# ASCERTAINING THE INTER-RELATION OF PRICING ALGORITHMS AND COLLUSION: AN EXPLORATORY STUDY FROM THE PERSPECTIVES OF THE NOTION OF 'CONSUMERISM'

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**ABSTRACT**

The technological revolution witnessed over the last two decades, has been rather remarkable. In the forefront of such innovations, remain the consumers, who form the backbone of any modern economy. However, such innovations have posed questions for the legal that has proven difficult to answer. The proposed piece shall attempt to examine one such resultant legal difficulties i.e., 'algorithmic collusion', one of the more concerning prospects, when viewed from the perspective of consumer protection.

To be succinctly put, algorithmic collusion refers to 'any act of collusion or a situation where any collusive outcome has been achieved by resorting to the use of pricing algorithms'. In general parlance, agreements covered within § 3(3)(a) of the Competition requires intent to collude on behalf of the colluding parties. However, the use of pricing algorithms effectively allows parties to collude, without leaving any trace of intent or the pre-requisite mental element. Thus, the lack of evidentiary links and the fractured legal position concerning its invalidity, creates regulatory hurdles in establishing a causal link between the pricing algorithm and the resultant collusive outcomes. While the Government of India, through the Competition (Amendment) Act, 2023, has attempted to regulate certain facets of algorithmic collusion, the efficacy of the same within the practical context, still remains an uncharted territory.

On account of the above context, the present piece would attempt to evaluate three primary issues. Firstly, whether algorithmic collusion be regarded as a genuine threat to the functional competition within the market and consequently to the consumers. Secondly, whether there exists an emergent need to revisit the approaches prescribed under §3(3), to explore its plausible application to an instance of algorithmic collusion. Lastly, whether there is a need for exploring a revamped understanding of 'consumer harm', given the change in dynamics due to technological innovations.

**Keywords:** Cartelisation, Anti-Competitive Agreements, Pricing Algorithms, Algorithmic Collusion, Consumer Harm, Consumer Protection

## I. INTRODUCTION

The contemporary market structure, has been significantly impacted by the numerous technical advancements since the turn of the millennium.[1] From the standpoint of the regulatory framework, a rather significant development has been the growth of 'Platform Enterprises/Digital Enterprises'.[2] 'Platform Enterprises' in the most rudimentary manner can be defined as,

"multi-sided digital structures, that allow interaction amongst the various Stakeholders within the Marketplace. These structures essentially operate on Blockchain and Cloud Computing technology, wherein, they collect the personal information (synonymously referred to as 'Big Data') of the consumers, and process the same using various algorithmic models to offer varying category of services to their consumers".[3]

Given the difference in operational modalities between the two business set-up, they have been considered as two separate classes resulting in differences in the regulatory regime.[4] One rather intriguing difference between a traditional business set-up and a platform business, is the employment of algorithms,[5] as the lynchpin of its operations.[6]

From the competition law standpoint, a subset of the Algorithms, i.e., 'Pricing Algorithms', employed by the Platform entities to determine the pricing strategies of the commodities has increasingly become a matter of concern in the last decade. Pricing Algorithms can be defined "as codes that determine the prices of the products in accordance with the

prevailing market variables including demand-supply levels, pricing strategies of the competitors and potential future growth prospects of the commodity in question".[7]

When seen from the perspective of 'potential technical advancement', the employment of pricing algorithms for determining pricing could be said to result in certain plausible benefits. The Competition Authority of the UK has observed that the use of algorithms does have the potential to benefit consumers by increasing effectiveness and efficiency within the market set-up, apart from lowering barriers to entry and enabling innovation.[8] Additionally, pricing algorithms, bring about a certain degree of transparency in the prices adopted by the market players. Such transparency allows the consumers to be in a better position to make an informed decision, which in turn increases the standing and bargaining powers of the consumers.[9]

However, the abovementioned innovations do come with their own set of regulatory concerns. Two pertinent concerns regarding potential anti-competitive challenges that may arise due to the use of pricing algorithms i.e., (a) Tacit Coordination; and (b) Restructuring the existing market dynamics.[10]

The first concern regarding the use of algorithmic pricing was that of tacit coordination. According to the report, algorithmic pricing broadens the grey area between illegal overt collusion and legal implicit collusion, thereby, making it easier for companies to achieve the results of collusive conduct.[11] However, the above scenario may be differentiated based on the specific role being played by such algorithms,[12] as we will be witnessing in the upcoming sections.

But the bottom-line is that there is no requirement of a specific intent or understanding between the parties that suggests collusive behaviour,[13] as is the case under the prevalent legal regimes. Under the current competition policies worldwide, identification of an agreement between the competitors is a pre-requisite to any evaluation concerning collusive activity. In practice however, the definition of an agreement (in its present form) provides little guidance as to whether more subtle forms of communication fall within the scope of the competition rules.[14] This particular loophole creates a potential situation of exploitation.

The second noteworthy concern raised in this report concerned the dilution of the existing structure of market dynamics. Under the traditional market structure, the possibility of a collusion is higher in an oligopolistic market, as is evident from several decisions. This is due to the existence of fewer market players, which makes ensuring coordinated action easier.[15] However, with the wider reach and understanding of the pricing strategies there is a concern being raised that algorithms may change the market dynamics and competition, thus incentivizing collusive activities.[16] Therefore, the possible scenario that unregulated employment of algorithms may render the market concentration irrelevant and increase the possibility of collusion in a non-oligopolistic market as well.[17]

With the forgoing paragraphs focusing upon the structural tenets of the law form the fundamental premise of the discussion, the author has also made an attempt to evaluate the impact of the same on the consumers.

The author herein, argue that the notion of anti-competitiveness within the jurisdictions of the EU and India is not only hinged upon the notion of 'consumerism', but is essentially an extension of the principle of consumer harm. Thus, there also exists an emergent need to reconsider our interpretation as to what entails 'consumer harm' given the altered market dynamics, which further necessitates a re-evaluation of the principle of 'consumerism' in the digital world.

Accordingly, the author has structurised his arguments and observations under three sections. Section II discusses the perspectives of the European and UK while dealing with the concerns regarding increased competition that arises due to the interaction of algorithms with the market dynamics. The second half of the section will focus on the apparent and possible anti-competitive scenarios that could pose a serious concern for the competition regulators.

Section III would focus solely on the competition regulatory regime of India. Through this Section, the author would establish the practical difficulties that the regulators face, while evaluating cases involving pricing algorithms, and would try to ascertain the approach taken by the Indian competition regulators and other legal forums.

The Section IV would attempt to highlight the (a) the interconnectedness of 'consumer harm' vis-à-vis 'anti-competitive agreements' and (b) redundancy of the present understanding of consumer harm vis-à-vis algorithmic collusion. The section would attempt a rationalization of the assertions being advanced while emphasizing the plausible anti-competitive effects of the agreements, albeit inherently non-collusive in nature. The author has also advocated the need

for broadening the scope of anti-competitive agreements, through the inclusion of such non-collusive anti-competitive scenarios within the extant scope of anti-competitive agreements.

