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ANTITRUST ON DYNAMIC PRICING ALGORITHMS IN E-COMMERCE: A NORMATIVE LEGAL ANALYSIS

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Abstract- *This article examines automatic pricing (dynamic pricing) in e-commerce from a competition law perspective, focusing on the legal qualification of algorithm-based pricing behavior and the liability of business actors for system outputs that have the potential to suppress competition. The research uses a normative legal method through qualitative literature study and thematic synthesis of primary legal materials and academic literature. The analysis is based on Law Number 5 of 1999, specifically the prohibition of price-fixing agreements, the prohibition of marketing arrangements that affect prices, and the prohibition of exclusive actions that could lead to monopolistic practices or unfair business competition. The discussion is supplemented by the ITE Law and its amendments, PP 71/2019, and PP 80/2019 to assess system accountability, traceability of electronic evidence, and PMSE implementation obligations, as well as Law 8/1999 for aspects of price transparency and transaction certainty. The findings indicate that independent dynamic pricing can be lawful, as long as it is not established through agreements, facilitation, or parameter alignment. The risk of violations increases when algorithms are used to standardize pricing benchmarks, orchestrate promotions, or conduct selective price reductions that weaken competitors. Primary responsibility remains with businesses, while technology vendors and relevant marketplaces are liable if they are actively involved in the design, configuration, or incentives that drive standardization.*

Keywords: antitrust; pricing algorithm; dynamic pricing; e-commerce; KPPU; price agreement; marketplace

INTRODUCTION

Electronic trading has changed the way businesses determine prices. In the e-commerce space, prices are no longer set solely through relatively stable cost and margin calculations, but often move quickly in response to signals from demand, inventory, time, location, user segmentation, and competitor responses (Chen & Chen, 2015). This change has led to a shift from human-based pricing to software-based pricing, particularly automated pricing algorithms that perform repeated updates in minutes or seconds. The adoption of this type of technology is part of a broader digital ecosystem, in which various channels, including social media, play a role in shaping market dynamics and online business promotion (Infante & Mardikaningsih, 2022). At this point, prices become information that is continuously produced and reproduced by the system, then perceived as "normal" by market participants because they appear as technical outputs. Business law, however, views price as a central element of competition because it affects market structure, consumer substitution patterns, and incentives for business entry and exit. When pricing decisions are transferred to algorithms, legal questions arise regarding how to identify intent, agreement, or coordination, given that software works through parameters and data that are not always transparent to end users.

Dynamic pricing algorithms in e-commerce are generally designed to maximize specific objectives, such as revenue, profit, inventory turnover, or market share, by utilizing historical and real-time data. In practice, the system can test various price points, study demand elasticity, and then adjust prices adaptively. This model is efficient for businesses because it reduces market monitoring costs and speeds up responses to competition. This transformation towards automation is part of broader changes in labor relations and management in the digital age, which require adaptation at the organizational level (Darmawan et al., 2023). This efficiency, however, has the potential to be accompanied by the risk of market lock-in, price discrimination that is difficult to detect, and price coordination that occurs without explicit communication between competitors. When many businesses use similar tools or the same pricing service provider, there is a possibility of uniform pricing patterns emerging, prices remaining stable at a high level, or price wars being avoided, even if the businesses never exchange messages. This situation challenges the design of competition law enforcement, which has emphasized proving agreements, intent, or mutual awareness of actions as evident from human behavior.

In the Indonesian legal system, antitrust issues fall under the jurisdiction of business competition law, particularly in relation to the prohibition of agreements and activities that give rise to monopolistic practices and unfair business competition. E-commerce expands the scope of application of these norms because competition occurs through platforms, APIs, advertising systems, and ranking mechanisms. Dynamic pricing can be linked to a larger ecosystem, such as automated promotion programs, shipping cost adjustments, bundling, and cross-channel inventory integration. As a result, pricing is not always a single decision, but rather part of a series of decisions that are compiled into encoded business

logic. Law enforcement officials and judges are faced with the need to interpret the digital traces and incentive structures embedded in algorithm design (Wibowo et al., 2022). This requires a rigorous academic discussion on how to construct evidence, how to assess the causal relationship between system design and market outcomes, and how to assign responsibility to businesses for the algorithms they choose, train, or purchase.

Attention to antitrust legal aspects for automatic pricing algorithms is also related to changes in the structure of market players. In e-commerce, business players can be large traders, MSMEs, aggregators, distributors, or cross-border sellers. They compete in a space that facilitates instant monitoring of competitors' prices and reduces comparison costs. This situation allows market discipline mechanisms to operate very quickly, but it can also create artificial price stability if algorithms observe and adjust to certain patterns. The presence of third-party technology providers also introduces new actors who are not always visible as "competitors," even though they can influence price structures through the configuration templates used by many clients. From a business law perspective, the contractual relationship between merchants and pricing service providers, as well as their relationship with marketplace platforms, gives rise to a complex chain of responsibility. The legal question is not simply whether prices "rise," but how to assess the actions that produce those results, how to assess standards of business prudence, and how to test compliance with prohibitions on unfair business competition in a highly digitized space.

At the corporate policy level, the use of dynamic pricing is often seen as a necessity to survive in an increasingly digitized and data-driven digital competition (OECD, 2015). Management expects a system that can automatically optimize prices without manual intervention, while maintaining brand consistency and compliance with platform rules. When antitrust risks arise, however, companies need a mapping of legal obligations that can be translated into operational and auditable internal controls (Ezrachi & Stucke, 2016). The challenge is that antitrust compliance frameworks are traditionally designed for human decision-making processes, such as pricing meetings or the exchange of sensitive information between businesses (Harrington, 2011).

Dynamic pricing shifts the compliance risk to the system design stage, including parameter setting, data source selection, objective function formulation, and response mechanisms to competitor prices. If compliance is not embedded from the design stage, companies may find themselves in a situation where the system's output creates market patterns that are legally questionable, while internally it is difficult to explain why the system acts in this way (UK Competition and Markets Authority, 2016). This condition confirms that antitrust risks in dynamic pricing are not only a matter of market behavior, but also a matter of technology governance and organizational accountability. The normative legal discussion therefore needs to be directed towards bridging antitrust prohibition norms with technical realities, so that the formulation of legal obligations can be understood as auditable standards of behavior.

