How should Competition and Consumer Protection rules evolve in the age of Artificial intelligence (“AI”)?

ABSTRACT

The rapid adoption of Artificial Intelligence across industries is transforming business operations and consumer experiences, necessitating a reevaluation of Singapore's competition and consumer protection frameworks. This essay examines the challenges posed by AI, focusing on algorithmic collusion and big data-driven market dominance in competition law, and consumer manipulation and targeting in consumer protection.

Existing frameworks, built upon traditional notions of intent, causality and market definition, are ill-equipped to address the unique complexities of AI-driven markets. Algorithmic collusion, facilitated by AI's autonomous decision-making capabilities, challenges the ability to establish intent and attribute liability. Similarly, the vast datasets wielded by tech giants, coupled with AI's predictive power, create barriers to entry and raise concerns about entrenched market power.

In the realm of consumer protection, AI-powered micro-targeting and opaque algorithms threaten consumer autonomy and informed consent. Existing policies, focused on

broader data collection practices and overt deception, fail to address AI-enabled subtler forms of influence.

This essay proposes a shift towards an outcome-based approach, prioritising the demonstrable market effects of AI over establishing intent. To address algorithmic collusion, (1) pre-emptive regulation, (2) data portability scrutiny and (3) a redistribution of the burden of proof are suggested. To tackle big data-driven dominance, (1) limited data-sharing mandates, (2) expanded assessment parameters for market dominance. In consumer protection, (1) the development of Explainable AI frameworks, (2) Algorithmic Impact Assessments, (3) regulatory sandboxes and international normative harmonisation are proposed.

This essay also acknowledges potential drawbacks of these interventions, including disincentives for innovation, regulatory uncertainty and concerns about regulatory capture. A balanced approach, combining proactive regulation with robust safeguards for legitimate business interests, is crucial in ensuring the pursuit of competition does not stifle the very innovation it aims to promote, achieving the overarching goal of fostering a fair, competitive and consumer-centric AI landscape in Singapore.

(298 words)

1. Introduction

The rapid integration of Artificial Intelligence (AI) across industries is fundamentally transforming business operations and consumer experiences. AI-driven automation is revolutionising service sectors, predictive analytics are optimising supply chains and hyper-personalisation is enhancing marketing strategies. Advancements in intelligent process automation (IPA) and large language models (LLMs) further amplify AI's disruptive potential by enabling complex data interpretation and redefining customer profiling (Lee et al., 2023).

The Competition and Consumer Commission of Singapore (CCCS) is entrusted with enforcing the Competition Act 2004, which regulates anti-competitive mergers, cartels and abuses of dominance, as well as the Consumer Protection Fair Trading Act (CAFTA), which combats unfair consumer practices. CCCS with its well-established expertise in market oversight and active participation in regional collaborations, is well-positioned to adapt its competition and consumer protection framework to the AI era. This proactive approach aligns with Singapore's macroeconomic goals of fostering economic resilience and sustainable growth, further solidifying its position as a global AI innovation hub.

To navigate the evolving landscape of our increasingly AI-driven economy, Singapore's competition and consumer protection frameworks must shift from reactive enforcement

to proactive design principles, balancing innovation while addressing the unique systemic challenges AI poses to market fairness.

2. Competition Law

2.1 Corporate Objectives Behind AI Adoption

Firms adopt AI to enhance efficiency, profitability and market expansion. Automation reduces operational costs, with Deloitte (2020) estimating a 20-35% reduction over three years. AI-powered demand forecasting and dynamic pricing optimise revenue, potentially increasing sales by 2-10% and profit margins by 1-2% (McKinsey, 2018). Moreover, AI's data analysis capabilities identify latent market needs and untapped customer segments, fostering innovation and business model transformation. This can lead to new revenue streams, with Accenture (2018) suggesting a possible 38% revenue increase through AI-led innovation.

2.2 Challenge of Algorithmic Collusion

2.2.1 Area of Contention

Algorithmic collusion occurs when AI systems independently learn to coordinate pricing or output strategies, leading to anti-competitive outcomes similar to those achieved through traditional cartels (Ezrachi & Stucke, 2016). Algorithmic collusion can occur through various mechanisms, including the core programming logic of reinforcement learning algorithms, facilitation of indirect signalling among competitors and the potential for AI systems to act as central hubs within hub-and-spoke collusion arrangements.