## II. DECODING THE PHENOMENON OF ALGORITHMIC COLLUSION: ASSESSING THE EUROPEAN ANTI-COMPETITIVE PERSPECTIVES

As discussed in foregoing paragraphs, one of the defining attributes of pricing algorithms, is the ease of enabling price discrimination, which enhances efficiency and can lead to market equilibrium.[18] However, corollary to such benefit, the concern of plausible anti-competitive conduct remains significant.[19] In the same vein, this section seeks to explore the inter-relation of pricing algorithms and that of the anti-competitive conduct mentioned above, in greater detail.

### A. ALGORITHMS VIS-À-VIS COLLUSION

In its report on 'Algorithmic Pricing and Competition Policy in Digital Age', the OECD raised certain concerns regarding the challenges that may arise due to the use of algorithmic pricing, which may create enforcement issues for competition regulators worldwide.[20] The concerned raised in the aforementioned report was warranted on the basis of increased possibility surrounding tacit coordination,[21] and it was argued that usage of pricing algorithms broadens the grey area between illegal overt collusion and legal implicit collusion,[22] thereby, making it easier for companies to achieve results akin to a collusive outcome and resultantly, retain profits above the competitive average without having to enter into an overt arrangement.[23]

Similar sentiments could also be witnessed in the reports released by the various national Competition Regulators within the EU jurisdiction, there have been two primary concerns regarding the use of algorithmic pricing: a) it might result in high price transparency and rapid price adjustments, that would allow the competitors to react quickly and aggressively concerning any price change in the market, which in turn would make the cartels more stable; b) algorithmic pricing might enable the firms to outcomes of a traditional cartel through tacit collusion.[24]

Thus, to be succinctly put, tacit collusion is seemingly the primary concern arising out of the increased use of algorithms. Hence, the forthcoming sections will attempt a brief analysis of the same. Furthermore, the section would also attempt to bifurcate the primary forms of collusive conduct, that may arise due to the use of pricing algorithms, based on the degree of autonomous decision making involved.

### 1. Decoding the phrase 'Algorithmic Collusion' and its Forms

In their seminal work on Virtual Competition, Prof. Ariel Ezrachi and Prof. Maurice Stucke, had coined the term 'algorithmic collusion' to connote the 'plausible collusive scenarios that arise due to the use of pricing algorithms'.[25]

In furtherance of this, they identified four primary categories of algorithm induced collusive scenarios: (a) Messenger Scenario, where the intended use of the pricing algorithms is limited to the purposes of the monitoring and implementation of the existing collusive schemes; (b) Hub and Spoke Scenario[26], involves instances, wherein, a common third-party service (i.e., pricing algorithm) operate as a common source of information dissemination between two distinct market players; (c) Predictable Agent Scenario, requires the use of self-learning algorithms, which are adopted by the firms unilaterally, with an intent to facilitate tacit collusion; and (d) Digital Eye Scenario, where the firms use self-learning algorithms which are programmed or calibrated to facilitate the objective of profit maximisation, and owing to their self-learning ability, such algorithms may choose act in a coordinated manner (even though they have not been not been calibrated to do so).[27]

However, they also noted that the notion of interaction of algorithms with that of the markets is extremely diversified.[28] Thus, compartmentalization of all the instances of interactions between pricing strategies and pricing algorithms, is most definitely an arduous task.[29] They further noted that, this difficulty primarily arises due to the inherent differences in the level of autonomy (i.e., the varying degree of human involvement in the determination of the result) as well as the intended use of the pricing algorithm being employed.[30] Thus, while 'algorithmic collusion', could very well be used to

define the above-mentioned categories of interactions, however, given its generic characteristic, due caution should be exercised, while using the term in a legal sense.[31]

The legal pitfall of using the term 'algorithmic collusion' in a generic sense, have been further discussed by Dewenter and Bernhardt. They argue that, from the lens of the Competition law framework, the primary objective of the Regulators is to deter unscrupulous (i.e., anti-competitive) conduct on part of the market players. Thus, an instance of a collusive conduct that could possibly arise due to the employment of pricing algorithms, also raises similar questions of liability as any traditional collusive forms of conduct does.[32]

However, owing to the differences in the way various pricing algorithms operate, differences will necessarily arise in terms of the approach being adopted to determine the questions of liability (unlike the traditional collusive forms). Now using a generic phrase as an all- encompassing term to connote all possible instances of involvement of algorithms for price determination, fails to adequately address the inherent differences, thus, creating a possibility of erroneous determination pertaining to the questions of liability.[33]

Thus, accordingly, on the basis of the degree of 'human involvement', the algorithmic collusive scenarios may be predominantly categorised as, a) Autonomous Algorithmic Collusion, which includes scenarios, where the collusive outcomes are devoid of prior or continuing communication between the market players, and accordingly would include the 'Predictable Agent' and 'Digital Eye' scenarios. Whereas, the (b) Human-Relatable Algorithmic Collusion or Algorithm-fuelled Tacit Collusion, covers instances where the Algorithm is merely used as a facilitative tool to give effect to pre-existing arrangement or understanding, however, the actual result is subject to the implicit/tacit human interference and thus the Messenger scenario could be categorised within it.[34]

Coming to the last scenario i.e., Hub and Spoke scenario, it assumes slightly more flexibility and given the mechanism adopted to achieve the collusive outcome, it somewhat has an overlap within both the primary distinctions. The question of whether an anti-competitive behaviour within a hub and spoke arrangement, would be categorised former category (Autonomous) or the latter category (Human-Relatable), is dependent on the 'concurrence of will',[35] or 'awareness of the parties to such alleged collusion' as was held by the Court of Justice for European Union (hereinafter referred to as 'CJEU') in the recent Eturas decision.[36]

This categorisation has also been adopted by the French and the German competition authorities,[37] wherein, they established the 'knowledge of the parties' as a pre-cursor to establish a 'concurrence of will' to delineate 'tacitly coordination/parallel conduct' from that of 'conscious parallelism'[38].

The following paragraphs, would be delving into a greater detail with respect to the above-mentioned two categories.

**(a)      Human-Relatable Algorithmic Collusion or Algorithm-fuelled Tacit Collusion**

As mentioned above, this category predominantly involves the Messenger scenario. However, in certain cases, depending on the factual circumstances (as has been enumerated in later half of this section) might also include the Hub and Spoke scenario as well.

Messenger scenario can be regarded as the simplest form of collusive scenario involving pricing algorithms. In the given situation, the entities employing such algorithms have complete control over the determination of the prices, with the role of the algorithms being reduced to merely that of a facilitative role.[39] To this extent, the usage of an algorithm is predominantly intended for monitoring the behaviour of other market players or disseminating information between the members of a cartel, without being actively involved in the process of information dissemination. From a regulatory context, this assumes significance, as the active involvement of the market players, is often considered as concrete evidence for establishing intent.

The recent Order passed by the European Commission,[40] wherein, it imposed fines on four electronic appliances manufacturers (namely: Asus, Phillips, Deron & Marantz, and Pioneer) for imposition of a minimum price on the online retailers, could be considered as a classic case of the Messenger scenario.

The Commission while highlighting the modus operandi of the alleged anti-competitive acts, suggested that, Asus initially employed internal monitoring algorithms, for identifying the retailers on the various online platforms, who were selling its products below the desired price level and intervened by prescribing a minimum price threshold for the sale of its products.