Finally, research on antitrust law aspects of automatic pricing algorithms (dynamic pricing) in e-commerce needs to be positioned as a business law study that examines the relationship between freedom of enterprise, technological innovation, and fair competition restrictions. The law needs to provide space for innovation and pricing efficiency that benefits consumers and businesses. The law must also be able to recognize new forms of coordination, including unstated coordination, software-mediated coordination, or coordination driven by platform architecture. This research focuses on how Indonesian competition law defines agreements, evidence, and liability in situations where the operational "actors" are algorithms, and how Indonesian norms interact with the principles of data governance and trade through electronic systems. To maintain scientific quality, the discussion requires verified academic references and caution in distinguishing between technical speculation and accountable legal arguments. This research is also relevant in the context of studies on institutionalization and skills in technology to ensure equitable access and competence (Ramle & Mardikaningsih, 2022).

Automatic pricing tests the conceptual boundary between independent competitive behavior and coordinated behavior. In modern competition theory, price coordination is commonly associated with communication between competitors or agreements that can be traced through direct or indirect evidence, such as information exchange or consistent behavior patterns (Vives, 2011). When price adjustments are made by algorithms that continuously monitor competitors' prices and respond based on a predetermined set of rules, the resulting price patterns can resemble the outcome of an agreement without any identifiable human contact (Klein, 2016). Competition literature highlights that such mechanisms have the potential to facilitate implicit coordination, as algorithms are able to learn from the market environment and stabilize prices at levels that resemble collusion without explicit communication (Calvano et al., 2015). These conditions challenge the conventional antitrust framework of proof, which focuses on intent and human interaction, as problematic market behavior can arise as a result of the design and interaction of the algorithmic system itself (Mehra, 2015). The literature on algorithmic collusion has shown that machine learning and optimization can drive market outcomes that approximate collusive behavior under certain conditions, particularly when price agents interact repeatedly and use price signals as feedback (Calvano et al., 2020). In academic debate, the central issue is how the law assesses "intent" and "consent" when such outcomes arise from systems designed for profit, but not explicitly instructed to collude. This misalignment between traditional legal categories and technical mechanisms has the potential to create uncertainty for businesses and law enforcement.

Another problem lies in the expansion of the chain of actors contributing to price formation. Businesses can adopt the same pricing tools from vendors that provide standard settings, recommendations, and monitoring dashboards,

so that many pricing decisions are derived from vendor designs and standard configurations. In addition, marketplace platforms have promotion rules, service fees, and display order rules that can guide merchant pricing behavior. In such circumstances, attributing responsibility becomes complicated: should a particular price outcome be attributed entirely to the merchant, or is there relevant responsibility on the part of the vendor and platform as facilitators? The scientific debate on "virtual competition" highlights how digitization can reduce competition uncertainty and increase monitoring capabilities, making market structures more prone to move toward price stability that is detrimental to consumers (Ezrachi & Stucke, 2016). Within the framework of competition law, this attribution issue is important because it determines the appropriate subject to hold accountable, determines the type of evidence that is relevant, and determines the proportional corrective action. This analysis becomes more complex when considering the responsibility of digital marketplace platforms in assessing business competition (Negara et al., 2024).

The next issue concerns the burden of proof and standards for assessing violations in antitrust enforcement. Competition law enforcement requires convincing evidence of collusive agreements, parallel conduct supported by additional factors, or abuse of a dominant position, depending on the applicable regulatory regime. In the realm of algorithms, key evidence often resides in system logs, design documentation, optimization parameters, or training datasets, which are not always easy to obtain or understand. Competition law literature has noted that collusion by autonomous agents requires the development of analytical tools, including market structure assessments, monitoring mechanisms, and tests of whether pricing behavior is more consistent with coordination than aggressive competition (Harrington, 2018). The problem is that proof standards that demand too much explicit communication evidence may fail to capture coordination that occurs through adaptive learning, while standards that are too loose risk punishing legitimate price innovation. This tension creates a need for normative legal research that examines the adequacy of Indonesian legal categories for assessing dynamic pricing, without blurring the distinction between legal price uniformity and price uniformity arising from prohibited coordination mechanisms.

E-commerce in Indonesia has developed as a trading infrastructure used by millions of consumers and businesses, so that even small shifts in pricing mechanisms can have a major impact on consumer welfare, market access, and business continuity. Dynamic pricing accelerates price adjustments, but at the same time reduces coordination friction because competitors' prices are available almost instantly. In conditions of intense competition, businesses tend to seek tools that promise "always competitive prices," which in practice often means prices that always respond to competitors. This tendency can result in a uniform market, rendering promotions meaningless and reducing the price variation that is usually a signal of competition. For competition enforcers, these changes require the ability to assess whether digital mechanisms result in a substantial reduction in competition, as well as how to formulate corrective actions that target the source of the problem, namely the design and governance of algorithms, rather than merely the price figures on a given day. In this case, optimizing the principles of fair business competition and the role of the KPPU is crucial to realizing a fair economy in the digital era (Wibowo et al., 2023).

This topic is also relevant because national regulations that are still in effect regarding business competition, electronic trading, and personal data protection form an overlapping landscape of obligations. E-commerce businesses can process data to develop price segmentation, while platforms and technology vendors have access to extensive price and purchasing behavior data. When data becomes the main input for pricing algorithms, compliance aspects cannot be separated from antitrust questions: what type of data is used, is there an exchange of sensitive data between businesses, how do platforms regulate data access, and how are companies' internal controls designed? A thorough normative legal discussion is needed so that businesses understand the limits of competitive behavior in the era of automated pricing, and so that authorities have an assessment framework that is consistent with the nature of digital evidence. Structured research results will help map risks, clarify relevant legal categories, and guide realistic compliance practices. Similar implications are also found in cross-border transactions, where payment regulations and consumer protection require adjustments in the digital economy system (Rahman et al., 2024; Mujisulistyo et al., 2024).

