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## ANTI-COMPETITIVE EFFECTS OF ALGORITHM PRICING: COMPARATIVE STUDY OF INDIA AND EU REGIME

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### ABSTRACT

In the early nineteenth century, brick-and-mortar shops did not have access to modern information. The virtual market has significantly overtaken its offline counterparts, and it is expected to grow only more due to some features of economic efficiency. Recently, CCI has emphasized looking for a possibility of anti-competitive pricing in Airline Industries. There has been a paradigm shift in anti-competitive practices from conventional to non-conventional anti-competitive practices. It was also alleged in Uber/Ola that pricing arrangements artificially manipulated demand and supply, which guaranteed higher fares to drivers who would otherwise compete against one another on price and would not be able to command such high prices. However, CCI rejected the allegations imposed on them, stating there existed no agreement/coordination amongst the cab aggregators and drivers regarding price fixation. It said the price was fixed by centralized pricing algorithms, which helped compute the fare based on various factors. On one side, the efficiency advantage for the companies using pricing algorithms is more because of it being cost-saving and revenue maximization on the other, the EU has already ascertained the rising competition concern that algorithms pose on the virtual market competition in a recent submission to the OECD.

There has been a surge in different online markets, and with that, there has been an increase in consumers' purchasing patterns. This change is a contribution to the advancement of technology, which has opened the market to competition. This research will analyze how algorithms and data crunching are radically changing the nature of the virtual market competition, hampering the welfare of consumer to their disadvantage. It is therefore necessary to consider whether the current Indian framework effectively takes into account potential anti-competitive consequences or the impact on competition. This is a review paper to have a comparative analysis of the regulatory framework and enforcement mechanism of anti-competitive effects of algorithm pricing in India and the EU.

**Keywords:** Algorithm, Anticompetitive, Cartel, collusion, India, EU.

## Introduction

The virtual market competition gives an image of next-to-perfect competition where everything is transparent. The increased transparency is a result of not only the data available but also the algorithms used and their ability to make predictions and reduce strategic uncertainty. It allows low entry barriers and opportunities to expand without any hurdles. Suppose any competitor increases the price of their goods online. In that case, consumers have an open option to switch to the cheaper alternative goods available, which may be intra-band or inter-band.<sup>1</sup> Another advantage that the digital or virtual market gives the sellers the edge over the sellers of the offline market is that it reduces or makes it easy for the consumer to save time by not hopping from grocery store markets, which reduces the search cost. Also, it leads to a reduction in the seller's procurement cost.

In the current debatable topic, it is not data that's a matter of concern but the term "Big Data."

Online markets depend on data collected from users for some specific targeted advertising and price fixing. This collection of enormous amounts of data is considered Big Data. With the evolution of big data analytics and self-learning algorithms, there is rapid growth in the online virtual market or platform. Now, these technology-driven markets are setting themselves apart from the traditional markets as they are getting more and more diverse dynamic with rapid innovations, and this, along with the advent of technological progressions like big data, complex algorithms, and artificial intelligence make life easier and available at our door steps in a click.

Artificial Intelligence itself says intelligence borne by computers is the same as that of intelligence born by humans. At times, there is the isolation of human intervention, which might have no express agreement and would have an adverse effect on the market; therefore, it becomes a challenge to hold someone liable for it. This has undoubtedly been very beneficial to us where price comparison websites, low pricing, better quality, variety of choices of goods, fast delivery, transparency, and freedom to choose are all options available, which makes a better healthy competitive environment enabling a dynamic market and innovation. The virtual market has many price comparison websites, which help consumers compare and make

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<sup>1</sup> Cole, Miranda. "The CMA's Paper on Pricing Algorithms, Collusion and Personalised Pricing." *The National Law Review*, August 25, 2023. <https://natlawreview.com/article/cma-s-paper-pricing-algorithms-collusion-and-personalised-pricing>.

informed decisions by filtering their relevant needs and choices based on taste and preferences. This approach continues to develop as an access to Big Data.

So, to suffice, various data is collected from considerable companies in order to provide enterprises with efficient solutions to develop new strategies comprised of big data, and the enterprises take all of this to have a business strategy for revenue generation or profit maximization.

For instance, the online shopping platform Amazon used computer-based algorithms to make price adjustments automatically instead of manually, which contravened the provisions of the Competition Act, of 2002. The algorithm scoops personal and market data to go with the best price for the product available on the shelf. There were discriminatory prices for different consumers, and an algorithmic analysis was performed using personal data, i.e., Amazon used a pricing algorithm to collude with other e-commerce portals by exchanging the market information and consumer information and fixed discriminatory prices.

Competition officials are now acknowledging that privacy protection can be a parameter of qualitative competition. In contrast, continuing with this data collection process and usage and identifying the behavior of consumers, they somehow tend to have gained market power, which helps them retain potential customers. However, "firms do not need to have market power in order to violate the privacy rights, and even if they do, it would still be necessary to prove that such conduct would amount to an abuse of dominance."<sup>2</sup> The inevitable fallout of artificial intelligence will have an immediate adverse impact on "consumer welfare."

### **"Algorithms": How do they affect competition?**

An algorithm is an unambiguous, precise list of simple operations applied mechanically and systematically to a set of tokens or objects. The initial set of tokens is said to be input, and the final set of tokens is said to be out<sup>3</sup>. It is a sequence of rules that are performed in an exact order to keep carrying out specific tasks; we can say it is an instance of logic that generates an output from a given input, be it to solve a mathematical equation or know a particular behavior,

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<sup>2</sup>1. OECD, May 30, 2017, [https://one.oecd.org/document/DAF/COMP/M\(2016\)2/ANN2/FINAL/en/pdf](https://one.oecd.org/document/DAF/COMP/M(2016)2/ANN2/FINAL/en/pdf).

<sup>3</sup> Organization For Economic Co-Operation And Development, 'Algorithms and Collusion' (June 9, 2017) <[https://one.oecd.org/document/DAF/COMP\(2017\)4/en/pdf](https://one.oecd.org/document/DAF/COMP(2017)4/en/pdf)> accessed 3 January 2024

etc. With the advent of algorithms, there could be technological advancements taken up by computer programming that would allow the human mind to do what it could do.

Online companies are quick to analyze personal data. They may collect massive chunks to the extent of controlling the online markets, which has an anti-competitive effect on both consumers and firms as well, i.e., they enter into secret agreements that prima facie cannot be proved, or we can say they study the acts or behavior of the firms setting their prices to keep a balance or to set prices in a way that they can play a dominant role in the particular sector.