The Commission further observed that, the impact of such intervention by the Manufacturer, were further amplified due to the employment of pricing algorithms by Asus's competitors. As the pricing algorithms were calibrated to match the lowest price, thus, targeting of the lowest retailers and prescription of the minimum resale price, essentially ensured a stable higher price range for all the products. This translated to continuing supra-competitive profits for the manufacturers. The evidences supplied by the alleged cartel members, hinted that, the information on the price as well as the price sensitive inputs (i.e., information relevant for price calibration) generated Asus's monitoring software had been shared with the other electronic manufacturers, who thereafter were able to the match the prices, using other pricing software.

From the perspective of the Commission, the conduct was anti-competitive on two main accounts. Firstly, it stabilized the existing price levels on these platforms. Secondly, there was no reduction in demand, as the consumers did not have sufficient opportunities available to them to switch to a different platform (given the similarity of the prices).

Now at present, the messenger scenario per se do not present a convoluted situation of pricing discrimination, but could be considered to be relevant from an evidentiary perspective to prove the existence of an understanding vis-à-vis the parallel conduct amongst the parties.[41] However, rampant usage of pricing algorithms within the marketplace could potentially be utilised to establish a standard which could very well be confused with conscious parallelism.[42] For instance, if we consider a situation where, pricing algorithms become an industry standard within the platform markets, it would necessarily mean that all prices would be determined by such algorithms. Thus, the market players could easily manipulate the results produced by the algorithms, by creating a position of inflated demand or price levels for the commodities.

Similarly, a hub and spoke form of collusion necessitates two primary elements. Firstly, a vertical element entails a series of individual vertical agreements between the competitors and a common upstream market player.[43] The second facet is a horizontal element, which entails an indirect information exchange between the competitors through the upstream market player.[44] However, with the evolution of the algorithms, there have been arguments in favour of delineating traditional hub and spoke collusion from that of algorithmically enhanced hub and spoke collusion.[45]

The UK Competition Appellate Tribunal, in one of its decisions concerning a traditional hub and spoke collusion, has sought to provide for a specific test, outlining the key criteria required to be satisfied for proving the existence of a hub and spoke collusion.[46]

"(i)     disclosure of interest/intent by the Competitors to the Upstream market player;

(ii)     reasonable foreseeability regarding the intent of such Upstream market player to pass information so received to other Competitors in the downstream market;

(iii)     actual dissemination of information by the Upstream market players to the various Competitors in the downstream market;

(iv)     reasonable nexus or link between the information so received by the Competitors and the further pricing strategies adopted by such players."[47]

The primary distinction between a traditional hub and spoke model and algorithmically enhanced hub and spoke model is the involvement of a human element, in the capacity of an intermediary. In the case of an algorithmically enhanced model, the third party (which in this instance, would connote an Upstream market player), would be replaced by an algorithm, and the act of determination of the prices is done by such algorithms, based upon the information and the data sets provided to it by the firms in question.[48]

However, a concerning aspect of such price determination highlighted by Ezrachi and Stucke, wherein, such determination is carried out through the employment of identical algorithms.[49] Their primary assertion hinges upon the rationale for the developmental costs of such software. Owing to high R&D costs, it is a valid assumption to make that, instead of developing one's own tailored pricing software, the firms may find the option of using third-party software (belonging to that of an upstream enterprise) commercially justifiable.[50]

The necessary corollary of such conduct is that it ensures a similarity in the determinant factor, thereby giving rise to the possibility of an alignment of the market behaviour of the firms (in terms of pricing strategy), even without any semblance of communication or interaction amongst the firms.[51] The above situation is concerning from the regulators'

perspective, as the extant regulatory regimes mandate the existence of an agreement or arrangement to establish a causal relationship between the alleged collusive conduct and the suggested intent thereof.[52]

### (b)     Autonomous Algorithmic Collusion

The autonomous algorithms, unlike the algorithms which are dependent on certain degree of human involvement, present a different challenge. A growing body jurisprudence, being developed through both theoretical studies as well as computational simulations tend to suggest that a collusive outcome arising out of autonomous algorithms is a real threat.[53] Ezrachi & Stucke had vehemently argued that the collusion of autonomous algorithms, is indeed a real threat to fair competition in the market. They believe that, autonomous algorithms, could potentially teach themselves (like in the case of self-learning algorithms) to collude for better profits.[54]

While, the assumption being made by Ezrachi & Stucke, has its own merit, however, one needs to be appreciative about the high degree of technical advancement that would be required for such a scenario to arise. To this effect the author would argue that, autonomous algorithms are still being considered as uncharted territory and have not been subjected to scrutiny from competition law enforcement perspective.[55]The limited jurisprudence that we have at this point highlighting the performance indices of autonomous algorithms in a real world situation, suggest that while, autonomous algorithmic collusion do take place within the market set-up, yet, it throws some interesting insights into the role being played by the humans in this regard .[56]

The existing literature suggests that, when the market players unilaterally calibrate their self-learning algorithms to collude, no change in the prices were recorded, however, when the self-learning algorithms were employed by multiple rivals, only then a 30% change in the price was noticed.[57] Thus, although, a bold assumption, the author would suggest that, even when autonomous algorithms are being calibrated to produce collusive outcomes, the same is not possible without some degree of human intervention.[58] Thus, while the evidence at this stage is too nascent to be justified, yet one might feel that the concerns raised by Ezrachi & Stucke, were somewhat premature.[59]

### 2.     Pricing Algorithms vis-à-vis Likelihood of Tacit Collusion

Tacit collusion or Tacit Coordination is a phenomenon that occurs in markets where few entities function in parallel because of market characteristics, without concerted practise in the legal sense.[60] Although, from a broader perspective, tacit coordination may be achieved by employing algorithms, yet, some scholars have attempted to differentiate them based on human interference in achieving tacit coordination,[61] as has been discussed in depth in the foregoing section.[62]

The existing literature suggests a divided opinion regarding the issue of the likelihood of tacit collusion.[63] On one hand, legal scholars advocating for the regulation of algorithmic pricing software opine that the use of algorithms for determining prices increases the possibility of collusion.[64] Some have considered algorithmic collusion very likely. They have argued that pricing algorithms stabilize collusive outcomes by facilitating easy identification of deviations from the agreement and enabling rapid price changes. As a result, the collusion could become more persistent.[65]

The contrary position can be inferred from the observations of Petit, who referred to the possibility of collusion using pricing algorithms as nothing but science fiction. He further observed that the entire understanding of algorithmic collusion is based upon certain strict underlying assumptions like product homogeneity and the use of either similar or compatible algorithms by both competitors.[66] He argued that the above-mentioned underlying assumption is inapplicable to most markets, hence, algorithmic collusions are relatively unlikely to occur.[67]

Similarly, Schwalbe argues that algorithmic collusion may arise out of even the simplest of coincidences, where two independent competitors unintentionally tend to use similar algorithms. For the same reason, he has maintained that

evaluating the usage of algorithms from the lens of anti-competitive conduct might prove to be counterproductive.[68] He argues that such an evaluation might go against the fundamental ethos of competition policy as it would inhibit innovation, rather than assisting the same.[69]

On account of the discussion in the previous section concerning 'concurrence of will',[70] and 'conscious parallelism'[71], the author asserts that, the major concern that arise in any instance of algorithmic collusion is that of over-reliance on the concept of 'concurrence of will'. The reason, for such assertion is that, while concurrence of will continues to be a mainstay in the determination of collusion, however, as has been shown by the author in the foregoing section,[72] the same can be easily manipulated and thus become redundant in cases involving algorithms. This is due to the ability of the algorithms to mimic the existence of a concurrence of will (and more so applicable in cases of autonomous algorithms).