The application of algorithms in competitive markets raises critical questions regarding potential unintended collusion and subsequent liability attribution. Unsupervised learning algorithms, designed to operate autonomously and identify patterns from data, may inadvertently converge on anti-competitive outcomes such as price fixing in their pursuit of profit maximisation (Calvano, et al., 2019). More worryingly, recent research on the predictable agent theory of collusion suggests that even deterministic algorithms may inadvertently lead to collusion, as humans are likely to design algorithms which respond to endogenous information in a consistent way, reducing strategic uncertainty (Connor, 2019).

This directly contradicts the CCCS's broader objective of promoting microeconomic efficiency and sustaining macroeconomic growth. By artificially restricting output,

algorithmic collusion leads to underproduction, inefficient resource allocation and ultimately stifles innovation and market dynamism in the long-term (Harrington, 2018). The resulting artificial inflation of prices further erodes consumer welfare, causing deadweight losses in specific markets.

2.2.2 Existing Policy Voids

The advent of AI fundamentally challenges the traditional framework of competition law which hinges on proving intentional collusion. This challenge arises from the difficulty of establishing "meeting of minds" given rapidly shifting market dynamics and the nascent stage of AI development. The outsourcing of algorithm development and the use of pre-trained commercial AI solutions further diffuse control and blur lines of responsibility.

The rapidly evolving nature of AI necessitates a reconsideration of retroactive liability. Holding companies liable for unforeseen anti-competitive consequences years after initial algorithm deployment could stifle innovation due to increased risk aversion. Furthermore, the inherent opacity of many AI systems hinders the determination of intent behind algorithmic behaviours. While algorithms are often designed for efficiency, their complex interactions within a market may inadvertently result in collusive outcomes, making it challenging to distinguish between legitimate business goals and anti-competitive motivations (Lesser & Rady, 2016).

Moreover, the decentralised and continuously evolving nature of algorithmic decision-making systems, often involving outsourced and self-adapting elements, further complicates the imputation of liability. Identifying ownership and control over specific algorithms contributing to anti-competitive outcomes becomes increasingly difficult, potentially rendering traditional liability frameworks inadequate in addressing these dynamic complexities (Brundzaite & Gutman, 2020).

2.2.3 Suggestions

The adoption of an outcome-based approach could significantly bolster the CCCS's ability to address algorithmic collusion. By prioritising the tangible effects of algorithmic behaviour on market competition, rather than relying exclusively on establishing intent, the CCCS gains the flexibility to intervene where demonstrable market harm occurs (OECD, 2017).

A multi-pronged approach emphasising pre-emptive regulation and data portability scrutiny could be implemented. Pre-emptive measures would involve developing safeguards and standards for AI design in collusion-prone industries (OECD, 2017). In sectors where data control drives market dominance, stricter data portability and interoperability regulations could help level the playing field. This would allow

consumers greater flexibility in switching services and create opportunities for new entrants to access essential data resources.

The concept of redistributing the burden of proof shows promise, requiring firms deploying high-risk algorithms to proactively demonstrate the absence of anti-competitive motives in their system's design (Gal, 2019). This approach could incentivise the integration of anti-collusion safeguards into algorithm design from the outset, increasing firm transparency and accountability.

2.3 Challenge of Big Data and Market Dominance

2.3.1 Area of Contention

Tech giants' vast, cross-sector datasets fuel concerns about entrenched market power. Their first-mover advantage enables superior AI systems, attracting more users, thus expanding their data pool and widening the performance gap with competitors (Einav & Levin, 2014). This self-reinforcing cycle, fueled by spillover effects, raises the spectre of "natural monopolies," where firms leverage network effects for exponential growth through low marginal cost and extensive economies of scale, raising barriers to entry and increasing market concentration.

Big data-driven hyper-personalisation also poses challenges to consumer choice and market contestability. By creating "filter bubbles" prioritising profits over consumer well-being, these algorithms subtly manipulate choices, eroding traditional assumptions of market transparency and ease of switching. Consumers become trapped within curated environments, limiting their perceived options and distorting their preferences.

A further challenge lies in the evolving nature of "killer acquisitions". Dominant firms increasingly target innovative startups, neutralising potential threats. Traditional competition law focused on existing market structures struggles to address this. The true value of nascent AI technology lies in its market-reshaping potential, making it

difficult to quantify the competitive harm of eliminating companies whose full impact is unrealised (OECD, 2020). Furthermore, pre-emptive acquisitions of startups that have not yet developed a rival product ecosystem may be classified as conglomerate acquisitions. Over the long run, this can potentially harm allocative and dynamic efficiency as the acquiring firm has less incentive to continue the acquired firm's innovation projects given the existing conflict of interest (Shapiro, 2011).

