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CONSUMER HARM IN THE AI ERA: ETHICAL AND ANTITRUST IMPLICATIONS OF AI-FACILITATED COLLUSION ON ONLINE MARKETPLACES

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Abstract: The digital economy is undergoing a profound transformation due to the rapid integration of artificial intelligence (AI) into online marketplaces. While AI promises unprecedented efficiencies, personalization, and innovation, it also brings novel risks especially concerning consumer welfare and competition. In India, where online commerce has grown dramatically and AI adoption is accelerating, the intersection of antitrust regulation, consumer protection, and algorithmic governance demands rigorous analysis. This paper explores how AI-facilitated collusion on digital platforms can harm consumers, evaluates India's current regulatory posture, compares it with global responses, and proposes policy and enforcement strategies to mitigate risk without stifling innovation.

Keywords: Artificial Intelligence, Online market, Collusion, Competition law, Consumer-harm, Regulation

1. Background: AI in Online Marketplaces

Over the last decade, online marketplaces have evolved from simple platforms facilitating buyer-seller matching to highly sophisticated ecosystems powered by AI. Machine learning models, reinforcement learning agents, and data-driven algorithms now drive dynamic pricing, inventory management, demand forecasting, and personalized recommendations. These capabilities create powerful efficiencies: platforms can optimize for supply chain logistics, reduce waste, and tailor experiences to individual users. Yet, these same tools can also enable opaque decision-making, pricing strategies that exploit consumer segments, and coordination across sellers via algorithmic behaviours.

The rapid expansion of artificial-intelligence (AI) technologies has substantially reshaped online marketplace operations. In retail, logistics and recommendation systems, firms increasingly deploy machine-learning algorithms to set prices, segment consumers, optimise supply-chains and personalise user-experience. According to one estimate, the global AI market is projected to grow from roughly USD 244 billion in 2024 to over USD 1 trillion by 2031.[1] In India, Competition Commission of India (CCI) has observed the domestic AI market expanding from US $7.84 billion in 2024 to a forecast US $31.94 billion by 2031.[2]

[1] Xingchen Xu, Stephanie Lee and Yong Tan, 'Algorithmic Collusion or Competition: the Role of Platforms' Recommender Systems' (2023) arXiv (pre-print) https://arxiv.org/abs/2309.14548 accessed 13 Nov 2024.
[2] 'Artificial Intelligence And The Competition Act, 2002: CCI's Market Study and the Architecture of Digital Competition' (Mondaq, 6 Oct 2024) https://www.mondaq.com/india/antitrust-eu competition/1689902/artificial-

In the context of online marketplaces this technological infusion has two major implications. First, algorithmic systems can enable more efficient matching between sellers and buyers, dynamic pricing, personalised offerings and improved logistics. Second, these same systems introduce novel risks of consumer harm such as pricing discrimination, hidden biases in recommendations, opacity of algorithmic decisions and new forms of market coordination. Within the Indian marketplace ecosystem where digital penetration is surging and online marketplaces already influence roughly 73 % of purchase decisions[3] the convergence of AI and digital platforms merits urgent scrutiny.

The interplay of AI and online marketplaces presents both opportunities for efficiency and innovation as well as significant consumer-protection and competition-law challenges.

2. Consumer Harm in the AI Era

In digital marketplaces powered by AI, consumer harm can manifest in several ways. First, price discrimination through algorithms may allow certain consumers to pay more than others for essentially identical goods or services, thereby eroding consumer surplus. Second, dynamic pricing and the opaque use of recommendation systems may reduce consumer choice or steer consumers towards less favourable options. Third, "dark-pattern" user-interface designs enabled by algorithms that Personalized user experience can mislead consumers, hide pricing surcharges or manipulate behavioural responses.