This research aims to formulate a normative legal analysis of automatic pricing in e-commerce from an antitrust perspective, by explaining the qualifications of behavior relevant to the prohibition of agreements and price coordination, and developing a framework for business actors' accountability for algorithm outputs in relation to technology vendors and platforms. The theoretical contribution is expected to clarify the adaptation of the concepts of agreements, understandings, and circumstantial evidence to algorithm-based pricing systems, while the practical contribution is expected to assist companies in designing compliance measures through the mapping of auditable decision points, the establishment of internal controls, and the management of adequate documentation to respond to competition authority investigations.

RESEARCH METHODS

This research uses a normative juridical method with a qualitative literature study design oriented towards the interpretation of norms and the construction of business law arguments. Primary legal materials are positioned as the main focus, namely laws and regulations governing business competition, electronic trading, consumer protection, and data

protection, along with relevant authority decisions or guidelines as long as they are officially available. Secondary legal materials in the form of academic books and reputable journal articles are used to clarify the concepts of antitrust, price coordination theory, and the shift in evidence to algorithmic behavior. The literature processing framework follows the principles of qualitative research to construct normative propositions, with an emphasis on systematic reasoning and coherence between norms and doctrines. In developing the argument, the research utilizes analytical-comparative reading techniques on the concepts of agreements, coordinated behavior, and the accountability of business actors when pricing decisions are generated by automated systems. The synthesis step adopts a theme development approach so that findings from the literature and norms can be integrated into consistent analytical categories, as in the practice of coding and theme development in qualitative analysis (Braun & Clarke, 2006; Miles, Huberman, & Saldaña, 2014).

The literature search strategy was conducted in stages and documented. Keywords were determined based on competition law and digital system terminology, as listed in the abstract. Inclusion criteria include: (a) direct relevance to pricing algorithms and competition enforcement, (b) methodological or conceptual discussions that can be used to construct a normative analytical framework, (c) bibliographic traceability via DOI/ISBN. Exclusion criteria included: popular writings without scientific review, presentation materials without academic manuscripts, and sources whose bibliographic identities could not be verified. To maintain breadth while remaining focused, the study combined systematic searching and purposeful searching through backward searching of the bibliographies of key articles, following literature review practices that emphasize transparency in the selection process (Tranfield et al., 2003; Grant & Booth, 2009).

Coding was performed by constructing an extraction matrix containing the following elements: legal issues, referenced norms, doctrinal concepts, types of antitrust risks, and implications for the assessment of evidence. The units of analysis are treated as arguments or propositions in the literature that can be linked to categories of norms, such as the elements of "agreement," "information exchange," "parallel behavior," "platform facilitation," and "system design standards of care." After extraction, thematic synthesis is used to consolidate findings into themes that address the problem formulation, such as the theme of digital price coordination qualification, the theme of attribution of responsibility for algorithm output, and the theme of the need for internal control and system design documentation. Quality assurance is carried out through consistency checks between sources, cross-referencing of terms, and a clear separation between the description of norms and the author's evaluative arguments. The thematic synthesis references are used as a guide to ensure that the combination of findings does not become a mere summary, but rather produces a testable analytical structure (Thomas & Harden, 2008).

RESULTS AND DISCUSSIONS

Legal Qualification of Competition on Dynamic Pricing and Indications of Digital Price Coordination

Dynamic pricing in e-commerce is a pricing practice that is carried out automatically through algorithms with real-time data input, so that prices can change according to demand, time, stock availability, promotion intensity, or shopping behavior patterns (Suresh Kumar et al., 2023). Legally, the "automatic" nature does not negate the fact that price is the most important competitive variable, so its legal assessment must be placed within the regime prohibiting monopolistic practices and unfair business competition. Law No. 5 of 1999 is the main reference because it contains prohibitions on certain agreements, certain activities, and the abuse of market power that reduces competition. The initial qualification that needs to be emphasized is the distinction between independent pricing and pricing influenced by coordinative relationships. Algorithms are often understood as decision-making tools, but in competition law, they can become a medium for forming pricing patterns that close the space for competition if they are designed with parameters that encourage parallel adjustments, give signals, or lock in competitor behavior. The normative analysis must therefore assess the structure of the relationships between business actors, the design of the pricing system, the sources of competitor data, and the impact on consumer choice, before concluding whether the practice falls within the realm of fair competition or has shifted to prohibited behavior.

Article 5 of Law Number 5 of 1999 prohibits price fixing agreements, whether direct or indirect, that have the potential to cause unfair business competition. In dynamic pricing, the normative test does not lie in rapid price changes, but rather in the existence of a "price-fixing agreement." If a business entity uses an algorithm to independently adjust prices based on costs, demand, and internal objectives, then the agreement element in Article 5 is generally not fulfilled. The prohibition in Article 5 covers indirect forms, so technical patterns can be assessed as a means that functions similarly to an agreement if there is joint regulation, use of the same vendor accompanied by uniformity of core parameters, or sharing of rules for responding to competitors' prices that are understood by all. The assessment of "indirect" requires a careful reading of technical mechanisms that can reduce competition uncertainty, such as algorithm rules that set lower and upper price limits following certain competitors, or rules that restore prices to a certain level after a competitor's promotion ends. Within the framework of Article 5, the main issue is whether price fixing occurs as a result of an agreement between competitors or solely as a result of competitive adaptation that is common in transparent markets.