Algorithms can put a strain on the traditional concept of anticompetitive agreement, tacit collusion, concerted practices, etc, under Competition Law. The algorithms cannot be used for the implementation of the agreement that the firms enter into secretly, which is unlawful under the traditional antitrust concept. However, these can very well alter the competitive behavior followed by the firms to replace the explicit agreement with that of tacit agreement or, say, coordination even without the need for agreement, and that is what makes it indifferent. In order to find an illegal agreement existing between two firms or companies, there should be some proof showing that without the agreement, they could not have acted independently to have an adverse impact on the market.<sup>4</sup>

Algorithms function more straightforwardly and quickly, and they have the speed to adapt to market changes and analyze how to react. Moreover, they also have intellectual sophistication. Enterprises use them to coordinate prices. It is beneficial to competitors at times as well to compete by trying to know the behavior of other players in the market; beneficial to companies as they have information asymmetry where they have more material knowledge or information than other companies. That is how companies that are sellers have an advantage over buyers.

These advanced technologies being used in the market by the market players have potential benefits, i.e., they have consumer benefits but, at the same time, impose difficulty on the competition enforcers. Algorithms also have the potential to "learn" collusive (Cartel) behaviour and aid in the implementation of cartel agreements.

"There is widespread usage of algorithms for price fixing on virtual or online platforms. Many

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<sup>4</sup>Guest. 2018. "Pricing Algorithms: How Should India Deal With It? IndiaCorpLaw."IndiaCorpLaw. September 28, 2018. <https://indiacorplaw.in/2018/09/pricing-algorithms-india-deal.html>.

sellers on Amazon use *pricing algorithms*<sup>5</sup>. Along with simple pricing techniques provided by various platforms, some third-party firms sell much more advanced pricing algorithms to retailers, or they, with the use of computer models, fix the price on behalf of the clients. With the help of these algorithms, it becomes easy for firms or entrepreneurs to offer different prices to different customers depending on what information they hold about them. These are used for personalized advertising, ranking, discounts, and searches. When the advanced algorithms are used with consumer data available, then the scope for firm increases with respect to personalized pricing."<sup>6</sup>

Prima facie pricing algorithms, along with artificial intelligence, have an impact on the virtual market competition and players of the market, which raises many policy concerns.<sup>7</sup> CCI<sup>8</sup> is under a legal obligation to understand how this works to keep a regular check on how the usage of algorithms has an impact on the firms on one side and consumers on the other side, which leads to unfair competition in the virtual market.<sup>9</sup>

To adjust prices, Uber uses data on riders as well as drivers to make sure there is a balance between the demand and supply, "to ensure reliability and availability for those who agree to pay more" and "to encourage more drivers to be back on the road." The algorithm used by Amazon features the sellers prominently in a "buy box" that maintains low prices compared to their competitors. Similarly, Google uses an algorithm that matches the advertisers and the users on various criteria, including the "context of the website and the interests and demographics of the website visitor."<sup>10</sup>

### **Potential anti-competitive Effects of algorithms in the virtual market**

This research paper will focus only on the anti-competitive effects of algorithms in virtual market Anti-competitive agreements under Section 3 of the Competition Act, 2002. With the

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<sup>5</sup>Pereira, Lucilia Falsarella. 2024. "Pricing Algorithms and Competition Law: What You Need to Know." November 8, 2024. <https://competitionandmarkets.blog.gov.uk/2024/11/08/pricing-algorithms-and-competition-law-what-you-need-to-know/>.

<sup>6</sup> Ibid

<sup>7</sup> Nidhi Singh And Shivani Swami, 'Are existing antitrust laws applicable to current challenges in virtual competition?' *Financial Express* (7 September, 2018) < <https://www.financialexpress.com/opinion/are-existing-antitrust-laws-applicable-to-current-challenges-in-virtual-competition/1305081/>> accessed 15 February 2024

<sup>8</sup> Abbreviation of Competition Commission Of India

<sup>9</sup> OECD, 'Summary of discussion of the hearing on Big Data' (29-30 November, 2016) <[https://one.oecd.org/document/DAF/COMP/M\(2016\)2/ANN2/FINAL/en/pdf](https://one.oecd.org/document/DAF/COMP/M(2016)2/ANN2/FINAL/en/pdf)> accessed 3 January 2024

<sup>10</sup> Google, 'How ads are targeted to your site' <<https://support.google.com/adsense/answer/9713?hl=en>> accessed 5 February 2024

help of algorithms, firms tend to play with prices by keeping average prices higher than marginal prices without any communication, which makes it difficult for authorities to catch hold of such activities because of the lack of tools. This process has limited human intervention, and subsequently, the presence of the element "agreement" becomes difficult to prove. This raises the question of whether it is necessary to intervene to ensure healthy competition, especially when it is actually vivid in the digital markets.

While interpreting a broad definition of consumer, it has dual outcomes. One, producers (in the present case, firms) are encouraged to fire from the shoulder of the commission as a strategy for meeting competition. Two, it has led to the emergence of perverse situations where maximization of total welfare, which is against the well-established tenet of competition economics, maximization of consumer welfare. As a result, pricing schemes so adopted may be discriminatory or unfair practices of pricing that are viewed from the perspective of a producer rather than from the perspective of the benefits/harm accruing to end consumers.<sup>11</sup>

The market in the contemporary world is no longer restricted to the actual market; instead, it takes the virtual market under its meaning as well. With the Rise of technology, the online market has also played a substantial role as a form of market. Though the present Competition Act is apt for the regulation of the actual market, it fails to take the virtual market's functioning under its ambit. Hence, there is a need for an amendment whereby an exhaustive definition of the market can be construed in the said Act.

Recently, the Union Ministry of Finance constituted a panel to review the Act/ rules/regulations as there is an urgent need or requirement to review the 2002 Act, as there has been no check or review since its enactment. In order to keep the Act effective in a proper or relevant manner, it has to be reviewed soon, and the lacunas must be focused on. "Network economies, platforms, virtual markets, the increasing importance of the non-tangible capital, they need a modern regulatory framework with the changing business environment."<sup>12</sup>

With the existing complexity being present, it is necessary to remember that the fundamental objective of the competition law is to preserve the competition in markets. Digital markets have been getting more rewarding to the consumers and beneficial as well, for which the negative

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<sup>11</sup> Geeta Gouri, 'Opinion on Reviewing the Competition Act' (22 October, 2018) <<https://www.livemint.com/Opinion/KrqLmYStQ4dNJTRLnz2AuL/Opinion--Reviewing-the-Competition-Act.html>> accessed 20 March 2024

<sup>12</sup> Ibid.

or the anti-competitive aspect tends to get overlooked, leading to augment of regulatory challenges in digital market increases and poses a threat to the players of the market competition and challenge for the authorities to keep the check and have proper, efficient tools to curb the anti-competitive practices that hamper the healthy market competition.

### **Cartel and Rise of Algorithmic Tacit Collusion**

The term "Cartel" refers to the creation of agreements to fix prices of goods and services at an artificially high level with the objective of raising prices above the competition levels, resulting in injury to the ultimate consumers and economy. Section 2(c) of The Competition Act, 2002 defines Cartel<sup>13</sup>. "The collusion among a few independent firms in the same industry to coordinate pricing, production, or marketing practices in order to limit competition, maximize market power, and affect market prices is considered to be a "cartel." Cartels are the formal agreement to collude, but when firms act together to reduce the output and keep the prices high, then it is called collusion.

