholes that can be exploited through algorithmic pricing practices harmful to personal data subjects. By adopting more comprehensive regulations that incorporate these recommendations, Indonesia can enhance the effectiveness of its personal data protection framework. This is crucial not only for ensuring personal data protection equivalent to international standards, but also for strengthening Indonesia's position as a trusted business hub in developing the national digital economy.

5. Conclusion

Algorithmic pricing cannot be categorized as a form of "automated decision with legal or significant effect" under Law Number 27 of 2022 on Personal Data Protection. This is because algorithmic pricing does not fulfill the element of "automated" as referred to in Article 34 paragraph (2) letter (a) of the PDP Law. There remains legal ambiguity in the "automated" element of that article due to the absence of a clear interpretation. This legal weakness could serve as a loophole for e-Commerce providers to evade their obligations to conduct a Data Protection Impact Assessment (DPIA) and to respect the data subject's right to object as stipulated in Article 10 paragraph (1) of the PDP Law. Further regulation is required to provide legal certainty to the public regarding the provision on automated decision-making under the PDP Law.

A comparative legal analysis shows that the European Union has more specific regulations concerning automated decision-making, thereby enabling algorithmic pricing to fall within the scope of automated decisions under the GDPR. In the EU, data controllers are still obligated to carry out a DPIA, even when human intervention is involved. Therefore, Indonesia needs to strengthen its regulatory framework under Law Number 27 of 2022 concerning automated decision-making to encompass algorithmic pricing. This can be achieved by reformulating Article 34 paragraph (2) letter (a) of the PDP Law and by issuing a ministerial regulation containing guidelines on "automated decisions with legal or significant effects."

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