Prohibited price fixing does not always require physical meetings or explicit communication. Article 5 is designed to prevent market outcomes that are detrimental to consumers due to prices being held at unreasonable levels through coordination. In dynamic pricing, the element of agreement can be tested using relationship indicators, such as cooperation agreements between competitors on pricing services that include minimum price arrangements, the exchange of planned price lists, or clauses requiring compliance with price recommendations from certain aggregators. This analysis can be enriched by the "rule of reason" approach, which is also applied in other business cooperation cases, such as in franchisor-franchisee relationships, where the aim is to assess the balance between efficiency and the impact on competition (Putra et al., 2022). Even if there is no contract between competitors, the use of the same software can be an issue if it is accompanied by identical and widely known standard settings that give rise to stable price uniformity. In normative analysis, price uniformity is not sufficient to conclude a violation, as certain competitive markets can indeed display similar prices. Uniformity accompanied by automatic disciplinary mechanisms, such as algorithms that punish sellers who lower prices by triggering simultaneous price drops and then returning to high levels, can be seen as a signal that price competition is being systematically suppressed. This is where Article 5 acts as a safeguard to prevent pricing innovations from turning into coordinated schemes that stifle competition.

Article 11 of Law Number 5 of 1999 prohibits agreements between competing business entities that intend to influence prices by regulating the production and/or marketing of goods and/or services, which may result in monopolistic practices and/or unfair business competition. In e-commerce, “marketing” is no longer limited to physical distribution, but also includes catalog management, automated promotions, auction-based advertising, bundling arrangements, and availability control through inventory management and fulfillment. Dynamic pricing can be an instrument that binds marketing arrangements between competitors if algorithms are aligned to maintain certain price levels, regulate discount cycles, or divide promotional areas so as not to attack each other. For example, two or more large sellers agree on a rule that discounts are only activated at certain hours, while at other hours prices will follow a common benchmark to maintain margins. If these rules are automated through the same system, then the element of “agreement to influence prices” through marketing arrangements can be fulfilled, because it is not the device that is prohibited, but rather the agreement that suppresses competition. The normative test focuses on the purpose and consequences, namely whether the marketing arrangement weakens price and promotional competition, reduces consumer choice, or makes it difficult for other businesses to compete fairly.

In Article 11, evidence can move from a pattern of behavior to an inference of agreement if there are additional rational indications. In e-commerce, additional evidence may include similarities in vendor pricing and deliberately standardized configurations, similarities in pricing change schedules that are too precise without operational justification, or similarities in algorithmic responses to market events that should cause variation. Normative assessments should also examine whether there are mechanisms that reduce incentives to deviate from collective pricing patterns. Algorithms can be designed to maximize long-term profits by avoiding price wars, for example by raising prices again immediately after a price reduction triggers a competitor's response. If this design is applied uniformly based on an agreement, Article 11 can be used to assess agreements that affect prices through digital marketing arrangements. If the designs are born from the internal policies of each business without coordination, Article 11 will be difficult to apply because the element of agreements between competitors remains key. The legal qualification in Article 11 requires separating parallelism arising from market structure from parallelism arising from agreements that trap the market into specific pricing patterns.

Article 19 of Law Number 5 of 1999 regulates the prohibition for business actors to engage in actions that could result in monopolistic practices and/or unfair business competition, including rejecting or obstructing certain business actors, limiting distribution or sales, and engaging in discriminatory practices against certain business actors. In dynamic pricing, Article 19 is relevant when business actors in a strong position use algorithms as a tool for exclusion, for example through predatory pricing that is very selectively targeted at certain segments or regions, then raising prices after competitors weaken. Algorithms enable precise price reductions, for example, only for new users, only in certain areas, or only at certain times that are peak hours for competitors. Normatively, such actions can be understood as a form of obstructing or eliminating opportunities to compete, because price pressure is directed at breaking the competitors' vitality, not at competing efficiently. This exclusive action also reflects a broader failure of business ethics, as can be observed in the importance of ethical foundations for creating sustainable business performance and relationships (Putra et al., 2022). Article 19 may also intersect with discrimination against other business actors in the market chain, for example, when marketplaces or technology vendors provide pricing facilities that benefit certain groups, thereby preventing other actors from obtaining equivalent input prices or promotional access. Article 19 thus shifts the focus of analysis from “price agreements” to “exclusive behavior” that has the effect of closing access or suppressing competition.

The issue of coordinated behavior, often referred to as tacit collusion, poses a challenge because coordination can be established through mechanisms of monitoring and repeated responses without explicit communication. Although the term originates from economic discourse and competition policy, its legal assessment in Indonesia must still be based on the elements required by Law No. 5 of 1999 and its enforcement practices. Dynamic pricing can create a market that appears to be actively moving, but is actually stable at a certain price level because each business operator ties its algorithm to competitors' price signals. Normatively, two things need to be separated. First, reasonable competitive adaptation,

where business actors observe public prices and adjust to remain attractive. Second, designs that deliberately reduce competition uncertainty, such as permanently embedding a "follow the price leader" rule or embedding an automatic retaliation rule against discounts. If such designs arise from an agreement, then Article 5 or Article 11 may be applied. If the design arises without an agreement, enforcement will be more complicated, but the KPPU can still assess whether there are other prohibited behaviors, including exclusive practices or abuse of market power under other provisions, as long as the elements of the offense are fulfilled. This means that the term tacit collusion helps to identify risks, but the legal qualification must remain faithful to the elements of the article.

In the e-commerce space, the rule of reason is commonly used when a practice has the potential for efficiency gains as well as competition risks. Dynamic pricing is often justified as a way to allocate goods efficiently, reduce stockouts, and adjust prices to changes in demand. In assessing the rule of reason, the legal question is whether the practice actually enhances legitimate efficiency and whether those benefits are achieved without means that suppress competition. If an algorithm raises prices when demand is high, this can be understood as a market mechanism. The algorithm is designed so that sellers always avoid lowering prices below a certain threshold agreed upon or recommended by the technology provider serving many competitors, then the efficiency benefits are no longer neutral because the means used reduce price competition. For KPPU, this kind of assessment requires testing market structure, price transparency, degree of concentration, and price stability over a certain period. From a normative legal perspective, the rule of reason directs analysis toward proving a causal relationship between algorithm design and reduced competition, rather than assuming that all use of AI is problematic. Legal qualifications become more precise when efficiency is described as a testable fact, rather than a marketing claim.