Collusion refers to any form of coordination or agreement between competitor firms or companies with the aim of raising or fixing higher prices than the non-cooperative equilibrium. These cartels can be a result of either implicit collusion or explicit collusion. Cartels, as defined under the European Union Act, are explicit or implicit agreements between enterprises (including the association of enterprises) not to compete on price, product (including goods and services), or customers but to fix prices, limit production, and supply, allocate market share or sales quotas, or engage in collusive bidding or bid-rigging in one or more markets. An important dimension in the definition of a cartel is that it requires an agreement between competing enterprises not to compete or to restrict competition.

Cartel activity has evolved as and when firms companies have used pricing algorithms to collude. At one point in time, when human involvement becomes limited compared to

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<sup>13</sup>The Competition Act, 2002 Section 3(3) provides "Any agreement entered into between enterprises or associations of enterprises or persons or associations of persons or between any person and enterprise or practice carried on, or decision taken by, any association of enterprises or association of persons, including cartels, engaged in identical or similar trade of goods or provision of services, which—

a) Directly or indirectly determines purchase or sale prices;  
b) Limits or controls production, supply, markets, technical development, investment or provision of services;  
c) Share the market or source of production or provision of services by way of allocation of geographical area of market, or type of goods or services, or number of customers in the market or any other similar way;  
d) Directly or indirectly results in bid rigging or collusive bidding, shall be presumed to have an appreciable adverse effect on competition."

advancements in technological developments, the actions would be determined independently by intelligent computer machines using dynamic, self-learning pricing algorithms in a trial-and-error method. The relationship between humans and machines raises an area of concern in order to determine how to hold companies liable for their innovative actions without any human intervention. However, when a computer's action is not a result of human effort or command, then it becomes problematic. Instead, the action is the result of many intermediary steps adopted by computer learning, which utilize vast amounts of data. This is how it becomes difficult to detect if there has been a tacit collusion between firms, as it is not reasonably foreseeable.<sup>14</sup>

Along with the shift from a world where executives expressly collude in smoke-filled hotel rooms to a world where pricing algorithms continuously monitor and adjust to each other's price and market information. Algorithms could be used for "tacit collusion" for price fixing by keeping a check on the movements and behaviour happening in the market among the competitors, which they automatically react to. It is difficult to prove the tacit side of the collision. "The use of advanced algorithms in this scenario transforms an oligopolistic market in which transparency is limited, and therefore, conscious parallelism cannot be sustained in a market susceptible to tacit collusion/ conscious parallelism in which prices will rise. Importantly, price increases are not the result of express collusion but a natural outcome of tacit collusion."<sup>15</sup>

In tacit collusion, Competition and Markets Authority said, "In relation to tacit collusion or coordination, stimulation models confirm that some pricing algorithms can lead to collusive outcomes even when firms set prices unilaterally." Increased price transparency would facilitate "tacit collusion" by competitors adjusting to each other's actions without explicit agreement.

The primary point of difference between the two types of collusion, "explicit collusion" and "tacit collusion," is "Agreement"<sup>16</sup>. In order to prove an illegal Cartel, the existence of an

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<sup>14</sup>Ariel Ezrachi and Maurice Stucke, From Smoke-Filled Rooms to Computer Algorithms — The Evolution of Collusion <<http://clsbluesky.law.columbia.edu/2015/05/14/from-smoke-filled-rooms-to-computer-algorithms-the-evolution-of-collusion/>> accessed 4 March 2024.

<sup>15</sup>Ibid

<sup>16</sup> The Competition Act, 2002, Section 2(b) provides "Agreement includes any arrangement or understanding or a action in concert-

Whether such arrangement ,understanding or action is formal or in writing, or

Whether or not such arrangement, understanding or action is intended to be enforceable by legal proceedings."

agreement has to be shown.

The Competition Act 2002 gives a clear definition of the term agreement under S. 2(b). This definition is different from that of the definition given by S. 2(e)<sup>17</sup> of the Indian Contract Act 1872. The Competition Act gives a much inclusive and broader definition. Agreements could be understood as implied arrangements without any requirement of formal proof of agreement. It is not anti-competitive if enterprises use algorithms to fix prices, but if the enterprises use the algorithms to collude and fix high prices, then problems arise.

Few executives of firms agree upon colluding and fixing high prices with the help of specifically designed self-learning algorithms. However, the collusion that has led to such an Act becomes challenging to prove before the authorities as there is no direct interaction between enterprises or companies to set such prices. However, such an Act is done by the pricing algorithms. Thus, this makes it highly complicated for the Competition authorities to prove the existence of price-fixing agreements between the enterprises or companies, and this is where the law appears to be inadequate. Also, the mere existence of an agreement between the enterprises and companies is not enough, but there must have been an act done in furtherance to make it illegal and have an adverse effect on the virtual market.

In the EU, Article 101 of the TFEU applies to all "agreements" and "concerted practices," although the TFEU does not provide clear-cut definitions of what an agreement or a concerted practice is. According to the courts, an agreement reflects "a concurrence of wills between economic operators on the implementation of a policy, the pursuit of an objective, or the adoption of a given line of conduct on the market, irrespective of the manner in which the parties' intention to behave on the market in accordance with the terms of that agreement is expressed." "In other words, the concept of agreement simultaneously involves the existence of a common will and some form of manifestation, whether it is implicit or explicit. In the absence of a formal agreement, the category of concerted practices can be applied. This involves other factors, such as direct or indirect contacts intended to influence the conduct of other firms deliberately."<sup>18</sup>

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<sup>17</sup> Every promise and set of promises forming a consideration for each other is called as an agreement.

<sup>18</sup> OECD, 'Algorithms and Collusion- Competition Policy in digital age'(2017) [www.oecd.org/competition/algorithms-collusion-competition-policy-in-the-digital-age.htm](http://www.oecd.org/competition/algorithms-collusion-competition-policy-in-the-digital-age.htm) accessed on 5 March 2024.

## Various algorithmic theories of harm

Situations where computers facilitate the various methods of price fixing collusion leading to anti-competitive practices:

### The "Messenger" scenario/ Monitoring Algorithms:

In this situation, firms usually use algorithms to implement a cartel. Pricing algorithms are used to aid information by monitoring the Cartel. Here, algorithms are just mere 'intermediaries' through which firms have agreed to enter into an agreement, which makes it 'per se' illegal. Basically, it is the technological extension of human will<sup>19</sup>, where humans are the executing agents that collude through algorithms as messengers that facilitate information exchange.

So, this kind of cartel agreement is easy for authorities to establish or regulate.

Humans cannot take the defense that the computers did the anti-competitive Act or that the computers are the sole perpetrators of the Act. It has to be examined through a human prism in order to hold somebody liable for the adverse effect on the virtual market competition. This scenario does not create any competitive concern as there is an explicit agreement between the firms and the existing competition law, which is potential enough to deal with these types of anti-competitive effects.

