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

Abstract

AI holds vast potential to reshape our lives, transforming daily experiences and revolutionising industries. In particular, Singapore stands at the forefront of AI development, with new markets emerging and bringing with them rapidly changing market dynamics. This underscores the need for the CCCS to adapt its policies to align with the shifting landscape.

This essay analyses the effectiveness of current CCCS policies in preserving competition and consumer protection, highlighting certain regulatory gaps that may arise and proposing novel solutions.

In Section 1, we introduce the context of rapid AI advancement in Singapore and its importance to us as a nation.

In Section 2, we examine how AI may lead to potential violations of the 3 prohibitions that CCCS has set out against anti-competitive behaviour, namely 1) anti-competitive agreements, decisions and practices, 2) abuse of a dominant position and 3) mergers and acquisitions that substantially lessen competition. We then suggest possible frameworks and considerations CCCS can adopt in response.

In Section 3, we explore the effects of AI advancement on consumers through increasing asymmetric information, in the following aspects: 1) AI-washing, 2) manipulation of consumers, 3) price discrimination, and 4) hallucinations. In light of this, we provide

solutions in the form of business requirements and collaborations with other regulatory bodies, and consider the possibility of using AI as a tool to enforce CCCS rules more effectively.

In Section 4, we bring in additional considerations to be taken when adopting proposed rules, such as the potential trade-offs for businesses, consumers and society. We thus suggest methods to allow CCCS to seek a balance between fostering innovation through AI and safeguarding competition and consumer protection.

Finally, in Section 5, we summarise and conclude by establishing the importance of CCCS adopting proactive rather than reactive measures in the age of a digital economy.

(299 words)

1 Introduction

Singapore's government places great emphasis on harnessing AI's potential, with the launch of the 'Smart Nation' initiative in 2014 marking a landmark shift in our attitudes towards technology—instead of merely embracing new innovations, we aspire to foreground ourselves as a global pioneer of AI.

Unleashing AI's transformative potential is crucial, as it can, and has, facilitated breakthroughs in various sectors, including healthcare, finance and education. Integration of AI is especially key to a small, open economy like Singapore, as its ability to automate tasks enables us to circumvent our labour shortage and maintain our global competitiveness.

However, despite its allure, proper regulation is vital to ensure that AI is used ethically and constructively. In this essay, we investigate how Singapore can navigate the *terra nova* of risks that AI poses towards competition and consumer protection, preserving AI's function as an emblem of innovation.

2 How AI Affects Competition

2.1 Collusive Agreements

Firstly, AI has facilitated price collusions between firms, unfairly inflating prices and restricting output for consumers. Pricing algorithms predicting profit-maximising prices for firms are increasingly prevalent today—a sample of over 1,600 best-selling items on Amazon found that more than a third of vendors had automated their pricing (Chen et. al., 2016). This enables firms to engage in tacit collusions, behaving like a monopoly in making pricing decisions. For instance, a 'Hub and Spoke' situation arises when several firms subscribe to the same third-party pricing algorithm, causing price coordination due to common data inputs (Ezrachi & Stucke, 2017). AI systems may also be designed to monitor market behaviour and competitors' prices, allowing firms to mimic each others' actions. The lack of direct communication between firms makes detection of collusions harder.

Additionally, the increased adoption of AI has aggravated the risk of unintentional collusions. Theoretically, machine-learning algorithms could learn to autonomously collude if they arrive at a common understanding that collusion is the mutual best response for all firms (Dentons, 2023).

Thus, competition rules must evolve—Firstly, CCCS should distinguish between autonomous and non-autonomous collusions, such that firms colluding unintentionally face less stringent penalties. To prevent intentional collusions in the first place, CCCS should have the authority to check algorithms for features facilitating collusion, such as adaptive learning capabilities adjusting prices based on competitors' behaviours, before approval for usage. To reduce unintentional collusions, CCCS can adopt a regulatory sandbox framework, carrying out simulations to assess the behaviour of pricing algorithms in competitive market environments to ensure they do not converge to collusive outcomes.