2.3.2 Existing Policy Voids

Section 54 of the Competition Act is ill-equipped to handle the intricate cross-market effects of non-horizontal mergers in AI-driven sectors (Coyle, 2019). The current framework, focused on immediate impact within static markets, struggles to predict and address the potential stifling of innovation. Establishing counterfactual scenarios, crucial for evaluating potential competition, is legally challenging in dynamic innovation cycles. False negatives in merger assessments are difficult to reverse and can have detrimental long-term consequences for innovation, especially if the acquiring firm has discontinued the acquired firm’s products (Cremer et al., 2019).

Furthermore, traditional competition law, which relies on identifying demonstrable harm within established market structures, is ill-equipped to recognise nascent threats in emerging AI industries. This misalignment with the dynamic nature of these ecosystems overlooks the potential stifling of innovation and foreclosure of future competitive landscapes.

Additionally, the pervasive "freemium" model, where seemingly free services are monetised through data exploitation, challenges traditional competition law's reliance on price as a primary indicator of market dominance. Tech giants leveraging vast datasets may not engage in overtly predatory pricing, yet their data control can stifle competition through non-price mechanisms (Einav & Levin, 2014).

2.3.3 Suggestions

CCCS should mandate data-sharing by dominant firms, subject to stringent privacy safeguards and proportionality considerations. This promotes a level playing field and encourages innovation while preventing inadvertent consolidation of power. Concurrently, assessment parameters for dominance should expand beyond traditional metrics to encompass factors like declining service quality, limited consumer choice due to data lock-in, reduced innovation, or suppression of alternative business models to mitigate the challenge imposed by non-price competition (Stucke & Grunes, 2016). The shift from reactive to proactive legislation allows for more active risk mitigation and agile regulatory intervention.

Furthermore, the concept of "safe harbours" in antitrust enforcement, which often provide immunity to large platforms under a certain size or revenue threshold, warrants reevaluation. AI-driven markets can exhibit rapid dominance even before firms reach

established size thresholds. Instead, a "safe behaviours" framework could focus on identifying and deterring specific harmful conduct while delineating pro-competitive or neutral practices.

Establishment of a specialised advisory group comprising technical experts, economists and venture capitalists would bolster the CCCS's capabilities. This multidisciplinary team could detect obscured anti-competitive behaviour, offer crucial input on market analysis and facilitate information exchange with international agencies, reducing detection costs and fostering harmonised approaches in the increasingly interconnected digital economy. Collaboration with experienced international counterparts like the UK's Competition and Markets Authority would further enhance best practices development.

2.4. Caveats to Suggestions

To prevent regulatory overkill and perverse outcomes, potential drawbacks must be considered. Overzealous data-sharing mandates might disincentivise innovation by reducing returns on investment for firms that have rightfully acquired large datasets. Additionally, introducing "safe behaviours" frameworks, while potentially agile, requires clear definitions to avoid regulatory uncertainty, which could hinder risk-taking and experimentation vital for a burgeoning AI ecosystem. Lastly, while external expertise is valuable, over-reliance on advisory groups might create a perception of regulatory capture, thereby eroding public trust in CCCS's impartiality. A balanced approach that combines proactive regulation with robust safeguards for legitimate business interests is crucial to ensure that the pursuit of competition does not inadvertently undermine the very innovation it seeks to promote.

3. Consumer Protection Rules

3.1 Challenge of Consumer Manipulation and Targeting

3.1.1 Areas of Contention

While AI enhances personalisation and efficiency, its micro-targeting capabilities raise questions regarding consumer manipulation. AI's ability to analyse vast datasets and exploit individual vulnerabilities through tailored messaging and product offerings can undermine informed consent, a cornerstone of consumer protection law (Srinivasan et al., 2023). This is particularly concerning as current regulations primarily focus on broader data collection practices rather than the nuanced manipulative techniques enabled by AI.

