How should Competition and Consumer Protection rules evolve in the age of Artificial Intelligence?

Abstract

The rapid advancement of Artificial Intelligence ("**AI**") tools has sparked profound transformation across industries, generating considerable benefits for consumers and businesses. Yet, in the absence of regulation, these tools could jeopardise market competition by facilitating anti-competitive collusion and abusive conduct such as price discrimination and self-preferencing. As exploiting AI can bring significant profits to businesses, strong demand for AI has led businesses to enter more data-driven mergers to secure essential inputs for AI development (i.e., data and computational resources). Killer acquisitions and restricting access to these key inputs can mean smaller players can no longer compete. To address these concerns, this essay proposes actionable steps for the Competition and Consumer Commission of Singapore ("**CCCS**"):

1. To combat autonomous anti-competitive collusion by algorithms, we recommend CCCS to initiate periodic sector-specific market studies and to collaborate with technical experts to identify violations through pricing patterns and trends.

2. To target AI-facilitated price discrimination, instead of prohibition, we recommend price transparency obligations which require companies to inform consumers when prices are personalised based on automated decision-making. This empowers consumers to make informed choices and mitigates welfare loss from asymmetric information while preserving the benefits of price discrimination.

3. To address AI-driven self-preferencing by dominant firms, CCCS can enhance detection of self-preferencing by collaborating with technical experts, encourage whistleblowing, conduct market studies to identify self-preferencing and require disclosure of ranking parameters from suspected undertakings.

4. On the merger front, without altering the voluntary merger notification regime, we recommend CCCS to closely monitor AI-related markets and actively initiate investigations into mergers that have not been notified.

This essay explores how these recommendations provide a nuanced approach that upholds competition and consumer welfare, while nurturing innovation and maintaining Singapore's position as a technology hub.

I.   INTRODUCTION

The rapid advancement into the digital age has resulted in artificial intelligence ("**AI**") tools becoming ubiquitous. These tools continue to expand rapidly in accessibility, capability and scalability, leaving in their trail revolutionised and disrupted industries. More often than not, this has generated benefits for consumers and businesses alike.

Yet, if left unchecked, the power of AI, in particular generative AI, and those who control it can pose serious challenges to competition in the free market. For one, developing and deploying generative AI requires large datasets and computational resources to begin with, meaning that only those with significant resources can afford to do so. This raises the risk of abuse of dominance. In the same vein, incumbents may look to consolidate their lead in this nascent market, raising

concerns over potential "killer acquisitions". Separately, as generative AI tools become increasingly autonomous, we may potentially face a dystopian future where prices in the free market are determined by algorithms.

Competition and consumer protection law therefore have a significant role to play in facilitating the growth of AI development in Singapore. Simultaneously, it is imperative that the existing architecture keeps pace with complex legal issues that arise, to support continuous innovation by smaller players, while ensuring that businesses and consumers are not disadvantaged.

In this essay, we discuss the various competition and consumer protection risks arising from the development and use of AI, in relation to the Competition Act 2004 ("**CA**") and the Consumer Protection (Fair Trading) Act 2003 ("**CPFTA**"). We then examine practical solutions that the Competition and Consumer Commission of Singapore ("**CCCS**") can adopt without breaking the mould. We conclude by recognising the challenges CCCS faces in dealing with risks posed by AI while maintaining the growth of AI development in Singapore. While this balance is difficult to achieve, it is crucial and ultimately achievable.

II.   THE RISK OF AUTONOMOUS ANTI-COMPETITIVE COLLUSION

A key tenet of competition law is the prohibition against cartelistic conduct, such as price-fixing, bid-rigging, output restrictions and market sharing. Competition regulators globally are well aware of the potential for AI to facilitate collusive and cartelistic practices, given the proliferation of algorithmic pricing tools over the past few years. In 2018, the European Commission ("**EC**") separately fined four consumer electronics manufacturers for using pricing algorithms to impose fixed or minimum resale prices on their online retailers. These algorithms closely monitored

the resale prices of retailers and allowed manufacturers to identify the retailers who sold products below recommended resale prices.[1] The European Commissioner for Competition, Margrethe Vestager, had forewarned in 2017 that "businesses also need to know that when they decide to use an automated system, they will be held responsible for what it does. So they had better know how that system works."[2]

Particularly with the advent of *generative* AI[3], algorithms may gradually shift from a passive role of facilitating collusion to an increasingly active role of determining and implementing collusive practices on its own, such as through machine learning and autonomous decision-making. Ezrachi and Stucke (2015) had identified a category of algorithmic collusion termed "Digital Eye", where algorithms are simply provided a target (e.g. profit maximisation) and the underlying AI operates autonomously to achieve the target. Here, the AI may determine, without any human input, that tacit collusion is the optimal strategy to achieve its target. In fact, simulations involving self-learning algorithms indicate that the algorithms eventually coordinated to achieve prices which were significantly higher than competitive price levels. The researchers also observed that the algorithms left no trace of concerted action – the algorithms had learnt to collude purely by trial and error (Calvano et al., 2018). In other words, there is a real risk that businesses may not have any idea how such algorithms work.

