

## AI-Based Dynamic Pricing in Online Transportation Services: A Legal Review of Algorithmic Fairness and Transparency

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### ABSTRACT

The development of Artificial Intelligence (AI) has significantly transformed the digital economy, including app-based transportation services. One of the most debated applications of AI is *dynamic pricing*, a mechanism that automatically adjusts fares based on real-time market demand and supply fluctuations. In Indonesia, this practice raises legal issues related to consumer protection and economic fairness, particularly when prices surge drastically during emergencies. The lack of algorithmic transparency in fare determination raises concerns about fairness for consumers and the balance of interests among service providers, drivers, and users. This study aims to analyze the legal implications of *dynamic pricing* under Indonesia's *Consumer Protection Law* and *Trade Law*, and to formulate regulatory recommendations ensuring that AI-based pricing systems remain ethical and fair for all parties. The research employs a normative legal method using three main approaches: a statutory approach to examine relevant legal frameworks, a conceptual approach to explore theories of price fairness and digital consumer protection, and a comparative approach to assess *dynamic pricing* practices in other countries. Data are collected from primary and secondary legal sources, as well as in-depth interviews with key stakeholders, including government regulators, transportation service providers, drivers, consumers, and digital law experts. The findings are expected to provide concrete recommendations for regulating AI-driven *dynamic pricing* in online transportation services, thereby promoting a balance between consumer protection, algorithmic transparency, and the sustainability of Indonesia's digital economy.

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### Keywords:

*Dynamic Pricing;*  
*Artificial Intelligence;*  
*Digital Economic Law*

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## INTRODUCTION

The development of Artificial Intelligence (AI) in the economy has rapidly advanced, creating a significant impact across various sectors, including app-based transportation services (Jones & Zhang, 2021; Pratama, 2020). One of the most controversial implementations of AI is dynamic pricing, a mechanism that automatically adjusts fares based on real-time market demand and supply (Thompson & Lee, 2022). In the context of online transportation services in Indonesia, AI-based dynamic pricing has sparked debate concerning fairness, transparency, and business ethics (Widodo & Tanjung, 2023). The implementation of dynamic pricing in online transportation allows AI systems to adjust fares according to factors such as demand levels, driver availability, and external conditions like

weather or public transport disruptions (Sari, 2021; Susanto & Ramadhan, 2020). For example, during rush hours, heavy rain, or public transportation strikes, fares can increase drastically (Kusuma & Suryo, 2022). In some cases, such as during floods or natural disasters, prices may surge up to three times higher than normal rates (Hidayat & Suryani, 2022).

While this mechanism can improve operational efficiency and ensure service availability, AI-based dynamic pricing also raises ethical and legal concerns (Darmawan & Putra, 2022; Suryani, 2021). Consumers often have no choice but to pay higher prices in urgent situations, leading to questions regarding fairness and consumer protection (Pratama, 2021). From an economic perspective, uncontrolled price surges can limit transportation accessibility for low-income individuals, ultimately affecting labor mobility and economic productivity (Fadli & Yuliana, 2020; Siahaan & Tjahjono, 2023). From a legal standpoint, dynamic pricing mechanisms must be examined in the context of Law No. 8 of 1999 on Consumer Protection, which guarantees consumers' rights to fair prices and clear information regarding applicable fares (Kusuma & Rachman, 2022). Meanwhile, Law No. 7 of 2014 on Trade allows market-based pricing mechanisms, providing a potential legal foundation for service providers to implement dynamic pricing (Ramadhan & Wibowo, 2021). However, the key question remains whether significant fare increases during vulnerable situations can be ethically and legally justified (Wijaya, 2022).

From a business ethics perspective, the central issue is whether it is fair for companies to gain higher profits when consumers are in difficult circumstances (Kandpal et al., 2024; Sheetal et al., 2023). On one hand, AI-based dynamic pricing can encourage more drivers to remain active during periods of high demand, ensuring continuous service availability. On the other hand, it may also be viewed as the exploitation of consumer needs during emergencies. Currently, regulations concerning AI-based dynamic pricing in Indonesia remain limited. Further studies are needed to evaluate whether this pricing policy aligns with the principles of fairness, transparency, and economic sustainability. Without clear regulation, there is a risk that AI-driven pricing mechanisms could create economic instability, exacerbate inequality in access to transportation, and lead to legal uncertainty in the digital economy.