Therefore, while, the author does not negate the significance of this concept, however, they would argue that, reliance on it should be placed with utmost caution. Unlike, the prevalent practice, wherein, it is considered as one of the fundamental tenets of the anti-competitive agreements. Accordingly, the author over the course of the following section, will attempt to highlight the specific regulatory challenges that arise in tackling the aforementioned phenomenon.

## III. INDIAN POSITION ON ALGORITHM ENHANCED TACIT COLLUSION AND ALGORITHMIC COLLUSION

A perusal of Section 3 of the Competition Act (hereinafter the 'Act') reflects that any agreement "which causes or is likely to cause an appreciable adverse effect on competition within India" is prohibited.[73] The provision also lays down the per se rule for deciding Appreciable Adverse Effect on Competition (hereinafter 'AAEC'), wherein certain agreements shall be presumed to have an AAEC.[74] The provision envisions a clear demarcation of horizontal agreements (dealt under Section 3(3)) and vertical agreements (dealt under Section 3(4)). Considering the scope of the discussion, the author has restricted the assessment to the horizontal agreements.

Section 3(3) is fundamentally premised on the requirement of 'horizontal restraint', which encompasses a wide range of conduct.[75] The definition of 'agreement' is broad and includes any 'understanding', 'arrangement' or 'coordinated action'.[76] Similarly, the term 'practice' has a wide scope and covers any activity about a person or company's trade.[77]

Considering the wide import of the aforementioned terms, the author believes that, the collusive scenarios arising out of the use of a predictable agent, the hub and spoke scenario as well and messenger algorithms, could be considered as 'arrangements' as well as 'action in concert' and thus consequentially be considered as 'agreement' under Section 3(3).

As far as the judicial position concerning the issue at hand is considered, the decisions concerning algorithmic collusions have been scarce. At present, there has been only one decided case of the Hon'ble Supreme Court of India on the issue of algorithmic fuelled hub and spoke cartel,[78] whereas, another case dealing with the issue of parallel algorithms is currently pending before an intermediate judicial forum.[79]

However, as would be evidenced in the following discussions, the Courts have surprisingly shown a considerable degree of reluctance in accepting the notion of algorithmic collusion or algorithm-fuelled collusion. Against this backdrop, the discussion will now delve into the assessment concerning the efficacy of the present legal framework through an analysis of the aforementioned cases.

### A. REGULATION OF ALGORITHMICALLY ENHANCED HUB AND SPOKE CARTELS: AN EVALUATION OF THE CAB AGGREGATORS' CASE

The Cab Aggregators' case,[80] is one of the few cases concerning algorithmic collusion that has come before the Competition Commission of India (hereinafter 'CCI'). Thus, needless to say, the case held a great deal of significance, in terms of the potential for the Commission to lay down new or decisive principles to meet the challenges arising due to the interplay of algorithms with collusive conduct.

**(a)     Background of the Case**

In this case, information was filed by Mr. Samir Agrawal (hereinafter referred to as the "Informant") alleging violation of Section 3 of the Act by Ola and Uber (hereinafter referred to as the "OPs").

The facts pertained to the pricing model of the OPs while providing taxi service. The primary allegation was that the algorithmic pricing by the OPs caused "price fixing" which hindered the freedom of the drivers to compete amongst themselves or negotiate with riders and was therefore violative of the Act.[81]

A notable submission of the Informant is:

"…due to algorithmic pricing, riders are not able to negotiate fares with individual drivers for rides matched through App nor drivers can offer any discounts. Thus, the algorithm takes away the freedom of the riders and drivers to choose the other side based on price competition and both have to accept the price set by the algorithm. It is further alleged that the algorithm calculates the fare based on a base amount, ride distance, and time spent in transit, which is multiplied by a 'surge' factor during periods of high demand…[sic]"[82]

Another allegation made in this case was that the OPs acted as 'hubs' and the competing drivers acted as colluding 'spokes.' Since the OPs 'guaranteed' high fares to drivers and did not have either an agency or an employee relationship with the drivers, the co-operation amongst the drivers was contended to be a 'concerted action' under the Act.[83] The Informant also submitted that the OPs possessed greater bargaining power in comparison to the riders owing to an "information asymmetry." This enabled them to execute price discrimination based on the personalized data of the riders.[84]

**(b)     CCI's and NCLAT's Position vis-à-vis Algorithmically enhanced Hub and Spoke Cartel**

The observation of the CCI which is pertinent to the discussion at hand is extracted hereinbelow:

"…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 co-ordinate 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. Thus, the Commission finds no substance in the first allegation raised by the Informant…[sic]".[85]

Accordingly, the NCLAT observed that,

"…fact remains that when a statute like the Competition Act specifically provides for the mode of taking cognizance of allegations regarding contravention of provisions relating to certain anti-competitive agreement and abuse of dominant position by an enterprise in a particular manner… Any other interpretation would make room for unscrupulous people to rake issues of anti-competitive agreements or abuse of dominant position targeting some enterprises with oblique motives…[sic]".[86]

Thus, the NCLAT took a rather narrow interpretation in defining a 'person' who could file under the relevant provision.[87] Despite this view, the NCLAT opined on the merits of the case. The NCLAT vehemently reiterated the CCI's view on the non-applicability of the hub and spoke model in the present case and held that the drivers had the liberty to choose the app and the rides that they prefer.[88]

**(c)     Supreme Court's Stance**

The above decision was placed on appeal before the Hon'ble Supreme Court. The Supreme Court partially struck down the NCLAT's order, holding that the term 'person' had a wide ambit under the Act,[89] which must be contrasted with the definition of the term 'consumer'.[90] Therefore, the Court held that the NCLAT was wrong in deciding that the Informant, being an independent lawyer, did not possess the locus for filing the information.[91]

The Hon'ble Court held:

"…given the context of the Act in which the CCI and the NCLAT deal with practices which harm competition and are considered to be in derogation of the interest of consumers, it is clear that the Act vests powers in the CCI and enables it to act in rem, in the public interest. This would make it clear that a "person aggrieved" must, in the context of the Act, be understood widely and not be constructed narrowly……signifying that all persons who bring to the CCI information

of practices that are contrary to the provisions of the Act, could be said to be aggrieved by an adverse order of the CCI in case it refuses to act upon the information…[sic]."[92]

The Court made another crucial observation that when the CCI performs inquisitorial functions, the doors to the CCI and the NCLAT should be kept open to serve the public interest. This wide scope is significant to protect consumer and public interest.[93] However, unfortunately, the Court did not deal with the nuances of pricing algorithms in detail, it affirmed the decision of the CCI as well as the NCLAT in dismissing the allegations of anti-competitive conduct.[94]

**(d)      Could the Judicial Approach in the Cab Aggregators' Case be considered as a missed opportunity?**

Post the detailed assessment of the judicial forums in the above-discussed case, the author is inclined to form an opinion that the case should in all probability be regarded as a missed opportunity in terms of providing a preliminary foundation with regard to the legal position of tacit collusion as well as algorithms.