Department of Justice faced the first challenge of pricing algorithms in 2015, when a criminal case, "*U.S.A v. David Topkins*,"<sup>20</sup> was filed by the Department of Justice against David Topkins along with his co-conspirators.

Topkins was the director of Company A, who, along with his co-conspirators, was charged for being involved in the anti-competitive conspiracy, which was said to be an "algorithm-enhanced price fixing" scheme. The Company used pricing algorithms to sell a few posters and prints directly to customers in the US through Amazon Marketplace. Amazon acted as the third-party seller and an intermediary between the Company and the consumers for selling posters, etc. Here, Company A and other poster-selling firms used a pricing algorithm to fix the prices

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<sup>19</sup> Ariel Ezrachi and Maurice Stucke, 'Virtual Competition- The Promise and Perils of the Algorithm-driven Economy'

<[https://www.academia.edu/31432814/Virtual\\_Competition\\_The\\_Promise\\_and\\_Perils\\_of\\_the\\_Algorithm\\_Driven\\_Economy](https://www.academia.edu/31432814/Virtual_Competition_The_Promise_and_Perils_of_the_Algorithm_Driven_Economy)> accessed on 5 March 2024

<sup>20</sup> *U.S.A v. David Topkins*, Case No. 3:15-cr-00201-WHO

of the posters that were to be sold on Amazon Marketplace. Sales were made through Amazon, but sellers could control the decisions relating to price, etc., and what products they offered on that platform.

The software that the Company and the other sellers used helped them to know their competitors' price information for the products and set prices based on their own choices. Had subsequently agreed and entered into cartel coordination and conspiracy to fix prices for products to be sold in the US on Amazon. As a result of this conduct, consumers had to face the problem of paying the same price for an identical product irrespective of what they chose, which ultimately removed the sellers from price competitors.

Topkins and his co-conspirators had collected, exchanged, monitored, and discussed price fixation for the posters. There was a traditional "*meeting of minds*" where the sellers agreed to collude among themselves, and when the government proved this.

Generally, when companies or firms do not explicitly enter into an agreement but instead use pricing algorithms to decide the prices only then these antitrust prosecutions become challenging to prove and bring it under the scope of the existing regulation or when cartels collude secretly without any formal agreement then it is challenging for the authorities to bust them.

Department of Justice made sure that lawyers, firms, economists, etc, were warned about the consequences if they had to enter into anti-competitive agreements or conspiracy with the help of algorithms. Thereafter, there was a clear understanding of how the technological advancements being introduced in the virtual market might have antitrust issues like firms engaging in fixing prices colluding with firms to decide prices and, which is per se illegal, irrespective of the fact of it, i.e., cartel agreements being successful or unsuccessful. The price fixing algorithms are said to be "*no brainers*" by the antitrust world because of little or no presence of human intervention and mental effort. Ezrachi and Stucke, in their book,<sup>21</sup> referred to this scenario where humans entered into an explicit agreement to fix prices using advanced technology as a "Messenger" scenario, i.e., "the pricing algorithms were following explicit

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<sup>21</sup> Ariel Ezrachi and Maurice Stucke, 'Virtual Competition- The Promise and Perils of the Algorithm-driven Economy',  
<[https://www.academia.edu/31432814/Virtual\\_Competition\\_The\\_Promise\\_and\\_Perils\\_of\\_the\\_Algorithm\\_Driven\\_Economy](https://www.academia.edu/31432814/Virtual_Competition_The_Promise_and_Perils_of_the_Algorithm_Driven_Economy)> accessed 9 March 2024

human instructions to violate the anti-trust laws and thereby acting as messengers among the various co-conspirators."<sup>22</sup>

### **The "Hub and Spoke" scenario/ Signalling Algorithm:**

The traditional model uses computer-based algorithms as a central hub to coordinate competitor prices and incidental activities. In this scenario, competitors, instead of using their data and algorithms, use a third-party algorithm supplier, which they find compelling in gaining data and understanding the pricing policy. This collusion is facilitated by a developer of an algorithm that, by entering into vertical agreements with its competitors, ensures price-fixing.

"Unlawful conspiracy is often formed without simultaneous agreement or action on the part of conspirators," as held by US S C in *United States v. Laspier*.<sup>23</sup> In the driven hub and spoke model, algorithms perform the 'hub' functions to facilitate collusion among the competitors in the virtual market. Firms use single algorithms on the same platform where prices will be automatically aligned with the use of similar 'logic' to determine the pricing decisions. Competition and Markets Authority is of the opinion that " 'Hub and spoke' is likely to pose a more immediate risk by highlighting situations where competitors decide, instead of using their data and algorithms, that it is more effective to delegate their pricing decisions to a common intermediary which provides algorithmic pricing services." It also says "third party providers of pricing algorithms services may be natural 'hub for 'hub and spoke' collusion."<sup>24</sup>

Nowadays, algorithmic pricing has made it significantly faster to react to market dynamics, and competitors usually do not interact directly with each other but outsource their pricing mechanism to an upstream supplier algorithm. Hence, the sole algorithm being used on the same platform but by different competitors would now align the prices automatically as they are using the same logic for determining their pricing decisions. For a scenario to happen in this category, there needs to be a communication or agreement for the firms to co-ordinate as

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<sup>22</sup>Terrell McSweeney, 'The Implications of Algorithmic Pricing for Coordinated Effects Analysis and Price Discrimination Markets in Antitrust Enforcement'

<[https://www.ftc.gov/system/files/documents/public\\_statements/1286183/mcsweeney\\_and\\_odea\\_implications\\_of\\_algorithmic\\_pricing\\_antitrust\\_fall\\_2017\\_0.pdf](https://www.ftc.gov/system/files/documents/public_statements/1286183/mcsweeney_and_odea_implications_of_algorithmic_pricing_antitrust_fall_2017_0.pdf)> accessed 10 March 2024

<sup>23</sup> 2015 WL 4664689, Para 8

<sup>24</sup> Gary Murray, Keith Jones, 'Latest(economic) thinking on competitive impact of pricing algorithms-paper by UK's Competition and Market Authority' (17 October, 2018)

<<http://competitionlawblog.kluwercompetitionlaw.com/2018/10/17/latest-economic-thinking-competitive-impact-pricing-algorithms-paper-uks-competition-markets-authority/>> accessed 11 March 2024.

to which hub they should have a hub and spoke Cartel, which would again not have any new competition law problems.

In the case of *Samir Agrawal v. ANI Technologies Pvt Ltd.*, [Case No. 37 of 2018], the case was filed before CCI against Ola and Uber (cab aggregators) for adopting an algorithmic pricing mechanism while rendering the radio taxi services, which led to price fixing that contravene the provision of S 3 of the Competition Act. It was alleged that Ola and Uber acted as 'Hub' and drivers as 'spokes' and colluded on prices.

