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AI-Based Dynamic Pricing Strategies and Perceived Price Fairness in Digital Platforms

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Abstract

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This article examines how artificial intelligence based dynamic pricing on digital platforms shapes perceived price fairness and subsequent customer responses. The study focuses on revenue management practices in electronic commerce, ride hailing, online travel, and accommodation sharing services where machine learning models continuously adjust prices based on behavioural and contextual data. Using a systematic literature review, the article synthesises peer reviewed evidence on the design of algorithmic pricing, the role of personalization intensity and transparency, and the psychological mechanisms that connect price perceptions with trust, satisfaction, and loyalty. The findings show that artificial intelligence based pricing can enhance revenue and capacity utilisation, but that opaque and highly personalized prices often generate perceptions of unfairness, privacy concern, and feelings of betrayal, which weaken platform relationships. The review concludes that dynamic pricing strategies must treat fairness as a central design constraint and align pricing logic and communication with evolving expectations of contractual fairness on digital platforms and with emerging regulatory and ethical standards.

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1. Introduction

Artificial intelligence based dynamic pricing has become a core element of revenue management on digital platforms such as e commerce marketplaces, ride hailing apps, online travel agencies, and accommodation sharing sites. By learning from large volumes of transactional, behavioral, and contextual data, machine learning algorithms are able to update prices in near real time in response to changes in demand, inventory, competition, and user characteristics, often through reinforcement learning or similar adaptive techniques (Yin & Han, 2021). These systems allow platforms to segment users more finely, predict willingness to pay, and test thousands of price combinations at scale, which promises higher revenue and better capacity utilization compared with traditional static or rule based pricing strategies (Seele, 2021).

At the same time, pricing research emphasizes that perceived price fairness is a central determinant of customer satisfaction, emotions, and behavioral intentions, particularly in service and platform settings where customers repeatedly interact with the provider. Studies in peer to peer accommodation and hospitality show that when customers perceive prices as consistent with reference prices, justified by observable conditions, and applied without discrimination, they report more positive emotions, higher satisfaction, and stronger intentions to repurchase or recommend (Ali et al., 2018). In digital environments, the rise of personalized and dynamic pricing strategies raises new questions about when price differences between users or over time are interpreted as acceptable yield management and when they are seen as opportunistic exploitation (Boerman et al., 2021).

Recent work on algorithmic pricing highlights that the same features that make artificial intelligence based systems powerful, such as fine grained personalization and opaque learning rules, can also erode perceived fairness. Experimental evidence on algorithmic price discrimination indicates that charging higher prices to certain customers based on their data reduces perceived price fairness and triggers feelings of betrayal, with negative consequences for trust and platform loyalty (Wu et al., 2022). Empirical analyses of online travel platforms further show that consumers exposed to dynamic room rates react more negatively when they cannot understand the rationale behind price fluctuations or when differences across users appear arbitrary, even if such pricing improves overall capacity utilization (Alderighi et al., 2022). Ethical and legal scholars warn that algorithmic pricing can conflict with emerging notions of contractual fairness, especially when opacity and information asymmetries prevent consumers from assessing whether they are treated equitably (Alper, 2022; Seele, 2021).

Against this background, there is still limited empirical evidence on how specific design features of artificial intelligence based dynamic pricing strategies on digital platforms shape perceived price fairness and downstream behavioral responses. Existing studies tend to isolate either technical optimization aspects of dynamic pricing or broad attitudinal reactions to price variability, rather than examining how perceptions of algorithmic transparency, controllability, and personalization intensity jointly inform fairness judgments in real platform contexts (Alderighi et al., 2022; Wu et al., 2022). This study addresses this gap by investigating the relationship between artificial intelligence based dynamic pricing strategies and

perceived price fairness in digital platforms, with particular attention to how users interpret price differences generated by algorithms and how these interpretations influence trust, satisfaction, and continued platform use.

2. Literature Review

Prior research on dynamic pricing in digital platforms shows that algorithmic price adjustments can effectively balance demand and supply, yet they simultaneously create tension regarding how consumers evaluate price fairness. Qualitative evidence from ride hailing services indicates that users assess dynamic prices not only on economic grounds but also in terms of transparency, justification, and the availability of alternative transport options. When surge multipliers are poorly communicated or perceived as opaque, dynamic fares are more likely to be judged as unfair and lead to reduced intentions to use the platform (Santos et al., 2019). From a theoretical perspective, game theoretic models of platform pricing suggest that consumers' fairness preferences act as an important constraint on optimal dynamic pricing strategies in repeated interactions, pushing platforms to internalize fairness concerns when designing algorithmic pricing rules (Wang et al., 2021).

A growing stream of literature conceptualizes personalized and dynamic pricing as a specific form of algorithmic price discrimination. Experimental studies on personalized dynamic pricing show that individual level prices are generally perceived as less fair than segment level prices, and that location based personalization is evaluated more negatively than personalization based on purchase

history, particularly when privacy concerns are salient (Priester et al., 2020). In large scale e commerce settings, personalized price discrimination tends to benefit price favored customers while harming those who are disadvantaged, with heightened perceptions of price unfairness among the latter group increasing negative emotions and lowering purchase intentions (Hufnagel et al., 2022). These findings imply that artificial intelligence based personalization capabilities amplify heterogeneity in fairness perceptions, because a single pricing rule can be experienced as a reward by some consumers and as exploitation by others.