The urgency of this research rests on the significant normative gap between the rapid development of Artificial Intelligence (AI) technology in online transportation pricing systems and the slowness of positive law in Indonesia in responding to this phenomenon. Dynamic pricing systems implemented by platforms like Gojek and Grab have become common practice and are widely accepted by the public, yet to date there are no specific regulations comprehensively governing these algorithm-based pricing mechanisms. This situation creates a legal vacuum that has the potential to generate legal uncertainty for all stakeholders, especially consumers who are in a weak bargaining position when faced with fare spikes in emergency situations.

Considering both legal and ethical aspects, this research aims to analyze the implementation of AI-based dynamic pricing in Indonesia's online transportation services from legal and ethical perspectives and to evaluate whether the mechanism upholds the principles of fairness and algorithmic transparency under the prevailing legal framework.

The main problems addressed in this research are: (1) What are the legal implications of applying dynamic pricing that significantly increases fares during emergencies or difficult situations under Law No. 8 of 1999 on Consumer Protection and Law No. 7 of 2014 on Trade? (2) What legal regulations can be implemented to balance the interests of companies, drivers, and consumers in AI-based dynamic pricing to ensure ethical and fair practices within Indonesia's economy?

The objectives of this study are: (1) To analyze the legal implications of implementing AI-based dynamic pricing in online transportation services, particularly concerning fare surges in emergencies or difficult conditions, with reference to Law No. 8 of 1999 on Consumer Protection and Law No. 7 of 2014 on Trade; and (2) To evaluate and formulate legal regulations that can balance the interests of companies, drivers, and consumers in AI-based dynamic pricing systems, ensuring that the mechanism operates ethically, fairly, and transparently within Indonesia's economic context. These objectives encompass both legal analysis and regulatory formulation, offering balanced policy solutions for all stakeholders so that AI-based dynamic pricing does not harm consumers while still providing benefits for companies and drivers.

## **METHOD**

This study employed a normative legal research method, specifically juridical-normative research, which examined theoretical frameworks, legal concepts, and relevant legislation related to the topic. Normative juridical research treated law as a structured system of norms derived from laws, regulations, agreements, and legal doctrines. The primary objective was to examine the ethics, statutory regulations, and legal concepts relevant to *AI-based dynamic pricing* in online transportation services. The research was descriptive-analytical, providing an overview and interpretation of *AI-based dynamic pricing* under Law No. 8 of 1999 on Consumer Protection and Law No. 7 of 2014 on Trade.

The study applied three main approaches to analyze *AI-based dynamic pricing* in online transportation services:

- 1) Statutory approach – Examined relevant legal regulations, including Law No. 8 of 1999 on Consumer Protection, Law No. 7 of 2014 on Trade, and other related regulations influencing dynamic pricing policies.
- 2) Conceptual approach – Explored principles of fairness, transparency, and business ethics within dynamic pricing systems, and analyzed relevant legal theories such as fair pricing and consumer protection in digital transactions.
- 3) Case approach – Studied cases related to the implementation of *AI-based dynamic pricing* in Indonesia and other countries, including policies adopted and public responses to price surges during emergencies or specific circumstances.

This research relied on secondary data, including:

- 1) Primary legal materials – Law No. 8 of 1999 on Consumer Protection, Law No. 7 of 2014 on Trade, Ministerial Regulations, and other legal instruments relevant to pricing policies in online transportation services.

- 2) Secondary legal materials – Academic journals, books, research reports on *AI-based dynamic pricing*, and case studies comparing regulations and best practices internationally.
- 3) Tertiary legal materials – Legal dictionaries, encyclopedias, and other reference sources supporting understanding of relevant legal concepts.

Literature study – Examined legislation and academic studies related to *AI-based dynamic pricing*.

In-depth interviews – Semi-structured interviews were conducted with:

- 1) Government regulators, such as the Ministry of Transportation, Ministry of Trade, and Financial Services Authority (OJK), regarding policies and oversight of dynamic pricing.
- 2) Online transportation service providers, including Gojek and Grab, to understand the application of *AI-based dynamic pricing* algorithms.
- 3) Online drivers, to examine the impact of dynamic pricing on income and welfare.
- 4) Consumers, to capture experiences and perceptions of fairness.
- 5) Legal and digital economy experts, to analyze compliance with regulations and market impact.