Conceptually, consumer harm in this context arises when the marketplace fails to deliver transparent, fair and contestable interactions. On online platforms, sellers and platforms can exploit information asymmetries, algorithmic complexity and behavioural biases. For instance, one Indian case study found that misleading discount claims (where the "marked price" is artificially inflated) significantly affect purchasing behaviour: customers perceived a selling price of ₹81 where the list price was ₹100.[4] This suggests that even standard discount signals can distort consumer perception. Empirical insight specific to India remains somewhat limited while studies of dark-patterns on Indian e-commerce platforms (based on surveys of 77 000+ consumers) found that 75 % of users reported hidden fees at checkout[5], the direct quantification of consumer welfare loss from AI facilitated collusion remains unpublished.

AI-driven processes on online marketplaces pose tangible risks of consumer harm via pricing opacity, behavioural manipulation and information asymmetry, empirical data for India exists in fragments but does not yet extend to full quantification of welfare loss.

3. AI-Facilitated Collusion: Mechanisms and Challenges

Traditional competition law frameworks conceive collusion as an agreement among firms to fix prices, allocate markets or restrict output. In the AI era, novel mechanisms emerge algorithms can learn tacitly

intelligence-and-the-competition-act-2002-ccis-market-study-and-the-architecture-of-digital-competition accessed 1 Nov 2024.

[3] Suneera Tandon, 'Online Marketplaces Influence 73% of Purchases: Deloitte-FICCI Report' Mint (20 Aug 2024) https://www.livemint.com/companies/digital-shopping-trends-india-online-marketplaces-11755686160657.html accessed 1 Nov 2024.

[4] Klaus Kraemer and others, 'Trapping Fake Discounts as Drivers of Real Revenues and Their Impact on Consumer's Behavior in India: A Case Study' (2019) MDPI Sustainability 11 4637.

[5] 'Dark Patterns Continue on eCommerce Marketplaces in India: Survey' LocalCircles (Oct 2024) https://www.localcircles.com/a/press/page/dark-patterns-ecommerce-survey accessed 1 Nov 2024.

to coordinate pricing without explicit human collusion, often through reinforcement learning strategies, feedback loops and monitoring of rivals' behaviour.[6]

On online marketplaces sellers may deploy AI-pricing bots that observe competitor prices and adjust in real time. Platform recommendation algorithms may reinforce higher price equilibria by favouring sellers who maintain higher margins.

In India, the CCI's recent market study on AI and competition reported that 37 % of surveyed AI-startups perceived a risk of "AI facilitated collusion", while 32 % flagged algorithmic price discrimination and 22% flagged predatory pricing concerns.[7] These findings suggest awareness of the phenomenon even if enforcement frameworks are still evolving. The key challenge for competition enforcement lies in proving intent or concerted behaviour when the coordination is embedded within algorithmic systems (also known as "black box" collusion). Regulators face difficulties in detecting and attributing algorithmic coordination to human action, interpreting data logs, identifying the pricing logic and intervening in real time.

The mechanisms for AI facilitated collusion differ markedly from traditional cartel models. The enforcement challenge is heightened by algorithmic opacity, dynamic pricing and the absence of classical human agreements.

4. India's Legal & Regulatory Framework

India's primary competition statute, the Competition Act, 2002 (amended by the Competition (Amendment) Act, 2023), grants the CCI authority to prohibit practices having an appreciable adverse effect on competition (AAEC) and to penalise cartels under Section 3 of the Competition Act. The CCI released a market study on "Artificial Intelligence and Competition" in October 2024.[8] That study underscores the need to consider algorithmic pricing, dynamic market behaviour and data driven platforms within the competition law lens. The study's terms include examination of key AI ecosystems, potential competition issues, use cases and regulatory frameworks.[9] The intersection of consumer protection and data regulation is also relevant. the Digital Personal Data Protection Act, 2023 and the Consumer Protection (E-Commerce) Rules, 2020 impose obligations on online marketplaces around transparency, unfair trade practices and data handling. For example, the 2020 Rules prohibit e-commerce entities from manipulating the price of goods or services offered on their platform to make "unreasonable profit".[10] Nonetheless, there is no explicit statutory provision in India that directly addresses algorithmic collusion or AI-mediated coordination among sellers.