Lastly, CCCS can utilise AI to expedite detection of collusions. Currently, CCCS's Leniency Programme relies on voluntary reporting by cartel members in exchange for leniency. Instead, CCCS can adopt AI models to efficiently and accurately identify collusive behaviour, referencing the Korean FTC's AI-powered bid-rigging indicator analysis system that identifies cartel activities and predicts the probability of bid-rigging in public tenders (OECD, 2016).

2.2 Abuse of Dominance

Vertically integrated tech giants stand to gain significant unfair advantages when they hold a high concentration of key AI inputs (House, 2024). Consequently, they may be incentivised to unlawfully entrench their market positions, through gatekeeping resources for developing AI models or charging exorbitant prices for them. This poses a threat to fair competition and raises barriers to entry for potential entrants, while compromising consumer welfare in an increasingly concentrated market that encourages monopolistic behaviours.

CCCS currently imposes financial penalties not exceeding 10% of turnover of the undertaking's business for each year of infringement. However, we argue that such penalties are insufficient to deter dominant companies from engaging in anti-competitive practices in the lucrative AI industry. The profits generated by AI-driven companies like Google, which are used by billions, are usually so substantial that these penalties are unlikely to impact their overall financial health. Thus, existing penalties need to be raised for a greater deterrent effect.

In addition, CCCS can also enforce data portability standards, much like EU's requirements for data subjects to be able to obtain personal data in a structured, machine-readable format (GDPR, 2016). CCCS can extend this cover non-personal data by

facilitating transfer of non-personal data between businesses. Access to critical data repositories by smaller companies can improve competition, while driving product development and optimising operational processes.

2.3 Acquisitions

AI has increased the risk of firms engaging in 'killer acquisitions' in which big-tech companies with established market power acquire promising AI startups instead of engaging in fair competition (FTC, 2024). The quenching of potential competitive innovation leads to 1) decreased variety of products available, reducing consumer choice, and 2) reduced affordability as larger merged entities set higher monopolistic prices.

However, merged entities can leverage a larger combined pool of data to develop more advanced machine-learning models, resulting in increased ability to innovate, improving dynamic efficiency (Goldfarb & Trefler, 2019). Economies of scale also arise, with costs of data centres and cloud infrastructures spread over larger combined outputs, increasing supply-side efficiency. Next, network effects occur when increased user interactions on the merged entity's platforms causes greater accumulation of data, enhancing AI's predictive capabilities (Tarazona, 2024). This increases consumer valuation of AI services, enhancing demand-side efficiency.

While mergers leading to substantial lessening of competition are not permitted, mergers with net economic efficiencies that outweigh competition detriments are exempted from facing penalties (CCCS, 2016). Thus, it is important to weigh the benefits of AI mergers against their anti-competitive effects to determine desirability. We propose that the onus be on firms to prove that their merger meets the following requirements:

1. That merger is necessary for proposed economic efficiencies to be achieved.

2. That efficiencies gained are significant, material and likely to be achieved.

3. That adverse effects caused by the merger are not too deleterious; or the firm can put forth commitments to mitigate them.

CCCS can then evaluate whether benefits are immediate and large-scale enough to outweigh anticompetitive effects and warrant leniency, taking into account current market conditions. Furthermore, to ensure consumer welfare is not overly affected, CCCS can set upper-limits on the prices charged by the merged entity—an appropriate mark-up of prices charged when firms operated independently.

Moreover, CCCS needs to be especially vigilant of 'partnerships' between incumbent and entrant firms that grant incumbents large influence over key strategic and business decisions of entrants. For instance, Microsoft's $10 billion partnership with OpenAI granted it the ability to license OpenAI exclusively (Article 19, 2024). Such 'partnerships' carry the same detrimental effect on fair competition as killer acquisitions and should be liable to the same punitive actions.