The authority of KPPU as the authority that enforces Law No. 5 of 1999 helps determine how dynamic pricing is qualified. KPPU regulations regarding case handling procedures are procedural instruments to ensure that investigations are conducted fairly, including the investigation stage, preliminary examination, further examination, evidence, and decisions. In algorithm cases, evidence may include internal pricing policies, contracts with pricing vendors, parameter documentation, price change logs, and business communications related to price stabilization objectives. Normatively, the biggest challenge is translating technical artifacts into "legal facts" that are relevant to the elements of the article, so that the evidence procedure must facilitate expert testing and examination of electronic documents. The KPPU guidelines on the assessment of pricing agreements serve as interpretive guidelines for reading the elements of the agreement and indicators of violations (Hartono et al., 2021). With these guidelines, the assessment does not stop at price uniformity, but also assesses additional indicators such as the similarity of the timing of changes, disciplinary mechanisms, access to sensitive information, and market structures that support coordination. Since users request that every regulation mentioned be reviewed, KPPU regulations are understood as supporting procedural and interpretative legal certainty, so that enforcement does not depend on intuition, but on traceable examination steps.

Law No. 11 of 2008 on Electronic Information and Transactions and its amendments add another layer of obligation when dynamic pricing is implemented through electronic systems. Although the ITE Law is not competition law, it affects how businesses conduct transactions, provide information, and maintain system accountability. From an antitrust legal perspective, the ITE Law is relevant because proving competitive practices in e-commerce often relies on electronic information and documents, including transaction records, system logs, and price change records. The validity, integrity, and reliability of the system are prerequisites for such evidence to be used and tested. If dynamic pricing mechanisms are hidden so that consumers do not obtain proper information about how prices are formed, there is a risk of disputes in the realm of consumer protection and the potential for an assessment that the market practices that occur are unfair. At this point, information disclosure is not merely a matter of business ethics, but an element that influences the assessment of whether the market is functioning fairly or being misled by system design. Therefore, the validity and enforceability of electronic contracts governing these dynamic transactions are a crucial foundation that helps determine legal protection in the digital ecosystem (Sulaiman et al., 2023). Competition qualifications do focus on the relationship between business actors, but the quality of information in electronic transactions can influence the evaluation of the impact on consumers, especially when prices are personalized, difficult to detect, and potentially obscure consumers' ability to compare.

Government Regulation No. 71 of 2019 concerning the Implementation of Electronic Systems and Transactions clarifies the obligations of electronic system operators to ensure reliable, secure, and responsible systems. In dynamic pricing, this PP is relevant because pricing algorithms operate as part of a system that processes data inputs and generates price outputs that bind consumers at checkout. If the system is managed without good governance, for example, price change logs are not stored, parameter access is not audited, or configuration changes are not documented, then businesses will find it difficult to show that prices are formed independently (Krahel & Titera, 2015). From an antitrust perspective, this audit difficulty weakens the ability to distinguish between reasonable competitive adjustments and covert coordination. PP 71/2019 is also important for marketplace platforms that provide infrastructure for many sellers, as platforms can set price recommendation features, repricing tools, or competitor analytics. If a platform provides such features, it must manage the system responsibly, including controlling access, recording activities, and securing data.

Normatively, orderly system governance supports competition law enforcement because it facilitates fact-finding, while also providing clearer boundaries regarding who controls the parameters that affect prices.

Government Regulation No. 80 of 2019 concerning Electronic System Trading imposes certain obligations on PMSE business actors regarding information, advertising, offers, and transactions. For dynamic pricing, this PP is important because it emphasizes the principle of transparency in trading conditions, including price and cost information, so that consumers can make reasonable decisions. If prices change based on time or availability, this information can be conveyed as part of the pricing policy, for example, "prices are subject to change at any time" accompanied by an explanation that is not misleading. If prices change based on user profiles or behavior, the question of appropriateness becomes more acute because consumers may experience different prices without any understandable reason. Normatively, such practices may trigger an assessment as unfair trade practices, even though the main issue of this study is antitrust. The link between the two lies in market outcomes: if price personalization reduces consumers' ability to compare, then competitive pressure among businesses may weaken. In this context, studies on management strategies based on consumer reviews become relevant, as consumer feedback can counterbalance non-transparent pricing practices and influence product competitiveness (Negara et al., 2021). PP 80/2019 also touches on the role of platforms as trade facilitators, which is relevant when platforms provide automated pricing tools that are used by many sellers. If such features encourage price uniformity or direct sellers toward the same benchmarks, the potential for competition issues increases, so that PMSE information and governance obligations need to be read in line with the prohibition on price coordination.

Law No. 8 of 1999 on Consumer Protection complements the analysis because dynamic pricing may interfere with consumers' rights to accurate, clear, and honest information and to be treated fairly. Although the Consumer Protection Law does not regulate cartels, it influences the assessment of the fairness of market practices, especially when prices change rapidly and consumers find it difficult to understand the basis for the changes. If businesses conceal their price personalization mechanisms, consumers may feel deceived because the prices displayed are not "general" prices, but rather prices set based on specific categories that are not disclosed. Normatively, practices that undermine transparency can exacerbate antitrust concerns if, at the same time, the market is moving toward price uniformity among competitors. In such circumstances, consumers lose two things at once: the ability to compare prices and the benefits of price competition. The Consumer Protection Law also provides a basis for monitoring standard clauses that are detrimental to consumers, such as clauses that give businesses the unilateral right to change prices after consumers have agreed to a purchase. If such clauses are used to cover up extreme automatic price changes, they could potentially be challenged. The legal qualification of fair dynamic pricing therefore requires regular price information, certainty at the transaction stage, and fair treatment of consumers, as a fair competitive market depends on reliable information.