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[1] Case AT.40465 - Asus.

[2] Speech by Commissioner Margrethe Vestager at the Bundeskartellamt 18th Conference on Competition: Algorithms and Competition (16 March 2017).

[3] Generative AI refers to deep-learning models that can generate new content based on the data they were trained on.

Insofar as human input is involved (e.g., agreeing to collude by using algorithms or AI), current competition enforcement tools remain sufficient. The CCCS *E-commerce Platforms Market Study* (2020) ("**E-commerce Market Study**") states that "where algorithms or AI [are] used to support or facilitate any pre-existing or intended anti-competitive agreement or concerted practice, such activities are clearly subject to the existing enforcement framework" under Section 34 of the CA ("**Section 34 Prohibition**"). Yet, these tools may fall short in addressing the capabilities of generative AI. The challenge lies in *detecting* tacit collusion between algorithms in the first place, along with the concomitant difficulty of establishing intent and attributing liability where no human input is involved under the Section 34 Prohibition.

To this end, the UK Competition and Markets Authority ("**CMA**") launched an initial review of generative AI in May 2023 (Competition and Markets Authority, 2023). More recently, the CMA published an update paper and technical report in April 2024, which detail the feedback received from various stakeholders and market developments in the generative AI space. These are intended as precursors to developing guidelines to guide the development of generative AI. Similarly, the EC requested for contributions on competition in generative AI and sent requests for information to several large digital undertakings in January 2024 (European Commission, 2024).

In aligning with international practices, there is no immediate need to modify the existing competition architecture. Rather, CCCS can adopt a two-pronged approach to identify and understand risks and to enhance its detection capabilities.

(a)   First, similar to the EC and CMA, CCCS can initiate periodic sector-specific market studies to identify markets at risk (e.g. e-commerce, ride hailing, travel, etc.) and to understand how generative AI and algorithms are used in these markets.

(b)   Second, CCCS can improve its detection capabilities by collaborating with technical experts (e.g. AI Singapore) to identify potential violations through pricing patterns and trends.

III.   AI-ENABLED PRICE DISCRIMINATION

AI may not only facilitate acts of collusion but also be used to implement price discrimination. This raises issues under both competition and consumer protection laws.

In this respect, there are algorithms that analyse consumer data to predict purchasing power, which allow companies to set individualised pricing and tailor promotional offers to different customers. By identifying price-sensitive consumers, companies can maximise profits by offering them discounted prices, while charging higher prices to less price-sensitive consumers (Lau, 2020). For instance, consumers deemed to have high "purchasing power" might be identified through their IP address and be charged higher prices than consumers with lower "purchasing power".

Various types of consumer data, including demographics (e.g., race, income, location)[4] and online behaviour (e.g., browsing history and social media output) can

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[4] European Commission, *Guidance on the interpretation and application of Directive 2005/29/EC* (2021).

be used to determine price-sensitivity and implement price discrimination (Wallmark et al., 2018).

On one hand, this can disproportionately affect consumers from certain demographics and mislead consumers into accepting a higher price. This asymmetric information may lead to market failure (Klock, 2002).

On the other hand, it is arguable that price discrimination may allow a group of customers who have low reservation prices to access products and services that they could not afford under a uniform price (e.g., children and the elderly) (Townley et al., 2019). Price discrimination may therefore increase consumer welfare and should not face a blanket prohibition.

Ultimately, price discrimination can raise competition concerns under Singapore's competition law where it is engaged in by a dominant undertaking and used to harm competition. A dominant undertaking can use AI algorithms to identify customers that are prone to switching to its competitors and offers these customers a predatory price or significant discounts, thereby foreclosing all or a substantial part of the market to competition.

AI-enabled price discrimination can also be characterised as a consumer protection issue, because welfare loss mainly occurs where consumers are misled into paying higher prices. Anecdotally, it can be observed that two customers of a ride hailing platform may be offered different price when they search at the same time for a ride using the same origin and destination, suggesting that the algorithm may be charging different prices based on the customer's profile and loyalty to the platform.