The author opines that, the Commission did make an error by assuming that a formal agreement among drivers is required to deem the hub and spoke model unlawful. Accordingly, the situation should have been considered as a tacit agreement, which was facilitated through the employment of pricing algorithms by the 'Hub' i.e., Ola & Uber. As has been discussed in the previous section,[95] there is a distinction between a traditional hub and spoke collusion model and an algorithmically enhanced hub and spoke model. This distinction is of primary importance as in the latter category, the 'hub' is in a position to effectively facilitate a collusive outcome amongst the spokes, without significant interference.

If we draw a parallel between the present decision and the CJEU's stance in the Eturas case, the similarities are rather stark. In both the situations, the business model adopted was that of a hub and spoke model, with one centralised player (Uber/Ola and Eturas our case), with the players affiliated to the centralised player acting as spokes. In both the instances, the hubs had indeed employed pricing algorithms to achieve the desired outcome (i.e., influence the conduct of the spokes in a manner beneficial to their interest).

Evaluating the above position under the current framework, it has to be seen whether it satisfies the two-pronged test of 'presence of an agreement' and 'concurrence of will'. Firstly, if the entire set of facts are to be assessed, then it can be concluded that the entire structure was nothing but a mere 'arrangement', wherein, both the sets of market players i.e., the 'hubs' and the 'spokes' had pre-defined roles. Now if we refer to initial within this section the definition of 'Agreement' under Section 2(b) of the Act includes 'arrangement' within its ambit.

Secondly, concerning the requirement for 'concurrence of wills'. The CCI has historically maintained a rather broad understanding regarding concurrence of wills.[96] Furthermore, considering the per se approach under the Act, there exists a presumption in favour of the concurrence of wills, unless the contrary has been proved.

In this regard, the author opines that, CCI committed a rather fundamental mistake in its assessment of the case, was equating an application-based market with that of the traditional market set up. In the above context, the CCI's observation in the Jasper Infotech Ltd. case,[97] is relevant to be analysed. In the said order CCI has itself observed that the traditional brick-and-mortar market would necessarily differ from that of an online market place.[98] However, if CCI's position on the delineation of relevant market, is juxtaposited to the stance taken in the Cab Aggregators' case, then, CCI had seemingly backtracked from its initial position, and considered the app-based cab services and traditional cab services as one single market.

In the present dispute, it is noted that, there did not exist any evidence that there existed a concurrence of will amongst the 'spokes' specifically. However, it is the author's assertion that, given the business structure in the present case, establishing a specific concurrence was never required. This is because all drivers are cognisant that they are accepting identical terms and conditions as every other driver on Cab Aggregator's platform, and as such, they have given their assent to provide transportation services at prices determined by the pricing algorithm adopted by the Cab Aggregator. Thus, an implicit concurrence is formed amongst the 'spokes' through their conduct on the platform.

Furthermore, looking at the matter from an alternate perspective, CCI's understanding concerning the possibility that algorithms could probably be used to initiate anti-competitive agreements was particularly baffling. The disregard towards such a possibility was so flagrant that the impugned order hardly accorded sufficient rationale as to why the allegations did not warrant further investigation.

To some extent, the relative inexperience of CCI in handling matters of like nature could be considered a valid reason for the impugned approach. However, if closely scrutinized, the case does bear a certain degree of resemblance to the

electronic goods manufacturers' case.[99] Thus, CCI did have some semblance of a reference point, which could have been adopted by it while handling a rather novel issue.

**B. REGULATION ALGORITHM-DRIVEN COLLUSION BETWEEN COMPETITORS INVOLVING A THIRD-PARTY ALGORITHM: ASSESSING THE POSITION IN THE AIRLINES CARTEL CASE**

**(a) Background**

The Airlines Cartel case[100] is another interesting case that threw up the issue of tacit cartels in India. One Ms. Shikha Roy (hereinafter referred to as the "Informant") alleged contravention of Section 3 by the airline companies Jet Airways, SpiceJet, and IndiGo (hereinafter referred to as the "OPs"), by way of increasing ticket prices on certain specific routes.[101] The allegations were made on the account that it was trend within the aviation industry wherein the prices of the tickets, were exorbitantly increased during the time of emergencies, as evidenced by the Jat Agitation of 2016 as well as previous instances during the floods in Chennai.

The Commission initially held informal conferences with the Informant as well as the Opposite Parties, post which it made a reference to the DGCA u/s 21A of the Act seeking its comments concerning the allegations being averred by the Informant. Additionally, the Commission exercising its power under Section 36(4), sought for additional information concerning the pricing strategies adopted by the various airliners.[102]

The Commission found that, during the alleged period of Jat agitation, there was a general increase in the prices of the tickets for the all the airliners. Accordingly, the Commission formed a prima facie opinion that there was an increase in ticket prices of certain routes during exigencies. It further observed that, there existed a possibility that such increase in the price could be attributed to the employment of the pricing algorithms employed by the Opposite Parties, which could have resulted in an collusive outcome, despite the Opposite Parties not having intended for the same. This led to a possibility of collusion with or without human intervention.[103] Based on this opinion, the Commission directed the "Director General" (hereinafter referred to as "DG") to investigate the matter.[104]

**(b) Observations by the Director General**

The relevant period which was considered for the purposes of the DG Investigation was from 18th – 23rd February, 2016 and the relevant sectors (synonymously referred to as 'routes') were that of Delhi-Amritsar; Delhi-Chandigarh; and Delhi-Jaipur. The mandate of the DG investigation was two-fold. First, to ascertain whether the increase in the ticket prices was the outcome of a collusion (whether in traditional form or facilitated through algorithms) between the Opposite Parties? and second, whether the price uniformity would be akin to that of price parallelism?[105]

The investigation revealed that there was no uniformity with regards to the individual fare of the tickets being sold by the Opposite Parties during the relevant period. Although, it did indicate that the tickets pertaining to the alleged sectors were sold at a higher rate by the Opposite Parties during the relevant period. The report further observed that, despite the increased ticket prices, no uniformity could be established viz. other relevant parameters such as the total revenue, average ticket price, peak demand, to indicate the possibility of agreement or collusion.[106] Accordingly, the DG with regards to the above situation observed that the exorbitant increase in the prices was primarily due to the lack of alternative transportation modes, as the road and rail services were severely affected by the Jat agitation, however, it did not indicate the existence of price parallelism.[107]

The second aspect that the DG report had evaluated was the impact of the pricing algorithms being employed by the Opposite Parties viz. the change in prices. While explaining the fundamental assessment criteria adopted by the Opposite Parties, the report observed that, the practice common to all the pricing algorithms employed suggested that, they are calibrated on account of the data input provided by the airlines. Accordingly, the algorithms generate various price points (otherwise knowns as 'Fare Buckets') for a specified departure, which are based upon the dynamic pricing principle. According to the said principle, there exists a direct correlativity between the proximity to the departure date and fare bucket within which the ticket is placed. Therefore, fare bucket would be maximum closer to the suggested departure date and contrary is also true.[108]

Further, the DG also found that the algorithms adopted by the by the Opposite Parties operated with different modus operandi. However, there were three specific categories of softwares that were identified in the DG report i.e., inventory

allocation software, revenue management software, and price determination software. For better clarity, the same have been explained herewith:[109]

*a.*      Inventory Allocation Software: IndiGo, GoAir and Spice Jet used a common software 'Navitaire', for the purposes of seat allocation into various 'fare buckets' based on the historical data available for any concerned route or flight. However, the software requires the exercise of individual discretion of the Route Analysts, who thereafter changes the inventory pattern, based upon the volume of demand for a particular route or flight. While, in case of Air India, the inventory allocation into the fare buckets were carried out manually by the Route Controllers.