AI-driven micro-targeting, employing tailored recommendations and emotionally charged advertising, subtly influences consumer choices by leveraging psychological mechanisms like "social proof" and "scarcity bias" (Susarla et al., 2020). This targeted approach allows firms to leverage data mining to segment consumers based on their value, maximising the difference between consumer acquisition cost and lifetime value. This potentially erodes consumer autonomy and when coupled with AI-enabled price discrimination (Selbst & Barocas, 2018) can significantly diminish consumer welfare. Existing legal frameworks, primarily focused on overt coercion or deception, are inadequate in addressing these subtler forms of influence.

The opacity of AI algorithms further compounds these challenges. The lack of transparency in AI decision-making processes obscures inherent biases within algorithms (Mittelstadt et al., 2019). This informational asymmetry creates a regulatory blindspot and limits consumer empowerment.

3.1.2 Existing Policy Voids

Current policies based on the opt-out illusion prove inadequate as AI models can circumvent user preferences, thereby undermining genuine consumer agency. Opaque algorithmic processes can render consumer opt-out choices meaningless as AI models continue targeted advertising by repurposing data (Chen et al., 2020). A paradigm shift is necessary, moving beyond binary opt-out options to granular controls that empower consumers with both understanding of specific targeting algorithms and the ability to selectively opt out of distinct data practices or manipulative tactics.

Consumer autonomy, predicated upon informed and rational decision-making, faces unprecedented erosion as AI-powered platforms strategically manipulate choice architecture—the subtle online cues that shape user experiences (Yeung, 2017). This creates a policy void as traditional concepts of coercion and deception are insufficient to address the insidious ways AI algorithms undermine free will. Regulations need to

evolve from simply addressing overt deception towards a framework that protects the very process of decision-making.

Moreover, AI's capacity to amplify societal biases poses a risk of exacerbating societal fragmentation. AI algorithms, often trained on datasets reflecting historical prejudices, can perpetuate discriminatory practices and reinforce inequalities (Eubanks, 2018). This necessitates mandatory bias audits, the development of standardised metrics to detect algorithmic discrimination and the promotion of algorithmic fairness. Diverse teams must be involved in the development and testing of AI systems to minimise the risk of amplifying societal biases that could undermine Singapore's social fabric.

3.1.3 Suggestions

Although developing Explainable AI (XAI) frameworks and algorithms that illuminate AI's decision-making processes is essential, a singular focus on transparency might be insufficient. XAI algorithms, designed to illuminate how AI reaches targeting conclusions, empower regulators and consumers with a degree of oversight. However, the effectiveness of XAI hinges on the comprehensibility of explanations for non-technical users. Therefore, alongside XAI development, the CCCS should prioritise consumer empowerment through robust digital literacy initiatives which empower consumers to critically evaluate AI-driven marketing and understand their data rights.

A paradigm shift towards Algorithmic Impact Assessments (AIAs) is crucial, mandating companies to preemptively assess algorithmic biases, fairness and potential manipulation, enabling proactive risk identification and mitigation. Regulations must define clear boundaries on permissible micro-targeting, prohibiting the exploitation of cognitive biases or targeting based on sensitive consumer demographics. To balance innovation and responsible implementation, regulatory sandboxes would provide a controlled testing environment for AI systems. Moreover, given the global reach of AI, international normative harmonisation is vital for consistent ethical and consumer protection standards.

Current regulations, focused on data privacy, necessitate a shift towards data ownership. Empowering consumers to opt out of specific targeting, request data profile deletion and exercise 'data portability' is fundamental for reclaiming control. Establishing robust algorithmic accountability mechanisms, including mandatory disclosure of micro-targeting criteria and providing avenues for consumers to contest manipulation or discrimination are paramount. Drawing on the concept of algorithmic accountability (Wachter et al., 2017), this approach ensures companies are held responsible for the ethical development and deployment of AI systems, fostering a more transparent and trustworthy digital marketplace.

4. Conclusion

In summation, the advent of AI necessitates a fundamental rethinking of Singapore's competition and consumer protection frameworks. While the potential for AI to enhance economic efficiency and consumer experience is undeniable, its unique capabilities also pose novel challenges to market fairness and consumer autonomy. Shifting from a reactive ex-post to a proactive ex-ante approach, focusing on outcomes over intent and expanding assessment parameters beyond traditional metrics are crucial steps towards determination of an optimal nexus between innovation and regulation. By embracing these forward-thinking strategies, Singapore can position itself at the forefront of AI innovation while upholding its commitment to ethical, equitable AI practices. thus ensuring our continued prosperity in the imminent era of Industry 4.0.

(2488 words)

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