The legal qualification of dynamic pricing in e-commerce under Indonesia's competition law regime can be formulated as follows. The practice of automatic pricing is essentially legal if it is an independent decision made by each business actor, with parameters set for reasonable internal purposes and without agreement with competitors. The risk of violation increases when there is an explicit or implied agreement on price benchmarks, the use of the same software accompanied by core configuration alignment, or marketing arrangements aimed at maintaining prices at certain patterns, so that the elements of Article 5 and Article 11 of Law Number 5 of 1999 have the potential to be fulfilled. Another risk arises when market-powerful businesses use algorithms to exclude competitors, discriminate against certain businesses, or engage in targeted predatory pricing, thereby potentially triggering Article 19. At the same time, the ITE Law, PP 71/2019, PP 80/2019, and the Consumer Protection Law establish standards for the governance of transaction systems and information that affect the traceability of evidence, system reliability, and fair treatment of consumers. By combining the interpretation of the elements of the article and electronic system governance, normative analysis can distinguish legitimate pricing innovations from price coordination schemes that suppress competition.

Accountability Construction for Pricing Algorithms in the E-Commerce Business Chain

The responsibility of business actors for the output of automatic pricing algorithms in e-commerce needs to be based on the fundamental principle that business decisions delegated to technology remain the decisions of business actors (Gerlick & Liozu, 2020). Algorithms are not legal subjects, so the market consequences arising from the design, selection, purchase, training, and application of algorithms are attached to the party that operates or orders their use. Under Law No. 5 of 1999, business actors are prohibited from creating market structures that distort competition through agreements or certain behaviors, so the use of automated systems cannot be used as a reason to absolve responsibility. Responsible and ethical business practices in the use of technology and data, including for managerial decision-making, are the foundation of broader corporate accountability (Ali & Darmawan, 2023). The appropriate liability framework must map the chain of control, namely who selects the optimization objectives, who sets the parameters, who determines the source of competitor data, and who approves pricing policies within the organization. The decision maker can be the board of directors, commercial manager, data team, or e-commerce unit, but internal structural differences do not change the fact that the company as a business entity is responsible for its market behavior. From a normative analysis perspective, accountability can be drawn through the concept of business intent as reflected in decisions to adopt certain systems, activate certain features, ignore risk warnings, or allow configurations that encourage anti-competitive outcomes.

Article 5 of Law Number 5 of 1999 prohibits direct or indirect price fixing agreements. In the case of algorithms, the liability of business actors is usually tested on two levels. The first level is behavioral, namely price outputs that show uniformity or pricing patterns that systematically follow competitors' benchmarks. The second layer is the decision layer, which is whether there is an agreement, communication, or joint arrangement that causes the systems in several companies to work towards the same price point. The businesses are liable if there is evidence that they have harmonized configurations, agreed on lower or upper limit parameters, agreed on a list of products that must be "stable," or appointed the same vendor with instructions to ensure uniform results. Even when agreements are made through third parties, such as pricing vendors offering "market-aligned prices," responsibility remains with the business actor because they approved the mechanism as a strategy. The defense that "the algorithm works on its own" does not break the legal causal link if the choice of system, features, and inputs are determined by the business operator The construction of liability in Article 5 thus encourages companies to assess the risk of hidden agreements through technology procurement decisions, service agreements, and configuration governance.

Article 11 of Law Number 5 of 1999 prohibits agreements that intend to influence prices by regulating the production or marketing of goods and services. In the e-commerce chain, marketing arrangements can be realized through automatic promotion calendars, discount quota arrangements, availability restrictions, bundling arrangements, and pricing linked to promotional programs. Businesses are liable if algorithms are used as instruments to implement joint arrangements on when prices are lowered, how much discount is given, and when prices are restored, because such patterns can reduce the intensity of promotional competition. Technology vendors are relevant as parties that provide tools and arrangement schemes, but their status in antitrust assessments depends on their degree of involvement. If vendors merely sell general software, they are more appropriately viewed as tool providers. If the vendor coordinates rules, suggests the same configuration to competitors, centrally manages parameters, or facilitates the exchange of sensitive information, then the vendor can be positioned as a party that contributes to marketing arrangements that affect prices. Marketplaces may also fall under the analysis of Article 11 if they provide mass promotion features that encourage sellers to follow certain patterns that eliminate price differences, such as setting uniform discount benchmarks as a condition for visibility. Responsibility must still be carefully determined through mapping of active actions and appropriate knowledge.

Article 19 of Law No. 5 of 1999, which covers the prohibition of actions that could result in monopolistic practices or unfair business competition, is relevant to the construction of liability when algorithms are used as a means of exclusion. In e-commerce, exclusion can arise through selectively lowering prices in segments that are the basis of competitors, through price differentiation between regions that closes opportunities for local competitors, or through price arrangements that require the purchase of complementary products that lock in consumers. Exclusive algorithm outputs often appear to be the result of automatic calculations, but business actors remain liable because they set the objectives and tolerance levels for their aggressive strategies, such as targets to "dominate a category" within a certain period of time. The legal framework for preventing monopolistic practices that harm businesses, including SMEs, provides an important context for analyzing these exclusive practices (Indarto et al., 2023). If a business has market power, then the use of algorithms to suppress small competitors through deadly pricing patterns can be considered an act that hinders certain business actors (Kurniasari & Rahman, 2022). In the chain of responsibility, technology vendors may be questioned if they offer features that are designed from the outset to systematically target specific competitors, for example, through competitor price mapping that enables automatic undercutting practices on the same product (Autorité de la concurrence & Bundeskartellamt, 2016). Marketplace platforms are also relevant from a competition law perspective if they provide tools or algorithms that structurally favor certain sellers and facilitate targeted price reductions that potentially close off access to the market for other businesses (Gal, 2016). This type of liability construction requires a factual reading of the program design, the incentive structure established by the platform, and its exclusionary impact on the dynamics of competition in the digital market (Elhauge, 2016).