The study employed qualitative analysis through:

- 1) Normative analysis – Interpreted relevant legal rules governing dynamic pricing, particularly regarding consumer protection and trade regulation.
- 2) Thematic analysis – Categorized interview findings into key themes, including price fairness, algorithmic transparency, consumer protection, and economic impact.
- 3) Comparative analysis – Compared Indonesia’s regulatory framework on dynamic pricing with that of other countries with established rules for AI-based pricing mechanisms.

To ensure data validity, triangulation was applied by comparing interview findings from multiple stakeholders and cross-verifying them with existing literature and regulations.

## **RESULT AND DISCUSSION**

### **Legal Implications of Implementing Dynamic Pricing That Significantly Increases Fares During Emergency or Difficult Situations Based on Law No. 8 of 1999 on Consumer Protection and Law No. 7 of 2014 on Trade**

This study found that the implementation of dynamic pricing in online transportation services in Indonesia—particularly during emergency situations—has significant legal implications. Under Law No. 8 of 1999 on Consumer Protection, consumers have the right to receive clear and transparent information regarding the prices charged. However, in practice, many consumers feel that they do not receive sufficient information about how fares are determined, especially during drastic price surges. Based on questionnaire data, 113 respondents from Palangka Raya City provided answers.

The majority of respondents (65.66%) answered “neutral.” Those who agreed with the use of dynamic pricing algorithms and those who disagreed (believing it harms consumers) each accounted for 17.17%. This indicates that transparency regarding AI-based dynamic

pricing algorithms in online transportation systems remains uneven. Some respondents ignored fare increases, while those who disagreed were consumers who felt their rights were violated. Algorithmic transparency is generally known only to companies and drivers. This limited access to information can lead consumers to feel exploited, particularly when they are forced to pay much higher fares during emergencies.

According to an interview with one online transportation driver, information transparency is indeed uneven. What should be known to all stakeholders is often understood only by companies and drivers, who are given clear explanations. The driver mentioned that fare changes depend on certain conditions, with a minimum base fare of IDR 8,800 on one online platform (Gojek), although the driver himself did not fully understand what dynamic pricing means. He agreed with price fluctuations, as he believed they increase income proportionally to the risks faced. The driver added that the app marks “lightning zones” where surge pricing occurs—commonly in areas like Sanaman Mantikei in Palangka Raya—especially during rush hours, bad weather, or major events such as concerts and religious holidays.

Therefore, it is crucial to develop regulations ensuring pricing transparency and adequate consumer protection. There should be clear guidelines regarding fare increase limits in specific situations so that consumers do not feel disadvantaged. Stronger supervision of dynamic pricing practices is also needed to ensure compliance with regulations and prevent unfair treatment toward consumers.

An interview with a law graduate from the Faculty of Law at UPR revealed that, in principle, the system does not contradict legal norms, but from a justice perspective, it is essential to ensure the benefits of price increases are distributed fairly among all parties. Beyond the Consumer Protection Law, which mainly governs goods transactions, specific regulations for online transportation services are needed. Since technology continues to evolve, the issue of dynamic pricing must be viewed through the lens of ethics and fairness, necessitating new regulations to address it comprehensively.

#### 1. Legal Analysis of Dynamic Pricing

From a legal standpoint, dynamic pricing must be viewed as a mechanism that benefits companies but must also uphold consumer rights. Law No. 8 of 1999 emphasizes transparency and fairness in trade practices. However, many companies fail to adequately inform consumers how prices are determined. Survey data shows that 70% of respondents were dissatisfied with price transparency, creating uncertainty and dissatisfaction, especially when they are forced to pay higher fares during emergencies.

#### 2. Ethics in Price Setting

From an ethical perspective, dynamic pricing raises questions of fairness—whether it is justifiable for companies to gain higher profits when consumers are in vulnerable situations. While dynamic pricing encourages more drivers to work during high demand, it can also be seen as exploiting consumers’ urgent needs. Survey data reveals that 65% of respondents perceive significant fare hikes during emergencies as unethical. Therefore, policies should not only focus on corporate profits but also consider the broader social impact.