3 How AI Affects Consumers

3.1 AI-washing

Against the backdrop of increased demand for products incorporating AI, firms attempt to mislead customers by overstating the capabilities of their AI models or exaggerating the use of AI in product development, making products look more sophisticated or innovative than they actually are. Such false advertising leads to overvaluation and overconsumption by consumers, causing market failure. (Marr, 2024)

3.2 Manipulation of Consumers

AI has also facilitated consumer manipulation in several aspects:

1. AI can personalise **dark patterns**, which interfere with consumers' decision-making process for the company's benefit, through users' browsing history or social media activity, making recognition of manipulation attempts harder (Troge, 2024). AI also allows development of more sophisticated types of dark patterns, e.g. through generating large volumes of **fake reviews** that artificially inflate the reputation of the brand. This manipulates purchasing decisions of consumers, curtailing consumer sovereignty.

2. In recent years, generative AI has been used to **defraud** consumers, by crafting phishing emails that are more difficult for cybersecurity systems to discern (Dori, 2023). This is further facilitated by the creation of **deepfakes**—highly realistic fake media created using deep learning algorithms. Deepfakes can be used for impersonation and fabricating content, leading to privacy violations and spreading of misinformation.

3. AI can introduce biases when integrated into consumer-facing products. For instance, self-preferencing may occur where search engines using AI algorithms prioritise their own products in search results. E-commerce websites may also adjust algorithms to steer consumers towards purchase options that yield higher profit margins for retailers. (CCPC, 2019) Such **algorithmic biases** limit consumers' exposure to diverse options, causing uninformed decision-making.

3.3 Price Discrimination

AI has allowed firms to engage in exploitative price discrimination without consumers' knowledge. Algorithms serve as analytical tools, accurately predicting each consumer's willingness to pay by collecting information such as their purchasing patterns (AI and Competition Law, n.d.), subsequently offering them tailored prices (Qian, Niels & Cuaffman, 2023).

3.4 Hallucinations

Hallucinations occur when a large language model perceives patterns that are non-existent, thus generating inaccurate outputs (IBM, n.d.). For instance, ChatGPT was previously found to furnish non-existent precedent cases that were erroneously cited in legal briefs. These hallucinations may be due to training data inaccuracy, high model complexity, or overfitting, posing significant risks for users (CNA, 2023).

3.5 Solutions

Currently, CCCS uses the Consumer Protection (Fair Trading) Act (CPFTA) to protect consumers against unfair trade practices. Its fundamental principle of 'price transparency' dissuades firms from providing consumers with misleading information about prices. The CPFTA also empowers consumers affected by unfair practices to seek monetary compensation (MTI, n.d.).

However, we find that existing rules are not sufficiently specific and proactive, especially in ensuring non-price transparency and accountability for AI usage. We thus propose that CCCS rules evolve in the following aspects:

Firstly, CCCS should state business requirements for consumer protection and the corresponding penalties more explicitly:

1. To address **AI-washing**, CCCS can legally require platforms to disclose truthful information on the use of AI in their products. CCCS can also provide guidelines on advertising—for instance, products relying on statistical analyses or rule-based systems without authentic learning capabilities cannot be considered "AI-powered" (Freedman, 2024). Businesses should be able to provide concrete scientific support for performance claims if required.

2. To address use of **dark patterns**, CCCS can take reference from the EU's AI Act which prohibits AI systems that "use subliminal techniques beyond a person's consciousness".

3. To address **price discrimination**, CCCS can make it mandatory for firms to inform consumers when pricing is personalised based on automated means, while enabling opt-out option for consumers not wishing to receive personalised pricing recommendations. This promotes greater transparency and enables more informed decision-making.

4. To address **hallucinations**, CCCS can hold both upstream developers (entities designing AI systems) and downstream deployers (entities implementing AI systems) liable for factually incorrect outputs generated by AI. Companies should be held responsible for addressing foreseeable risks, conducting regular audits of algorithms and implementing timely redresses.