The KPPU plays a central role in establishing a fair and measurable accountability framework, as proving algorithmic cases requires testing electronic documents, logs, and configurations. KPPU regulations on case handling procedures provide a procedural foundation that enables investigations and examinations to access relevant evidence without overstepping boundaries. In cases involving automatic pricing, the KPPU needs to assess who controls the system, who can change the parameters, and how internal policies guide the use of the system. The accountability of businesses can be linked to the concept of control, namely the ability to determine or influence pricing behavior. If a company gives a vendor access to change the configuration, the company remains responsible because it has surrendered control through a contract. If a marketplace provides repricing tools and requires their use in order to obtain a certain display position, then the marketplace can be considered as a party contributing to market mechanisms, especially if it directs many sellers towards uniform recommendations. KPPU guidelines on agreement assessment and assessment approaches that consider market effects provide scope for analysis that combines evidence of behavior and evidence of control structures. With this procedural framework and guidelines, accountability does not stop at price figures, but is directed at the decisions that shape those figures.

Law No. 11 of 2008 concerning Electronic Information and Transactions and its amendments affect the construction of accountability through two channels. The first channel is the channel of system accountability and the

reliability of electronic information as evidence, because algorithm behavior is recorded in electronic systems. The businesses that implement dynamic pricing must be able to show the trail of price changes, the reasons for changes based on system rules, and the parties that made the configuration changes. If a company does not maintain the integrity of its logs and access controls, it bears the risk of evidence that is detrimental to itself, because the inability to explain system behavior can be interpreted as a governance negligence that increases the risk of violations. The second pathway is the information obligation pathway in electronic transactions, especially when platforms or sellers present rapidly changing or personalized prices. If the pricing mechanism is structured in such a way that consumers do not obtain appropriate information about how prices are formed, then issues of transaction propriety arise that may intersect with competition assessments, because healthy markets rely on comparable price information. In online transactions, consumer protection against unclear information or misleading practices is a prerequisite for creating a healthy and fair e-commerce ecosystem (Ali et al., 2024). Marketplaces that provide transaction infrastructure also cannot escape their obligation to maintain a responsible system. The construction of responsibility at the platform level can move from “mere intermediary” to “system operator” with technical and procedural control obligations.

Government Regulation No. 71 of 2019 concerning the Implementation of Electronic Systems and Transactions reinforces the obligation of electronic system operators to manage systems reliably and securely. For the construction of antitrust liability, this PP is important because it provides a normative basis for assessing internal governance obligations over pricing systems. Businesses that rely on pricing algorithms must have access controls, separation of authority, change controls, and activity logging. When allegations of violations arise, a company's ability to present an audit trail becomes an indicator of whether pricing behavior is an uncontrolled output or the result of traceable decisions. For technology vendors, PP 71/2019 is relevant when vendors act as system operators for their clients, for example, through cloud-based services that process pricing data and send recommendations or execute pricing changes. If a vendor operates a system, it bears the responsibility for its operation, including security and traceability. In the case of marketplaces, this regulation is also relevant because marketplaces are system operators that facilitate massive transactions, so the design of automatic pricing features and API access settings must meet auditable operating standards. In antitrust assessments, PP 71/2019 helps build the argument that system governance failures can increase the risk of price coordination, as uncontrolled systems can easily become channels for the standardization of parameters across businesses.

Government Regulation No. 80 of 2019 concerning Electronic System Trading emphasizes the obligations of PMSE businesses regarding information and trading procedures. In terms of liability, this PP serves as a reference for assessing the position of marketplaces and sellers as actors in the PMSE ecosystem. If a marketplace provides a widely used automatic pricing feature, then the marketplace cannot simply claim technical neutrality, because it designs rules that affect how prices are formed and displayed. For example, if a marketplace implements a policy that encourages sellers to follow “recommended prices” in order to gain visibility, then that policy can create incentives that encourage uniformity. E-commerce platforms, as key facilitators, bear an important responsibility to ensure that transactions run smoothly, including in terms of product returns, which also reflects their commitment to consumer protection (Anugroh et al., 2023). The marketplace’s responsibility can arise in the form of an obligation to ensure that platform policies do not become a means of price coordination, especially if the recommendations are compiled from competitor price data centralized by the platform. For sellers, PP 80/2019 reinforces the obligation to present pricing information accurately and clearly, so that the use of algorithms must be accompanied by price display governance, such as when prices are binding, how cancellations are handled in the event of changes, and how additional costs are displayed. The relationship between PMSE and antitrust norms lies in market quality: if price information is chaotic or misleading, consumers find it difficult to compare, thereby weakening competitive pressure. PP 80/2019 provides a framework for assessing responsibility at the level of digital trade design, not just on final price behavior.

Law No. 8 of 1999 on Consumer Protection provides a dimension of accountability attached to automatic pricing practices, particularly in relation to consumers' rights to information and fair treatment. In the case of algorithms, one risk that often arises is unexplained price personalization, where different consumers see different prices for the same item. From a competition perspective, personalization can alter the structure of competition because consumers lose a uniform point of comparison. From a consumer protection perspective, hidden personalization can be considered unclear or misleading information. The construction of liability here is layered: sellers are liable because they choose to implement personalization and agree to the way prices are displayed; technology vendors can be held liable in the realm of contracts and professional standards if they design systems that encourage deceptive practices; while marketplaces are liable if they provide price personalization features or allow such practices without oversight mechanisms even though they control the means of display and transaction rules. The quality of interaction and service in online transactions, which can influence consumer satisfaction and repurchase intention, is also affected by clarity and fairness in pricing (Darmawan, 2022; Fared et al., 2021). The Consumer Protection Law is also relevant when price changes occur after consumers have made a purchase, as this affects transaction certainty and prohibits harmful practices. In antitrust assessments, unclear information can exacerbate consumer losses when the market experiences coordination, as consumers are trapped at high prices without the ability to compare. This law therefore emphasizes that price algorithm regulations must be accompanied by accountable information governance.