*b.*      Revenue Management Software: A Revenue Management software, is a software that optimizes the prices for a particular commodity. In this case, the revenue management software would necessarily be used by the airlines for determining the fare buckets (within which the tickets would be allocated). While Spice Jet was not found to be using any revenue management software, Air India was found to be using PROS, Indigo was using AirRm, while GoAir was using RADIX. While, all the softwares were proprietary, however, the functional tenet of all the three remained same i.e., it produced results based on the historical data collected with respect to the price points/fare buckets.

*c.*      Price Determination Software: It was also found that both GoAir and IndiGo used QL2, which was meant for the purposes of extracting data concerning the prices at which the tickets were being sold by their competitors.

However, the DG did not any common algorithm being employed by any of the Opposite Parties which could be used to facilitate collusive conduct. The DG further observed that the algorithms which were being used by multiple players, had been altered to meet the specific demand of the airline, that was using it.[110]

Accordingly, the DG concluded after its investigation that there was no violation of Section 3 since there was no uniformity in the pricing of the different OPs. Further, the pricing software and algorithms being used by the OPs were also different. Thus, no price parallelism or identical pricing was found.[111]

**(c)**      **Assessing the observations of the Commission**

The Commission began its observations in a manner very apt for the issue at hand, by noting:

"At the outset, it can be noted that the existence of an 'agreement' is sine qua non before ascertaining whether the same is anti-competitive or not in terms of the scheme of Section 3 of the Act……The definition, of being inclusive and not exhaustive, is a wide one……There is rarely any direct evidence of action in concert and in such a situation, the Commission has to determine whether those involved in such dealings had some form of understanding and were acting in coordination with each other."[112]

The order was set up in a manner that would provide scope for tacit collusion where no explicit agreement was found. However, the Commissions went on to adopt a selective and sceptical interpretation by holding:

"Thus, the establishment of 'agreement' would require some explicit or tacit arrangement amongst the parties wherefrom a concert between them can be deciphered. This may include, amongst others, the exchange of information in the form of communications/e-mails or any other form of communication amongst the competitors, whether - explicit or tacit, oral or in writing, formal or informal including through parallel conduct which cannot be otherwise explained, etc."[113]

Though the Commission rejected the claims of the Informant, it did indulge in an analysis of the complex issue of pricing algorithms wherein, it evaluated the issue of common algorithms being employed by the Opposite Parties viz. the intent to achieve a collusive outcome and adopted evidence-based approach for the same.[114]

The Commission, observed that, first, the all the airlines adopted different versions of algorithms, thus, the pricing decisions being made by the various airlines would inherently be different.[115] However, the Commission opined that the nature of the algorithms adopted required a certain degree of human intervention, wherein, the respect revenue management teams took the final decisions with regards to the pricing of the fares.[116]

Furthermore, the Commission also focused upon the concurrent market positions of the airlines under scrutiny, for which it reviewed their market shares. From an economic standpoint, the fluctuations in the market shares, have inverse co-relation with that of concerted practice.[117] This entails that, in a cartelised market, the market shares of the cartel players would remain stable (as the market conditions for all the players remains same).[118] On account of the above two

assessments, the Commission held that there existed no specific evidence, which suggested that the conduct on behalf of the market players, suggested concerted conduct and a consequential contravention of Section 3(3) of the Act.[119]

This reflects that the regulator is becoming aware of the sizeable impact that technology and algorithms can have on competition. The Commission, by not dismissing the contentions prima facie, by ordering a DG investigation, and by then breaking down the report of the DG, has taken the right steps towards acknowledging and tackling algorithmic collusion. This intention, coupled with further technological knowledge and analysis, can set the pace for a more equipped manner of dealing with tacit collusion in India. This is a landmark case in the sense that it recognized that the increasing usage of pricing algorithms could cause anti-competitive implications and enable collusion without human interaction.

However, it also raises an important question concerning the identification of a collusive behaviour in such cases, where the element of human intervention is minimal. This is so because as discussed earlier,[120] there exists a real possibility that self-learning algorithms can teach themselves that collusion with other algorithms is beneficial for revenue maximization. The human utilizing the algorithm may not be aware of such behaviour, or they may not intend to engage in collusive conduct. Therefore, detecting algorithmic collusion that leads to higher prices, which poses significant challenges to basic tenets of the competition legislation of the Country.

### IV. ALGORITHMIC PRICING, COLLUSION & CONSUMER HARM: CONNECTING THE PROVERBIAL DOTS

Detecting the existence of algorithmic collusion would necessarily involve a two-step process. As is the case with any collusion, the use of algorithms is usually veiled in secrecy, hence, the first step for proving algorithmic collusion should be the identification of their usage and the second step involves the quantification of such usage, to establish or indicate the existence of collusion.[121]

### A. ESTABLISHING THE LINK BETWEEN ALGORITHMIC PRICING & COLLUSIVE CONDUCT

As witnessed in the Airlines Cartel case,[122] discussed in the Section III, while traditional mechanisms may be adopted to for identifying an instance of algorithmic collusion, yet the efficacy of such mechanism remains questionable. Hence, it is important to understand the behavioural patterns and dynamics that remain unique to the instances of algorithmic collusion. However, given the nascency of the issue, the existing body of literature exploring the said facet is rather limited.[123]

### 1. Identifying the use of Algorithmic Pricing

The existing literature that has attempted to answer the above question, have identified two criteria (albeit in different market settings) i.e., frequency/response time of the price change and correlativity of price change. Chen et. al. in their empirical study concerning the existence of pricing algorithms on Amazon market place, suggested the existence of pricing algorithms could be connected to a higher frequency of change in price.[124]

They argued that unlike traditional collusion, pricing algorithms would allow the sellers on the platforms would adapt to any change more quickly, as in this case, the information concerning the price change is not disseminated by the sellers through back-channels, rather they are either notified to the competitors through monitoring algorithms (as witnessed in both in the Eturas and the Airlines Cartel cases), or such change is reflected through automated procedure.[125]

A similar approach could be seen in the literary work of Wieting and Sapi, wherein the subject matter was the online market place Bol.com.[126] The research followed a similar trajectory as that of Chen at. al., wherein one of the observations stated that the frequency of price change, is the most reliable indicator of the use of pricing algorithms. However, they went a step ahead to identify the factor 'price corelation' to corroborate the former.[127] They argued that a conjoint evaluation of both the factors are necessary as on a standalone basis, frequency or price correlation might fail to adequately detect the use of algorithms.[128]

The approach was refined further as evidenced in the research of Assad et. al. concerning the algorithmic pricing in German gasoline retail market.[129] Building upon of the existing body of research, Assad et. al., provided for a new facet

for the identification of algorithmic pricing, which included the econometric tool of 'Quandt-Likelihood Ratio Test'[130], this tool evaluates the structural break (i.e., the exact point of time, where a change is noticed)[131].