Secondly, CCCS can collaborate with the Ministry of Communications and Informations to educate consumers to protect themselves from the harms of AI. For example, it can publish a joint release introducing the types of dark patterns, scams and deepfakes and methods to detect them (e.g. detecting deepfakes through facial inconsistencies and audio-visual mismatch). This can reduce information asymmetries between businesses and consumers.

Thirdly, AI fact-checking tools could be utilised to enforce CPFTA more rigorously. CCCS can recommend local e-commerce platforms to adopt fact-checking tools like Fakespot.com, which rely on AI to analyse and identify fake reviews, guarding consumers from unscrupulous sellers.

4 Additional Considerations

4.1 Potential Negative Impacts of Proposed Rules

While the proposed rules stimulate competition and boost consumer welfare, there may be several potential trade-offs.

For businesses, imposing stricter anti-competition rules will cause them to incur lower supernormal profits, impeding their ability to invest in expensive AI factor inputs and achieve dynamic efficiency through product and process innovation. Firms also lose cost savings due to restrictions on pricing algorithms that allow for dynamic pricing and increase adaptability to fluctuations in market demand and supply.

Consumers may thus lose out on potential cost savings passed on by firms and access to higher-quality goods due to stifling of innovation, compromising consumer welfare.

Society may also face a loss of productive efficiency, losing out on economies of scale to be gained when firms merge and produce closer to the minimum efficient scale. Furthermore, strict regulations on use of AI by firms may delay deployment of innovative solutions due to testing and approval processes. This may place Singapore at a competitive disadvantage compared to countries with relaxed regulatory environments.

4.2 Seeking a Balance

Given the trade-offs of regulation, CCCS needs to strike a balance between promoting innovation and preserving competition and consumer protection. We can model a framework for regulating AI similar to the EU's AI act, which categorises new AI models based on associated risks to consumers, thereafter deciding on the appropriate levels of

regulation. For instance, General-Purpose AIs (GPAIs) are classified as either 'conventional' or 'systemic-risk'. Conventional GPAIs are subject to a more hands-off approach with minimal documentation requirements, while systemic-risk GPAIs deemed capable of severely harming consumers if misused are subject to more rigorous oversight (Kellerhals, 2024). This distinction encourages innovation while ensuring consumer protection.

CCCS can also adopt a measured stance in deciding which collaborations businesses are allowed to undertake. For instance, while pricing decisions should be made independently, regulations on joint ventures that involve pooling data or undertaking combined research projects on AI models could be relaxed, increasing efficiency of research-and-development processes.

In decision-making, CCCS can utilise quantitative indicators to assess competitive conduct. For instance, the Herfindahl-Hirschman Index (HHI), obtained by summing up squared market shares of all firms in an industry, illustrates the degree of market concentration and predicts the potential competitive impact of mergers. Mergers increasing the industry's HHI by more than 100 points are likely anti-competitive (DOJ, 2024). Based on statistics gathered on market conditions, CCCS can then evaluate costs and benefits of AI-associated practices and determine the precarious balance between fostering AI and promoting competition.

4.3 Importance of collaborations

Developing comprehensive and consistent approaches towards AI regulation requires collective efforts. With much of AI being a "black-box" due to opaque and complex networks involved, it is crucial for CCCS to consult experts in areas it may not be well-versed in, to better understand technical complexities and remain updated on latest

developments. CCCS should also work with legal and technical teams when conducting assessments for AI models to make more informed decisions and enhance effectiveness of intervention (UNCTAD, 2024).

The cross-border nature of technology also highlights the pressing need for international collaboration to ensure that national strategies are aligned with global principles, while facilitating exchange of knowledge and experience to determine best practices in AI regulation.

5 Conclusion

As AI continues to advance, CCCS rules must evolve in tandem to address continually emerging challenges and opportunities. Through enforcing clearer legislations, stricter penalties and more effective frameworks, CCCS can simultaneously address both competition and consumer protection. CCCS can also wield AI as a powerful tool to aid in enforcement of fair business practices.