[6] Gianluca Brero et al, 'Learning to Mitigate AI Collusion on Economic Platforms' (2022) arXiv https://arxiv.org/abs/2202.07106 accessed 1 Nov 2024.
[7] 'CCI Market Study on AI and Competition, ETLegalWorld' (6 Oct 2024) https://legal.economictimes.indiatimes.com/news/regulators/cci-market-study-on-ai-and-competition/124345141 accessed 13 Nov 2024.
[8] 'Algorithms and Collusion: Bridging the Gap with Alternative Tools' IIC 56 463.
[9] 'Cartels in the Algorithmic Age – India's Legal Framework for Hub-and-Spoke Collusion' (2024) Indian Journal of Law and Legal Research https://www.ijllr.com/post/cartels-in-the-algorithmic-age-india's-legal-framework-for-hub-and-spoke-collusion.pdf accessed 13 Nov 2024.
[10] 'Leniency Programmes vs Algorithmic Collusion – An Equal Fight?' (2024) Indian Journal of Law and Legal Research https://www.ijllr.com/post/leniency-programmes-vs-algorithmic-collusion-an-equal-fight.pdf accessed 13 Nov 2024.

India's regulatory framework provides a foundation for addressing competition and consumer-protection issues, but lacks specific provisions tailored to AI facilitated collusion. The CCI's study reflects recognition of this gap.

5. Ethical Dimensions and Global Comparators

Beyond legal enforcement, ethical considerations are intrinsic to AI's deployment in online marketplaces. Algorithmic transparency, fairness, explainability and algorithmic bias all demand normative attention. When algorithms decide pricing or allocate visibility of offerings on platforms, consumers may experience discrimination for example, higher-prices for certain segments based on their data profile or exclusion (if recommendation engines steer them away from competitive offers). Ethically, this raises questions about autonomy, informed consent and equitable treatment of users.

Globally, regulators are increasingly scrutinising algorithmic collusion. In the European Union, the European Commission has explored algorithmic pricing within its antitrust framework; in the United States, the Federal Trade Commission has raised concerns about algorithmic coordination and platform dominance.[11] Scholarly work emphasises that algorithm driven coordination demands new regulatory tools such as model-explainability, automated audit trails, algorithmic audit regimes and real time monitoring.[12] For India, lessons may be drawn from global practices such as ex-ante algorithmic oversight, transparency obligations for platforms, and regulatory sandboxes for digital-pricing systems.

Ethical considerations of AI-mediated markets transcend legal enforcement. Global comparators highlight the need for anticipatory and algorithm-aware policy design, which India can adapt.

6. The Impact of AI-Facilitated Collusion on Consumers in India

The entry of AI into pricing, recommendation systems and marketplace orchestration can significantly affect consumers in India. First, when algorithmic collusion elevates prices across sellers on a platform, consumer surplus is reduced and choice is constrained. Although precise quantification for India is scarce, international modelling demonstrates how reinforcement learning pricing bots can converge to higher collusive price levels absent intervention.[13] Second, consumers in India appear exposed to interface design manipulations, as in one survey of more than 77 000 Indian consumers across 334 districts found that 75 % experienced hidden fees at checkout (a "drip pricing" practice) on e-commerce marketplaces.[14]The combination of dynamic pricing and lack of transparency disproportionately affects less digitally sophisticated consumer groups, including rural users or first-time online buyers. Third, innovation and entry can be stymied when dominant platforms or sellers coordinate via AI becomes a