Issues dealt with were:

- Ola and Uber engaged in price fixation by using pricing algorithm mechanisms, thereby not allowing drivers to compete on price.
- Ola and Uber's price discrimination is to the disadvantage of the riders because of the information asymmetry.

Based on the issues, CCI gave its findings and observations by rejecting the allegations so imposed on them, saying there existed no agreement/coordination amongst the cab aggregators and drivers regarding price fixation. It said the price was fixed by centralized pricing algorithms, which helped compute the fare based on various factors. CCI said that centralized control is integral to the functioning of the aggregation-based model.

CCI dismissing the allegations made for price fixing under Section 3(3)(a) ordered:<sup>25</sup>

*"In the present case, the drivers may have acceded to the algorithmically determined prices by the platform (Ola /Uber). This cannot be said to be amounting to collusion between the drivers. In the case of ride-sourcing and ride-sharing services, a hub-and-spoke cartel would require an agreement between all drivers to set prices through the platform or an agreement for the platform to coordinate prices between them. There does not appear to be any such agreement between drivers inter-se to delegate this pricing power to the platform/cab aggregators."*

Ola and Uber Act as intermediaries between drivers and riders to facilitate service. They do not own any taxis but operate as a platform. It provides a platform through a mobile application

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<sup>25</sup> Samir Agrawal v. ANI Technologies Pvt Ltd., Case No. 37 of 2018

that allows riders and drivers to interact. They can download the app, register for it, and use it. When they opt for a ride, the fare is calculated by an algorithm based on many factors like base amount, time spent in transit, ride distance, etc., and the payment is made through digital mode. However, due to the usage of algorithms by the app, the fares that display at the end of the ride are non-negotiable, and The drivers who ride or are attached to the respective networks act as independent third-party providers but not as employees but still the prices are not decided independently with the cab aggregators.

The drivers are obviously influenced by the effect that more drivers are accepting this type of mechanism and that when they enter into such tacit agreement where they agree to the pricing mechanism followed by cab aggregators in order to indulge in price fixing and that "agreements that directly or indirectly determine the sales prices are prohibited under the law.

As per the analysis, we opined that the Hon'ble Commission has erred in interpreting the principle of the Hub and Spoke scenario and erred in passing the judgment as there are clear reasons why the issues could have led CCI to penalize Cab aggregators. With the case in hand, Ola and Uber are a Hub, drivers are the spokes, and the 'Terms of Service' between Ola and Uber and drivers is the rim. All the drivers sign the 'Terms of Service'. They are aware of the simple fact that other fellow drivers are also signing a similar arrangement with Ola and Uber and are agreeing to let the cab aggregators fix the prices or fares. This arrangement would work only if the drivers were onboard and allowing the cab aggregators to fix prices. This clearly indicates that there is a meeting of minds between the drivers.

Under this principle, The driver (spokes) do not enter into an agreement inter se, but the agreement is with Cab aggregators (Hub). Hence, the commission, by stating that there was no agreement between the drivers, committed an error. It erred in giving importance to the concept of "meeting of minds," whose presence gave Rise to collusion. The traditional approach has to be changed along with the rapid advancements happening in the economy to cope with all of its effects.

CCI and courts have, over time, said that under the Competition Act, the definition of the term "agreement" is broad and inclusive but not exhaustive. "Even a wink or a nod can be said to be an agreement." It is not only restricted to a formal understanding but also covers a few practices, such as understanding or cooperation without any formal agreement.

In *Interstate Circuit, INC v. United States* [306 US 208 (1939)], The US Supreme Court held that "inferences can be drawn of an agreement from the nature of proposal that is made and the unanimous action of the parties." A similar decision was taken in the case of "*Director General v. M/s Puja Enterprises Basti & Ors*"<sup>26</sup> and "*British Basc Slag Ltd v. Registrar of Registrar of Restrictive Trading Agreement*."<sup>27</sup>

In order to establish that firms are agreeing, price fixation can be induced just with the knowledge or facts about the conduct of the parties. So, the tacit agreement between the drivers can be shown as they fall under the purview of Section 3(3)(a) as they have appreciable adverse effects and are anti-competitive.

This was very well a situation of "Hub-and-spoke agreement" where Cab aggregators acting as Hubs imposed Vertical restraints (prices) on the drivers acting as Spokes, leading to collusion with the drivers (Spokes) by virtue of its agreement with the Cab aggregators (Hub) and should be treated as anti-competitive.<sup>28</sup> "Hub-and-Spoke- arrangement requires the spokes (participating element) to use a hub (Third Party Platform) for exchanging sensitive information, which in this case should be on data on prices so that the same can be fixed."<sup>29</sup>

The conduct of drivers is illegal as there is a horizontal agreement as u/ S 3(3)(a), Competition Act 2002, that prohibits 'agreement between individuals/association to directly/ indirectly determine purchase/sale price that results in AAE<sup>30</sup> on competition. The conduct of the drivers

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<sup>26</sup> " *Director General v. M/s Puja Enterprises Basti & Ors*, (2013) CompLR 714 (CCI), Held: "*In most cases, the existence of an anti-competitive practice or agreement must be inferred from a number of coincidences and indicia which, taken together, may, in the absence of another plausible explanation, constitute evidence of the existence of an agreement*"; Kaustub N.S. Bhati and Prankul Boobana, 'CCI order on Price Fixing: Collusion in Cab aggregation Models?' (26 January 2019) <<https://indiacorplaw.in/2019/01/cci-order-price-fixing-collusion-cab-aggregation-models.html>> accessed 11 March 2019

<sup>27</sup> In *British Basc Slag Ltd v. Registrar of Registrar of Restrictive Trading Agreement* [(1996)LR 6 RP 101] Held: "*Where the member companies are suggesting here is, in effect, that the parties can give to the court an undertaking not to make an arrangement, and can themselves prevent what would otherwise be an arrangement from being such by the simple device of taking care not to tell one another what they are going to do before they start to do it; even though over a period of years thereafter they carry out a course of conduct involving the acceptance of mutual obligations, which are implied if their conduct is to achieve its only point and purpose: and they carry it out in the knowledge: and because of the knowledge, that others are all doing likewise and can be expected to continue so to do. In such situation there is an arrangement, just as much as if they had each side to the other in advance*"

<sup>28</sup> Kaustub N.S. Bhati and Prankul Boobana, 'CCI order on Price Fixing: Collusion in Cab aggregation Models?' (26 January 2019) <<https://indiacorplaw.in/2019/01/cci-order-price-fixing-collusion-cab-aggregation-models.html>> accessed 11 March 2023

<sup>29</sup> 'Price Fixing allegations against Uber and Ola rejected by Competition Commission of India' (9 November, 2018) < <https://www.bgr.in/news/uber-ola-price-fixing-allegations-rejected-by-competition-commission-of-india/>> accessed 13 May 2023

<sup>30</sup> Abbreviation to appreciable adverse effect

was in such a manner that led to an agreement for the determination of the sale price with cab aggregators, knowing the facts that other fellow drivers had indirectly entered into a similar kind of arrangement for determining the sale price. This collusion should have been presumed to have AAE on competition under S 3(3)(a).