To target this, we recommend imposing price transparency obligations similar to the EC's Omnibus Directive. This would require companies to clearly inform consumers when prices are personalised based on automated decision-making.[5] Personalised pricing would constitute a misleading practice if consumers were not adequately informed on how price is calculated or if any price advantage exists.[6] Empowering consumers to make informed decisions improves consumer welfare.

The ethos of this solution aligns with CCCS' Price Transparency Guidelines, which specify how misleading pricing practices can infringe Section 4(a) of the CPFTA. We recommend addressing non-transparent AI-driven price discrimination in these guidelines.

The benefits of this solution are twofold. First, it preserves the efficiencies associated with price discrimination as there is no outright prohibition. Second, it addresses the underlying problem of consumer welfare loss resulting from asymmetric information by empowering consumers to make informed choices. This approach can strike a balance between the interests of businesses and consumers in the digital marketplace.

IV. AI-FACILITATED SELF-PREFERENCING

In addition to price discrimination, AI can be used to facilitate other types of abuse of dominance, such as self-preferencing. Dominant firms can embed self-preferencing mechanisms in their algorithms and leverage AI to favour their own products or services. The EC's case against Google Shopping illustrates how

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[5] Omnibus Directive (EU) 2019/2161

[6] Ibid (n 9).

Google manipulated search results to prioritise its offerings, demoting rivals and thereby reducing consumer choice (OECD, 2021). More broadly, AI enables firms to alter "choice architecture" by exploiting consumer behavioural biases, such as the tendency to click on the first few search results (OECD, 2020). These practices maintain the firm's competitive edge and market control, making it harder for competitors to gain visibility and market share.

To target this issue, we propose the following multi-pronged approach. CCCS can: (a) enhance detection of self-preferencing by collaborating with technical experts to better understand how AI algorithms facilitate self-preferencing; (b) encourage whistleblowing from undertakings which believe they are disadvantaged by self-preferencing practices; (c) undertake market studies to identify undertakings which are likely to be employing self-preferencing algorithms; and (d) if CCCS reasonably suspects such activity, it can require these undertakings to disclose the parameters used in their ranking process.

V.   AI & MERGERS

As illustrated above, AI can be exploited to offer significant profits to businesses, driving a strong demand for AI. Consequently, it is likely that we will see greater competition amongst businesses to secure essential inputs for AI development (i.e., data and computational resources). Given the relative infancy of the generative AI market, and the fact that it is dominated by market players with significant computational resources and data, merger control plays a critical role in ensuring that mergers are not used to reinforce the existing market power of large incumbents in the AI space. In particular, competition regulators must pay special attention to potential "killer acquisitions" involving smaller players.

A.   *Addressing Data-driven Mergers*

Data-driven mergers create competition issues by enabling firms with large and high-quality datasets to offer better-targeted products. This attracts more customers which generates more data, thus creating a positive feedback loop which reinforces their competitive advantage (Chen et al., 2022). Notable mergers like Facebook/Instagram, Google/Waze, and Google/Fitbit have raised concerns about increased market dominance and reduced competition in online services. When assessing mergers that involve acquisition of significant datasets, CCCS can consider requiring the acquirer to commit to data sharing obligations to alleviate competition concerns. For instance, the EC mandated that Google provide third parties access to Fitbit's health data post-merger to promote competition and innovation in the digital healthcare sector.[7] This can allow data obtained through mergers to remain accessible to competitors, while not wholly prohibiting data-driven mergers from taking place.

B.   *Control over computational resources*

Apart from data, the ability to develop and deploy generative AI tools requires significant resources, such as processing power and cloud computing. Competition regulators have in particular placed significant emphasis on cloud computing, given that the inability to access the cloud can foreclose smaller or new players from developing their own AI tools (Federal Trade Commission, 2023; Ofcom, 2023).

Mergers by large incumbents which involve smaller players can therefore raise competition concerns, especially if there is a risk of the cloud computing market

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[7] Case M.9660 – Google / Fitbit.

becoming oligopolistic or monopolistic. To this end, the US Federal Trade Commission ("**FTC**") initiated an inquiry in January 2024 into the generative AI investments and partnerships made by large incumbents, such as Alphabet, Amazon, Microsoft and OpenAI. The FTC has requested for, amongst others, the strategic rationale and practical implications of specific investments and partnerships.