### 3. Balancing Innovation and Consumer Protection

This study shows that although AI-based dynamic pricing enhances operational efficiency and service availability, clear and transparent regulation is necessary to protect consumers. Without adequate regulation, AI-driven pricing mechanisms risk creating economic instability and worsening inequality in access to transportation. Survey results indicate that 78% of respondents agree that stricter regulations are needed to safeguard consumers. Hence, collaboration between the government, companies, and the public is vital to build a fair and sustainable digital ecosystem.

### 4. Recommendations for Future Research

This research opens opportunities for further studies on dynamic pricing and its implications across various sectors. As AI technology continues to expand, continuous evaluation is essential to assess its impact on consumers and markets. Future research can guide policymakers in designing fairer and more responsive regulations to meet public needs.

In conclusion, this study contributes to the understanding and regulation of AI-based dynamic pricing in Indonesia's online transportation sector, aiming to balance consumer protection, algorithmic transparency, and the sustainability of the digital economy.

Legal Regulations to Balance the Interests of Companies, Drivers, and Consumers in AI-Based Dynamic Pricing to Maintain Ethics and Fairness in Indonesia's Economic Context

Transportation is a derivative demand driven by economic and social activities. It plays a vital role in both social and economic aspects by enabling the distribution of goods and people from one location to another (Sugiarto et al., 2016). Generally, transportation is categorized into land, sea, and air transport. The growth of online transportation services in Indonesia stems from citizens' constitutional right to express opinions, as guaranteed under Article 28E(3) of the 1945 Constitution of the Republic of Indonesia, which states that "every person has the right to freedom of association, assembly, and expression."

This freedom has fostered the emergence of innovative business ideas powered by technology, such as online transportation platforms that have rapidly expanded and become essential to Indonesians. However, there is still no specific regulation governing the transportation of passengers or goods by online service providers.

The absence of clear regulations allows online transportation platforms to use AI-based dynamic pricing systems, which cause unpredictable fare fluctuations. Companies often cite "peak hours" without prior notification, and no information about price increases is displayed on official apps or websites. These practices violate the principle of transparency. Under Article 7(b) of Law No. 8 of 1999 on Consumer Protection, business actors are required to:

*"Provide correct, clear, and honest information regarding the condition and guarantee of goods and/or services, as well as instructions for their use, repair, and maintenance."*

Failing to disclose clear pricing information allows companies to gain excessive profits without fulfilling their legal obligations, thereby violating consumer rights as stated in Article 4(c) of the same law:

*“Consumers have the right to correct, clear, and honest information regarding the condition and guarantee of goods and/or services.”*

This issue arises because there is no specific regulation addressing dynamic pricing, highlighting the urgent need for clear legal provisions to ensure fairness among consumers, drivers, and online transportation companies.

Balanced regulation should not only focus on lowering consumer fares but also on creating a fair incentive and income structure for partner drivers. Companies can implement measures such as establishing a minimum base fare, offering realistic performance-based bonuses, and ensuring commission rates align with operational costs. It is equally important to provide drivers with access to social protection programs, such as health and accident insurance, and to organize regular dialogue forums between companies and driver communities.

Ultimately, pricing strategies in online transportation are not just about numbers—they reflect values of fairness and equity. Successful platforms are those that foster a healthy ecosystem where consumers feel protected, drivers earn a fair livelihood, and companies continue to thrive. This industry’s emergence has transformed lifestyles and work structures, marking a new chapter in Indonesia’s digital civilization.

## **CONCLUSION**

Based on the research findings, the implementation of AI-based dynamic pricing in Indonesia’s online transportation services has significant legal, ethical, and social implications. While it enhances operational efficiency and service availability, it raises major concerns regarding transparency, fairness, and consumer protection, particularly when fares surge drastically during emergencies. Although market-based pricing allows business operators flexibility, such practices may conflict with consumer protection principles, highlighting the need for stricter regulations to prevent exploitation. A balanced regulatory framework should include transparent pricing mechanisms, limits on fare increases, and strict oversight to protect consumers, ensure fair welfare for drivers, and provide business certainty for service providers. Collaboration among government, companies, and society is essential to create an ethical, sustainable digital ecosystem that supports national economic growth. Future research could explore the design and effectiveness of regulatory models for algorithmic pricing in digital transportation, including cross-country comparisons to identify best practices for ethical AI deployment.

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