Uber Technologies Inc. is an American MNC that works in the online transportation network. Many cases have been filed against Uber in European countries due to the pricing differences faced by consumers. Uber uses this surge-pricing algorithm, i.e., when there is more demand for rides and less supply of cars, charges discriminatory high prices to the consumers. Uber uses a surge pricing algorithm that is run every 5-10 minutes to determine the prices of rides for the places in high demand. This surge pricing is far from perfect, and according to Uber, the surge pricing is used to maximize the no. of rides, but no one actually knows how it works as one cannot see what prices others are getting while booking a ride, neither the drivers nor the riders know. Explaining using an instance happened, in Times Square, Manhattan being one of the dense areas with patchy demand, two persons standing on either side of the road get different prices or are shown discriminatory prices, and it was said even drivers theoretically colluded to manipulate the system.<sup>31</sup> Uber does not provide any data about demand and supply, and their pricing algorithm is very opaque. They have successfully manipulated the system to gain profits. This can be considered a form of vertical price fixing as we know that drivers are not Uber employees but are mere independent third parties, and the prices are not determined independently but by Uber's centralized system. So, it can be considered a form of collusion among drivers.

### **Predictable Agent/ Parallel Algorithms:**

This is one of the collusion scenarios that is challenging to establish when there is frequent usage of complex algorithms, and it is also a challenge to identify human perpetrators behind such activities. Pricing Algorithms act as 'Predictable Agents' that respond or behave automatically as per the market dynamics. Competitors usually do not use the same algorithm but unilaterally design and apply their algorithms to adapt to market changes and maximize profits. Instead of aligning prices through self-learning behavior, the algorithms would adapt to the commercial behaviors of competitors. Firms operate on their own using their algorithms

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<sup>31</sup> Jessica Leber, 'The Secrets of Uber's Mysterious Surge pricing Algorithm', <<https://www.fastcompany.com/3052703/the-secrets-of-ubers-mysterious-surge-pricing-algorithm-revealed>> accessed 28 February 2024

while being aware of the fact that other firms will also be using pricing algorithms without actually entering into any actual agreement and subsequently entering into tacit collusion or understanding or conscious parallelism.

Algorithms react very quickly, i.e., when firms lower the price, other prices also lower their price immediately. This is where the issue arises as to the point of agreement; they do not explicitly agree but enter into a tacit understanding to fix prices without leaving behind any direct evidence for the competition authorities to regulate the same for any anti-competitive outcomes premised on anti-competitive intent of the companies or the firms.<sup>32</sup>

*"If parallel algorithms are used, a firm could make an "offer" to collude by implementing an algorithm that imitates in real time the price of the market leader, while the leader could "accept" the offer by increasing the price in reaction to the competitor's algorithm. Alternatively, a firm may make an "offer" to collude by publicly releasing a pricing algorithm, while competitors would "accept the offer by using the same algorithm.""*<sup>33</sup>

### **Artificial Intelligence/ Digital Eye/ Self-learning Algorithms:**

This involves machine learning algorithms. Makers here design their algorithms, but they do not program them to behave or react in a particular way to the market stimulants. These algorithms use Artificial Intelligence, and as they are self-learning, they start colluding on their own.

Artificial Intelligence is highly deceptive, and as discussed by Ezrachi, the "technological advancement in terms of the enhanced ability of the computers to process huge amounts of data by itself at a real-time speed that could literally lead to achieving a God-like or divine view of the market and attain objective to maximize profits without any intention of human colluding and also with limited possibility of being identified by regulators." This is how tacit collusion is intensified.

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<sup>32</sup> Ulrich Schwalbe, 'Algorithms, Machine Learning and Collusion', 5 April, 2018 : Nidhi Singh, "Virtual Market" <<http://www.icc.qmul.ac.uk/media/icc/gar/gar2018/Virtual-Competition---Challenges-for-Competition-Policy-in-an-Algorithm-Driven-Market.pdf>> accessed 15 May 2024.

<sup>33</sup> 'OECD workshop addresses algorithms and collusion issues' (July 2017) <<https://www.nortonrosefulbright.com/en-be/knowledge/publications/6aabf0b8/oecd-workshop-addresses-algorithms-and-collusion-issues#section6>> accessed 14 March 2024.

This scenario is different from the other three scenarios as, here, algorithms are just autonomous agents that are created by companies to help them achieve their target of price fixing and profit maximization, not just mere instruments used by humans. Here, the machines are efficient enough to behave independently as per market behavior and help humans achieve their goals. AI can be used to build sophisticated algorithms that would give us a perfect image of virtual competition, but it would not benefit from the "technology at all.

### **Challenges for Competition Law Enforcement: India and EU**

Few executives of firms agree upon colluding and fixing high prices with the help of specifically designed self-learning algorithms. However, the collusion that has led to such an Act becomes challenging to prove before the authorities as there is no direct interaction between enterprises or companies to set such prices. However, such an Act is done by the pricing algorithms. Thus, this makes it highly complicated for the competition authorities to prove the existence of price-fixing agreements between the enterprises or companies, and this is where the law appears to be inadequate. Also, the mere existence of an agreement between the enterprises and companies is not enough, but there must have been an act done in furtherance to make it illegal and have an adverse effect on the virtual market.

The appreciable adverse effect is an impact that an agreement has on the competition. The Competition Act mentions the presumption of the appreciable adverse effect in cartel cases<sup>34</sup>, but the presumption is not itself evidence to evidence or proof. It shifts the burden of proof in order to rebut the presumption of appreciable adverse effects on respondents. For a cartel to exist, a few parameters have been laid down under S. 19(3) of the Competition Act, 2002 to see if a Cartel has an appreciable adverse effect on the market. In the case of an algorithmic Cartel, the defense of technological advancement and promotion can be taken. There are many economic factors, such as the structure of the market and government. Economic policies, etc., help rebut the presumption. However, it would put a hurdle for the authorities to detect and punish cartels where pricing algorithms are used. Anti-competitive agreements are caught by Article 101 of the Treaty on the Functioning of the European Union (TFEU), irrespective of the instruments used for their implementation.

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<sup>34</sup> The Competition Act, 2002, Section 3(3)

Programmers and users should be aware of the potential legal consequences of the algorithm and its uses. However, except in uncomplicated cases, regulators are still figuring out when the use of pricing algorithms is prohibited. Indeed, part of the challenge is that "smart coordination" through algorithms requires "smart regulation"— setting rules that limit the harms of increased coordination while ensuring the benefits of algorithms are not lost.

CCI has been facing enforcement challenges with respect to tacit collusion and AI. This makes it difficult to ascertain the existence of the agreement.