[11] Maria Giacalone, 'Algorithmic Collusion: Corporate Accountability and the Application of Art. 101 TFEU' (European Papers, Interest Insight) https://www.europeanpapers.eu/europeanforum/algorithmic-collusion-corporate-accountability-application-art-101-tfeu accessed 14 Nov 2024.
[12] Vincenzo Denicolò, E. Calvano, G. Calzolari & S. Pastorello, 'Artificial Intelligence, Algorithmic Pricing and Collusion' (Paper presented at FTC Micro Conference, Washington DC, November 2019) https://www.ftc.gov/system/files/documents/public_events/1494697/2_vincenzo_denicolo.pdf accessed 14 Nov 2024.
[13] US Federal Trade Commission, 'Algorithms and Collusion' (Note by the United States, OECD) DAF/COMP/WD(2017)41 https://www.ftc.gov/system/files/attachments/us-submissions-oecd-other-international-competition-fora/algorithms.pdf accessed 14 Nov 2024.
[14] Connor Douglas, Foster Provost & Arun Sundararajan, 'Naive Algorithmic Collusion: When Do Bandit Learners Cooperate and When Do They Compete?' (2024) *arXiv* https://arxiv.org/abs/2411.16574 accessed 14 Nov 2024.

de facto barrier to competition, this indirectly harms consumers through fewer alternative offerings and less willingness among firms to compete on price or quality.

Although comprehensive empirical data for India remains limited, available studies indicate real consumer risk from algorithmic pricing and deceptive interface practices. Vulnerable segments face disproportionate harm and competition distortion threatens the broader marketplace ecosystem.

7. Policy Recommendations and Enforcement Strategies

To protect consumers and preserve competition in the AI-enabled marketplace, India requires a multi-pronged strategy. First, the CCI and related regulators should develop algorithmic audit frameworks, mandated documentation of pricing-algorithm logic, periodic review of machine-learning models for coordination risk, real-time alerting of anomalous price movements and increased data-access for regulatory scrutiny. Second, competition-law treatment of algorithmic coordination requires doctrinal adaptation for example, reconceptualising "agreement" in Section 3 of the Competition Act to cover algorithm-mediated coordination and tacit collusion, as some Indian scholars propose.[15] Third, consumer-protection frameworks should compel transparency of pricing algorithms: platforms must disclose when dynamic pricing is applied, give consumers the ability to compare price-histories and ensure clear presentation of fees and surcharges. Fourth, promoting contestability: regulators should ensure that access to data, compute and algorithms does not become a barrier to new entrants, mandating platform neutrality and interoperability standards may reduce risk of dominant-platform-mediated collusion. Fifth, regulatory sandboxing and stakeholder engagements, collaboration among the CCI, consumer-protection authority, platform-operators, consumer-groups and AI-ethics experts can foster safe innovation while guarding against consumer harm.

The Indian regulatory ecosystem must evolve to recognise the unique challenges of AI-facilitated collusion. A combination of doctrinal reform, algorithmic oversight, consumer-transparency and competitive infrastructure is required.

8. Conclusion: Charting a Fair AI-Enabled Marketplace

The convergence of AI and online marketplaces in India presents both promise and peril. On one hand, algorithmic tools afford efficiencies, personalised experiences and dynamic commerce. On the other hand, AI-facilitated collusion, opaque pricing, recommendation-bias and interface-manipulation present real hazards for consumers and competition. Indian regulators have begun recognising these risks evidenced by the CCI's 2024 market-study announcement, but the legal, ethical and empirical frameworks are still nascent. For Indian consumers especially digital newcomers and rural users ensuring transparency, fairness and contestability is paramount. Going forward research must fill empirical gaps (for instance quantifying welfare losses in India from algorithmic collusion) and policy must keep pace with technology. In doing so, India can chart a regulatory path that preserves innovation while safeguarding consumer welfare and competitive markets.

[15] Sebastián Tinoco, Andrés Abeliuk & Javier Ruiz del Solar, 'Impact of Price Inflation on Algorithmic Collusion Through Reinforcement Learning Agents' (2024) *arXiv* https://arxiv.org/abs/2504.05335 accessed 14 Nov 2024.