As incumbents continue to expand in the cloud computing market, including in Singapore, CCCS must be alive to the risk of industry-consolidating transactions. In particular, as merger notification to CCCS is voluntary, there is the possibility that mergers are concluded without CCCS's review. Without altering the voluntary merger notification regime, one recommendation is for CCCS to closely monitor AI-related markets and actively initiate investigations into mergers that have not been notified to ensure that the market remains open and contestable in the face of potential industry-consolidating transactions. Given the wide spectrum of activities that technology companies engage in, CCCS should also scrutinise conglomerate mergers (for instance, between AI developers and cloud computing companies) for any potential anti-competitive effects that may arise in the two different but adjacent product markets.

VI.   PROVIDING GUIDANCE ON USE OF AI

Given the recent proliferation of AI and its attendant complexities, it may be opportune for CCCS to:

(a)   Conduct an in-depth market study into algorithms and AI, in particular expanding on the E-commerce Market Study which already addresses algorithms and AI;

(b)   Update the guidelines on the CA to provide greater clarity on how the existing enforcement framework can apply to algorithms and AI; and

(c)   Issue a guidance note relating to the use of algorithms and AI, with illustrations on the possible different types of AI-related conduct and clear guidance on the types of AI-related conduct that businesses may engage in.

The impetus this is twofold:

(a)   First, it raises awareness that the use of algorithms and AI can raise competition law concerns. This can encourage complaints of anti-competitive conduct and augment CCCS's market intelligence function, enhancing CCCS's detection capabilities.

(b)   Second, it signals that this is an enforcement priority for CCCS moving forward, which deters anti-competitive conduct.

VII.   CONCLUSION

In conclusion, the rapid advancement of AI, and in particular generative AI, brings substantial benefits but also significant competition and consumer protection challenges. By adopting the strategies proposed, CCCS can effectively manage the challenges posed by AI, promoting innovation while safeguarding competitive markets and consumer interests. Despite the difficulties of balancing these competing interests, CCCS can effectively balance its objectives of foster innovation while ensuring fair competition and protecting consumers.

Bibliography

- Calvano, E., Calzolari, G., Denicolo, V., & Pastorello, S. (2018). Algorithmic pricing: What implications for competition policy? *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3209781

- Case AT.40465 – Asus.

- Case M.9660 – Google/Fitbit.

- Chen, Z., Choe, C., Cong, J., & Matsushima, N. (2022). Data-driven mergers and personalization, *The RAND Journal of Economics*.

- Competition and Markets Authority. (2023, May 4). *Ai Foundation models: Initial review*. https://www.gov.uk/cma-cases/ai-foundation-models-initial-review

- European Commission. (2024, January 9). *Commission launches calls for contributions on competition in virtual worlds and generative AI*. https://ec.europa.eu/commission/presscorner/detail/en/ip_24_85

- Ezrachi, A., & Stucke, M. E. (2015). Artificial Intelligence & Collusion: When computers inhibit competition. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2591874

- Federal Trade Commission. (2023, March 22). *Solicitation for Public Comments on the Business Practices of Cloud Computing Providers*. https://www.regulations.gov/document/FTC-2023-0028-0001

- Klock, M. (2002). Unconscionability and Price Discrimination, Tennessee L Rev 317, 69.

- Lau, Y. (2020). A Brief Primer on the Economics of Targeted Advertising, *Bureau of Economics Federal Trade Commission,* 7.

- OECD. (2021). *OECD Business and Finance Outlook 2021: AI in Business and Finance*. https://www.oecd-ilibrary.org/sites/3acbe1cd-

en/index.html?itemId=%2Fcontent%2Fcomponent%2F3acbe1cd-en#section-d1e9799

- OECD (2020). Abuse of dominance in digital markets. https://web-archive.oecd.org/2021-10-31/566602-abuse-of-dominance-in-digital-markets-2020.pdf

- Ofcom. (2023, April 5). *Consultation: Cloud services market study - interim report.* https://www.ofcom.org.uk/__data/assets/pdf_file/0029/256457/cloud-services-market-study-interim-report.pdf

- Reuters. (2024, May 7). *Amazon to spend nearly $9 bln to expand cloud infra in Singapore.* https://www.reuters.com/technology/amazon-spend-9-bln-expand-cloud-infra-singapore-bloomberg-news-reports-2024-05-07/

- Speech by Commissioner Margrethe Vestager at the Bundeskartellamt 18th Conference on Competition: Algorithms and Competition (16 March 2017).

- Townley, C., Morrison, E., Yeung, K. (2019). Big data and personalized price discrimination in EU competition law, 19-20.

- Wallmark, M., Greenberg, & Engels, D. (2018). Consumer Welfare and Price Discrimination: A Fine Line. *SMU Data Science Review*, 2.