The essentials to establish the existence of cartels under s. 3 are:

- presence of agreement
- act that is done in furtherance of the agreement to reach an anti-competitive
- the agreement must lead to an appreciable adverse effect on the competition.

As firms have enough data so, it helps them to unilaterally design algorithms to give few predictable outcomes and react in the way that they want with the help of the market-changing dynamics or the use of a pricing algorithm that automatically decides and changes the price without the intervention of human/enterprise/company, it becomes difficult for the regulators to bring the algorithms developers under the scanner as CCI lack enforcement tools.

Anti-competitive intent can be brought into disposal in case of tacit collusion. However, there is complete isolation of the "human" element from the algorithms building the strategic decisions, and they end up colluding tacitly. A position is made where CCI faces challenges to regulate the virtual market with the absence of human interference, express agreements, etc, which leads to holding nobody liable and ultimately reducing consumer welfare. So, this calls for a specialist approach to study algorithms and their degree of control over machines in order to know the intention of defendants and check how far transparency, accuracy, and predictability pose harm in AI space.

Article 101 of TFEU does not prevent companies from using the information available in the market to adapt to the existing and anticipated conduct. Only if enterprises could foresee their challenger's conduct could they adjust their prices accordingly. Unlike Indian Law, EU law only holds explicit collusion as illegal. Competition Market authorities have a view that the

models of "predictable agent and "Digital Eye" are very much not likely to fall within Art 101 of TFEU as they might generate coordination themselves.<sup>35</sup>

CCI is trying to access the algorithms used by the airline for the pricing of the tickets in order to keep a check on possible cartelization. Just after the Jat agitation in 2016, the airfares for flights from Chandigarh to Delhi sharply increased. D.K. Sikri, Chairperson, CCI, told PTI that the regulators are now checking on the fare increase and its effect on the market cartelization. CCI is not alone in having faced this kind of situation. However, earlier, there have been cases before EC and Department of Justice in the US that faced this situation of price fixing by airlines on passenger and cargo fuel surcharges. It was alleged that airlines in the US regulated traffic across the routes in order to fix prices, and in the EU, there was a restriction of airlines and travel agents from shifting to competition.

EU, while considering the case of Uber, said that the surge pricing algorithms do not qualify as an agreement because of their unilateral conduct by means of technological features. Subsequently, it was found that there was no violation under Art 101<sup>36</sup> TFEU.

These cases can very well be dealt with under the first category of collusion, i.e., Messenger category, as algorithms are the tools for implementation of collusion but are not parties to collusion. Algorithms are said to be tools for implementation as they are used to reflect the

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<sup>35</sup> Miranda Cole and Jerome de Ponsay, 'The CMA's paper on pricing Algorithms, Collusion and Personalised Pricing' (5 November, 2018) < <https://www.covcompetition.com/2018/11/the-cmas-paper-on-pricing-algorithms-collusion-and-personalised-pricing/> > accessed 16 March 2024.

<sup>36</sup> TFEU, Art 101 reads as "All agreements between undertakings, decisions by associations of undertakings and concerted practices which may affect trade between Member States and which have as their object or effect the prevention, restriction or distortion of competition within the internal market, and in particular those which:

- (a) directly or indirectly fix purchase or selling prices or any other trading conditions;
- (b) limit or control production, markets, technical development, or investment;
- (c) share markets or sources of supply;
- (d) apply dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage;
- (e) make the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts.

2. Any agreements or decisions prohibited pursuant to this article shall be automatically void.

3. The provisions of paragraph 1 may, however, be declared inapplicable in the case of:

- any agreement or category of agreements between undertakings,
- any decision or category of decisions by associations of undertakings,
- any concerted practice or category of concerted practices,

which contributes to improving the production or distribution of goods or to promoting technical or economic progress, while allowing consumers a fair share of the resulting benefit, and which does not:

- (a) impose on the undertakings concerned restrictions which are not indispensable to the attainment of these objectives;
- (b) afford such undertakings the possibility of eliminating competition in respect of a substantial part of the products in question"

intent or, say, the collusive intent of the market players. The US and EU placed this situation under this category. However, the information received by CCI is being investigated. This indicates that this case would fall under the third (Predictable Agent) and fourth (Artificial Intelligence/Digital Eye) categories, as the algorithms were self-learning and were designed with a certain logic to collude.

To analyze the potential treatment of both of these categories under The Competition Act 2002, it is very well clear that both of these categories pose challenges for the CCI because there is a complete isolation of human intervention.

Section 3(3) of the Competition Act prohibits collusion and restricts horizontal agreements and the decisions or practices adopted for collusion.

So, by breaking down **Sec 3(3)** into parts, we have,

"a) if there is any ***"agreement entered into"*** or ***"practice carried on"*** or "decision taken by"

b) ***"persons"*** or association of persons or enterprises or association of enterprise

c) which directly or indirectly determines purchase or sale prices,

then it shall be presumed to have an appreciable adverse effect on competition."

Applying this to the issue at hand, the very fact that algorithms are used to fix airfare prices has an adverse effect on consumers, so an appreciable adverse effect is automatically presumed.

Then comes the necessity for analyzing the first two pointers/requirements of the section:

a) *if there is any "agreement entered into" or "practice carried on" or "decision taken by":*

Under the Indian Competition regime, not only are explicit agreements said to be illegal, but tacit agreements, understandings, practices, or decisions are also considered to be illegal and fall within the ambit of horizontal restraints.

The term "agreement"<sup>37</sup> defined under the law includes "arrangement or understanding or

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<sup>37</sup> The Competition Act 2002, Section 2 (2)

action in concert," and the term "practice" broadly includes "any practice relating to the carrying on of any trade by a person or enterprise."

- A predictable agent scenario is concerned here as algorithms are programmed, be it unilaterally or independently, to behave in a particular way to the market stimulants, which clearly amounts to a "practice" and "action in concert."
- Additionally, to deal with Artificial intelligence/ Digital eye, the self-learning behavior of the algorithms used to fix prices, in comparison to the prices set by the rivals, would amount to "action in concert."

The broad ambit of conduct within horizontal restraint satisfies the first requirement. However, in jurisdictions like the US and EU, an agreement needs to be established for collusion.

b) *"persons" or "association of persons or enterprises or association of enterprise":*

This second requirement raises the issue of whether the agreement or practice must be entered into between persons or enterprises, etc. The definition of "Person" is inclusive and taking into the purposive interpretation of the Act, which talks of the protection of the interest of consumers and consumer welfare and competition, would induce CCI to make the most of the non-exhaustive nature of "Person" (strategies used by companies to have ACP)

- In the scenario of Predictable agents, competitors use algorithms to reflect the logic of the programmers. So, the competitors would themselves be acting in concert through indirect means.
- Meanwhile, in artificial intelligence, algorithms collude to generate revenue for enterprises. So, algorithms here act in concert, and persons using them can be very well brought under the purview of the section.