The test adopted by Assad et. al., was based upon three parameters: a) No. of Price Changes (to check the total instances where a change in price was noticed); b) Average Size of Price Change (which was used to determine the correlation of change in price viz. the Competitor's Price); and c) Response time between such Price Change (the duration between the Price Changes of various Competitors).[132] The underlying premise of the test was that the higher values of the above-mentioned parameters, the greater the possibility of the use of algorithmic pricing.[133]

The second step of the assessment post the identification of the algorithmic pricing is that of drawing a nexus between the algorithmic pricing and the existence of a collusion. at this juncture, this has proven to be the most challenging task for Regulators across jurisdictions. Hence, the following discussion would attempt to discern this particular question.

## 2.    Establishing Collusive Conduct

Ascertaining the presence of a collusive conduct from the mere existence of pricing algorithms (as can be witnessed from the foregoing discussions) often proves to be a challenging task. The author hereby argues that, given the distinct categories of algorithms in play as discussed in Section II, the approach adopted for ascertaining collusive conduct, necessarily must be different.

The prevalent approaches of identifying a traditional collusion are based on basic economic principles intended towards identifying patterns indicative of supra-competitive prices, indicative of a collusion. Such patterns include:

- low price variance (i.e., the difference between the expected sales price and actual sales price)[134];
- price uniformity;[135]
- sudden and substantial increase in profit margins (without corresponding increase in extraneous factors such as: demand or supply);[136]
- negative correlation between demand and price levels;[137] etc.

In the opinion of the author, for the human relatable algorithms, the approaches otherwise adopted for screening traditional collusion, would still remain relevant. However, the same is being suggested with necessary amount of scepticism, as there exists a very real possibility, that the algorithms may be calibrated or altered to make the detection increasingly difficult. In this regard, the observations made by the French and the German Competition authorities in their report becomes relevant. They observe that,

"algorithms could even be used to attempt to deliberately conceal cartel behaviour by being programmed to implement different prices during periods of low demand or being set to occasionally generate periods of price heterogeneity or instability [sic]".[138]

If the said observation is proven correct, then it would effectively render the above discussed approaches moot.

However, in addition to the above approaches, Wieting and Sapi have identified five possible pricing patterns, that could prove to be relevant to establish a nexus between algorithmic pricing and the existence of a collusion.[139] These include:

- price jitters (steep and short-term increase or decrease in the prices)[140]. Nazzini and Henderson have argued that, 'Price jitters can be understood as signals of intent regarding changes in prices. In this scenario, a market player acts as the 'Lead Market Player,' initiating brief price changes—either increases (upward jitters),[141] or decreases (downward jitters)—before returning to the baseline price. Downward jitters are particularly concerning, as they may indicate that market players have consistently been selling at supra-competitive prices'.[142]
- rocket and feathers pattern (which involve a rapid escalation in the price levels followed by a period of gradual decrease, until the original/starting price levels are reached)[143];
- balloons and rocks pattern;[144] (the said pattern stands as a contradiction to the rocket and feathers pattern. Herein, there is a gradual increase in the price followed by a sudden and steep decline. In the author's opinion, this

pattern is most likely indicative of a collusive behaviour, as it could indicate the cartel members punishing any of the defectors).

- Alternating Prices; and
- Random Price Jumps

Although Wieting and Sapi do concede to the shortcoming that the patterns at this juncture are not sufficient to definitively prove the existence of collusion.[145] Thus, a question arises that, given the circumstances does an 'intent to collude is mandatory to be proved'?. The author asserts that considering the changed circumstances, a possibility that should be accorded a serious consideration, is that it might not be possible to establish a nexus between algorithmic pricing and the intent to collude in all the instances.

Hence, the next potential jurisprudential development in this arena could be the evolution of 'non-collusive agreement resulting in collusive outcome'. As radical as this assertion might sound, however, the existing competition legal frameworks, do the have flexibility to potentially fiddle with such a possibility. The author believes that the genesis of the aforementioned notion, lies in the notion in the much celebrated notion of 'consumer harm', which would be taken up for assessment in the following discussion.

### B. EVALUATING THE NOTION OF 'CONSUMER HARM' AS TEST FOR ESTABLISHING ANTI-COMPETITIVE AGREEMENTS

The notion of 'consumer harm' is a test adopted by the competition regulators, across the globe to determine the degree of (anti)competitiveness of a particular conduct or measure adopted by the market players. The test refers to the question of whether the conduct of entities enjoying dominant position in the market results in either increase in prices, decrease in output or reduction in product innovation.[146] While the test does incorporate from the principles of long-term welfare of consumers, it does not manifest directly from the objective of consumer welfare.[147]

The origins of the test can be traced to the Competition Law regime in the European Union, where in the Post Danmark I case,[148] where the European Court of Justice relied on the result of the conduct of the dominant undertakings to identify whether anti-competitive laws were violated. This clearly indicates that the test of consumer harm is intricately integrated in the anti-competition laws. However, au contraire, the General Court and the European Commission opined in Intel that an analysis of consumer harm is not necessary to determine the anti-competitive effects of the conduct of dominant entities.[149]

Similarly, the test of consumer harm has been adopted in the United States (US) anti-trust regime as well. In fact, the US Supreme Court in Verizon Communications,[150] categorically observed that if an entity possesses dominant position in a market, it, in and of itself, does not indicate violation of anti-trust laws unless accompanies by harm to consumer welfare.[151]

In the Indian jurisdiction, the consumer harm test is encased within the domain of the 'rule of reason' approach.[152] The Act has adopted the rule of reason approach through the implementation of the phrase 'causes or likely to cause appreciable adverse effects on competition may be held anti-competitive'.[153] The phrase while on a superficial analysis, indicates a focus on the competitive harm, however, when read with the relevant provisions concerning the determination of 'appreciable adverse effect',[154] reveals a consumer-centric undertone to its approach.