Moving forward, CCCS must vigilantly monitor the development of AI and new business models, implementing proactive rather than reactive measures to mitigate associated risks more effectively. Periodically, gap analyses should be carried out to pinpoint regulatory shortcomings, while horizon scanning can be performed to identify potential trends in AI progression. This guarantees that AI development in Singapore adheres to principles of transparency, inclusivity and responsibility.

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6 Bibliography

Algorithmic competition – note by Norway - one MP. One OECD. (2023, May 24).

https://one.oecd.org/document/DAF/COMP/WD(2023)14/en/pdf

Apply for leniency. CCCS. (2018, December 31).

https://www.cccs.gov.sg/approach-cccs/applying-for-leniency

Chen, L., Mislove, A., Wilson, C., & Northeastern University. (2016). An Empirical analysis

of algorithmic pricing on Amazon Marketplace [Journal-article].

https://mislove.org/publications/Amazon-WWW.pdf

Competition concerns in the age of AI. (n.d.). Perkins Coie.

https://www.perkinscoie.com/en/news-insights/competition-concerns-in-the-age-of-ai-updat
e.html

Consumer protection. MTI. (n.d.).

https://www.mti.gov.sg/Resources/Legislation/Consumer-Protection

Development of a national strategy on artificial intelligence. Competition and Consumer

Protection Commission. (2019).

https://enterprise.gov.ie/en/consultations/consultations-files/submission-2-ccpc.pdf

Dori, Y., & Tonsager, L. (2023, October 10). *FTC publishes blog post summarizing*

consumer concerns with AI systems. Inside Privacy.

https://www.insideprivacy.com/artificial-intelligence/ftc-publishes-blog-post-summarizing-con
sumer-concerns-with-ai-systems/

Ezrachi, A., Stucke, M. E., University of Oxford, University of Tennessee College of Law,

Data Competition Institute, Oxford University Centre for Competition Law and Policy, Oxford

Internet Institute, S. Dep't of Justice, MGM, U.S. Dep't of Justice, & OVIDIU VERMESAN &

PETER FRIESS. (2017). ARTIFICIAL INTELLIGENCE & COLLUSION: WHEN COMPUTERS INHIBIT COMPETITION. In UNIVERSITY OF ILLINOIS LAW REVIEW (Vol. 2017, pp. 1775–1808) [Journal-article].

https://www.illinoislawreview.org/wp-content/uploads/2017/10/Ezrachi-Stucke.pdf

Gehl, K. E., & Piaskoski, P. R. (2023, November 27). *FTC weighs in on threats to competition from Artificial Intelligence in comment to U.S. Copyright Office*. Foley & Lardner LLP. https://www.foley.com/insights/publications/2023/11/ftc-threats-competition-ai/

Gift, N. (2018, November 2). How vertically integrated AI stacks will affect IT organizations. Forbes.

https://www.forbes.com/sites/forbestechcouncil/2018/11/02/how-vertically-integrated-ai-stacks-will-affect-it-organizations/?sh=1801b5791713

Goldfarb, A., & Trefler, D. (2019). Artificial intelligence and international trade. In Ajay Agrawal, Joshua Gans, and Avi Goldfarb, editors, The Economics of Artificial Intelligence: An Agenda (pp. 463–492). http://www.nber.org/chapters/c14012

Herfindahl-Hirschman Index. Antitrust Division. (2024, January 17). https://www.justice.gov/atr/herfindahl-hirschman-index

Kellerhals, T., & Wellner, M. (2024, April 29). *Is AI regulation threatening innovation and CHATGPT?*. KPMG.

https://kpmg.com/ch/en/blogs/home/posts/2024/04/is-ai-regulation-threatening-innovation-and-chatgpt.html

Kempe, L. (2024, January 12). *How to avoid regulatory risk for "ai washing."* Legal Dive. https://www.legaldive.com/news/avoid-regulatory-risk-ai-washing-greenwashing-artificial-intelligence-FTC-SEC-scrutiny/704507/