CCI relies on circumstantial evidence, both economic and conduct-based, to reach its decision on the existence of a cartel agreement. The executives do not need to have an express collusive agreement as each firm may individually use their own pricing algorithms, which would help them set their own price. They may or may not use it with an anti-competitive intent. However, executives cannot even predict how it will affect the virtual market as danger is not associated with express collusion but with tacit collusion.

We are now aware that algorithms and their usage by enterprises have appreciable adverse effects on the virtual market. However, the isolation of human intervention in the actions of algorithms raises challenges to attribute liability to its operators or programmers who might escape from the scrutiny of regulators. CCI faces a massive problem with the determination of liability in algorithmic collusion cases.

- In the third category, Predictable Agents, the competitors make sure that the algorithms are unilaterally designed or programmed to collude and react to market conditions in an identical way by giving the same prices.
- In the fourth category, the Digital eye, the problem arises as competitors use algorithms for profit maximization, but algorithms use AI to learn that collusion is the best way to result in profit maximization. The competitors expressly design for profit maximization but do not act in a particular way through collusion. As they do not have any implied or express intention to collude, an assumption can be made that they were aware that the self-learning algorithms used for profit maximization would ultimately lead to collusion.

Here comes a question: can the knowledge be sufficient to hold the competitors liable? This poses difficulty for the CCI in deciding the extent of involvement of competitors.<sup>38</sup>

Basically, from all of this information, we now know that both of these categories (Predictable Agent and Digital Eye) carry on the function or role of competitors' employees to fix prices to reflect market forces.

OECD, in a discussion on "algorithms and Collusion," DG for competition, talked of two principles for the treatment of algorithmic pricing, out of which one says that if algorithms are under the Company's control, then the Company shall remain liable for its actions.

## Conclusion

India continues to have a unique market and regulatory environment with an intense involvement of the regulator and the government. The gradual regulatory evolution to support

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<sup>38</sup> Madhavi Singh, 'Algorithmic collusion in Flight Pricing in India' (29 November, 2018) <<https://lawschoolpolicyreview.com/2018/11/29/algorithmic-collusion-in-flight-pricing-in-india/>> accessed 20 June 2024.

the technical developments happening in the virtual market has to be continued. The increasing competition provides thoughtful opportunities to develop the competition in the virtual market as per international standards. However, it also has become a challenge for enterprises, companies, and consumers to counter its adverse effects by having a strong base of our law rather than drawing precedence from EU law or relying on the EU law for adequately analysing the adverse effects of algorithms on the virtual market and penalizing the human perpetrators behind them. Technology holds the key to the success of the Indian market as India could leapfrog into a virtual market. Technology is always a double-edged sword that can be used for dual purpose, good or bad.

Big data, data analytics, self-learning algorithms, and AI, as a result of the advancement happening in the present era and forming the essential part for the functioning of the virtual market, lead to transparency in the virtual market and a significant decline in the traditional market. The increase in market dynamics yields benefits and poses adverse effects on the virtual market. The technological advancements used by firms should be used to generate maximum consumer surplus and advantages. Algorithms have a positive and negative impact on the virtual market competition. The extant competition law dealing with anti-competitive practices is somewhat not on par to deal with the advancements happening. The Competition Act 2002 basically derives its substance from the European Union Competition law. For many years, there have been cases faced by the EU, so presently, it can be said that EU regulators have attained maturity while dealing with innovations in the virtual market. They have actually made attempts to deal with the cases fairly by penalizing enterprises using algorithms to have appreciable adverse effects.

Enterprises, in order to reap benefits for themselves, would actually go to the extent of finding the gap in the law and committing adverse acts and being caught for doing so. Primarily, the challenging aspect with respect to collusion is establishing the existence of agreements between enterprises. There is a limited intervention of the human element with respect to algorithms-driven conscious parallelism, AI, and humans. If humans have used the algorithms to keep algorithms for their benefit, then even if it has some adverse effect on the competition, enterprises or competitors should be penalized. Competition Jurisprudence has evolved globally and has considered price-fixing cartels as per se illegal, and it has also recognized the harmful effects on the competition and consumers. Under US Antitrust law, humans are held liable and are imprisoned if they engage in price collusion. Even if price-fixing cartels are not

materialized still, they are considered anti-competitive.<sup>39</sup>

Big data and information asymmetry are a few of the factors that cause discrimination in the virtual market. The disruption in the anti-competitive equilibrium decreases consumer well-being, which subsequently jeopardizes consumers' privacy to a greater extent. The isolation of human intervention in the actions of algorithms might raise a challenge to attribute any kind of liability to its operators and would escape scrutiny from the regulators. The researcher is of the opinion that CCI should introduce proper checks and balances in the present pricing algorithm methods and have a sound monitoring system as problems arise in the virtual market. Competition policies are universal and are happening across all industries in many jurisdictions. CCI should efficiently look into new forms of anti-competitive behavior. Economic developments would continue to happen in their own way, but at the same time, the purpose of the Competition Act should not be overlooked. In the end, the law is to sustain healthy competition, protect the interest of participants, and prevent any anti-competitive practices happening in the market.

The framework for the enforcement of the competition law needs to become accustomed to a world of algorithmic pricing. This would include monitoring the virtual market in a more automated way and building a test environment wherein the computer algorithms could be investigated and examined in order to know how they react. The regulators or, say, the competition authorities have to adapt themselves to the ever-increasing new methods being adapted or used by enterprises or companies for their business and profit-making by putting their competitors or consumers or customers in a disadvantageous position. Not every enterprise or Company uses it to its benefit by hampering the virtual market. However, it has to be kept in mind that, many times, algorithms are used to help break down the barriers to the competition and also make the functioning of the virtual market more effective."

Algorithms are no doubt one of the technological innovational gifts. However, they also have been used by enterprises or companies to their benefit of profit maximization and enjoying a dominant position by keeping a lead in the virtual market. The concept of a market is itself evolving. Hence, the incidental innovation or developments also form a part of it. Through the research, we could understand that India does not have a strong base to deal with ACP in the

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<sup>39</sup> Nidhi Singh, 'Virtual competition: Challenges for competition policy in an algorithm driven market' (Sept 11, 2018) <<http://www.icc.qmul.ac.uk/media/icc/gar/gar2018/Virtual-Competition---Challenges-for-Competition-Policy-in-an-Algorithm-Driven-Market.pdf>> accessed 03 Feb 2019

virtual market. The regulators and authorities have time and again relied on previously decided EU cases to deal with the present rising problematic situations. There has only been one case where regulators could penalize the Company (Google) for indulging in anti-competitive practices using algorithms. With the ongoing innovations happening in the market, there have been few cases of anti-competitive practices. However, hardly any regulators could actually find the actual lacunae, but they dismissed the case because of a lack of competition jurisprudence on our own. The CCI needs to keep pace with the market and technological developments. It should promptly investigate when it feels there might be an anti-competitive practice. CCI should also be in a position to support a faster enforcement mechanism to prevent the creation of well-established monopolies in virtual markets like the Google search bias case.