This is reflected in the case of Schott Glass India,[155] wherein the Competition Appellate Tribunal held that, "where there was no effect on the consumer, i.e., no evidence of consumer harm due to the discounts offered by Schott Glass, a case of abuse of dominant position cannot be made out".[156]

Further, under the Indian jurisprudence, a dominant undertaking may justify its conduct resulting in foreclosure of competition, thereby proving that there has been no violation of the provisions of the Act, on the grounds that no net harm to the consumers is likely to arise by its conduct.[157] Thus, ultimately the Competition Commission of India,

assesses the conduct of a dominant entity on the basis of the objective necessity of the conduct and the effect of the conduct on harm to the consumer.[158]

This clearly indicates that the enforcement of competition law in India deals with the practices violating competition law which result in harm to the ultimate consumers, either in the form of higher prices, lower quality of goods, limitation in available choices, lack of innovation, etc.[159]

Another pertinent observation that the author would enunciate at this juncture is that, the 'consumer harm' principle, until this point, has been predominantly used as an assessment criterion within the wider purview of Section 19(3) read with Section 4 of the Competition Act, 2002, considering the rule of reason approach contained therewith. However, in the course of the ensuing discussion, the author will be advocating not only the feasibility but also the necessity of application of this test for ascertaining horizontal anti-competitive agreements (especially the instances involving pricing algorithms).

In a traditional setup, where the operationality of the markets is not impacted by autonomous algorithms, a test for determining anti-competitiveness solely based on the notion of consumer harm comes with its own set of challenges. Such tests, as several scholars have argued,[160] have the potency of attracting unnecessary intervention. A pure consumer harm test allows for a regulatory intervention wherever, in the opinion of the regulator, there is a harmful conduct being carried out by an enterprise, thus creating a possible scenario of jurisdictional over-reach.[161]

However, the position varies rather significantly when the notion of consumer harm is viewed in a situation otherwise dominated by the influx of algorithms. The consensus suggests that pricing algorithms do offer significantly better incentives in terms of business management and market awareness as discussed in Section II.[162] However, it does raise certain concerns, when viewed from the perspective of the consumers by allowing the sellers to charge supra-competitive prices, even in the absence of collusive behaviour.[163]

Thus, the question arises, given the nuanced challenges being posed by the pricing algorithms, would it be a possibility, that in certain cases a non-collusive conduct, might result in a collusive outcome. If yes, then in such cases, could the notion of 'consumer harm' be a sufficient ground to consider such instances as anti-competitive practices.

## 1.     Can Non-Collusive Conduct result in Collusive Outcome & Consumer Harm?

The author through this piece has attempted to argue that consumer harm unlike algorithmic collusion is not necessarily dependent on the coordinated conduct of the enterprises. The same could be initiated even by a single enterprise, through the implementation of an advanced algorithm. This assertion is a significant departure from the present understanding we have regarding the notion of consumer harm.[164] However, considering a market, such as e-commerce platforms, where the prices are generally determined through the employment of algorithms, the reduced thresholds of defining consumer harm are of paramount importance.

Furthermore, it is pertinent to be noted that, the entire process of developing an algorithmic program, might entail serious pressure on a firm's economic resources as well as might lie well outside their purview of expertise. Hence, there exists a good possibility that the developmental facet of algorithms might be outsourced to a third-party developer. The concerns arise, when a common third-party developer becomes associated with competing firms, and provides them with a common algorithm.[165]

This furthers strengthens the assertion of the author that, an intent to collude in conjunction with an agreement or arrangement to further such collusive intent plays a significant role in establishing collusion, yet they should not be considered absolute. As it would be contended in the following discussion, we are currently in an era of market operations, where collusive outcomes and harm to consumers may also arise out of non-collusive conduct.

Algorithmic pricing strategies could be used to facilitate supra-competitive prices within a market primarily in two ways. Firstly, such strategies allow the enterprises employing such algorithms, to indulge in real-time updation and re-pricing of the commodities. This remains a key advantage when viewed from the perspective of enterprises, that lack such abilities.[166] The ability of price updation or repricing on a real-time basis provides a significant competitive edge to the specific market players, allowing them to favourably price their products, without being concerned about a commensurate response from their competitors.[167]

The lack of ability to reprice their products on a real-time basis eventually forces the competitors to price their products above the existing competitive price levels, in an attempt to mitigate potential losses arising due to the pricing war. However, at the same time, the algorithms allow the firms, to reprice their products yet again. The revised prices would although below the levels of the prices of their rivals, but would remain above the competitive levels. The strategy not only allows such an enterprise to undercut its rival's position but also enables it to capture supra-competitive margins without any adverse implications. The sole victim of this entire process remains the consumer, who now has to pay a higher price as compared to the earlier situation.[168]

Another mechanism, in which algorithms may be employed to initiate consumer harm, is through a pre-specified pricing strategy. Any enterprise possessing superior or advanced technology (known as the Lead Market Player) adopts a particular pricing strategy, then all the other market players with inferior technological knowhow, automatically conform to such strategy as employing their superior rival. The conduct on the part of such inferior market players is understandable as they want to avoid undercutting their consumer base. In doing so, all the market players in their attempt to conform to the price followed by the Lead Market Player, end up pricing their products at supra-competitive prices, even though there is no semblance of collusion or pre-existing agreement to collude amongst the players.[169]

The prudent understanding while evaluating the interaction of algorithms with market dynamics suggests increased competition. However, practical prospects could not be any further from the truth. The theoretical models suggest that an increased use of algorithms results in higher prices not only within an oligopoly structure but also in cases where the inherent market structure does not conform to either of the two models.[170] The assertion is further substantiated through empirical studies, which have concluded that algorithmic pricing strategies have not only increased the frequency of asymmetric pricing but have also resulted in higher prices within the platform markets.[171]

Thus, in the context of the foregoing discussion assert that non-collusive algorithmic pricing leading to higher consumer prices — is likely both more common than explicit or tacit collusion and more difficult to remedy. Because, by definition, we are focusing on competitive markets where firms are not colluding, this conduct is beyond the current reach of the antitrust regulatory framework, even when broadly defined. Thus, a specific assessment of agreements from the perspective of consumer harm, carves out the possibility of enabling the regulators to evaluate the anti-competitiveness concerns in a more effective manner.

## V.  CONCLUDING REMARKS

Algorithmic pricing has gradually gained significant grounding, where its potential adverse impact on the existing and the potential competition could no longer be considered as mere fiction. On the contrary, as the technical advancements become more nuanced, the threat being posed by pricing algorithms, as has been evidenced earlier, will only become increasingly pronounced. In our opinion, the market position in the Country has already been tarnished by algorithmic prices models, and the discovery of the same is merely a question of 'when', rather than a question of 'whether'.

However, the author is appreciative of not only the nascency of the issue at hand, but also regarding the possible positive implications that may arise out of the employment of algorithms. However, given the propensity of the algorithms to be utilized as an effective tool to facilitate either tacit collusion or non-collusive supra-competitive pricing, the same should be considered rather carefully. Consequently, we would steadfastly assert that forming an understanding that the algorithmic pricing strategies currently are not advanced enough to pose a competitive threat would be counterproductive, to say the least.

It is important to be clearly understood that the phenomenon of algorithmic collusion is far-reaching, not only in its ambit but also in its consequences. The current piece has attempted to discuss and evaluate a very small facet of the entire legal behemoth, solely from the perspective and notion of 'consumerism'.

Consequently, the author suggests that the Competition regulator should adopt an approach which is less intrusive and more functional, intended to regulate the ability and the frequency of price alteration being adopted by the market entities. The approach remains an advantageous option in comparison to the more apparent structural approach, where our current understanding and knowledge concerning the pricing algorithms may prove to be inadequate.