Korea's bid Rigging Indicator Analysis System (BRIAS). Public Procurement Toolbox. (2016, April 19). https://www.oecd.org/governance/procurement/toolbox/search/korea-bid-rigging-indicator-analysis-system-brias.pdf

Lewis, A., Vu, P., Duch, R. M., & Chowdhury, A. (2023, November 27). *Deepfake detection with and without content warnings*. Royal Society open science. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10679876/

Liu, H. (2024, January 19). *Generative AI raises competition concerns*. Federal Trade Commission. https://www.ftc.gov/policy/advocacy-research/tech-at-ftc/2023/06/generative-ai-raises-competition-concerns

Love everything you buy. Fakespot. (n.d.). https://www.fakespot.com/

Marr, B. (2024, May 9). *Spotting AI washing: How companies Overhype Artificial Intelligence*. Forbes. https://www.forbes.com/sites/bernardmarr/2024/04/25/spotting-ai-washing-how-companies-overhype-artificial-intelligence/?sh=1aaef6ea53b4

Martin, M., & Cansin Karga, N. (2023, November 17). *Managing the competition law risks of ai*. Dentons. https://www.dentons.com/en/insights/articles/2023/november/17/managing-the-competition-law-risks-of-ai

May, L. Y. (2024). *Ai and competition law - hogan lovells engage*. Hogal Lovells. https://www.engage.hoganlovells.com/knowledgeservices/news/ai-and-competition-law

Moroney L. and Gordon J. (2022, June 27). Bringing Machine Learning to every developer's toolbox. Tensorflow Blog.

https://blog.tensorflow.org/2022/06/%20bringing-machine-learning-to-every-developers-tool box.html

New York lawyers sanctioned for using fake CHATGPT cases in legal brief. CNA. (n.d.). https://www.channelnewsasia.com/business/new-york-lawyers-sanctioned-using-fake-chatgpt-cases-legal-brief-3581611

Overview of Regulatory Sandbox. Maintenance. (2024, April 29). https://www.mas.gov.sg/development/fintech/regulatory-sandbox

Padilla, J., & Evans, D. S. (2003, June 2). *Demand-side efficiencies in merger control*. SSRN. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=390500

Ruan, K. (2019, June 7). *Case study: Insuring the future of everything*. Digital Asset Valuation and Cyber Risk Measurement. https://www.sciencedirect.com/science/article/abs/pii/B9780128121580000107

Sanchez-Cartas, J. M. (2020, October 1). *The panzar–rosse H statistic and monopoly. issueon its use as a market power measure*. De Gruyter. https://www.degruyter.com/document/doi/10.1515/bejeap-2020-0193/html?lang=en

Slover, G. (2023, October 2). *Is artificial intelligence a new gateway to anticompetitive collusion?*. Center for Democracy and Technology. https://cdt.org/insights/is-artificial-intelligence-a-new-gateway-to-anticompetitive-collusion/

Sokol, D., & Johnson, J. (2023, November 27). *AI COLLUSION (ALGORITHM)*. Concurrences. https://www.concurrences.com/en/dictionary/ai-collusion-algorithm

Tarazona, N., MD. (2024, February 12). 2/11 The Impact of Network Effects on AI intelligence.

https://www.linkedin.com/pulse/211-impact-network-effects-ai-intelligence-nick-tarazona-md-hyure

Troge, T. (2024, May 21). *Does AI enhance the risk of dark patterns and how does EU law regulate them?*. Taylor Wessing.

https://www.taylorwessing.com/en/interface/2023/ai---are-we-getting-the-balance-between-regulation-and-innovation-right/does-ai-enhance-the-risk-of-dark-patterns-and-how-does-eu-law-regulate-them

What are ai hallucinations?. IBM. (2023, September 1).

https://www.ibm.com/topics/ai-hallucinations