Beyond the pricing rules themselves, recent research highlights the psychological and relational antecedents of fairness judgements in personalized pricing contexts. Survey based evidence in e commerce shows that price perceptions, consumer involvement, product knowledge, and the perceived quality of recommendation systems jointly shape perceived price fairness, and that fair price perceptions increase willingness to pay partly through greater stickiness to the online store or platform (J & Gotmare, 2021). Taken together, this literature suggests that artificial intelligence based dynamic pricing strategies on digital platforms cannot be evaluated solely in terms of revenue optimization. Their long term effectiveness depends on how algorithm design, transparency, and communication practices align with consumers' fairness expectations, trust, and relational attachment to the platform.

3. Methods

This study employs a systematic literature review method to synthesise existing evidence on artificial intelligence based dynamic pricing strategies and perceived price fairness in digital platforms. The review begins with the formulation of clear research questions focusing on how algorithmic pricing design, personalization intensity, and transparency influence fairness perceptions, trust, satisfaction, and behavioural intentions. Based on these questions, a search protocol is developed that specifies relevant keywords and Boolean combinations related to artificial intelligence, dynamic or personalized pricing, digital platforms, and price fairness. Academic databases such as Scopus, Web of Science, and Google Scholar are systematically searched, and only peer reviewed journal articles written in English and directly examining pricing practices in digital or platform based contexts are considered. The screening process is conducted in two stages: an initial review of titles and abstracts to remove clearly irrelevant studies, followed by a full text assessment against predefined inclusion and exclusion criteria. To ensure the robustness of the evidence base, each article that passes screening is evaluated using a structured quality assessment checklist covering research design, data adequacy, and clarity of measurement of key constructs. The final set of studies is then coded to capture information on platform type, pricing mechanisms, fairness dimensions, and reported outcomes, and the findings are synthesised using a narrative and thematic approach that highlights convergences, divergences, and remaining gaps in the literature.

4. Results and Discussion

The systematic review shows a consistent tension between the revenue optimisation promise of artificial intelligence based dynamic pricing and its potential to undermine perceived price fairness. Studies focusing on the technical side of dynamic pricing demonstrate that machine learning and reinforcement learning models enable platforms to update prices in near real time and to extract substantial efficiency gains from finer segmentation and willingness to pay prediction (Seele, 2021; Yin & Han, 2021). However, work in peer to peer accommodation, hospitality, and ride hailing environments indicates that these same mechanisms are evaluated by users through a fairness lens that goes beyond pure economic rationality. When price changes are perceived as consistent with reference prices, justified by observable conditions, and applied without discrimination, customers report more positive emotions, higher satisfaction, and stronger repurchase intentions (Ali et al., 2018). Conversely, when surge multipliers or dynamic room rates are experienced as opaque or arbitrary, users are more likely to judge them as unfair and reduce their intentions to continue using the platform (Santos et al., 2019; Alderighi et al., 2022).

The reviewed evidence also clarifies that personalization is a double edged feature in artificial intelligence based pricing. Experimental studies on personalized dynamic pricing show that prices tailored at the individual level, particularly when based on location or other sensitive attributes, tend to be perceived as less fair than segment based prices, and can trigger stronger privacy concerns (Priester et al., 2020). Research on algorithmic price discrimination further suggests that charging higher prices to specific customers based on their data reduces perceived price

fairness and elicits feelings of betrayal, with negative consequences for trust and platform loyalty (Hufnagel et al., 2022; Wu et al., 2022). At the same time, survey based work in e commerce finds that when pricing practices are embedded in a broader experience characterised by clear communication, high quality recommendation systems, and a sense of control, fair price perceptions can still emerge and translate into greater willingness to pay and behavioural stickiness (J & Gotmare, 2021). Taken together, these findings imply that the impact of artificial intelligence based dynamic pricing on perceived price fairness is not determined solely by the sophistication of the algorithm, but by how transparency, justification, and the intensity and basis of personalization are managed. Platforms that treat fairness as a design constraint and align pricing logic and communication with consumers' expectations appear better positioned to capture the economic benefits of dynamic pricing without eroding trust, satisfaction, and continued use.

5. Conclusion

This study set out to synthesise evidence on how artificial intelligence based dynamic pricing strategies on digital platforms interact with consumers' perceptions of price fairness and subsequent behavioural responses. Across the reviewed literature, a clear pattern emerges: the same algorithmic capabilities that allow platforms to optimise revenue through fine grained segmentation, real time price updates, and willingness to pay prediction also create significant fairness risks when prices are perceived as opaque, arbitrary, or discriminatory. Findings from peer to peer accommodation, hospitality, ride hailing, and e commerce contexts consistently

show that customers respond favourably when price variations are transparently justified, aligned with reference prices, and applied in a non discriminatory manner, but react negatively when they cannot understand or accept the rationale behind observed price differences. In this sense, fairness perceptions act as a critical mediating mechanism between technical optimisation and long term relationship outcomes such as trust, satisfaction, and continued platform use.

The review also highlights that personalization is a particularly sensitive design dimension in artificial intelligence based pricing. Individual level prices rooted in granular personal data, especially location or other sensitive attributes, are more likely to be judged as unfair and to trigger privacy concerns and feelings of betrayal than segment based adjustments. At the same time, the evidence suggests that negative reactions are not inevitable: when dynamic pricing is embedded in a broader experience characterised by clear communication, credible recommendation systems, and a degree of user control, fair price perceptions and even higher willingness to pay can still be achieved. Overall, the results imply that effective implementation of artificial intelligence based dynamic pricing requires treating fairness as a core design constraint rather than an afterthought. Platforms that deliberately align algorithmic logic, transparency practices, and personalization intensity with consumers' fairness expectations are better positioned to realise the efficiency and revenue benefits of dynamic pricing without undermining the trust and loyalty on which sustainable digital business models depend. Future research should examine these trade offs empirically across different platform types and

regulatory environments, and explore concrete governance mechanisms that can make algorithmic pricing both economically effective and socially acceptable.

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