The multi-level accountability structure in antitrust assessments can be formulated through three categories of roles, namely decision controllers, means providers, and ecosystem regulators. Sellers are typically categorized as decision controllers because they determine whether algorithms are used, for what products, for what purposes, and with what restrictions. Technology vendors usually fall into the category of means providers, but can shift to decision controllers if they actively manage parameters, run services that execute price changes, or orchestrate the same recommendations to many competitors. Marketplaces fall into the category of ecosystem regulators because they set the rules for visibility, costs, promotions, and features that shape price incentives. Under Law No. 5 of 1999, this category helps determine who can be held liable for violations of Articles 5, 11, or 19. If there is a price-fixing agreement, the seller remains the primary subject. If facilitation is provided through vendors or platforms, the assessment may extend to their involvement, especially if there are active actions or knowledge that is relevant to anti-competitive objectives. Within the framework of the ITE Law, PP 71/2019, and PP 80/2019, this category helps assess system governance obligations, audit trails, and transaction transparency. With this mapping, accountability is not applied uniformly, but the principle that technology does not negate legal obligations is maintained.

The rule of reason principle used in assessing certain practices encourages the construction of liability based on an assessment of objectives, methods, and consequences. In dynamic pricing, efficiency can occur, for example, in the form of reduced pricing costs or better stock adjustments. Antitrust liability arises, however, when the means employed create risks of coordination or exclusion. At the seller level, the rule of reason requires proof that the policy of using algorithms is designed for efficiency and accompanied by internal restrictions that prevent uniformity, such as prohibitions on the use of coordinative signal inputs, prohibitions on features that restore collective pricing, or restrictions on the use of uniform vendor recommendations. At the vendor level, the rule of reason requires testing whether product design promotes competition or reduces competition through homogeneous templates. At the marketplace level, the rule of reason requires an assessment of whether platform rules promote fair competition or create incentives that steer sellers toward a single benchmark. The KPPU, with case handling procedures regulated in its internal regulations, needs to base this assessment on testable evidence, such as feature rules, service contracts, promotion policies, and price change data. Such a construction of liability helps distinguish legitimate innovation from designs that reduce competition.

Normatively, antitrust risk prevention through algorithm governance is directly related to accountability, as the ability to control and explain the system is the basis for a reasonable defense. Businesses that choose pricing algorithms need to ensure that contracts with vendors set limits on vendor authority, documentation obligations for changes, audit access guarantees, and prohibitions on using client data to align recommendations across competitors. Marketplaces need to ensure that price recommendation features and repricing tools do not encourage a single benchmark that suppresses price variation, and need to provide a complaint mechanism that allows sellers to report suspected features that encourage uniformity. The application of the principle of good faith in the implementation of contracts, including contracts with technology vendors, is a crucial element in ensuring transparency and fairness in these business relationships (Irfansyah et al., 2024). These obligations can be linked to the ITE Law, Government Regulation 71/2019, and Government Regulation 80/2019 regarding the implementation of responsible electronic trading systems and practices, as well as the Consumer Protection Law regarding clear information for consumers. Within the framework of Law 5/1999, this governance is not merely administrative compliance, but part of proving that the company acts independently and does not direct the system towards coordination. When internal controls are absent, accountability is easier to draw because businesses are considered to have allowed the system to run without proper supervision. Conversely, tight controls do not automatically exonerate, but they do provide a stronger basis for arguing that the price outcome is the result of legitimate competition.

The final assessment of the construction of liability for the output of automatic pricing algorithms in e-commerce needs to emphasize that the main subject remains the business actors who utilize technology to compete. Law No. 5 of 1999 provides a gateway to liability through the prohibition of price-fixing agreements in Article 5, the prohibition of production or marketing arrangements that affect prices in Article 11, and the prohibition of exclusive actions that lead to monopolistic practices or unfair competition in Article 19. Technology vendors and marketplace platforms have real relevance when they act as active facilitators, parameter controllers, or incentive designers that close the space for price competition. The ITE Law and its amendments, PP 71/2019, and PP 80/2019 strengthen the accountability dimension of electronic systems and digital trade governance, which determine the traceability of evidence and the appropriateness of price display. The Consumer Protection Law affirms consumers' rights to information and fair treatment, which can strengthen the analysis of losses when automatic pricing practices close consumers' ability to compare. With a construction based on the chain of control and degree of involvement, antitrust enforcement can assess responsibility proportionally without giving room for the defense that technology is the “guilty” party.

CONCLUSIONS

Automatic pricing (dynamic pricing) in e-commerce can be considered legal under the business competition regime as long as it is established through independent business decisions and does not rely on agreements, facilitation,

or alignment of parameters that suppress price variation. The qualifications for violations in Law No. 5 of 1999 remain based on the elements of the article, so the focus of the examination is directed at coordinative relationships, the design of price response mechanisms, and exclusive actions that lead to monopolistic practices or unfair business competition. In the chain of actors, the main responsibility lies with business actors because the selection of vendors, the setting of optimization objectives, and the arrangement of data sources are business decisions, while technology vendors and marketplaces are relevant when they actively direct configuration, manage parameters, or shape ecosystem incentives that encourage uniformity.

In practical terms, companies need to organize their pricing algorithms as part of their compliance with business competition and electronic transaction regulations. Strengthening internal controls should focus on controlling access and parameter changes, documenting system objectives and limitations, and tracking audit trails in line with electronic system and transaction obligations. For marketplaces, the design of price recommendation features, repricing tools, and visibility rules needs to be tested to ensure they do not promote a single benchmark that stifles competition. For technology vendors, product and service designs need to be maintained so as not to orchestrate the behavior of competing clients, while still providing room for auditing and data usage restrictions. In the consumer realm, price transparency and certainty at the transaction stage need to be maintained so that pricing can still be tested and understood appropriately.

The KPPU needs to strengthen its digital evidence-based inspection practices with proportional data request standards, the use of expert inspections of algorithm configurations, and assessments that link price outputs to system control structures Businesses are advised to implement risk assessments prior to vendor pricing procurement, to emphasize contract clauses prohibiting coordination facilitation, and to establish incident response procedures in the event that the system shows patterns of unreasonable pricing. Marketplaces are advised to provide feature settings that allow for price variation and provide reporting channels for sellers when platform features are suspected of directing uniformity. Vendors are advised to provide auditable technical documentation and configuration options that prevent the use of pricing rules that resemble agreements.

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